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DIPTERA DANICA

PART IV

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DIPTERA DANICA

GENERA AND SPECIES
OF FLIES HITHERTO FOUND IN DENMARK

BY

WILLIAM LUNDBECK

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[vol. 2]

PART IV

DOLICHOPODIDAE

WITH 130 FIGURES

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(ORTHORRHAPHA BRACHYCERA.)

(ORTHOGENYA.)

Dolichopodidae.

Head about of the breadth of thorax or a little broader; it may be higher than, or as high as broad, or on the contrary broader than high; it is as a rule somewhat narrowed below, and it is often a little different in breadth in the two sexes; it is semiglobular, and generally a little arched behind; sometimes it is shorter and flat behind, or on the other hand longer and globular or almost so. The vertex is more or less excavated, sometimes only slightly, or (as in *Diaphorus*) on the contrary a little prominent. There is a generally prominent ocellar tubercle with three ocelli. The frons is generally broad, and more or less decreasing in breadth towards the antennæ; it is often a little broader in the female than in the male, and in the former sex sometimes with the margins parallel. Only in the males of most species of *Diaphorus* the eyes are touching above the antennæ, and the frons thus reduced to a small triangle. There are ocellar and postvertical bristles, and generally also outer vertical bristles; the postvertical bristles are as a rule smaller than the other bristles; they are placed on the upper part of the occiput, sometimes in the middle and somewhat near to each other, but generally more distantly, and often they are placed as if they were the uppermost postocular bristles. The outer vertical bristles are sometimes wanting in the males, when this sex has the vertex somewhat narrowed. There are generally a pair or more of small hairs or bristles on the posterior side of the ocellar tubercle; they are as a rule very small; (they may perhaps sometimes answer to inner vertical bristles). On the occiput, along the hind margin of the eyes, is a row of bristles, the postocular bristles; they form a single row above, and also often below, and they are also present along the oral aperture behind, and here either continuous, or interrupted in the middle, just above the aperture. Besides there are generally some bristles on the lower part of occiput, and not rarely the bristles only form a single row above, while the lower

part of occiput is more or less densely covered with longish hairs. The eyes are large, generally more or less oval, but as a rule somewhat narrowed downwards. In the living specimens they are metallic green, more or less with reddish or purplish reflexes, especially at the upper corner, and sometimes almost quite purplish; in a few cases they are banded. They are in most cases densely but generally short-haired, sometimes nearly microscopically haired, rarely (*Medeterus*) bare. The facets are either of equal size, or a little or somewhat enlarged on the front side towards the epistoma, in both sexes or only in the male. In the males of *Diaphorus* they are enlarged above, and in this genus sometimes in the whole upper part, and this part may be marked off by a dividing line. With the exception of species of *Diaphorus* the eyes are always separated on the frons; below the antennæ the eyes are generally also separated, either narrowly, or more or less broadly, and most often more broadly in the females than in the males; in the latter sex they are sometimes very narrowly separated, or really touching; the epistoma in the various genera may either be of equal breadth, or it is narrowed towards above, or on the contrary narrow below. The antennæ are inserted near to each other, in or generally more or less above the middle, sometimes rather high; only in the males of *Diaphorus* they are placed below the middle. They are five-jointed, and generally not long (the three basal joints), from shorter than the head to somewhat more than twice as long; they are very often longer in the male than in the female. The first joint is more or less short, sometimes somewhat elongated, generally obconical, and sometimes with the inner lower corner somewhat drawn out; the second joint is short, likewise generally obconical; it is either of simple shape, or the apical margin is often peculiarly formed; it is then prolonged triangularly, or, when much prolonged, more thumb-like, in the middle on the inner side, and at the same time also somewhat prolonged above on the outer side; this peculiar construction reaches its highest degree in *Syntormon*, but here the prolongation is often only present on the inner side; (in an American genus, *Parasyntormon*, the construction is similar). The second joint is somewhat compressed. The third joint is always compressed, most towards the apex; it is shorter or longer, and rather varied in shape, triangular, reniform, roundish, ovate, or longer and lancet-shaped or almost band-shaped, and it is especially this joint, which is of various length and variously shaped in the two sexes. When the second joint has the peculiar shape mentioned above, the third joint is constructed in accordance herewith; it is then somewhat incised at the base, or has incisions on the sides for

the reception of the thumb-like prolongations of the second joint. It is then also somewhat hollowed, and from the second joint issues a somewhat conical, collar-shaped and somewhat chitinated prolongation, which fits into the cavity of the third joint (fig. 18), the real membranous connection between the two joints being at the end of this prolongation. The third joint bears a two-jointed arista, which is dorsal, placed nearer the base or the apex of the joint, or it is sub-apical or really apical. The arista may be shorter or longer than the antenna itself (the three basal joints), sometimes shorter in the female, longer in the male, and it may in the latter sex sometimes be very long, longer than the whole body; in a few cases it may also in the male show dilatations at the end of both joints, or only at the apex. Its first joint is shorter or longer, from quite short to very long, much longer than the second joint, and then longer in the male than in the female. The first antennal joint is more or less hairy or bristly above, or it is bare (i. e. microscopically haired); the second joint has small bristles at the apical margin, often longer above or above and below; the third joint is generally more or less distinctly hairy, and the arista hairy or pubescent, sometimes only microscopically hairy or apparently bare; in a few cases the arista is more long-haired, or almost feathery. Jowls are generally not at all developed, only rarely present, and sometimes a little broad. The epistoma is broader or narrower, generally narrowest in the male, and here, when the eyes are approximated or touching below, very narrow to quite disappearing. As the antennæ are generally placed above the middle, the epistoma is somewhat high; it is generally bare or apparently so, sometimes distinctly pubescent. The clypeus is higher or lower; it is not really separated from the epistoma, but it is however more or less marked off; the dividing line is generally marked by a small nodule or elevation at each side, often with a little notch; sometimes it is more marked off by a transverse keel or ridge; it is not rarely bent a little inwards, thus forming a small angle towards the epistoma, and often it is somewhat arched, while the epistoma is flat; its lower margin is straight or rounded, sometimes somewhat angular. Sometimes the clypeus reaches to or a little below the lower margin of the eyes, but generally it is shorter; rarely it reaches far below the eyes (the males of the American genus *Polymedon*). The height of the clypeus is always easily made out, also when it is only slightly marked from the epistoma, for while the margins of the latter are in connection with the eyes, this is not the case with the clypeus, the side margins of which are free, so that it is only connected with the epistoma above. (Figs. 1 and 2). As the clypeus

is not free, there is no oral cone developed. The proboscis is almost always short, slightly or not at all protruding; only in *Orthochile* it is long and somewhat thin, and also in a group of species of *Herco-stomus* it is somewhat elongated. It is characteristic for the family that the proboscis and the other mouth parts, as well as the oral aperture are often considerably larger in the female than in the male, in accordance with the breadth of the epistoma. The oral aperture is in the whole rather large, stretching more or less up on

Fig. 1. *Dolichopus unguulatus* ♂. Fig. 2. *Tachytrechus ammobates* ♂.
Heads showing epistoma and clypeus.

the occiput. The labrum is strong, and of a curious shape; it is high at the base, broad and arched; it has a less chitinated median tooth, and on each side a strong lateral tooth; as the labrum is strongly semitubular, the lateral teeth lie lower downwards than the median; sometimes the median tooth is not developed. Hypopharynx likewise strong, it is more or less elongated triangular, sometimes somewhat broadly, about of the length of labrum, and like this generally curved a little downwards at the apex; rarely the apex is two-pointed (*Medeterus*). There are no maxillæ, but one-jointed maxillary palpi, which are large, squamiform, more or less oval; sometimes they are very large; they are hairy and generally with one or several bristles. In rest the palpi repose on the front side of the proboscis. Labium short, as mentioned, only longer in *Orthochile* and some species of *Herco-stomus*; it has the basal part about of the length of the labella; these latter are broad, when spread out they form a nearly circular disc surrounding the median cavity; they have generally hairs at the margin. When the labella are closed they form together a somewhat wedge-shaped part. Labium rather strongly semitubular, or nearly tubular, its upper edges going somewhat near to each other; the hole thus formed is rather large. The basal connecting membrane of the

labium is not long. Thorax rectangular, sometimes almost or quite square; it is somewhat high, and more or less arched above. In some genera the disc has a flat or slightly concave, somewhat declining area behind, in front of the scutellum; this area is sometimes small and less distinct. Postscutellum distinct, sometimes somewhat long. The præsutural depression is large. Prothorax small; it has a transverse row of small bristles above. Metathorax likewise small, but distinct and visible above as a narrow rim; there is no chitinated metasternum. The metaepimera are very distinct, sometimes rather broad; they are generally lying more or less close towards the abdomen, sometimes directed more outwards. The acrostichal bristles are generally short or very short, rarely longer; they are biserial or uniserial, in the latter case sometimes irregularly biserial behind, and they are sometimes quite absent; they do not reach to the scutellum. The dorsocentral bristles may be of various number in the various genera, and also sometimes in the same genus; they are very often six, but may be more numerous or on the contrary go down to only three or two, in the latter case they are then sometimes continued in front by small hairs; their number is generally, but not always, quite constant in the species; they increase as a rule in length towards behind. Of bristles the thorax has further a humeral, and generally one or some weaker, one or two posthumeral; of the other bristles the number is generally the following: one præsutural, three supraalar, the first placed at the inner end of the transverse furrow, one postalar and two notopleural bristles, but the præsutural bristle may be absent, and likewise one or two of the supraalar, or they may be very small, and sometimes there is only one notopleural bristle.¹ The rows of bristles are generally more or less diverging towards behind, especially the last dorsocentral bristle is placed somewhat laterally. The front part of the disc, to the transverse furrow behind, has more or fewer small hairs, some of which may sometimes be stronger; they are very conveniently termed præscutal hairs (Präskutalbörstchen) by Oldenberg l. c. The propleura have as a rule hairs, either both above and below, or only below, and they have generally one or several prothoracic bristles. Metapleura have no hairs. In one genus, *Eutarsus*, the pteropleura are hairy below.

¹ I have here followed the terminology for the bristles given by Oldenberg (Zeitschr. f. syst. Hymenopt. und Dipt. IV, 1904, 67). The author states that it is in accordance with the views of Girschner. Intraalar bristles are thus considered to be wanting. I am however not sure, whether it is perhaps not more correct to consider the two first supraalars as intraalars.

On the pteropleura, below the squamula, there is generally or always a more or less distinct, flat, somewhat membranous process. Scutellum bare or more or less pubescent or hairy above, often especially at the margin; it has generally two marginal bristles, and as a rule at each side a small hair; sometimes there are also small hairs between the marginal bristles; scutellum may sometimes have four marginal bristles, rarely six. Abdomen longer or shorter, sometimes even shorter than thorax (f. inst. *Hydrophorus*); it is usually more or less narrowed towards the end and thus somewhat conical; but when it is specially long, it is generally thin and slender, and not or slightly narrowed towards behind. It is cylindrical, often a little compressed, sometimes more compressed, or on the contrary flattened. In the female it is generally more or less pointed. The dorsal segments of abdomen are much broader than the ventral, and arched; the ventral segments are more narrow and flat; thus the dorsum and the sides are formed of the dorsal segments. The first dorsal segment is generally shorter than the following, at other times of the same length or even longer; it is rarely a little broader than the second; the first ventral segment is very short, only forming a small chitination just in front of the second; sometimes it is perhaps not at all chitinated. In the male the abdomen has eight segments, then follows the hypopygium, formed of the ninth segment. Sometimes all eight segments are visible, those in front of the hypopygium more or less decreasing in size, but often some of the latter are more or less hidden, so that only five or six segments are visible anterior to the hypopygium. More or fewer of the anterior ventral segments are normally developed, the following more or less incised, with membranous parts or quite membranous. These latter are folded up groove-like, so that a smaller or larger cavity for the reception of the hypopygium is formed. The seventh segment is small and generally unsymmetrical; it has a chitinated sternite, generally lying at the ventral base of the hypopygium, but sometimes in front of it. The eighth segment is always of a curious shape, peculiar to the family; it is scale-like, of various circumference but often roundish; it is not divided into tergite and sternite, and it lies always on the left side of the hypopygium; its anterior opening lies at the anterior end, and its posterior opening on the inside, and the two openings are on the inside only separated by a rather narrow bridge. The ninth segment or the hypopygium seems to be of the same principal structure throughout the family, but may otherwise vary considerably in shape; it is smaller or larger, generally somewhat oval, and more or less elongated, or short and roundish; it is often more or less compressed. The cavity of the eighth segment

opens into it through a hole always placed on the left side near the base. The construction of the hypopygium is well described and illustrated in a paper by Snodgrass (Proc. of the Californ. Acad. of Sc. 3, III, 273, 1904, Pl. XXX—XXXIII) with regard to several genera. At the base the hypopygium is somewhat, more or less, unsymmetrical on account of the seventh and eighth segment being placed at the left side. On the ventral side it is deeply invaginated, the cavity thus formed (genital chamber, Snodgrass) being open ventrally and posteriorly; sometimes, when the hypopygium is short and roundish, the opening is more apical than ventral. The sides of the cavity are more or less raised and thin, and thus often forming more or less distinct lobes, the ventral lobes; often the lobes are divided so that there are middle ventral lobes and posterior ventral lobes, the latter stretching beyond the end of the cavity. The middle lobes are sometimes unsymmetrical, this on one side being of another shape than the other. The lobes may for the rest be of manifold shape and may vary much in length, especially the posterior lobes may sometimes be very long, and they may be variously, sometimes rather long-haired. At the anterior end of the hypopygium the cavity is roofed over, and from here arises the penis, which is thin, generally long, and stretched backwards along the ventral side, often running between the mentioned lobes; the penis is much curved in the basal part, as it arises in reality inwards from the dorsal side; it is more or less inclosed in a sheath of various structure. At the posterior side margins of the cavity arise (generally) two pairs of appendages, the lateral and median inner lamellæ, probably clasping organs; they are stretched backwards, of various structure, often thin, more or less styliform with various dilatations, and more or less curved towards each other. Between them, more dorsally, there is a generally more or less hook-like median appendage, the dorsal median appendage. All these appendages are perhaps not always present. On the dorsal side at the end the hypopygium is more or less, sometimes rather deeply incised, and in this incision the small and hidden tenth segment is placed. It bears two lamellæ, the outer lamellæ; these are smaller or larger, and of very various shape, generally more or less scale-like, or sometimes thread-like; for the rest they may be triangular, roundish, elongated, sometimes very elongated, forked or of other shape; they are generally hairy, and the margin is not rarely split into teeth and has long, more or less curved bristles. Sometimes the outer lamellæ are quite or partly united in the middle. According to Snodgrass l. c. the tenth segment bears the anal opening. This author is of opinion, that the outer lamellæ have no direct connection with

the copulation. Loew on the other hand declares (Mon. of Dipt. of North. Am. II, 1864, 5) that they: "must be considered as organs of great irritability, as the roots of the hairs on their inside are connected with nerves." — The hypopygium is either exposed and pedunculated, the seventh segment forming the peduncle, and it is then bent in under abdomen and laid more or less up in the groove formed here; or it is more or less imbedded at the end of the abdomen, and then only partly or almost not at all visible; also in the latter case it is bent in under the abdomen, with the posterior end pointing more or less forwards, and the ventral side turned upwards. The described appendages are often not all to be seen without dissection, especially when the hypopygium is imbedded, and sometimes they are not at all visible, or only the outer lamellæ.¹ In the female the abdomen has generally five visible segments, the three following hidden, but sometimes more than five to all eight segments are seen; it terminates with a small ovipositor, which generally has some small spines above, and a pair of styles or small lamellæ below; in some cases the spines are wanting. Sometimes the ovipositor is larger and knife-shaped (e. g. *Thrypticus*). Dot-like impressions at the side margins of some of the abdominal segments (such as also sometimes found in other families) are always or nearly always present and generally rather conspicuous; they are most often found on the second to fourth segment, sometimes on more, and they may also, but rarely, be present on the first; they seem in some cases only to be present in the female. The abdominal segments have generally hindmarginal bristles, which are longest on the first segment; sometimes they are small and indistinct, except on the first segment, and

¹ According to Snodgrass l. c. and to the above description, the hypopygium thus in general has the following appendages: ventral lobes, one or two pairs (not articulated); two pairs of inner lamellæ (after Snodgrass sometimes three pairs, [*Pelastoneurus laetus*]), one pair of outer lamellæ, and an unpaired dorsal median appendage (articulated). The distinction between ventral lobes and lamellæ is generally not drawn in earlier descriptions; thus Kowarz says in his paper on *Medeterus* (Verhandl. Zool. bot. Gesell. Wien, XXVII, 1877, 42, note 1): "Das Hypopygium hat bekanntlich vier Paare Analanhänge", and Schiner says (F. A. I, 203) about *Tachytrechus*, that the inner appendages are more numerous than in the following genera. In both cases both lamellæ and ventral lobes are considered. — A thorough study of the male genitalia of the Dolichopodids might perhaps make it possible to compare them with the genitalia in other families as f. inst. the Empidids; it is perhaps not impossible that the outer lamellæ in the former might answer to the outer or lower lamellæ in the latter, and likewise the two pairs of inner lamellæ to the upper or inner lamellæ in the Empidids, which are often two-branched (as they are also in the Asilids).

they may be quite wanting, also on the first segment. The legs are generally somewhat long and slender, sometimes more robust; they show very often sexual dimorphism, being variously shaped or adorned in the male, often rather peculiar; thus the tarsi (front, middle or hind) may have one or more joints dilated or plumed, or otherwise distinguished by shape or adornments with hairs, bristles or thorns, or some joints may be unusually shortened or elongated; or the tibiae may be peculiarly shaped, curved, dilated etc., or provided with special hairs or bristles. Also the femora may have special bristles in the males, and sometimes a fringe of long hairs below. Moreover the legs, especially the tarsi, are often longer in the male than in the female. — The coxæ are a little elongated, especially the front coxæ; these latter are placed higher than the posterior coxæ on account of the shape of the thorax. The front legs are sometimes raptorial (*Hydrophorus*), the femora and tibiae more or less armed with spines below, and the femora somewhat thickened. The legs have generally short, sometimes longer hairs, and are generally provided with numerous bristles, especially on the dorsal side of the tibiae, and most on the posterior tibiae. Sometimes the legs are less bristly to almost bare. The bristles on the hind tibiae are in a few genera continued out on the metatarsus. The tibiae have also apical bristles, often small or wanting on the front tibiae. The posterior or the hind femora have generally one, sometimes more preapical bristles; sometimes they have none. The anterior coxæ have as a rule bristles or bristly hairs on the anterior or outer side towards the apex, and the hind coxæ have generally one, sometimes several, characteristic bristles on the outside. In *Porphyrops* and *Xiphandrium* the males have often a flat spine, composed of coalesced hairs, at

Fig. 3. *Dolichopus unguulatus*.
Empodium, partly from below, and one
claw. $\times 265$.

the apex of the middle coxæ, or rarely of the posterior coxæ. The hairiness of the legs is not rarely stronger in the males than in the females; on the other hand the females have sometimes the legs more bristly than the males. There are two claws, generally small, two pulvilli and an empodium; the latter is as a rule linear or narrowly lobiform, with bristles below, and thus more or less comb-

shaped¹; sometimes the empodium is broader, and it may be as broad as or almost as broad as the pulvilli and pulvilliform (*Medeterus*, *Hydrophorus*). In some genera the pulvilli are in the male enlarged on the front tarsi (*Machaerium*, some species of *Diaphorus*), or on the anterior or all tarsi (some species of *Diaphorus*). In *Sphyrrotarsus* (non-Danish) the pulvilli are absent. In the species of *Diaphorus* with the pulvilli on the front tarsi enlarged in the male, these tarsi have no claws. (How it may be, when the posterior tarsi also have the pulvilli enlarged I do not know). The wings are generally of the usual shape, a little varying in length, being sometimes longer and more narrow, sometimes shorter and broader; in a few cases they may be broadened in the male or otherwise of special shape. They are sometimes more or less dark spotted. The venation is rather uniform, and it is characteristic for the family in its principal formation; it shows however not a few special differences of systematic value. The costa reaches to the apex of the discal vein. The mediastinal vein is short and terminates in the subcostal vein; in a few cases it is a little elongated and ends freely, not uniting with the subcostal vein; the latter is generally short, rarely longer. The radial vein issues quite near the base; also the cubital vein issues near the base from the radial vein, and the point of its beginning is thickened; it is unforked, and there is thus one cubital cell; the discal vein is generally unforked, only forked in *Sciapus* (and some foreign, related genera), and with a tendency towards forking in some few other species; there are thus three, only in *Sciapus* and the other cases mentioned, four posterior cells, the second and third often not quite separated, as the lower branch of the fork does not always reach the margin. The last part of the discal vein (the part behind the posterior cross-vein) is as a rule more or less curved, or angularly bent; there are all gradations from a quite rectangular bend, sometimes with small veinlets from one or both angles, through a smaller, more obtuse or rounded curvature to a quite shallow and gentle, sometimes

¹ De Meijere (Zool. Jahrb. Abtheil. für Anat. und Ont. XIV, 1901, 443) says: "... trifft man bei den *Dolichopodidae* schöne Beispiele von kammförmigen Sohlenläppchen", and he figures (Pl. 34, fig. 120) the empodium of *D. unguatus* (*aeneus*) as quite comb-shaped. I think no Dolichopodid has a really comb-shaped empodium i. e. armed below with a single row of teeth or bristles; only the empodium is generally linear and with bristles below, and thus to some degree comb-shaped, but the bristles are not placed in a single row, or at most only just at the apex; thus *D. unguatus* has the empodium linear, attenuated and pointed; below it has bristles, or more correctly, emergences, which cover the surface from the base outwards; at the apex it is branched or runing out into some bristly processes, which are divided furcately. (Fig. 3.)

scarcely perceptible flexure, and finally the vein may be quite straight, and parallel with the cubital vein. When the vein is more or less curved, the part after the curve may be more or less converging with the cubital vein, or quite parallel with it. The medial cross-vein is small, and sometimes somewhat indistinct, it is situated near the base, below the mentioned thickening, and thus at the base of the cubital vein; the first basal cell is thus small and short. A discal cell is present; it is shorter or longer, but always rather long; its lower border is formed by the upper branch of the postical vein (it thus in reality also includes the fourth posterior cell); the discal cell is confluent with the second basal cell, as there is no branch from the discal vein separating them; there is however sometimes a trace of a branch at the postical vein. The cross-vein closing the discal cell at the apex I term the posterior cross-vein (probably a branch from the discal vein, or perhaps from the postical vein). The lower branch of the postical vein issues quite near the base, and is recurrent, with a rounded curve, uniting with the anal vein; the anal cell is thus quite small and retracted to the base. The anal vein is generally more or less short and abbreviated, not reaching the margin, rarely it is longer and reaches the margin; in some genera it is quite absent, and then the lower branch of the postical vein is generally also more or less obliterated. The posterior cross-vein is variously situated, from a little before the middle of the wing to more or less near the margin. On the last part of the discal vein there is in nearly all genera a more or less distinct convexity, the curve of the vein lying on it. Stigma always absent. The axillary lobe larger or smaller, sometimes wanting, especially in the males, and the wing then cuneiform. Alula very small, practically wanting, the margin here generally with somewhat long hairs. The thoracic squamula not developed, at most the frenulum a little widened at the angulus. The alar squamula not large, it is generally somewhat widened near the wing, then it is narrow, but at the angulus again widened to a smaller or larger lobe, which is directed upwards; the basal part lies on to the thorax, while the part with the angular lobe is erect, pointing outwards. The angular lobe bears a fan of long hairs or bristles, rarely they are short; the basal part has shorter hairs, sometimes longer, or almost as long as the fan. In rest the wings lie parallel over the abdomen, one covering the other, rarely they are borne half open (*Chrysotus*).

The venation of the wings shows some interesting and characteristic points. As said, the last part of the discal vein has nearly always a convexity on which the curve of the vein, when present,

is lying; I think this may be the remainder of the convex vein V, for the rest obliterated by the coalescing of the concave veins IV and VI to the discal vein. In *Sciapus* the convexity seems to lie on the base of the upper branch of the fork. In some species of *Hygroceleuthus* and *Dolichopus* the discal vein is rectangularly broken, and when the lower angle has a little veinlet, we have here in reality the beginning of a fork; also here the convexity is found on the vertical part. When the vein is quite straight, the convexity is generally still present, but in some genera with a quite straight discal vein (*Achal-cus*, *Thrypticus*, *Medeterus*, *Acropsilus*) it has disappeared, and thus no remainder of the fifth vein is left. The vein I have termed the anal vein, and which is usually termed so, is, I think, in reality the axillary vein, since it seems to be distinctly convex: Redtenbacher and Brauer figure it also as convex, Adolph on the contrary as concave.

The developmental stages of the *Dolichopodidae* are not well known, and only of a few genera have either larvæ and pupæ or only pupæ been observed (*Sciapus*, *Neurigona*, *Dolichopus*, *Tachytrechus*, *Hercostomus*, *Leucostola*, *Porphyrops*, *Machaerium*, *Systenus*, *Thrypticus* and *Medeterus*); of *Hygroceleuthus*, *Tachytrechus* and *Hercostomus* they are for the first time described here, but only the pupæ. The known larvæ are cylindrical; the body consists of twelve segments; the head is small and retractile. The mouth parts consist (Brauer) of mandibles and maxillæ with small palpi; also small antennæ are present. No eyes. The abdominal segments or most of them have on the ventral side a transverse swelling, acting as prolegs. The last segment is generally a little swollen, with some longitudinal furrows; it is more or less obliquely cut at the end, and has here four triangular warts, squarely placed, the two lower are generally the largest; sometimes there is a small, fifth wart between the two upper. The larvæ are amphipneustic with small prothoracic spiracles, and likewise rather small posterior spiracles, lying at the base of the upper warts. The larvæ thus in general bear resemblance to the Leptid larvæ, but they may as a rule be known by the unequal sized posterior warts, of which the two lower are the longest, or there is a small wart between the two upper. According to Beling the larva of *Neurigona* has no warts on the last segment. — The pupa is free; it has the antennal sheaths lying at the front of the head directed downwards, but generally slightly marked; they are provided with some transversely compressed teeth. The head and the dorsal side of thorax have some short, stiff hairs. At the front margin of the thorax there are two long or very long, thin, cylindrical spiracular

tubes, generally somewhat pointed. The abdominal segments have each, generally except the first, a transverse girdle of short, flat spines of unequal length. There are seven pairs of abdominal spiracles.

The known larvæ live in the earth, in sand or in decaying wood; they are no doubt all carnivorous, and this has been observed with regard to the larvæ of *Medeterus*, which have been found feeding on larvæ and pupæ of Tomicins. The pupæ are found on the same places at the larvæ; they rest in a cocoon formed of particles of the material they live in, earth, sand or particles of decaying wood. The cocoon is on the inside clothed with a delicate film or web, and it is somewhat solid; it seems also to be somewhat impenetrable, but it has at one end a small, circular opening, through which the ends of the spiracular tubes project. Sometimes (species of *Medeterus*) the cocoon seems to be only formed of a web or of some silky substance. — With regard to the developmental stages of *Thrypticus*, the larva of which is described as phytophagous and peripneustic, see under this genus. — The larvæ hibernate, and the transformation to pupa and the development of the imago take place in spring and summer. Some species have perhaps more than one brood in the year.

Some species of Dolichopodids seem to be able to hibernate as imagos, thus Drewsen has recorded (Krøyer's Tidsskr. IV, 1843, 349), that he found *Hydrophorus nebulosus*, *bipunctatus* and *balticus* and *Campsicnemus scambus* at the end of November in Bøllemosen (when the author also mentions *H. viridis* this is certainly due to a wrong determination, as this species is not known from Denmark); the temperature had in the foregoing days been as low as $\div 8^{\circ}$, and there was thick ice on the water. I have myself taken *Camp. scambus* on ²⁰/₁₂.

The family of the *Dolichopodidae* is very characteristic, and the species are easily known by the venation of the wings, especially the confluent discal and second basal cell, and the generally present, curious convexity on the discal vein, as also by the nearly always metallic, more or less green colour. They are small or of medium size, from one to about nine millim. They are also characterised by the postocular bristles, the generally present great difference in the size of the mouth parts in the two sexes, the hypopygium of the male with the eighth segment and the opening lying on the left side; also the antennæ are characteristic, and likewise the chaetotaxy. The shape of the antennæ, and the venation of the wings show, that they approach to the cyclorrhaphous flies. Not only by their shape but also by their behaviour they are rather characteristic, as at all events most species sit in a curious, somewhat upright position, because they are

more or less raised on the front legs, whence Verrall says, "appearing to be standing on tiptoe". In no other family does the sexual dimorphism reach so high a degree as in the Dolichopodids; the larger majority possess in the males secondary sexual characters more or less developed. These characters are in the first line adornments of the legs, such as more or less plumed dilatations of the tarsi, especially the front or middle, more rarely the hind tarsi; special shape of, or special bristles on the tibiæ, and also special bristles on the femora. But the characters are also found on other parts of the body; the antennæ, especially the third joint, is often longer in the male, likewise the arista or its first joint, and the arista may show dilatations; the epistoma is often narrower and of another colour than in the female, and the mouth parts smaller. The wings may be broadened or of special shape, or they may have a special venation, and sometimes also dark markings: the costa has sometimes thickenings. The pulvilli, especially on the front tarsi, may be enlarged, even the claws may be specially shaped (Loew), or they may be wanting, at all events on the front tarsi (*Diaphorus*). Also the colour of the body may in the male be different from that in the female (f. inst. *Argyra*). Even when no adornments are present on the legs, the length of them, and sometimes the colour may be different from that in the female; further the hind tibiæ are often or generally more thickened towards the end in the males than in the females, and there is not rarely, thus in most *Dolichopodinae*, a little impression or furrow at the end on the dorsal side, often with special, short, generally white hairs. The hind metatarsus is generally stronger in the male than in the female, its base is a little differently shaped, and sometimes (species of *Medeterus*) it has in the male a little excision at the base, often with a little spine or tubercle. Finally also the wings, when not specially shaped in the male, often show however small differences from the female, such as the bend of the discal vein being a little larger, and the posterior cross-vein lying slightly nearer the apex, as Macquart has figured it for a number of species (Ann. de la Soc. Ent. de Fr. 2, II, 1844, 177, Pl. 4—5).

The Dolichopodids are all predaceous, feeding on other insects, especially small and soft ones, and also on other small animals; instances have several times been recorded; among others Loew says in Mon. of Dipt. of North Am. II, 1864, 4.: "The species of the genera with a large proboscis, especially their females, can altogether engulf small insects within their proboscis, as if they swallowed them, whereas they only suck them out, and throw the remainder away". E. Becker says (Denkschrift. d. Math-Nat. Cl. d. Kais. Akad. d. Wissensch. Wien, XLV, 1882, 28), that it may be observed on the living specimens,

that they in fact masticate the prey on account of the labrum being very movable, and being used during the feeding. There is also an interesting observation by Wahlberg (Öfvers. Vet. Akad. Förh. I, 1844, 37, and Kröyer's Tidsskr. 2, I, 1845, 45) with regard to the prey of the Dolichopodids. The author observed a number of species of Dolichopodids (together with a few other Diptera) belonging to the genera *Hygroceleuthus*, *Dolichopus*, *Tachytrechus*, *Chrysotus*, *Porphyrops*, *Syntormon*, *Hydrophorus*, *Campsicnemus*, *Sympycnus* and *Tinophilus*; the species were in activity on a muddy sea-shore, still wet after the water had retracted; they were often seen sitting with the proboscis down to the mud, and when the mouth was retracted, a small whitish thread was drawn up, and eagerly sucked out. These threads proved on closer examination to be Naids, which thus here were the chief food of these flies. The author states, that he did not see the Dolichopodids attack any other insect, but they seized and sucked flies, which he had killed and thrown among them. According to my experience the species are however not often found with prey (I have only seen this on very few occasions), I think because the prey is generally small, and thus quite engulfed during the sucking, so that it is not seen.

The species of Dolichopodids occur on bushes, in low herbage and grass in woods and outside, generally on damp localities and more or less near water, or at the borders of lakes and streams; some are common on water plants, others on the wet earth or sand at the borders, or on stones in water; the species of *Hydrophorus* are able to run on the water-surface; many species are found at or near the shore; some species are generally sitting on tree-trunks; only few occur on more dry localities, on palings and walls of houses. Only few species are spring-species, occurring more or less early, the great majority do not occur until in June. The species occur all over the world, also going rather high towards the north; thus two species of *Dolichopus* are found in Greenland, one of them is the common and widely distributed *D. plumipes*.

With regard to the behaviour of the sexes on copulation Aldrich mentions (Amer. Naturalist, XVIII, 1894, 35) a case of courtship with regard to a species of *Dolichopus* (*tenuipes*), in which the male has the front tarsi with the last joint dilated, and a species of *Hygroceleuthus* (*crenatus*) with simple front tarsi. The male of the former placed itself in front of the female, beating somewhat with the front legs; then it flew up trying to alight on the female. The male of the latter species was hovering in the air before the female, and then it tried to alight on her. Dahl (Zool. Anz. XII, 1889, 245) observed a

similar behaviour of *D. plumipes*; the male of this species also hovering over the female, and then trying copulation, and I have myself often observed the same with regard to *Herc. germanus*, the females sitting on flowers of Umbellifers, the males hovering a short time above the female, and then trying to copulate. In nearly all cases, also in my own observations, copulation was never gained; only Dahl mentions that the male succeeded after repeated attempts. In the mentioned cases the authors think, that the ornamented legs, or, in the *Hygroceleuthus*, the antennæ, are of use for the male in attracting the female; I can say nothing about this, only I may remark, that in *Herc. germanus* no ornamentations are found. Copulated pairs of Dolichopodids of various genera have otherwise been observed by several authors.

From the palæarctic region about 586 species of Dolichopodids are known, and from North America about 526; I find 10 to be recorded as common to both regions.

No case of Hymenoptera parasitic on Dolichopodids is recorded.

Dolichopodidae earlier recorded from Denmark. — Kramer (Specim. Insectol. Dan. 1760) has no Dolichopodid in his list of Diptera. Brünniche (Prodrom. Insectol. Siælland. 1761) has one species, *Musca unguata*, and in 1763 (Pontoppidan, Dansk Atl. I) he has the same. O. F. Müller (Faun. Fridrichsd. 1764) has likewise only the same. It can only be said about this, that the species is probably a *Dolichopus*, or no doubt whatever *Dolichopus* or similar species, that has come into the hands of these authors. Müller's new species, *Musca squamata* seems to be the male of some *Dolichopus*. Fabricius has in 1775 (Systema Entomologiæ) only one species, *Musca rostrata* (*Medeterus diadema* L.), for which Denmark is given as locality, and only the same is again enumerated in Species Insectorum, II, 1781, Entomologia systematica, IV, 1794, and as *Dolichopus rostratus* in Systema Antliatorum, 1805. Stæger gives in 1842 (Krøyer's Tidsskr. IV, 1) a work over the Danish species of the group he termed *Dolichopodes lamelliferæ* i. e. *Hygroceleuthus*, *Dolichopus*, *Tachytrechus*, *Poecilobothrus*, *Hercostomus* and *Hypophyllus*. He enumerates 46 species, which are enumerated again by Zetterstedt; one of them, by Stæger described as *Dol. ciliefemoratus* Macq., which species it cannot be, remains still unidentified, as Stæger's specimens are lost. Zetterstedt enumerates in 1843 (Dipt. Scand. II) 73 species, and in VIII, 1849 he has further 26 species, thus in all 99 species. As he does not mention *Hypophyllus discipes* (*patellatus* by Zetterstedt) from Denmark, the number of species then known would be 100, but as Zetterstedt mentions *Argyra argyria* both as *D. argentatus* and *argentellus*, and as his

Rhaphium nasutum is probably *Porphyrops spinicoxa* (see under this species), the number known to him is in reality 98. In XI, 1852 he further mentions *Herc. chaerophylli*, but this is certainly erroneous, the species being no doubt *germanus* (see under this species). Still four Danish species are mentioned by Loew, viz. *Porphyrops spinicoxa* (Stett. Ent. Zeitg. XI, 1850, 101), *Syntormon pumilus (longiseta)* (ibid. 119), *Xiphandrium appendiculatum* (ibid. 133) and finally *Dol. Meigeni* (Neue Beitr. V, 1857, 11); of these only *Syntormon pumilus (longiseta)* and *Xiphandrium appendiculatum* were mentioned as Danish by Zetterstedt, the number of species recorded from Denmark up to 1857 thus being 100. Schiner mentions (F. A. I, 1862, 214, nota) *Dol. Falleni* from Denmark, but this species was already recorded by Zetterstedt (*nigripes*). In the present work 172 species are enumerated.

The subdivision of the family of *Dolichopodidae* in subfamilies is at present not satisfactory, at all events with regard to the palæarctic fauna. In the Kat. paläarkt. Dipt. the family is divided into four subfamilies. With regard to the American fauna Aldrich (A cat. of North Am. Dipt. Smiths. Miscell. Coll. XLVI, 1905) has divided the family into not less than twelve subfamilies; these are, I think, good and natural, but the author has given no diagnoses of them. As I have only examined the Danish genera and species more closely, I have thought it most advisable at present to keep the subfamilies given in the Kat. paläarkt. Dipt., though I am well aware, that some of them are no doubt somewhat heterogenous. I have only made the few alterations, that I have placed *Thrypticus* and *Acropsilus*, both in the Catalogue included in the *Diaphorinae*, to the *Hydrophorinae*, the former near *Medeterus*, the latter near *Tinophilus* and *Schoenophilus*. The experienced Dipterologist Mr. Th. Becker in Liegnitz, to whom I am indebted for many valuable hints, works at present with the *Dolichopodidae*, and we may hope soon to have from his hand a new and more satisfactory arrangement of the family in subfamilies.

Table of Subfamilies.

1. Acrostichal bristles present and biserial, or when not biserial, the second antennal joint inserted thumb-like into the third; (*Achalcus*, *Thrypticus* and *Medeterus* of the second division have also biserial acrostichal bristles, but the two first are known by the wanting anal vein, and all three have a flat or concave, declining area on the thorax in front of the scutellum)..... 2.

- Acrostichal bristles uniserial (sometimes a little irregularly biserial behind), or wanting; only biserial in *Achalcus*, *Thrypticus* and *Medeterus* (see above); the second antennal joint never thumb-like inserted into the third IV. *Hydrophorinae*.
- 2. Arista dorsal, or when subapical the third joint short and rounded 3.
- Arista apical or practically so; the third antennal joint long in both sexes, or generally long only in the male, shorter and more or less oval in the female; hypopygium generally more or less imbedded, the outer lamellæ often more or less thread-like, sometimes forked; in *Systemus* the hypopygium pedunculated III. *Rhaphiinae*.
- 3. Postocular bristles forming a single row also below, or when the lower part of occiput has dense hairs the discal vein is forked; arista dorsal; only one prothoracic bristle, or none, and only one bristle on the hind coxæ; when it is otherwise the discal vein is either forked, or the colour not metallic; hypopygium free, pedunculated (only hidden in *Eutarsus*) I. *Dolichopodinae*.
- The lower part of occiput covered with dense hairs, when not distinctly (*Chrysotus*) the third antennal joint short and the arista subapical; more than one prothoracic bristle, or when this not distinct, the hind coxæ with more than one bristle; colour metallic, at most abdomen with yellow spots; hypopygium small, not pedunculated, more or less hidden II. *Diaphorinae*.

I. Dolichopodinae.

The antennæ have the arista dorsal; the second joint somewhat overlapping the third, except in *Sciapus* and *Neurigona* (or in the latter to a very slight degree). The postocular bristles form a single row, only *Sciapus* has the lower part of occiput covered with dense hairs. Acrostichal bristles biserial. Generally one prothoracic bristle, and one bristle on the outside of the hind coxæ, but *Sciapus* and *Neurigona* may have more. Hypopygium of the male exposed and pedunculated, only hidden in *Eutarsus*. — The subfamily is scarcely quite natural; Aldrich forms a group for *Sciapus* together with related American genera, and one for *Neurigona*, and he places *Eutarsus* in *Diaphorinae*, and this way of dividing the group is perhaps correct.

Table of Genera.

- 1. Discal vein forked 1. *Sciapus*.
- Discal vein not forked 2.

2. Colour not metallic, or at all events abdomen not metallic coloured 3.
- Colour metallic 4.
3. Thorax and scutellum yellow or grey, not metallic; hypopygium of the male free..... 2. *Neurigona*.
- Thorax and scutellum metallic; hypopygium of the male small and concealed..... 3. *Eutarsus*.
4. Hind metatarsus with bristles above 5.
- Hind metatarsus without bristles above..... 6.
5. Epistoma reaching below or down to (or almost to) the lower margin of the eyes 4. *Hygroceleuthus*.
- Epistoma not reaching to the lower margin of the eyes..... 5. *Dolichopus*.
6. Epistoma reaching to or almost to the lower margin of the eyes; hind femora with a number of preapical bristles..... 6. *Tachytrechus*.
- Epistoma not reaching to the lower margin of the eyes; hind femora with only one preapical bristle 7.
7. Arista distinctly hairy, almost feathered; the radial, cubital and discal veins somewhat near to each other 7. *Poecilobothrus*.
- Arista less hairy or apparently bare; radial, cubital and discal veins less approximated 8.
8. Shape not specially slender; front tibiæ with one or two ventral bristles, or, if not, the postocular bristles black; hypopygium of the male not specially long, not much pedunculated and without long ventral lobes .. 8. *Hercostomus*.
- Shape long and slender, front tibiæ without ventral bristles; postocular bristles pale below; hypopygium of the male long, with a somewhat long peduncle, and with long ventral lobes..... 9. *Hypophyllus*.

II. Diaphorinae.

Arista dorsal, or (*Chrysotus*) more or less subapical; the second joint not or slightly overlapping the third, sometimes to a higher degree; the third joint sometimes elongated in the male. The lower part of occiput with dense hairs, in *Chrysotus* less dense. Acrostichal bristles biserial¹. More than one prothoracic bristle, or only smaller, more or less bristly hairs. Hind coxæ with one or several bristles on the outside. Hypopygium of the male not pedunculated, more or less hidden. — This subfamily seems to me somewhat natural. Aldrich takes it in another sense, and places *Eutarsus*, *Teucophorus* and *Campsicnemus* into it, whilst he excludes *Argyra* and *Leucostola*, placing these genera with the *Rhaphiinae*.

¹ In the males of some species of *Argyra* the acrostichal bristles may appear somewhat irregularly pluriserial on account of the hairiness of the thoracic disc.

Table of Genera.

1. Hind coxæ with only one bristle on the outside; antennæ short in both sexes; colour not silvery 2.
- Hind coxæ with more than one bristle on the outside; antennæ in the male more or less elongated; colour in the male generally more or less silvery 3.
2. Arista subapical; frons broad; epistoma generally very narrow in the male, and narrower than the frons in the female; pulvilli not enlarged 10. *Chrysotus*.
- Arista distinctly dorsal; eyes of the male touching on the frons, in the female the frons not broader than the epistoma; the pulvilli of the front tarsi enlarged in the male 11. *Diaphorus*.
3. Basal joint of antennæ hairy above; middle tibiæ with more than two bristles below 12. *Argyra*.
- Basal joint of antennæ bare above; middle tibiæ with one or two bristles below 13. *Leucostola*.

III. *Rhaphiinae*.

Arista apical, rarely somewhat subapical; the second antennal joint simple, not overlapping the third, or (*Syntormon*) inserted thumb-like into it; the third joint is elongated and long to very long in the male, short, triangular or ovate in the female; rarely it is of the same length in both sexes. Postocular bristles forming a single row, or the lower part of occiput more or less densely covered with hairs. Acrostichal bristles biserial, in most species of *Syntormon* uniserial, but generally a little biserial behind. Prothorax with more or less numerous hairs on the pleura, of which one or some may be bristly. Hind coxæ without, or with one to two or three bristles on the outside. Hypopygium more or less imbedded or (*Systemus*) quite free and pedunculated; the outer lamellæ sometimes long, more or less thread-like or forked; at other times small. — This subfamily is very natural; the genera included in it form the genus *Rhaphium* of Loew in 1850 (Stett. Ent. Zeitg. XI, 1850, 85), and Meigen has them as *Porphyrops* in Vol. VII (together with *Achalcus*) here uniting his *Rhaphium* (Vol. IV) with *Porphyrops* after the exclusion of *Argyra* from this latter. In Neue Beitr. V, 1857 Loew forms or limits the now accepted genera, after Haliday in 1831 had established the genus *Machaerium*. — Aldrich, as said, places *Argyra* and *Leucostola* in this subfamily.

Table of Genera.

1. Second antennal joint simple 2.
- Second antennal joint inserted thumb-like into the third 15. *Syntormon*.
2. Third joint of antennæ long in both sexes, broad at

- the base, then excised below and with the apical part thin 16. *Machaerium*.
- Third antennal joint long in the male, shorter in the female, not excised below 3.
3. Hind metatarsus considerably shorter than, about half as long as the second joint; hypopygium in the male free, pedunculated 18. *Systemus*.
- Hind metatarsus from slightly longer to somewhat shorter than the second joint; hypopygium in the male more or less imbedded, not free 4.
4. Hind coxæ without bristles on the outside; third antennal joint in the male moderately long, not more than thrice as long as high, larger, hairier species . . 14. *Porphyrops*.
- Hind coxæ with a bristle on the outside; third antennal joint in the male more elongate, six to ten times as long as high; smaller, less hairy species 17. *Xiphandrium*.

IV. Hydrophorinae.

Arista dorsal, subapical or apical; the second antennal joint simple, rarely overlapping the third a little, the third short, or sometimes a little elongated. Postocular bristles forming a single row, sometimes with bristles inwards to it, or the lower part of occiput covered with dense hairs. Acrostichal bristles present or absent, in the former case uniserial, sometimes a little biserial behind; only in *Achalcus*, *Thrypticus* and *Medeterus* biserial. Propleura without, or with one to several prothoracic bristles; hind coxæ likewise with or without bristles on the outside. Hypopygium generally small and imbedded, in *Thrypticus* and *Medeterus* free; the outer lamellæ generally small or somewhat small, often united in the middle. Anal vein generally present, sometimes wanting (*Achalcus*, *Thrypticus*). — This subfamily is no doubt heterogenous, and should be subdivided; thus f. inst. *Medeterus* and *Thrypticus* seem to form a natural group. Aldrich has divided it into *Sympycninae*, *Xanthochlorinae*, *Tinophilinae*, *Medeterinae*, *Hydrophorinae* and *Aphrosylinæ*, after having excluded *Campsicnemus* and *Teucophorus*, which are placed in the *Diaphorinae*.

Table of Genera.

1. Acrostichal bristles present 2.
- Acrostichal bristles absent (or practically so) 11.
2. Acrostichal bristles biserial 3.
- Acrostichal bristles uniserial (at most a little irregularly biserial behind) 5.
3. Anal vein present; hypopygium in the male large, pedunculated 21. *Medeterus*.
- Anal vein absent 4.

4. Colour not metallic, greyish or yellow; hypopygium roundish..... 19. *Achalcus*.
- Colour brightly metallic; hypopygium elongated .. 20. *Thrypticus*.
5. Posterior cross-vein as long as, or longer than the last part of the postical vein..... 6.
- Posterior cross-vein shorter than the last part of the postical vein..... 8.
6. Front femora and tibiæ with remarkably long spines below..... 22. *Scellus*.
- Front femora and tibiæ without, or only with short spines below..... 7.
7. Front femora somewhat thickened at base, these and the tibiæ with short spines below; hind coxæ without bristle; mesopleura not prolonged into a spine; scutellum with two or four bristles..... 23. *Hydrophorus*.
- Front femora not thickened; these and the tibiæ without spines; hind coxæ with a bristle on the outside; mesopleura prolonged downwards into a spine; scutellum with six bristles..... 24. *Liancalus*.
8. Abdomen depressed; epistoma narrow below the antennæ, but widened downwards; legs of the male, especially middle legs, generally more or less peculiar or armed with bristles..... 25. *Campsicnemus*.
- Abdomen compressed; epistoma equally broad, or narrowed downwards..... 9.
9. Antennæ dark; abdomen dark metallic..... 10.
- Antennæ and abdomen mainly orange..... 31. *Bathycranium*.
10. Frons metallic; costa in the male with a long swelling..... 27. *Teucophorus*.
- Frons not metallic; costa without swelling..... 28. *Sympycnus*.
11. Wings somewhat dark variegated, in the male narrow towards the base without axillary lobe .. 26. *Ectomus*.
- Wings not variegated, and not narrow towards the base in the male..... 12.
12. Thoracic and scutellar bristles yellow..... 13.
- Thoracic and scutellar bristles black..... 14.
13. Arista nearly apical; hypopygium in the male small 29. *Chrysotimus*.
- Arista distinctly dorsal; hypopygium in the male large and swollen..... 30. *Xanthochlorus*.
14. Thorax strongly shining, almost black; third antennal joint somewhat elongated, most in the male, pointed, arista near its base..... 32. *Anepsiomyia*.
- Thorax dull; antennæ short, with the third joint roundish, arista not near its base..... 15.
15. Palpi large; hind metatarsus slightly shorter than the second joint; posterior femora with preapical bristles..... 16.
- Palpi not large; epistoma in the female with hairs

- below; hind metatarsus much shorter than the second joint; posterior femora without preapical bristles 33. *Acropsilus*.
 16. Arista dorsal 34. *Tinophilus*.
 — Arista subapical, almost apical 35. *Schoenophilus*.

Obs. I may remark here, that in the following descriptions I speak of epistoma shortly as the name for the whole face below the antennæ and between the eyes, thus in reality epistoma + clypeus. With regard to the hypopygium, I use the terms dorsal and ventral, anterior and posterior, as if the hypopygium was stretched out towards behind; my terms indicate thus the real dorsal and ventral sides, and anterior and posterior ends, but it must be remembered, that in the natural, inflexed position of the hypopygium, the position of the parts is inverted, the real dorsal side turned down, the ventral upwards, the anterior end being behind and the posterior pointing forwards.

I. Dolichopodinae.

1. **Sciapus** Zell.

(*Psilopus* Meig.)

Species of slender shape, with a somewhat long and narrow abdomen. Head as broad as or broader than thorax, generally somewhat to considerably broader than high, rarely a little higher than broad (*platypterus*); it is short, flat behind. Vertex rather deeply excavated, and the ocellar tubercle prominent. Frons a little decreasing in breadth towards the antennæ, or generally with almost parallel borders. There are ocellar, outer vertical and postvertical bristles; on the posterior side of the ocellar tubercle there are a pair of small bristles. Eyes large; they are short almost microscopically hairy, most distinctly downwards; the facets generally of equal size, but when the epistoma is narrowed, the facets are a little enlarged towards the epistoma in the male, and also slightly in the female (*platypterus*). The eyes are separated in both sexes, the epistoma more or less broad, sometimes broader in the female than in the male, but generally of the same breadth. Postocular hairs fine, only just above a little stronger; the lower part of occiput covered with dense hairs. The antennæ are inserted somewhat above the middle, near to each other:

they are relatively short, of the same shape in both sexes. They are five-jointed, the two basal joints obconical, the third short ovate, almost roundish, compressed, bearing dorsally a long, two-jointed arista, the basal joint of which is short. The arista may in foreign species be dilated at the end in the males, and it may sometimes be very long. The first antennal joint has no hairs above, the second bears a circlet of small bristles at the apex, the uppermost is the longest; the third joint and the arista are densely short-haired. Epistoma is, as said, generally rather broad, and of the same or almost the same breadth in both sexes, sometimes narrower, and narrower in the male than in the female. Clypeus is only slightly marked by a small notch at each side; it reaches to, or almost to the lower margin of the eyes. Proboscis slightly protruding; it is of the same or almost the same size in both sexes, only when the epistoma is narrow in the male, the proboscis is here a little more slender than in the female. Labrum very strong; it has a median, less chitinated, and two lateral, strongly chitinated teeth; on account of its semi-tubular shape the lateral teeth are lying lower than the median. Hypopharynx strong, triangular, about of the length of labrum. The maxillary palpi are oval, squamiform. Labium has the basal part and the labella of about the same length. Thorax somewhat high, rectangular or almost quadratic; prothorax very small, with small bristles above; metathorax likewise small, and there is no chitinated metasternum. The acrostichal bristles biserial, very small or a little longer; there are six dorsocentral bristles, increasing in length behind, further a humeral, a posthumeral, two notopleural, a præsutural, two or three supraalar and a postalar bristle; besides there are some small hairs on the anterior part of thorax; prothoracic bristles are only represented by a few rather small, more or less bristly hairs. Scutellum bare above with two marginal bristles and on each side a small hair. Abdomen long and slender; the first dorsal segment is very short and a little broader than the following; the first ventral segment is likewise short, and weakly chitinated; in the male there are six visible segments, except the first of about the same length; the seventh is small and somewhat hidden. The hypopygium is exposed, rather small; in some species it is typical, with two outer lamellæ, in others the outer lamellæ are united, and there are long, styliform or almost thread-like posterior ventral lobes. In the female the abdomen is less long and slender; it has five visible segments; the small ovipositor ends with some (4) small spines above, and a pair of small styli below. There are no dot-like impressions at the side margins of the dorsal segments.

The abdominal segments have shorter or longer hindmarginal bristles. The legs are long and slender, the coxæ elongated; hind metatarsus from as long as to considerably longer than the second joint, without bristles. In the males the front or middle tarsi are sometimes adorned in various ways. The legs are haired with short hairs, and have few bristles, the hind coxæ one or several bristles on the outside; the hind femora have a distinct preapical bristle, sometimes also the middle femora; the tibiæ have small apical bristles; the females have strong spines below the front femora, the males have here generally weaker or stronger hairs. There are two small claws, two pulvilli and a somewhat comb-shaped empodium. The wings are sometimes broad in the male; they have not rarely (in foreign species) dark markings. The mediastinal vein terminates in the subcostal vein; the discal vein is forked, and the first posterior cell narrowly open; the anal vein is weak, it does not reach the margin, but is generally short; the axillary lobe is generally not large. Squamulæ small, and also their angular lobe small, with a fan of long hairs, the inner part of the squamulæ with short hairs.

The developmental stages of *Sciapus platypterus* are described by Beling (Arch. für Naturgesch., 48, I, 1882, 222). The larva is 8 mm long, 0.8 mm thick, cylindrical, of yellowish colour. It consists of twelve segments in all. The last segment is a little swollen, with shallow, longitudinal furrows, and at the end with four squarely placed membranous teeth, the two upper small and somewhat distant the two lower nearer to each other, longer, and with the apex directed upwards. The posterior spiracles lie between the teeth. — The pupa is 5 mm long and 1 mm thick (shrivelled), yellowish. At the lower side of the frons there are two, approximately placed, compressed protuberances, each with two small spines or teeth, and with a hair at the anterior end; more posteriorly on the lower side there are two small protuberances, forming a transverse ridge, and in front of this, in the middle, two short hairs. There are two long spiracular tubes on the front part of the thoracic dorsum, and on the dorsal side of thorax are some hairs. The abdominal segments have each dorsally a transverse girdle of bristly teeth of unequal length. The sheaths of the legs reach to the end of abdomen. — The larva was found in a forest of beech-trees in the ground below leaves on 28.4, the imago came on 4/6.

The species of *Sciapus* are characteristic by their slender shape and long legs. They occur in low herbage and in foliage on shaded and humid places, especially near water; they may also, at all events some species, often be seen on tree-trunks and palings. I have taken

S. platypterus with a small Arachnid as prey, and I have observed *S. Wiedemanni* attacking a small fly.

Of the genus about 36 species are known from the palæarctic region; 5 have been found in Denmark.

Table of Species.

1. Hind metatarsi much longer than the second joint; in the male either the fourth joint of the front tarsi compressed and dilated, but not lobed, or the middle tarsi with the third and fourth joint compressed and white 2.
- Hind metatarsus as long as or slightly longer than the second joint; in the male either the fourth joint of the front tarsi lobed, or all tarsi simple 3.
2. Epistoma rather narrow in both sexes; posterior cross-vein straight; wings in the male broad, and middle tarsi with the third and fourth joint compressed and white. . . . 1. *platypterus*.
- Epistoma broad in both sexes; posterior cross-vein very or somewhat curved outwards; wings in the male not broad, and front tarsi with the fourth joint compressed and dilated 2. *nervosus*.
3. Posterior cross-vein considerably longer than the last part of the postical vein; posterior coxæ yellow, or only slightly greyish; fourth joint of front tarsi lobed in the male . . 3. *Wiedemanni*.
- Posterior cross-vein shorter, or at most as long as the last part of the postical vein; posterior coxæ, or at all events middle coxæ, distinctly grey; tarsi in the male simple 4.
4. Abdomen without bands; frons greenish. 4. *longulus*.
- Abdomen with conspicuous bands; frons grey 5. *contristans*.

1. *S. platypterus* Fabr.

1805. Fabr. Syst. Antl. 270, 20 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 36, 2, Tab. XXXIV, Fig. 14 (*Psilopus*). — 1862. Schin. F. A. I, 182 (*Psilopus*). — 1903. Kat. paläarkt. Dipt. II, 291. — *Leptopus tipularius* Fall. 1823. Dipt. Suec. Dol. 23, 1. — *Psilopus tipularius* Zett. 1843. Dipt. Scand. II, 623, 1, et 1849. VIII, 3105, 1, et 1855. XII, 4643, 1, et 1859. XIII, 5071, 1.

Male. Head higher than broad; vertex and frons grey, bristles black. Epistoma narrow, greyish white. Palpi whitish, a little yellowish. Occiput grey; the postocular hairs white, downwards somewhat long, and the whole lower part of occiput covered with hairs; above the postocular hairs are a little yellowish, and the uppermost are a little stronger, and one or more may be black. Antennæ yellow or ferruginous, the third joint and the arista brown or blackish brown. Thorax metallic green, greyish pruinose and hence dull; the

pruinosity especially dense in front, the posterior part and scutellum less pruinose, slightly shining; there are generally three less pruinose and thus more green stripes. The acrostichal hairs are small and yellow anteriorly, longer behind; the bristles black; there

Fig. 4. Antenna of *S. platypterus*. $\times 65$.

are two supraalar bristles. Scutellum with two black bristles and on each side a smaller hair. Pleura grey or slightly greenish grey, a little pale just below the humeri and above the middle coxæ, and the part of the hypopleura above the hind coxæ (metaepimera) yellow. Abdomen metallic green, less pruinose than thorax and thus a little more shining; the incisures form brown, transverse bands, the brown colour lying mainly at the anterior margin of the segments. Abdomen is clothed with hairs, which are mainly black above, yellowish at the sides and above anteriorly; at the hind margin of the segments there are long, black, bristly hairs, which are strongest on the two last segments; on the first segment they are yellow and very long. Venter yellow or brownish yellow, palest towards the base, with yellow hairs. Hypopygium of moderate size, somewhat rectangular in contour, black; the anterior part is metallic shining, the posterior part finely, longitudinally striated; the eighth segment is somewhat pruinose, pale-haired at the upper part; the hypopygium is rather deeply incised on the dorsal side, so that the outer lamellæ issue somewhat dorsally; these latter are small, narrow and curved downwards or outwards at the apex; they are brown and brownish hairy at the margin; the inner lamellæ are almost quite hidden. The sheath of the penis reaches to the end of the hypopygium. Legs yellow, front coxæ and femora whitish; the hind femora may be very slightly darkened at the tip above, hind tibiæ likewise very slightly darkened in the middle, and hind tarsi towards the tip, the last joint black. The front metatarsus is shorter than the four following joints; the middle tarsi have the third and fourth joints somewhat compressed, snow-white, the fourth black at the apex and the fifth joint black; the metatarsus is longer than the other four joints; the hind metatarsus as long as the four following joints. The front coxæ have longish, white hairs and a row of bristles on the anterior side; the posterior coxæ whitish hairs on the outer side, and each with a stronger bristle; for the rest the legs have short, black or brownish black hairs, only the front femora have yellow hairs beneath, which

just at the apex are long and form a tuft, the hairs of which are curled at the apex. The posterior femora are bare beneath, they have small preapical bristles, and the posterior tibiæ short bristles on the various sides. Wings very broad, especially towards the apex, slightly yellowish; veins brown; first posterior cell narrowly open; the lower branch of the discal fork going straight forwards, forming

Fig. 5. Wing of *S. platypterus* ♂.

no angle with the stem, stopping a little before the margin; the postical vein a little curved at the apex; the posterior cross-vein about as long as or a little shorter than the part of the discal vein to the fork, and shorter than the last part of the postical vein. Squamulae yellow, blackish just at the tip, with a yellow fringe. Halteres yellow.

Female. Head as broad as high. Epistoma broader than in the male, but however rather narrow. Palpi with a somewhat strong bristle. Front coxae with stronger bristles than in the male, and front femora with five strong, spine-like bristles below; middle metatarsi simple; hind metatarsi about as long as the two following joints. The transverse bands on abdomen generally less pronounced or almost wanting, and the long hairs on the first segment black. Wings of the usual shape.

Length 3.5–6 mm; the male is longer than the female.

S. platypterus is common in Denmark; Copenhagen in gardens, Charlottenlund, Ermelund, Dyrehaven, Bøllemsen, Lyngby Mose, Ørholm, Hillerød, Tisvilde, Nordskoven at Jægerspris, Svenstrup between Roskilde and Ringsted, Sorø; on Langeland at Lohals; on Funen at Odense, Hoffmansgave, Veflinge and Strib; in Jutland in Vejle Nørreskov, at Nebsager near Horsens, Horsens, Ry, Silkeborg, Hald near Viborg and Frederikshavn; finally on Bornholm at Hammeren, Rø, Allinge and Almindingen. My dates are $19/6$ – $11/8$. It occurs in low herbage and on bushes in humid places and near water, and it is

also often seen on tree-trunks and palings, sometimes in great number. I have once taken it (the female) with a young and very small Arachnid as prey.

Geographical distribution:— Europe down into France; towards the north to northern Sweden; and in Finland, but becoming rare towards the north.

2. *S. nervosus* Lehm.

1822. Lehm. Programm. 1822, 40 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 36, 3 (*Psilopus*). — 1849. Zett. Dipt. Scand. VIII, 3106, Obs. 3, (*Psilopus*). — 1857. Loew, Neue Beitr. V, 2, 2 (*Psilopus*). — 1862. Schin. F. A. I, 181 (*Psilopus*). — 1903. Kat. paläarkt. Dipt. II, 291.

Male. Head much broader than high; vertex and frons green, yellowish grey pruinose; bristles black. Epistoma very broad, slightly bluish metallic, but densely whitish grey pruinose. Palpi yellow. Occiput slightly bluish, grey pruinose; postocular hairs white; the lower part of occiput covered with long, white hairs. Antennæ yellow, the third joint brown at the apex, and the arista brown. Thorax bright golden green, sometimes more bluish or blue, especially behind and on the scutellum; it is a little greyish or greyish yellow pruinose, most densely anteriorly and on the sides. The acrostichal bristles are only represented by some very small and short, pale hairs in front; the bristles black; there are three supraalar bristles, the first short, the second a little longer. Inwards to the humeri are some longish, pale hairs. Scutellum with two black bristles, and a small bristle on each side. Pleura a little metallic blue, and bluish grey pruinose. Abdomen golden green, more or less coppery; it is clothed with yellowish hairs, which are long at the sides, longest anteriorly; at the hind margin of the segments are black bristles, on the first segment they are pale, and not much marked from the long hairs. Venter pale-haired. Hypopygium small; the eighth segment relatively large, grey pruinose; there are very long, linear ventral lobes, they are brownish, serrated at the margin, and with long, yellow hairs; the outer lamellæ are united to a short lobe with hairs at the margin; below this lobe lie some appendages, probably inner lamellæ, the shape of which I could not see in my specimen, but which at all events terminate with a pair of hooks, which are serrated or bear short, stiff bristles at the ventral margin; below them are still a pair of other appendages; the appendages seem thus principally to be the same as in *Wiedemanni*. Legs yellow, posterior coxæ a little grey at the base; the last tarsal joint brown or blackish. The front metatarsus is much longer than the four following joints, the fourth joint

is compressed, dilated dorsally and drawn out into a point; it is like the fifth joint brown or blackish: the middle metatarsus is much longer, and the hind metatarsus about as long as the four following joints. Front coxæ with long, somewhat bristly, white hairs; posterior coxæ with white hairs on the anterior and outer side. The front femora are somewhat thickened at the base, and have about five very long, white, somewhat curled hairs, and apically to them some shorter hairs; for the rest the legs have short, chiefly brownish hairs, pale below the femora; the hind femora have some long, pale hairs at the base on the posterior side; the hind femora have a preapical bristle, and the hind tibiæ small bristles on the various sides. Wings hyaline or slightly yellowish; veins brown; the discal vein is doubly curved, the lower branch of the fork quite short; the posterior cross-vein curved very much outwards, situated about in the middle of the wing and thus shorter than the part of the discal vein to the fork; the part of the postical vein after the cross-vein short and weak, not reaching the margin. The wings have an incision in the hind margin at the anal vein; the axillary lobe very large. Squamulæ yellow with a blackish margin and a yellow fringe. Halteres yellow.

Female. Epistoma not broader, or even scarcely as broad as in the male. Front femora with about five strong bristles below; front tarsi simple; hind metatarsus shorter than in the male. Wings with the discal vein slightly curved, the lower branch of the fork and the last part of the postical vein longer, prolonged to or almost to the margin; the posterior cross-vein curved much less outwards, situated more apically and not much shorter than the part of the discal vein to the fork; no incision in the hind margin of the wing, and the axillary lobe smaller.

Length 4—6,5 mm.

S. nervosus is very rare in Denmark, we have only one male and one female, from Westermann's collection, labelled Sealand, June 1824.

Geographical distribution:— Northern and middle Europe down into France; its northern limit is in Denmark.

3. *S. Wiedemanni* Fall.

1823. Fall. Dipt. Suec. Dol. 24, 2 (*Leptopus*). — 1830. Meig. Syst. Besch. VI, 360 (*Psilopus*). — 1843. Zett. Dipt. Scand. II, 625, 2, et 1849. VIII, 3105, 2, et 1855. XII, 4643, 2 (*Psilopus*). — 1862. Schin. F. A. I, 182 (*Psilopus*). — 1903. Kat. paläarkt. Dipt. II, 292.

Male. Head broader than high; vertex and frons greenish grey, the bristles black. Epistoma broad, white, finely pubescent. Palpi yellow, with whitish hairs and one bristle. Occiput grey, the post-

ocular hairs white, the uppermost very short, black; the lower part of occiput covered with white hairs. Antennæ yellow, the third joint and the arista brown or blackish brown. Thorax metallic green, somewhat densely greyish or brownish pruinose, dull; it is most densely pruinose anteriorly, and indistinctly striped. Scutellum less pruinose. The acrostichal hairs are stronger than in *platypterus*, black like the other bristles; there are three supraalar bristles, the hindmost longest. Scutellum with two black bristles, and on each side a small hair. Pleura grey, metaepimera yellowish. Abdomen metallic green, slightly pruinose, the incisures forming brown transverse bands, lying mainly at the anterior margin of the segments. Abdomen clothed with short, black hairs, at the sides anteriorly they are longer and yellow; at the hind margin of the segments are black bristles, they are long on the first segment, and also here black. Venter yellow, with yellow hairs; the yellow colour may stretch in on the side margins of the first segments. Hypopygium somewhat small, and quite different from that in *platypterus*; the eighth segment grey, sparingly covered with pale hairs; the hypopygium has somewhat triangular, yellow middle ventral lobes, and long, styliform posterior ventral lobes; these latter are curved towards each other, they are yellow with black apex; at the base of each a long, thin hair is seen. The outer lamellæ are united to a small, yellow median lobe, with long, black hairs at the apex, and pale hairs above. Below the said lobe lies a vertically placed, somewhat rhomboidal, yellow piece, which bears two haired styliform processes at the apical corner, and two brushes of curved hairs at the ventral corner; I have not been able to decide, whether the rhomboidal piece is paired or single, but I think the whole answers to the inner lamellæ.¹ The sheath of penis reaches to the end of the hypopygium. Legs yellow, the front coxæ whitish, the four last tarsal joints on the posterior

Fig. 6. Hypopygium of *S. Wiedemanni*.

¹ I think the above interpretation of the parts of this curious hypopygium is correct, as the places, from which the parts issue, seem to me to allow no other interpretation; moreover the structure is then in accordance with the figure of the hypopygium of *S. (Gnamptopsilopus) filipes* given by Snodgrass (Pl. XXXIII, figs. 4—6) in the work cited in the introduction, but this species seems to have no inner lamellæ.

tarsi brown, and also the extreme tip of metatarsus; the front tarsi slightly brownish, the fourth joint with a black lobe at the apex on the dorsal side and the fifth joint black; the metatarsus on the anterior legs longer than the four following joints, on the hind legs a little longer than the second joint. The front coxæ with white hairs and some fine bristles on the anterior side, the posterior coxæ sparingly yellowish haired on the outer side, the hind coxæ with a pair of small bristles. The front femora with whitish hairs below, and with five longer, bristly hairs; for the rest the legs with short, blackish or brownish hairs, the middle femora bare beneath; there is a small preapical bristle on the hind femora, a somewhat long bristle at the base on the anterior side of the middle tibiæ, and very small bristles on the ventral and dorsal side of the hind tibiæ; for the rest the legs are bristleless, and the apical bristles on the tibiæ very small; the

Fig. 7. Wing of *S. Wiedemanni* ♂.

hairs on the middle tibiæ are curiously erect, not adpressed as in *platypterus*. Wings slightly yellowish; veins brown or blackish brown; first posterior cell narrowly open; the curvature of the upper branch of the discal vein slighter than in *platypterus*; the lower branch of the discal fork forming an angle with the stem, stopping long before the margin; the last part of the postical vein straight; the posterior cross-vein considerably longer than the discal vein to the fork, and than the last part of the postical vein. Squamulæ yellow, blackish just at the tip, with a yellow fringe. Halteres yellow.

Female. Epistoma hardly any broader than in the male. Palpi with two bristles. The transverse bands on abdomen narrow, or almost wanting. The bristles on the front coxæ a little stronger and the front femora with five (sometimes four or six) spine-like bristles below; the legs more bristly than in the male, as there are small bristles on the dorsal side of the front tibiæ and on the various sides of the middle tibiæ, also a bristle near the base on the anterior side of the hind tibiæ. The hairs on the middle tibiæ not splayed out;

the hind metatarsus about as long as the second joint. The upper branch of the discal vein more rectangularly curved.

Length 4—6 mm; the male is longest.

This species externally resembles *platypterus* somewhat, but they are easily distinguished; the males are at once recognised by the wings, the legs and the hypopygium, and also the spinulation of the legs is quite different; the females are more like each other, especially as the legs are spinulated in about the same way, but they are easily distinguished by the narrow epistoma and the longer hind metatarsus in *platypterus*, characters which are present in both sexes.

S. Wiedemanni is common with us; Copenhagen, Vester Fælled, Charlottenlund, Dyrehaven, Fure Sø, Hillerød; Tisvilde and Rørvig; on Langeland at Lohals; on Funen at Odense and Faaborg; in Jutland at Silkeborg, Ry, Laven and Funder near Silkeborg, Hald near Viborg, Aalborg and Frederikshavn; finally on Bornholm at Hasle and Almindingen. My dates are $19/6$ — $7/8$. It occurs in low herbage and on bushes, and it seems to be most common near the coast.

Geographical distribution:— Europe down into Spain; towards the north to middle Sweden; and in Finland.

4. *S. longulus* Fall.

1823. Fall. Dipt. Suec. Dol. 24, 4 (*Leptopus*). — 1830. Meig. Syst. Besch. VI, 361, 10 (*Psilopus*). — 1843. Zett. Dipt. Scand. II, 629, 6 et 1849. VIII, 3107, 6 et 1859. XIII, 5072, 6 (*Psilopus*). — 1903. Kat. paläarkt. Dipt. II, 291. — *Psilopus lugens* Meig. 1824. Syst. Besch. IV, 38, 6. — 1843. Zett. Dipt. Scand. II, 628, 5 et 1849. VIII, 3106, 5. — 1862. Schin. F. A. I, 182. — *Psilopus obscurus* Meig. 1824. Syst. Besch. IV, 39, 7.

Male. Head broader than high; vertex and frons green, shining, slightly dusted; bristles black. Epistoma broad, green, greyish yellow dusted. Palpi yellowish, with pale hairs and one dark bristle. Occiput greyish green; the upper postocular hairs black, the others together with the hairs on the lower part of occiput whitish. Antennæ with the basal joints yellow or brownish, darkened above and at the apex of the second joint; the third joint and the arista black. Thorax green, slightly dusted, and with indications of two more dusted stripes; the bristles black, the acrostichal bristles small; there are three supralar bristles. Scutellum with two black bristles and on each side a small hair. Pleura grey, slightly greenish. Abdomen green, shining, darker incisures very narrow and inconspicuous; it is clothed with hairs, which are mainly black, but yellow at the sides and partly anteriorly; the long hairs on the first segment black; at the hind

margin of the segments there are black, bristly hairs. Venter somewhat greyish, with pale hairs. Hypopygium rather small, blackish grey at the basal part, the appendages yellow; it is constructed almost as in *Wiedemanni*, but is relatively shorter, and there is no

Fig. 8. Hypopygium of *S. longulus*.

distinct middle ventral lobe; the posterior ventral lobes styliform and curved towards each other, black at the apex; at the base of each lobe are two hairs, placed on a peduncle; the outer lamellæ are united and bear long, black hairs at the apex; the basal part of the inner lamellæ is not formed as in *Wiedemanni*, but is simple and straight, the styliform apices project beyond the outer lamellæ in such a way, that it looks as if they were prolongations of this. Legs yellow, posterior coxæ grey, the hind pair a little yellowish behind, tarsi dark brown or blackish. Front metatarsi as long and middle metatarsi almost as long as the four following joints, hind metatarsi very slightly longer than the second joint. On the middle tarsi the first, second and third joints are a little dilated at the end. The front coxæ have a row of spine-like, yellow bristles at the anterior side, the middle coxæ have some yellow hairs, and the hind coxæ a yellow bristle on the outer side. The front femora have five yellow bristles below; for the rest the legs have short, brownish or blackish hairs, and they are almost bristleless; the middle femora bare below; of bristles there are only some small ones on the front tibiæ above, and a row above on the hind tibiæ, further a preapical bristle on the hind femora, and a bristle near the base on the anterior side of the middle tibiæ; the apical bristles on the tibiæ small; the hairs on the middle tibiæ are erect. Wings hyaline or a little greyish; veins blackish, the lower branch of the discal fork somewhat faint; the posterior cross-vein about as long as the discal vein to the fork, and shorter than the last part of the postcal vein. Squamulæ yellow, with a yellow fringe. Halteres yellow.

Female. Epistoma not broader than in the male. The acrostichal bristles few and generally only present anteriorly. Hind coxæ yellow; the front femora seem always to have only four bristles below; the legs are more bristly than in the male, as there are more and longer bristles on the tibiæ, and also the hind tibiæ have a bristle near the base on the anterior side. The upper branch of the discal fork more rectangularly curved (though varying in this respect).

Length 2,7—3,8 mm.

This species is in the male easily distinguished from the preceding by the simple tarsi; in the female the grey middle coxæ and the green frons are good characters, as also the four bristles below the front femora; finally the species is much smaller and less pruinose.

S. longulus is much less common in Denmark than *platypterus* and *Wiedemanni*; Lersøen, Charlottenlund, Ordrup Mose, Dyrehaven, Tisvilde; on Langeland at Lohals, and on Bornholm at Allinge. My dates are $2\frac{1}{7}$ — $29\frac{1}{7}$. It occurs in low herbage and on leaves on humid and shaded places.

Geographical distribution:— Northern and middle Europe down into France (Corsica); towards the north to middle Sweden.

5. *S. contristans* Wied.

1817. Wied. Zool. Mag. I, 72, 19 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 627, 3, et 1849. VIII, 3106, 3 (*Psilopus*). — 1857. Loew, Neue Beitr. V, 5, 9 (*Psilopus*). — 1862. Schin. F. A. I, 181 (*Psilopus*). — 1871. Loew, Beschr. eur. Dipt. II, 306, nota (*Psilopus*). — 1903. Kat. paläarkt. Dipt. II, 290. — *Psilopus regalis* Meig. 1824. Syst. Besch. IV, 35.

Male. Head broader than high; vertex and frons greyish white, bristles black. Epistoma broad, white. Palpi pale yellow, with pale hairs and a small, black bristle. Occiput grey; postocular hairs white, and the lower part of occiput covered with white hairs; the uppermost postocular hairs black. Antennæ with the basal joint yellow, the third joint and the arista black, the second joint more or less brown or black. Thorax grey, a little greenish, but only slightly metallic, dull, whitish about the humeri; the bristles black; the acrostichal bristles rather large; there are three supraalar bristles, the hindmost longest. Scutellum with two black bristles, and on each side a small hair. Pleura whitish grey. Abdomen greyish green, somewhat pruinose, with broad, dark brown transverse bands at the anterior margin of the segments; the bands do not reach the side margins, and on the second segment there is only a middle spot. Abdomen is clothed with black hairs along the dorsum, yellow hairs at the sides and on the first segment; at the hind margins there are rather small bristles, longest at the sides, the first segment has long, black marginal bristles. Venter greyish, with pale hairs. Hypopygium rather small, it is constructed quite as in *Wiedemanni*, but the appendages are darker to black. Legs yellow, the posterior coxæ grey, a little yellowish at the apex, and the hind coxæ on the posterior side; all tarsi brownish black, the metatarsi except the apex lighter. Front

metatarsi about as long as, middle metatarsi a little shorter than the four following joints, hind metatarsi about as long as the second joint. The three first joints on the middle tarsi very slightly dilated at the end. Front and middle coxæ with white hairs on the anterior side, hind coxæ with a pair of bristles on the outer side. The front femora have white hairs below, but no bristles; for the rest the legs are haired with short, dark hairs, the middle femora bare below. The legs are almost bristleless, there is only a preapical bristle on the hind femora, a bristle near the base on the anterior side of the middle tibiæ, and small bristles on the hind tibiæ; besides there are small, pale, bristly hairs below the middle femora; the apical bristles on the tibiæ small; the hairs on the middle tibiæ are not erect. Wings slightly yellowish; veins brownish black; the first posterior cell very narrowly open; the lower branch of the discal fork faint, not reaching the margin, the posterior cross-vein longer than the part of the discal vein to the fork, but shorter or at most about as long as the last part of the postical vein. Squamulæ yellowish white, blackish just at the tip, with a whitish fringe. Halteres whitish.

Female. Epistoma not broader than in the male. Front coxæ with a row of bristles, and front femora with five (four to six) spines beneath; the anterior tibiæ with some small bristles.

Length 3—4.5 mm.

This species is easily distinguished in both sexes by the conspicuous bands on abdomen, and from *longulus* besides by the grey frons.

Remarks: Zetterstedt says that the female of this species has six spines below the front femora, and Loew (l. c. 1871) notes, that this is generally the case, but that it may also have five or four; by far the most of my specimens have five, only a couple of specimens have six on one femur, but five on the other. About *S. zonatulus* Zett. (II, 628, 4) the author says that it has five spines; according to the above this distinction has thus no value; Zetterstedt notes two other characters for *zonatulus*, viz. epistoma "sordide cano", and the abdominal segments 2—5 "subcoerulescenti viridibus, nitidissimis, basi nigrofasciatis"; he concludes that he does not consider it a rubbed variety of *contristans*, but I think it is only somewhat fattened specimens of *contristans* as both the mentioned characters are just present in such specimens.

S. contristans is not properly common in Denmark, but has however been taken at many localities; Geel Skov, Tisvilde, Rørvig; on Langeland at Lohals; on Funen at Odense and Veflinge; in Jutland at Sminge near Silkeborg, Hald near Viborg and Frederikshavn, and

on Bornholm at Allinge. My dates are $2\frac{1}{6}$ to the first part of August. It occurs on the same places as the preceding one.

Geographical distribution: — Europe down into Spain; towards the north to middle Sweden.

2. **Neurigona** Rond.

Species of slender shape with a long, narrow abdomen; colour not metallic, yellow, or thorax grey and abdomen yellow, and sometimes thorax grey in the male, yellow in the female. Head about as broad as, or slightly broader than thorax, and sometimes a little higher than broad, at other times broader than high; the greatest breadth lies above the middle; the head is short, almost flat behind; vertex somewhat excavated, the ocellar tubercle prominent. Frons broad, a little decreasing in breadth towards the antennæ. There are ocellar, outer vertical and postvertical bristles, and on the ocellar tubercle a pair of small or very small hairs. Eyes large, somewhat oval, but narrowed downwards; they are very slightly, only microscopically hairy, and in the living specimens they are brightly metallic green; they are generally separated below the antennæ, sometimes contiguous here in the male (*Erichsoni*). The facets in the male slightly enlarged towards the epistoma, most so when the eyes are contiguous; they are also very slightly enlarged in the female. The postocular bristles form a single row, besides there are some bristles on the lower part of occiput. The antennæ are inserted somewhat above the middle, near to each other; they are short, five-jointed, of the same shape in both sexes; the basal joints are obconical, the second very short, a little longer on the inside than on the outside;

Fig. 9. Antenna of *N. quadrifasciata*. From the inside. $\times 80$.

the third joint also short, truncately triangular with a somewhat reniform base; it is somewhat compressed, bearing a dorsal, two-jointed arista, with a short basal joint; the first antennal joint has no hairs above, the second joint has a circlet of small bristles at the apex, longest above, the third joint is distinctly hairy, and the arista has short hairs. Epistoma narrow, a little broader in the female, sometimes widening a little downwards; when the eyes are contiguous below the antennæ the epistoma is only present above and below.

Clypeus shorter or longer, sometimes as long as epistoma; it is marked off by a small, transverse keel, and generally bent a little inwards; it does not reach the lower margin of the eyes. Proboscis slightly or not protruding, of the same size in both sexes, or only very slightly larger in the female. The mouth parts (*quadrifasciata*) are constructed about as in *Sciapus*; labrum broad and high at the base, with a shorter median and two longer lateral teeth, the latter in the natural position lying below the median on account of the semitubular curvature of the labrum. Hypopharynx elongated triangular, curved downwards at the apex, as long as labrum. Maxillary palpi and labium as in *Sciapus*. There is the difference from *Sciapus* that the parts are less strongly chitinated, both labrum, hypopharynx and labium, with the basal part, are yellow, only the apex of hypopharynx is black. Thorax rectangular, high, somewhat arched above; prothorax small, with small bristles above, metathorax likewise small, and there is no chitinated metasternum. The thoracic disc has behind, in front of the scutellum, a somewhat, large flat or slightly concave and a little declining area. The acrostichal bristles biserial; there are about six to eight dorsocentral bristles (the number is not constant) increasing in length behind; further a humeral bristle, and often a weaker, a posthumeral, two notopleural, a small praesutural, three supraalar, the two first small, the third long, and a postalar bristle; besides the anterior part of the disc has small hairs, among which the praesutural bristle is sometimes less distinct, and they are also sometimes only slightly marked off from the anterior dorsocentral bristle. There is one or two prothoracic bristles, and generally one or a couple of small hairs above it. Scutellum bare, with two marginal bristles, and generally a small hair on each side. Abdomen long and slender; the first segment is short, and its ventral plate weakly chitinated. In the male there are five, always visible and distinct, dorsal segments, segments two to four of about the same length, the fifth generally smaller, and sixth and seventh, when visible, small, forming a sort of peduncle for the hypopygium, but sometimes hidden. The male abdomen is otherwise variously shaped in the various species; the side margins of the last dorsal segments may be prolonged downwards in different ways; in most species the fifth segment has on the ventral side two dentiform prolongations, prolonged more or less forwards, and which together form a sort of cavity for the hypopygium; the other ventral segments are normal. The abdomen of the male is also variously haired in the various species, sometimes the hairs at the sides increase in length towards behind. The hypopygium is free, somewhat large; it is deeply in-

cised above, the outer lamellæ thus placed near the middle; these latter are small, more or less hidden; the inner lamellæ are for the most part hidden, only some small, styliform appendages may be seen. In the female the abdomen is a little less slender; it consists of five normal segments, the rest more or less hidden, and it ends with a small ovipositor, consisting of two styles. Abdomen has either no dot-like impressions at the sides, or they are indistinct, I have only observed them on the second segment of the female of *pallida*, just as remarked by Oldenberg (Zeitschr. f. syst. Hymn. und Dipt. IV, 1904, 71). There are short, somewhat indistinct hindmarginal bristles, only long on the first segment. Legs long and slender, the coxæ elongated; in the male the front tarsi may be adorned (*quadri-fasciata*); the hind metatarsus shorter than, rarely as long as the second joint, without bristles above. The legs are haired with short hairs and have some bristles; the posterior tibiæ have apical bristles, the front tibiæ none; the hind coxæ have one bristle on the outer side; the femora have no preapical bristles, but there may be a small hair at the apex on the posterior side of all femora. There are two claws, two pulvilli, and a small, lobe-shaped empodium with bristles or spines below; sometimes the claws and pulvilli on the front tarsi are enlarged in the male (*Erichsoni*, and to a less degree *cilipes* [non Danish]). The wings have the mediastinal vein terminating in the subcostal vein; the discal vein is more or less bent, and with a distinct convexity at the bend; the anal vein somewhat long and reaching the margin, sometimes it is rather long; the posterior cross-vein about in the middle or more apical; the axillary lobe is generally somewhat developed, sometimes wanting in the male (*suturalis*). Squamulæ small, and the angular lobe not much developed; it has a fan of long hairs; the inner part of squamulæ is short-haired. On the pteropleura below the squamulæ there is a small, somewhat membranous process. — In some foreign (African) species the discal vein is straight or almost so, and the posterior femora have a pre-apical bristle —.

The developmental stages of *N. quadrifasciata* have been described by Beling (Arch. für Naturgesch. 48, I, 1882, 223). The larva is 9 mm long, 1,2 mm in diameter, cylindrical, yellowish white; it consists of twelve segments; the last segment is somewhat shorter than the eleventh, and somewhat thickened towards the end; it has very shallow, longitudinal furrows; the posterior surface is rounded, without teeth, and has in the middle the spiracles. The prothoracic spiracles lie on the second segment. The fifth to eleventh segment have on the ventral side small, transverse swellings (Kriechschwielens). — The

pupa is 5 mm long and 1.7 mm in diameter, dirty whitish; on the front end there is a short projection with two teeth, and to each side of this is a long hair, pale at the base, blackish outwards. Thorax anteriorly with two spiracular tubes, and on the disc with some hairs. The second and eighth abdominal segments with a girdle of short, fine, depressed bristles on the dorsal side, the interjacent segments with similar, but longer bristles, placed on a brown band. The sheaths of the legs reach to the end of abdomen in the female, but farther behind in the male. The larva was found in humous earth under leaves in a forest of beech-trees on ⁶/₄ and ²⁹/₄ and the imago came on ⁷/₅ and ³⁰/₅.

The species of *Neurigona* may occur on meadows and on open, humid and shaded places in woods on the foliage, but they are, I think, most often seen on tree-trunks. The males are generally more rare than the females: Kowarz communicates (Verh. zool. bot. Gesell. Wien, XXIX, 1869, 566), that he saw a male of *Erichsoni* flying repeatedly along a tree-trunk from below upwards, and he thinks this behaviour is common for the males in this genus; this is, I think, correct, as I have observed the males of *suturalis* and *quadri-fasciata* behaving just in the same way.

Of the genus 10 species are known from the palæarctic region; 5 occur in Denmark.

Table of Species.

1. Thorax grey in both sexes, or yellow in the female, but then with a grey spot, and the bands on abdomen incised	2.
— Thorax yellow in both sexes, abdomen unbanded, or the bands not incised	4.
2. Front tarsi in the male adorned; thorax in the female yellow with a greyish spot	1. <i>quadrifasciata</i> .
— Tarsi in the male simple; thorax grey in both sexes . . .	3.
3. Wings infuscated towards the anterior margin; abdomen with narrow bands; discal vein scarcely bent, posterior cross-vein considerably behind the middle of the wing	3. <i>suturalis</i> .
— Wings not infuscated at the anterior margin; abdomen unbanded; discal vein bent, posterior cross-vein near the middle of the wing	4. <i>abdominalis</i> .
4. Front tarsi in the male much longer than tibiæ; abdomen unbanded	2. <i>pallida</i> .
— Front tarsi in the male shorter than tibiæ, abdomen banded	5. <i>Erichsoni</i> .

1. *N. quadrifasciata* Fabr.

1781. Fabr. Spec. Ins. II, 448, 69 (*Musca*) et 1794. Ent. Syst. IV, 342, 126 (*Musca*) et 1805. Syst. Antl. 269, 16 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 48, 7 (*Porphyrops*) et 1838. VII, 154, 9 (*Argyra*). — 1843. Zett. Dipt. Scand. II, 614, 101 et 1849. VIII, 3098, 101 (*Dolichopus*). — 1862. Schin. F. A. I, 183. — 1903. Kat. paläarkt. Dipt. II, 293.

Male. Vertex and frons grey, the bristles black. Epistoma narrow, light grey. Palpi yellowish. Occiput grey, the postocular bristles yellowish white. Antennæ yellow, arista brown. Thorax grey, in the middle two indistinct darker stripes, separated by a slightly lighter space; the humeri yellowish. Scutellum yellow, with two black bristles, and on each side a small hair; postscutellum grey. Pleura grey, posteriorly a little yellowish, below the squamulæ a small, blackish spot; there is a white prothoracic bristle. Abdomen yellow, somewhat shining; the sixth and seventh segments visible; at the anterior margin of the second, third and fourth segments there is a transverse black or blackish brown band (on the second segment it lies a little behind the margin); the bands are more or less incised behind in the middle; the sixth segment is blackish towards the hind margin. The fifth segment has two black, triangular ventral teeth. Abdomen is clothed with short, blackish hairs, almost not longer at the hind margin of the segments, only the first segment has long, black bristles at the hind margin; at the side margin of the segments on the last half part of abdomen the hairs are longer and more or less pale, also at the end of the fourth segment there are pale hairs, and the fifth segment is pale-haired and with long and dense, yellow bristles at the hind margin. Venter yellow with yellow hairs. Hypopygium black or blackish, shining, almost rectangular, with small middle and posterior ventral lobes; the eighth segment has a few pale hairs and is slightly pruinose at its posterior margin. The hypopygium is deeply incised above, so that the outer lamellæ are placed about in the middle; these latter are small, whitish, hairy at the margin; of the inner lamellæ a small, styliform part is seen below, ending with an upwards turned spine. Legs yellow, front tarsi with the third and fourth joints plumed with black hairs at the sides; the first two joints long; the middle metatarsus longer than the four following joints and the hind metatarsus a little shorter than the second joint. The anterior coxæ with some bristly hairs anteriorly, the hind coxæ with a black bristle on the outer side. The legs clothed with short, brown or blackish hairs, the femora bare beneath, only the hind femora here with short hairs; the middle tibiæ with some bristles, especially on the anterior side, the hind tibiæ likewise, especially on the dorsal

side, and both pairs with apical bristles; also the posterior metatarsi with a few bristles. Wings slightly yellowish; veins brown; the axillary lobe a little pronounced; the discal vein with a somewhat strong bend, the first posterior cell rather broadly open. Squamulæ whitish yellow, with a yellow fringe. Halteres yellow.

Fig. 10. Wing of *N. quadrifasciata* ♂.

Female. Epistoma very slightly broader than in the male. Thorax yellow, in front of the scutellum a grey patch, which is sometimes somewhat indistinct, and generally with indications of three greyish stripes produced from the patch forwards. Postscutellum more or less grey. Pleura yellow, very slightly greyish pruinose, with a small, blackish spot as in the male. The four transverse bands on abdomen are more or less deeply incised in the middle of the hind margin, often so much as to be nearly divided into two spots. Legs simple.

Length 3,5 to about 5,5 mm; the male is longer than the female.

N. quadrifasciata is somewhat common in Denmark; Copenhagen in a garden, Ørdrup Mose, Ermelund, Dyrehaven, Geel Skov, Tisvilde, Soro, and in Jutland at Sæby. My dates are ¹⁰ 6—²⁰ 7. It may occur in high grass on meadows, and in herbage and on foliage on humid, shaded places, but especially on tree-trunks. Schiner says that only the female is common, the male rather rare, but I think he has not sought for it on trunks; I found both sexes in great number in Dyrehaven on ²⁷ 6 and ²⁹ 6; they were present on almost every tree-trunk I examined, the males flying vertically along them; on the latter date many copulated pairs were taken.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden.

2. *N. pallida* Fall.

1823. Fall. Dipt. Suec. Dol. 21, 29 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 611, 97 (*Dolichopus*). — 1862. Schin. F. A. I, 183. — 1903. Kat. paläarkt. Dipt. II, 293. — *Porphyrops ochraceus* Meig. 1824. Syst. Besch. IV, 58, 29. — *Medeterus ochraceus* 1838. Meig. ibid. VII, 155.

Male. Vertex and frons grey; postvertical bristles yellow, sometimes one or both black; the other bristles black. Epistoma narrow.

white. Palpi white. Occiput grey; postocular bristles yellow, rarely the uppermost black. Antennæ yellow, arista brown. Thorax yellow, slightly greyish pruinose, dull. Scutellum yellow, with two black marginal bristles, and on each side a small hair; postscutellum more or less blackish. Pleura yellow, greyish white pruinose, more or less blackish grey below the wing-root, on the front part at the lower margin and above the posterior coxæ; propleura with about two pale bristles. Abdomen yellow, somewhat shining; the sixth and seventh segments short, more or less visible; the fifth segment black, only yellow just above; the fourth segment has the sides prolonged downwards anteriorly, so that it is broad here, the side margins are sloping upwards behind, the segment thus narrowed backwards; the fifth segment is likewise prolonged down on the sides; the fifth ventral segment is black and prolonged forwards or downwards as two black ventral teeth. Abdomen clothed with black hairs, the fourth and fifth segment have longer, yellow, erect hairs at the sides, the fifth also above. There are long, black hindmarginal bristles on the first segment, short on the second, and very short or almost wanting on the third and fourth. Venter yellow, with pale hairs, the third segment black towards the hind margin, and here with long hairs. Hypopygium large, strongly compressed towards the base; it is black and shining; the eighth segment with yellowish hairs; there are small, pointed, middle and posterior ventral lobes; the inner lamellæ hidden; the outer lamellæ are small, white, lying dorsally. Legs pale yellow, the tarsi not or imperceptibly darkened at the apex; the fourth joint on the front tarsi is a little dilated towards the apex below, and with the hairs a little tuft-like, the apical part suddenly excised; the front metatarsus about as long as the three following joints, the middle metatarsus longer than the four following joints, and the hind metatarsus about as long as the second joint. The front coxæ pale-haired, with some yellow and black bristles at the apex, the middle coxæ black-haired, with a flat, yellow spine at the apex, formed of coalesced hairs; the hind coxæ with a strong, black bristle. The legs have short, black hairs, the anterior femora bare below or with imperceptible, pale hairs; middle femora with some black hairs below at the base, and behind them three to four black, flat, squamular hairs; front tibiæ with a pair of small bristles above near the base, posterior tibiæ with bristles on the dorsal and anterior sides, and with apical bristles; the posterior metatarsi with some bristles on the sides and below. Wings yellowish tinged; veins brown, discal vein with a not large bend, the first posterior cell broadly open; axillary lobe small. Squamulæ pale, with a yellow fringe. Halteres yellow.

Female. Epistoma broader than in the male. Thorax generally more greyish pruinose. Legs simple, without spine on the middle coxæ or squamular hairs on the middle femora, but they have more and stronger bristles, the bristles at the apex of the front coxæ stronger, and also black bristles at the apex of the middle coxæ; the bristles on the posterior tibiæ stronger and more numerous.

Length 5.5—6 mm.

N. pallida is very rare in Denmark, we have only three specimens, all females: at Hillerød in 1898 (Godskesen), at Tisvilde ¹⁰ 1909, and in Jutland at Hald near Viborg ^{25/6} 1910 (the author).

Geographical distribution: — Northern and middle Europe down into Austria, Hungaria and Styria: towards the north to middle Sweden; and in Finland.

3. *N. suturalis* Fall.

1823. Fall. Dipt. Suec. Dol. 21, 32 (*Dolichopus*). — 1830. Meig. Syst. Besch. VI, 363, 30 (*Porphyrrops*). — 1838. Meig. ibid. VII, 155 (*Medeterus*). — 1843. Zett. Dipt. Scand. II, 613, 99 et 1849. VIII, 3097 (*Dolichopus*). — 1862. Schin. F. A. I, 183. — 1903. Kat. paläarkt. Dipt. II, 293.

Male. Vertex and frons grey, the bristles black, the postvertical bristles yellow. Epistoma narrow, light grey. Palpi whitish yellow. Occiput grey; postocular bristles pale yellow. Antennæ yellow, arista brown. Thorax grey, with two narrow, indistinct stripes, one on each side of the acrostichal bristles; humeri a little reddish. Scutellum yellow, with the base grey; it has two black bristles and on each side a small hair. Postscutellum grey. Pleura grey, metaepimera yellow; there is a whitish prothoracic bristle. Abdomen yellow or brownish yellow, somewhat shining, with narrow, brown, not very distinct incisures at the front margin of the second, third and fourth segments, generally very indistinct on the second segment, only more distinct at the sides; the fifth segment is brown, its ventral plate is black and produced forwards as two triangular ventral teeth; the sixth and seventh segments hidden. Abdomen clothed with short, brown or blackish brown hairs, at the side margin the hairs are yellow, and the fifth segment is partly yellow-haired. At the hind margin of the segments there are somewhat longer, black bristles, long on the first segment. Venter yellow and yellowish haired. Hypopygium black, shining; the eighth segment has some pale hairs, and is a little pruinose at the hind margin; otherwise the hypopygium is constructed about as in *quadrifasciata*, the outer lamellæ likewise small, almost hidden, pale and pale-hairy; of the inner lamellæ a pair of hairs are seen at the end. Legs simple, yellow, hind tibiæ and tarsi slightly

darkened. The anterior metatarsi about of the length of the four following joints, the hind metatarsi shorter than the second joint. The front coxæ yellow-haired, with some bristles, and the middle coxæ with some black bristles anteriorly; hind coxæ with a black bristle on the outer side; for the rest the legs have short, blackish hairs, the anterior femora bare beneath; the front tibiæ with a bristle in the middle on the dorsal side, the posterior tibiæ with bristles on the various sides, and with apical bristles, and the posterior metatarsi with some bristles, on the hind metatarsi only below. Wings narrow at the base, no axillary lobe present; they are yellowish, brownish at the anterior margin; veins brown or blackish brown; the discal vein almost without any bend, nearly parallel with the cubital vein; the posterior cross-vein lying nearer towards the apex than in *quadrifasciata*; the anal vein long, almost reaching the middle of the wing. Squamulæ pale yellow, with a yellow fringe. Halteres yellow.

Female. Epistoma a little broader than in the male, and more grey. Thorax grey as in the male. Anterior tarsi slightly darkened towards the end. Wings not narrow at the base, the axillary lobe moderately developed; the anal vein shorter.

Length 3,5—5 mm.

This species is easily known from *quadrifasciata*, in the male by the legs and the narrow wings, and in the female by the grey thorax; in both sexes the infuscation of the anterior margin of the wings, and the direction of the discal vein are good characters.

N. suturalis is somewhat rare in Denmark; Lersøen, Ordrup Mose (Stæger), Charlottenlund (the author), Hillerød (Godskesen); on Funen at Odense, and in Jutland at Frederikshavn (H. J. Hansen). The dates $^{12}/_6$ to the last part of July. It may occur on meadows in low herbage, but is generally, especially the males, found on tree-trunks; I have taken it on $^{21}/_6$ in Charlottenlund, where it was present in great number, the males were sitting on tree-trunks and flying vertically along them, from below upwards, evidently seeking for prey; also females were found on the trunks.

Geographical distribution:— Europe down into Italy; towards the north to southern Sweden.

4. *N. abdominalis* Fall.

1823. Fall. Dipt. Suec. Dol. 21, 30 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 612, 98 (*Dolichopus*). — 1869. Loew, Besch. eur. Dipt. I, 303 (*Saucropus*). — 1903. Kat. paläarkt. Dipt. II, 292.

Male. Vertex and frons grey, the bristles black, the postvertical bristles yellow. Epistoma very narrow, light grey. Palpi yellowish.

Occiput grey; the postocular bristles whitish. Antennæ yellow, arista brown. Thorax grey, with a very faint, greenish reflex; there is a small, yellowish humeral point. Scutellum yellow, with two black bristles, and on each side a small hair; postscutellum grey. Pleura grey, metaepimera reddish yellow; there is a whitish prothoracic bristle. Abdomen yellow or brownish yellow, somewhat shining; the sixth and seventh segments hidden: the fifth ventral segment seems to have no ventral teeth (but I have only examined one specimen). Abdomen clothed with short, black hairs, becoming pale towards the side margins. At the hind margins of the segments are short bristles, those on the first segment long. Venter yellow, with yellow hairs. Hypopygium blackish brown, shining; it seems to be constructed quite as in *quadrifasciata*, but is a little smaller. Legs yellow, the last four joints of the posterior tarsi brownish. Anterior metatarsi about of the length of the four following joints, hind metatarsi shorter than the second joint. Front coxæ yellow-haired on the anterior side, with some bristles downwards, middle coxæ with some black bristles anteriorly, hind coxæ with a black bristle on the outer side. The legs otherwise with short, blackish hairs, the anterior femora bare beneath. Front tibiæ with some small bristles on the dorsal side, posterior tibiæ with bristles on the various sides, and with apical bristles, and the posterior metatarsi with some bristles, the hind ones only below. Wings a little yellowish; veins brown or blackish brown; the discal vein distinctly bent, ending before the apex of the wing, the first posterior cell narrowly open; the posterior cross-vein lying rather inwardly, near the middle of the wing; axillary lobe small. Squamulæ whitish, with a whitish fringe. Halteres yellow.

Female. Epistoma a little broader than in the male. Thorax grey as in the male. Also the front tarsi brownish towards the end. Wings with the axillary lobe a little larger.

Length 4—4,5 mm.

This species can only be confused with *N. saturalis*, but is easily distinguished by the unbanded abdomen, the course of the discal vein, and the position of the posterior cross-vein.

N. abdominalis is very rare in Denmark, only three specimens, a male and two females, are known (Stæger), one taken in Charlottenlund on $10/7$ 1846. Stæger took it on *Corylus*.

Geographical distribution:— As far as I am aware this species is not known south of Denmark; towards the north it goes to middle Sweden.

5. *N. Erichsoni* Zett.

1843. Zett. Dipt. Scand. II, 613, 100 (feminis pluribus exclusis), et 1849. VIII, 3097, 100 (*Dolichopus*). — 1862. Schin. F. A. I, 184. — 1903. Kat. paläarkt. Dipt. II, 292.

Male. Frons and vertex grey, the bristles black. Eyes contiguous below the antennæ, and the epistoma thus divided into two small, white triangles, an upper and a lower. Palpi whitish yellow. Occiput grey; the postocular bristles all whitish (in the specimens I have examined, according to Oldenberg, Zeitschr. f. syst. Hymn. and Dipt. IV, 1904, 76, one to three of the uppermost may be black). Antennæ yellow, arista brown. Thorax yellow, the humeral and side parts paler, in front of the scutellum a faint, abbreviated, darker stripe. Scutellum yellow, with a small, darker spot at the base in the middle. Postscutellum yellow, with a faint, darker middle stripe. Pleura yellow, very slightly whitish pruinose, below the squamulæ a black spot; there is a whitish prothoracic bristle. Abdomen yellow or reddish yellow, a little shining; the sixth segment nearly, the seventh quite hidden; at the front margin of the second, third and fourth segments a blackish, transverse band; a similar but very faint one on the fifth segment; also at the base of the first segment a narrow, black stripe. Abdomen clothed with short, blackish hairs, becoming pale just at the side margins; at the hind margin of the segments are a little longer bristles, those on the first segment long. Venter yellow. Hypopygium black or brownish black, shining, the eighth segment with pale hairs; the hypopygium seems to be constructed as in *quadrifasciata*; it has very small, nearly hidden, outer lamellæ; of the inner lamellæ a pair of small styles are seen above, and another pair at the end, the latter directed upwards. Legs yellow, the posterior tarsi a little darkened towards the end. The front tarsi short, shorter than the tibiæ, metatarsus longer than the four following joints, which are short, the three middle ones not longer than broad, the claws and pulvilli enlarged; middle metatarsus about as long as the four following joints, hind metatarsus considerably shorter than the second joint. Front coxæ with yellow hairs on the anterior side, and front and middle coxæ with black bristles anteriorly towards the end; hind coxæ with a black bristle on the outer side. For the rest the legs with short, blackish hairs, the middle femora bare beneath; the front femora have below a row of fine, erect hairs, which are longer and somewhat distant in the basal half, short and dense in the apical half, and the front tibiæ have below a fine, short, somewhat erect ciliation. The front tibiæ have a small bristle on the anterior side near the base, the posterior tibiæ have bristles on the various sides, and

apical bristles, also the posterior metatarsi have some bristles, the hind ones only below. Wings yellowish; veins brown; the discal vein with a considerable bend, the first posterior cell somewhat narrowly open; the posterior cross-vein rather near the middle; axillary lobe somewhat developed. Squamulæ whitish yellow, with a whitish fringe. Halteres yellow.

Female. Epistoma somewhat broad. Abdomen with four distinct bands as the band on the fifth segment is conspicuous. Front tarsi of common shape, longer than the tibiæ, the metatarsus about as long as the three following joints; claws and pulvilli not enlarged.

Length 3.5—4 mm.

The female of this species shows resemblance to the female of *quadrifasciata*, and it was also originally confused with it by Zetterstedt, and it was first later, in vol. VIII. that, advised by Stæger, he distinguished the two species correctly; *quadrifasciata* is distinguished by the grey spot on thorax, the bands on abdomen being incised and the postscutellum more or less grey, and finally it has the first posterior cell more broadly open.

N. Erichsoni is very rare in Denmark, we have only one specimen, a male, caught many years ago, and without any locality given.

Geographical distribution:— Europe down into Styria and Hungaria; towards the north to southern Sweden; and in Finland.

3. **Eutarsus** Loew.

Head a little broader than thorax, and in the male a little higher than broad, in the female broader than high; it is somewhat short, and a little arched behind. Vertex slightly excavated; the ocellar tubercle a little prominent. Frons somewhat broad, broadest in the

Fig. 11. Antenna of *E. aulicus* ♂. From the inside. $\times 65$.

female, a little decreasing in breadth towards the antennæ, especially in the male, slightly in the female. There are ocellar, outer vertical and postvertical bristles; on the posterior side of the ocellar tubercle a pair of small bristles. Eyes large, somewhat oval, hairy; the facets slightly enlarged towards the epistoma in the male. The eyes are

separated in both sexes, narrowly in the male, broadly in the female. The postocular bristles form a single row, besides there are bristles at and above the oral aperture. Antennæ inserted near to each other, above the middle; the first joint obconical, a little elongated; it is produced into a small, pointed protuberance at the apex on the inner side below; the second joint is lobe-like inserted into the third on the inside, and also above on the outside¹; the third is short triangular, it bears a dorsal, two-jointed arista, with the basal joint somewhat short. In the female the antennæ are a little shorter, especially the basal joint. The basal antennal joint has no hairs above, the second has small bristles at the apical margin, the third joint and the arista are short-haired. Epistoma narrow in the male, slightly widened both upwards and downwards; in the female it is broad with parallel margins. Clypeus short, slightly marked off, most in the female, where it is somewhat arched; it does not reach the lower margin of the eyes. The oral aperture and proboscis are somewhat larger in the female than in the male; the proboscis is slightly, almost not, protruding; the mouth parts I have otherwise not examined. Thorax rectangular, high, somewhat arched above. The acrostichal bristles biserial; there are six long dorsocentral bristles, further a humeral, a posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle, and besides small hairs on the anterior part of the disc. Prothorax has fine hairs on the pleural parts, but there are no prothoracic bristles; the sternopleura have a few hairs, and the pteropleura have hairs below; the metaepimera with hairs on the posterior side. Scutellum with two long bristles, and on each side a small hair. Abdomen somewhat long and slender, the first segment is short; in the male six segments are distinctly visible both on the dorsal and ventral side, they decrease in length behind. Hypopygium small and concealed. In the female there are five visible segments. Abdomen has no dot-like impressions at the side margins. The segments have hindmarginal bristles. Legs somewhat long, the coxæ elongated, hind metatarsus shorter than the second joint, without bristles above. The legs are haired with short hairs; the posterior legs have some bristles, and the femora preapical bristles; the posterior tibiæ have apical bristles, the front tibiæ none; the hind coxæ have a bristle on the outer side. There are two claws, two rather large

¹ Loew (Mon. of Dipt. of N. Am. II. 1864, Pl. VI, fig. 28, b) figures the antenna, but his somewhat small figure is not correct with regard to the shape of the second joint; in the text (153) on the other hand it is mentioned in a general way, as he says about the antennal joints: "the second much overreaching the third".

pulvilli, especially large on the front tarsi in the male, and there is a somewhat comb-shaped empodium. Wings with the subcostal vein short, the mediastinal terminating in it; the discal vein very slightly bent, and with a distinct convexity; the anal vein not reaching the margin; the posterior cross-vein about in the middle of the wing; the axillary lobe rather well developed. Squamulae small, the angular lobe not large, bearing a long fan, the basal part of the squamulae with short hairs; below the squamulae there is, as in *Neurigona*, a small projection.

The developmental stages of *Eutarsus* are not known.

Of the genus only one palæarctic species is known, also occurring in Denmark.

1. *E. aulicus* Meig.

1824. Meig. Syst. Besch. IV, 48, 6. (*Porphyrops*) et 1838. *ibid.* VII, 154, 8 (*Argyra*). — 1843. Zett. Dipt. Scand. II, 615, 102 (*Dolichopus*). — 1903. Kat. paläarkt. Dipt. II, 293.

Male. Vertex and frons bluish metallic, the bristles black. Epistoma very narrow, whitish. Palpi dark. Occiput greenish, the postocular bristles whitish, the upper five or six black. Antennae black. Thorax bronze-coloured, greenish in the middle, somewhat pruinose, almost not shining. Scutellum metallic green, bare, with two black bristles and on each side a small hair; postscutellum green, greyish pruinose. Pleura green, somewhat greyish pruinose, metaepimera yellow. The propleural parts have fine, white hairs. Abdomen yellow or brownish yellow, with brown or blackish incisures, which do not reach the side margin; the first incisure is faint. Abdomen clothed with short, blackish hairs, at the hind margin of the segments are somewhat long bristles, longest on the first segment; at the sides of the first segment and down the posterior side of the metaepimera are yellow hairs. Venter yellow, with short, yellow hairs; on the first ventral segment some long, bristly hairs. Hypopygium small and quite hidden, only just to be seen below at the end of abdomen. Legs yellow, middle coxae more or less greyish on the outer side, tarsi, except the anterior metatarsi, infuscated. Front coxae yellow-haired anteriorly, anterior coxae with black bristles on the anterior side at the end, hind coxae with a black bristle on the outer side; for the rest the legs with short, blackish or brownish hairs, slightly longer below the

Fig. 12.
E. aulicus ♂,
hind meta-
tarsus. $\times 45$.

femora. Femora with some preapical bristles; posterior tibiae with dorsal and antero-dorsal bristles, and with preapical bristles, hind tibiae also with a row of fine ventral bristles, strongest towards the apex; hind metatarsi with an excision on the ventral side, a little dilated above the excision and with a tuft of short, spine-like bristles, a pair of which are somewhat curved. Wings more or less yellowish; veins blackish brown; subcostal vein short, discal vein slightly bent,

Fig. 13. Wing of *E. aulicus* ♂.

the first posterior cell broadly open; anal vein not reaching the margin. Squamulae yellow, with a fan of dark yellow bristles. Halteres yellow.

Female. Epistoma broad, grey. Antennae shorter than in the male. Middle tibiae with a strong bristle in the middle on the ventral side; hind metatarsi simple.

Length 4,5—5,5 mm.

E. aulicus is rare in Denmark, and almost all specimens have been taken many years ago; Amager (Stæger, Jacobsen) and on Bornholm at Allinge (H. J. Hansen); on Amager it was found in no small number at a pool, at Allinge only one specimen was taken, in July; both localities seem to indicate, that the species lives near the coast.

Geographical distribution:— Most Europe, and in Asia minor; towards the north to middle Sweden.

4. **Hygroceleuthus** Loew.

This genus is in most respects quite agreeing with the following, *Dolichopus*. The head is higher than broad, sometimes in the female broader than high. The eyes are oval, narrowed downwards, hairy; the facets of about the same size, or slightly enlarged towards the epistoma in both sexes (*diadema*). Postocular bristles strong, forming a single row. The bristles on occiput along the oral aperture are likewise strong, they are interrupted in the middle, as there are no bristles above the oral aperture, but they are represented by fine, short hairs. Antennae short, or the basal joints elongated; they are

a little shorter in the female than in the male; the basal joint is hairy above, in the male of *latipennis* it has bristles; the second joint overlaps the third a little in a different way in the various species, it has shorter or longer bristles at the apex; the arista is dorsal, shorter or longer, and has the basal joint of some length; it is short-haired. Epistoma moderately broad, somewhat or slightly broader in the female. Clypeus is slightly marked off, a little arched, it reaches to the lower margin of the eyes, or a little longer, and it is longer in the male than in the female; in the female of *latipennis* it does not quite reach the lower margin of the eyes; this character, that the clypeus reaches so far down, is the chief character, and almost the sole separating the genus from *Dolichopus*, and the character is rather small, as at least one species, *D. laticola* Verr. comes very near to *Hygroceleuthus* in this respect. The oral aperture and the proboscis are a little larger in the female than in the male. Thorax has six dorsocentral bristles, two posthumeral, a præsutural, three supraalar, a postalar and two notopleural bristles. Scutellum slightly hairy. The legs are somewhat bristly, and hind metatarsus has bristles above; it is of about equal length with the second joint. In a foreign species, the American *H. latipes*, the middle tarsi have the four last joints dilated. The wings are in some species (*latipennis* and the non-Danish *rotundipennis*) broad, especially in the male; costa with a larger or smaller swelling at the apex of the subcostal vein in the male; the anal vein reaches near to the margin.

Of the developmental stages I have examined a pupa of *H. latipennis*. It is 6 mm long, yellow; the sheaths of the antennæ lie down the front side of the head, diverging with the apices; at the base of each is a small, flat tooth, the two teeth forming together a transverse edge with two small, black points in the middle; at the middle of each sheath is a small, transverse, serrated tooth, with a hair at the inner end; on the front side of the head and on thorax are a few other, small hairs. At the anterior margin of thorax are two moderately long, slightly curved, attenuated spiracular tubes, they are brown, black in the apical half. The abdominal segments have each, except the first, a dorsal girdle of densely placed, short, flat, brown spines. The sheaths of the legs reach to the end of abdomen. The pupa was found, together with the cast larval skin, below decaying sea-weed on the shore on $\frac{9}{8}$, and it developed on $\frac{10}{8}$. The larva thus evidently lives on the shore below sea-weed.

The species of *Hygroceleuthus* occur on sea-coasts.

As said the genus is in all essential respects similar to *Dolichopus*, and the main distinguishing character, that the clypeus reaches so

far down, is scarcely valid, several species of *Dolichopus* coming near in this respect. Melander and Brues (Biol. Bull. I, 1900, 123) have also treated the genus as a subgenus only, and have among several American species also referred *D. plumipes* to it, and Aldrich unites it in the Catal. of North Amer. Dipt. with *Dolichopus*.

Of the genus 4 species are known from the palæarctic region; two occur in Denmark.

Table of Species.

1. Discal vein bent obtusely	1. <i>latipennis</i> .
— Discal vein bent rectangularly	2. <i>diadema</i> .

1. *H. latipennis* Fall.

1823. Fall. Dipt. Suec. Dol. 8, 1 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 83, 16 (*Dolichopus*). — 1831. Stann. Isis 1831, 45, 1 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 13, 1 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 503, 3 (*Dolichopus*). — 1862. Schin. F. A. I, 212. — 1903. Kat. paläarkt. Dipt. II, 294.

Male. Frons and vertex bluish. Epistoma moderately broad, stretching downwards just to the lower margin of the eyes; it is light grey, brownish above. Palpi greyish yellow. Occiput grey,

Fig. 14. Antenna of *H. latipennis* ♂, from the inside. $\times 50$.

slightly greenish; postocular bristles black above, yellowish below. Antennæ black, long, the two basal joints somewhat elongated, of about equal length, the third shorter, pointed oval; the basal joint with bristles above, the second with very small bristles at the apex, it overlaps the third above on the outside, below on the inside; the arista somewhat short, distinctly hairy. Thorax bluish or greenish black, at the sides more greenish, shining, very slightly brownish pruinose, most distinctly anteriorly; sometimes it is more bronze-coloured. There are two posthumeral, a præsutural and three supraalar bristles; sometimes some of the hairs on the front part of the disc may be strong, so as to imitate bristles. Scutellum with short, pale hairs, especially distinct at the margin, and with two black bristles

and at each side a very small hair. Pleura slightly greenish, above often more copper-coloured, finely grey pruinose; the anterior spiracle yellowish; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, and often somewhat copper-coloured, finely greyish pruinose, shining; it is clothed with short, black hairs; at the hind margin of the segments are bristly hairs, longest on the first segment. Venter greyish, with pale hairs. Hypopygium somewhat large, the eighth segment greyish pruinose, with black hairs; the hypopygium black, somewhat pruinose, with yellow posterior ventral lobes, reaching a little beyond the end of the hypopygium. The inner lamellæ about half as long as the outer, the median thin, the lateral broad, flat, with some incisions and teeth at the end; the outer lamellæ ovate, white, the margin in the apical half black, dentated and provided with black, inwards curved hairs. Legs yellow, front coxæ a little greyish at the base, posterior coxæ grey; tarsi brownish black, except the base of the metatarsi. Anterior coxæ with black bristles below on the anterior side, hind coxæ with a black bristle on the outer side. The legs have short, blackish hairs; the middle femora with one or two, the hind femora with three to five preapical bristles on the anterior side; the front tibiæ with some bristles above and one on the postero-ventral side above the middle; middle tibiæ with four to five antero-, two postero-dorsal bristles, and one ventral bristle below the middle; hind tibiæ with two rows of bristles above and a row of fine bristles ventrally; all tibiæ besides with apical

Fig. 15. Wing of *H. latipennis* ♂.

bristles, and the front tibiæ with a somewhat long, thin apical hair on the posterior side; hind metatarsi with bristles above (2) and on the anterior side. Wings short and rather broad, with rounded apex; they are hyaline; at the end of the short subcostal vein a very large, black swelling; the discal vein with a strong, but obtuse bend. Squamulæ yellow, with a black fringe, the innermost of the hairs yellow. Halteres yellow.

Female. Epistoma broader than in the male, grey, not quite reaching the lower margin of the eyes. Antennæ somewhat shorter, the basal joint not with dense bristles. Wings not so broad as in the male, without any black costal swelling. Hind femora generally with only two preapical bristles, and front tibiæ without any apical hair.

Length 5—6 mm.

H. latipennis is not rare in Denmark; Amager, Charlottenlund, Skelskør and on the little island Egholm at Skelskør, Frederikssund, Roskilde and Boserup; on Falster at Resle; in Jutland at Horsens, and on Læsø. It is seen somewhat early in the year, my dates are $23/5$ — $10/8$. It occurs at the sea-coast and often in great number. A pupa was taken on Amager, on the coast below sea-weed by J. P. Kryger on $9/8$, and the imago came on $10/8$.

Geographical distribution: — Northern and middle Europe, down into Bohemia; towards the north to northern Scandinavia.

2. *H. diadema* Hal.

1831. Hal. Zool. Journ. V, 361, 11 (*Dolichopus*). — 1862. Schin. F. A. I, 212. — *Dolichopus fraternus* Stæg. 1842. Krøyer's Tidsskr. IV, 14, 2. — *Dolichopus Stannii* Zett. 1843. Dipt. Scand. II, 560, 51 et 1859. XIII, 5056, 51.

Male. Vertex and frons dark greenish. Epistoma somewhat narrow, white, reaching below the lower margin of the eyes. Palpi greyish. Occiput greyish green; postocular bristles yellow. the upper

Fig. 16. Antenna of *H. diadema* ♂, from the inside. $\times 65$.

black. Antennæ black, not long, first joint longer than second, third short, triangular; the second overlaps the third about in the middle on both sides, highest on the outer side; it has a circlet of bristles at the apex, longest above and below; arista longer than the antennæ. Thorax metallic green, more olive on the disc, very slightly pruinose, shining; there are two posthumeral, a præsutural, and three supralar bristles. Scutellum very short-haired, with two long, black bristles, and on each side a very small hair. Pleura greenish, finely greyish pruinose; the prothoracic spiracle yellow; propleura with fine, pale

hairs, and a black prothoracic bristle. Abdomen metallic green, generally with more or less distinct copper-coloured reflexes, especially at the hind margin of the segments, thus forming darker incisures; it is finely greyish pruinose, especially downwards. Abdomen clothed with short, black hairs, the hind margins of the segments have black bristles above, increasing in length towards the apex, those on the first segment not long, longest at the sides. Venter grey with pale hairs. Hypopygium greenish black, finely greyish pruinose, shining towards the apex; the eighth segment grey pruinose, with black hairs, the anterior of which are somewhat long; the hypopygium constructed about as in *latipennis*, the yellow posterior ventral lobes have a little style at the apex; the inner lamellæ almost as long as the outer, curved downwards, the median pointed, the lateral dilated at the apex; the outer lamellæ white, oval but a little pointed, the margin at the apex black, serrated, and with inwards curved, black hairs; on the dorsal margin, somewhat near the apex, there are two stronger teeth with about four hairs, and from these and to the apical point the margin is without hairs. Legs yellow, front coxæ somewhat grey at the base, silvery pruinose on the anterior side; posterior coxæ grey; anterior tarsi black except the basal part of metatarsus; hind tibiæ more or less blackish, especially towards the tip, and hind tarsi black. Anterior coxæ with black bristles on the front side towards the apex, middle coxæ with a bristle on the outer side, and hind coxæ likewise, but the latter bristle small. Legs otherwise with short, blackish, below the femora pale hairs; the hairs on the dorsal side of the hind femora somewhat long and erect. Posterior femora with one preapical bristle; front tibiæ with dorsal bristles, a strong ventral bristle below the middle, and a smaller near the base on the postero-ventral side; middle tibiæ with about three antero-dorsal and two dorsal bristles, and with one antero-ventral bristle in the middle; hind tibiæ with a dorsal and antero-dorsal row, and with one ventral bristle, and besides densely haired on the apical half of the posterior side; hind metatarsus with two bristles above, and some on the anterior side; the tibiæ have apical bristles. Wings hyaline, at the apex of the short subcostal vein a small, black swelling; discal vein bent rectangularly, the lower angle with a small veinlet, the last part parallel with the cubital vein; postical vein thin at the apex and curved. Squamulæ yellow, with a yellow fan. Halteres yellow.

Female. Epistoma a little broader than in the male, reaching to the lower margin of the eyes. Antennæ slightly shorter than in the male. Legs with hind tibiæ and base of hind metatarsi yellow; hind femora without longer hairs above, and hind tibiæ without dense

hairs on the apical part. Wings without costal swelling. Squamular fringe black.

Length 4,5—5 mm.

H. diadema is not rare in Denmark, but seems to be rather local; Amager, Charlottenlund; on Funen at Odense; in Jutland at Gjerlev

Fig. 17. Wing of *H. diadema* ♂.

near Randers Fjord and Struer; and on Bornholm. My dates are in July and the first part of August. It occurs at the coast, especially on *Carex*, often in great number.

Geographical distribution: — Europe down into Spain and Sicily, and further in Egypt; towards the north to middle Scandinavia.

5. **Dolichopus** Latr.

Species of medium or somewhat large size, and always of metallic, green or æneous colour. Head as broad as, or a little broader than thorax; it is short, about semiglobular, and about as broad as high, or a little broader, especially in the female; it is broader above than below, as the greatest breadth lies above the middle. Occiput slightly arched. Vertex somewhat excavated, and the ocellar tubercle a little prominent. Frons broad, slightly decreasing in breadth towards the antennæ, especially in the male, which has the frons a little narrower than the female, in which latter sex it has almost parallel margins. There are ocellar, outer vertical and postvertical bristles, and on the posterior side of the ocellar tubercle a few small hairs. Eyes large, somewhat oval in circumference, metallic green with coppery reflexes in the living specimens; they are densely short-hairy; the facets are in the males very slightly enlarged towards the epistoma. The eyes are separated, more broadly in the female than in the male. The postocular bristles are strong and form a single row; the bristles which are inserted along the oral aperture behind are interrupted in the middle, as there are no bristles just above the aperture. The antennæ are inserted near to each other, somewhat above the middle; they are five-jointed, short or somewhat longer, and generally longer

in the male than in the female; it is mainly the third joint which varies in length both in the various species, and in the two sexes, and it may also be of another shape in the male than in the female; the first joint is longer than broad, increasing in breadth from the base towards the apex and thus obconical; the second joint is short and likewise obconical, its apical margin is not straight, but is on the inside prolonged a little triangularly in the middle, and likewise on the outside above; the third joint is more or less triangular, ovate or lancet-shaped according to its length, and often its point is lying dorsally or turned upwards; when dissociated from the second joint, it is seen to be incised in the base, and thus in reality somewhat cordate in shape; the incision is different on the two sides in accordance with the shape of the second joint. From the anterior end of

Fig. 18 *D. plumipes* ♂, second and third joints of antenna, dissociated to show the exact shape; a. the collar-shaped prolongation. $\times 100$.

the second joint issues a somewhat collar-shaped, slightly conical, and a little chitinised prolongation, forming a sort of connecting membrane and fitting into a similar cavity in the third joint; it is only seen, when the joints are dissociated; the real connection between the second and third joint lies at the end of the prolongation, which is connected to the anterior end of the cavity in the third joint. The two basal joints are a little compressed, the third is more compressed, and strongly so towards the apex; the two last joints form an arista, which is generally longer than, sometimes only as long as the antennæ (the three first joints); the first joint of the arista is somewhat long. The arista is inserted dorsally on the third joint, in the middle or nearer the base or apex; it is inserted on a small peduncle on the dorsal margin. The basal antennal joint has hairs above and at the apex, the second joint has small bristles along the apical margin, longest above and below; the third joint is very short-haired, sometimes a little more distinctly, and the arista is short- or almost microscopically hairy. In a foreign species (the American *D. hastatus*) the

arista is long, and dilated at the tip. Epistoma more or less narrow in the male and always broader in the female, though it also in this sex may vary a little in breadth in the various species. Clypeus short, it is only slightly marked off from the epistoma by a small elevation at each side with a little notch; it is generally a little arched, especially in the female, while the epistoma is flat; the clypeus is also generally bent a little inwards, so that a small angle is formed between epistoma and clypeus; it does not reach to the bottom of the eyes, though in some species it may go far down, almost to the lower margin of the eyes (e.g. *plumipes*). The proboscis very slightly protruding, it is considerably thicker and the mouth parts are larger in the female than in the male, according to the breadth of the epistoma, and likewise the oral aperture is larger in the female, and reaching higher up on the back of the head. Labrum (*D. unguatus* ♀) short and broad, it has a longer median tooth, the end of which is curved hook-formed downwards, and a shorter, broad, triangular tooth on each side; backwards or upwards the labrum is prolonged into a strong process, bringing it in connection with clypeus. Hypopharynx slightly longer than labrum, broad at the base and triangularly attenuated and pointed; it has a very distinct salivary duct, which is widened in the broad basal part. The maxillary palpi are oval, squamiform, hairy and with stronger bristles at the apex. The basal part of labium is a little longer than the labella, which are broad and bear hairs and bristles. Thorax rectangular, somewhat high and somewhat arched above; prothorax small, it has a transverse row of small bristles above; metathorax likewise small and forming a narrow rim above, but there is no chitinised metasternum. The acrostichal bristles are biserial and distinct; there are six long dorsocentral bristles, longest behind; further a humeral bristle, and generally one weaker, two posthumeral, of which the inner is generally weaker than the other, but sometimes of the same size, two notopleural bristles, a præsutural, placed far forwards, three supralar and a postalar bristle; the front part of the disc has small hairs. The propleura have fine hairs and one prothoracic bristle. Scutellum with two marginal bristles, and on each side a small hair; besides it is more or less pubescent, especially at the margin. Abdomen slightly compressed, narrowed behind and thus somewhat conical; the first dorsal segment is shorter than the following; the second ventral segment is roundly incised anteriorly, and in front of it lies an exceedingly narrow chitinisation, representing the first ventral segment; the space between the latter and the hind coxæ membranous. In the male the second to fifth dorsal segments are of about

the same length, the sixth is small, the seventh is likewise small and forms the peduncle of the hypopygium; on the ventral side the second and third sternites are normal, the following are strongly incised posteriorly, the largest part of them being membranous, or there are here no chitinised sternites; this part is folded up groove-like between the dorsal segments, and the hypopygium is laid up in this groove; the seventh segment has a chitinised sternite, lying at the ventral base of the hypopygium. The hypopygium is exposed, somewhat pedunculated, curved up under the venter: it is generally large, and has as a rule slightly projecting posterior ventral lobes, rarely these are longer and styliform, or on the contrary broad and projecting downwards; also the middle ventral lobes may be more or less projecting backwards. The inner lamellæ are more or less curved, generally the median are thin, the lateral more or less dilated. The median dorsal appendage is hook-shaped. The outer lamellæ are blade- or shovel-shaped, smaller or larger, and may vary somewhat in shape; they are generally divided into teeth at the end, and bear curved hairs at the apical and ventral margin. In the female there are five normal abdominal segments, the second to fifth being of about the same length, and with normal sternites; further there are three hidden segments, and an ovipositor terminating with some (6) small spines above, and below them two small styles. Abdomen has conspicuous dot-like impressions at the side margin of the second, third and fourth segments. The abdominal segments have hindmarginal bristles. Legs somewhat long, coxæ a little elongated. In the males the front or middle tarsi are sometimes adorned in different ways, one or more joints being dilated, plumed and differently coloured; in rare cases it may be the hind tarsi which are adorned (*remipes*); in other cases the front tarsi in the males may be bearded with short hairs. The hind tibiæ are always a little (more or less) thicker in the male than in the female, sometimes to a considerable degree. The legs are haired with short hairs; the coxæ have bristles at the apex, generally largest on the front coxæ; the middle coxæ have a bristle in the middle on the front side near the outer edge, and the hind coxæ have a bristle in the middle on the outside. There are one or more preapical bristles towards the apex on the posterior femora, and bristles on the tibiæ, which to some degree may afford specific characters; the tibiæ have also apical or preapical bristles; the hind metatarsus is of or about of the length of the second joint, rarely considerably longer, and always has bristles. In the males the hind femora sometimes bear a fringe of long hairs or cilia, rarely these are found on all femora; sometimes the front tibiæ in the males bear a

long, thin hair at the tip. There are two small claws, two pulvilli and a narrow, somewhat comb-shaped empodium. The wings are of common shape; they may vary a little in breadth in the various species, and may be somewhat narrowed towards the base; sometimes they are a little shortened; in the males there are in many species a smaller or larger swelling on the costa, where the subcostal vein unites with it; the mediastinal vein terminates in the subcostal vein; the discal vein has a double bend, which may be larger or smaller, and obtuse or more rectangular, sometimes quite rectangular and with small veinlets from the angles; the bend lies on a distinct convexity. The posterior cross-vein is placed towards the middle of the wing or more apically. The axillary lobe varies in the various species from quite small to rather large, and the anal vein is in accordance directed somewhat downwards or more forwards; it does not reach the margin. The squamulæ have the angular lobe somewhat well developed, bearing a fan of long hairs at the margin, the hairs also often covering the front side; the inner part of the squamulæ has short hairs.

The developmental stages of several species of *Dolichopus* are known. De Geer describes and figures these stages of *D. unguulatus* (*Nemotelus aeneus*) (De Geer: Mem. VI, 1776, 198, Tab. XI, Fig. 14—18); he found the larvæ in May in the ground; one transformed to pupa on $\frac{4}{6}$ and to imago on $\frac{27}{6}$. Stæger mentions (l. c. 27) that he has found the larvæ and pupæ to *D. popularis* under moss on old stubs of beeches. The larva of *D. latilimbatus* is described by Belling (Arch. für Naturgesch. 41, I, 1875, 53); it was found in the ground on a meadow on $\frac{8}{6}$, and the imago came on $\frac{10}{7}$. Further Belling describes (ibid. 48, I, 1882, 227—30) the larvæ of *D. discifer*, *popularis*, *trivialis* and *longicornis*, of the first and last also the pupa; the larva of *discifer* was found in the ground on $\frac{22}{6}$ and developed on $\frac{16}{7}$, that of *popularis* was found on $\frac{24}{4}$ and developed on $\frac{31}{5}$; *trivialis* was found on $\frac{28}{5}$ in a decaying beech, the imago came on $\frac{26}{7}$; *longicornis* was found in the ground on a field and developed on $\frac{20-26}{5}$, another specimen was found on $\frac{3}{5}$ and developed on $\frac{5}{6}$. Finally Brauer describes and figures the larva of *D. unguulatus* (*aeneus*) (Denkschr. d. Kais. Akad. d. Wissensch. XLVII, 1883, 44, Taf. IV, Fig. 72—76) as found in hollow poplars. I have myself examined the pupa of *D. lepidus*, and larvæ and pupæ of *D. claviger* and *popularis*. The larva is cylindrical, whitish or slightly yellowish; it has twelve segments; the head-capsule is black, small and retractile; the other segments increase evenly in length behind; the last segment is short and a little swollen, it is obliquely cut at the end and has

here four triangular teeth or warts, two shorter above and two longer below; on the ventral side of the segment lies the anus; the segment has some longitudinal furrows. On the ventral side of the fifth to eleventh segments there is a low, transverse swelling, lying at the front margin of the segments; the swellings are somewhat divided in the middle, and they are armed with a row of small spines. The prothoracic spiracles are very small, lying near the hind margin of the prothoracic segment; the posterior spiracles lie on the hinder surface of the last segment, one at the base of each of the upper warts; they are also rather small. — The pupa is yellowish; on the front side of the head lie the antennal sheaths, directed downwards, but they are only slightly observable; at the base of them there are four, transversely compressed teeth, with a brown margin, two above and two below, and a little lower down there are two similar teeth; all the teeth are almost connected in the middle; above the upper teeth are a pair of hairs, and at the lowermost stand also a pair of approximated hairs. Here, as also in *Hyroceleuthus*, the upper teeth mark in reality the apical margin of the first antennal joint, the lower teeth mark the apical margin of the second joint, and below a weak outline of the third joint and the arista is seen. On the thoracic disc there are some (8) short hairs, three on each side placed in an oblique line, and a pair quite behind in the middle. On the border between head and thorax there are two long, attenuated and pointed spiracular tubes, which are black in the apical part. On the dorsal side of each of the abdominal segments, except the first, is a transverse row of short, somewhat flat, brown spines of unequal length; they are directed backwards. The sheaths of the posterior legs reach to the end of the fifth segment, or longer backwards. On the sides of abdomen are seven pairs of small spiracles.

The larvæ live in the earth, especially humous earth in woods and on meadows, and they are often found in mole-casts; they may also live in decaying wood in trunks and stubs. It is curious that the earlier observers only speak of the pupa, while none has observed the cocoon. The larvæ I have observed were found in the earth; when the larva is ready for pupating, it forms a cavity in the earth, and this cavity is on the inside covered with some secretion, which makes a film-like layer; thus a more or less oval, earthy cocoon is constituted, the film-like inner layer of which is somewhat solid; in one end the film remains uncovered over a small space, and here it has a small, circular opening, through which the spiracular tubes project; it thus seems that the cocoon is impenetrable to the air, so that a special opening is needed, and thus the cause of the long

spiracular tubes in the Dolichopodid pupæ is understood. The pupa rests inside this cocoon, and at the time for the final development it works out, the cocoon then being somewhat damaged. I think it very probable, that all species of *Dolichopus* form a similar cocoon. When the earlier authors have not seen the cocoon, it is, I think, because this is easily destroyed when seeking for the pupa; or when the imago is bred from the larva, the pupal skin will be found outside the cocoon, which latter in its then somewhat damaged condition does not easily attract observation. — The larva hibernates, the pupation and final development taking place in spring or summer.

The species of *Dolichopus* are beautiful and lively flies; they occur on bushes and in low herbage, generally on humid places, in the outskirts of and in open districts in woods, in fens and meadows, and most species occur at or near water, some on water plants; a great number of species occur especially near the coast; only few may be found on more dry localities. It is the genus of Dolichopodids which goes farthest towards the north, two species being found in Greenland, one of which is our common *D. plumipes*.

Of the genus about 117 species are at present known from the palæarctic region; 45 have been found in Denmark, but of these one is here described as new, the total number of palæarctic species thus increasing to 118.

Table of Species.

Males.

1. Femora black	2.
— Femora pale	16.
2. Lower postocular bristles black	3.
— Lower postocular bristles pale	12.
3. Tibiæ black (middle tibiæ in <i>Stenhammari</i> with a white ring)	4.
— Anterior tibiæ quite or mainly yellow or ferruginous...	9.
4. Wings blackish on the outer half; hind metatarsi very bristly	1. <i>atratus</i> .
— Wings not blackish on the outer half; hind metatarsi moderately bristly	5.
5. Last joint of front tarsi dilated	6.
— Last joint of front tarsi normal	7.
6. Last joint of front tarsi depressed, flat; posterior femora with longish, pale hairs below on basal part	2. <i>Falleni</i> .
— Last joint of front tarsi compressed; hind femora with a long, black fringe below	4. <i>melanopus</i> .
7. Posterior femora with longish, pale hairs below on basal part; the three middle joints of the front tarsi ferruginous	3. <i>Meigenii</i> .

- Posterior femora not pale-haired below; front tarsi black 8.
- 8. Middle tibiæ with a snow-white ring, metatarsi snow-white, with a bristle above; hind femora with a long, black fringe below 6. *Stenhammari*.
- Middle tibiæ black, metatarsi without bristle above; hind femora not fringed 9. *picipes*.
- 9. Last joint of middle tarsi dilated 5. *planitarsis*.
- Last joint of middle tarsi normal 10.
- 10. Middle femora with two preapical bristles 7. *campestris*.
- Middle femora with only one preapical bristle 11.
- 11. Epistoma brown; hind femora with a long, black, fringe below 8. *lepidus*.
- Epistoma white; hind femora without fringe; anterior tibiæ with a dark ring 10. *varitibia*.
- 12. Antennæ quite black; hind metatarsi with more than one bristle above 13.
- Antennæ yellow beneath the basal joint; hind tibiæ dilated in the middle; hind metatarsi with only one bristle above 15. *clavipes*.
- 13. Hind tarsi with the three last joints feathery 11. *remipes*.
- Hind tarsi simple 14.
- 14. Hind tibiæ with rather long bristles on the dorsal side, and also ventrally 12. *tanythrix*.
- Hind tibiæ with shorter bristles, and only small bristles ventrally 15.
- 15. Epistoma brown; legs chiefly black 13. *atripes*.
- Epistoma white; tibiæ yellowish 14. *vitripennis*.
- 16. Lower postocular bristles pale 17.
- Lower postocular bristles black 42.
- 17. Front or middle tarsi adorned, i. e. one or more joints dilated, plumed or silvery 18.
- Tarsi not adorned 25.
- 18. Last joint of front tarsi dilated; middle tarsi normal .. 19.
- Last joint of front tarsi normal; middle tarsi partly dilated, plumed or silvery 21.
- 19. Hind femora with more than one preapical bristle; squamulæ yellow fringed 16. *claviger*.
- Hind femora with only one preapical bristle; squamulæ black fringed 20.
- 20. Discal vein slightly bent; front tarsi with the third and fourth joints of about equal length 17. *discifer*.
- Discal vein almost rectangularly bent; front tarsi with the fourth joint about half as long as the third 18. *confusus*.
- 21. Basal joint of middle tarsi feathered, others normal 22.
- Basal joint of middle tarsi simple 23.
- 22. Middle tibiæ not much longer than the tarsi, with a brown line above; hind tibiæ at tip and hind tarsi black 19. *plumipes*.

22. Middle tibiæ nearly twice as long as the tarsi, not brown above; hind tibiæ entirely and base of hind tarsi yellow 20. *Wahlbergi*.
23. Second and third joint of middle tarsi plumed, the last two joints silvery; hind femora with one pre-apical bristle 21. *pennatus*.
- Second joint of middle tarsi normal; hind femora with more than one preapical bristle 24.
24. Third and fourth joint of middle tarsi plumed, fifth joint silvery; hind tibiæ yellow 22. *popularis*.
- The joints of the middle tarsi normal, only the last joint silvery on the anterior side; hind tibiæ almost quite black 23. *urbanus*.
25. Wings with a snow-white spot at the apex 24. *apicalis*.
- Wings without a white spot at the apex 26.
26. Basal joint of middle tarsi with one bristle above; hind femora fringed beneath 27.
- Basal joint of middle tarsi without any bristle above... 30.
27. Wings with a costal swelling; front tarsi with the three middle joints bearded with short, erect hairs... 28.
- Wings without costal swelling; front tarsi not bearded 28. *arbutorum*.
28. Front tarsi with the three middle joints straight, and with a bristle only at the apex of the first, or of the first and second joint..... 29.
- Front tarsi with the three middle joints curved, and with a curved bristle at the apex of the three first joints 27. *ciliefemoratus*.
29. Front tarsi with a bristle only at the apex of the first joint; antennæ blackish, basal joint yellow beneath, third joint longer than broad 25. *trivialis*.
- Front tarsi with a bristle at the apex of first and second joint; antennæ yellowish, third joint brownish at the apex, not longer than broad 26. *festivus*.
30. Discal vein bent rectangularly, often with a small veinlet; front tibiæ with a long thin hair at tip 31.
- Discal vein bent obtusely 32.
31. Hind metatarsus only black at tip, with two bristles above; hind femora not fringed 29. *nitidus*.
- Hind metatarsus quite black, with only one bristle above; hind femora black fringed beneath 30. *griseipennis*.
32. Antennæ long, third joint more than twice as long as broad, with a long, pointed apex turned up at the tip 33.
- Antennæ not specially long, the third joint not twice as long as broad, much less pointed 34.
33. Antennæ black, basal joint yellow beneath; front tibiæ without any long, thin hair at the tip 31. *acuticornis*.
- Antennæ yellow, blackish above and at apex; front tibiæ with a long, thin hair at the tip 32. *longicornis*.
34. Epistoma distinctly pubescent; posterior ventral lobes

- of hypopygium broad, produced downwards, more or less triangular 35.
- Epistoma not pubescent; posterior ventral lobes of hypopygium of another shape 36.
35. Squamulae with a yellow fringe; front tibiae without any long, thin hair at the tip 33. *nubilus*.
- Squamulae with a black fringe; front tibiae with a long, thin hair at the tip 34. *latilimbatus*.
36. Front tibiae with a long, thin hair at the tip 37.
- Front tibiae without any long, thin hair at the tip 38.
37. Epistoma silver-white; coxae all yellow 35. *linearis*.
- Epistoma yellow; posterior coxae grey 36. *notabilis*.
38. Wings with a blackish blotch at the anterior margin on the apical half 39. *sabinus*.
- Wings without any blackish blotch 39.
39. Hind metatarsi with only one bristle above 40. *agilis*.
- Hind metatarsi with more than one bristle above 40.
40. Basal joint of antennae only yellowish below; wings with a small costal swelling 41.
- Basal joint of antennae quite yellow and second joint more or less yellow; epistoma pale yellow; wings without costal swelling 41. *simplex*.
41. Epistoma silver-white 37. *caligatus*.
- Epistoma ochraceous 38. *lineatocornis*.
42. Last joint of front tarsi dilated; femora pale fringed 42. *brevipennis*.
- Last joint of front tarsi normal; femora not pale fringed 43.
43. Posterior femora with three or more preapical bristles 43. *ungulatus*.
- Posterior femora with only one preapical bristle 44.
44. Hind femora black fringed 44. *longitarsis*.
- Hind femora not fringed 45. *rupestris*.

Females.

1. Femora black 2.
- Femora pale 15.
2. Lower postocular bristles black 3.
- Lower postocular bristles pale 11.
3. Tibiae black (middle tibiae in *Stenhammari* with a pale ring) 4.
- Anterior tibiae yellow or ferruginous 9.
4. Wings darkened on outer half; hind metatarsi with many bristles 1. *atratus*.
- Wings not darkened on outer half; hind metatarsi moderately bristly 5.
5. Front tarsi ferruginous or pale brownish; posterior femora pale-haired below at the base 6.
- Front tarsi black; posterior femora not pale-haired below at the base 7.

6. Front coxæ white-haired, front tarsi considerably longer than tibiæ 2. *Falleni*.
 — Front coxæ black-haired, front tarsi not much longer than tibiæ 3. *Meigenii*.
 7. Middle tibiæ with an obscure pale ring; middle metatarsi with a bristle above 6. *Stenhammari*.
 — Middle tibiæ with no ring; middle metatarsi without bristle above 8.
 8. Anterior tibiæ not pale at the base of the tarsi; small ventral bristles on hind tibiæ distantly placed 4. *melanopus*.
 — Anterior tibiæ pale at the base of the tarsi; small ventral bristles on the hind tibiæ densely placed .. 9. *picipes*.
 9. Middle femora with two preapical bristles 7. *campestris*.
 — Middle femora with one preapical bristle 10.
 10. Epistoma not specially broad; arista near the apex of the third joint; hind tibiæ black, with the small ventral bristles distantly placed 5. *planitarsis*.
 — Epistoma broader; arista more dorsally placed; hind tibiæ generally more or less yellowish on the basal half, with the small ventral bristles somewhat densely placed 8. *lepidus*.
 11. Antennæ quite black, hind metatarsi with more than one bristle above 12.
 — Antennæ yellow beneath the basal joint; hind metatarsi with only one bristle above 15. *clavipes*.
 12. Wings infuscated at the anterior margin and at the posterior cross-vein; anterior tibiæ yellow, hind tibiæ dark in the apical part, middle tarsi mainly yellow; brightly shining species 11. *remipes*.
 — Wings not or less infuscated at the anterior margin and not at the posterior cross-vein; tibiæ all black or all yellow, middle tarsi mainly black; less bright species 13.
 13. Hind tibiæ with long bristles on the ventral side .. 12. *tanythrix*.
 — Hind tibiæ with only short bristles on the ventral side 14.
 14. Tibiæ black or somewhat piceous 13. *atripes*.
 — Tibiæ yellowish 14. *vitripennis*.
 15. Lower postocular bristles pale 16.
 — Lower postocular bristles black 40.
 16. Basal joint of middle tarsi with a bristle above 17.
 — Basal joint of middle tarsi without any bristle above... 22.
 17. Hind femora with more than one preapical bristle 16. *claviger*.
 — Hind femora with only one preapical bristle 18.
 18. Antennæ nearly all blackish or brownish, only the basal joints more or less yellowish beneath 19.
 — Antennæ yellowish, more or less dark above and at the apex 20.
 19. Front tarsi yellow with only last joint black; front coxæ grey at the base 18. *confusus*.

- Front tarsi black, with only basal joint, except the apex, yellow, front coxæ quite yellow..... 25. *trivialis*.
- 20. Front coxæ somewhat black-haired 21.
- Front coxæ white-haired; hind tibiæ quite yellow.. 28. *arbustorum*.
- 21. Hind tibiæ blackish at the apex 26. *festivus*.
- Hind tibiæ quite yellow 27. *ciliifemoratus*.
- 22. Middle tibiæ with more than one bristle beneath.. 17. *discifer*.
- Middle tibiæ with only one bristle beneath..... 23.
- 23. Hind femora with more than one preapical bristle 22. *popularis*.
- Hind femora with only one preapical bristle (*urbanus* may sometimes have two, but is known by its almost quite black hind tibiæ) 24.
- 24. Discal vein bent rectangularly 25.
- Discal vein bent obtusely 26.
- 25. Hind metatarsi only black at tip, with two bristles above 29. *nitidus*.
- Hind metatarsi quite blackish, with only one bristle above 30. *griseipennis*.
- 26. Hind tibiæ nearly quite black 23. *urbanus*.
- Hind tibiæ yellow, or only black a tip..... 27.
- 27. Epistoma distinctly pubescent..... 28.
- Epistoma not pubescent 29.
- 28. Hind femora with an obvious black spot above at the apex, hind tibiæ distinctly black at the apex.. 33. *nubilus*.
- Hind femora with a less distinct, blackish or brownish spot above at the apex, hind tibiæ slightly darkened at the apex 34. *latilimbatus*.
- 29. Hind metatarsi with only one bristle above 40. *agilis*.
- Hind metatarsi with more than one bristle above 30.
- 30. Hind coxæ mainly yellow..... 31.
- Hind coxæ grey 33.
- 31. Middle coxæ mainly grey; third antennal joint somewhat long, sharply pointed..... 32.
- Middle coxæ yellow, only with a grey stripe on the outside; third antennal joint shorter, not sharply pointed..... 35. *linearis*.
- 32. Antennæ black, only yellow beneath the basal joint 31. *acuticornis*.
- Antennæ yellow, black above and at tip 32. *longicornis*.
- 33. Antennæ black, only yellow beneath the basal joint, or beneath basal and second joint 34.
- Antennæ more yellow; third joint partly yellow (in *sabinus* only a slight spot below at base), or when third joint black, the first joint is quite yellow 37.
- 34. Basal joint of middle tarsi black..... 38. *lineatocornis*.
- Basal joint of middle tarsi with the basal part pale... 35.
- 35. Hind tibiæ distinctly black at the apex..... 36.
- Hind tibiæ not or slightly darkened at the apex .. 21. *pennatus*.
- 36. Epistoma somewhat narrow, greyish yellow; antennæ as long as the head, third joint as long as broad 35. *notabilis*.

- Epistoma a little broader, whitish; antennæ shorter than the head, third joint shorter than broad . . . 37. *caligatus*.
- 37. Third joint of antennæ partly yellow (in *sabinus* only a small spot below, but this species has the hind metatarsi pale at the base) 38.
- Third joint of antennæ all black; hind metatarsi black 41. *simplex*.
- 38. Basal joint of antennæ quite yellow 39.
- Basal joint of antennæ black above; hind metatarsi yellowish at base 39. *sabinus*.
- 39. Hind tibiæ at tip and hind tarsi black 19. *plumipes*.
- Hind tibiæ quite, and base of hind tarsi yellow . . 20. *Wahlbergi*.
- 40. Basal joint of middle tarsi with a bristle above 41.
- Basal joint of middle tarsi without any bristle above . . 42.
- 41. Posterior femora with only one preapical bristle . . 42. *brevipennis*.
- Posterior femora with more than one preapical bristle 43. *ungulatus*.
- 42. Epistoma whitish, frons green 44. *longitarsis*.
- Epistoma grey, frons brownish 45. *rupestris*.

The females of *varitibia* and *apicalis* are unknown; the latter will, I think, be easily recognised by the postocular bristles being pale below, but with the lowermost black.

To facilitate the general view I may add the following summary:

Basal joint of middle tarsi with a bristle above in both sexes: *Stenhammari*, *claviger*, *confusus*, *trivialis*, *festivus*, *ciliefemoratus*, *arbustorum*, *brevipennis*, *ungulatus*.

Middle tibiæ with more than one bristle beneath in both sexes (the bristles, or some of them, may be antero- or postero-ventral): *planitarsis*, *Stenhammari*, *claviger*, *discifer* (the male sometimes only one), *confusus*, *trivialis*, *festivus*, *ciliefemoratus*, *arbustorum*, *brevipennis*, *ungulatus*. These two characters thus follow each other, only *planitarsis* and *discifer* form exceptions.

Hind metatarsus with only one bristle above in both sexes: *clavipes*, *griseipennis*, *agilis*.

More than one preapical bristle in both sexes: on hind femora: *popularis*, *urbanus* (female generally only one); on middle femora: *campestris*; on posterior femora: *claviger*, *ungulatus*.

Hind femora fringed beneath in the male: *melanopus* (black), *planitarsis* (pale), *Stenhammari* (black), *tanythrix* (black), *campestris* (black), *lepidus* (black), *clavipes* (pale), *trivialis* (pale), *festivus* (pale), *ciliefemoratus* (pale), *arbustorum* (pale), *griseipennis* (black), *brevipennis* (pale), *longitarsis* (black); in *ungulatus* all femora are black fringed; in *claviger*

the anterior femora are pale fringed. In *remipes* the posterior femora have longish, pale hairs below in the male, and hind femora a black fringe in the apical part. *Pennatus*, *caligatus* and *lineatocornis* have in the male a fringe of shorter, fine, pale hairs below the hind femora. *Falleni* and *Meigenii* have somewhat longish, pale hairs below the posterior femora towards the base in both sexes.

A long, thin hair at the tip of the front tibiæ in the male: *nitidus*, *griseipennis*, *longicornis*, *latilimbatus*, *linearis*, *notabilis*.

Obs. The bristles on the tibiæ afford to some degree specific characters; they are placed in rows, but the single bristles are not always placed exactly below each other; whether a row should be termed f. inst. dorsal or antero-dorsal, anterior or antero-ventral etc. is often a matter of judgment, and the same holds good for some of the single bristles. In the following descriptions I have used the terms in accordance with the position, in which the rows or single bristles appeared to me to be placed or to come nearest, but it may well be, that a row or a bristle, which is in one species termed f. inst. antero-dorsal, is in reality answering to a row or bristle termed in another species dorsal or anterior etc.; I do not think however, that any mistake may arise from this.

1. *D. stratus* Meig.

1824. Meig. Syst. Besch. IV, 76, 3. — 1831. Stann. Isis 1831, 139, 33. — 1842. Zett. Dipt. Scand. II, 521, nota, et 1849. VIII, 3078, nota. — 1862. Schin. F. A. I, 213. — 1903. Kat. paläarkt. Dipt. II, 295.

Male. Vertex and frons green or bluish. Epistoma moderately narrow and a little narrowed downwards, grey. Palpi greyish black. Occiput green, slightly pruinose; postocular bristles black. Antennæ black, the third joint a little elongated, triangularly ovate, pointed. Thorax green, slightly brownish pruinose, not much shining; there is a faint, brighter shining middle stripe. Scutellum finely pale-haired at the margin; postscutellum grey pruinose. Pleura greenish, greyish pruinose; propleura with fine, pale hairs and a black, prothoracic bristle. Abdomen green, often with some bluish reflexes, finely whitish pruinose, especially downwards; the hind margins of the segments narrowly darkened; abdomen has short, black hairs, and a little longer bristles at the hind margins of the segments. Venter greyish, slightly pale-haired. Hypopygium black, somewhat pruinose; the eighth segment with black hairs; there are small, brownish posterior ventral

lobes, terminating with a little knob above; the inner lamellæ somewhat short, whitish, curved downwards, the lateral dilated at the apex; the outer lamellæ somewhat small, almost semicircular, with the dorsal margin straight; they are whitish with a blackish brown margin, broadest on the ventral side; this side is serrated and has inwards curved, brown hairs; at the dorsal apical angle there are about three longer teeth with stronger hairs. Legs black, coxæ grey, somewhat whitish pruinose on the anterior side. The legs have short, black hairs, hind femora with longer hairs above in the basal half, and below with a fringe of short, bristly hairs; posterior femora with one preapical bristle. Front tibiæ with bristles above, and one on the posterior side above the middle; middle tibiæ with about four antero- and two postero-dorsal bristles, one dorsal above and one ventral below the middle; hind tibiæ with an antero- and postero-dorsal row, one dorsal bristle above the middle and one ventral towards the apex, besides a ventral row of small bristles; hind metatarsus with many bristles above and on the anterior side, and some below. Wings somewhat yellowish, with a brown fumigation on somewhat more than the outer half between the margin and the discal vein, and seaming the posterior cross-vein. Veins blackish brown; the discal vein with a distinct, angular but obtuse bend; axillary lobe rather small, anal vein stretching somewhat long forwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male. Antennæ with the third joint shorter. Hind femora with the fringe below shorter, and hind metatarsi with fewer bristles.

Length 4—4,5 mm.

D. atratus is rare in Denmark, and only known from Jutland; Rye and Funder near Silkeborg, (on the latter locality from Esben Petersen), and Hald near Viborg (the author); the dates are $\frac{2}{6}$ — $\frac{22}{6}$. It occurs in forests and on marshy places, often near water, and it is said to be often found on alders.

Geographical distribution:— Europe down into France, and in England; it seems to have its northern limit in Denmark.

2. *D. Falleni* Loew.

1857. Loew, Neue Beitr. V, 12, et 1859. VI, 8. — 1862. Schin. F. A. I, 213. — 1903. Kat. paläarkt. Dipt. II, 298. — *Dolichopus melanopus* Stann. (nec. Meig.) 1831. Stann. Isis 1831, 61, 13. — *Dolichopus nigripes* Fall. 1823. Dipt. Suec. Dol. 10, 3 p. p. — 1842. Stæg. Krøyer's Tidsskr. IV, 28, 19 p. p. — 1843. Zett. Dipt. Scand. II, 515, 13.

Male. Vertex and frons bluish. Epistoma somewhat narrow, greyish white. Palpi dark. Occiput green, a little pruinose; post-ocular bristles black. Antennæ black, third joint triangular, a little longer than broad. Thorax dark green, shining, very slightly brownish pruinose. Scutellum finely yellow-haired at the margin; postscutellum somewhat greyish pruinose. Pleura greenish, slightly greyish pruinose; propleura with fine, yellowish or pale brownish hairs and a black prothoracic bristle. Abdomen green or somewhat bronze-coloured, downwards slightly whitish pruinose, with the hind margins of the segments narrowly darkened. It is clothed with short, black hairs;

the hind margins of the segments have rather long bristles. Venter greyish, slightly pale-haired. Hypopygium black, greyish pruinose; the eighth segment with somewhat long, black hairs; there are no distinct ventral lobes; the inner lamellæ about half as long as the outer, curved downwards, the lateral dilated at the apex; the outer lamellæ long, almost rectangular, white with a blackish margin; at the posterior end above they are prolonged into two long processes, with black, curved hairs, then follow some smaller teeth at the ventral corner, with black, curved hairs, the rest of the ventral margin has a single row of shorter hairs. Legs black; coxæ greyish pruinose, on the anterior side whitish pruinose; knees narrowly reddish, the apical part of the front metatarsi and the three following joints ferruginous; the front tarsi are long and thin, the last joint depressed, flat, somewhat dilated, triangular, deep black; middle tarsi also long and thin, considerably longer than the tibæ. Front coxæ whitish-haired, with rather few bristles at the apex, and likewise the middle coxæ; the legs otherwise with short, black hairs, the posterior femora with somewhat long, fine, pale

Fig. 19.
D. Fallenii ♂.
front tarsus
from above.
× 35.

hairs below at the base, and each with one preapical bristle; front tibæ with rows of bristles on the dorsal, posterior and postero-ventral side; middle tibæ with about five antero-dorsal and two postero-dorsal bristles, and with one dorsal above and one ventral below the middle; hind tibæ with an antero- and postero-dorsal row, one dorsal bristle above the middle and one ventral towards the apex, and besides with a ventral row of fine bristles; hind metatarsi with rather many bristles on the dorsal (three) and anterior side; the posterior metatarsi distinctly spinulose beneath. Wings yellowish, somewhat infuscated at the anterior margin; veins blackish brown; costa with a small, black swelling; discal vein bent obtusely and not distinctly

angularly; axillary lobe rather well developed, anal vein stretching somewhat forwards. Squamulae yellow, with a blackish fringe. Halteres yellow.

Female. Epistoma broader than in the male, grey. Antennae a little shorter, the third joint short, broader than long. Front tarsi simple, but considerably longer than the tibiae. Wings without costal swelling.

Length 4.7—5 mm.

D. Falleni is rare in Denmark, we have only two specimens, a male and a female, taken by Stæger at Lersøen many years ago; as however Schiner says, that he has had specimens from Stæger of this species, there must have been more specimens; to be sure Stæger says l. c. that the species was common, but he mixed it together with the following.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden, and in Finland. The species seems to be rather rare.

3. *D. Meigenii* Loew.

1857. Loew, Neue Beitr. V, 12 et 1859 VI, 8, 1. — 1862. Schin. F. A. I, 214. — 1903. Kat. paläarkt. Dipt. II, 300. — *Dolichopus nigripes* Fall. 1823. Dipt. Suec. Dol. 10, 3 p. p. — 1842. Stæg. Krøyer's Tidsskr. IV, 28, 19 p. p.

Male. Vertex and frons green. Epistoma somewhat narrow, whitish grey. Palpi dark. Occiput green, a little pruinose; post-ocular bristles black. Antennae black, third joint triangular, longer than broad. Thorax dark green, shining, a little greyish pruinose. Scutellum finely yellow-haired at the margin; postscutellum greyish. Pleura greenish, slightly greyish pruinose; propleura with fine pale hairs and a black prothoracic bristle. Abdomen green or more bronze-coloured, a little whitish pruinose, especially downwards, and with the hind margins of the segments narrowly darkened. It is clothed with black hairs, the hind margins of the segments with somewhat long bristles. Venter greyish, slightly pale-haired. Hypopygium as in *Falleni*, but with small posterior ventral lobes; the inner and outer lamellae as in *Falleni*. Legs black; coxae grey, somewhat whitish grey pruinose on the anterior side; knees reddish, most broadly on the anterior legs; the apical part of the front metatarsi and the three following joints ferruginous, metatarsus also narrowly reddish at the base. The front tarsi are not so long and thin as in *Falleni*, but they are a little compressed; the last joint not dilated, brown; middle tarsi not long and thin, about of the length of the tibiae. Front and

middle coxæ have more numerous and stronger bristles than in *Falleni*, and they are blackish haired anteriorly. The legs otherwise with short, black hairs; the posterior femora with longer, fine, yellowish hairs below, especially at the base, and each with a preapical bristle; front tibiæ with rows of bristles on the dorsal, posterior and postero-ventral side; middle tibiæ with about six antero-dorsal, two postero-dorsal bristles, one dorsal above and one ventral below the middle; hind tibiæ with an antero- and postero-dorsal row, one dorsal bristle above and one ventral below the middle, and besides with a ventral row of fine bristles; hind metatarsi with three bristles above and some on the anterior side; the posterior metatarsi distinctly spinulose below, and also the front metatarsi finely spinulose. Wings hyaline; veins blackish brown, costa with a small, black swelling; discal vein obtusely, and not angularly bent; axillary lobe rather well developed, anal vein going more downwards than forwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, grey. The third antennal joint shorter than in the male, not longer than broad. Wings more or less yellowish, no costal swelling.

Length 5—5,5 mm.

The species is similar to *Falleni*, but it is in the male easily distinguished by the shape of the front tarsi and the length of the middle tarsi; in the female it is distinguished by the shorter front tarsi, and in both sexes the pale-haired anterior coxæ with few bristles in *Falleni* and the blackish-haired, more bristly in *Meigenii* are good characters, as also the five antero-dorsal bristles on the middle tibiæ in *Falleni* in contrast to the six in *Meigenii* seem to be constant. I think also the characters given by Loew (l. c. V, 11) viz. the more whitish pruinose coxæ and longer-haired eyes in *Falleni* hold good; when Loew says, that the dark colour on the front metatarsi in *Falleni* reaches nearer to the apex than in *Meigenii*, I have not found this confirmed, but as the metatarsus is longer in *Falleni* than in *Meigenii*, the black coloured part is naturally longer in the former than in the latter. Schiner's descriptions are somewhat confused, what he says about the colour of the front tarsi is not correct, and when he says about *Meigenii*, that the wing has no costal swelling, this is also erroneous.

D. Meigenii is rare in Denmark, as it has only been taken on one locality, at Lersøen, by Stæger many years ago; the author notes (l. c. 29), that it was common in the meadows at Lersøen, but as already remarked, he mixed together this and the foregoing species.

Geographical distribution: — Northern and middle Europe down

to the Alps; if it is certain that it is included in Fallen's *nigripes*, it goes towards the north into Sweden.

Remarks: I have for both the preceding species quoted *D. nigripes* Stæg. p. p. and for the following reasons: Loew (l. c. V) says, that three pairs sent to him from Stæger were *Meigenii*; Schiner on the contrary states, that he has had specimens from Stæger, which were *Falleni*. In Stæger's collection also both species stood under *nigripes*, so that it is evident, that he had mixed the two species. Loew is of opinion, that Stæger's description is based on *Meigenii*, in this I cannot agree; on the contrary Stæger's expression about the last joint of the front tarsi in the male seems to me to indicate without doubt, that he has had *Falleni* to hand.

4. *D. melanopus* Meig.

1824. Meig. Syst. Besch. IV, 86, 21. — 1842. Stæg. Krøyer's Tidsskr. IV, 29, 20. — 1843. Zett. Dipt. Scand. II, 514, 12 et 1849. VIII, 3077, 12. — 1857. Loew, Neue Beitr. V, 11 et 1859. VI, 8, 2. — 1903. Kat. paläarkt. Dipt. II, 300.

Male. Vertex and frons green. Epistoma moderately narrow, whitish grey. Palpi dark. Occiput green, greyish pruinose; post-ocular bristles black. Antennæ black, shorter than the head, third joint triangular, shorter than broad. Thorax green, shining, very slightly brownish pruinose; there may be an indication of a more bronze-coloured median stripe. Scutellum finely yellow-haired; post-scutellum green, greyish pruinose. Pleura greenish, slightly greyish pruinose; propleura with fine, pale hairs, and a black prothoracic bristle. Abdomen green, with more or less bronze-coloured reflexes, downwards slightly whitish pruinose; the hind margins of the segments narrowly dark bronze-coloured. It is clothed with short, black hairs and has somewhat long hindmarginal bristles, longest behind. Venter greenish, slightly pale-haired. Hypopygium black, greyish pruinose; eighth segment with longish, black hairs; there are small, brown posterior ventral lobes; the inner lamellæ somewhat short, curved downwards, the lateral a little dilated; the outer lamellæ somewhat short and roundish, whitish with a somewhat broad, brownish black margin; the apical margin is serrated and with rather few, curved hairs, the ventral margin with dense, short hairs. Legs black; coxæ grey, front coxæ whitish grey pruinose anteriorly; knees very narrowly reddish; the last joint of the front tarsi dilated, but it is compressed, not flattened as in *Falleni*. The anterior coxæ with rather long bristles apically; otherwise the legs with short, black hairs; hind femora with longer hairs above and below, and with a

fringe of long, black cilia below in the apical half; posterior femora with one preapical bristle; front tibiæ with rows of bristles above and on the posterior side; middle tibiæ with about four antero- and two postero-dorsal bristles, one dorsal above the middle and one ventral below the middle; hind tibiæ somewhat thickened towards the apex, with two dorsal rows of bristles and one ventral bristle towards the apex, besides with a ventral row of fine bristles; hind metatarsi with bristles above and anteriorly, and with shorter bristles below. Wings somewhat short, hyaline; veins blackish brown, costa with a small, black swelling; discal vein with a somewhat large and angular, but obtuse bend; axillary lobe moderately developed, anal vein stretching somewhat forwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Fig. 20.
D. melanopus ♂, front
tarsus from
the side.
× 35.

Female. Epistoma broad, darker grey than in the male. Antennæ shorter, third joint very short. Hind femora without fringe, and hind tibiæ not thickened. Wings a little fumigated, especially towards the anterior margin; costa without swelling.

Length 4—4,2 mm.

D. melanopus is rare in Denmark, only three specimens are known, a pair taken by Stæger in a fen in Dyrehaven in August, and a male taken by H. J. Hansen on Bornholm at Allinge in July.

Geographical distribution: — Northern and middle Europe, down into France; towards the north to southern Sweden.

5. *D. planitarsis* Fall.

1823. Fall. Dipt. Suec. Dol. 12, 8. — 1831. Stann. Isis 1831, 122, 17. — 1842. Stæg. Krøyer's Tidsskr. IV, 30, 21. — 1843. Zett. Dipt. Scand. II, 516, 14, et 1855. XII, 4624, 14 et 1859. XIII, 5042, 14. — 1862. Schin. F. A. I, 214. — 1903. Kat. paläarkt. Dipt. II, 302.

Male. Vertex and frons green. Epistoma moderately narrow, silver-white. Palpi greyish. Occiput green, greyish pruinose; postocular bristles black. Antennæ black, elongated, longer than the head, third joint considerably longer than broad, triangularly ovate; arista short. Thorax green, towards the sides sometimes somewhat olive, shining, slightly brownish pruinose. Scutellum finely pale-haired at the margin; postscutellum green, greyish pruinose. Pleura greenish, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green with slight, bronze-coloured reflexes, finely whitish

pruinose downwards, and with darkened hind margins to the segments. It is clothed with short, black hairs, and has somewhat long hindmarginal bristles. Venter greyish, slightly pale-haired at the base. Hypopygium black, greyish pruinose; eighth segment with longish, black hairs; there are small posterior ventral lobes, projecting a little backwards; the inner lamellæ about half as long as the outer, yellowish, curved downwards, the median ending with an attenuated part, the lateral dilated and with a little point at the apex; the outer lamellæ are somewhat narrow, pointed towards the apex; they are white, narrowly brownish seamed in the apical half, more broadly at the apex; at the latter are a pair of longer projections with curved hairs, the rest of the ventral margin is serrated, with shorter, somewhat strong, and not specially dense hairs. Legs with the femora black or blackish, the apex of the front femora, about the apical third of the middle femora, and the anterior tibiæ and tarsi yellowish, the last joint of the front tarsi darkened; the middle tarsi somewhat long and thin, longer than the tibiæ; the last joint dilated, flattened and black, with a short fringe at each side, the apex and the pulvilli white; coxæ grey, front coxæ whitish grey pruinose, and white-haired. The legs with short, black hairs, hind femora with a little longer hairs above at the base, and with a fringe of fine, pale hairs below, longest in the apical half; posterior femora with one preapical bristle; front tibiæ with rows of bristles above and on the posterior side; middle tibiæ with about five antero-dorsal and two dorsal bristles, and with two antero-ventral, the upper weak, and one ventral bristle below the middle; hind tibiæ with two dorsal rows, and with one ventral bristle below the middle, besides with a row of fine bristles below; hind metatarsi with about three bristles above and some on the anterior side. Wings slightly brownish, especially towards the anterior margin; veins blackish brown, costa with a very small swelling; the bend of the discal vein small, and only the lower angle slightly angular; axillary lobe rather well developed, anal vein stretching somewhat forwards. Squamulæ whitish, with a blackish fringe, in which are some shorter, pale hairs. Halteres yellow.

Female. Epistoma broad, grey. Antennæ shorter than in the male, about as long as the head, third joint short, triangularly ovate, arista rather near the point. Anterior femora only yellowish at the apex, and the anterior tarsi blackish, only metatarsus pale at the base; middle tibiæ darkened, brown to blackish, middle tarsi simple; front coxæ black haired; hind femora without fringe. Wings without costal swelling.

Length 4.2—4.6 mm.

D. planitarsis is not rare in Denmark, but hitherto however has only been taken in few localities; Ordrup Mose, Ryget Skov at Farum Sø, Sorø, and in Jutland at Funder near Silkeborg. My dates are only $^{12}/_5$ — $^{21}/_6$; Stæger l. c. records its from May and again from August; it thus occurs rather early, but seems to have two broods. It occurs on open, humid places at the outskirts of woods and in fens in foliage, often on the leaves of alder.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden; and in Finland.

Remarks: Verrall says (Ent. Month. Mag. XV, 1904, 197) that he cannot trace Kowarz's distinctive character of the female, based upon more than one bristle beneath the middle tibiæ (Wien. ent. Zeitg. III, 1884, 54); there is also only one ventral bristle, but two antero-ventral in both sexes, so that I think it is these latter which Kowarz has included.

6. *D. Stenhammari* Zett.

1843. Zett. Dipt. Scand. II, 521, 18, et 1849. VIII, 3678, 18, et 1859. XIII, 5043, 18. — 1895. Lichtw. Deutsch. Ent. Zeitschr. 1895, 103. — 1903. Kat. paliarkt. Dipt. II, 304. — *Dolichopus annulipes* Zett. (nec Meig.) 1838. Ins. Lapp. 710, 12.

Male. Vertex and frons green. Epistoma somewhat broad, brownish grey, rather short. Palpi dark. Occiput slightly greenish, densely grey pruinose; postocular bristles black. Antennæ black, not as long as the head, third joint short, triangularly ovate. Thorax dark olive green or more olive, distinctly greyish brown pruinose, not much shining. Scutellum finely yellowish haired at the margin; postscutellum almost grey. Pleura slightly greenish or more bronze-coloured, grey pruinose; propleura with fine, blackish to pale brownish hairs and a black, prothoracic bristle. Abdomen green, with bronze-coloured reflexes, slightly whitish pruinose downwards, with darkened hind margins to the segments. It is clothed with short, black hairs, and has longer bristles at the hind margins of the segments. Venter greyish, with pale hairs at the base. Hypopygium black, greyish pruinose; eighth segment with longish hairs; posterior ventral lobes very small, almost wanting; inner lamellæ about half as long as the outer, curved downwards, the median shortest, pointed; the lateral somewhat dilated; the outer lamellæ somewhat small, rectangularly ovate, yellowish or dirtily whitish, with a rather broad, blackish brown margin; at the end there are four longer teeth with black, curved hairs; the teeth are longest at the dorsal corner; the ventral margin very slightly serrated, with shorter, almost straight, not dense hairs,

more dense at the anterior corner. Legs with all tarsi long, considerably longer than the tibiæ, the metatarsi elongated, much longer than the second joint; the legs are black; coxæ grey, a little lighter pruinose anteriorly; knees very narrowly reddish; front metatarsi, except the apex, yellowish or pale brownish; middle tibiæ with a broad, snow-white ring a little below the middle, and the metatarsus snow-white except the very apex, and silvery on the anterior side. The hind tibiæ have a curvature at the base, with the convex side behind. The legs have short, black hairs, hind femora with longer hairs above towards the base, and with a fringe of long, black hairs below in the apical half; posterior femora with one preapical bristle; front tibiæ with rows of bristles above and on the posterior side; middle tibiæ with about five antero-dorsal, two or three dorsal, three antero-ventral and one postero-ventral bristle, the latter below the middle; hind tibiæ with a dorsal and antero-dorsal row, one ventral bristle below the middle, and a ventral row of fine bristles; the long metatarsus with four bristles above and some on the anterior side and below; middle metatarsus with a bristle above after the middle, and shorter bristles below. Wings almost hyaline; veins black, costa with a small, but somewhat elongated swelling; discal vein with a small, obtuse bend; axillary lobe somewhat well developed, anal vein not stretching long forwards. Squamulæ yellow with a black fringe. Halteres yellow.

Female. Epistoma slightly broader than in the male. Antennæ of about the same length as in the male. Front metatarsi blackish; the ring on the middle tibiæ very obscured, and also the metatarsi less clear white and not silvery anteriorly; hind femora with somewhat longish hairs beneath, but without fringe. Wings without costal swelling.

Length 5—5,5 mm.

This beautiful species is easily recognised by the colour of the legs.

D. Stenhammari is very rare in Denmark, only one specimen, a male, has been caught in Lyngby Mose on ³/₆ 1909 (the author).

Geographical distribution:— It is a boreal species; towards the south it goes down into Germany; towards the north it is found to northernmost Scandinavia, in Finland and Siberia. It also occurs in North America in Labrador and Alaska.

7. *D. campestris* Meig.

1824. Meig. Syst. Besch. IV, 78, 8. — 1831. Stann. Isis 1831, 136, 30. — 1842. Stæg. Kroyer's Tidsskr. IV, 35, 28. — 1843. Zett. Dipt. Scand.

II, 562, 52, et 1859. XIII, 5056, 52. — 1862. Schin. F. A. I, 215. — 1903. Kat. paläarkt. Dipt. II, 296.

Male. Vertex and frons green. Epistoma moderately narrow, light brownish yellow. Palpi blackish. Antennæ black, short, shorter than the head, third joint short triangular. Thorax varying from green to bronze or copper-coloured, slightly greyish brown pruinose, shining. Scutellum distinctly yellow-haired; postscutellum greenish, grey pruinose. Pleura greenish or bronze-coloured, finely grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, with more or less predominant bronze or copper-coloured reflexes; it is finely whitish pruinose, and there are distinct, dark copper-coloured hind margins to the segments; abdomen is clothed with short, black hairs, and has somewhat short hindmarginal bristles, which are not longer on the first segment; they increase slightly in length behind. Venter greyish, slightly pale-haired at the base. Hypopygium somewhat long, black, a little greenish on the right side, grey pruinose; eighth segment with black hairs; there are slightly projecting, rounded posterior ventral lobes; the inner lamellæ somewhat short, curved downwards, the median thin, the lateral dilated; the outer lamellæ not large, roundish rectangular, blackish, sometimes paler to dirty whitish, and then with a broad, blackish margin; the apical margin has some teeth with curved, black hairs, the ventral margin is almost not serrated, and has densely placed, yellow hairs, which are curved strongly inwards. Legs black, coxæ grey, tibiæ yellowish, hind tibiæ black towards the apex; anterior metatarsi dark yellowish, except the apex. The legs have short, black hairs, hind femora with longer hairs above at the basal part and with a fringe of longish, fine, black cilia below; middle femora with two, hind femora with one, sometimes, but rarely, two pre-apical bristles; front tibiæ with two or three antero-dorsal, one dorsal, and two or three posterior bristles; middle tibiæ with about four antero-dorsal, two postero-dorsal, and one ventral bristle, the latter below the middle; hind tibiæ with a dorsal and antero-dorsal row, and about two ventral bristles, besides with a ventral row of smaller bristles, which however generally increase evenly in length towards the long ventral bristles; hind metatarsi with two longer and a smaller bristle above, and some on the anterior side. Wings a little narrow, slightly fumigated, most towards the anterior margin; veins blackish; discal vein with a small, obtuse bend; axillary lobe large, anal vein directed chiefly downwards. Squamulæ yellow, with a black fringe. Halteres pale yellow.

Female. Epistoma broader than in the male, grey. Antennæ of about the same length as in the male. Hind femora with short hairs below.

Length 4.2 to fully 5 mm.

D. campestris is common in Denmark; Lersøen, Amager, Charlottenlund, Ermelund, Ørholm, Fure Sø, Hillerød, Roskilde; on Funen at Odense; in Jutland at Horsens, Timbæk Mølle at Lindenberg Aa and Frederikshavn, and on Bornholm at Hasle and Allinge. My dates are $\frac{3}{6}$ — $\frac{18}{8}$. It occurs on meadows and in fens, and else on humid places and at borders of water.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden.

8. *D. lepidus* Stæg.

1842. Stæg. Krøyer's Tidsskr. IV, 36, 29. — 1862. Schin. F. A. I, 215. — 1903. Kat. paläarkt. Dipt. II, 299. — *Dolichopus tibialis* Zett. 1838. Ins. Lapp. 710, 13. — 1843. Zett. Dipt. Scand. II, 524, 20, et 1852. XI, 4284, 20, et 1859. XIII, 5045, 20. — *Dolichopus geniculatus* Zett. (nec Stann.) 1843. Dipt. Scand. II, 525, 21, et 1852. XI, 4285, 21, et 1859. XIII, 5047, 21.

Male. Vertex and frons green or bluish green. Epistoma very narrow, brown. Palpi black. Occiput green, greyish pruinose; post-ocular bristles black. Antennæ black, short, not as long as the head, third joint short, triangular. Thorax green, very slightly pruinose, shining; scutellum finely yellow- or brown-haired; postscutellum greyish pruinose. Pleura green, finely greyish pruinose; propleura with fine, blackish hairs and a black prothoracic bristle. Abdomen green, sometimes with bronze reflexes, finely whitish pruinose downwards, and with darkened hind margins to the segments. It is clothed with short, black hairs, and has longer hindmarginal bristles. Venter greyish, slightly yellow-haired at the base. Hypopygium somewhat large, black, greyish pruinose; eighth segment with black hairs; there are slightly projecting posterior ventral lobes; the inner lamellæ small, curved downwards, the lateral dilated at the apex; the outer lamellæ not large, roundish, dirtily whitish, with a somewhat broad, blackish margin; the end has some teeth with curved, black hairs; the ventral edge is almost not serrated and has short, dense, pale hairs. Legs black, coxæ grey, a little lighter pruinose anteriorly; knees and the anterior tibiæ and metatarsi except the apex yellow or pale ferruginous. The legs have short, black hairs, hind femora with longer hairs above in the basal part, and with a fringe of long, black cilia below in the apical part; posterior femora with one preapical bristle; front tibiæ

with about three bristles above and one to three postero-ventral bristles; middle tibiæ with about five antero-dorsal, two dorsal bristles and one ventral below the middle; hind tibiæ somewhat thickened in the whole length, with a dorsal and antero-dorsal row of bristles, and a ventral bristle below the middle, besides a ventral row of small, short bristles, almost forming a ciliation; hind metatarsi with three to four bristles above and some on the anterior side, besides distinctly spinulose below. Wings a little brownish, most towards the anterior margin, and here sometimes rather strongly; veins blackish, costa with a small, but somewhat elongated swelling; discal vein with a small, obtuse bend; axillary lobe well developed, anal vein going somewhat downwards. Squamulæ whitish, with a black fringe. Halteres yellowish white or yellow.

Female. Epistoma much broader than in the male, grey or whitish grey. Antennæ slightly shorter. Hind tibiæ generally more or less yellowish, except the apical part, but sometimes slightly or not at all; hind femora without fringe. Wings without costal swelling.

Length 4—4.5 mm.

The pupa has a length of about 5 mm.

This species is in the female very similar to *planitarsis*, but is distinguished by the broader epistoma, the short third antennal joint with the more dorsally inserted arista, the yellow hind tibiæ with the small ventral bristles more densely placed, and besides by characters in the bristles of the legs, the middle tibiæ having no antero-ventral bristles. — The species was founded on Danish specimens.

D. lepidus is somewhat rare in Denmark, Lersø (Stæger), Bølle-mosen, Lyngby Mose, Fure Sø, Frerslev Hegn (the author), Hillerød (Godskesen), and in Jutland at Silkeborg. My dates are $\frac{4}{6}$ to the first part of August; Stæger records it from the last part of May. It occurs in fens and at the borders of water.

Geographical distribution: — Northern and middle Europe down into France; towards the north to northernmost Scandinavia, and in Finland.

9. *D. picipes* Meig.

1824. Meig. Syst. Besch. IV, 76, 4. — 1831. Stann. Isis 1831, 138, 32. — 1842. Stæg. Krøyer's Tidsskr. IV, 34, 26. — 1843. Zett. Dipt. Scand. II, 523, 19, et 1859. XIII, 5044, 19. — 1903. Kat. paläarkt. Dipt. II, 302. — *Dolichopus fastuosus* Hal. 1831. Zool. Journ. V, 260, 8. — 1862. Schin. F. A. I, 214. — *Dolichopus plebejus* Zett. (nec Meig.) 1840. Ins. Lapp. 710, 11.

Male. Vertex and frons green. Epistoma somewhat narrow, white. Palpi black. Occiput green, greyish pruinose; postocular

bristles black. Antennæ black, scarcely as long as the head, the third joint triangular. Thorax green, slightly pruinose, shining; scutellum finely yellow-haired at the margin; postscutellum grey pruinose. Pleura green, finely greyish pruinose; propleura with fine, blackish or brownish hairs and a black prothoracic bristle. Abdomen green, finely whitish pruinose downwards, the hind margins of the segments darkened, bronze-coloured. Abdomen clothed with short, black hairs, and with somewhat long hindmarginal bristles, longest on the first segment. Venter greyish, slightly pale-haired at the base. Hypopygium black, greyish pruinose; the eighth segment with somewhat long, black hairs; there are slightly projecting posterior ventral lobes, ending with a little point with small spines; the inner lamellæ half as long as the outer, curved downwards, the median thin, brownish black, the lateral dilated, yellowish; the outer lamellæ not large, roundish rectangular, whitish with a somewhat broad, blackish brown margin; at the end there are longer teeth with curved hairs, the teeth decreasing in length towards the ventral margin; this latter is serrated and with more straight hairs, and on the inner side with curved hairs. Legs black; coxæ grey, on the anterior side whitish grey pruinose; the knees and the apical point of the front tibiæ reddish or yellow; the anterior metatarsi a little pale just at the base, on the middle tarsi the pale colour sometimes more extended. The legs have short, black hairs, hind femora with a little longer hairs above towards the base, and with short hairs below; posterior femora with one preapical bristle; front tibiæ with antero-dorsal, postero-dorsal and posterior bristles, about three in each row or generally four in the two posterior rows, and besides with a dorsal bristle below the middle; middle tibiæ with about five antero-dorsal, two postero-dorsal, two dorsal bristles, and a ventral bristle below the middle, but the number may vary; hind tibiæ with a dorsal and an antero-dorsal row, one ventral bristle below the middle, and a row of dense, short ventral bristles; hind metatarsi with three bristles above, some on the anterior side, and smaller bristles below. Wings somewhat blackened, especially at the anterior margin towards the base, where the wing may be rather black; veins black, costa somewhat thick, and the anterior margin of the wing a little curved; there is no costal swelling, but at the place where this should be the costa is curved outwards; discal vein with a slight, obtuse bend; axillary lobe well developed, anal vein directed somewhat downwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male, grey. Antennæ somewhat shorter, third joint triangular, broader than long.

Length 4.6—5.2 mm.

This species is in the female rather similar to *melanopus*, but is distinguished by the anterior tibiæ being pale at the extreme apex, and the small ventral bristles on the hind tibiæ being more densely placed; also the bristles on the legs differ somewhat.

D. picipes is not rare in Denmark, though it cannot be termed common; Ordrup Mose. Ermelund, Dyrehaven, Ørholm, Lyngby Mose. Hillerød and Præstevang at Hillerød, Sorø; on Funen at Veflinge; in Jutland at Funder near Silkeborg and Hald near Viborg, and on Bornholm at Rønne and Almindingen. My dates are ^{2.6} to the last part of July; Stæger records it from May. It occurs in fens and on humid places at the outskirts of woods.

Geographical distribution:— Northern and middle Europe, down into France; towards the north to northern Sweden, and in Finland.

10. *D. varitibia* n. sp.

Male. Vertex and frons green. Epistoma rather narrow, white. Palpi blackish. Occiput green, grey pruinose; postocular bristles black. Antennæ black, about as long as the head, third joint triangularly ovate, as long as broad. Thorax dark greenish or olive greenish, a little brownish pruinose; scutellum finely yellow-haired at the margin; postscutellum grey pruinose. Pleura green, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, bronze-coloured above, finely whitish pruinose downwards; the hind margins of the segments dark. It is clothed with short, black hairs, and has somewhat long, hindmarginal bristles. Venter grey, a little yellow-haired at the base. Hypopygium somewhat large, black, greyish pruinose; the eighth segment with black hairs, and yellowish pruinose at the upper margin; there are somewhat projecting, rounded posterior ventral lobes, with a hair at the apex; they issue more basally than commonly, and do not reach the end of the hypopygium; the inner lamellæ fully half as long as the outer, curved downwards, the median pointed, the lateral dilated and with excisions at the apex; the outer lamellæ rather small, narrowed towards the end, whitish, with a narrow, blackish margin, only broad at the end; at the latter there are some teeth with curved, black hairs, the ventral margin slightly serrated, with distant, black, almost straight hairs, and inwards with dense, somewhat strong, curved hairs; the dorsal margin has rather long hairs. Legs black, coxæ grey, anteriorly whitish grey pruinose; also the femora somewhat pruinose; knees somewhat broadly reddish; front tibiæ yellowish, with an indistinct, dark ring below the base, middle tibiæ likewise yellowish, with a distinct and broad dark ring

below the base; anterior metatarsi dark yellowish except the base. The legs have short, black hairs, a little longer above the hind femora in the basal half, and below the hind femora short, pale hairs; posterior femora with one preapical bristle; front tibiae with four rows of bristles on the dorsal, posterior and postero-ventral side; middle tibiae with about five antero-dorsal, two postero-dorsal bristles, one dorsal above and one ventral below the middle; hind tibiae with two dorsal rows, and with one ventral bristle below the middle, besides with a ventral row of small, distant bristles; hind metatarsi with three bristles above and some on the anterior side, and with small bristles below. Wings slightly tinged, a little brownish at the anterior margin above the cubital vein; veins black, costa with a rather large swelling; discal vein with a very slight and obtuse bend; axillary lobe well developed, anal vein going somewhat downwards. Squamulae yellow, with a black fringe. Halteres yellow.

Female unknown.

Length 5.3 mm.

This species seems to be most nearly allied to *D. picipes*, from which however the colour of the legs and the costal swelling at once distinguish it.

D. varitibia is very rare, only one specimen, a male, has been caught in Lyngby Mose on ⁸/₇ 1911 (the author).

11. *D. remipes* Wahlb.

1838. Wahlb. Vetensk. Akad. Handl. 1838. 13, 6. — 1843. Zett. Dipt. Scand. II, 518, 15. — 1903. Kat. paläarkt. Dipt. II, 303. — *Dolichopus lepidus* Zett. (nec Stæg.) 1843. Dipt. Scand. II, 527, 24, et 1849. VIII, 3079, 24, et 1859. XIII, 5048, 24, ♀.

Male. Vertex and frons brightly dark green. Epistoma somewhat narrow, silver-white, reaching to or nearly to the lower margin of the eyes, slightly widened downwards. Palpi blackish grey. Occiput green or bluish, slightly pruinose; postocular bristles white, almost silver-white below, black above; they are longer and stronger below, longest and dense to each side of the mouth aperture, and here a little flattened. Antennae black, shorter than the head, third joint about as long as broad. Thorax bright bluish green, golden green or even coppery, sometimes quite bluish, it is almost not pruinose, much shining; scutellum with distinct, yellow hairs at the margin; post-scutellum slightly grey pruinose. Pleura green, greyish pruinose; propleura with longish, pale hairs, and a black prothoracic bristle. Abdomen green, bluish green or blue, very finely whitish pruinose downwards, with black incisures; it is clothed with short hairs, which are

black above, white and a little longer at the sides of the three first segments, and specially long on the first segment; there are hind-marginal bristles of medium length, and almost not longer on the first segment. Venter green, a little greyish pruinose, with pale hairs, long at the base, and curved a little forwards on the third segment. Hypopygium blackish green, greyish pruinose; eighth segment with black hairs; there are somewhat large, brownish, rounded posterior ventral lobes, with a little joint at the upper corner; the inner lamellæ are thin, curved downwards, the median hastately pointed, with a bristle at the upper margin, the lateral a little dilated at the apex and here with a bristle or spine; the outer lamellæ broad, somewhat triangular, the ventral side drawn somewhat triangularly out; they are white, with a narrow, black margin along the apical and outer part of the dorsal edge, the ventral corner broadly black; at the dorsal corner there are a pair of teeth with curved, black hairs, and dorsally to them a pair of hairs with the apex bent and dilated; the apical margin is serrated, with shorter hairs, and on the inside with short, inwards curved hairs, which are dense and tuft-like at the ventral corner. Legs with coxæ and femora black, anterior coxæ whitish pruinose anteriorly; femora a little bluish metallic, and somewhat greyish pruinose; the apex of the anterior femora and the anterior tibiæ yellow, front tarsi darkened towards the end, with about the three last joints blackish; middle tarsi white, with just the apex of the joints blackish; hind tibiæ a little thickened towards the apex, yellowish, blackened towards the end; hind tarsi black, long, considerably longer than the tibiæ, the three last joints feathered with long hairs on the dorsal side. The legs have short, black hairs, anterior coxæ white-haired, and also the hind coxæ with some pale hairs; middle femora with fine, longish, pale hairs below, black at the apex, hind femora likewise, the black hairs in the apical third long, forming a fringe; posterior femora with one preapical bristle; front tibiæ with bristles above, and one on the postero-ventral side; middle tibiæ with seven to eight antero-dorsal, two to three postero-dorsal bristles, and with one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, and with short, dense bristles on the ventral side, among which one or a couple stronger towards the apex; hind metatarsus with three to four dorsal bristles, and a few small on the anterior side. Wings with the space above the cubital vein, from the apex of the subcostal vein, blackish, and with the posterior cross-vein blackish seamed, the colour also stretching somewhat along the discal and postical veins; veins black; costa with a quite small swelling; discal vein with

a somewhat small, obtuse bend, the last part converging towards the cubital vein; axillary lobe small, anal vein going forwards. Squamulae pale yellow, with a whitish fringe. Halteres whitish yellow, the peduncle brownish.

Female. Epistoma broader than in the male, but not specially broad. Antennae about as in the male. Colour of the body bright and shining as in the male, but generally more green or golden green. Abdomen not pale-haired at the sides. Femora without long hairs below, and hind tarsi simple. Wings without costal swelling, and the blackenings a little weaker. The hairs of the squamular fringe for the greatest part black.

Length 5—6 mm.

D. remipes is an interesting and beautiful species, I think the most beautiful *Dolichopus*; it is rare in Denmark and was first taken in this year (1912), when I took it in some number (9 males and 17 females) in Bøllemosen on $\frac{3}{7}$ and $\frac{6}{7}$. It occurs at water on water plants, I took my specimens on the leaves of *Calla palustris*. As soon as I saw the first male, I could see at the same moment that it was *D. remipes*; it was especially sitting on the leaves, which were quite down to the water surface, and it was rather restless and not easy to catch, especially the males, which also were less numerous than the females; as already noted by Wahlberg, it was never seen on erect plants or in the herbage on the border. Wahlberg has l. c. some notes about its behaviour, and mentions that the males follow the females "Gallorum more", hovering above them in the air, and I observed the same.

Geographical distribution:— Northern and middle Europe down into Germany; towards the north to middle Sweden, and in Finland. It occurs also in North America.

12. *D. tanythrix* Loew.

1869. Loew, Beschr. eur. Dipt. I, 274, 163. — 1903. Kat. paläarkt. Dipt. II, 305.

Male. Vertex and frons green. Epistoma somewhat broad, narrowed downwards, white. Palpi blackish. Occiput greenish, somewhat bronze-coloured, greyish yellow pruinose; postocular bristles white below, black above. Antennae black, short, shorter than the head, the third joint shorter than broad. Thorax green, at the sides more bronze-coloured, slightly brownish pruinose, shining; scutellum distinctly yellow pubescent; postscutellum greenish, grey pruinose. Pleura greenish, grey pruinose; propleura with fine, pale hairs and a

black prothoracic bristle. Abdomen bronze-coloured, at the sides a little greenish, and here whitish pruinose; the hind margins of the segments dark; abdomen is clothed with short, black hairs, the hind-marginal bristles not long, increasing in length behind. Venter greyish, slightly pale-haired. Hypopygium somewhat large, black, a little æneous on the right side, greyish pruinose; the eighth segment with black hairs; there are slightly projecting posterior ventral lobes with a little styliform point at the apex; the inner lamellæ short, curved downwards, the lateral dilated; the outer lamellæ of moderate size, somewhat ovate, whitish with a somewhat broad, blackish margin, narrower on the dorsal side; at the end there is a couple of teeth with black, curved hairs; the first tooth is placed somewhat dorsally; the ventral margin has short, dense hairs, and longer, inwards curved hairs; the outside of the lamellæ is short and densely pale-haired. Legs black, coxæ grey, on the anterior side whitish grey pruinose; anterior metatarsi except apex obscurely yellowish or brownish, the middle metatarsi lightest. The legs have short, black hairs, the anterior coxæ chiefly white-haired; hind femora with longish hairs above at the base, short, pale hairs below, and here with a fringe of long, black hairs in the whole length; posterior femora with one preapical bristle; front tibiæ with rows of bristles dorsally, and with one posterior bristle above the middle; middle tibiæ with about four antero-dorsal, two dorsal or postero-dorsal bristles and one ventral below the middle; hind tibiæ with two dorsal rows of very long bristles, longest in the postero-dorsal row and many bristles in each row, and with a ventral row of likewise long bristles; hind metatarsi also with many bristles above and on the anterior side, and with small bristles below. Wings slightly brownish tinged, most towards the anterior margin; veins black, costa with a somewhat long swelling; discal vein with a small, obtuse, but slightly angular bend; axillary lobe small, anal vein stretching far forwards. Squamulæ yellow, with a yellow fringe. Halteres yellow.

Female. Epistoma broad, whitish grey. Antennæ about as in the male. Coxæ more black-haired; hind femora with shortish, dark hairs below, and without fringe; hind tibiæ with the bristles a little shorter, and hind metatarsi with only two bristles above. Wings more brownish tinged; costa without swelling. The fringe on the squamulæ with a couple of black hairs intermingled.

Length 3.5 to about 4 mm.

This interesting species is obviously *D. tanythrix* Loew, but it differs in one character, viz. the yellow-fringed squamulæ; only in the female there are a few black hairs; but this difference is, I think,

of no consequence, as also other species are known, which are not quite constant with regard to the colour of the squamular fringe.

D. tanythrix is very rare in Denmark, and has only been taken on one occasion, when four specimens, two males and two females, were taken at Sminge near Silkeborg in Jutland on ¹⁰/₇ 1909. (Th. Mortensen).

Geographical distribution:— The species is, as far as I am aware, only known from Denmark, Bohemia and Styria.

13. *D. atripes* Meig.

1824. Meig. Syst. Besch. IV, 102, 51. — 1831. Stann. Isis 1831, 137, 31. — 1852. Zett. Dipt. Scand. XI, 4283, 19—20, et 1855. XII, 4625, 19—20. — 1862. Schin. F. A. I, 213. — 1903. Kat. paläarkt. Dipt. II, 295.

Male. Vertex and frons green. Epistoma moderately narrow, narrowed downwards, brown. Palpi blackish. Occiput green, a little greyish pruinose; postocular bristles white below, black above. Antennæ black, shorter than the head, third joint short triangular, broader than long. Thorax green, slightly greyish pruinose, shining; scutellum distinctly yellow-haired; postscutellum green, grey pruinose. Pleura green, slightly grey pruinose; propleura with fine hairs, which are brown above, paler downwards, and with a black, prothoracic bristle. Abdomen green, with slight bronze reflexes, finely whitish pruinose down the sides, and with slight dark hind margins to the segments. It is clothed with short, black hairs; the segments have bristles at the hind margin. Venter grey, with slight, pale hairs at the base. Hypopygium somewhat large, black, but a little æneous at the right side, greyish pruinose on the anterior half; the eighth segment with black hairs; there are slightly projecting, rounded posterior ventral lobes; the inner lamellæ are very complicated, the median pointed, the lateral large, whitish, flat, with various dilatations at the end; the outer lamellæ inserted somewhat dorsally, they are not quite of the usual shape, the dorsal posterior corner being broadly rounded, so that they get a curved appearance with a straight end margin (the real ventral margin); they are dirty whitish to pale brown, the end has a narrow, blackish margin; the end margin is only slightly serrated and has somewhat short, black hairs, and inwardly curved hairs, which are dense at the posterior corner; above this the margin has still some

Fig. 21. *D. atripes*. Apical part of hypopygium.

longer, curved hairs; for the rest the dorsal margin has straight hairs. Legs black, coxæ grey, a little lighter anteriorly; knees reddish, the anterior tibiæ sometimes somewhat piceous. The legs have short, black hairs, hind femora somewhat longer hairs above towards the base; posterior femora with one preapical bristle; the front tibiæ have bristles above and two postero-ventral bristles; middle tibiæ with about four to five antero-dorsal, two postero-dorsal bristles, and one ventral below the middle; hind tibiæ with two dorsal rows, and with one ventral bristle towards the apex, besides with a ventral row of small bristles; hind metatarsi with two or three bristles above, one on the anterior side, and small bristles below. Wings a little brownish tinged, most towards the anterior margin; veins black or blackish brown; discal vein with an obtuse, but somewhat angular bend; axillary lobe somewhat small, anal vein going forwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, grey. Antennæ as in the male.

Length 4 to about 4.5 mm.

D. atripes is rare in Denmark; Lyngby Mose (Esben Petersen); in Jutland in Grejsdalen at Vejle, at Silkeborg and Laven near Silkeborg; and on Bornholm at Almindingen (H. J. Hansen). The dates are in July and August. It occurs in woods on open, humid places, and near water.

Geographical distribution: — Northern and middle Europe down into France; towards the north to middle Sweden.

14. *D. vitripennis* Meig.

1824. Meig. Syst. Besch. IV, 78, 7. — 1831. Stann. Isis 1831, 134, 28. — 1871. Loew, Besch. Eur. Dipt. II, 259 et 261. — 1903. Kat. paläarkt. Dipt. II, 306. — *Dolichopus tibiellus* Zett. 1843. Dipt. Scand. II, 526, nota, et 1849. VIII, 3079, 21—22, et 1852. XI, 4285, 21—22. — 1859. Loew, Neue Beitr. VI, 8, 3.

Male. Vertex and frons green. Epistoma somewhat narrow and long, white. Palpi black. Antennæ black, a little elongated, as long as the head, third joint triangularly ovate, longer than broad. Occiput green, a little greyish pruinose; postocular bristles whitish below, black above. Thorax green, very slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum grey pruinose. Pleura green, grey pruinose; propleura with fine, pale hairs, and a black prothoracic bristle. Abdomen green, sometimes with slight bronze reflexes, very slightly whitish pruinose downwards; the hind margins of the segments narrowly dark. It is clothed with short, black hairs, and has somewhat short hindmarginal bristles. Venter greyish, very slightly pale-

haired at the base. Hypopygium somewhat large, black, greyish pruinose on the anterior part and above; the eighth segment with black hairs; there are small posterior ventral lobes, with a little point at the end; the inner lamellæ curved downwards, the median quite thin, the lateral a little dilated; the outer lamellæ not large, somewhat triangular and pointed; they are whitish, towards the end with a narrow, brownish margin; at the end there are a couple of teeth with curved, black hairs, the ventral margin slightly serrated, with short hairs, and on the inner side with inwards curved hairs; the anterior ventral corner is somewhat produced and has a tuft of short, black hairs. Legs black, coxæ grey, a little lighter anteriorly; all tibiæ, and the anterior metatarsi except the apex, yellow, the hind tibiæ blackened at the apex. The legs have short, black hairs, the hind femora longer hairs above in the basal part; posterior femora with one preapical bristle; front tibiæ with bristles above and two postero-ventral bristles; middle tibiæ with about four to five antero-dorsal (one of them dorsal), two postero-dorsal bristles and one ventral below the middle; hind tibiæ with two dorsal rows and with one ventral bristle below the middle, besides a ventral row of small bristles; hind metatarsi with two dorsal and one anterior bristle. Wings hyaline; veins black or blackish brown, costa with a very small swelling only forming a point; discal vein with an obtuse, slightly angular bend; axillary lobe somewhat large, anal vein directed somewhat downwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Fig. 22. *D. vitripennis*. Apical part of hypopygium.

Female. Epistoma broad, whitish. Antennæ shorter than in the male, third joint short, shorter than broad. Wings slightly yellowish tinged.

Length 3,4—3,7 mm.

D. vitripennis is like the preceding a rare species in Denmark; Tisvilde (the author), and in Jutland at Sminge near Silkeborg (Th. Mortensen), Hald near Viborg (the author), Hulsig north of Frederikshavn (Th. Mortensen), and on Læsø (H. J. Hansen). My dates are ²⁷ to the last part of July. It occurs in marshy districts and often near the coast.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden, and in Finland.

15. *D. clavipes* Hal.

1831. Hal. Zool. Journ. V, 365, 23. — 1903. Kat. paliarkt. Dipt. II, 297. — *Dolichopus fuscipes* Hal. 1831. Zool. Journ. V, 364. — *Dolichopus obscuripes* Meig. 1838. Syst. Besch. VII, 163, 63. — *Gymnopternus obscuripes* 1862. Schin. F. A. I, 211. — *Dolichopus rusticus* Meig. 1824. Syst. Besch. IV, 77, 5. — *Dolichopus trochanteratus* Zett. 1843. Dipt. Scand. II, 540, 34, et 1855. XII, 4268, 34. — *Dolichopus vitripennis* 1842. Stæg. (nec Meig.) Krøyer's Tidsskr. IV, 35, 27.

Male. Vertex and frons green or bronze-coloured. Epistoma moderately broad, a little narrowed downwards, white. Palpi yellowish or brownish. Antennæ black, the basal joint yellow beneath; they are not as long as the head, third joint short triangular. Occiput green, greyish pruinose; postocular bristles white, black above. Thorax green, slightly brownish pruinose, shining; scutellum finely yellow pubescent; postscutellum greyish. Pleura greenish, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen greenish, downwards finely whitish pruinose; darker hind margins to the segments slight or wanting. The colour of the body may vary rather much, from greenish to bronze or more copper-coloured, or to more olive. Abdomen clothed with short, black hairs, the hind margins of the segments have short bristles. Venter greyish or greenish grey, slightly pale-haired at the base. Hypopygium rather small, reaching about to the base of the fourth segment, black or slightly greenish, greyish pruinose; the eighth segment with black hairs; there are somewhat projecting posterior ventral lobes, with a little point at the upper apical corner; the inner lamellæ curved downwards and towards each other, the median are pointed, the lateral dilated and with three small, black spines at the upper margin; the outer lamellæ of medium size, somewhat ovate, whitish with a somewhat broad, blackish margin in the posterior half; the end has some teeth, the ventral margin is serrated, and both have blackish, curved hairs, and on the inner side inwards curved hairs. Legs with the coxæ grey, lighter anteriorly, trochanters reddish yellow, femora blackish or dark piceous, sometimes lighter towards the base; knees, anterior tibiæ and basal part of metatarsi yellowish or dark yellowish; hind tibiæ somewhat compressed, and dilated in the middle, black, sometimes a little pale at the base; anterior tarsi with apex of metatarsus and the four following joints black, and hind tarsi quite black. Legs with short, black hairs; front coxæ white-haired, and all femora somewhat pale-haired below; hind femora with a little longer hairs above towards the base, and with a fringe of long, yellow cilia below in about the apical two thirds; posterior femora with one preapical

bristle; front tibiae with bristles above, and one (sometimes two) on the postero-ventral side; middle tibiae with about four antero-dorsal (one of them dorsal) and two postero-dorsal bristles, and with one ventral a little below the middle; hind tibiae with two dorsal rows, one ventral bristle towards the apex, and a ventral row of small bristles; hind metatarsi with only one bristle above. Wings almost hyaline or slightly yellowish towards the anterior margin; veins blackish, costa with a small swelling; discal vein with a somewhat large, a little angular, but obtuse bend; axillary lobe somewhat developed, anal vein stretching somewhat forwards. Squamulae yellow, with a fringe, the exterior hairs of which are black or brown, the interior yellow, the predominance of the colour somewhat varying. Halteres yellow.

Female. Epistoma broad, white. Antennae slightly shorter than in the male. Hind femora without fringe, hind tibiae simple, dark yellowish except the apex. Wings without costal swelling.

Length 3,5—4,5 mm.

D. clavipes is a rare species in Denmark; Amager, Dyrehaven (Stæger), at Boserup near Roskilde, and in Jutland at Frederikshavn (H. J. Hansen). My dates are in July. It occurs generally near the coast.

Geographical distribution:— Northern and middle Europe down into Bohemia; towards the north to southern Sweden.

16. *D. claviger* Stann.

1831. Stann. Isis 1831, 56, 9. — 1842. Stæg. Krøyer's Tidsskr. IV, 20, 11. — 1843. Zett. Dipt. Scand. II, 532, 27, et 1859. XIII, 5048, 27. — 1862. Schin. F. A. I, 216. — 1903. Kat. paläarkt. Dipt. II, 297.

Male. Vertex and frons green or bronze-green. Epistoma narrow, white. Palpi yellow. Occiput green, greyish pruinose; post-ocular bristles yellow below, black above. Antennae shorter than the head, third joint somewhat ovate, pointed, not longer than broad; they are black, the basal joint yellow beneath. Thorax green, often golden green, and there may be a golden middle stripe; it is finely greyish pruinose, shining. Scutellum slightly pale-pubescent; post-scutellum greyish pruinose. Pleura greenish, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, golden green or copper-coloured, sometimes with bluish reflexes, finely whitish pruinose downwards; there are narrow, dark hind margins to the segments; abdomen is clothed with short, black hairs, the hindmarginal bristles are short, only long at the sides of the first segment. Venter greenish grey, distinctly yellow-haired, the hairs on the third segment curved forwards. Hypopygium somewhat long, black, slightly aeneous,

greyish pruinose; the eighth segment with black hairs; there are somewhat projecting posterior ventral lobes with a little, black style at the end; inner lamellæ somewhat large, curved downwards, the median most strongly curved, broad at the base, hook-shaped; the lateral dilated, especially at the apex; the outer lamellæ somewhat large, rounded rectangular, broadest at the end; they are whitish, the end with a broad, indeterminately bordered, blackish margin; at the dorsal end-corner there are some teeth with curved hairs, the first tooth long; the rest of the apical and ventral margin serrated, the former with yellow, curved hairs, the ventral margin with short, black hairs; the inner surface has short, black hairs in the apical half. Legs long, pale yellow; front coxæ white pruinose anteriorly, posterior coxæ grey, yellowish at the apex; middle tarsi with the four last joints blackish, hind tibiæ blackish at the apex and hind tarsi black. Front tarsi long, the last joint compressed and dilated, ovate, black, hairy at the margin. The legs have short, black hairs, front coxæ white-haired with a few black hairs intermingled; the anterior femora with a row of long, fine, yellow hairs below in the apical half, and the middle femora with a few shorter, and black hairs below at the apex; all femora with short, pale hairs below at the base; posterior femora with two to three preapical bristles; front tibiæ with bristles above and on the posterior side; middle tibiæ with about six antero-dorsal, four postero-dorsal, four antero- and four postero-ventral bristles, the uppermost in the two latter rows weaker; hind tibiæ with two rows of dorsal bristles, and one ventral bristle below towards the apex, besides a ventral row of fine, distant bristles; middle metatarsi with one dorsal bristle, and hind metatarsi with three or four dorsal and some anterior bristles. Wings somewhat yellowish; veins blackish, costa with a long, black swelling; discal vein with a moderately large, obtuse bend, especially the upper angle is rounded; axillary lobe not large, anal vein going somewhat forwards. Squamulæ yellow, with a fringe of long, yellow, a little curled and somewhat silky hairs. Halteres yellowish white.

Female. Epistoma broader than in the male but however rather narrow, greyish white. Antennæ a little shorter, with the third joint shorter. Front tarsi simple, not long, more or less darkened towards the apex; femora without fringes. Wings more yellowish, without costal swelling. Squamular fringe with some black hairs.

Length 5,5—6,5 mm.

The fullgrown larva has a length of 13 mm, the pupa of 7 mm; the latter has the sheaths of the legs reaching to the end of the fifth abdominal segment.

D. claviger is common in Denmark; Charlottenlund, Ordrup Mose, Ermelund, Dyrehaven, Hareskov, Ryget Skov at Farum Sø, Tisvilde, Rørvig, Nordskoven at Jægerspris, Faxe Ladeplads, Nyraad near Vordingborg; on Langeland at Lohals; on Fünen at Strib; in Jutland at Horsens and at Hald near Viborg, and on Bornholm at Rønne. My dates are $\frac{2}{6}$ — $\frac{28}{7}$. Stæger records it from May and June and again in August, which would seem to indicate two broods; my dates do not confirm this. The species occur in woods on bushes and in low herbage on humid places and near water. The larva was found in Dyrehaven in mole-casts on $\frac{27}{4}$, they pupated on $\frac{18}{5}$ and the imagines came on $\frac{26}{5}$.

Geographical distribution: — Northern and middle Europe down into France; towards the north to southern Sweden, and in Finland.

17. *D. discifer* Stann.

1831. Stann. Isis 1831, 57, 10. — 1843. Zett. Dipt. Scand. II, 533, 28, et 1849. VIII, 3079, 28, et 1859. XIII, 5048, 28. — 1862. Schin. F. A. I, 216. — 1903. Kat. paläarkt. Dipt. II, 297. — *Dolichopus patellatus* Meig. (nec Fall.) 1824. Syst. Besch. IV, 86, 22. — 1842. Stæg. Krøyer's Tidsskr. IV, 21, 12.

Male. Vertex and frons green. Epistoma narrow, white. Palpi narrow, yellow. Occiput green, grey pruinose; postocular bristles yellow, black above. Antennæ a little elongated, fully as long as the head, third joint elongated triangular; they are black, the basal joint yellow beneath. Thorax green or more golden green, slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum grey pruinose. Pleura green, grey pruinose; propleura with fine, pale hairs, and a black prothoracic bristle. Abdomen green or somewhat golden green, sometimes with some bronze reflexes, finely whitish pruinose downwards; the hind margin of the segments narrowly dark bronze-coloured. It is clothed with short, black hairs, and has hindmarginal bristles, which are not long, except at the sides of the first segment. Venter greenish grey, with very slight, pale hairs. Hypopygium large and long, black, slightly greenish on the right side, grey pruinose; the eighth segment with black hairs; the posterior ventral lobes narrow, projecting considerably behind the end of the hypopygium, and with a little bristle at the apex; the inner lamellæ curved downwards, the lateral dilated and with a whitish dilatation at the apex, the median shorter and lying close to the lateral; the outer lamellæ somewhat small, about trapeze-shaped, whitish or yellowish white, with a narrow, blackish margin along the ventral, apical and posterior half of the dorsal edge; the end has long teeth, longest towards the dorsal corner, with curved, black hairs; the ventral margin is serrated, with shorter hairs, and

on the inner side inwards directed hairs. Legs long, pale yellow; front coxæ whitish anteriorly, posterior coxæ grey, just at apex yellow; middle tarsi with the four last joints black, hind tibiæ a little black at the apex, especially on the posterior side, and hind tarsi black; front tarsi long and thin, nearly twice as long as the tibiæ, the three middle joints long, the third and fourth about equal in length, the last compressed, dilated, of ovate shape, it is black, white at the base, haired at the margin. The legs have short, black hairs, the front coxæ white-haired with a few black hairs, and the hind femora with inconspicuous pale hairs beneath; posterior femora with one preapical bristle; front tibiæ with bristles above and on the posterior side, middle tibiæ with about five to six antero-dorsal (one of them dorsal), two to three postero-dorsal, and two (sometimes one) ventral bristles below the middle; hind tibiæ with two dorsal rows, and with one ventral bristle

Fig. 23. Wing of *D. discifer*.

towards the apex, besides with a ventral row of fine, small bristles; hind metatarsi with about four dorsal bristles, some anterior, and small bristles below, middle metatarsi with some small bristles below at the sides. Wings somewhat narrow, yellowish or slightly brownish tinged, most towards the anterior margin; veins black, costa with a very small and inconspicuous swelling; discal vein with a small bend which is almost not double, and hence the vein is convergent towards the cubital vein; axillary lobe large, anal vein short, only reaching half way towards the margin. Squamulæ yellow, with a black fringe. Halteres pale yellow.

Female. Epistoma broad, greyish. Antennæ shorter than in the male, third joint short triangular. Front tarsi simple, not long; the middle tibiæ may have seven antero-dorsal bristles, and there are always two, or sometimes three, ventral bristles. Wings a little broader than in the male, the anal vein a little longer.

Length 5—5,7 mm.

Remarks: Kowarz (Wien. Ent. Zeitg. III, 1884, 55) distinguishes in his table both sexes as having more than one ventral bristle on

the middle tibiæ, but not rarely the male has only one; the female on the contrary seems always to have two, and sometimes even three.

D. discifer is not common in Denmark, but has however been taken in many localities; Dyrehaven, Bøllemosen, Geel Skov, Ruderhegn, Nordskoven at Jægerspris, Sorø; on Langeland at Lohals; in Jutland at Horsens, Silkeborg, Laven near Silkeborg and Frijsenborg; and on Bornholm at Almindingen. My dates are ^{16.6}—^{15.8}. Stæger l. c. records it from the last part of May. It occurs on bushes and in low herbage in woods, and near water and on water plants.

Geographical distribution: — Northern and middle Europe down into France; towards the north to southern Sweden, and in Finland and Siberia; it occurs also in North America.

18. *D. confusus* Zett.

1843. Zett. Dipt. Scand. II, 535, 29, et 1849. VIII, 3080, 29. — 1862. Schin. F. A. I, 216. — 1903. Kat. paläarkt. Dipt. II, 297. — *Dolichopus patellatus* Stann. (nec Fall.), 1831, 59, 11. — *Dolichopus plumipes* Meig. (nec Scop.) 1824. Syst. Besch. IV, 87, 23.

Male. Vertex and frons green or bluish green. Epistoma somewhat narrow, narrowed downwards, whitish grey. Palpi yellow. Occiput green, greyish pruinose; postocular bristles yellow below, black above. Antennæ not quite as long as the head, the third joint about as long as broad, or slightly longer; it is somewhat ovate, the point turned a little upwards, the upper edge slightly concave; the antennæ are black, inconspicuously yellow below the apex of the basal joint. Thorax green or golden green, often a median and two side-stripes are golden, and sometimes thorax is bluish green; it is slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum greyish pruinose. Pleura greenish, grey pruinose; propleura with pale yellow hairs and a black prothoracic bristle. Abdomen green or golden green, more or less with copper-coloured reflexes, and coppery towards the end; it is slightly whitish pruinose downwards, and the segments have very narrow, darkened hind margins; it is clothed with short, black hairs, the hindmarginal bristles short, somewhat longer on the first segment. Venter greyish with a little longish, pale hairs at the base and darker hairs towards the end. Hypopygium black, slightly æneous, and greyish pruinose on the anterior part and above; the eighth segment with black hairs; there are slightly projecting posterior ventral lobes, with a small point at the end; the inner lamellæ short, curved downwards, the median pointed, the lateral dilated and with a hyaline dilatation at the apex; the outer lamellæ somewhat oval, whitish with a somewhat broad, blackish brown margin

along the ventral and apical edge; the end has long teeth with inwards curved, blackish hairs; the ventral margin is slightly serrated, with shorter, likewise curved hairs, and on the inner side are inwards directed hairs. Legs somewhat long, yellow; the front coxæ at the base and the posterior coxæ grey; the middle tarsi with apex of metatarsus and the four last joints black; hind tibiæ black just at the apex and hind tarsi black; front tarsi long, but not twice as long as tibia, the fourth joint about half as long as the third, the last joint compressed, dilated, triangular and larger than in *discifer*, it is black, and hairy at the margin. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with bristles above and one or two on the postero-ventral side; middle tibiæ with about five antero-dorsal, two postero-dorsal, two antero-ventral or the upper ventral, and one postero-ventral bristle; hind tibiæ with two dorsal

Fig. 24. Wing of *D. confusus* ♂.

rows of bristles, and a ventral row of rather long bristles, the lowermost longest; middle metatarsi with one bristle above; hind metatarsi with three bristles above, some anterior, and small bristles below. Wings a little broad, slightly tinged; veins black or brownish black; discal vein with a large bend, approaching to be rectangular and the lower angle distinctly angular, often with a small veinlet, the upper angle more rounded; axillary lobe small, anal vein stretching somewhat long forwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male, but not specially broad. Antennæ considerably smaller and shorter and the third joint shorter than in the male. Front tarsi simple. Wings not so broad, darker, brownish tinged.

Length 4—5,7 mm.

D. confusus is not rare in Denmark; Tisvilde, Rørvig, Vedbæk; in Jutland at Funder near Silkeborg, Blaavand, Bovbjerg, Sæby, Frederikshavn and Hulsig and Jerup north of Frederikshavn, and on

Bornholm at Hasle. My dates are $2\frac{7}{8}$ — $8\frac{7}{8}$. It occurs near water and seems especially to prefer sandy localities near the coast.

Geographical distribution:— Northern and middle Europe down into Tirol and Hungary; towards the north to southern Sweden.

19. *D. plumipes* Scop.

1763. Scop. Ent. Carn. 334, 895 (*Musca*). — 1862. Schin. F. A. I, 217. — 1903. Kat. paläarkt. Dipt. II, 302. — *Dolichopus pennitarsis* Fall. 1823. Dipt. Suec. Dol. 11, 6. — 1824. Meig. Syst. Besch. IV, 90, 29. — 1831. Stann. Isis 1831, 63, 14. — 1842. Stæg. Krøyer's Tidsskr. IV, 25, 15. — 1843. Zett. Dipt. Scand. II, 541, 35, et 1855. XII, 4628, 35. — *Dolichopus planitarsis* Meig. (nec Fall.) 1824. Syst. Besch. IV, 45, 25.

Male. Frons and vertex green. Epistoma somewhat narrow, yellow or ochraceous; it is long, going to or almost to the lower margin of the eyes. Palpi yellow. Occiput green, slightly greyish pruinose; postocular bristles yellow below, black above. Antennæ a

Fig. 25. Antenna of *D. plumipes* ♂, from the inside. $\times 65$.

little longer than the head, the third joint ovate; the basal joints and the lower basal corner of the third joint yellow, the rest black. Thorax bright green or golden green, sometimes more olive, slightly pruinose, shining; scutellum slightly yellow pubescent; postscutellum green, a little greyish pruinose. Pleura green, grey pruinose; propleura with fine pale hairs and a black prothoracic bristle. Abdomen green or golden green, sometimes with coppery reflexes, slightly whitish grey pruinose downwards, and with narrow, dark hind margins to the segments. It is clothed with short, black hairs, and has a little longer hindmarginal bristles, which are not longer on the first segment. Venter greenish grey, with short, yellow hairs. Hypopygium black, a little greenish, greyish pruinose; the eighth segment with black hairs; there are somewhat projecting posterior ventral lobes with a little point at the upper apical corner; the inner lamellæ are only curved slightly downwards, the median short and thin, the lateral longer and dilated, especially at the apex; the outer lamellæ somewhat small, nearly oval, whitish with a brownish black ventral and apical margin, the latter broadest; at the end there are some short

teeth with curved, black hairs; only the most dorsally placed tooth is longer; the ventral margin serrated with curved hairs, and on the inner side of the margin only few, fine, inwards directed hairs. Legs yellow, posterior coxæ grey, slightly pale just at the apex; front tarsi with apex of metatarsus and the following joints black; middle tibia somewhat long, depressed, flat and very thin, slightly swollen at the apex; it has a brown line along the dorsal side and is white near the apex with the very apex black; middle tarsi black, the first joint a little flat and feathered at the margins; hind tibiæ black just at the tip, and hind tarsi black. The legs have short, black hairs, paler below the hind femora; posterior femora with one preapical bristle; front tibiæ with bristles above, and two on the postero-ventral side; the middle tibiæ have three anterior bristles and one postero-dorsal near the base, and besides there are a dorsal, an anterior and a ventral bristle near the apex; the hind tibiæ have two dorsal rows, and a ventral bristle towards the apex, and besides a ventral row of small bristles; hind metatarsi with two bristles above, an anterior, and small bristles below. Wings very slightly tinged; veins blackish, costa with a quite small swelling; discal vein with a somewhat large, obtuse bend; axillary lobe very large, anal vein going much downwards. Squamulæ yellow, black fringed. Halteres pale yellow.

Fig. 26. Antenna of *D. plumipes* ♀, from the inside. $\times 65$.

Female. Epistoma broad, whitish grey or light yellowish grey. Antennæ shorter than in the male, third joint short. Middle legs simple, tibiæ with four antero-dorsal, two postero-dorsal or dorsal bristles, and one ventral bristle below the middle.¹ Wings a little darker than in the male; costa without swelling; axillary lobe a little smaller.

Length 4—4.5 mm.

D. plumipes is very common in Denmark, and is, I think, in this regard next to *ungulatus*; it has been taken in every part of the

¹ Mik says (Verh. zool. bot. Gesell. Wien, XXX, 1880, 596, nota) that the female of *plumipes* has two bristles on the ventral side of the middle tibiæ. This certainly must be due to some mistake.

country, and is generally present in great numbers. It occurs generally on meadows, humid places in woods and near water, on bushes and in low herbage, but it may otherwise be found almost everywhere, both near the shore and inland. My dates are $\frac{4}{6}$ — $\frac{10}{8}$.

Geographical distribution:— Europe down to Italy; towards the north to northernmost Scandinavia, in Finland and in Siberia. It also occurs in North America and in Greenland.

20. *D. Wahlbergi* Zett.

1843. Zett. Dipt. Scand. II, 546, 38, et 1852. XI, 4293, 38. — 1857. Loew, Neue Beitr. V, 12, et 1859. VI, 10, 8. — 1875. Verrall, Ent. Month. Mag. XII, 32. — 1903. Kat. paläarkt. Dipt. II, 306.

Male. Vertex and frons green or golden green. Epistoma somewhat narrow, ochraceous, stretching almost to the lower margin of the eyes. Palpi yellow. Occiput greenish or more golden, greyish pruinose; postocular bristles yellow, black above. Antennæ a little longer than the head, the third joint somewhat ovate, but the upper margin a little concave; the basal joints and the lower basal corner of the third joint yellow, the rest black. Thorax green or golden green, sometimes with indications of stripes; it is somewhat pruinose, not much shining; scutellum very finely yellow pubescent; post-scutellum green, greyish pruinose. Pleura greenish or golden, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green or golden green, with some more or less distinct coppery reflexes, slightly whitish pruinose downwards, and with very narrow, dark hind margins to the segments; it is clothed with short, black hairs and has longer hindmarginal bristles, longest on the first segment. Venter greyish, slightly pale-haired. Hypopygium black or æneous black, greyish pruinose; eighth segment with black hairs; there are somewhat projecting posterior ventral lobes with a little point at the dorsal apical angle; the inner lamellæ about as in *plumipes*, but the outer lamellæ with more long teeth at the end. Legs yellow, posterior coxæ grey, the hind ones a little yellow at the apex; front tarsi infuscated or blackened towards the end; middle tibiæ long, much longer than in *plumipes*, considerably longer than the femora and almost twice as long as the tarsi; they are thin, but not flat, and quite yellow, a little whitish at the apex anteriorly; the metatarsus is more strongly feathered than in *plumipes*, and it is longer, almost as long as the four following joints; it is black, but white at the very base; the hind tibiæ are quite yellow, and the hind tarsi yellow at the base, the rest black. The legs have short, black hairs, the front coxæ white-haired outwards, the hind femora pale-

haired below; posterior femora with one preapical bristle; front tibiæ with bristles above and two on the postero-ventral side; middle tibiæ with three anterior and one postero-dorsal bristle, but with no bristles near the apex (besides the apical); hind tibiæ with two dorsal rows of bristles and one ventral bristle near the apex, besides with a ventral row of small bristles; hind metatarsi with about two bristles above, one anterior, and small ventral bristles. Wings slightly yellowish tinged; veins black or blackish brown, costa practically with no swelling; discal vein with a somewhat large, obtuse bend; axillary lobe very large, anal vein going chiefly downwards. Squamulæ yellow, with a black fringe. Halteres pale yellow.

Female. Epistoma broader than in the male, but likewise ochraceous. Antennæ shorter. Middle legs simple, tibiæ rather long, distinctly longer than the tarsi, with four to five antero-dorsal, two postero-dorsal bristles and one ventral below the middle. Wings a little darker than in the male.

Length 4.5—5 mm.

This interesting and curious species is very near to and similar to *plumipes*, but as seen from the description the male is distinguished by many characters; also the female is easily distinguished by the yellow hind tibiæ and base of metatarsi, and especially by the longer middle tibiæ, which in *plumipes* are not longer than the tarsi.

D. Wahlbergi is rare in Denmark, only eight specimens are known; Espegærde; in Jutland in Greisdalen at Vejle and at Silkeborg, and on Bornholm at Hammeren (the author). My dates are in June and from $\frac{1}{8}$ — $\frac{13}{8}$. I can confirm the note by Verrall (l. c.) that it does not occur in company with *plumipes* or only rarely. Stæger did not know it, but in his collection a male was found, intermingled with *plumipes*.

Geographical distribution:— Northern and middle Europe, down into Germany; towards the north to middle Sweden, and in Finland.

21. *D. pennatus* Meig.

1824. Meig. Syst. Besch. IV, 90, 28. — 1831. Stann. Isis 1831, 64, 15. — 1843. Zett. Dipt. Scand. II, 543, 36, et 1852. XI, 4292, 36, et 1855. XII, 4629, 36. — 1903. Kat. paläarkt. Dipt. II, 301. — *Dolichopus popularis* p. p. 1823. Fall. Dipt. Suec. Dol. 11, 7. — *Dolichopus signatus* Stæg. (nec Meig.) 1842. Krøyer's Tidsskr. IV, 25, 16. — 1862. Schin. F. A. I, 217.

Male. Vertex and frons greenish. Epistoma narrow, ochraceous. Palpi yellow. Occiput green, greyish pruinose; postocular bristles yellow.

low below, black above. Antennæ somewhat elongated, as long as, or a little longer than the head, the third joint elongated triangular; they are black, the basal joint yellow, black above, the second joint a little yellow on the inner side. Thorax green or golden green, sometimes more coppery or olive, somewhat pruinose and not much shining; generally there is a brighter, less pruinose and hence more shining middle stripe; scutellum finely yellow pubescent; postscutellum greenish, grey pruinose. Pleura green or golden green, greyish pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, golden green or more coppery, slightly whitish pruinose downwards, with generally narrow, sometimes almost wanting, dark hind margins to the segments; it is clothed with short, black hairs, and has somewhat long hindmarginal bristles, a little longer on the first segment. Venter grey or greenish grey, slightly pale-haired at the base. Hypopygium black or greenish black, greyish pruinose; the eighth segment with black hairs; there are a little projecting posterior ventral lobes with a styliform point at the upper apical corner; the inner lamellæ curved downwards, the median thin, the lateral longer, dilated and with a dilatation at the apex and a little black spine at the upper margin; the outer lamellæ are ovate, whitish with a narrow, blackish margin at the ventral, apical and outer half of the dorsal edge; at the end there are black teeth with curved hairs, the ventral margin is serrated, with black hairs, and on the inner side with inwards curved hairs. Legs yellow, posterior coxæ grey, slightly yellowish at the apex; front tarsi with the apex of metatarsus and the following joints black; middle tarsi long, the apex of metatarsus and the following joints black, the second and third joint somewhat compressed a little dilated and slightly feathery haired at the margin, the two last joints silvery on the anterior side; hind tarsi black; the hind tibiæ are a little thick in the whole length, and are suddenly thinned at the base, near this is on the posterior side a small swelling, which is bare and shining. The legs have short, black hairs, hind femora longer hairs above, and a fringe of longish, pale hairs below; posterior femora with one preapical bristle; front tibiæ with bristles above and about two on the posterior side; middle tibiæ with about four to six antero-dorsal, one dorsal, two postero-dorsal bristles, and one ventral bristle below the middle; (the lowermost antero-dorsal bristle might perhaps be termed dorsal); hind tibiæ with two dorsal rows of bristles, and one ventral bristle towards the apex, besides a ventral row of small bristles; hind metatarsi with about three bristles above, some anterior, and small bristles below. Wings a little tinged; veins black; the discal vein with a somewhat small,

obtuse bend; the axillary lobe large, anal vein going downwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male, yellow or greyish yellow. Antennæ shorter, the third joint triangular. Middle legs simple; hind tibiæ sometimes a little darkened at the apex; hind femora short-haired below. Wings with the axillary lobe smaller, anal vein going more forwards.

Length 4,6—5,7 mm.

D. pennatus is one of the most common species in Denmark; Amager, Vester Fælled, Damhusmosen, Utterslev Mose, Ordrup Mose, Ermelund, Lyngby Mose, Fure Sø, Ørholm, Hillerød, Tryggerød, Frederikssund, Boserup at Roskilde, Gisselfeldt, Faxe Ladeplads and Nyraad near Vordingborg; on Langeland at Lohals; on Funen at Odense and Veflinge; in Jutland at Borbjerg, Silkeborg, Rye and Laven near Silkeborg, Frijsenborg, Hald near Viborg, Tinbæk Mølle at Lindenberg Aa, Frederikshavn; finally on Bornholm at Allinge and Rønne. My dates are $\frac{3}{6}$ — $\frac{10}{8}$. It occurs in fens and on humid places in woods generally near water, on bushes and in low herbage.

Geographical distribution:— Northern and middle Europe down into France and on Corsica; towards the north to northern Scandinavia, and in Finland.

Remarks: In Kat. paläarkt. Dipt. II, 304, Stæger's *signatus* is quoted under *signatus* Meig. but this is not correct; both the description by Stæger, and the specimens in the collection prove, that Stæger's species is *pennatus* Meig; *signatus* does not occur in Denmark, it seems to be a more southern species, as it is not found in Scandinavia.

22. *D. popularis* Wied.

1817. Wied. Zool. Mag. I, 70, 15. — 1824. Meig. Syst. Besch. IV, 91, 30. — 1831. Stann. Isis 1831, 66, 16. — 1842. Stæg. Krøyer's Tidsskr. IV, 26, 17. — 1843. Zett. Dipt. Scand. II, 545, 37, et 1855. XII, 4629, 37. — 1862. Schin. F. A. I, 217. — 1903. Kat. paläarkt. Dipt. II, 303.

Male. Vertex and frons green. Epistoma narrow, ochraceous. Palpi yellow. Occiput greenish or æneous, greyish pruinose; post-ocular bristles yellow below, black above. Antennæ not quite as long at the head, the third joint somewhat ovate; they are yellow, the third joint blackish above and at the apex. Thorax green or golden green, somewhat pruinose, shining; there is generally a less pruinose, more shining and brighter or more golden middle stripe; scutellum finely yellow pubescent; postscutellum greenish, grey pruinose. Pleura greenish or æneous, greyish pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green with more or less distinct,

golden or coppery reflexes, it is somewhat whitish pruinose downwards, and there are narrow, dark hind margins to the segments; it is clothed with short, black hairs, and has hindmarginal bristles, a little longer on the first segment. Venter greyish green, very slightly pale-haired, almost bare. Hypopygium æneous black, greyish pruinose; eighth segment with black hairs; there are slightly projecting posterior ventral lobes with a small point at the upper apical corner; the inner lamellæ curved downwards, the median thin and short, the lateral longer, dilated, with a dilatation at the apex and a pair of small spines at the upper margin; the outer lamellæ are ovate, whitish with a somewhat narrow, blackish margin; at the end there are some teeth with black, curved hairs; the ventral margin is serrated, with a little shorter hairs, and on the inner side inwards curved, fine hairs. Legs yellow, posterior coxæ grey, a little yellowish at the apex; the three last joints of the front tarsi black; the middle tarsi with the two first joints long and thin, the first almost twice as long as the second, the third and fourth compressed, dilated, black, feathery haired at the margin, longest on the dorsal side; the fifth joint a little compressed, silver-white with black hairs; hind tarsi black, metatarsus except the apex yellow, often the second joint brown. The legs have short, black hairs, hind femora with longer hairs above in the basal half, and with shortish, pale brown hairs below; middle femora with one, hind femora with three (rarely two or four) preapical bristles; front tibiæ with bristles above, and generally two posterior; middle tibiæ with about four antero-dorsal, two postero-dorsal bristles, and one ventral below the middle; hind tibiæ with two dorsal rows, a ventral bristle towards the apex, and a ventral row of small bristles; hind metatarsi with two dorsal, one or two anterior, and small ventral bristles. Wings slightly yellowish; veins black; discal vein with a small, obtuse and not at all angular bend; axillary lobe very large, anal vein going chiefly downwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, yellow or ochraceous, but less bright than in the male. Antennæ shorter than in the male, third joint short. Middle legs simple. Wings more tinged, axillary lobe smaller, and the anal vein going more forwards.

Length 4.5 to about 5.5 mm.

The full-grown larva is 13 mm long; the pupa about 6 mm, it has the sheaths of the legs reaching about to the end of abdomen.

D. popularis is common in Denmark; Ordrup Mose, Ermelund, Dyrehaven, Lyngby Mose, Fure Sø, Ruderhegn, Tryggerød, Frederikssund, Faxe Ladeplads and Nyraad near Vordingborg; on Langeland

at Lohals; on Funen at Veflinge; in Jutland at Silkeborg, Funder near Silkeborg, Dollerup near Viborg and Frederikshavn, and on Bornholm at Rønne. My dates are $2/6$ — $31/7$. It occurs in fens, in woods on open, humid places, and at water, on bushes and in low herbage. The larva was taken in Ermelund in mole-casts on $15/4$, they formed cocoons on $26/4$ and the imagines came on $18/5$ — $20/5$.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden, but somewhat rare.

23. *D. urbanus* Meig.

1824. Meig. Syst. Besch. IV, 92, 31. — 1831. Stann. Isis 1831, 123, 18. — 1842. Stæg. Krøyer's Tidsskr. IV, 27, 18. — 1843. Zett. Dipt. Scand. II, 547, 39. — 1862. Schin. F. A. I, 219. — 1903. Kat. paläarkt. Dipt. II, 306.

Male. Vertex and frons green. Epistoma somewhat narrow, white. Palpi yellow. Occiput green, greyish pruinose; postocular bristles yellow below, black above. Antennæ short, shorter than the head, the third joint short triangularly ovate; the basal joints and the lower basal part of the third joint yellow, the rest black or brownish black. Thorax green or golden green, somewhat pruinose and not much shining; generally there is a less pruinose, more shining middle stripe; scutellum with fine, yellow pubescence; postscutellum green, greyish pruinose. Pleura green, greyish pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, sometimes somewhat coppery, whitish pruinose downwards, and with narrow, darkened hind margins to the segments; it is clothed with short, black hairs, and has hindmarginal bristles, longer on the first segment. Venter greyish, very slightly pale-haired at the base. Hypopygium æneous black, greyish pruinose; eighth segment with black hairs; there are a little projecting, whitish posterior ventral lobes, tapering into a small lobe at the apical dorsal corner; the inner lamellæ curved downwards, the median thin, the lateral dilated, with a dilatation at the apex, and two small spines at the upper margin; the outer lamellæ nearly ovate, whitish with a blackish brown margin along the ventral, apical and posterior part of the dorsal edge; the end has some long teeth with curved, black hairs; the ventral margin is serrated, with long, curved hairs, and inwards paler, curved hairs. Legs yellow, front coxæ white pruinose anteriorly, posterior coxæ grey, yellow at the apex; front tarsi with the three last joints blackish, middle tarsi with the apical part of the third joint and the fourth joint black, the last joint white, silvery on the anterior side; hind tibiæ black in about the whole length, only the base yellow, but the

yellow colour may be extended somewhat downwards; the apical part of the hind femora more or less blackened; hind tarsi black. The legs have short, black hairs, the front coxæ white-haired exteriorly; hind femora with longer hairs above in the basal half, and with short, pale hairs below; middle femora with one, hind femora with two (rarely one) preapical bristles; front tibiæ with bristles above, and generally two postero-ventral bristles; middle tibiæ with about four antero-dorsal, two postero-dorsal, and with one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, and one ventral bristle towards the apex, besides with a ventral row of small bristles; hind metatarsi with about three dorsal bristles, some anterior, and with small ventral bristles. Wings more or less brownish tinged, somewhat strongly towards the anterior margin; veins black; discal vein with a not large, obtuse bend; axillary lobe large, anal vein going somewhat downwards. Squamulæ yellow, with a black fringe, in which there are more or less numerous yellow hairs. Halteres yellow.

Female. Epistoma much broader than in the male, white or greyish white. Antennæ about as in the male. Middle legs simple; hind femora generally with one preapical bristle, rarely two. Wings somewhat darker than in the male, axillary lobe smaller.

Length 4.5 mm.

D. urbanus is rare in Denmark and has only been taken at few occasions; Ordrup Mose, Dyrehaven (Stæger), and in Jutland at Funder near Silkeborg (Esen Petersen) and Hald near Viborg (the author). The dates are in June. It has been taken in fens and on humid places in woods.

Geographical distribution:— Northern and middle Europe down into France; towards the north to northern Scandinavia, and in Finland. It is generally somewhat rare.

Remarks: In Kat. paläarkt. Dipt. is *urbanus* given with Stannius as author, and *urbanus* Meig. is placed as synonym to *simplex* Meig. I do not know the reason for this, and I follow Verrall (Ent. Month. Mag. XV, 1904, 242) and the earlier authors in considering Meigen's *urbanus* as identical with Stannius' species of the same name.

24. *D. apicalis* Zett.

1849. Zett. Dipt. Scand. VIII, 3084, 54—55. — 1903. Kat. paläarkt. Dipt. II, 295.

Of this species I have only examined one single male specimen, Zetterstedt's type-specimen; it is now in so bad a condition, that a detailed description is impossible, so that for points not mentioned

here, I must refer to Zetterstedt's description. The epistoma is somewhat narrow, ochraceous. Antennæ black. Postocular bristles yellowish below, but the lowermost are black. Legs dark yellow or reddish yellow, front coxæ grey at the base, posterior coxæ grey; all tarsi, also the hind ones, have the apex of metatarsus and the four following joints black. Posterior femora with one preapical bristle; middle tibiæ with one ventral bristle. Wings slightly tinged, with a snow-white spot at the apex, stretching from the cubital vein to somewhat below the apex and bordered inwardly by an oblique line; discal vein with a not small, but quite obtuse bend; axillary lobe large. Squamulæ yellow, with a black fringe. Halteres yellow.

Length 4.8 mm.

The female seems not to be known; Zetterstedt had only the male, and also Kowarz (Wien. Ent. Zeitg. III, 1884, 55) mentions only the male.

In spite of the deficient description, the species is at once recognised by the white spot on the wings; also the colour of the postocular bristles is characteristic, as there are black bristles downwards at the mouth aperture; this is an interesting character, it is also found in *D. perversus* Loew, but this species has black legs and no spot on the wings.

D. apicalis is very rare in Denmark, only one male specimen is known, taken by Jacobsen at Sorø on 1.8.1845, and described by Zetterstedt.

Geographical distribution:— So far as I am aware the species is only known from Denmark and Bohemia.

25. *D. trivialis* Hal.

1831. Hal. Zool. Journ. V, 363, 18. — 1862. Schin. F. A. I, 220. — 1903. Kat. paläarkt. Dipt. II, 305. — *Dolichopus intermedius* Stæg. 1842. Krøyer's Tidsskr. IV, 20, 10. — 1843. Zett. Dipt. Scand. II, 537, 31, et 1852. XI, 4288, 31.

Male. Vertex and frons green. Epistoma somewhat narrow, yellowish white or light yellowish grey. Palpi yellow. Occiput green, greyish pruinose; postocular bristles yellow below, black above. Antennæ a little elongated, as long as the head, first joint somewhat long, the third joint longer than broad, the lower margin convex, the upper straight and thus the point dorsal; the antennæ are blackish or brownish, the first joint yellow beneath and also the second joint sometimes a little yellow beneath. Thorax green, sometimes more golden green, rarely bluish green; often it has a more golden middle stripe; it is slightly pruinose, somewhat shining; scutellum finely yel-

low pubescent; postscutellum greenish, grey pruinose. Pleura green or æneous, greyish pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, with more or less distinct

Fig. 27. Antenna of *D. trivialis* ♂, from the inside. $\times 65$.

golden or coppery reflexes; sometimes it is bluish; it is slightly whitish pruinose downwards; dark hind margins to the segments are very narrow or wanting; abdomen clothed with short, black hairs, and has somewhat short hindmarginal bristles, longer on the first segment. Venter greyish, distinctly pale-haired. Hypopygium not large, æneous black, greyish pruinose; the eighth segment with black hairs; the posterior ventral lobes project a little, they are narrow and pointed, and with a fine hair towards the apex; the inner lamellæ curved downwards, the median thin, pointed, the lateral dilated, with a dilatation at the apex; the outer lamellæ somewhat trapeze-shaped, whitish or yellowish white with a narrow, blackish margin along the ventral, apical and posterior part of dorsal edge, the latter broadest; at the end there are some long teeth with curved hairs, increasing in length towards the dorsal corner; the ventral margin serrated, with shorter hairs, and on the inside with inwards directed hairs. Legs yellow, front coxæ a little whitish pruinose, posterior coxæ grey with the apical part yellow, the hind coxæ somewhat more yellow and yellow behind; anterior tarsi with the apex of metatarsus and the four following joints black; hind tibiæ scarcely or slightly darkened at the apex, hind tarsi black. Legs with short, black hairs, hind femora a little longer haired above towards the base, and with a fringe of long, yellow hairs below in the apical half; the front tarsi with short, dense, erect hairs on the anterior side of the three middle joints, and with a bristle at the apex of metatarsus on the anterior side; posterior femora with one preapical bristle; front tibiæ with bristles above and generally one on the postero-ventral side; middle tibiæ with about four antero-dorsal bristles (the two more dorsal), two postero-dorsal, two antero-ventral and one ventral bristle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and besides a ventral row of smaller, but however somewhat long bristles; middle metatarsi with one bristle above; hind metatarsi with about two dorsal, two anterior, and smaller ventral bristles. Wings slightly

brownish tinged, most towards the anterior margin; veins black or brownish black, costa with an elongated swelling; discal vein with a somewhat small, obtuse bend; axillary lobe not large, anal vein going a little forwards. Squamulæ yellow, black fringed. Halteres yellow.

Fig. 28. Wing of *D. trivialis* ♂.

Female. Epistoma somewhat broader than in the male, greyish white. Antennæ a little shorter, the third joint not longer than broad; the second joint often more yellow than in the male, and often the third joint slightly reddish below at the base. Front tarsi without erect hairs and hind femora without fringe. Wings a little darker, without costal swelling.

Length 4—4.5 mm.

This species is in the female somewhat similar to *confusus*, which also has a bristle above on the middle metatarsi, but it is distinguished by the longer first antennal joint, the quite yellow front coxæ, the mainly black front tarsi, which in *confusus* have only the last joint black, and finally by the hind tibiæ not or slightly darkened at the apex.

D. trivialis is not rare in Denmark; Amager, Vester Fælled, Ordrup Mose, Dyrehaven, Vedbæk, Faxe Ladeplads; on Funen at Veflinge, and on Fæno; in Jutland at Frijsenborg and Frederikshavn, and on Bornholm at Allinge. My dates are ²⁴ 6—8. It occurs at water and on humid places in woods, but I have especially taken it near the coast in low herbage.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden, and in Finland.

26. *D. festivus* Hal.

1831. Hal. Zool. Journ. V, 361, 10. — 1862. Schin. F. A. I, 220. — 1903. Kat. paläarkt. Dipt. II, 298. — *Dolichopus ciliefemoratus* Stann. (nec Macq.) 1831. Isis 1831, 52, 6. — *Dolichopus Macquarti* Stæg. 1842. Krøyer's Tidsskr. IV, 17, 6. — 1843. Zett. Dipt. Scand. II, 550, 41.

Male. Vertex and frons green or bluish green. Epistoma narrow, white. Palpi yellow. Occiput green, greyish pruinose; postocular bristles whitish below, black above. Antennæ not as long as the

head, third joint short, not longer than broad; they are yellow, the third joint brownish, especially towards the apex and above, the basal joints may appear slightly darkened above on account of the black hairs. Thorax green varying to æneous, sometimes somewhat bluish,

Fig. 29. Antenna of *D. festivus* ♂, from the inside. $\times 65$.

slightly pruinose, shining; scutellum finely yellow pubescent; post-scutellum green, greyish pruinose. Pleura green, greyish pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, sometimes with coppery reflexes, and it may be somewhat bluish; it is whitish pruinose downwards and has narrow, somewhat darker hind margins to the segments; it is clothed with short, black hairs, but down the sides the hairs are paler and become yellow; there are black hindmarginal bristles, which are long on the first segment. Venter greenish grey, distinctly and not sparingly pale-haired, on the third segment the hairs are longish and curved forwards. Hypopygium small, black or æneous black, greyish pruinose; the eighth segment with somewhat long, black hairs; there are large, rounded posterior ventral lobes with the dorsal apical corner somewhat pointed, and there are middle ventral lobes stretching far backwards; the inner lamellæ curved downwards, the median thin, the lateral dilated and with a dilatation at the apex; the outer lamellæ have the ventral margin rounded, the dorsal straight; they are whitish with a narrow, blackish margin along the ventral, apical and outer part of the dorsal edge; the end has some long teeth with curved hairs, the most dorsally placed tooth is rather long, the others decreasing in length; the ventral margin is serrated, with long hairs, and on the inner side inwards curved hairs. Legs yellow, front coxæ whitish pruinose anteriorly, middle coxæ grey, yellow on the apical part, hind coxæ only with a grey stripe or spot on the outer side; anterior tarsi with the apex of metatarsus and the four following joints blackish; hind tibiæ blackish at the apex and hind tarsi black. The legs have short, black hairs, front coxæ white-haired, only inwards just at the base some black hairs; also middle coxæ white-haired, except the black bristles; hind femora with longer hairs above towards the base, and with a fringe of long, yellow hairs below in

about the apical two thirds; front tarsi with the three middle joints shining on the front side, on the antero-dorsal side with hairs, directed obliquely downwards, and with dense, erect hairs on the antero-ventral side; at the apex of the two first joints there is a slightly curved bristle on the antero-ventral side; hind femora with one preapical bristle; front tibiæ with bristles above and about two on the postero-ventral side; middle tibiæ with about four to five antero-dorsal, (two of them more dorsal), two postero-dorsal, two antero-ventral bristles

Fig. 30. Wing of *D. festivus* ♂.

and one postero-ventral bristle. Hind tibiæ with two dorsal rows, one ventral bristle towards the apex, and a ventral row of small bristles; middle metatarsi with one bristle above, hind metatarsi with about three bristles above, some anterior and small ventral bristles. Wings yellowish or light brownish tinged; veins black or blackish brown, costa with a somewhat large, elongated swelling; discal vein with a large, distinctly angular, but somewhat obtuse bend; axillary lobe somewhat well developed, anal vein going somewhat downwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, greyish white. Antennæ a little shorter than in the male, third joint very short. Abdomen black-haired at the sides. Legs with the front coxæ generally more black-haired; front tarsi simple and hind femora not fringed. Wings without costal swelling.

Length 5—6 mm.

This species is in the male easily distinguished from *trivialis* by the shorter antennæ and the bristles on the front tarsi; the female is less easily distinguished, but is known by the much more yellow and a little shorter antennæ, and the larger bend of the discal vein; the species also is larger.

D. festivus is in Stæger (l. c.) noted as not rare from July into October on bushes and hedges; in my experience it is a rare species, and I have only once taken a single specimen. We have in all eight specimens in the collection, taken on Vester Fællad (Stæger), at Faxø

Ladeplads (the author) and on Funen at Hoffmangave and Veflinge (H. J. Hansen). My dates are in July.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden.

27. *D. ciliefemoratus* Macq.

1827. Macq. Soc. Sc. Lille, 1827, 63, 9, et 1834. Suit. à Buff. I, 463, 16. — 1838. Meig. Syst. Besch. VII, 161, 56. — 1843. Zett. Dipt. Scand. II, 548, 40. — 1903. Kat. paläarkt. Dipt. II, 296. — *Dolichopus nitidus* Stann. (nec Fall.) 1831. Isis 1831, 50, 5.

Male. Vertex and frons green or cyaneous. Epistoma somewhat narrow, white or greyish white. Palpi yellow. Occiput greenish, greyish pruinose; postocular bristles whitish below, black above. Antennæ a little elongated, as long as the head, third joint elongated, longer than broad, the lower margin convex, the upper straight, and thus the point dorsal; they are yellow, the third joint brownish on the whole apical part and above; the basal joints may appear very slightly darkened above on account of the black hairs. Thorax greenish, generally with a more golden green middle stripe, or it is bluish with a more greenish stripe; it is slightly pruinose, not much shining; scutellum finely yellow pubescent; postscutellum green, greyish pruinose. Pleura greenish or bluish, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green with golden or bluish reflexes, slightly whitish pruinose downwards, and with narrow, dark hind margins to the segments; it is clothed with short, black hairs, but down the sides the hairs are yellow, especially on the second and third segment; there are black hindmarginal bristles, a little longer on the first segment. Venter greenish grey, somewhat densely pale-haired, the hairs on the third segment curved forwards. Hypopygium small, black or æneous to greenish black, grey pruinose; the eighth segment with somewhat long, black hairs; there are somewhat projecting but not broad posterior ventral lobes, pointed towards the upper apical corner; the inner lamellæ curved downwards, the median thin, with styliiform apex, the lateral dilated, with a dilatation at the apex; the outer lamellæ somewhat trapeze-shaped, narrower than in *festivus*, whitish with a narrow, blackish brown margin along the ventral, apical and outer part of the dorsal edge; at the end there are some teeth with curved, black hairs, the dorsal tooth rather long; the ventral margin slightly serrated, with shorter hairs, and on the inner side with inwards curved, pale hairs. Legs yellow, front coxæ slightly whitish anteriorly, middle coxæ grey, yellow on the apical part and partly on the anterior side, hind coxæ only with a

grey spot or stripe on the outer side; anterior tarsi with the apex of metatarsus and the four following joints black; hind tibiæ slightly and indefinitely brownish at the apex, hind tarsi black. The legs have short, black hairs, front coxæ white-haired, only a few black hairs at the base inwards; also middle coxæ mainly pale-haired; hind femora with a little longer hairs above towards the base, and with a fringe of long, yellowish white hairs below in about the apical two thirds; front tarsi with the three middle joints somewhat curved, shining on the front side, with hairs on the antero-dorsal side, which are directed obliquely downwards, and with dense, erect hairs on the anterior or antero-ventral side; the three first joints have a somewhat curved bristle at the apex on the antero-ventral side; posterior femora with one preapical bristle; front tibiæ with bristles above, and with one or two on the postero-ventral side; middle tibiæ with four to five antero-dorsal bristles (two of them dorsal), two postero-dorsal, two antero-ventral and one postero-ventral bristle; hind tibiæ with two dorsal rows, and with one ventral bristle towards the apex, besides with a ventral row of small bristles; middle metatarsi with one bristle above, hind metatarsi with two to three bristles above, some anterior, and small ventral bristles. Wings a little yellowish or light brownish tinged; veins blackish brown, costa with a somewhat large, elongated swelling; discal vein with a large bend, which is generally more rectangular than in *festivus*, especially the lower angle is generally sharp, and sometimes with an indication of a veinlet; axillary lobe smaller than in *festivus*, anal vein going more forwards. Squamulæ yellow, with a black fringe. Halteres pale yellow.

Female. Epistoma broad, grey. Antennæ shorter than in the male, third joint short, not longer than broad, triangular. Abdomen black-haired at the sides. Legs with the front coxæ mainly black-haired, only white-haired outwards; hind tibiæ quite yellow; front tarsi simple, and hind femora not fringed. Wings without costal swelling.

Length 5—5,5 mm.

This species is in the male easily distinguished from *festivus* by the longer antennæ with the third joint considerably longer than broad, and by the differently constructed front tarsi with a bristle at the apex of three of the joints; in the female it is, I think, very difficult to distinguish; I have only examined one female, and I find only, that the hind tibiæ are quite yellow, and the axillary lobe slightly smaller; the discal bend is the same in both species.

D. ciliefemoratus is very rare in Denmark; we have only three specimens, all males, two from Svenstrup between Roskilde and Ring-

sted, and one from Funen, taken between Odense and Middelfart (H. J. Hansen). No dates are given.

Geographical distribution: — Northern and middle Europe down into France and northern Italy; towards the north to middle Sweden, and in Finland.

Remarks: Stæger (Krøyer's Tidsskr. IV, 1842, 16, 5) describes a species as *ciliefemoratus* Macq., taken by Jacobsen at Fjurendal near Sorø in July; the specimens (or there was perhaps only one specimen) of this species are not now in our collection. Stæger does not mention any special hairiness of the front tarsi, and Zetterstedt (l. c. II, 550, obs. 1), to whom he had sent a specimen, declares, that there was no such hairiness, and mentions other characters showing, that it cannot have been *ciliefemoratus* Macq. It is impossible to decide with certainty, which species this may have been; perhaps it could be *arbustorum*; what Stæger says about the wings, that the posterior cross-vein lies about in the middle, so that the part of the postical vein from the base to the cross-vein is scarcely twice as long as the rest of the postical vein, is to some degree in accordance with *arbustorum*, but the statements: "alarum nervo 4to rectangulariter fracto" and "alis linea costali nigra" is less in accordance. When Stæger is quoted under *ciliefemoratus* Macq. in Kat. paläarkt. Dipt., this is consequently incorrect.

28. *D. arbustorum* Stann.

1831. Stann. Isis 1831, 125, 20. — 1862. Schin. F. A. I, 220. — 1903. Kat. paläarkt. Dipt. II, 295.

Male. Vertex and frons green. Epistoma somewhat narrow, white. Palpi whitish yellow. Occiput green, greyish pruinose; postocular bristles white below, black above. Antennæ a little elongated, about of the length of the head, the third joint a little longer than broad, somewhat truncately pointed; the basal joints are yellow, a little darkened above, chiefly on account of the black hairs, the third joint brownish, a little yellowish below at the base. Thorax green or a little golden green, slightly pruinose, somewhat shining; scutellum finely yellow pubescent; postscutellum green, grey pruinose. Pleura green, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, sometimes somewhat bluish, whitish pruinose downwards, without dark hind margins to the segments, or these only slightly coppery; it is clothed with short, black hairs, down the sides there are some yellow hairs; the segments have longish hindmarginal bristles, somewhat longer on the first segment.

Venter greyish, pale-haired. Hypopygium somewhat small, slightly æneous black, greyish pruinose; eighth segment with black hairs; there are a little projecting posterior ventral lobes, with the ventral margin somewhat rounded, and with a truncate point, which is turned upwards; they have a hair at the ventral margin; the inner lamellæ curved downwards, the median thin, styliform, the lateral dilated, with a small dilatation at the apex, separated off by an excision; the outer lamellæ almost semicircular, with the dorsal margin straight, and somewhat petiolated; they are whitish with a narrow blackish margin along the ventral, apical and outer half of the dorsal edge; at the end there are about four long teeth with black, curved hairs, the tooth on the dorsal corner long, and dorsally to it two curved hairs; the ventral margin serrated, with long, curved hairs, and inwards curved hairs on the inside. Legs pale yellow; front coxæ white pruinose anteriorly, middle coxæ grey with the apex broadly yellow, and also the front side partly yellow, hind coxæ yellow with only a more or less distinct grey spot at the base on the outer side; anterior tarsi with the very apex of metatarsus and the four following joints brown or blackish; hind tibiæ very slightly darkened at the apex, hind tarsi black, sometimes a little reddish at the very base. The legs have short, black hairs; front coxæ white-haired; the femora give the impression of being bare below and on the larger part of the posterior side, but they are in reality pale-haired: hind femora with a long, whitish fringe below in about the outer two thirds; posterior femora with one preapical bristle; front tibiæ with bristles above, and one or two on the postero-ventral side; middle tibiæ with about four antero-dorsal bristles, two postero-dorsal, two (sometimes three) antero-ventral and one ventral bristle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of small, distantly placed bristles; middle metatarsi with one bristle above, hind metatarsi with two dorsal bristles, generally two anterior, and with small ventral bristles. Wings a little yellowish or light brownish tinged; veins black or brownish black, costa with a very small swelling, so small that it may be considered as practically absent; discal vein with a somewhat large and angular, but obtuse bend; axillary lobe small, anal vein going forwards. Squamulæ whitish, with a black fringe. Halteres pale yellow.

Female. Epistoma broad, light grey. Antennæ shorter than in the male, third joint scarcely as long as broad. Front coxæ white-haired as in the male, only with some black hairs quite inwards and towards the apex; hind femora without fringe, and hind tibiæ generally yellow quite to the apex.

Length 4 to fully 5 mm.

This species is in the male easily distinguished, as it is the only species with more than one ventral bristle on the middle tibiæ, a bristle on the middle metatarsi and quite simple tarsi; the female is very similar to the female of *festivus* and *ciliifemoratus*, but it may, I think, be known by the almost quite white-haired front coxæ, the paler and more pale-haired legs, and from *festivus* also by the generally quite yellow hind tibiæ; besides it has some yellow hairs at the sides of abdomen.

D. arbustorum is very rare in Denmark, only two specimens, both females, have been taken at Svenstrup between Roskilde and Ringsted (H. J. Hansen). According to Verrall it prefers dry localities.

Geographical distribution:— Northern and middle Europe down into Austria, Bohemia and Hungary; it seems to have its northern limit in Denmark, and it occurs also in England.

29. *D. nitidus* Fall.

1823. Fall. Dipt. Suec. Dol. 12, 9. — 1824. Meig. Syst. Besch. IV, 80, 12. — 1843. Zett. Dipt. Scand. II, 558, 49, et 1859. XIII, 5054, 49. — 1862. Schin. F. A. I, 218. — 1903. Kat. paläarkt. Dipt. II, 301. — *Dolichopus nitens* Stann. 1831. Isis 1831, 48, 3. — *Dolichopus ornatus* Meig. 1824. Syst. Besch. IV, 79, 11. — 1831. Stann. Isis 1831, 46, 2. — — 1842. Stæg. Krøyer's Tidsskr. IV, 14, 3. — *Dolichopus jucundus* Hal. 1833. Ent. Mag. I, 163. — *Dolichopus coeruleicollis* Meig. 1838. Syst. Besch. VII, 160, 55.

Male. Vertex and frons green, sometimes bluish green. Epistoma somewhat narrow, greyish white. Palpi yellow. Occiput green, greyish pruinose; postocular bristles whitish below, black above. Antennæ

Fig. 31. Antenna of *D. nitidus* ♂, from the inside. $\times 65$.

not as long as the head, third joint triangular, short, not longer than broad; the basal joints are yellow, sometimes slightly darkened above, third joint blackish, yellow beneath at the base. Thorax green or slightly golden green, sometimes more bluish; it is slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum green, greyish pruinose. Pleura greenish or æneous, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green,

sometimes with coppery reflexes, slightly whitish pruinose downwards, and with dark hind margins to the segments; it is clothed with short, black hairs, and has hindmarginal bristles, increasing in length to-

Fig. 32. *D. nitidus*. Apical part of hypopygium; the lateral inner lamella and the dorsal median appendage are seen behind the outer lamella.

wards the end and also a little longer on the first segment. Venter greenish grey, slightly yellow-haired at the base. Hypopygium large, æneous black, grey pruinose; eighth segment with longish, black hairs; there are broad, rounded, but slightly projecting posterior ventral lobes with some long hairs; the middle ventral lobes project somewhat backwards, they are unsymmetrical, one much longer than the other; the inner lamellæ are somewhat long, curved downwards, the median thin, but a little dilated at the apex and here with fine hairs, the lateral considerably dilated, and with various dilatations at the apex; the outer

lamellæ are somewhat long and narrow, they are especially narrow towards the base, and hence petiolated and almost pear-shaped with the end truncate, and they are curved more outwards than commonly; they are whitish with a somewhat broad, blackish margin; there are no teeth but the end margin is serrated and bears very long, black, curved hairs; the outer part of the ventral margin has shorter, finer and paler hairs, and the dorsal margin has short, brown hairs. Legs yellow, the anterior coxæ greyish white pruinose, posterior coxæ grey with the apex yellow; front tarsi a little infuscated towards the end, posterior tarsi with the apex of metatarsus and the four following joints blackish; the middle tarsi may be more brownish; the hind tibiæ are a little brown at the apex, especially above. The legs have short, black hairs, a little longer above the hind femora towards the base, and the hind femora have short, pale hairs below; the posterior femora have one preapical bristle; the front tibiæ have bristles above, and one or two on the postero-ventral side, and there is a very fine, long hair at the tip on the ventral side; the middle tibiæ have about three antero-dorsal, one dorsal, two postero-dorsal bristles, and one ventral below the middle; the hind tibiæ have two dorsal rows of bristles and one ventral bristle towards the end, besides a ventral row of small bristles; hind metatarsi with two dorsal, one anterior,

and some small ventral bristles. Wings slightly tinged or almost hyaline; veins black or brownish black, costa with a not large swelling; discal vein with a large, rectangular or almost rectangular bend, with a small veinlet at the lower angle, and often a similar, but still smaller, at the upper angle; axillary lobe somewhat large, and the anal vein going somewhat forwards. Squamulae yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, light grey. Antennae shorter than in the male, third joint shorter than broad. Front tibiae with no hair at tip. Wings without costal swelling.

Length 4.4—5.5 mm; one single male only reaches 4 mm.

D. nitidus is not common in Denmark; Lersøen, Ordrup Mose; on Funen; in Jutland at Sæby and Frederikshavn, and on Bornholm at Hasle, Rø and Almindingen. My dates are in July; Stæger l. c. records it from July to October. It occurs often near water and on water-plants.

Geographical distribution: — Northern and middle Europe down into France and on Corsica; towards the north to middle Sweden, and in Finland.

30. *D. griseipennis* Stann.

1831. Stann. Isis 1831, 49, 4. — 1843. Zett. Dipt. Scand. II, 559, 50. — 1862. Schin. F. A. I, 218. — 1903. Kat. paläarkt. Dipt. 298. — *Dolichopus nitidus* 1842. Stæg. (nec Fall.) Krøyer's Tidsskr. IV, 15, 4.

Male. Vertex and frons green or bluish. Epistoma somewhat narrow, greyish white. Palpi yellow. Occiput green, greyish pruinose; postocular bristles whitish below, black above. Antennae somewhat

Fig. 33. Antenna of *D. griseipennis* ♂, from the inside. $\times 65$.

elongated, a little longer than the head, third joint considerably longer than broad, somewhat lancet-like; they are black, the basal joint yellow beneath. Thorax green, golden green, aeneous or even coppery, generally with a golden or coppery middle stripe; it is distinctly pruinose, not or slightly shining; scutellum finely, pale pubescent; postscutellum grey pruinose. Pleura greenish or aeneous, grey pruinose;

propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green with golden or coppery reflexes, sometimes almost quite coppery, with very narrow or almost wanting dark hind margins to the segments; it is distinctly whitish pruinose, most down the sides; it is clothed with short, black hairs and has hindmarginal bristles, a little longer on the first segment. Venter greyish, pale-haired. Hypopygium somewhat large, black or æneous black, greyish pruinose; eighth segment with black hairs; there are broad, rounded posterior ventral lobes with a little upwards turned point, and a long hair on the outer side near the base; they project only slightly beyond the end of the hypopygium; there are also a little projecting middle lobes; the inner lamellæ are somewhat short, the median thin, angularly bent and pointed, the lateral dilated, with a dilatation at the apex, and a spine at the upper margin near the base; the outer lamellæ are nearly ovate, whitish with a narrow, blackish margin; at the end there are a number of teeth with black, curved hairs; the most dorsally placed tooth is somewhat long, and dorsally to it is a small tooth with two strong hairs; the teeth decrease evenly into the serration of the ventral margin, with its shorter hairs, and on the inner side are inwards curved, pale hairs. Legs yellow, front coxæ grey at the base, whitish pruinose anteriorly; posterior coxæ grey, yellow just at the apex; anterior tarsi with the apex of metatarsus and the four following joints blackish; hind tibiæ blackish or brownish at the apex, sometimes slightly or almost not, hind tarsi blackish. The legs have short, black hairs; the anterior coxæ are white-haired except for the black bristles; the hind femora have longer hairs above towards the base, they are slightly pale-haired below and have here a

Fig. 34. Wing of *D. griseipennis* ♂.

fringe of long black cilia in about the apical half; the posterior femora have one preapical bristle; front tibiæ with bristles above and one or two postero-ventral bristles; there is a long, thin hair at the tip on the ventral side; middle tibiæ with three to four antero-dorsal, one

dorsal, two postero-dorsal bristles, and one ventral below the middle; hind tibiae with two dorsal rows of bristles, one ventral bristle towards the apex, and a row of small ventral bristles; hind metatarsi with only one dorsal bristle, further one anterior and small ventral bristles. Wings somewhat brownish or greyish tinged; veins blackish, costa with a somewhat small swelling; discal vein with a large, rectangular bend, and with a small veinlet at the lower angle; posterior cross-vein lying a little before the middle of the wing; axillary lobe not large, anal vein going forwards. Squamulae yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, grey or whitish grey. Antennae considerably shorter than in the male, third joint short, not or slightly longer than broad. Front tibiae without a long hair at the tip, and hind femora not fringed; hind tibiae not or very slightly darkened at the tip.

Length 4.7—5.4 mm.

D. griseipennis is common in Denmark; Copenhagen in a garden, Amager, Hellerup, Tisvilde; on Funen at Hoffmangave and Ørbæk-lunde, and in Jutland at Thisted. My dates are $\frac{6}{7}$ — $\frac{26}{8}$. It occurs often near the shore, and sometimes in great number, but also more inland; Stæger took it on Amager at the shore, on Carduus.

Geographical distribution:— The species is one of the most widely distributed; it occurs in Europe down into Spain, southern Italy and Greece, further in Asia Minor and in North Africa; towards the north to middle Sweden.

31. *D. acuticornis* Wied.

1817. Wied. Zool. Mag. I, 74, 23. — 1823. Fall. Dipt. Suec. Dol. 12, 10. — 1831. Stann. Isis 1831, 55, 8. — 1843. Zett. Dipt. Scand. II, 531, 26. — 1862. Schin. F. A. I, 218. — 1903. Kat. paläarkt. Dipt. II, 294. — *Dolichopus ruralis* Meig. 1824. Syst. Besch. IV, 94, 35. — 1842. Stæg. Krøyer's Tidsskr. IV, 18, 8.

Fig. 35. Antenna of *D. acuticornis* ♂, from the inside. $\times 65$.

Male. Body somewhat slender. Vertex and frons green. Epistoma somewhat narrow, white. Palpi whitish pruinose. Occiput green or æneous, grey pruinose; postocular bristles whitish below, black above.

Antennæ elongated, considerably longer than the head, third joint long, lanceolate, with an attenuated and pointed apex which is turned a little upwards; the joint is distinctly hairy; the antennæ are black, yellow beneath the basal joint. Thorax green or golden green, generally with a more golden middle stripe; sometimes the thorax is more æneous; it is distinctly greyish pruinose, somewhat shining; scutellum very finely yellow pubescent; postscutellum green, grey pruinose. Pleura greenish or æneous, greyish pruinose; propleura with few, short, pale hairs above, and a black prothoracic bristle. Abdomen green with golden, sometimes more coppery reflexes; it is distinctly white pruinose downwards, and has very narrow, darkened hind margins to the segments, or these are almost wanting; it is clothed with short, black hairs, at the sides with some pale hairs intermingled, and

Fig. 36. *D. acuticornis*. Apical part of hypopygium; posterior ventral lobe, lateral and median inner lamellæ, and dorsal median appendage are seen.

it has hindmarginal bristles, which are a little long on the first segment, and also increase in length towards the end. Venter greenish grey, very slightly pale-haired. Hypopygium black or slightly æneous, greyish pruinose; eighth segment with black hairs; there are long, straight, almost styliform posterior ventral lobes, ending with a pair of small spines, they

issue a little more forwards than commonly; there are also a little projecting middle ventral lobes, but this part of the hypopygium is a little unsymmetrical; the inner lamellæ issue more ventrally than commonly, they are long, the median curved a little downwards, hook-shaped at the apex; the lateral are straight, a little dilated, and at the apex with a dilatation which is separated off by an excision; the outer lamellæ somewhat small, almost rectangular, white, with a blackish margin only at the apex; at the end there are two longer and a few shorter teeth with curved, black hairs; dorsally to the teeth there are a pair of hairs, and the ventral margin has shorter hairs, and on the inside some inwards curved hairs. Legs yellow, front coxæ white pruinose anteriorly; middle coxæ grey, yellow on the apical part; hind coxæ mainly yellow, only greyish towards the base on the outer side; front tarsi with the apex of metatarsus and the following four joints black, middle tarsi black, only slightly yellowish at the extreme base; hind tibiæ black on the apical part, and

hind tarsi black. The legs have short, black hairs, coxæ white-haired with only the bristles black; hind femora with a little longer hairs above towards the base, and a little pale-haired below; posterior femora with one preapical bristle; front tibiæ with a few bristles above, and one on the postero-ventral side; middle tibiæ with three to four antero-dorsal (one of them more dorsal), two postero-dorsal bristles, and one ventral bristle below the middle; hind tibiæ with two rows of dorsal bristles, one, rather small, ventral bristle towards the apex, and a dense ventral row of small bristles; hind metatarsi with two dorsal bristles and only very small bristles below. Wings tinged somewhat brown, most towards the anterior margin; veins black, costa with a long swelling; discal vein with a small, obtuse bend; axillary lobe small, anal vein directed forwards. Squamulæ whitish yellow, with a yellow fringe. Halteres pale yellow.

Female. Epistoma broader than in the male, but not specially broad, whitish grey. Antennæ shorter than in the male, third joint

Fig. 37. Antenna of *D. acuticornis* ♀, from the inside. $\times 65$.

slightly longer than broad, but with a distinct apex, turned a little upwards. Coxæ for the most part black-haired. Wings without costal swelling. In the squamular fringe there may be more or less numerous black hairs, until the fringe becomes quite black.

Length 3.4—4.4 mm.

D. acuticornis is not properly common in Denmark; Hellebæk, Nordskoven at Jægerspris, Tisvilde, Faxe Ladeplads; on Langeland at Lohals, and in Jutland at Funder near Silkeborg, Sæby, Frederikshavn, and on Læsø. My dates are $\frac{2}{6}$ to the first part of August. It occurs generally near the coast.

Geographical distribution: — Northern and middle Europe down into the Alps; towards the north to middle Sweden.

32. *D. longicornis* Stann.

1831. Stann. Isis 1831, 53, 7. — 1843. Zett. Dipt. Scand. II, 529, 25, et 1849. VIII, 3079, 25. — 1862. Schin. F. A. I, 218. — 1903. Kat. paläarkt. Dipt. II, 299. — *Dolichopus acuticornis* 1824. Meig. Syst. Besch. IV, 94, 34. — 1842. Stæg. Krøyer's Tidsskr. IV, 17, 7.

Male. Of somewhat slender shape. Vertex and frons green. Epistoma narrow, narrower than in *acuticornis*, white, somewhat yellowish, especially upwards. Palpi white. Occiput green, greyish pruinose, postocular bristles white below, black above. Antennæ much elongated,

Fig. 38. Antenna of *D. longicornis*, ♂, from the inside. $\times 65$.

almost twice as long as the head, third joint long, the apical part attenuated, pointed and turned upwards with the apex; it is distinctly haired; the arista is inserted behind the middle; the antennæ are yellow, the two basal joints black above and the third joint black above and with the apical part black. Thorax dullish green, sometimes more æneous, and there may be a golden or coppery middle stripe; it is distinctly greyish or brownish pruinose, slightly shining; scutellum finely yellow pubescent; postscutellum almost quite grey. Pleura greenish, grey pruinose; propleura with a few, fine and pale hairs and a black prothoracic bristle. Abdomen green or golden green, often with coppery reflexes; there are narrow, dark hind margins to the segments; abdomen is clothed with short, black hairs, and has somewhat short hindmarginal bristles, a little longer on the first segment; down the sides there may be some yellowish hairs. Venter greenish grey, slightly pale-haired. The hypopygium is quite different from that in *acuticornis*; it is black or æneous black, greyish pruinose; eighth segment with black hairs; there are slightly projecting, somewhat broad posterior ventral lobes with a little point at the upper apical corner, and with a very fine hair; the middle lobes a little projecting; the inner lamellæ of usual shape, curved downwards, the median thin, the lateral dilated, with some spines; the outer lamella somewhat ovate, white, with a not quite narrow, blackish margin along the ventral, apical and the half part of the dorsal edge; at the end there are some teeth with black, curved hairs, and dorsally to these two strong hairs; the teeth decrease in length towards the ventral margin, which has long, paler hairs, and on the inner side inwards curved, pale hairs. Legs yellow; front coxæ whitish pruinose anteriorly, middle coxæ grey, with yellow apex, hind coxæ yellow, only with a small grey spot outwards, sometimes stretching more or less towards the base; front tarsi brownish towards the end;

middle tarsi generally with the apex of the two first joints, and the three last joints quite brownish; hind tibiae somewhat thickened towards the apex, and here often a little darkened; hind tarsi black. The legs have short, black hairs, the coxae, except for the bristles, mainly white-haired; hind femora pale-haired beneath; posterior femora with one preapical bristle; front tibiae with few bristles above, and one or two on the postero-ventral side, and with a long, thin hair at the tip on the ventral side; middle tibiae with three or four antero-dorsal bristles (one of them more dorsal), two postero-dorsal, and with one ventral bristle below the middle; hind tibiae with two dorsal rows of bristles, one ventral towards the apex, and a somewhat dense row of small ventral bristles; hind metatarsi with two bristles above, one anterior, and very small bristles below. Wings a little brownish tinged; veins black or brownish black, costa with a somewhat large swelling, which is elongated, but shorter than in *acuticornis*; discal vein with a slight, obtuse bend; axillary lobe small, anal vein directed

Fig. 39. Antenna of *D. longicornis* ♀, from the inside. $\times 65$.

forwards. Squamulae whitish yellow, with a yellow fringe. Halteres pale yellow.

Female. Epistoma broader than in the male, and a little more greyish. Antennae shorter, with the third joint considerably shorter, but distinctly attenuated towards the apex and pointed. Coxae more black-haired than in the male. Wings without costal swelling. The squamulae may have the fringe quite yellow, but there are generally more or less numerous black hairs, until the fringe is quite black.

Length 3.5—4.3 mm.

D. longicornis is a common species in Denmark; Copenhagen in gardens, Lersøen, Amager, Vester Fælled, Damhusmosen, Charlottenlund, Ordrup Mose, Ermelund, Fure Sø, Hillerød, Rørvig, Tisvilde, Sorø, Faxe Ladeplads; in Jutland at Vestbirk near Skanderborg, Silkeborg, Mønsted near Viborg, Holstebro and Frederikshavn, and on Bornholm at Hasle. My dates are $^{10}/_6$ — $^{1}/_9$. It occurs in meadows and fens, and in low herbage and on bushes on humid places and near water; I have f. inst. taken it numerously in Ordrup Mose on the leaves of Petasites.

Geographical distribution:— Northern and middle Europe down into France; towards the north to northern Scandinavia, in Finland and in Siberia.

Remarks: This and the foregoing species are somewhat similar, but in the males they are at once distinguished by the different hypopygium, and by the presence of a long hair at the tip of the front tibiæ in *longicornis*, further by the antennæ and several other characters. The females are distinguished especially by the colour of the antennæ, which also have the third joint longer and more pointed in *longicornis*. On the other hand the fringes of the squamulæ afford no character; Schiner says, that the male of *longicornis* has generally a black fringe, and Verrall (Ent. Month. Mag. XV, 1904, 196) has the female of *longicornis* in the analytical table in a division with black-fringed squamulæ; already Stannius (l. c.) gives for the male of *acuticornis* a yellow fringe, and for *longicornis* a black fringe, but he says nothing about the females. I have always found the fringes equal in colour in the two species viz. yellow in the males, and yellow with more or less numerous black hairs intermingled, until quite black, in the females. — While the two species are easily distinguished from one another, the females are on the other hand somewhat similar to several other species, but they are distinguished partly by the somewhat long, pointed antennæ, and partly by the yellow hind coxæ.

33. *D. nubilus* Meig.

1824. Meig. Syst. Besch. IV, 96, 39. — 1831. Stann. Isis 1831, 133, 26. — 1842. Stæg. Krøyer's Tidsskr. IV, 32, 24. — 1843. Zett. Dipt. Scand. II, 505, 4, et 1849. VIII, 3076, 4. — 1862. Schin. F. A. I, 215. — 1903. Kat. paläarkt. Dipt. II, 301.

Male. Vertex and frons green, sometimes blue. Epistoma narrow, white, and with a slight but distinct, white pubescence. Palpi yellow. Occiput green or æneous, greyish pruinose; postocular bristles white below, black above. Antennæ about as long as the head, third joint triangular, not or slightly longer than broad; they are black, the basal joint may be a little lighter below at the apex. Thorax dark green, sometimes somewhat golden or æneous, slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum green, greyish pruinose. Pleura greenish, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen dark green with more or less distinct, golden or coppery reflexes; it is slightly whitish pruinose at the sides, and has dark hind margins to the segments; it is clothed with short, black hairs, and has longish hindmarginal bristles,

a little longer on the first segment. Venter greenish grey, slightly pale-haired. Hypopygium not long, but somewhat robust, æneous black, greyish pruinose; eighth segment with black hairs; the posterior ventral lobes are curious, they are not long, but broad, produced downwards and about triangular, and they have some hairs; also the middle ventral lobes are prolonged, and are thin, but as far as I could see they are not symmetrical, the left being longer and of another shape than the right; the inner lamellæ are long, as long as the outer, slightly curved, the lateral almost straight, dilated at the apex, the median thin; the outer lamellæ are rather small, irregularly triangular, somewhat petiolated; they are whitish or

Fig. 40. *D. nubilis*. Apical part of hypopygium.

yellowish white with a very narrow, blackish margin only along the apical edge; they have no teeth and bear only somewhat short, brown or paler hairs along the dorsal and apical margin. Legs yellow, front coxæ whitish pruinose anteriorly, and with a little grey spot at the base, posterior coxæ grey, with the apical part yellow; hind femora with a black spot above at the apex; anterior tarsi with the apical part of metatarsus and the following joints black; hind tibiæ black at the apex and hind tarsi black. The legs have short, black hairs, anterior coxæ somewhat white-haired outwards; posterior femora with one preapical bristle; front tibiæ with bristles above, and one or two on the postero-ventral side; middle tibiæ with about four antero-dorsal bristles (one of them more dorsal), two postero-dorsal, and one ventral below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of small, distantly placed bristles; hind metatarsi with two dorsal, some anterior, and with quite small ventral bristles. Wings somewhat blackish or brownish tinged at the anterior margin, especially above the cubital vein, sometimes, namely in fresh specimens, the tinge is very indistinct; veins blackish; discal vein with a somewhat angular, but obtuse bend; axillary lobe of medium size, anal vein going somewhat downwards. Squamulæ whitish yellow, with a whitish fringe. Halteres pale yellow.

Female. Epistoma broader than in the male, greyish white, pubescent as in the male. Antennæ shorter than in the male, speci-

ally the third joint short. Wing with the axillary lobe a little smaller. Squamulæ with the fringe black.

Length 3,7—4,3 mm.

D. nubilus is rather common in Denmark: Copenhagen in gardens, Amager, Rørvig, Frederikssund, Faxe Ladeplads and on Egholm at Skelskør; on Funen at Odense and Hoffmangave, and on Fænø; in Jutland at Horsens, Nebsager near Horsens, Hald near Viborg and Bovbjerg, and on Bornholm at Hasle and Allinge. My dates are $\frac{6}{5}$ — $\frac{6}{8}$; it thus occurs somewhat early, I took it in some number on Egholm at Skelskør on $\frac{28}{5}$, but the specimens were all fresh. It occurs in low herbage and on bushes on humid places, but especially at the shore, on *Carex* and *Carduus*.

Geographical distribution: — Europe down into southern Italy; towards the north to middle Scandinavia, and in Finland.

34. *D. latilimbatus* Macq.

1827. Macq. Soc. Sc. Lille, 1827, 65, 14, et 1834. Suit. à Buff. I, 464, 26. — 1838. Meig. Syst. Besch. VII, 162, 59. — 1859. Loew, Neue Beitr. VI, 12. — 1862. Schin. F. A. I, 215. — 1903. Kat. paläarkt. Dipt. II, 299. — *Dolichopus vulgaris* Stann. 1831. Isis, 1831, 129, 24.

Male. Vertex and frons green. Epistoma narrow, silvery white, with a slight, but distinct, white pubescence. Palpi yellow. Occiput green or æneous, grey pruinose; postocular bristles white below, black above. Antennæ short, about as long as the head, third joint triangular, as long as broad; they are black, the basal joint slightly and inconspicuously yellowish below at the apex. Thorax dark green or more æneous, slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum green, greyish pruinose. Pleura greenish or æneous, grey pruinose; propleura with pale hairs and a black prothoracic bristle. Abdomen dark green, with more or less golden or coppery reflexes; it is somewhat greyish white pruinose at the sides and has dark hind margins to the segments; it is clothed with short, black hairs, and has longish hindmarginal bristles, a little longer on the first segment. Venter greenish grey, a little pale-haired. Hypopygium black or greenish black, greyish pruinose; eighth segment with black hairs; the posterior ventral lobes of a shape as in *nubilus*, but more obtuse and less broad, and likewise with some hairs at the margin; the inner lamellæ much shorter than in *nubilus*; the outer lamellæ larger, the apical part roundish triangular; they are whitish with a black margin along the apical edge; the dorsal apical margin has small teeth with black, curved hairs, the ventral margin has shorter, black hairs, and on the inside inwards curved hairs. Legs yellow,

front coxæ a little grey at the base, and somewhat silvery pruinose anteriorly, posterior coxæ grey with the apical part yellow; hind femora with a small, blackish or brownish spot above at the apex; anterior tarsi blackish except the basal part of metatarsus; hind tibiæ a little blackish or brown just at the apex, and hind tarsi black. The legs have short, black hairs, front coxæ a little pale-haired outwards; posterior femora with one preapical bristle; front tibiæ with bristles above, and one or two on the postero-ventral side, and with a long, thin hair at the apex on the ventral side; middle tibiæ with about four antero-dorsal bristles (one of them dorsal), two postero-dorsal, and one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, one smaller ventral bristle towards the apex and above it a row of small bristles; hind metatarsi with about two dorsal, one anterior, and small ventral bristles. Wings slightly tinged, almost hyaline; veins blackish; discal vein with an angular but obtuse bend; axillary lobe small, the anal vein going forwards. Squamulæ pale yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, greyish white, distinctly pubescent. Antennæ shorter than in the male, third joint shorter than broad. Front tibiæ without any long hair at the tip. Wings more tinged; the axillary lobe larger.

Length about 4 mm.

D. latilimbatus is very rare in Denmark; we have it not in our collection, but Mr. Th. Becker in Liegnitz has kindly communicated to me, that he has taken one specimen on Bornholm.

Geographical distribution:—Europe down into Italy; its northern limit is in Denmark (Bornholm), and it occurs in England.

Remarks: *D. nubilus* and *latilimbatus* are easily recognised among all the other species with pale postocular bristles by the pubescent epistoma, and for the males also the hypopygium is characteristic; the males of the two species are also easily distinguished from one another, as *nubilus* has a yellow squamular fringe and no long hair at the apex of the front tibiæ, while *latilimbatus* has such a hair and a black squamular fringe; the females on the other hand I cannot distinguish satisfactorily; I think *nubilus* has a more obvious spot above at the apex of the hind femora, and the hind tibiæ more blackish at the apex, these being sometimes almost quite yellow in *latilimbatus*, and these characters I have used in the table.

35. *D. linearis* Meig.

1824. Meig. Syst. Besch. IV, 84, 17. — 1862. Schin. F. A. I, 221. — 1903. Kat, paläarkt. Dipt. II, 299. — *Dolichopus plebejus* Meig. 1824.

Syst. Besch. IV, 99, 44. — *Dolichopus parvulus* Zett. 1843. Dipt. Scand. II, 555, 46, et 1852. XI, 4294, 46. — *Dolichopus agilis* Zett. (nec Meig.) 1849. Dipt. Scand. VIII, 3081, 43—44, et 1852. XI, 4294, 43—44.

Male. Vertex and frons green. Epistoma narrow, silver-white. Palpi pale yellow. Occiput green, greyish pruinose; postocular bristles yellowish below, black above. Antennæ about as long as the head, third joint as long as, or slightly longer than broad, convex below, straight above, and thus the point turned dorsally; the basal joints are yellow, darkened to blackish above, but sometimes so slightly, that it is almost imperceptible; the third joint black or brownish. Thorax green or more æneous green, generally with a more or less distinct brighter middle stripe; it is greyish pruinose, very slightly shining; scutellum finely yellow pubescent; postscutellum green, greyish pruinose. Pleura greenish, grey pruinose; propleura with few, fine, pale hairs above, and with a black prothoracic bristle. Abdomen green, more or less with golden or coppery reflexes, sometimes quite coppery; it is distinctly white pruinose, most down the sides, and there are very narrow, dark hind margins to the segments, or these are wanting; abdomen clothed with short, black hairs, and it has somewhat long hindmarginal bristles, longest behind and on the first segment. Venter greyish, slightly pale-haired. Hypopygium black, slightly æneous, greyish pruinose; eighth segment with black hairs; there are somewhat projecting posterior ventral lobes with the point turned upwards, and also a projecting middle lobe on the left side; the median inner lamellæ are hook-shaped, strongly and angularly bent and ending with a little hook or spine; the lateral inner lamellæ are also curved strongly downwards, dilated and with a dilatation at the apex; the outer lamellæ are somewhat roundish, whitish with a somewhat broad, blackish margin along the ventral, apical and outer part of the dorsal edge; at the end there are about three long teeth, with black, curved hairs, and dorsally to them a pair of strong hairs; the ventral margin is serrated, with curved hairs, and on the inside inwards curved hairs. Legs pale yellow or whitish yellow, front coxæ whitish pruinose anteriorly; posterior coxæ yellow, only the middle coxæ with a grey stripe outwards; the anterior tarsi more or less infuscated from the apex of metatarsus outwards, being darkest to black towards the apex, the middle tarsi sometimes with the four last joints black; the apex of the hind tibiæ and the hind tarsi black. The legs have short, blackish hairs, the front coxæ are finely white-haired; the femora give the impression of being more bare below and posteriorly than commonly, but they are in reality finely pale-haired; posterior femora with one preapical bristle; front tibiæ with

bristles above, and generally one on the postero-ventral side, and with a long, thin hair at the tip on the postero-ventral side; middle tibiæ with three to four antero-dorsal bristles (one of them somewhat dorsal), two postero-dorsal, and with one ventral below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of small bristles; hind metatarsi with about two dorsal, one anterior, and with only very small ventral bristles. Wings a little brownish tinged, especially on the anterior part; veins black or blackish brown, costa with a not large, somewhat elongated swelling; discal vein with a slight, quite obtuse bend; axillary lobe small, anal vein going forwards. Squamulæ whitish, with a black fringe. Halteres pale yellow.

Female. Epistoma somewhat broad, white or very slightly greyish. Antennæ shorter than in the male, the basal joint distinctly shorter, and the third joint broader than long. Front coxæ with a few black hairs downwards; front tibiæ with no long hair at the tip; hind tibiæ slightly or almost not darkened at the apex.

Length 3.5—4 mm.

This species may be known by the pale coxæ, only the middle coxæ having a grey stripe; from the other species in this group as *notabilis*, *caligatus* and *lineatocornis* it is also known by the lighter antennæ.

D. linearis is rare in Denmark; at Copenhagen, Ordrup Mose, Ermelund, Dyrehaven (Stæger, the author). My dates are $14/5$ — $26/6$. It occurs on humid places in or at woods.

Geographical distribution: — Northern and middle Europe down into Austria, Hungary and Styria; towards the north to middle Sweden.

36. *D. notabilis* Zett.

1843. Zett. Dipt. Scand. II, 506, 5, et 1849. VIII, 3076, 5, et 1855, XII, 4622, 5, et 1859. XIII, 5041, 5. — 1903. Kat. paläarkt. Dipt. II, 301. — *Dolichopus notatus* Stæg. 1842. Krøyer's Tidsskr. IV, 19, 9. — *Dolichopus puncticornis* Zett. 1843. Dipt. Scand. II, 536, 30. — 1903. Kat. paläarkt. Dipt. II, 303.

Male. Vertex and frons green or bluish green. Epistoma narrow, yellow or light yellowish. Palpi yellow. Occiput green or æneous, greyish pruinose; postocular bristles yellowish below, black above. Antennæ elongated, a little longer than the head, third joint somewhat large, considerably longer than broad, not attenuated but short triangularly pointed with the point somewhat dorsal; the antennæ are black, beneath the basal joint at the apex a very faint, reddish colour may be observed. Thorax somewhat dark green or more

æneous, sometimes with a more golden middle stripe; it is a little pruinose, somewhat shining; scutellum finely yellow pubescent; post-scutellum green, greyish pruinose. Pleura green, greyish pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen

Fig. 41. Antenna of *D. notabilis* ♂, from the inside. $\times 65$.

green, sometimes somewhat golden or more coppery, finely whitish pruinose downwards, with indistinct, dark hind margins to the segments, or these wanting; it is clothed with short, black hairs, and has longish hindmarginal bristles, a little longer on the first segment. Venter greyish, slightly pale-haired. Hypopygium black, slightly greenish, greyish pruinose; eighth segment with black hairs; there are slightly projecting posterior ventral lobes, ending with a little upwards turned point; the middle lobes somewhat projecting and pointed; the inner lamellæ curved downwards, the median thin and pointed, the lateral dilated and with a dilated apex; the outer lamellæ are small, somewhat ovate, yellowish white; there is a blackish margin along the ventral, apical and outer half of the dorsal edge, it is somewhat broad at the apical edge; the end has some teeth with curved, black hairs, and dorsally to them a pair of hairs; the slightly serrated ventral margin has curved hairs, and on the inside inwards curved hairs. Legs yellow, front coxæ somewhat whitish pruinose anteriorly; posterior coxæ grey with the apex yellow; anterior tarsi with the apex of metatarsus and the following joints brown or blackish, front tarsi generally palest, or only darkened towards the apex; hind tibiæ slightly thickened towards the end, with about the apical third black, hind tarsi black. The legs have short, black hairs, front coxæ a little pale-haired outwards and above; posterior femora with one preapical bristle; front tibiæ with bristles above, one on the posterior side and generally two on the postero-ventral side, and with a long, thin hair at the tip on the ventral side; middle tibiæ with three to four antero-dorsal bristles (one of them more dorsal), two postero-dorsal, and with one ventral below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a row of small ventral bristles; hind metatarsi with about two dorsal

bristles, some anterior, but only with very small ventral bristles. The bristles on the legs are somewhat long. Wings a little brownish tinged; veins black or blackish brown, costa with a not large but elongated swelling; discal vein with a moderate or somewhat large, obtuse bend, the lower angle of which is distinctly angular; axillary lobe somewhat small, anal vein going forwards. Squamulae whitish, with a black fringe. Halteres whitish yellow.

Female. Epistoma broader than in the male, but not specially broad, yellow or greyish yellow. Antennae shorter than in the male, third joint short, not longer than broad. Front tibiae with no long hair at the tip. Wings without costal swelling.

Length 3.5–4.2 mm.

This species bears resemblance to *acuticornis*, but in the male it is at once distinguished by the shorter and differently shaped antennae, the hypopygium and the long hair at the tip of the front tibiae; the female may be known by the shape of the antennae and the grey hind coxae; also the posterior bristle on the front tibiae seems to be characteristic in both sexes, and likewise the yellow or yellowish epistoma. — The species was originally founded by Stæger on Danish specimens (under the name *notatus*).

D. notabilis is somewhat rare in Denmark; Lersøen, Amager, Vester Fæled, Dyrehaven, Ørholm, Faxe Ladeplads; on Funen at Odense; in Jutland at Søndervig, Sminge near Silkeborg and Hulsig north of Frederikshavn; finally on Bornholm at Allinge. My dates are $\frac{3}{6}$ — $\frac{5}{8}$. It occurs in fens and on humid places, both inland and near the coast; I have once taken it on Iris at a small pond.

Geographical distribution: — Northern and middle Europe down into France; towards the north to southern Sweden, and in Finland.

Remarks: Kowarz suggests (Wien. Ent. Zeitg. III, 1884, 57) that *notabilis* and *puncticornis* are identical; in the Kat. paläarkt. Dipt. they are on the other hand kept separate; as I, through the kindness of Dr. S. Bengtsson in Lund, have been able to study Zetterstedt's type of *puncticornis*, and as I likewise have examined Stæger's specimens of *notabilis* (his *notatus*), which Zetterstedt had seen, I can prove the identity with certainty. It is curious that Zetterstedt does not compare these two species, but I think that when he once had placed *notabilis* in the section with black antennae, and *puncticornis* in the section with partly yellow antennae, this has prevented him from comparing them.

37. *D. caligatus* Wahlb.

1850. Wahlb. Öfvers. Vet. Akad. Förh. VII, 221. — 1852. Zett. Dipt. Scand. XI, 4287, 30–31. — 1903. Kat. paläarkt. Dipt. II, 296.

Male. Vertex and frons green. Epistoma somewhat broad, narrowed downwards, white. Palpi yellowish. Occiput green or æneous, greyish pruinose; postocular bristles whitish below, black above. Antennæ shorter than the head, third joint as long as or a little longer than broad, the lower margin very convex, the upper straight, the apical point short, truncate or rounded, turned dorsally; the antennæ are black, the basal joint yellowish below at the apex. Thorax green or slightly golden green, sometimes bluish green, slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum greenish or æneous, grey pruinose; propleura with pale hairs and a black prothoracic bristle. Abdomen green, or more or less golden or coppery, finely whitish pruinose downwards, with very narrow and indistinct dark hind margins to the segments, or these wanting; it is clothed with short, black hairs, and has somewhat short hindmarginal bristles, only slightly longer on the first segment. Venter greyish green, slightly pale-haired. Hypopygium somewhat large, black or slightly æneous black, greyish pruinose above; eighth segment with black hairs; there are somewhat projecting posterior ventral lobes, with the point turned upwards; the inner lamellæ somewhat short, curved downwards, the median thin, the lateral dilated with a dilatation at the apex and a small spine at the upper margin; the outer lamellæ almost rectangular, whitish with a narrow, blackish margin along the ventral, apical and outer half of the dorsal edge; at the end there are some teeth with curved, black hairs, and dorsally to them a pair of curved hairs; the ventral margin is serrated, with curved hairs, and on the inside inwards directed hairs. Legs yellow, front coxæ slightly greyish just at the base, whitish or greyish white pruinose anteriorly; posterior coxæ grey, with the apex yellow; anterior tarsi with apex of metatarsus and the four following joints black; apex of hind tibiæ, and the hind tarsi black. The legs have short, black hairs, hind femora a little longer hairs above towards the base and a fringe of fine, longish, yellow hairs below in the whole length; posterior femora with one preapical bristle; front tibiæ with bristles above, and two on the postero-ventral side; middle tibiæ with about five antero-dorsal (one of them more dorsal), two postero-dorsal bristles, and one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of small bristles; hind metatarsi with two to three dorsal bristles, some anterior, and with small ventral bristles. Wings very slightly tinged; veins black, costa with a small, short, somewhat punctiform swelling; discal vein with a not small, but quite obtuse bend; axillary lobe

of medium size, anal vein going somewhat forwards. Squamulae yellow, with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male, white or greyish white. Antennae shorter, third joint shorter than broad. Hind femora without fringe beneath. Wings somewhat more tinged, with no costal swelling.

Length 4—4.5 mm.

This species is in the male easily known from *notabilis* by the want of a long hair at the apex of the front tibiae, by the shorter antennae, silver-white epistoma and the fringe of longish hairs below the hind femora; the female may likewise be known by the white epistoma and shorter antennae.

D. caligatus is rare in Denmark, and has only been taken in Jutland; Horsens, Laven near Silkeborg, Frijsenborg, Ravnkilde and Tinbæk Mølle at Lindenberg Aa. It was taken in the last part of July and first part of August.

Geographical distribution: — Northern and middle Europe down into Bohemia and Styria; towards the north to southern Sweden, and in Finland.

38. *D. lineatocornis* Zett.

1843. Zett. Dipt. Scand. II, 538, 32. — 1862. Schin. F. A. I, 222.
— 1903. Kat. paläarkt. Dipt. II, 299.

Male. Vertex and frons green. Epistoma narrow, deep yellow or ochraceous. Occiput green, greyish pruinose; postocular bristles yellowish below, black above. Antennae about as long as the head, third joint somewhat large, a little longer than broad, short pointed; they are black, the basal joint yellow below. Thorax greenish or æneous, sometimes with a more golden middle stripe, slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum greenish, greyish pruinose. Pleura greenish, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, more or less with golden or coppery reflexes, finely whitish pruinose downwards, the segments with narrow, dark hind margins; it is clothed with short, black hairs, and has hindmarginal bristles, which are only slightly longer on the first segment. Venter greenish grey, slightly pale-haired. Hypopygium æneous black, greyish pruinose; eighth segment with black hairs; there are a little projecting posterior ventral lobes with the apical point turned upwards; the inner lamellæ curved downwards, the median thin, the lateral dilated, with a dilatation at the apex; the outer lamellæ roundish rectangular, whitish, with a narrow, blackish margin along the ventral, apical and outer part of the dor-

sal edge; the end has some teeth with curved, black hairs, and dorsally to them a pair of curved hairs; the ventral margin is serrated, with shorter hairs, and on the inside inwards curved hairs. Legs yellow, front coxæ a little lighter pruinose anteriorly; posterior coxæ grey, a little yellow just at the apex; anterior tarsi with the apex of metatarsus and the four following joints black; hind tibiæ a little thickened, with a slight, but distinct swelling on the posterior side near the base; the apex is a little brownish black or blackish; hind tarsi black. The legs have short, black hairs, front coxæ with some pale hairs outwards; hind femora with a little longer hairs above towards the base, and with a fringe of short, pale hairs below; posterior femora with one preapical bristle; front tibiæ with bristles above, and one to three on the postero-ventral side; middle tibiæ with about five antero-dorsal bristles (one of them more dorsal), two postero-dorsal, and with one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of small bristles; hind metatarsi with two or three dorsal bristles, some anterior, and with small ventral bristles. Wings somewhat brownish tinged; veins black, costa with a quite small swelling; discal vein with a not small, but quite obtuse bend; axillary lobe large, anal vein going downwards. Squamulæ pale yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, greyish yellow. Antennæ shorter than in the male, third joint short, not as long as broad. Middle metatarsi quite black; hind femora short-haired below, and hind tibiæ simple. Wings without costal swelling; axillary lobe smaller, anal vein going more forwards.

Length 4—4.8 mm.

I was somewhat in doubt with regard to the determination of this species, but through the kindness of Dr. S. Bengtsson in Lund I have examined the type of *lineatocornis*, and thus I am certain with regard to the identity. Zetterstedt says of the epistoma "flavido" and "flavescente"; it is in the type slightly paler than in my specimens, but it is however not pale, but yellow; otherwise there is not the slightest doubt about the determination, the small costal swelling and the specially formed hind tibiæ being very characteristic. I think also that *D. lineaticornis* mentioned by Verrall (Entom. Month. Mag. XV, 1904, 226), about which the author expresses some doubt, is this species. The female had not hitherto been described, I have not taken it in copula with the male, but I feel rather sure, that it belongs here, though it has the middle metatarsus quite black. — The species is in the male distinguished from *caligatus* by the dark yellow

epistoma, and the thickened hind tibiæ; the female may be distinguished from the female of *notabilis* by the shorter antennæ, a little broader epistoma, and the quite black middle metatarsi; from the female of *caligatus* it may be distinguished by the greyish yellow epistoma, and likewise by the black middle metatarsi; finally it has in both sexes the basal antennal joint much more yellow.

D. lineatocornis is very rare in Denmark, only four specimens, three males and a female, have been taken; Copenhagen, Amager, Damhusmosen, Utterslev Mose (the author). The dates are ^{15.6}—^{3.7}.

Geographical distribution:— Northern and middle Europe down into Germany; towards the north to southern Sweden; it seems on the whole to be a rare species.

Remarks: The females of the three species *notabilis*, *caligatus* and *lineatocornis* show some resemblance to the female of *pennatus*, but the antennæ are less yellow beneath the basal joint, and have the second joint quite black; also *pennatus* is larger.

39. *D. sabinus* Hal.

1838. Hal. Ann. Nat. Hist. II, 184. — 1862. Schin. F. A. I, 219. — 1903. Kat. paläarkt. Dipt. II, 304. — *Dolichopus pictus* Stæg. 1842. Krøyer's Tidsskr. IV, 31, 23. — 1843. Zett. Dipt. Scand. II, 539, 33, et 1859. XIII, 5050, 33.

Male. Head somewhat low. Vertex and frons green. Epistoma not specially narrow, rapidly widening upwards, silver-white. Palpi yellow. Occiput green or æneous, greyish pruinose; postocular bristles whitish below, black above. Antennæ short, shorter than the head, third joint about as long as broad, almost roundish with a short point; the antennæ are black, the basal joints yellow below, and also the third joint with a small, sometimes somewhat indistinct, yellowish spot below at the base. Thorax dark green or æneous, sometimes even coppery, and sometimes with a coppery middle stripe; it is slightly pruinose, shining; scutellum finely yellow pubescent; post-scutellum green, greyish pruinose. Pleura greenish or æneous, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, with coppery reflexes, often quite coppery; it is slightly whitish pruinose downwards, on the second segment there is a distinct, grey pruinose, semicircular spot on the side at the hind margin; the segments have narrow, dark hind margins; abdomen clothed with short, black hairs, and it has somewhat short hind-marginal bristles, not longer on the first segment. Venter greyish, with pale hairs, which are a little longish at the base. Hypopygium black or æneous black, greyish pruinose; eighth segment with short,

black hairs; the posterior ventral lobes are slightly projecting, with the apex turned upwards; inner lamellæ short, curved downwards, the median very thin, the lateral dilated, with a dilatation at the apex; the outer lamellæ are ovate or roundish rectangular, whitish with a blackish margin along the ventral, apical and just the outer part of the dorsal edge, it is somewhat broad at the end; the end has teeth with black, curved hairs, and dorsally to them a pair of curved hairs; the ventral margin is serrated and has long and fine, curved hairs, and on the inside more inwards curved hairs. Legs yellow, front coxæ whitish pruinose anteriorly; posterior coxæ grey with the apex yellow; anterior tarsi with the apex of metatarsus and the four following joints black; hind tibiæ black or blackish at the apex, and hind tarsi black, but with the base of metatarsus yellow. The legs have short, black hairs, front coxæ white-haired anteriorly towards the outer side; hind femora with a little longer hairs above towards the base, and short pale-haired below; posterior femora with one preapical bristle; front tibiæ with bristles above, and one or two on the postero-ventral side; middle tibiæ with about four antero-dorsal bristles (one of them more dorsal), two postero-dorsal, and one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of very small, distantly placed bristles; hind metatarsi with two or three dorsal bristles, generally a small anterior, and with very small ventral bristles. Wings with a blackish or brownish blotch on about the apical half at the anterior margin, stretching towards the discal vein; veins black, costa with a short, but rather thick swelling; discal vein with a small, obtuse bend; axillary lobe somewhat large and anal vein going somewhat downwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad. Antennæ of about the same length as in the male. The characteristic grey spot on the second abdominal segment wanting. Front coxæ less white-haired than in the male. Wings slightly tinged, but without any blotch, and without costal swelling.

Length 3,4—3,7 mm.

This species is in the male easily recognised by the colour of the wings; in the female it may be distinguished by the colour of the antennæ, this being only the same in *longicornis*, which has much longer antennæ, yellow hind coxæ, and hind metatarsus quite black; *plumipes* and *Wahlbergi* differ by having the basal antennal joints quite yellow. — Stæger says, that the female has the hind metatarsus almost quite black, and Zetterstedt terms it quite black; all my

females have it with a distinct yellow base, only one specimen has it barely slightly yellow at the extreme base.

D. sabinus is somewhat rare in Denmark; Amager; on Funen at Hoffmangave, on Fæno, and on Bornholm. My dates are in July. It occurs on commons and similar places, at or near the shore; Stæger took it on Carduus.

Geographical distribution:— Europe down to the southern Italy; towards the north to southern Sweden.

40. *D. agilis* Meig.

1824. Meig. Syst. Besch. IV, 97, 41. — 1831. Stann. Isis 1831, 127, 22. — 1862. Schin. F. A. I, 221. — 1903. Kat. paläarkt. Dipt. II, 294.

Male. Vertex and frons green. Epistoma somewhat broad, white. Palpi yellow. Occiput green, grey pruinose; postocular bristles whitish below, black above. Antennæ somewhat elongated, as long as the head, third joint longer than broad, truncate, the upper corner slightly pointed, the arista inserted somewhat near the base; the antennæ are black, the basal joint yellow below, and also the second joint yellowish on the inner side. Thorax dark green or æneous, generally

Fig. 42. Antenna of *D. agilis* ♂, from the inside. $\times 65$.

with a coppery middle stripe and somewhat coppery at the sides; it is somewhat pruinose, not much shining; scutellum finely yellow pubescent; postscutellum green, greyish pruinose. Pleura green, grey pruinose; propleura with few, fine, pale hairs and a black prothoracic bristle. Abdomen green, with coppery reflexes, and with dark or coppery hind margins to the segments; it is somewhat whitish pruinose, especially downwards; it is clothed with short, black hairs, and has hindmarginal bristles, which are not distinctly longer on the first segment. Venter greyish, slightly pale-haired. Hypopygium black, slightly æneous, greyish pruinose; eighth segment with somewhat short, black hairs; there are somewhat projecting, rather narrow posterior ventral lobes, ending with a little hair; also the middle ventral lobes are somewhat projecting; the inner lamellæ curved downwards, the median thin, the lateral dilated, with a dilatation at

the apex; the outer lamellæ small, roundish rectangular, whitish with a narrow, blackish margin along the ventral, apical and outer half of the dorsal edge; the end has about three teeth with black, curved hairs, and dorsally to them a curved hair; the ventral margin is slightly serrated, with few hairs, and on the inside inwards curved hairs. Legs pale yellow, front coxæ whitish pruinose anteriorly; posterior coxæ grey with pale yellow apex, the hind coxæ also pale on the posterior side and with the apex more broadly pale; anterior tarsi with apex of metatarsus and the four following joints black; hind tibiæ a little thickened towards the apex with about the apical third black, hind tarsi black. The legs have short, black hairs, front coxæ a little white-haired outwards; hind femora inconspicuously pale-haired below; posterior femora with one preapical bristle; front tibiæ with bristles above, and two on the postero-ventral side; middle tibiæ with three or four antero-dorsal bristles (one of them more dorsal), two postero-dorsal, and with one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of small, somewhat densely placed bristles; hind metatarsi with only one dorsal bristle, and only small anterior and ventral bristles. The bristles on the legs are somewhat long. Wings almost hyaline or very slightly tinged; veins blackish, costa with a thin, but elongated swelling; discal vein with a small, obtuse bend; axillary lobe not large, anal vein directed somewhat forwards. Squamulæ pale yellow, with a black fringe. Halteres yellowish white.

Female. Epistoma broad, greyish white or a little yellowish. Antennæ shorter than in the male, third joint shorter and more pointed. Wings somewhat tinged, costa without swelling.

Length 3,3—3,8 mm.

This species is, in spite of its resemblance to several other species, easily recognised by the single dorsal bristle on the hind metatarsi.

D. agilis is rare in Denmark, and most specimens are taken in recent time; it was not known to Stæger, yet three specimens were present in our old collection, placed under the species labelled as *agilis*, which is identical with *linearis*, and also under *trivialis*; otherwise only six specimens have been caught; Vedbæk, Tisvilde (the author); on Funen (H. J. Hansen); in Jutland at Hald near Viborg (the author), and at Frederikshavn, and finally on Bornholm at Hasle (H. J. Hansen).

Geographical distribution:— Northern and middle Europe down into Austria and Styria; it seems to have its northern limit in Denmark; in Kat. paläarkt. Dipt. Zetterstedt is quoted, but according to

Dipt. Scand. XI, 4294, *agilis* is not found in Scandinavia, and this certainly is correct. Neither does it occur in England.

41. *D. simplex* Meig.

1824. Meig. Syst. Besch. IV, 85, 20. — 1831. Stann. Isis 1831, 126, 21. — 1842. Stæg. Krøyer's Tidsskr. IV, 31, 22. — 1843. Zett. Dipt. Scand. II, 552, 43, et 1849. VIII, 3081, 43, et 1855. XII, 4629, 43. — 1862. Schin. F. A. I, 220. — *Dolichopus thalassinus* Hal. 1831. Zool. Journ. V, 363, 17.

Male. Vertex and frons green or bluish. Epistoma somewhat narrow, whitish yellow. Palpi yellow. Occiput greenish, greyish pruinose; postocular bristles yellowish below, black above. Antennæ

Fig. 43. Antenna of *D. simplex* ♂, from the inside. $\times 65$.

a little elongated, about as long as the head, the third joint short, shorter, or at all events not longer than broad, moderately pointed; the basal joints are yellow, the second joint may be obscured or nearly black, and the first joint may appear obscured above on account of the black hairs; the third joint black. Thorax generally green, more rarely somewhat æneous, and sometimes bluish green; it is slightly pruinose, somewhat shining; scutellum finely yellow pubescent; postscutellum greenish, grey pruinose. Pleura greenish or more æneous, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, with more or less pronounced golden or coppery reflexes, and with narrow, dark hind margins to the segments, or these almost wanting; it is finely whitish pruinose downwards, and it is clothed with short, black hairs, and has longish hindmarginal bristles, a little longer on the first segment. Venter greyish, slightly pale-haired. Hypopygium somewhat large, æneous black, greyish pruinose; eighth segment with black hairs; there are somewhat projecting posterior ventral lobes, with an apical point, which is turned upwards; also the middle ventral lobe is somewhat projecting on the left side; the inner lamellæ curved a little downwards, the median thin and somewhat short, the lateral dilated and with a dilatation at the apex; the outer lamellæ somewhat small, roundish rectangular, whitish with a narrow, black margin along the

ventral, apical and outer half of the dorsal edge; at the end there are some teeth with black, curved hairs; the ventral margin has few, somewhat short hairs, and on the inside fine, paler hairs, which are curved inwards. Legs yellow, front coxæ whitish pruinose anteriorly, posterior coxæ grey with yellow apex; anterior tarsi with the apex of metatarsus and the four following joints black, middle metatarsus often more or less darkened to quite black; hind tibiæ slightly darkened at the apex and hind tarsi black. The middle tibiæ are somewhat long and thin, longer than the femora. The legs have short, black hairs, front coxæ white-haired anteriorly on the outer part; hind femora with a little longer hairs above towards the base, and inconspicuously pale-haired below; posterior femora with one preapical bristle; front tibiæ with bristles above and one or two postero-ventral bristles; middle tibiæ with four to five antero-dorsal bristles (one of them somewhat dorsal), two postero-dorsal, and with one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of small bristles; hind metatarsi with about two dorsal, one anterior, and with small ventral bristles. Wings a little greyish or yellowish tinged; veins black or blackish; discal vein with a somewhat small, obtuse bend; axillary lobe large, anal vein going a little downwards. Squamulæ yellow with a black fringe. Halteres yellow.

Fig. 44. Antenna of *D. simplex* ♀, from the inside. $\times 65$.

Female. Epistoma broad, yellowish grey. Antennæ slightly shorter than in the male. Front coxæ more black-haired; for the rest similar to the male.

Length 4—4,5 mm.

This species may be known from *notabilis*, *caligatus* and *lineatocornis*, besides by other characters, by the basal joints of the antennæ being quite yellow, or at all events more yellow than in the named species; with regard to the males *notabilis* has a long hair at the tip of the front tibiæ, and *caligatus* and *lineatocornis* have differently coloured epistoma and longer hairs below the hind femora. On the other hand the female of *simplex* shows very great resemblance to the female of *plumipes*; it will, however, be distinguished by the

quite black third antennal joint, which is also shorter, and generally by the more or less pale basal part of the middle metatarsus, this being at all events somewhat reddish at the base, and only rarely quite or almost quite black; further *plumipes* has a somewhat larger axillary lobe, and the anal vein is directed more downwards than in *simplex*, though this character requires close examination to be correctly judged. Stæger says, that the female of *simplex* has the third antennal joint yellow below at the base, and Zetterstedt mentions varieties with the third joint so coloured; I am strongly inclined to believe that these authors have confounded the females of *simplex* and *plumipes*; in Stæger's collection most females were now correctly determined, and had also a black third antennal joint, but some females of *plumipes* were intermingled. Also to *pennatus* the female shows resemblance, but this is a larger species with the basal antennal joint more black.

D. simplex is common in Denmark; Copenhagen in gardens, Amager, Damhusmosen, Charlottenlund, Ørdrup Mose, Dyrehaven, Lyngby Mose, Fure Sø, Ruderhegn, Hareskov, Hillerød, Gurre, Bose-rup and Svenstrup near Roskilde, Frederikssund, Tisvilde, Rørvig, Egholm at Skelskør; on Funen at Hoffinansgave; in Jutland in Greisdalen at Vejle, Nebsager near Horsens, Laven near Silkeborg, Frijsenborg, Søndervig, Holstebro, Gjerlev near Randers Fjord, Thisted, Frederikshavn, Hulsig north of Frederikshavn and on Læsø; finally on Bornholm at Hasle, Rø, Hammeren and Almindingen. My dates are $28/5-1/9$. It occurs on bushes and in low herbage, especially on more or less humid places and near water, but also more remote from water, and both near the shore and inland.

Geographical distribution:— Northern and middle Europe down into France; towards the north to northern Sweden, and in Finland.

Remarks: I follow the Kat. paläarkt. Dipt. and Verrall in considering *D. thalassinus* Hal. as a synonym to *simplex*. Mik (Verhandl. zool. bot. Gesell. Wien, XXX, 1880, 594, Taf. XVII, Fig. 2—5) tried to distinguish the two species, and says, that the species described by Stæger is *thalassinus*; this is certainly not so, and the characters given by Mik are, I think, not valid; in the description of the hypopygium he has no doubt committed some error, as I think it very improbable, that any species of *Dolichopus* should have more than two pairs of inner lamellæ, besides the posterior ventral lobes, and the unpaired median dorsal appendage. — When Loew (Neue Beitr. VI, 1859, 12) ascribes the male of *simplex* a long thin hair at the tip of the front tibiæ, he has probably confounded the species with *notabilis* or *linearis*.

42. *D. brevipennis* Meig.

1824. Meig. Syst. Besch. IV, 89, 27. — 1831. Stann. Isis 1831, 60, 12. — 1842. Stæg. Krøyer's Tidsskr. IV, 23, 13. — 1843. Zett. Dipt. Scand. II, 511, 10, et 1849. VIII, 3077, 10, et 1855. XII, 4623, 10. — 1862. Schin. F. A. I, 221. — 1903. Kat. paläarkt. Dipt. II, 296. — *Dolichopus plumitarsis* Fall. var. β . 1823. Dipt. Succ. Dol. 10, 4.

Male. Vertex and frons green, sometimes bluish. Epistoma narrow, brownish yellow. Palpi dark yellow. Occiput green, greyish pruinose; postocular bristles black. Antennæ not quite as long as the head, black, third joint a little longer than broad, short pointed. Thorax green, sometimes æneous, generally with a more golden or coppery middle stripe; it is somewhat pruinose, not much shining. The inner posthumeral bristle is as strong as the outer. Scutellum finely yellow pubescent; postscutellum green or æneous, grey pruinose. Pleura greenish or æneous, greyish pruinose; propleura with somewhat long, yellowish hairs and a black prothoracic bristle. Abdomen green, with more or less distinct coppery reflexes, and with very narrow, dark hind margins to the segments; it is slightly, greyish white pruinose downwards, and is clothed with short, black hairs; there are somewhat short hindmarginal bristles, a little longer on the first segment. Venter green, slightly pruinose, with somewhat long, dark yellow or brownish hairs; they are specially long on third segment, and curved outwards. Hypopygium black, slightly æneous, greyish pruinose; eighth segment with somewhat long, black hairs; there are slightly projecting, somewhat rounded posterior ventral lobes, bearing a little style at the upper apical corner; the inner lamellæ large, strongly curved, the median angularly bent, somewhat hook-shaped, dilated in the middle at the angle, and here with a pair of bristles at the upper margin; the lateral dilated towards the apex, and at the apex with a dilatation, separated off by an excision; the outer lamellæ are somewhat large, the dorsal margin straight, the ventral rounded; they are yellow to brownish, with a broad, black margin along the ventral and apical edge; at the end there are somewhat numerous teeth with curved, black hairs, and dorsally to them a pair of curved hairs; the teeth decrease evenly in length towards the ventral margin, which has shorter, dense hairs, and on the inside there are dense, black, inwards curved hairs in about the apical half. Legs yellow, front coxæ grey at the base, posterior coxæ grey; front tarsi long and thin, the two last joints black, the fourth joint compressed, a little dilated, triangular; the fifth joint strongly compressed and dilated, oval, black-haired at the dorsal margin; middle tarsi with the apex of metatarsus and the four following joints black; hind

tibiæ black on the apical third or more, and hind tarsi black. The legs have short, black hairs, the hind femora with a little longer hairs above on the basal part, and with a fringe of somewhat few, but very long, yellow cilia below in the apical two thirds; posterior femora with one preapical bristle; front tibiæ with bristles above, and a row of three to five postero-ventral bristles; middle tibiæ with five to six antero-dorsal bristles (two of them more dorsal), two postero-dorsal, two to three antero-ventral and one ventral bristle; hind tibiæ with two dorsal rows of bristles, the postero-dorsal row only reaching a little beyond the middle; towards the apex there is a dorsal bristle; further there is a ventral row of bristles, the four or five last of which are long, the others small; middle metatarsi with one dorsal bristle, and hind metatarsi with about three dorsal, some anterior, and with small ventral bristles. Wings somewhat short, slightly yellowish or light brownish tinged; veins black, costa with a

Fig. 45. Wing of *D. brevipennis* ♂.

somewhat large swelling; discal vein with a not large, quite obtuse bend; axillary lobe somewhat large, anal vein going downwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, greyish yellow. Antennæ shorter than in the male, third joint short not longer than broad. Front tarsi simple, darkened towards the apex, the last three joints black; hind femora without fringe. Costa without swelling.

Length 5,5—6,5 mm.

D. brevipennis is common in Denmark; Lersøen, Amager, Vester Fæled, Ordrup Mose, Bøllemosen, Ruderhegn, Hillerød, Roskilde, and Boserup and Svenstrup near Roskilde, Frederikssund, Nordskoven at Jægerspris, Skelskør; on Langeland at Lohals; on Funen at Odense; in Jutland at Ribe, Søndervig, Bovbjerg and Frederikshavn; and finally on Bornholm at Hasle. My dates are 1st, 6—8th. It occurs on humid places and at water in low herbage and on bushes, and not rarely near the shore.

Geographical distribution:— Northern and middle Europe, down into the Alps; towards the north to northern Scandinavia, and in Finland. It occurs also in North America.

43. *D. unguilatus* L.

1758. Linn. Syst. Nat. Ed. X, 1, 598, 76 (*Musca*). — 1805. Fabr. Syst. Antl. 266, 3. — 1823. Fall. Dipt. Suec. Dol. 9, 2. — 1824. Meig. Syst. Besch. IV, 80, 13. — 1831. Stann. Isis 1831, 130, 25. — 1842. Stæg. Krøyer's Tidsskr. IV, 33, 25. — 1843. Zett. Dipt. Scand. II, 501, 2, et 1849. VIII, 3075, 2, et 1855. XII, 4622, 2. — 1903. Kat. paläarkt. Dipt. II, 305. — *Nemotelus aeneus* De Geer, 1776. Mem. VI, 194, 4, Tab. XI, Fig. 14—22, Tab. XII, Fig. 1—3. — *Dolichopus aeneus* 1862. Schin. F. A. I, 222. — *Dolichopus chalybeus* Meig. (nec Wied.) 1824. Syst. Besch. IV, 79, 10.

Male. Vertex and frons green. Epistoma narrow, greyish white, or light yellowish grey. Palpi black. Occiput green, greyish pruinose; postocular bristles black. Antennæ black, not as long as the head, third joint not longer than broad, triangular. Thorax green or æneous, rarely bluish, often with a more golden or coppery middle stripe, sometimes divided into two; it is slightly pruinose, shining; scutellum finely yellow pubescent; postscutellum greenish, grey pruinose. Pleura green or æneous, grey pruinose; propleura with fine, pale or brown hairs and a black prothoracic bristle. Abdomen green or more or less golden or coppery, with very narrow, dark hind margins to the segments, or these wanting; it is very slightly greyish white pruinose at the sides, and is clothed with short, black hairs; it has hind-marginal bristles, somewhat long on the first and also on the fifth segment. Venter green, greyish pruinose; it has yellowish hairs, which on the third segment are somewhat long and directed forwards and outwards. Hypopygium æneous black, greyish pruinose; eighth segment with long, black hairs; the posterior ventral lobes not or almost not projecting beyond the end of the hypopygium; they bear a little style at the apex; the inner lamellæ curved downwards, not long, the median high and dilated at the base, the lateral have a small dilatation at the apex; the outer lamellæ are somewhat narrowed towards the base, broad at the end, with the dorsal margin straight; they are whitish or pale yellowish, with a broad, black margin at the end and a narrow margin at the ventral edge; there are only a pair of teeth with black, curved hairs at the dorsal corner, and dorsally to them a pair of curved hairs; the rest of the apical margin has somewhat curved hairs, the ventral margin shorter, straight hairs; on the inside

there are black, inwards directed hairs in about the apical half. Legs yellow, front coxæ grey in about the apical half, posterior coxæ grey, a little yellowish at the apex; front tarsi somewhat darkened towards the apex, middle tarsi with the apex of metatarsus and the four following joints black; hind tibiæ black at the apex, and hind tarsi black. The legs have short, black hairs; front femora with long hairs on the postero-ventral side in the apical part, shorter towards the base; the posterior femora have a fringe of long, black hairs below in about the apical half; posterior femora with three to five preapical bristles; tibiæ rather bristly, front tibiæ with bristles above and on the postero-dorsal side, and with three to five bristles on the postero-ventral side; middle tibiæ with rows of bristles on the antero-ventral, antero-dorsal, dorsal and postero-dorsal side, and with one or two ventral bristles below the middle; hind tibiæ with rows of bristles above, and with a row on the antero-ventral side, besides with some small ventral bristles; middle metatarsi with one dorsal bristle, hind metatarsi with about three dorsal bristles, two anterior, but only small ventral bristles. Wings slightly tinged; veins black, costa with a small swelling; discal vein with a quite obtuse bend; axillary lobe not large, anal vein going forwards. Squamulæ yellow, with a fringe of black, somewhat curled hairs. Halteres pale yellow.

Female. Epistoma broader than in the male, but not specially broad, white or greyish white. Antennæ of the same or about the same length as in the male. Femora without fringes. Wings without costal swelling. The hairs in the squamular fringe not curled.

Length 4.8—7 mm.

D. unguilatus is by far the most common species of the genus in Denmark; it has been taken in every part of the country, and it occurs both at water and on humid places, and also sometimes on relatively dry localities, and both near the coast and inland; it is generally present in great numbers. My dates are $\frac{6}{6}$ to the first part of August.

Geographical distribution:— Europe down into Italy; towards the north to northern Scandinavia, and in Finland. It seems to be a very common species everywhere.

Remarks: As is well known Loew has shown (Zeitschr. f. gesamt. Naturwissensch. XLVIII, 1876, 9), that *Musca unguilata* Linné, Syst. Nat. Ed. X, is identical with *Nemotelus aeneus* De Geer, while *Musca unguilata* Linné, Fn. Suec. Ed. II, 1761, 457, 1858 is quite another Dolichopodid; it is therefore incorrect when Fn. Suec. Ed. II, is quoted under *D. unguilatus* in Kat. paläarkt. Dipt.

44. *D. longitarsis* Stann.

1831. Stann. Isis 1831, 124, 19. — 1862. Schin. F. A. I, 223. — 1903. Kat. paläarkt. Dipt. II, 300. — *Dolichopus cinctus* Stæg. 1842. Krøyer's Tidsskr. IV, 24, 14. — *Dolichopus equestris* Hal. 1831. Zool. Journ. V, 359, 4. — 1862. Schin. F. A. I, 221. — *Dolichopus Staegeri* Zett. 1843. Dipt. Scand. II, 508, 7, et 1852. XI, 4277, 7, et 1859. XIII, 5041, 7.

Male. Vertex and frons green. Epistoma narrow, white, distinctly pubescent. Palpi black. Occiput green, greyish pruinose; postocular bristles black. Antennæ not as long as the head, black, the third joint not longer than broad, triangular. Thorax green, sometimes slightly æneous, a little pruinose, shining; scutellum finely yellow pubescent; postscutellum green, grey pruinose. Pleura green, grey pruinose; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen green, with more or less pronounced golden or coppery reflexes, and with broad, blackish incisures; it is slightly whitish pruinose downwards and is clothed with short, black hairs; there are somewhat long hindmarginal bristles, which are not longer on the first segment. Venter grey pruinose, slightly pale-haired. Hypopygium æneous black, greyish pruinose; eighth segment with black hairs; there are slightly projecting, brown posterior ventral lobes, with the upper apical corner forming a little point and bearing a small, curved bristle or spine; the inner lamellæ curved downwards, the median a little dilated at the base, thin towards the apex, the lateral dilated, with a dilatation at the apex, and a small spine at the upper margin; the outer lamellæ somewhat short and roundish, whitish with a not quite narrow, blackish margin along the ventral, apical and outer part of the dorsal edge; at the end there are a few teeth with curved, black hairs, and dorsally to them a pair of curved hairs; the ventral margin has shorter, dense hairs, and on the inside inwards curved hairs. Legs yellow, front coxæ with the basal half, or more, grey, whitish pruinose anteriorly; posterior coxæ grey, yellow at the very apex; the anterior tarsi are somewhat long and thin, longer than the tibiæ, the apex of metatarsus and the four following joints black, the front tarsi have the last joint a little compressed and slightly dilated; the hind femora are a little darkened above at the apex, hind tibiæ slightly compressed, somewhat thickened, most towards the apex; the apical third is black; hind tarsi black, metatarsus a little thickened, most towards the base, the other joints thin. The legs have short, black hairs, hind femora a little longer hairs above towards the base, and short, pale hairs below, and here besides a fringe of long, black cilia in the apical half; posterior femora with one preapical bristle; front tibiæ with bristles above and

one on the postero-ventral side; middle tibiæ with about four antero-dorsal bristles, two postero-dorsal, and one ventral below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and besides very small ventral bristles or hairs; hind metatarsi with about three dorsal and two anterior bristles, and with small bristles below. Wings narrowed towards the base, with the axillary lobe very small; they are a little brownish tinged, especially towards the anterior margin; veins black or blackish, costa with a small swelling; discal vein with an obtuse bend; anal vein going much forwards. Halteres yellow, with a black fringe. Squamulæ yellow or pale yellow.

Female. Epistoma broad, greyish white, pubescent as in the male. Antennæ shorter than in the male, third joint shorter than broad. Front tarsi quite simple, hind tibiæ not thickened, and hind femora without fringe. Wings almost not narrowed towards the base, a little more tinged than in the male, without costal swelling.

Length 4—4.2 mm.

D. longitarsis is somewhat common in Denmark; Lersøen, Ordrup Mose, Lyngby Mose, Fure Sø, Boserup at Roskilde, Faxe Ladeplads; on Lolland at Maribo; on Funen at Odense; in Jutland at Horsens, Frijsenborg, Holstebro, Gjerlev near Randers Fjord, Hald near Viborg and Ravnkilde and Tinbæk Mølle at Lindenberg Aa; and finally on Bornholm at Allinge. My dates are $20\frac{1}{6}$ — $1\frac{1}{6}$. It occurs in low herbage and on bushes on humid places and at the border of water.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden, and in Finland.

45. *D. rupestris* Hal.

1833. Hal. Entom. Mag. I, 164. — 1862. Schin. F. A. I, 222. — 1903. Kat. paläarkt. Dipt. II, 303. — *Dolichopus festinans* Zett. 1838. Ins. Lap. 708, 5, et 1843. Dipt. Scand. II, 507, 6, et 1852. XI, 4276, 6. — *Dolichopus fuscimanus* Zett. 1843. Dipt. Scand. II, 510, 8, et 1849. VIII, 3076, 8.

Male. Vertex and frons of greenish ground colour, but strongly brownish dusted, so that the green colour is almost or quite hidden. Epistoma somewhat broad, brown. Palpi blackish or brown. Occiput æneous, grey pruinose; postocular bristles black. Antennæ black, a little elongated, about of the length of the head, third joint longer than broad with the lower margin convex, the upper straight, and thus the point dorsal, but much truncated. Thorax æneous, sometimes greenish æneous, brownish pruinose, slightly shining; scutellum finely yellow pubescent; postscutellum æneous, grey pruinose. Pleura

greenish or æneous, grey pruinose; propleura with a few pale hairs and a black prothoracic bristle. Abdomen green, æneous or coppery, slightly whitish grey pruinose downwards, without, or with very indistinct, dark hindmargins to the segments; it is clothed with short, black hairs, and has shortish hindmarginal bristles, very slightly longer on the first segment. Venter greyish, slightly pale-haired. Hypopygium somewhat large, black or blackish, greyish pruinose; eighth segment with black hairs; there are slightly projecting posterior ventral lobes, with a styliform point at the upper apical corner; the inner lamellæ curved downwards, the median thin, but high at the base, the lateral dilated, with a dilatation at the apex; the outer lamellæ small and narrow; they are yellowish or brownish, with a blackish margin all round, which is broad at the end; the end has some teeth with black, curved hairs, and dorsally to them a pair of curved hairs; the ventral margin is serrated, with somewhat long hairs, and on the inner side inwards curved hairs. Legs yellowish, coxæ grey, generally a little reddish at the apex; the femora somewhat darkened, especially the front femora are more or less brownish on the basal part, and the hind femora at the apex; anterior tarsi with the apical part of metatarsus and the four following joints black; hind tibiæ black at the apex; they have a small swelling above the middle on the posterior side, the swelling is bare and has a slight, longitudinal groove; the hind tarsi are black. The legs have short, black hairs, hind femora a little longer hairs above towards the base, and are inconspicuously pale-haired below; the posterior femora with one pre-apical bristle; front tibiæ with few bristles above, and generally one on the postero-ventral side; middle tibiæ with about five to six antero-dorsal bristles (one or two of them more dorsal), two postero-dorsal, and one ventral bristle below the middle; hind tibiæ with two dorsal rows of bristles, one ventral bristle towards the apex, and a ventral row of small bristles; hind metatarsi with three or four dorsal bristles, some anterior, and with small ventral bristles. Wings very slightly tinged; veins black or brownish black, costa with a small swelling; discal vein with a very small, quite obtuse bend; axillary lobe well developed, anal vein going somewhat downwards. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Vertex and frons still more dusted than in the male, quite brownish. Epistoma broad, grey. Antennæ shorter than in the male, third joint about as long as broad, more pointed. Hind tibiæ simple. Wings more brownish than in the male, costa without swelling.

Length 3,6 to fully 4 mm.

D. rupestris is very rare in Denmark, only five specimens have been taken, all in 1882 in Jutland at Hald near Viborg and at Holstebro (H. J. Hansen); they were taken in August.

Geographical distribution:— Northern and middle Europe down into Germany and Bohemia; towards the north to northern Scandinavia, and in Finland.

6. **Tachytrechus** Stann.

Species of medium or larger size, and of somewhat dull metallic, generally æneous or olive colour. Head a little broader than thorax; it is short, higher than broad, highest in the males, and sometimes as broad as high in the female; its greatest breadth lies above the middle, and it is somewhat narrowed downwards. Occiput slightly arched. Vertex considerably excavated, the ocellar tubercle prominent. Frons broad, decreasing in breadth towards the antennæ. There are ocellar, outer vertical and postvertical bristles, and a pair of small bristles on the posterior side of the ocellar tubercle. Eyes large, oval, narrowed below; they are metallic green in the living specimens, reddish at the upper angle and behind, and they are densely short-hairy; the facets are in the male somewhat enlarged towards the epistoma. The eyes are well separated, most in the female. The postocular bristles strong, forming a single row; the bristles on occiput along the oral aperture form a continuous row, being present also above the aperture. The antennæ are inserted rather high, near to each other; they are five-jointed, short or slightly elongated, and generally a little longer in the male than in the female; the joints are shaped about as in *Dolichopus*, and haired in the same way; the third joint is somewhat short, rounded or truncately pointed at the apex; the two last joints form a long, dorsal arista, with the first joint somewhat long; the arista is bare, or apparently so. — In a foreign species (the American species *T. moechus*) the second and third antennal joints are very small, the arista long, with a dilatation at the apex. — Epistoma in the male somewhat narrowed above, but widening from the middle downwards; in the female it is broader, as it is only slightly narrowed upwards, and also below it is a little broader. Clypeus not small, it is a little arched and is marked off from the epistoma at each side by a little elevation with a small notch; its lower margin is rounded; it reaches to or almost to the lower margin of the eyes. The proboscis is slightly protruding; it and the oral aperture are of the same, or approximately the same size in the two sexes. The proboscis (*ammobates*) is thick; labrum about

as in *Dolichopus*; it is strong, and has, as in this genus, a longer, more slightly chitinated median tooth, curved downwards at the end, and a shorter, more strongly chitinated lateral tooth at each side; the median tooth is furcated or two-pointed at the end, and labrum strongly semitubular, so that the lateral teeth lie considerably below the median. Hypopharynx strong, elongated triangular, curved a little down at the apex; it is of the length of labrum. The maxillary palpi are ovate, squamiform, with bristles at the end. The basal part of labium and the labella are of approximately the same length, the latter are broad, roundish and with bristles at the margin. Thorax rectangular, somewhat high and a little arched above; pro- and metathorax small, the former with a transverse row of small bristles above; no chitinated metasternum. The acrostichal bristles biserial and distinct; there are six long dorsocentral bristles, longest behind; further two humeral bristles of the same, or about the same size, two post-humeral, the inner weak, two notopleural, a præsutural far forwards, three supraalar and one postalar bristle. The front part of the disc has small hairs. The propleura have hairs and a prothoracic bristle. Scutellum is bare, it has four bristles, the lateral small. Abdomen somewhat compressed, slightly narrowed towards the end; it is otherwise in both sexes constructed about as in *Dolichopus*; in the male the second sternite is less or not emarginated in front; the fourth and fifth sternites are incised posteriorly, but distinctly present. The hypopygium is exposed, somewhat pedunculated, laid up under the venter; it is principally constructed as in *Dolichopus*; sometimes the posterior ventral lobes are strongly projecting and pedunculated (and hence they have been considered as a pair of inner lamellæ, and the hypopygium has been described as possessing more lamellæ than commonly). The outer lamellæ are smaller or larger, hairy at the margin, but not split into teeth. In the female the ovipositor ends with spines above and a single plate below. The abdominal segments have hindmarginal bristles. The second, third and fourth segments have distinct dot-like impressions at the side margin. Legs somewhat long, coxæ a little elongated; in the male the front tarsi are generally more or less dilated and haired; the hind metatarsus a little shorter than the second joint. The legs have short hairs, the coxæ, especially the front coxæ, have more or less bristly hairs at the apex; the middle coxæ have a strong bristle in the middle on the front side near the outer edge; the hind coxæ have a bristle in the middle on the outer side; there are more or fewer preapical bristles on the posterior femora, and rows of bristles on the tibiæ; the latter have also apical or preapical bristles, smallest on the front tibiæ. Hind

metatarsi always without bristles. There are two claws, two pulvilli, and a somewhat comb-shaped empodium with long bristles below. In the males the pulvilli of the front tarsi are (generally) more or less enlarged. Wings of common shape, somewhat small; the mediastinal vein terminating in the subcostal vein; the discal vein with a small bend, its apical part converging towards the cubital vein, the first posterior cell narrowly open; the posterior cross-vein lies behind the middle; the anal vein reaches near to the margin. Axillary lobe of medium size. The discal bend lies on a distinct convexity. Squamulae with a somewhat large angular lobe bearing a fringe of long hairs at the margin, between the long hairs, at the base, are short, dense hairs; the inner part of the squamulae has short hairs.

The genus is nearly allied to *Dolichopus* and *Hercostomus* (as well as to *Poecilobothrus*); from the former it is distinguished by the hind metatarsi having no bristles, and from both by the epistoma with clypeus reaching far down, to or almost to the lower margin of the eyes (Fig. 2), and also by the shape of the epistoma, which is widened downwards, especially in the males.

Of the developmental stages, which, as far as I am aware, have hitherto not been known, I have examined the pupa of *T. insignis*. It is brownish yellow; on the front side of the head there are a pair of approximated, short, triangular spines, and below them another pair of very small spines or knobs; further down there is on each side a narrow keel; the antennal sheaths are not discernible as such, but the mentioned spines answer no doubt to the apices of the antennal joints, and the keel to the arista; to each side of the upper spines is a short, somewhat strong hair. On the disc of thorax are three very short hairs in an oblique line on each side; at the front end of thorax are two closely approximated, long (2 mm), attenuated spiracular tubes, which are brownish yellow. On the second to eighth abdominal segment there is above, at the hind margin, a transverse row of very short and small spines, and the abdomen terminates with a pair of small knobs below. The sheaths of the legs reach to the end of abdomen.

The larva forms an oval cocoon of sand, of 8 to 9 mm's length, and rather solid. It is formed of grains of sand, and as the wall is not thin, 1 mm or more in thickness, this may be the reason, why the spiracular tubes of the pupa are so long. Dr. Wesenberg Lund, to whom I am indebted for the pupa and cocoons, found these at the Danish hydrobiological station at Fure Sø on ¹¹/s and bred one of them on ¹³/s. The cocoons were found in the sand at the border of the lake, and consequently the larva must live there,

and this no doubt holds good also for the other species, the larvæ living in the sand at the borders of lakes and at the shore.

The species of *Tachytrechus* occur exclusively at the borders of lakes, and at the shore, and they are seen running on the sand quite near to the water, and flying low, often in great numbers. I have seen them fly upon other flies as in attack, but I have never seen any specimen with prey.

Of the genus 15 species are known from the palæarctic region; 3 have hitherto been found in Denmark. No doubt two species more, *consobrinus* Walk. and *ripicola* Loew, will be found in our country.

Table of Species.

1. Front metatarsi in the male about as long as the four following joints; middle femora in both sexes short-haired below, or with long hairs on the basal part; all tibiæ with the apex black..... 2.
- Front metatarsi in the male twice as long as the four following joints; middle femora in both sexes with longish hairs below in the whole length; anterior tibiæ quite yellow..... 3. *insignis*.
2. Middle femora yellow for the greatest part, with long hairs below on the basal half; hind tarsi pale at the base; posterior cross-vein curved, discal bend not nearer to it than to the apex; in the male the outer lamellæ of the hypopygium much longer than broad..... 1. *ammobates*.
- Middle femora with only the apex yellow, without long hairs below; hind tarsi quite black; posterior cross-vein straight, discal bend nearer to it than to the apex; in the male the outer lamellæ short, not longer than broad 2. *notatus*.

1. *T. ammobates* Walk.

1851. Walk. Insect. Brit. I, 173, 40. (*Dolichopus*). — 1862. Schin. F. A. I, 204. — 1903. Kat. paläarkt. Dipt. II, 306. — *Dolichopus plumipes* Fall. (nec Scop.) 1823. Dipt. Suec. Dol. 14, 13. — 1843. Zett. Dipt. Scand. II, 619, 107, et 1859. XIII, 5070, 107. — *Ammobates plumipes* 1831. Stann. Isis 1831, 268, 1. — 1842. Stæg. Krøyer's Tidsskr. IV, 9, 1.

Male. Vertex and frons brown pruinose. Epistoma white, somewhat silvery. Palpi dark, light grey pruinose. Occiput æneous, a little pruinose; postocular bristles yellow below, black above. Antennæ a little elongated, about as long as the head, third joint longer than broad, very convex below, more straight above, the point truncate or rounded, lying dorsally but very slightly marked, the whole apex being nearly rounded; the antennæ are black, the basal joint yellow below or quite yellow. Thorax olive, somewhat æneous or a little

coppery at the sides, with two not very distinct stripes in front; about the humeri it is greyish; it is slightly brownish pruinose, not much shining, most towards the end. Scutellum somewhat coppery, with a brown stripe in the middle. Pleura æneous, grey pruinose;

Fig. 46. Antenna of *T. ammobates* ♂, from the inside. $\times 55$.

propleura with dark hairs and a black prothoracic bristle. Abdomen æneous or coppery, sometimes a little greenish, greyish white pruinose, especially on the front part of the segments; with the light from behind it is pruinose with an æneous middle stripe and a spot in the middle at the side of each segment; it is clothed with short, black hairs, and has somewhat long hindmarginal bristles, longest on the first segment. Venter greyish, slightly hairy. Hypopygium black, greyish pruinose, longitudinally striated on the sides behind; the eighth segment has black hairs; the posterior ventral lobes are of a curious shape, they have a thin, short stalk, the end is somewhat spoon-shaped, with a convex upper margin and a slightly concave lower margin; at the end there are two small points, each with a hair; on the right side there is also a median ventral lobe with some points, and this part of the hypopygium is thus somewhat unsymmetrical; the inner lamellæ somewhat long, the median have a double curve and are a little dilated at the end, with hairs at the lower margin; the lateral are a little dilated in the middle and towards the end. The outer lamellæ are long, triangular, with the apex rounded; they are black or brownish, with long hairs at the ventral and apical margin, shorter at the dorsal margin. The sheath of the penis is quite short. Legs somewhat long and thin, middle femora with a slight prominence below about in the middle; front metatarsus as long as the four following joints, hind metatarsus about one third shorter than the second joint; coxæ grey, femora yellow, front femora with a little more than the basal half, middle femora with the base grey, hind femora grey with only the apical part yellow; all tibiæ blackish at the apex, the hind tibiæ most distinctly; front tarsi with the four last joints compressed and a little dilated, feathery haired at the upper margin; the apex of

metatarsus and the four following joints black; the fifth joint has the hairs at the upper margin mainly white, and the puvilli are large, white; the posterior tarsi black with the basal part of metatarsus yellow. The legs have short, black hairs, the front coxæ somewhat longish hairs anteriorly: below the femora the hairs also a little longer, and the middle femora with long, bristly hairs below at the base: middle femora with one, sometimes two preapical bristles, hind femora with a number (five to nine) in two rows. Front tibiæ with bristles above and on the postero-ventral side; middle tibiæ with two dorsal rows, and sometimes a ventral bristle; hind tibiæ with two dorsal rows of bristles and a ventral row. Wings slightly greyish tinged; veins black; costa thickened on streak between the base and the apex of the subcostal vein; discal vein with a small bend, the apical

Fig. 47. Wing of *T. ammobates* ♂.

part converging towards the cubital vein, the first posterior cell narrowly open; the bend lies nearer to the apex of the vein than to the posterior cross-vein, or about in the middle; the posterior cross-vein curved with the convex side outwards; it is placed after the middle, the apical part of the postical vein being shorter than the cross-vein; there is a more or less distinct blackish or brownish spot at the bend of the discal vein, and a seam at the posterior cross-vein. Squamulae whitish yellow, with a black fringe. Halteres whitish yellow, the base of the peduncle darkened.

Female. Epistoma a little broader than in the male, as it is less narrowed above, grey or pale greyish yellow. Antennæ somewhat shorter than in the male. Front tarsi simple (but however a little compressed); middle femora without prominence below. The legs more bristly, front tibiæ with two ventral rows.

Length 5.3—5.8 mm.

T. ammobates is common in Denmark on suitable localities; Fure Sø, Sorø Sø, Long Sø at Sorø; in Jutland at Nymindégab, Madsø near Skørping, Frederikshavn, Hulsig north of Frederikshavn, and on Læsø. My dates are $\frac{1}{6}$ — $\frac{25}{8}$. It occurs at the sandy bor-

ders of lakes, running, flying and chasing near the water, generally in great numbers; it occurs also at sea-coasts in the same way.

Geographical distribution:— Northern and middle Europe, down into Germany; towards the north to northern Sweden, and in Finland.

2. *T. notatus* Stann.

1831. Stann, Isis 1831, 269, 2. (*Ammobates*). — 1842. Stæg. Krøyer's Tidsskr. IV, 10, 2. (*Ammobates*). — 1843. Zett. Dipt. Scand. II, 621, 108, et 1849. VIII, 3100, 108, et 1852. XI, 4299, 108 (*Dolichopus*). — 1862. Schin. F. A. I, 204. — 1903. Kat. paläarkt. Dipt. II, 307. — *Dolichopus litoreus* Hal. 1833. Entom. Mag. I, 164.

Male. Vertex and frons light brown or æneous. Epistoma silver-white, sometimes slightly yellowish below the antennæ. Palpi blackish. Occiput brown or æneous; postocular bristles whitish below, black above. Antennæ short, shorter than the head, third joint about as long as broad, rounded at the apex; they are black, the two basal joints yellow, more or less darkened above. Thorax somewhat olive or dull æneous, distinctly bright brownish pruinose, almost not shining, or only behind; there are two indistinct middle stripes in front; scutellum æneous, palest in the middle; sometimes thorax is lighter, almost yellowish pruinose, and only anteriorly, while there are some small, light spots towards behind on each side, between the dorsocentral bristles. Pleura æneous, greyish pruinose; propleura with black hairs and a black prothoracic bristle. Abdomen greenish or æneous, with coppery reflexes on the hind part of the segments, and with distinct, dark hindmargins to the segments; it is greyish white pruinose on the front part of the segments; with the light from behind it is quite pruinose with a dark middle line and hind margins; it is clothed with short, black hairs, and has longish hindmarginal bristles, a little longer on the first segment. Hypopygium black, greyish pruinose, very slightly longitudinally striated posteriorly, and with the lower margin here shining; the eighth segment with black hairs; there are slightly projecting posterior ventral lobes ending with a thin style, bearing a hair at the apex and one more forwards; there are no projecting middle lobes, and this part of the hypopygium is more symmetrical than in *ammobates*; penis and its sheath are long, reaching to the end of the hypopygium, and penis has a small hook behind the apex on the dorsal side; the inner lamellæ are lying close together, blackish, hairy at the apex; the outer lamellæ are short, somewhat triangular, equilateral; they are blackish or dark brown, with long hairs at the ventral margin, shorter at the rounded apex. Legs less long and slender than in *ammobates*, the middle femora

have a slight knob below near the base; front metatarsi about as long as the four following joints; hind tibiæ suddenly thickened at the end and here densely haired on the postero-dorsal side, hind metatarsi slightly thickened towards the base, almost as long as the second joint; it has a small, recurved spine at the extreme base on the postero-ventral side; coxæ and femora grey, the latter shining somewhat greenish olive, with the apex yellow, broadly on the anterior femora, but only slightly on the hind femora; anterior tibiæ yellow with about the apical third blackish grey, hind tibiæ dark yellow with base and apex black; anterior tarsi black with the base of metatarsus yellow, hind tarsi black; the front tarsi have the four last joints compressed and slightly dilated, a little hairy at the upper margin, the hairs on the last joint white. The legs have short, black hairs, the front coxæ some bristly hairs above anteriorly; the femora have slightly longer hairs below; posterior femora with about four to five preapical bristles; front tibiæ with bristles above and on the postero-ventral side, posterior tibiæ with two dorsal and one ventral row of bristles. Wings hyaline or almost so; veins black; costa strongly thick-

Fig. 48. Wing of *T. notatus* ♂.

ened on a streak between the base and the apex of the subcostal vein; discal vein with a slight bend lying much nearer the posterior cross-vein than the apex of the discal vein; the latter converging towards the cubital vein, the first posterior cell narrowly open; posterior cross-vein straight or almost straight; there is a slight blackish spot on the bend of the discal vein and a similar seam on the posterior cross-vein. Squamulæ pale yellow, with a black fringe. Halteres yellow, the peduncle darker.

Female. Antennæ slightly shorter than in the male. Epistoma a little broader upwards, pale greyish or white. Front tarsi compressed but not dilated, almost quite black; middle femora without any knob; hind tibiæ not thickened at the apex and hind metatarsus without spine at the base. Wings with the costal thickening distinctly visible, but thinner than in the male.

Length 4.6—5 mm.

This species is somewhat similar to the foregoing, but distinguished by many characters, as the colour of the second antennal joint, the colour of abdomen with its dark margins to the segments, the structure and colour of the legs and the bristles on them, and by the venation of the wing; in the male the hypopygium is quite different.

T. notatus is much less common in Denmark than *ammobates*; Fure Sø; on Funen; in Jutland at Hulsig north of Frederikshavn, and on Bornholm. My dates are $^{11}/_7$ — $^{25}/_8$; Stæger records it from Bornholm in September. It occurs on similar localities as *ammobates*, but in smaller number, thus I have taken it at Fure Sø together with *ammobates*, but much less abundant. I found it not rarely sitting on stones.

Geographical distribution: — Europe down into Spain and Italy, and further in Asia Minor and North Africa; towards the north to middle Sweden.

3. *T. insignis* Stann.

1831. Stann. Isis 1831, 270, (*Ammobates*). — 1842. Stæg. Krøyer's Tidsskr. IV, 12 (*Ammobates*). — 1862. Schin. F. A. I, 204. — 1903. Kat. paläarkt. Dipt. II, 307.

Male. Vertex and frons brown. Epistoma yellow or yellowish brown, scarcely reaching quite to the lower margin of the eyes. Palpi dark. Occiput greenish; postocular bristles yellow below, black above. Antennæ about as long as the head, third joint short, not or slightly longer than broad, rounded or very truncately pointed at the apex; the basal joint is yellow, sometimes a little darkened above, the others black. Thorax somewhat æneous, but strongly brown or brownish grey pruinose, not or almost not shining; scutellum æneous, greyish in the middle. Pleura æneous, greyish or brownish pruinose; propleura with black hairs and a black prothoracic bristle. Abdomen æneous or greenish, sometimes quite green, with more or less coppery reflexes; it has indistinct, dark, generally somewhat coppery hind margins to the segments and is greyish white pruinose; with the light from behind it is quite pruinose with a dark middle line, and a faint spot at each side on the segments; it is clothed with short, black hairs, and has longish hindmarginal bristles, only slightly longer on the first segment. The hypopygium resembles that of *ammobates*, but is smaller; the posterior ventral lobes are of quite the same shape, and likewise with two hairs at the end; the outer lamellæ are shorter than in *ammobates*, less triangular, and rounded at the end, they have

long hairs at the ventral margin. Legs long and slender, hind metatarsus a little shorter than the second joint; coxæ grey or brownish; anterior femora yellow, front femora with about the basal half, middle femora with the base black; hind femora black with the apical part yellow; the black parts are grey or brownish pruinose, shining somewhat greenish olive; tibiæ yellow, hind tibiæ a little darkened at the apex; front tarsi long, metatarsus thin, twice as long as the four following joints, these latter are compressed, a little dilated and with long, feathery hairs at the dorsal margin (they give therefore the impression of being much dilated); metatarsus yellow with the very apex black, the other joints and the hairs black, the hairs on the fifth joint yellowish towards the apex; posterior tarsi dark yellow with the apex of the joints black, the last two joints generally quite dark. The legs have short, black hairs, the front coxæ somewhat longer hairs, which are bristly above; femora with somewhat long hairs below which are fine on the front femora; the middle femora have one preapical bristle, the hind femora about four; front tibiæ with bristles above and a pair of small bristles below; posterior tibiæ with two dorsal rows of bristles and one ventral row. Wings about hyaline; veins black; costa only slightly thickened between the base and the apex of the subcostal vein; discal vein with a small bend about in the middle between the apex and the posterior cross-vein or nearer the latter, the apical part of the vein converging towards the cubital vein; the posterior cross-vein slightly curved or straight, with a very indistinct seam. Squamulæ yellowish white, with a black fringe. Halteres pale yellow, slightly darkened at the base of the peduncle.

Female. Antennæ about as in the male. Epistoma a little broader upwards, grey. Front tarsi simple, a little compressed, metatarsus about as long as the four following joints.

Length about 5 mm.

The pupa has a length of 5,5 mm.

This species is in the male at once recognised by the shape of the front tarsi; in the female it is very similar to *ammobates*, but it is distinguished by the middle femora having longish hairs below in the whole length, and not longer towards the base, by the quite yellow anterior tibiæ and by the middle tibiæ having only one ventral row of bristles, while in *ammobates* there are two.

T. insignis is rare in Denmark, I have only seen four specimens, one from earlier time, without locality, one from Fure Sø (Wesenberg Lund), one from Egholm at Skelskør (the author), and finally one from Bornholm, kindly sent to me from Mr. Th. Becker; (probably Becker took more specimens). My only date of capture is ²⁸/5. Dr.

Wesenberg Lund found the cocoons in the sand at the border of Fure Sø on ¹¹/₈ and bred one of them in the Danish hydrobiological Station; the imago came on ¹²/₈; he found the cocoons in some number, but bred only one specimen, the other cocoons being already empty; the number of the cocoons would indicate that the species is not specially rare, but it is not sure that the other cocoons belonged to this species, as the other two species were present on the same place, but these have not been bred. The somewhat late time of the year on which the species was bred seems to indicate a second brood, and the presence of such is also suggested by Verral (Entom. Month. Mag. XV, 1904, 243).

Geographical distribution: — Europe and down into North Africa; it perhaps does not go farther north than Denmark, as *insignis* by Zetterstedt is probably *ripicola* (see the remarks).

Remarks: In Kat. paläarkt. Dipt. is *plumipes* Macq. (Soc. Sc. Lille, Dolich. 1827, 68, 20, and Suit. à Buff. 1835, II, 662, 36) placed as synonym to *consobrinus* Walk., while *insignis* Stæg. is correctly placed under this species; but as Stæger l. c. has stated correctly, Macquart has confused more than one species under his *plumipes*, and at all events *insignis* was included in it, for he had sent a male of his *plumipes* to Stæger, and it is just the one male, which Stæger describes (*insignis* had at that time not yet been found in Denmark), and that it is *insignis* is proved by its yellow epistoma. Maquart also in 1827 terms the epistoma in the male “blanc argenté”, but in 1835 in Suit. à Buff. he calls it “jaune”.

I have not included Zetterstedt's *insignis* in the synonymy, as I have two specimens from Bohuslän, collected by A. Malm and determined as *insignis*, but they belong to *ripicola* Loew; it is therefore very probable that Zetterstedt's species is also *ripicola*, especially as his specimens were likewise taken in Bohuslän.

7. **Poecilobothrus** Mik.

Species of somewhat large size and of bright metallic colour. The genus is in most respects similar to *Dolichopus* and especially to *Hercostomus*, with which latter it is nearly related, and from which it was separated in 1878 by Mik (Dipt. Unters. Jahresb. d. k. k. akad. Gymnas. Wien, 1878, 3.). Head as in *Dolichopus*, epistoma somewhat narrow in the male, broad in the female; the clypeus not reaching to the lower margin of the eyes. Eyes hairy, metallic green in the living specimens; the facets very slightly enlarged towards the epistoma in the male. The bristles surrounding the oral aperture

behind are interrupted in the middle, as there are no bristles above the aperture. Antennæ as in *Dolichopus*, but the arista very distinctly haired, almost feathered; the basal antennal joint hairy above. The mouth parts are somewhat larger in the female than in the male. The thorax has always a purplish black spot at the upper corner of the præsutural depression. Acrostichal bristles biserial and distinct; the other thoracic bristles long; there are six dorsocentral bristles, one strong humeral bristle and a couple of weaker, two posthumeral, one præsutural, three supraalar, two notopleural and one postalar bristle; besides there are small hairs on the front part of the disc, of which some of the hindmost may be rather long. Scutellum only with a few hairs above and at the margin, and with two strong marginal bristles and on each side a small hair. Propleura with fine hairs and a prothoracic bristle. Abdomen as in *Dolichopus*, the fifth dorsal segment somewhat long, the sixth small, partly or quite hidden, the seventh segment likewise more or less hidden. The first sternite is only an exceedingly narrow chitinisation, sternites two to four are normal, the fifth for the greatest part membranous, only chitinised at the sides, the sixth is a somewhat V-shaped chitinisation, the seventh segment has a narrow sternite. The hypopygium is somewhat high, much compressed in the upper part; it is free, but not distinctly pedunculated as the sixth and seventh segments are small; the hypopygium is somewhat short and has broad, triangular lobes on the ventral side in the middle, and at the end two pairs of inner lamellæ; the outer lamellæ somewhat large, with long teeth at the end. In the female the abdomen shows five normal segments and three hidden, the last terminating with some small spines and below them two small styles. The second, third and fourth abdominal segments have dot-like impressions at the side margins, and the segments have hind-marginal bristles. Legs as in *Dolichopus*, posterior femora with one preapical bristle, hind metatarsi of the length of the second joint, without bristles above; only one species (*regalis*, non Danish) is aberrant in this respect, and has bristles. Wings somewhat variegated in the male with blackish and white spots; they have the radial, cubital and discal vein somewhat near to each other; the discal vein has only a very small bend, but is converging towards the cubital vein, and the first posterior cell thus narrowly open; anal vein somewhat long, but not reaching the margin. Axillary lobe very small or almost wanting. The discal vein has a distinct convexity about in the middle of its last part. Alar squamula with the angular lobe well developed, bearing a fan of long hairs at the margin, the inner part of the squamula with short hairs.

This genus is, as mentioned, nearly related to *Hercostomus*, especially to the subgenus *Hercostomus*, it is mainly distinguished by the subplumose arista, and partly by the course of the wing-veins.

As far as I am aware the developmental stages of the genus are not known.

The species of *Poecilobothrus* are all somewhat large, very beautiful flies; they occur in low herbage on meadows, especially at borders of water, and also in woods on humid places.

Of the genus 9 species are known from the palæarctic region; one is found in Denmark.

1. *P. nobilitatus* L.

1767. Linn. Syst. Nat. Ed. XII, 2, 995, 98 (*Musca*). — 1805. Fabr. Syst. Antl. 268, 6 (*Dolichopus*). — 1824. Meig Syst. Besch. IV, 75, 1 (*Dolichopus*). — 1831. Stann. Isis 1831, 140, 34 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 37, 30 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 565, 55, et 1849. VIII, 3085, 55 (*Dolichopus*). — 1862. Schin. F. A. I, 206 (*Gymnopternus*). — 1903. Kat. paläarkt. Dipt. II, 308. — *Dolichopus plumicornis* Meig. 1824. Syst. Besch. IV, 83, 15.

Male. Vertex and frons green. Epistoma greyish white, slightly yellowish upwards. Palpi dark. Occiput green; postocular bristles yellowish below, black above. Antennæ short, black, third joint short triangular. Thorax bright green, sometimes æneous or bluish, with indications of stripes in the middle, only slightly shining; on the foremost part it is greyish or brownish pruinose; at the upper part of the præsutural depressions there is a velvet black, somewhat purplish spot; scutellum often bluish in the middle, short and sparingly pubescent at the margin and with a few hairs above. Pleura greenish or æneous, grey pruinose; propleura with pale hairs and a black prothoracic bristle. Abdomen green or more or less golden or coppery, slightly greyish pruinose downwards; it is clothed with short, black hairs, and has hindmarginal bristles, longest on the first segment. Venter green or bluish, greyish pruinose, with distinct, pale hairs, which are long at the base. Hypopygium somewhat short, blackish green or æneous, more or less grey pruinose; the eighth segment has black hairs, and is a little reddish in the middle at the upper margin; on the ventral side there are broad lobes in the middle, which are projecting downwards, triangular, and with some hairs; at the end of the hypopygium there are two pairs of inner lamellæ, the lateral are directed straight backwards, they are elongated triangular, attenuated to a thin point and with a hair at the upper margin; the median inner lamellæ are curved strongly downwards and somewhat hammer-like dilated at the

end; the median dorsal appendage is hook-shaped and has on each side at the base a long, likewise hook-shaped lobe, so that the appendage is tripartite; the outer lamellæ are somewhat large, about triangular, with the dorsal apical corner drawn somewhat out; they are black or brownish black, the whole ventral margin has long teeth with black, curved hairs, and besides there are hairs inserted at the margin. Legs yellow, front coxæ whitish pruinose anteriorly, posterior coxæ grey, yellow at the apex; front tarsi with the apex of metatarsus and the four following joints black, posterior tarsi and the apex of the hind tibiæ black. The legs have short, black hairs, front coxæ white-haired towards the outside; posterior femora with one preapical bristle; front tibiæ with bristles above and on the postero-ventral side; middle tibiæ with four rows, and hind tibiæ with two dorsal and one ventral row of bristles. Wings with the axillary lobe small;

Fig. 49. Wing of *P. nobilitatus* ♂.

on the apical part there is a blackish, transverse band, most black towards the anterior margin; it stretches about from the posterior cross-vein to the end of the cubital vein, and the apex of the wing outwards to the band is snow-white; the veins are black, the radial and cubital veins, and the apical part of the discal vein are somewhat undulated; the cubital vein curves downwards at the apex, and the first posterior cell is thus narrowly open; anal vein somewhat long. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad. Antennæ of about the same length as in the male. Wings with the transverse band only slightly tinged, indistinct and indistinctly bordered, and without any white spot at the apex; the radial, cubital and discal veins only slightly undulated, almost straight.

Length 4.5—6 mm.

P. nobilitatus is common in Denmark on suitable localities; Frederiksberg Have, Amager, Nordskoven at Jægerspris, Faxe Ladeplads; on Funen at Hoffmansgave; in Jutland at Ribe and on the little island

Endelave in Horsens Fjord; finally on Bornholm. My dates are $12/7$ — $6/8$. It occurs in low herbage on meadows and especially at the borders of pools and ditches, not rarely at ditches with putrid water, and it is generally present in great or very great numbers; it may also occur on humid places in woods.

Geographical distribution: — Northern and middle Europe down into France; towards the north to middle Sweden.

8. **Hercostomus** Loew.

(1857. Neue Beitr. V, 9).

Medium sized or somewhat small species of metallic colour. This genus is again in most respects agreeing with *Dolichopus*. Head as broad as or slightly broader than thorax, short, somewhat semiglobular; it is about as broad as high or a little broader, broadest in the female, and it is a little narrowed downwards. Occiput slightly arched. Vertex a little excavated, the ocellar tubercle slightly prominent. Frons broad, generally a little decreasing in breadth towards the antennæ in the male, but with parallel or almost parallel margins in the female. There are ocellar, outer vertical and postvertical bristles, and a couple of small bristles on the posterior side of the ocellar tubercle. Eyes as in *Dolichopus*, metallic green with some reddish reflexes in the living specimens; they are densely short-haired; the facets of about the same size or very slightly enlarged towards the epistoma in the male. The eyes are separated, more or less narrowly in the male, more broadly in the female. Postocular bristles forming a single row; no bristles above the oral aperture on the back of the head. Antennæ inserted near to each other, above the middle; they are constructed as in *Dolichopus*, short, not or slightly longer than the head, shortest in the female; the arista has a generally somewhat short basal joint, sometimes it is longer; the basal antennal joint has hairs above, and the second joint small bristles at the apical margin; the arista is either apparently bare, only microscopically haired, or it is distinctly short-haired. Epistoma is more or less narrow in the male, broader in the female; clypeus small, it is only indistinctly marked off by a small elevation on each side, but it is generally bent more or less inwards and thus forming a more or less distinct angle with the epistoma; it is slightly, more or less, arched, and it does not reach to the lower margin of the eyes; it has a more or less distinct, longitudinal furrow. The proboscis and the other mouth parts are larger in the female than in the male. The mouth parts (*germanus* ♀) resemble those in *Dolichopus*; the proboscis is generally short, only in a small

group of species (*nigripennis* Fall., *labiatus* Loew, *rostellatus* Loew and *proboscideus* Beck.) it is longer, approximately as long as the head is high. Labrum strong, high at the insertion, three-pointed with the middle point longest and curved somewhat downwards; it is semitubular so that the lateral points are lying lower than the median; hypopharynx elongated triangular, pointed, of the length of labrum; maxillary palpi oval, squamiform, hairy and with a bristle at the apex. Labium with the basal part a little longer than the labella; these latter are broad, with hairs along the margin. Thorax somewhat high, rectangular and somewhat arched above; prothorax small and with small bristles above; metathorax likewise a small rim, and there is no chitinated metasternum. Acrostichal bristles biserial and distinct; there are six long dorsocentral bristles, longest behind; further a humeral bristle and generally one or two small, one strong posthumeral bristle and one smaller, a præsutural, three supraalar, two notopleural and one postalar bristle; the front part of the disc has small hairs, from which the inner posthumeral bristle is generally slightly marked; propleura have slight, short hairs and a black prothoracic bristle. Scutellum either almost bare, only with a few hairs above and some at the margin, or it is somewhat densely short-haired; it has two strong marginal bristles, and in some species a small hair on each side. Abdomen a little compressed, conical; the first dorsal segment a little shorter than the following; in the male the following segments of about equal length, the sixth small, the seventh likewise small, lying to the left side of the hypopygium. The first ventral segment is only represented by an exceedingly narrow chitination in front of the second; segments two to four are normal, the fifth and sixth for the greatest part membranous, the seventh has a chitinated sternite, lying above at the hypopygium. The hypopygium is free, somewhat pedunculated, curved in under abdomen; it has ventral lobes of various shape, lying about in the middle, and sometimes also posterior ventral lobes; the inner lamellæ are of various shape, and likewise the outer, which are small or larger. In the female the abdomen has five normal segments and three hidden; the ovipositor terminates with a semicircle of small spines above, and below them two small styles. At the side margins of abdomen there are dot-like impressions on the second, third and fourth segments, sometimes less obvious on the latter; the abdominal segments have hindmarginal bristles. Legs chiefly as in *Dolichopus*; only rarely they may show secondary sexual characters in the male, such as dilated joints on front or middle tarsi, or they may be thickened, curved or specially bristly. Hind metatarsus as long as or considerably shorter

than the second joint. The legs have short hairs, the coxæ bristles at the apex; the middle coxæ have besides a bristle on the front side near the outer edge, and the hind coxæ a bristle in the middle on the outer side; posterior femora with one preapical bristle; the tibiæ have various bristles, and besides apical or preapical bristles, which are small on the front tibiæ; the dorsal bristles on the middle tibiæ are generally three antero- and two postero-dorsal bristles; the hind metatarsi have no bristles. There are two small claws, two pulvilli and a narrow empodium with long bristles below and thus somewhat comb-shaped. The wings may sometimes have thickenings on the costa in the males; the mediastinal vein terminates in the subcostal vein; the discal vein may have a distinct bend and towards the end be strongly converging towards the cubital vein, or the bend may be smaller or quite wanting, and the discal and cubital veins be less converging or almost parallel; the first posterior cell is thus narrowly or more widely open; the posterior cross-vein lies about in the middle, or sometimes a little more basally or apically; anal vein not reaching the margin. There is a distinct convexity on the last part of the discal vein, more or less near to the cross-vein. The alar squamulæ have a somewhat developed angular lobe with a fan of long hairs; the inner part of the squamulæ have shorter hairs.

The main distinguishing character between this genus and *Dolichopus* is the want of bristles on the hind metatarsi, and the small or wanting bend of the discal vein.

The developmental stages of the genus seem hitherto not to have been known; I have examined a pupa of *H. metallicus*; it resembles the pupa of *Dolichopus*; on the front side of the head lie the antennal sheaths, directed downwards and with the ends a little diverging; at the base of each sheath there is a strong, bifid tooth, the two teeth are quite approximated; above each of them is a hair; longer downwards on the sheaths is a small tooth, marking the apex of the second antennal joint, and likewise with a hair above, and below a weak outline of the rest of the antennæ with the arista is seen. On the thoracic disc are some short hairs; at the front end of thorax there are two long, thin and pointed spiracular tubes, which have a small, black ring somewhat below the apex; the second to eighth abdominal segments have above a transverse girdle of short, flat, brown spines; the sheaths of the hind legs reach almost to the end of abdomen. The pupa was lying in an earthy cocoon of a somewhat oval shape, and of a length of 7—8 mm. The larva (which I have not examined) was found in moss on $\frac{4}{4}$, and the imago came on $\frac{19}{5}$.

The species of *Hercostomus* occur chiefly in the same localities as those of *Dolichopus*, on bushes and in low herbage on meadows and in woods, at and near water, several species not rarely on water-plants. Schiner says that many species may be seen sitting on the surface of water; but some species are also found in more dry localities on flowers, especially of Umbelliferæ.

Of the genus about 60 species are known from the palæarctic region; 15 have hitherto been found in Denmark. No doubt some more species will still be found in our country.

The genus *Hercostomus* was founded by Loew in 1857 (Neue Beitr. V, 9); he created it for three species, and mentioned several characters for it, especially the distinctly hairy arista and the bare scutellum, the other characters mentioned being of less value; as the type of the genus he gave *longiventris*. Already at the place cited Loew speaks of a possible uniting of the genus with species of *Gymnopternus*, and in 1861 (Neue Beitr. VIII, 26) he says that the species of *Gymnopternus* with the narrowed first posterior cell are nearly related to *Hercostomus*, and that the uniting of these species with *Hercostomus* perhaps would give a better generic distinction between the two genera; and again in 1864 (Mon. of Dipt. of North Am. II, 171, 76) he says that the group of species with a narrowed first posterior cell must necessarily be separated from *Gymnopternus*; finally in 1869 (Beschr. eur. Dipt. I, 278, Anm. 2) he divides *Hercostomus* and *Gymnopternus* after the mentioned character. This mode of distinction has since been followed by many authors, among others Mik and Kowarz, and is also used in the Kat. paläarkt. Dipt. The distinction is however not valid; thus in some species of *Hercostomus* (e. g. *nigripennis*) the discal and cubital veins are only slightly converging; also the characters from the hairiness of the arista and the scutellum are impossible to use as a generic distinction, the scutellum is never quite bare, but has in the species of *Hercostomus* some few hairs on the disc and some at the margin. I have therefore here united the two genera, but as there is in most species (Danish species) an observable difference, I have kept them as subgenera.

Table of Subgenera.

1. Cubital and discal veins more or less converging, first posterior cell thus narrowed towards the end; scutellum almost bare, only with very few hairs, chiefly at the margin; postocular bristles pale, or (*vivax* and *nanus*) black 1. Subg. *Hercostomus*.

- Cubital and discal veins not or slightly converging, first posterior cell thus not or only slightly narrowed towards the end; scutellum distinctly short-haired; postocular bristles black 2. Subg. *Gymnopternus*.

1. Subg. *Hercostomus*.

Cubital and discal veins more or less converging (in *nigripennis* only slightly). Antennal arista almost bare, only microscopically hairy or nearly so, in *chrysozygos* and *nanus* a little more haired. Scutellum almost bare, only with a few hairs above and some at the margin; it has two strong marginal bristles and at each side a small hair; this latter is large in *Sahlbergi* and somewhat large in *chrysozygos*, in *nigripennis* it is very small. Front tibiae with one or two ventral or postero-ventral bristles, only *nanus* has none; hind metatarsus as long or almost as long as the second joint, or somewhat shorter, only in *nanus* it is much shorter. The male hypopygium somewhat high and compressed, but not in *vivax* and *nanus*; on the ventral side it has a pair of lobes in the middle, which are more or less broad and directed downwards, only in *vivax* narrow and directed backwards; in *nanus* there is only a pair of posterior ventral lobes; the lateral pair of the inner lamellæ are generally somewhat lancet-shaped, the median pair often somewhat claw-shaped.¹ The outer lamellæ are larger or smaller, generally of a somewhat triangular shape; in *nanus* they are narrow and somewhat long. — It will be seen, that *nanus* in several respects differs from the other species, and it points somewhat towards *Hypophyllus*, its hypopygium is also pointed at the end on each side in a similar way as in this genus.

Table of Species.

1. Lower postocular bristles pale	2.
— Lower postocular bristles black	6.
2. Femora yellow	3.
— Femora black	5.

¹ I am not sure that the appendages which I have in this subgenus termed median inner lamellæ are in all cases in reality such, and answering to the same in *Dolichopus*. It is possible that they might answer to the posterior ventral lobes, as they seem in some cases (e. g. *chrysozygos*) to be a direct continuation of the edge of the hypopygium; then the other ventral lobes might answer to the middle lobes in *Dolichopus*, and there would be no median inner lamellæ. But against this view seem to speak the facts in *vivax*, where there seem to be two pairs of ventral lobes, and besides inner median lamellæ, and in *nanus*, where there are posterior ventral lobes and also inner median lamellæ.

3. Squamulae with a yellow fringe	1. <i>gracilis</i> .
— Squamulae with a black fringe	4.
4. Antennae black	2. <i>germanus</i> .
— Antennae mainly yellow	3. <i>chrysozygos</i> .
5. Large species; proboscis not elongated; wings somewhat brownish; middle metatarsus in the male with bristles below	4. <i>Sahlbergi</i> .
— Small species; proboscis rather long; wings strongly brown or blackish; middle metatarsus in the male simple	5. <i>nigripennis</i> .
6. Legs black	6. <i>vivax</i> .
— Legs yellow	7. <i>nanus</i> .

2. Subg. *Gymnopternus*.

Cubital and discal veins not or slightly converging. The antennal arista somewhat distinctly haired (in *angustifrons*, *assimilis* and *aerosus* rather short-haired). Scutellum distinctly hairy above, in *chalybeus* only slightly; it has two strong marginal bristles, but only in *chalybeus*

Fig. 50. Hypopygium of *Il. brevicornis*, ventral lobe, lateral and median inner lamellae and outer lamellae are seen.

there is besides a small hair at each side, the other species have none. The front tibiae have no ventral bristles, only in *chalybeus* there is a posterior bristle. Hind metatarsus much shorter than the second joint, in *chalybeus* only slightly shorter. The hypopygium of the male is alike in all species (Fig. 50); it is more or less long, on

the ventral side there is about in the middle, or at all events long before the apex, a pair of lobes of characteristic shape; they are long and slender, directed backwards with the end curved upwards, and with some hairs; of the inner lamellae the lateral are short, flat and of a characteristic shape, the ventral apical corner pointed and the dorsal corner going out into a spine; the space between the edges is thin and transparent; the median inner lamellae are more styliform, but a little dilated; the sheath of penis reaches to the end of the hypopygium; in *chalybeus* the ventral lobes issue more backwards and are shorter, and the inner lamellae are longer. The outer lamellae are small, somewhat roundish, the marginal hairs not long; in *chalybeus* they are larger, with longer hairs.

Table of Species.

1. Femora mainly black	2.
— Femora yellow	3.

2. Hind tibiæ and the greatest part of metatarsus yellow; male with a long costal swelling on the wing, and the middle tibiæ thickened and slightly curved 8. *cupreus*.
- Hind tibiæ blackish at the apex and hind metatarsi almost quite black; wings in the male without costal swelling, and middle tibiæ simple 9. *angustifrons*.
3. Wings with a thickening on costa between the basal cross-vein and the apex of the subcostal vein, very distinct in the male, slight in the female 4.
- Wings without thickening on costa 5.
4. Outer lamellæ of hypopygium yellow; wings not broad, anterior margin somewhat straight; hind metatarsi with only the apex black 10. *celer*.
- Outer lamellæ of hypopygium black; wings broader than in *celer*, anterior margin somewhat curved; hind metatarsi chiefly or quite black 11. *brevicornis*.
5. Thorax steel-blue; antennæ pale below the basal joint 12. *chalybeus*.
- Thorax green; antennæ quite black 6.
6. Discal vein with the first and second part of about the same length; size 3,8—4,4 mm 13. *metallicus*.
- Discal vein with the first part considerably shorter than the second; size 2,5—3,5 mm. 7.
7. Hind tibiæ a little darkened towards the apex; wings somewhat tinged, posterior cross-vein oblique, discal vein somewhat converging towards the cubital vein; male with the epistoma greyish white 14. *assimilis*.
- Hind tibiæ quite yellow; wings almost hyaline, posterior cross-vein nearly perpendicular, discal vein slightly converging towards the cubital vein, almost parallel with it; male with the epistoma black 15. *aerosus*.

Subg. *Hercostomus*.

1. *H. gracilis* Stann.

1831. Stann. Isis 1831, 255, 44 (*Dolichopus*). — 1903. Kat. paläarkt. Dipt. II, 311. — *Dolichopus bicolor* Macq. 1827. Soc. Sc. Lille, 61, 6. — 1838. Meig. Syst. Besch. VII, 160, 54. — *Dolichopus Bohemani* Wahlb. 1851. Öfvers. vet. Akad. Förh. VIII, 302. — 1855. Zett. Dipt. Scand. XII, 4633, 68—69.

Male. Vertex and frons green, somewhat yellowish brown dusted. Epistoma somewhat narrow, yellow. Palpi reddish. Occiput green, slightly pruinose; postocular bristles yellowish below, black above. Antennæ black, a little elongated, almost as long as the head, the third joint longer than broad, with the lower margin convex, the upper straight, the point thus dorsal, somewhat truncate. Thorax bright green, sometimes golden green, rarely more coppery; generally with a more golden middle stripe; it is somewhat shining; quite

anteriorly it is yellowish grey or light brownish pruinose; scutellum slightly yellow pubescent at the margin, and with very few, short hairs above. Pleura green or æneous, grey pruinose; propleura with somewhat long, pale hairs and a black prothoracic bristle. Abdomen green, sometimes more or less golden or coppery, finely greyish white pruinose downwards; it is clothed with short, black hairs; down the sides there are some yellow hairs, which are predominant just along the side margin; there are somewhat long hindmarginal bristles, not longer on the first segment. Venter green, greyish pruinose, with yellow hairs. Hypopygium somewhat large, greenish black, greyish pruinose; eighth segment with somewhat strong, black hairs; on the ventral side there are somewhat narrow lobes in the middle, which project downwards, and with a hair at the anterior edge; at the end of the hypopygium are two pairs of inner lamellæ, the lateral somewhat claw-shaped, with the hook-formed point turned upwards and with a hair in the middle at the upper margin; the median inner lamellæ I have not examined more closely; the outer lamellæ are somewhat large, roundish triangular, broader than long; they are brownish yellow with a black margin, which is broad at the end; they have somewhat strong, straight, bristly hairs along the whole margin, shortest at the dorsal margin; at the apical and ventral margin there are besides inwards curved bristles; the ventral and apical margin is a little serrated, with short teeth towards the dorsal angle. Legs yellow, front coxæ somewhat whitish pruinose anteriorly, posterior coxæ grey with yellow apex; tarsi blackish towards the end, the front tarsi least, the hind tarsi most, almost black except the basal part; hind metatarsus shorter than the second joint. The legs have short, black hairs, front coxæ white-haired, with some black, bristly hairs above towards the inside, and the femora imperceptibly pale-haired below; posterior femora with one preapical bristle; front tibiæ with bristles above and on the postero-ventral side; middle tibiæ with two dorsal rows of bristles, and one antero-ventral bristle; hind tibiæ with two dorsal and one ventral row. Wings hyaline; veins black or brownish black; costa thick and swollen from the apex of the subcostal vein and on a long streak, evenly decreasing in thickness outwards; axillary lobe somewhat well developed. Squamulæ yellow, with a yellow fringe. Halteres yellow.

Female. Antennæ shorter than in the male, third joint not longer than broad. Epistoma broad, greyish white. Wings a little tinged, costa not thickened.

Length 4,8—5,5 mm; sometimes smaller specimens are found, down to 4 mm.

Remarks: It is curious that Loew (Neue Beitr. V, 19) says about this species, that it has a hairy (behaartes) scutellum and is distinguished from related species by this character; also Verrall (Ent. Month. Mag. XII, 1875, 34) says the same; the species has in reality no hairy scutellum, there are only some very few, short hairs above as in the other species of *Hercostomus*.

H. gracilis is somewhat rare in Denmark, and it was first detected in 1908; Rørvig, Melby at Tisvilde, Faxe Ladeplads, and on Bornholm at Hammeren (the author). My dates are only $11/7$ — $11/8$. It occurs in bushes and in low herbage, sometimes at ditches, and especially near the shore; the localities, on which I have taken it, are almost all sandy and not at all humid.

Geographical distribution:— Northern and middle Europe down into France; towards the north to southern Sweden.

2. *H. germanus* Wied.

1817. Wied. Zool. Mag. I, 71, 17 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 95, 36 (*Dolichopus*). — 1831. Stann. Isis 1831, 251, 40 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 38, 32 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 570, 60, et 1852. XI, 4295, 60, et 1859. XIII, 5058, 60 (*Dolichopus*). — 1862. Schin. F. A. I, 207 (*Gymnopternus*). — 1903. Kat. paläarkt. Dipt. II, 311.

Male. Vertex and frons greenish, greyish or yellowish grey dusted. Epistoma narrow, greyish or slightly yellowish. Palpi dark. Occiput green, greyish pruinose; postocular bristles yellowish below, black

Fig. 51. Antenna of *H. germanus* ♂, from the inside. $\times 65$.

above. Antennæ black, slightly elongated, as long as the head, third joint longer than broad, truncately pointed or rounded at the end. Thorax æneous green, slightly pruinose, shining; scutellum bare, only with some few, pale hairs at the margin. Pleura greenish, grey pruinose; propleura with a few pale hairs above, and with a black prothoracic bristle. Abdomen æneous green, slightly greyish pruinose downwards; it is clothed with short, black hairs and has black hind-marginal bristles, which are somewhat longer on the first segment.

Venter greenish, grey pruinose, with yellow hairs, somewhat long at the base. Hypopygium large, rather high and compressed in its anterior part; it is blackish green, greyish pruinose; eighth segment with black hairs, somewhat long at the margin; on the ventral side there are somewhat narrow lobes in the middle, directed downwards and backwards, each with two hairs at the end; at the end of the hypopygium there are two pairs of inner lamellæ; the lateral resemble those in *gracilis*, they are brownish black, narrow, two-pointed, with the points turned upwards and each point ending in a bristle or spine; the median inner lamellæ are somewhat large, hook-like with the apex curved downwards and with a little lobe or tooth at the upper margin; they are black, only the dorsal tooth is yellow; the median dorsal appendage is hook-shaped, and it is somewhat tripartite as it has a lobe on each side at the base, and these lobes are again bilobate, but the whole appendage is only seen by dissection; the outer lamellæ are somewhat small, triangular or almost crescent-shaped, with the ventral margin concave; they are black or brownish black, the apical margin is serrated and has hairs, which are long towards the apex. Legs yellow, posterior coxæ grey with the apex yellow; anterior tarsi with apex of metatarsus and the four following joints black; hind tibiæ with the apical part, and hind tarsi black, the metatarsus a little shorter than the second joint. The legs have short, black hairs, femora inconspicuously pale-haired below; posterior femora with one preapical bristle; front tibiæ with bristles above, and generally a small postero-ventral bristle; middle tibiæ with

Fig. 52. Wing of *H. germanus* ♂.

two dorsal rows of bristles, two, sometimes three antero-ventral bristles and one ventral bristle; hind tibiæ with two dorsal rows and with a ventral row of somewhat smaller bristles. Wings brown, but varying from somewhat light to dark brown, they are darkest towards the anterior margin; veins black or brownish black; discal vein with a small bend and more or less converging towards the cubital vein, the first posterior cell thus somewhat narrowly or more broadly open

at the apex; axillary lobe somewhat small. Squamulae pale yellow, with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male, but however somewhat narrow, grey or yellowish grey. Antennae somewhat shorter. For the rest quite similar to the male.

Length 3.5—4.5 mm.

H. germanus is very common in Denmark and has been taken in many localities through the whole country including Bornholm. My dates are $\frac{4}{7}$ — $\frac{8}{9}$. It occurs both in woods and on fields and both on humid and dry localities and not especially near water. It is generally present in very great numbers and is especially found on flowers of Umbelliferae; most often I have taken it on Chaerophyllum, the flowers of which may often be quite covered by it. The males are then seen hovering quite low over the females resting on the flowers and jerking upon them, but I have however never seen copulation.

Geographical distribution: — Northern and middle Europe down into France; towards the north to middle Sweden, and in Finland.

Remarks: This species is very similar to *H. chaerophylli* but is easily distinguished in the male by the hypopygium, which in *chaerophylli* is much larger; the total length of it is like the length of abdomen, and its anterior part is ascending above the dorsal margin of abdomen, as Schiner correctly states; also both the ventral lobes and inner lamellae are more slender, and the outer lamellae longer and narrower, and hence less triangular. The female is less easily distinguished, but may, I think, be known by the discal bend being smaller than in *germanus* and the cubital and discal veins more parallel, which character is common to both sexes; finally *chaerophylli* is a smaller species. On the other hand the intensity of the browning of the wings gives no character.

Zetterstedt (l. c. VIII. 3086) mentions two female specimens from Denmark, sent to him from Stæger, and which seemed, both to him and to Stæger, a little differing from *germanus*; in XI, 4295, Zetterstedt says that one of them belongs to *H. chaerophylli*, which thus should occur in Denmark; at the place last cited he describes *chaerophylli* after Swedish specimens, but the distinguishing characters he gives seem to me not at all to prove that it is in reality *chaerophylli*; thus in VIII he says: "nervis 3 et 4 longitudinalibus versus apicem paullulum magis approximatis", what is contrary to the facts in *chaerophylli*. — I have never seen *chaerophylli* from Denmark, and I think that it does not occur with us, and that both the mentioned specimen from Stæger, as also the other specimens belong to *germanus*, which,

as is well known, is somewhat varying. I have written to Dr. S. Bengtsson in Lund about *chaerophylli*, and he kindly communicated to me that the species is not found in Zetterstedt's collection.

3. *H. chrysozygos* Wied.

1817. Wied. Zool. Mag. I, 71, 16 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 93, 33 (*Dolichopus*). — 1831. Stann. Isis 1831, 259, 48 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 39, 34 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 576, 65, et 1852. XI, 4297, 65 (*Dolichopus*). — 1862. Schin. F. A. I, 207 (*Gymnopternus*). — 1903. Kat. paläarkt. Dipt. II, 310.

Male. Vertex and frons green or golden green, slightly dusted. Epistoma narrow, yellow. Palpi yellowish. Occiput green, a little pruinose; postocular bristles yellow below, black above. Antennæ a little elongated, but not or scarcely as long as the head, third joint longer than broad, triangularly ovate, pointed; the antennæ are yellow, the third joint blackish above and at the apex. Thorax bright green, rarely more golden or coppery; it is slightly pruinose anteriorly, shining; at the upper angle of the præsutural depression is a small, blackish, somewhat purplish spot; scutellum only with some few, black hairs at the margin and above. Pleura green or æneous, greyish pruinose; propleura with pale hairs and a black prothoracic bristle. Abdomen green, sometimes a little golden or slightly æneous, a little whitish grey pruinose downwards; it is clothed with short, black hairs, and has hindmarginal bristles, which are a little longer on the first segment, and also increasing in length towards the end. Venter greenish, grey pruinose, with yellow hairs, which are somewhat long at the base. Hypopygium black, greyish pruinose; eighth segment with black hairs, long at the margin; on the ventral side there are lobes in the middle of a shape about as in *germanus*, somewhat triangular, directed downwards, with a hair at the anterior margin; at the end of the hypopygium there are two pairs of inner lamellæ, the lateral directed straight backwards, somewhat lancet-like, pointed, the median are somewhat hidden between the lateral, they are likewise straight, somewhat styliform; the outer lamellæ are brown or blackish brown, somewhat triangular with the dorsal margin straight; along the apical margin there are somewhat long teeth, longest towards the dorsal margin, with long, curved hairs; at the ventral angle there is a tuft of shorter hairs. Legs yellow, posterior coxæ grey with the apical part yellow; hind femora with a blackish spot above at the apex; hind tibiæ with the apical third or almost half part black; front tibiæ white on the dorsal side, front tarsi with metatarsus black or brownish black with a white ring near the apex, the second joint

with a white ring in the middle, the last three joints black, thus the whole tarsus is black with two white rings; posterior tarsi black, hind metatarsus a little shorter than the second joint. The legs have short, black hairs, posterior femora with some longish, pale hairs below at the base, and they have one preapical bristle; front tibiæ with a few bristles above, and one or two postero-ventral; middle tibiæ with two dorsal rows of bristles, two anterior bristles and one ventral; hind tibiæ with two dorsal rows and some ventral bristles, and besides with dense, short hairs on the ventral and posterior side. Wings a little brownish tinged, most towards the anterior margin; veins black; discal vein with a small, obtuse curve, and only slightly converging towards the cubital vein; the posterior cross-vein situated in the middle of the wing; axillary lobe somewhat small. Squamulæ pale yellow, with a black fringe. Halteres yellow.

Female. Epistoma considerably broader than in the male, grey. Antennæ a little shorter, third joint not longer than broad. Front tarsi black, brownish towards the base, metatarsus with a very faint, paler ring:

Length 4—5.3 mm.

H. chrysozygos is not rare in Denmark; Hellerup, Tisvilde, Bose-rup near Roskilde, Skelskør, Faxe Ladeplads; on Langeland at Lohals; on Funen at Odense, and on Fænø. My dates are $^{23}/_6$ — $^{21}/_7$. It occurs on bushes and in grass and low herbage, often near water; I have sometimes found it at ditches with putrid water.

Geographical distribution:— Northern and middle Europe down into France; towards the north to southern Sweden.

4. *H. Sahlbergi* Zett.

1838. Zett. Ins. Lapp. 711, 14 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 566, 56, et 1849. VIII, 3085, 56, et 1859. XIII, 5056, 56 (*Dolichopus*). — 1862. Schin. F. A. I, 208 (*Gymnopternus*). — 1903. Kat. paläarkt. Dipt. II, 313.

Male. Vertex and frons green, somewhat pruinose. Epistoma somewhat broad, silver-white. Palpi black. Occiput æneous green, somewhat pruinose; postocular bristles whitish below, black above. Antennæ black, shorter than the head, third joint about as long as broad, short triangularly pointed. Thorax dark æneous green, somewhat greyish pruinose, especially in front, and slightly shining; scutellum almost bare, only with some few, black hairs at the margin and above. Pleura dark greenish, greyish pruinose; propleura with long, yellowish hairs and a black prothoracic bristle. Abdomen green or æneous green, greyish white pruinose, especially downwards; it is

clothed with short, black hairs, and has hindmarginal bristles, which increase in length towards the end, and also are longer on the first segment. Venter greenish, grey pruinose, with short, pale hairs. Hypopygium somewhat high, black or a little greenish, greyish pruinose; eighth segment with strong, black hairs; on the ventral side of the hypopygium there are lobes in the middle, they are broad, stretching downwards and with a styliform apex directed backwards and a little upwards; at the end there are two pairs of inner lamellæ, the lateral narrow, directed backwards, attenuated to a thin apex ending in a small bristle, and with a bristle at the upper margin; the median inner lamellæ are broad in the basal part, pointed and curved somewhat downwards; the dorsal median appendage is hairy above; the outer lamellæ are large, somewhat roundish triangular, with a broad end and the dorsal margin straight; they are blackish brown, the apical and a part of the ventral margin has small teeth with hairs, which are angularly curved at the apex, besides there are long, evenly curved hairs; the dorsal margin has shorter hairs. Legs with the coxæ blackish grey, front coxæ whitish pruinose anteriorly; all coxæ a little yellowish at the apex; femora greenish black, a little greyish pruinose; tibiæ yellow with the very base black, and hind tibiæ with the apex blackish; anterior tarsi with the apex of metatarsus and the four following joints black; hind tarsi black, the first joint as long as the second. The legs have short, black hairs, front coxæ partly white-haired; posterior femora with one preapical bristle; front tibiæ with bristles above and one or two on the postero-ventral side; middle tibiæ with two dorsal rows of bristles and a ventral bristle; hind tibiæ with two dorsal and a ventral row; middle metatarsi with some bristles on the antero-ventral, and one long bristle on the postero-ventral side. Wings brown, most towards the anterior margin; veins black; discal vein with an obtuse but not small bend, and converging towards the cubital vein; axillary lobe not large. Squamulæ yellow, with a black fringe. Halteres yellow, the base of the peduncle a little darker.

Female. Epistoma only slightly broader than in the male, more grey. Antennæ of about the same length as in the male. The bristles below the middle metatarsi shorter, and no long postero-ventral bristle present.

Length 5.4 to about 6 mm.

H. Sahlbergi is rare in Denmark, it has only been taken at one occasion, at Frijsenborg in Jutland in July (H. J. Hansen).

Geographical distribution: — Northern and middle Europe down into France; towards the north to northern Scandinavia, and in Siberia.

5. *H. nigripennis* Fall.

1823. Fall. Dipt. Suec. Dol. 15, 16 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 102, 52, Tab. XXXV, Fig. 20 (*Dolichopus*). — 1831. Stamm. Isis 1831, 253, 42 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 39, 33 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 569, 59, et 1855. XII, 4631, 59 (*Dolichopus*). — 1862. Schin. F. A. I, 209 (*Gymnopternus*). — 1903. Kat. paläarkt. Dipt. II, 312.

Male. Vertex and frons dull green. Epistoma narrow, greyish white, clypeus bent angularly inwards. Palpi black. Proboscis rather long, when the labella are closed it is about as long as the head is high. Occiput greenish, greyish pruinose; postocular bristles yellow below, black above. Antennæ black, somewhat elongated, longer than the head, third joint longer than broad, with the rounded apex turned dorsally; the arista somewhat short, but with the first joint a little elongated. Thorax dark green, rarely more æneous, slightly pruinose, shining; scutellum only with a few dark hairs at the margin. Pleura green, grey pruinose; propleura with few, somewhat short, pale hairs and a black prothoracic bristle. Abdomen dark green, sometimes more æneous green or æneous, slightly greyish pruinose downwards; it is clothed with short, black hairs, and has short hind-marginal bristles, a little longer on the first segment. Venter greenish, grey pruinose, with pale hairs. Hypopygium short and thick, greenish black, greyish pruinose; eighth segment with black hairs; on the ventral side of the hypopygium there are lobes, which are not broad, somewhat triangular, with a pair of hairs; at the end there are two pairs of inner lamellæ, the lateral resembling those in *germanus*, two-pointed, with the points turned upwards and each point ending in a small spine; the median inner lamellæ are hook-like, curved downwards; the outer lamellæ somewhat roundish triangular, the apical margin with a shallow excision; they are blackish brown, lightest at the base, with hairs at the apical margin. Legs black, coxæ greyish; the apex of the anterior femora and the anterior tibiæ yellow or brownish, the apex of the middle tibiæ more or less darkened; the base of the front tarsi yellow or brown, and the hind tibiæ generally more or less pale brown in the basal part; hind metatarsus shorter than the second joint. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with bristles above, and generally a small postero-ventral bristle; middle tibiæ with two rows of bristles above, and with two antero-ventral and one ventral bristle; hind tibiæ with two dorsal rows of bristles and some antero-ventral bristles, besides with some small postero-ventral bristles. Wings strongly brown or blackish; veins black; discal vein with a very small bend

and only slightly converging with the cubital vein, first posterior cell widely open; axillary lobe somewhat small. Squamulae yellow, with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male, but not specially broad, greyish white. Antennae shorter. For the rest similar to the male.

Length 3—3.5 mm.

Among other characters this species is distinguished by the rather long proboscis, which is a somewhat unusual feature in the family. Zetterstedt says (l. c. XII): "Ciliae postoculares omnes atræ"; this must be a mistake, for his species is certainly *nigripennis*.

H. nigripennis is common in Denmark; Dyrehaven, Lyngby Mose, Ørholm, Frerslev Hegn and Præstevang near Hillerød, Rørvig, Bose-rup and Roskilde; on Funen at Odense, Veflinge and Hoffmangave, and on Fæno; in Jutland at Silkeborg, Laven near Silkeborg, Frijsenborg, Gjerlev near Randers Fjord, Holstebro, Sæby and Jerup at Frederikshavn; finally on Bornholm at Hasle, Allinge and Almindingen. My dates are $^{29}/_6$ — $^9/_8$. It occurs in low herbage on meadows in woods, and also on fields.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden.

6. *H. vivax* Loew.

1857. Loew, Neue Beitr. V, 19 (*Gymnopternus*). — 1862. Schin. F. A. I, 211 (*Gymnopternus*). — 1903. Kat. paläarkt. Dipt. II, 313.

Male. Vertex and frons dull green. Epistoma somewhat narrow, white. Palpi dark. Occiput greenish, greyish pruinose; postocular bristles black. Antennae black, about as long as the head, third joint slightly longer than broad, with the rounded apex turned dorsally. Thorax green or dark green, very slightly pruinose, shining; scutellum with only very few, inconspicuous hairs at the margin. Pleura dark green, greyish pruinose; propleura with a few, partly dark hairs and a black prothoracic bristle. Abdomen dark green, only slightly greyish pruinose downwards; it is clothed with short black hairs, and has hindmarginal bristles, longer on the first segment. Venter greenish, grey pruinose, with slight, pale hairs. Hypopygium greenish black, greyish pruinose; eighth segment with black hairs; on the ventral side of the hypopygium there are small, triangular lobes near the base; in the middle there are a pair of somewhat long ventral lobes, which are directed downwards at the base, but just after the base bent backwards, and with a long hair at the base and a smaller at the

apex; at the end there are, besides the dorsal median appendage, two pairs of inner lamellæ, both hook-shaped, the lateral bent angularly down in the middle, and the apex again bent backwards, so that they are doubly curved; the median inner lamellæ with the point curved downwards, and with a long tooth at the base on the dorsal side, which is directed upwards; the outer lamellæ are elongated, somewhat roundish; they are blackish, the whole apical margin is crenulated or has small teeth, which on the dorsal side bear hairs inwardly which are angularly bent at the apex, and outwardly shorter, straight hairs; on the ventral side are long, slightly curved hairs. Legs quite black, coxæ greyish, femora somewhat greenish; hind metatarsi slightly shorter than the second joint. The legs have short, black hairs, posterior femora with one preapical bristle; front tibiæ with bristles above and one on the posterior side; middle tibiæ with two rows of bristles above and one ventral bristle; hind tibiæ likewise with two rows above, and with only one small ventral bristle. Wings brownish tinged, most towards the anterior margin; veins black; discal vein with a very small bend, converging towards the cubital vein, the first posterior cell somewhat narrowly open; axillary lobe not large. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma a little broader than in the male, and the antennæ shorter, with the third joint not longer than broad; for the rest similar to the male.

Length 3—3,5 mm.

H. vivax is very rare in Denmark, only two specimens, a male and a female, have been caught, one in Vejle Nørreskov on 3.7. 1908 (the author), and one at Laven near Silkeborg in the first part of August 1881 (H. J. Hansen).

Geographical distribution:— Middle Europe down into Hungary and the Alps, and further in Italy; it seems to have its northern limit in Denmark, as it is not known from Scandinavia, nor from England.

7. *H. nanus* Macq.

1827. Macq. Soc. Sc. Lille, 1827, 66, 15, et 1834. Suit à Buff. I, 465, 27 (*Dolichopus*). — 1838. Meig. Syst. Besch. VII, 162, 60 (*Dolichopus*). 1903. Kat. paläarkt. Dipt. II, 312. — *Dolichopus minimus* Zett. 1849. Dipt. Scand. VIII, 3088, 71—72.

Male. Vertex and frons blackish green. Epistoma narrow, white. Palpi dark. Occiput blackish or greenish black, a little greyish pruinose; postocular bristles black. Antennæ black, a little elongated, slightly longer than the head, the third joint slightly or not longer

than broad, the apex somewhat rounded, turned dorsally; the arista with the basal joint about as long as the apical. Thorax dark green, almost not pruinose, shining; scutellum a little hairy above, and with distinct, black hairs at the margin. Pleura greenish, greyish pruinose; propleura with very few, small, dark hairs and a black prothoracic bristle. Abdomen dark green, not pruinose; it is clothed with short, black hairs, and has short hindmarginal bristles, longer on the first segment. Venter greenish, grey pruinose, with yellow hairs. Hypopygium somewhat short, black, slightly pruinose; eighth segment with black hairs; on the ventral side of the hypopygium the edge is prolonged into somewhat claw-like, black posterior lobes; at the end there are two pairs of somewhat styliform inner lamellæ, the lateral with two spines at the apex, the median with a dilatation in the middle and a thin styliform apex; the outer lamellæ are yellow, they are narrow and bent somewhat angularly downwards at the base; at the apex they are split into some bristle-like teeth, the dorsal being the longest, and there are long hairs at the margin. Legs yellow, front coxæ a little greyish at the base, posterior coxæ grey with yellow apex; hind femora with a small, dark spot at the apex above; hind tibiæ darkened to blackish in the apical third or half; on the anterior tarsi the apex of metatarsus and the four following joints brownish or blackish, hind tarsi black, the metatarsus much shorter than the second joint, not much more than half as long. The legs have short, black hairs; posterior femora with one preapical bristle; tibiæ with few and small bristles; front tibiæ with only one small bristle above near the base, but none below; middle tibiæ with four or five dorsal bristles in two rows (two or three in the anterior row); hind tibiæ with two dorsal rows, and a row of very small ventral bristles. Wings yellowish or light brownish tinged; veins brown or blackish brown; discal vein with a small bend and after it evenly converging towards the cubital vein; axillary lobe small. Squamulæ yellow with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male, but not broad, greyish white. Antennæ shorter, third joint shorter than broad. Wings with the discal vein a little less converging than in the male.

Length 2,5—2,7 mm.

H. nanus is not common in Denmark; Charlottenlund (the author), Ordrup Mose (Stæger), Lyngby Mose, Faxe Ladeplads (the author). My only dates of capture are in July. It was taken with the net in the wood Charlottenlund on water plants in a small streamlet; at Faxe Ladeplads it was somewhat numerous present at a ditch, flying low over the water, and the males were observed pursuing the females in the usual way. It was first detected in Denmark by Stæger, who

gave it the name *minimus*, under which Zetterstedt described it. Zetterstedt notes that Stæger took the species in copula.

Geographical distribution: — Middle Europe and down to Corsica; it seems to have its northern limit in Denmark as it is not known from Scandinavia, but it occurs in England.

Subg. *Gymnopternus*.

8. *H. cupreus* Fall.

1823. Fall. Dipt. Suec. Dol. 15, 15 (*Dolichopus*). — 1824. Meig Syst. Besch. IV, 98, 42 (*Dolichopus*). — 1831. Stann. Isis 1831, 260, 49 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 43, 40 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 577, 66, et 1855. XII, 4632, 66 (*Dolichopus*). — 1862. Schin. F. A. I, 209. — 1903. Kat. paläarkt. Dipt. II, 317.

Vertex and frons grey dusted, ocellar tubercle darker. Epistoma not very narrow, grey, clypeus bent angularly inwards. Palpi black. Occiput a little greenish, grey pruinose; postocular bristles black. Antennæ black, somewhat short, not as long as the head, the third joint shorter than broad, roundly pointed; the arista distinctly but short-haired. Thorax dark green, slightly pruinose, shining; scutellum haired with short, black hairs both at the margin and above. Pleura dark green, grey pruinose; propleura with a few black or brown hairs and a black prothoracic bristle. Abdomen dark green, sometimes a little æneous, very slightly pruinose downwards; it is clothed with short, black hairs and has short hindmarginal bristles, somewhat longer on the first segment. Venter greenish, grey pruinose, with dark or brown hairs, somewhat long at the base. Hypopygium somewhat long, black, greyish pruinose; eighth segment with black hairs; on the ventral side of the hypopygium there are long, styliform lobes, arising from the middle with a broad base; they project beyond the end of the hypopygium, the apex is curved upwards, and there is a long hair on the ventral side in the middle; the sheath of the penis reaches to the end of the hypopygium; at the end there are two pairs of inner lamellæ, the lateral short, flat and with small spines at the apex, the median longer, somewhat styliform, dilated at the apex, and with a small spine at the ventral corner; the dorsal median appendage is very complicated; the outer lamellæ rather small, somewhat roundish triangular, black or brownish black, with long, somewhat curved hairs at the apical and ventral margin. Legs with the coxæ grey with yellowish apex, femora black or brownish black, the apex yellow, most narrowly on the hind femora; tibiæ yellow, middle tibiæ thickened, most towards the apex, and the very apex curved a

little inwards; tarsi black with the metatarsus except the apex yellow; hind metatarsus much shorter than the second joint. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with bristles above, but none below; middle tibiæ with two rows of bristles above, below there are three or four short spine-like bristles which are directed downwards and each placed on a little elevation, the lowermost are paired, two standing beside each other; hind tibiæ with two dorsal rows of somewhat long bristles, and a ventral row of a little shorter bristles. Wings somewhat long, brownish fumigated; veins black; costa slightly thickened a little after the base and more thickened from the apex of the subcostal vein and outwards; discal vein very slightly bent, a little converging towards the cubital vein; axillary lobe somewhat small. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma somewhat broader than in the male. Antennæ of about the same length. Middle tibiæ simple, with the ventral bristles of usual shape. Wings with the costa less thick.

Length 3.5—4 mm.

H. cupreus is not uncommon in Denmark on suitable localities; Ordrup Mose, Bollemosen, Hillerød, Tyvekrogen near Hillerød, Faxe Ladeplads; on Langeland at Lohals; on Funen at Middelfart, and in Jutland at Funder near Silkeborg. My dates are 2.6—22.7. It occurs in woods on humid places and near water.

Geographical distribution: — Northern and middle Europe down into France; towards the north to middle Sweden.

9. *H. angustifrons* Stæg.

1842. Stæg. Krøyer's Tidsskr. IV, 44, 41 (*Dolichopus*) — 1843. Zett. Dipt. Scand. II, 578, 67, et 1852. XI, 4297, 67, et 1855. XII, 4632, 67 (*Dolichopus*). — 1903. Kat. paläarkt. Dipt. II, 317.

Male. Vertex and frons brownish or greyish dusted, ocellar tubercle darker. Epistoma narrow, white or greyish white; clypeus bent angularly inwards. Palpi black. Occiput dark greenish, a little pruinose; postocular bristles black. Antennæ black, not as long as the head, the third joint not as long as broad; arista distinctly but short-haired. Thorax dark green, very slightly pruinose, shining; scutellum with short, black hairs both above and at the margin. Pleura dark greyish pruinose; propleura with a few, short, dark hairs and a black prothoracic bristle. Abdomen dark green, not or almost not pruinose; it is clothed with short, black hairs, and has short hindmarginal bristles, somewhat longer on the first segment. Venter greenish, grey pruinose, with yellow or brownish hairs, a little longish at the base.

The hypopygium is, as far as I have been able to examine, constructed quite as in *cupreus*, there are the same long ventral lobes, and inner and outer lamellæ of similar shape. Legs with the coxæ greyish with yellow apex, femora black or blackish, with only the very apex yellow, hind femora almost quite black; tibiæ yellow, hind tibiæ with the apex black; anterior tarsi black, metatarsus yellow with black apex; hind tarsi quite black or only the extreme base pale, the metatarsus considerably shorter than the second joint. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with a few bristles above, but none below; middle tibiæ with two dorsal rows of bristles, and one ventral bristle below the middle; hind tibiæ likewise with two dorsal rows and one ventral bristle below the middle, and with some very small bristles upwards. Wings a little brownish tinged; veins brown or blackish brown; discal vein not bent and parallel with the cubital vein; axillary lobe somewhat small. Squamulæ yellow, with a black fringe. Halteres pale yellow.

Female. Epistoma considerably broader than in the male, grey. Antennæ about as in the male, and for the rest similar to it.

Length 2,5—2,8 mm.

This species is very similar to and also related to *cupreus*, but in the male it is easily distinguished by the simple middle tibiæ and the not thickened costa; in both sexes it is distinguished by the black apex of the hind tibiæ and the black hind tarsi, the parallel cubital and discal veins, and also by the hind tibiæ having only one long ventral bristle; finally it is much smaller.

H. angustifrons seems to be rare in Denmark; it has only been taken on three occasions; in Ordrup Mose in 1839 (Stæger), and recently in Bøllemosen (the author), and in Ryget Skov at Farum Sø (Kryger, the author). The dates are $^{25}/_5$ — $^6/_7$. We have only seven specimens, six males and a female, and one male was sent from Stæger to Zetterstedt; I think it has been overlooked on account of its smallness. It occurs on humid places, especially at the border of water on water plants. — The species was originally founded on Danish specimens.

Geographical distribution:—Northern and middle Europe down into Bohemia; towards the north to middle Sweden, and in Finland.

10. *H. celer* Meig.

1824. Meig. Syst. Besch. IV, 84, 18 (*Dolichopus*). — 1831. Stann. Isis 1831, 262, 50 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 42, 37 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 582, 71 (*Dolichopus*). — 1862. Schin. F. A. I, 209. — 1903. Kat. paläarkt. Dipt. II, 317.

Male. Vertex and frons grey dusted; ocellar tubercle dark. Epistoma not narrow, grey; clypeus bent angularly inwards. Palpi black. Occiput greenish, greyish pruinose; postocular bristles black. Antennæ black, not as long as the head, the third joint about as long as broad, triangularly pointed; arista distinctly short-haired. Thorax dark green or æneous green, rarely æneous, it may sometimes be brighter in the middle; it is slightly pruinose, shining; scutellum

Fig. 53. Antenna of *H. celer* ♂, from the inside. $\times 80$.

haired with dark hairs. brownish at the margin. Pleura greenish, grey pruinose; propleura with a few pale hairs and a black prothoracic bristle. Abdomen dark green or somewhat æneous, very slightly pruinose downwards; it is clothed with short, black hairs, and has hindmarginal bristles, which are longer on the first segment. Venter greenish, grey pruinose, with yellow or brownish hairs, somewhat long at the base. The hypopygium is constructed quite as in the preceding species; the outer lamellæ are small, broader than long, of yellow colour and with somewhat short hairs at the margin. Legs yellow, coxæ grey with the apex yellow; the tarsi with the apex of metatarsus and the four following joints black; hind metatarsus considerably shorter than the second joint. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with a few bristles above, but none below; middle tibiæ with two rows of bristles above and one ventral bristle; hind tibiæ likewise with two rows of dorsal bristles, and some smaller ventral bristles. Wings a little tinged; veins black, costa thickened on a streak between the base and the apex of the subcostal vein, and also somewhat thick from the apex of the subcostal vein and outwards; discal vein with a very slight bend and parallel with the cubital vein; axillary lobe small. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broader than in the male, grey. Antennæ shorter. Wings more tinged, with the thickness at the base of costa present, but thinner than in the male.

Length 3,3—3,8 mm.

H. celer is common in Denmark; Lersø, Charlottenlund, Ordrup Mose, Ermelund, Hillerød, Frederikssund, Faxe Ladeplads, and on

Bornholm in Almindingen. My dates are $17/6-9/s$. It occurs in low herbage on meadows, humid places and at the borders of water in woods, sometimes in great numbers. Zetterstedt mentions that Stæger has taken it in copula.

Geographical distribution:—Northern and middle Europe down into Italy; towards the north to southern Sweden.

11. *H. brevicornis* Stæg.

1842. Stæg. Krøyer's Tidsskr. IV, 42, 38 (*Dolichopus*). — 1857. Loew, Neue Beitr. V, 21. — 1903. Kat. paläarkt. Dipt. II, 317. — *Dolichopus obscuripennis* Zett. 1843. Dipt. Scand. II, 575, 64, et 1849. VIII, 3086, 64. — *Dolichopus fumipennis* Stæg. in litt. Zett. l. c. II, 575.

Male. Vertex and frons brownish grey dusted; ocellar tubercle dark. Epistoma narrow, light grey; clypeus bent inwards. Palpi black. Occiput greenish, greyish pruinose; postocular bristles black. Antennæ black, short, shorter than the head, the third joint not

Fig. 54. Antenna of *H. brevicornis* ♂; from the inside. $\times 80$.

as long as broad, short-pointed; arista short-haired. Thorax somewhat dark æneous green, varying from green to golden æneous; very slightly pruinose, shining; scutellum haired with short, dark hairs. Pleura greenish or æneous, grey pruinose; propleura with a few pale hairs and a black prothoracic bristle. Abdomen green or more or less æneous, very slightly pruinose downwards; it is clothed with short, black hairs and has hindmarginal bristles, which are longer on the first segment. Venter greenish, grey pruinose, with brownish hairs, a little longer at the base. Hypopygium quite as in the preceding species, the outer lamellæ small, black, with somewhat short hairs at the margin. Legs yellow, coxæ grey with yellow apex; tarsi with the apex of metatarsus and the following joints black; the hind tibiæ often a little brownish at the apex, and hind metatarsi black for the greatest part, not rarely quite black. Hind metatarsi considerably shorter than the second joint. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with a pair of bristles above but none below; middle tibiæ with two rows

of bristles above, and one ventral bristle; hind tibiæ with two rows above and with a few, smaller ventral bristles. Wings somewhat brownish tinged, most towards the anterior margin; they are a little broader than in *celer* as the anterior margin is curved a little out-

Fig. 55. Wing of *H. brevicornis* ♂.

wards; veins black, costa thickened as in *celer*; discal vein with a very slight bend, a little converging towards the cubital vein; axillary lobe a little larger than in *celer*. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad. Antennæ about as in the male. Wings more tinged and with the thickening of costa present, but thinner than in the male. Hind metatarsi generally quite black.

Length 3—3,8 mm.

H. brevicornis is common in Denmark; Charlottenlund, Ordrup Mose, Ermelund, Dyrehaven, Bøllemosen, Geel Skov and Ørholm; it has thus hitherto only been taken on Sealand. My dates are $^{20}_{16}$ — $^{3}_{8}$. It occurs in woods at the borders of water and on water plants in ditches, often in great number; though this species and *celer* occur in similar localities I have however never taken them together. — The species was originally founded on Danish specimens.

Geographical distribution: — Northern and middle Europe down into Styria and Hungary; towards the north to southern Sweden.

Remarks: *H. celer* and *brevicornis* may in the males easily be distinguished by the colour of the lamellæ of the hypopygium; also *celer* has longer antennæ with a more distinctly haired arista, and a broader epistoma; the females are very similar, they may on close examination always be known as belonging to one of the two species by the slight thickening of the costa near the base, but they are difficult to distinguish from one another; *brevicornis* may be known from *celer* by the somewhat broader wings, the costal margin being less straight than in *celer*; further the hind tibiæ are often a little brownish at the apex, and the hind metatarsus is generally quite black, while in *celer* it is always more or less yellow.

12. *H. chalybeus* Wied.

1817. Wied. Zool. Mag. I, 72, 18 (*Dolichopus*). — 1831. Stann. Isis 1831, 142, 35 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 37, 31 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 580, 69 (*Dolichopus*). — 1862. Schin. F. A. I, 210. — 1903. Kat. paläarkt. Dipt. II, 317.

Male. Vertex and frons blue. Epistoma somewhat broad, greyish white. Palpi yellowish. Occiput bluish black, greyish pruinose; post-ocular bristles black. Antennæ scarcely as long as the head, black, the first joint yellow below; third joint short triangular, not as long as broad; arista distinctly hairy. Thorax dark steel-blue, slightly pruinose, shining; scutellum very short-haired, at the margin the hairs longer. Pleura greenish, grey pruinose; propleura with a few pale hairs and a black prothoracic bristle. Abdomen dark greenish or more æneous, sometimes with coppery reflexes, distinctly whitish pruinose downwards; it is clothed with short, black hairs, and has somewhat long hindmarginal bristles, which are not longer on the first segment. Venter greenish, greyish pruinose, with short, dark hairs. Hypopygium mainly constructed as in the other species, but however with some differences; it is rather slender, the ventral lobes issue longer backwards, they are shorter and more dilated at the apex, and have here some hairs; the inner lamellæ are longer, and curved towards each other; the outer lamellæ are not small, of oval shape; they are yellowish white with a black margin; the outer half of the dorsal margin has longish teeth with strongly curved hairs, the apical and ventral margin are serrated, and have very long, fine hairs, shorter on the inner part of the ventral margin. Legs yellow, front coxæ a little darkened at the base, posterior coxæ grey with the apex yellow; hind femora a little brownish above at the apex, hind tibiæ more or less brownish, becoming blackish towards the apex; anterior tarsi with the apex of metatarsus and the following joints black or brownish black, hind tarsi black; the hind metatarsus a little shorter than the second joint. The legs have short, black hairs, paler below the anterior femora; hind femora with one preapical bristle; front tibiæ with some bristles above, and one on the postero-ventral side; middle tibiæ with two rows of bristles above, and with two antero-ventral bristles; hind tibiæ with two dorsal and one ventral row of bristles. Wings somewhat strongly brownish tinged, most towards the anterior margin, the extreme base clear; veins black or brownish black; the discal vein almost not bent, slightly converging towards the cubital vein; axillary lobe very small. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma broad, grey. Antennæ about as in the male. Abdomen generally darker than in the male, sometimes almost blackish.

Length 3,8—4,5 mm.

This beautiful species is easily known by the fine, steel-blue colour of thorax, and also the leg-bristles are characteristic, as well as the dark hind tibiæ and the yellow colour below on the first antennal joint.

H. chalybeus is not properly common in Denmark, and it has only been taken at Lersøen (Stæger), in Bollemosen and Lyngby Mose (the author), but where it occurs it may be present in great numbers. Stæger notes that it was numerously present in a ditch at Lersøen, especially on *Sium latifolium*, from May to September; I took it in great number in July in Bollemosen, chiefly on *Calla palustris*, and it was especially sitting and flying quite low just above the water.

Geographical distribution:— Northern and middle Europe down into Austria; towards the north to southern Sweden, and in Finland.

13. *H. metallicus* Stann.

1831. Stann. Isis 1831, 262, 51 (*Dolichopus*). — 1842. Stæg. Krøyer's Tidsskr. IV, 43, 39 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 578, 68, et 1855, XII, 4633, 68 (*Dolichopus*). — 1862. Schin. F. A. I, 210. — 1903. Kat. paläarkt. Dipt. II, 317.

Male. Vertex and frons greenish, grey dusted; the ocellar tubercle dark. Epistoma narrow, greyish white. Palpi dark. Occiput greenish, grey pruinose; postocular bristles black. Antennæ black, short, not as long as the head, third joint short triangular, shorter than broad; the arista short-haired. Thorax dark greenish or somewhat æneous, a little pruinose, shining; scutellum distinctly haired with short, dark hairs. Pleura greenish or æneous, grey pruinose; propleura with a few pale hairs and a black prothoracic bristle. Abdomen green, very slightly pruinose downwards; it is clothed with short, black hairs; the hindmarginal bristles are somewhat short, only long on the first segment. Venter greenish, grey pruinose, with yellowish hairs which are long at the base. Hypopygium shaped as in *cupreus* and the following species; the outer lamellæ small, roundish, darker or lighter brownish yellow, with the margin darkened and along it moderately long hairs; the lamellæ are sometimes darker to blackish. Legs yellow, coxæ grey with the apex yellow, front coxæ often yellowish to a greater extent; tarsi darkened towards the apex, on the anterior tarsi generally the last two or three joints brown or blackish, on the hind tarsi the last four, or the second joint more or less yellow; hind

metatarsus almost only half as long as the second joint. The legs have short, black hairs, posterior femora with one preapical bristle; front tibiae with a couple of bristles above, but none below; middle tibiae with two dorsal rows and one ventral bristle, and hind tibiae likewise. Wings slightly or somewhat brownish tinged; veins black or blackish; discal vein almost without bend and chiefly parallel

Fig. 56. Wing of *H. metallicus* ♂.

with the cubital vein; posterior cross-vein placed after the middle and thus the first and second part of the discal vein approximately of the same length; axillary lobe somewhat developed. Squamulae yellow, black fringed. Halteres yellow.

Female. Epistoma broader than in the male, but not specially broad, grey. Antennae shorter, third joint very short. Wings slightly more tinged.

Length 3,8—4,4 mm.

The pupa is pale yellow, it has a length of 4,5 mm.

H. metallicus is not rare in Denmark; Charlottenlund, Ordrup Mose, Ermelund, Dyrehaven, Bøllemosen, Lyngby Mose, Ryget Skov, Geel Skov, Ørholm, Brede, Tisvilde, Faxe Ladeplads; on Langeland at Lohals; in Jutland at Funder near Silkeborg. My dates are $\frac{2}{6}$ — $\frac{4}{8}$. It occurs in low herbage in woods on humid places and at the borders of water. The larva was found by Mr. Kryger in Ermelund in moss on $\frac{4}{4}$, and the imago came on $\frac{19}{5}$.

Geographical distribution: — Northern and middle Europe down into Corsica; towards the north to southern Sweden.

14. *H. assimilis* Stæg.

1842. Stæg. Krøyer's Tidsskr. IV, 41, 36 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 574, 63 (*Dolichopus*). — 1862. Schin. F. A. I, 211. — 1903. Kat. paläarkt. Dipt. II, 317. — *Dolichopus aerosus* 1838. Zett. Ins. Lapp. 711, 16 p. p.

Male. Vertex and frons greenish, densely grey dusted; ocellar tubercle dark. Epistoma narrow, greyish white. Palpi dark. Occiput

greenish, grey pruinose; postocular bristles black. Antennæ black, shorter than the head, third joint short triangular with the lower margin convex, not as long as broad; arista very short-haired. Thorax dark green or more æneous, slightly pruinose, shining; scutellum distinctly short-haired. Pleura greenish, greyish pruinose; propleura with sparse, more or less pale hairs, and a black prothoracic bristle. Abdomen dark green or more or less æneous, only slightly greyish pruinose downwards; it is clothed with short, black hairs, and has somewhat short hindmarginal bristles, a little longer on the first segment. Venter greyish pruinose, with yellowish or brownish hairs, somewhat long at the base. Hypopygium as in *cupreus* and the following species; outer lamellæ small, roundish, broader than long, with short hairs at the margin; they vary in colour from dark yellowish to blackish. Legs yellow, coxæ grey with the apex yellow, the front coxæ may be yellowish to a greater extent; hind tibiæ more or less brownish at the apex; tarsi with the apex of metatarsus and the four following joints black or brownish, the front tarsi often also with the second joint somewhat pale; hind metatarsus much shorter than the second joint. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with a few bristles above, but none below; middle tibiæ with two dorsal rows, and with one ventral bristle; hind tibiæ likewise with two dorsal rows, and with some

Fig. 57. Wing of *H. assimilis* ♂.

small bristles on the ventral side, one below the middle stronger. Wings a little brownish tinged; veins black or brownish black; discal vein with a very small, nearly wanting bend, and after it a little converging towards the cubital vein; posterior cross-vein somewhat oblique and placed a little before the middle of the wing, thus the first part of the discal vein considerably shorter than the second; axillary lobe moderately developed. Squamulæ whitish yellow, with a black fringe. Halteres whitish yellow.

Female. Epistoma broad, grey. Antennæ shorter than in the male, third joint very short.

Length 2.5—3 mm.

H. assimilis is rare in Denmark, I only know seven specimens; Damhussoen, Ermelund, Bollemosen, and on Langeland at Lohals (the author); in Jutland at Mønsted near Viborg (Esben Petersen), and on Bornholm at Hasle (H. J. Hansen); the dates of capture are $^{12}/_6$ — $^{11}/_8$. In the collection of our museum, of which Stæger's collection forms the main part, the species stood confused with a couple of other species; at present there is only one specimen of *assimilis* left, a male, which thus is the type-specimen, but Stæger mentions also the female.

Geographical distribution:—Northern and middle Europe down into Germany; towards the north to middle Sweden.

15. *H. aerosus* Fall.

1823. Fall. Dipt. Suec. Dol. 15, 17 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 98, 43 (*Dolichopus*). — 1831. Stann. Isis 1831, 258, 47 (*Dolichopus*). — 1838. Zett. Ins. Lapp. 711, 16 p. p. (*Dolichopus*). — 1842. Stæg. Kroyer's Tidsskr. IV, 40, 35 (*ærotus*, lapsus) (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 572, 61, et 1855, XII, 4632, 61, et 1859. XIII, 5059, 61 (*Dolichopus*). — 1862. Schin. F. A. I, 210. — 1903. Kat. paläarkt. Dipt. II, 316. — *Dolichopus Dahlbomi* Zett. 1843. Dipt. Scand. II, 573, 62.

Male. Vertex and frons grey, dusted; ocellar tubercle black. Epistoma narrow, black; clypeus whitish grey or brownish. Palpi dark. Occiput greenish, grey pruinose; postocular bristles black. Antennæ black, scarcely as long as the head, third joint shorter than broad, triangularly pointed, the lower margin convex, the point somewhat dorsal; arista very short-haired. Thorax dark green or somewhat æneous, slightly pruinose, shining; scutellum distinctly short-haired. Pleura greenish, greyish pruinose; propleura with a few, somewhat pale or darker hairs, and a black prothoracic bristle. Abdomen dark green or somewhat æneous, very slightly pruinose downwards; it is clothed with short, black hairs, and has hindmarginal bristles, longest on the first segment, and also somewhat long at the apex. Venter greenish, grey pruinose, with brown hairs, which are longish at the base. Hypopygium quite as in *assimilis*, the outer lamellæ dark brownish or black. Legs yellow, coxæ grey with the apex yellow, the front coxæ may be a little more yellowish; tarsi with apex of metatarsus and the four following joints black or brown; hind metatarsus considerably shorter than the second joint; very often the front and hind femora have a more or less pronounced blackish or brown stripe above (var. *Dahlbomi*). The legs have short, black hairs, the posterior femora one preapical bristle; front tibiæ

with a few bristles above, but none below; middle tibiæ with two rows of bristles above and one ventral bristle; hind tibiæ likewise with two dorsal rows, and with some very small ventral bristles and one stronger towards the apex. Wings almost hyaline; veins blackish brown or black; discal vein with an exceedingly slight bend and only

Fig. 58. Wing of *H. aerosus* ♂.

very slightly converging towards the cubital vein, almost parallel with it; posterior cross-vein about perpendicular, not oblique as in *assimilis*; axillary lobe moderately developed. Squamulae yellow, with a black fringe. Halteres pale yellow.

Female. Epistoma broad, grey. Antennæ shorter than in the male, third joint short triangular.

Length 3—3,5 mm.

This species is very similar to *assimilis*, but in the male it is at once known by the black epistoma; the female is more difficult to distinguish, but it will be known by the quite yellow hind tibiæ, and by the clearer wings with the more parallel cubital and discal vein and the more perpendicular posterior cross-vein; when the front and hind femora are blackish striped, this will also be a distinguishing character. The two species *assimilis* and *aerosus* will easily be known from *metallicus* by the size and the character from the venation given in the table; the females of these two species are on the other hand also similar to the females of *celer* and *brevicornis*, they may however be distinguished by the character in the latter species, that the basal part of the costa has a thickening, which is, to be sure, slight, but on close examination distinctly to be seen.

H. aerosus is rather common in Denmark; Charlottenlund, Ordrup Krat, Dyrehaven, Bollemosen, Ryget Skov at Farum Sø, Hillerød and Præstevang at Hillerød, Tisvilde, Faxe Ladeplads; on Funen at Middelfart and Veflinge; in Jutland at Laven and Sminge near Silkeborg, Randers, Ravnkilde near Skørping and at Sæby. My dates are $\frac{6}{6}$ to the first part of August. It occurs in woods in low herbage at and near water, and on water plants.

Geographical distribution: — Northern and middle Europe down into the Pyrenees; towards the north to southern Sweden, and in Finland.

9. **Hypophyllus** Loew.

Species of medium size and of slender shape, with long legs; the colour metallic green. Head a little broader than thorax, as broad as or broader than high, short semiglobular, a little narrowed downwards. Occiput slightly arched. Vertex a little excavated, the ocellar tubercle a little prominent. Frons broad, somewhat narrowed towards the antennæ. There are ocellar, outer vertical and postvertical bristles, and a couple of small hairs on the posterior side of the ocellar tubercle. Eyes large, somewhat oval in circumference but narrowest downwards, metallic green with reddish reflexes in the living specimens; they are densely short-haired; the facets are of the same or almost the same size. The eyes are separated in both sexes, narrowly in the male, more broadly in the female. The postocular bristles form a single row, they are not specially strong; there are no bristles on the back of the head above the oral aperture. The antennæ are inserted near to each other, somewhat above the middle; they are five-jointed, the third joint either somewhat elongated in the male, short in the female, or short in both sexes; the first joint is somewhat obconical, the second short, overlapping the third in a similar way as in *Dolichopus*; the third joint is short or longer, ovate or elongated triangular; the joints are compressed, especially the third; the two last joints form an arista, the basal joint of which is of various length; in some species it is in the male very long, longer than the second, in the female shorter, in other species this difference is smaller, or it is very short in both sexes; sometimes it is slightly thickened towards the apex. The arista is inserted dorsally, sometimes rather near the apex. The antennæ have the basal joint hairy above, the second joint has hairs at the apical margin, the third is very short-haired, and the arista bare (microscopically hairy). Epistoma narrow or very narrow in the male, broader in the female; clypeus short, rounded or truncate at the apex; it is slightly marked off from epistoma at each side by a little elevation with a notch, and it is a little arched; it does not reach the lower margin of the eyes. The mouth parts and oral aperture are larger in the female than in the male. The proboscis is slightly protruding; labrum (*obscurellus* ♀) as in *Dolichopus*, strong, high at the base, with a median tooth and longer backwards on each side a lateral tooth; it is semitubular, the lateral teeth lying below the median; hypopharynx triangular, a little shorter than or about as long as

labrum, broad at the base, with a distinct salivary duct; the maxillary palpi oval, squamiform, hairy, with a bristle at the apex. Labium with the basal part a little longer than the labella, these latter are broad, with rather long hairs at the margin. Thorax rectangular, somewhat high, and somewhat arched above; prothorax very small, with small bristles above; metathorax a narrow rim, and there is no chitinised metasternum. The acrostichal bristles biserial and distinct; there are six somewhat long dorsocentral bristles; further a distinct humeral bristle and besides a weaker, one posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle; the front part of the disc has small hairs, some of which may be a little longer, but scarcely forming any distinct second posthumeral bristle. Propleura with fine hairs and a prothoracic bristle. Scutellum bare above, with two strong marginal bristles, and at each side a very small hair. Abdomen elongated, more or less long and slender; it is not or only slightly compressed. On the dorsal side the first tergite is shorter than the following; in the male the second to fifth segments are of the same length, and the sixth also almost of the same length or only slightly shorter. The sternites are on the whole weakly chitinised, especially along the middle line; the first sternite is only represented by a very narrow chitinisation, the second, third and fourth are somewhat chitinised, the fifth and sixth for the greatest part or quite membranous; the seventh segment has as usual a chitinised sternite, which lies below the tergite, and not, as in *Dolichopus*, at the ventral base of the hypopygium; the seventh segment is thus free and forms a somewhat long peduncle for the hypopygium; this latter is of a characteristic shape; it is long and more or less slender, on each side it terminates in a pointed apex; there are long and slender, but variously shaped ventral lobes, stretching far beyond the apex of the hypopygium, with very long hairs; the outer lamellæ issue on the dorsal side, the hypopygium being here excised, they are narrow, more or less long; the inner lamellæ are thin, styliform, variously curved; the dorsal median appendage is hook-shaped, compressed. The hypopygium is bent in under abdomen, the angle being between the sixth and seventh segment. In the female the segments two to five are normal, then follow three hidden segments, the last with an ovipositor terminating with some small spines above, and below them two small styles. There are the usual dot-like impressions on the second and third, less obvious or wanting on the fourth segment. The segments have hindmarginal bristles. The legs are long and slender, the tarsi, especially the anterior often very long, especially in the males; the coxæ somewhat elongated. In the males the front

legs may show sexual characters, such as dilated tarsal joints or peculiar hairs. The legs are haired with short hairs; the coxæ have bristles at the apex, the middle coxæ have a bristle in the middle on the front side at the outer edge, the hind coxæ one in the middle on the outer side; the posterior femora have one preapical bristle; the tibiæ have some bristles in rows, the middle tibiæ three in an antero-dorsal, two in a postero-dorsal row; the front tibiæ have no ventral bristles; there are apical or preapical bristles, small on the front tibiæ. Hind metatarsi without bristles, a little or somewhat shorter than the second joint. There are two claws, two pulvilli and a narrow, lobe-shaped empodium with long bristles below. Wings of usual shape, the mediastinal vein terminating in the subcostal vein; the discal vein with a somewhat small and even bend after the cross-vein, and curved up against the cubital vein towards the apex; the posterior cross-vein placed in or before the middle of the wing; the anal vein not reaching the margin. The discal bend lying on a convexity. Squamulæ small, with the angular lobe moderately developed, bearing a fan of long hairs; the inner part of the squamulæ shorter haired.

The developmental stages of *Hypophyllus* are not known.

The species of *Hypophyllus* occur on bushes and in low herbage in fens, on meadows and other damp localities in woods, often at the borders of water and also on water plants.

Of the genus 7 species are known from the palæarctic region; 4 have been found in Denmark.

Table of Species.

1. Antennæ in the male with the third joint somewhat elongated; first joint of the arista very long or somewhat long in the male, longer than or as long as the third joint in the female, inserted about in the middle of the joint or nearer the base. Posterior coxæ and metaepimera yellow... 2.
- Antennæ short, and the first joint of the arista short in both sexes, a little thickened towards the apex, inserted nearer the apex of the the third joint. Posterior, or at all events middle coxæ mainly grey, metaepimera grey..... 3.
2. Arista in the male with the first joint twice as long as the second; front tarsi with the fifth joint disciform. In the female the arista inserted a little anterior to the middle of the third joint, the apex of its first joint reaching distinctly beyond the apex of the third antennal joint; middle tarsi distinctly longer than tibiæ 1. *discipes*.
- Arista in the male with the first joint much shorter than the second; front tarsi simple. In the female the arista inserted in the middle of the third joint, the apex of its

- first joint only reaching just beyond the apex of the third antennal joint; middle tarsi about as long as tibiae. 2. *obscurellus*.
3. Front metatarsi in the male with long hairs below. Hypopygium large, with long ventral lobes. 3. *crinipes*.
- Front metatarsi in the male with short hairs below. Hypopygium small, with shorter ventral lobes (only the male known) 4. *crinicauda*.

1. *H. discipes* Ahr.

1817. Ahr. Faun. Ins. Eur. IV, 24 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 71, 1 (*Sybistroma*). — 1842. Stæg. Krøyer's Tidsskr. IV, 4, 1 (*Sybistroma*). — 1862. Schin. F. A. I, 226. — 1903. Kat. paläarkt. Dipt. II, 314. — *Dolichopus patellatus* Fall. 1823. Dipt. Suec. Dol. 10, 5. — 1843. Zett. Dipt. Scand. II, 583, 72. — *Sybistroma patellipes* Meig. 1824. Syst. Besch. IV, 72, 2.

Male. Head as high as broad. Vertex and frons whitish grey, the ocellar tubercle darker. Epistoma narrow, greyish white. Palpi dark. Occiput somewhat æneous, densely grey pruinose; postocular bristles black above, yellowish below. Antennæ considerably longer than the head, black, the third joint may be somewhat translucently brownish or reddish; it is elongated, much longer than broad, somewhat lancet-shaped; the arista has the first joint very long, twice as long as the second. Thorax æneous olive or somewhat greenish, brownish pruinose, only slightly shining; the humeral callus yellowish. Pleura slightly æneous, grey pruinose, metaepimera reddish yellow;

Fig. 59. *H. discipes*. Hypopygium; ventral lobe, outer lamella and dorsal median appendage are seen.

propleura with fine, pale hairs and a black prothoracic bristle. Abdomen greenish, æneous or more or less coppery, especially above, slightly whitish grey pruinose downwards; it is clothed with short, black hairs, at the base and just at the sides there are yellowish hairs; the hindmarginal bristles short, somewhat longer towards the apex, and long at the sides of the first segment. Venter yellow with yellow

hairs. Hypopygium yellow, the eighth segment and the basal part brownish; eighth segment with short, black hairs; the ventral lobes are long and thin, brownish or blackish towards the end; they have long, pale hairs at the apex and on the margin towards the apex, those at the apex are very long and curved; on the ventral margin, at a distance from the apex there is a single hair; the outer lamellæ are long and narrow, with black apex, they have yellow and brownish hairs at the margin, those at the ventral margin towards the end are the longest; besides, the lamellæ have some (5) variously curved teeth or prolongations towards the end on the inside. Legs yellow, front coxæ pale yellow, the posterior more reddish yellow; the middle coxæ may be a little greyish on the outside; front tarsi much longer than tibiæ, a little brownish, the fourth joint compressed, slightly dilated, with hairs above, the fifth joint strongly compressed, and dilated towards the dorsal side, triangularly disciform with the apical margin rounded; it is black or brownish black; posterior tarsi with the very apex of metatarsus and the four following joints brown or blackish; they are likewise long, the middle tarsi considerably longer than tibiæ; hind metatarsi a little shorter than the second joint. The legs have short, black hairs, front coxæ pale-haired anteriorly; posterior femora with one preapical bristle; front tibiæ with a couple of bristles above, none below; middle tibiæ with two dorsal rows and a small ventral bristle below the middle; hind tibiæ likewise with a few bristles in two dorsal rows, and with a ventral row of small bristles; the posterior tarsi slightly spinulous beneath. Wings somewhat brownish tinged; veins black or brownish, the discal vein evenly curved, the curve nearest to the cross-vein. Squamulæ yellow, with a yellowish fringe. Halteres deep yellow.

Female. Epistoma broad, light grey. Antennæ much shorter than in the male, third joint not or slightly longer than broad, pointed oval; the arista shorter, with the first joint much shorter, only half as long as the second. The anterior tarsi shorter than in the male and front tarsi simple; hind metatarsi considerably shorter than the second joint.

Length 4 to fully 5 mm; the male has the greatest length.

H. discipes is rare in Denmark; Stæger notes that it was taken in Dyrehaven by Westermann; besides we have it from Ordrup Mose and Dyrehaven (Stæger), and from Roskilde (H. J. Hansen). Westermann took it in July on tree-trunks.

Geographical distribution:— Northern and middle Europe down into France; towards the north to southern Sweden.

2. *H. obscurellus* Fall.

1823. Fall. Dipt. Suec. Dol. 13, 11 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 101, 49 (*Dolichopus*). — 1831. Stamm. Isis 1831, 254, 43 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 584, 73 (*Dolichopus*). — 1862. Schin. F. A. I, 227. — 1903. Kat. paläarkt. Dipt. II, 314. — *Medeterus appendiculatus* Macq. 1827. Soc. Sc. Lille, 45, 5. — 1834. Meig. Syst. Besch. VII, 157, 29. — *Sybstroma appendiculata* 1842. Stæg. Krøyer's Tidsskr. IV, 7, 3.

Male. Head broader than high. Vertex and frons light grey; ocellar tubercle dark. Epistoma narrow, whitish grey. Palpi dark. Occiput a little greenish, grey pruinose; postocular bristles black above, yellowish below. Antennæ black, as long as or slightly longer than the

Fig. 60. Antenna of *H. obscurellus* ♂, from the inside. $\times 60$.

head, the third joint elongated, longer than broad, somewhat lancet-shaped; arista with the first joint shorter than the second. Thorax obscure æneous or green, slightly pruinose, somewhat shining; humeral callus slightly brownish. Pleura slightly æneous, grey pruinose, metaepimera yellow; propleura with fine, pale hairs and a black prothoracic bristle. Abdomen æneous green, sometimes more or less coppery, very slightly pruinose downwards; it is clothed with short, black hairs, somewhat brownish at the sides, and it has short hindmarginal bristles, longer towards the end, and long at the sides of the first segment.

Fig. 61. *H. obscurellus*. Hypopygium; penis-sheath, ventral lobe and outer lamella are seen.

Venter greyish, with short, yellowish hairs. Hypopygium yellow, the basal part and the eighth segment black, the latter with partly pale hairs; the ventral lobes long and very thin, the apex dilated, black, and with a fan of long, pale yellow, curved hairs; at the ventral margin a little more forwards is a single hair; the sheath of penis

reaches beyond the end of the hypopygium; the outer lamellæ are narrow, whitish with the apex black; they are hairy at the margin, and have some (2) variously formed teeth or spine-like prolongations at the apex on the inside. Legs pale yellow, the middle coxæ may have a small, greyish patch on the outside; tarsi not specially long, front tarsi somewhat longer than tibiæ, middle tarsi of about the same length as tibiæ, and hind tarsi shorter with metatarsus not much more than half as long as the second joint; the tarsi are brown or blackish, the metatarsus yellow with the very apex blackish, the hind metatarsus sometimes more brownish. The legs have short, black hairs, the anterior coxæ pale-haired except for the apical bristles; the posterior femora have one preapical bristle; front tibiæ with a couple

Fig. 62. Wing of *H. obscurellus* ♂.

of bristles above, none below; middle tibiæ with two dorsal rows of bristles and a small ventral bristle below the middle; hind tibiæ likewise with two dorsal rows, and with a ventral row of small bristles. Wings somewhat brownish; veins black or brownish black; discal vein with a shallow curve, lying near the cross-vein. Squamulæ yellow, with a fringe of blackish brown or brown, somewhat yellowish reflecting hairs. Halteres yellow.

Fig. 63. Antenna of *H. obscurellus* ♀, from the inside. $\times 60$.

Female. Epistoma broader than in the male, whitish grey. Antennæ considerably shorter than in the male, third joint short triangular, not as long as broad; also the first joint of the arista shorter than in the male.

Length 3.5—4 mm.

The female of this species is distinguished from the female of *discipes* by the shorter legs, the middle tarsi being about as long as tibiæ and the hind tarsi shorter, while in *discipes* the middle tarsi are distinctly longer than tibiæ and the hind tarsi slightly longer; besides *obscorellus* is smaller.

H. obscorellus is common in Denmark; Charlottenlund, Ordstrup Mose, Ermelund, Dyrehaven, Lynzby Mose, Faxe Ladeplads; in Jutland in Vejle Nørreskov, and on Bornholm at Almindingen and Hammeren. My dates are $18/7$ — $3/9$, it thus occurs somewhat late; it was taken in copula on $30/8$. It occurs in and at woods at the borders of water and on water plants and may sometimes be present in great numbers. I have once taken it with a small cicadid as prey.

Geographical distribution:— Northern and middle Europe down into Corsica; towards the north to southern Sweden.

3. *H. crinipes* Stæg.

1842. Stæg. Krøyer's Tidsskr. IV, 6, 2 (*Sybistroma*). — 1843. Zett. Dipt. Scand. II, 581, 70, et 1849. VIII, 3087, 70 (*Dolichopus*). — 1862. Schin. F. A. I, 226. — 1903. Kat. paläarkt. Dipt. II, 313. — *Dolichopus pectinifer* Zett. 1842. Isis 1842, 834, 16, Tab. I, Fig. 67—69.

Male. Head as high as broad. Vertex and frons light grey or whitish grey; ocellar tubercle dark. Epistoma very narrow, whitish grey. Palpi dark. Occiput a little greenish, grey pruinose; postocular bristles black above, yellow below. Antennæ black, short, shorter than the head, third joint shorter than broad, ovately pointed; the

Fig. 64. Antenna of *H. crinipes* ♂, from the inside. $\times 65$.

arista somewhat long, of the same thickness in its whole length, not pointed at the apex; its first joint is short, not longer than the third antennal joint, a little thickened towards the apex; the arista is inserted somewhat near the apex of the third joint. Thorax dark greenish or somewhat æneous, a little pruinose, somewhat shining. Pleura greenish or æneous, grey pruinose; propleura with fine and short, pale hairs and a black prothoracic bristle; metaepimera grey. Abdomen greenish, sometimes with slight, coppery reflexes, slightly greyish pruinose downwards; it is clothed with short, black hairs, and

has hindmarginal bristles, which are long at the apex and on the sides of the first segment. Venter greyish, with pale hairs. Hypopygium black; the eighth segment black-haired; the ventral lobes

Fig. 65. *H. crinipes*. Hypopygium; ventral lobe and outer lamella are seen.

long, band-shaped, the apical half somewhat spoon-like dilated with an oblique apical margin; they are whitish yellow, the apical dilatation with a blackish brown margin; the dorsal margin bears moderately long hairs; the apical margin has curious, very long, flattened, somewhat curved, brownish or blackish hairs; the first hair on the ventral side is specially broad, almost lancet-shaped; in the middle of the ventral margin is a single, strong hair; the outer lamellæ are shorter than in the preceding species, not reaching beyond the end of the hypopygium, they are whitish yellow with the apex black; the apical margin is roundly incised, the dorsal corner prolonged into, or bearing a long, thin, styliform tooth, the ventral corner drawn out into a short, broad tooth, near which is a curved spine on the inside; the dorsal margin has short, the ventral margin long hairs. Legs long, front tarsi long and thin, metatarsus longer than tibia, the whole tarsus much more than twice as long; the last joint compressed, a little dilated; middle tarsi considerably longer than tibiæ, hind tarsi as long as tibiæ, the metatarsus a little shorter than the second joint. The legs are yellow, posterior coxæ grey with the apex yellow, hind coxæ often more yellow, only with a grey spot on the outside; anterior tarsi with the very apex of metatarsus, and the four following joints blackish, the last joint of the front tarsi silvery on the anterior side; hind tibiæ very slightly brownish towards the end, hind tarsi blackish. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with some bristles above, none below; middle tibiæ with two dorsal rows of bristles and one ventral bristle below the middle; hind tibiæ likewise with two dorsal rows, and with a ventral row of small bristles; front metatarsi with a row of long, fine brownish hairs on the antero-ventral side, decreasing in length downwards, the three uppermost specially long, and curved; besides with

one or two similar hairs on the postero-ventral side near the base. Wings somewhat brownish; veins blackish, discal vein with a distinct curve, lying nearer the cross-vein than the apex. Squamulae yellow, with a yellow fringe. Halteres yellow.

Female. Epistoma broad, grey. Antennae slightly shorter than in the male, the arista shorter and a little attenuated towards the apex. Anterior tarsi much shorter than in the male, and the front tarsi simple, the metatarsus however with short, bristly hairs beneath, longest towards the base.

Length 3.5—4.5 mm.

H. crinipes is not rare in Denmark, and may sometimes be taken in rather great number; Lersøen, Ordrup Mose, Ermelund, Dyrehaven, Bøllemosen, Lyngby Mose, Ørholm and Hillerød; it has thus hitherto only been taken in North Sealand. My dates are $\frac{3}{6}$ — $\frac{8}{7}$; Stæger notes that it has also been taken in May. It occurs in woods on humid meadows and in low herbage on humid places, and at the borders of water. I have taken it in copula on $\frac{27}{6}$.

Geographical distribution:— Northern and middle Europe down into Styria, Bohemia and Hungary; it has its northern limit in Denmark, as it is not known from Scandinavia, nor does it occur in England.

4. *H. crinicauda* Zett.

1849. Zett. Dipt. Scand. VIII, 3087, 70—71 (*Dolichopus*). — 1903. Kat. paläarkt. Dipt. II, 313.

Male. Head as high as broad. Vertex and frons whitish grey; ocellar tubercle dark. Epistoma somewhat broad, whitish grey. Palpi dark. Occiput slightly æneous, grey pruinose; postocular bristles black above, yellow below. Antennae quite as in *crinipes*. Thorax dark green, slightly pruinose, shining. Pleura greenish, grey pruinose; metaepimera grey; propleura with a few, pale hairs, and a black prothoracic bristle. Abdomen green, very slightly pruinose downwards; it is clothed with short, black hairs; the hindmarginal bristles are long at the apex and on the sides of the first segment. Venter greyish, a little translucently yellowish, with pale hairs. Hypopygium small, much smaller than in *crinipes*, black; the ventral lobes are shorter, evenly dilated, with the apex rounded, and they are bent upwards from the middle; they are whitish with the margin in the outer part brownish; the apical part has, as in *crinipes*, very long, brownish, flattened and curved hairs, the first hair on the ventral side likewise curious, very flat, almost lancet-shaped; longer forwards on the ventral margin stands a single hair; the outer lamellae are al-

most quite as in *crinipes* in shape and colour, only a little smaller in accordance with the smaller hypopygium; also the inner lamellæ and the median appendage much smaller than in *crinipes*. Legs long, front tarsi much longer than tibiæ, but not so long and thin as in *crinipes*, and the last joint simple, the metatarsus about of the length

Fig. 66. *H. crinicauda*. Hypopygium; ventral lobe, median and lateral inner lamellæ, dorsal median appendage and outer lamella are seen.

of tibiæ; middle tarsi a little longer, and hind tarsi of the length of the tibiæ, hind metatarsus a little shorter than the second joint. The legs are yellow, front coxæ slightly greyish at the base, posterior coxæ grey with yellow apex, hind coxæ more yellowish; anterior tarsi with the very apex of metatarsus and the four following joints blackish; hind tibiæ very slightly brownish towards the end, hind tarsi blackish. The legs have short, black hairs; posterior femora with one preapical bristle; front tibiæ with some bristles above, none below, front metatarsi with a row of short, bristly hairs on the antero-ventral side, longest towards the base, and with a small hair on the postero-ventral side near the base; middle tibiæ with two dorsal rows of bristles, and a small ventral bristle below the middle; hind tibiæ likewise with two dorsal rows, and with a ventral row of small bristles. Wings somewhat brownish; veins brownish black; discal vein with a distinct bend, lying near the cross-vein. Squamulæ yellow, with a yellow fringe. Halteres yellow.

Female. Unknown.

Length about 4 mm.

This species is very nearly related to *crinipes*, but easily distinguished by the front legs and the hypopygium.

H. crinicauda exists only in one specimen, a male, taken by Stæger many years ago, probably at Ordrup (but no locality is given). It is the same specimen which was sent to Zetterstedt and described by him l. c.

Geographical distribution: — The species is only known from Denmark, the above specimen being, as said, the only one.‡

II. Diaphorinae.

10. **Chrysotus** Meig.

Species of small or very small size, of not slender shape and of bright metallic colour. Head a little broader than thorax, short, semiglobular, about as high as broad. Occiput only very slightly arched. Vertex slightly excavated; frons somewhat decreasing in breadth towards the antennæ; there are as usual a pair of strong ocellar and outer vertical bristles, and a pair of small postvertical bristles, besides there are a pair of small, but distinct bristles behind the ocellar tubercle (perhaps representing the inner vertical bristles). Eyes large, oval, narrowed downwards; in the living specimens they are metallic green, with reddish reflexes; they are densely short-haired. The eyes are in the male generally very approaching downwards, below the antennæ, or quite touching; the epistoma is thus small, very narrow or quite disappearing downwards; in the females the eyes are more broadly separated, and the epistoma has parallel borders. Only rarely (*laesus* of Danish species) the eyes are more broadly separated in the male, but the epistoma is however narrowed downwards, and narrower than in the female. The eye-facets are in the male distinctly enlarged downwards towards the epistoma, but there is no sharp dividing line; in *laesus* the facets are not or almost not enlarged. The postocular bristles form a single row along the eye-margin, but besides there is a row more inwards on the lower half of occiput, interrupted just above the mouth aperture. Antennæ inserted near to each other a little above the middle; they are short, five-jointed; the first joint sometimes somewhat thin, obconical, the second short, likewise obconical, more or less rounded anteriorly, sometimes somewhat triangularly, but slightly or not overlapping the third; this latter is generally small, sometimes larger, and it may be short, higher than long, not pointed, or more equilateral, or finally a little longer than high and somewhat pointed; it is somewhat roundly incised posteriorly and thus often more or less reniform; the two last joints form an arista, the first joint of which is quite short; the arista is inserted in a little excision, which is placed on the outside, so that it is not seen, when the antenna is viewed from the inside; the insertion is distinctly dorsal or more subapical. The first joint of the antennæ is not haired above, the second has a circlet of bristles at the apex, especially one long above; the third joint has rather strong hairs, and the arista is distinctly, though not densely haired. The epistoma is, as mentioned, generally very narrow in the male, broader in the female; in the male it has a median furrow above; the clypeus is

not or almost not visible in the males, in the females it is marked off at each side by a little elevation with a notch, and it is generally bent, forming a little angle with the epistoma, and slightly arched; it does not reach the lower margin of the eyes. The proboscis is not or almost not protruding in the male, a little more in the female; it and the mouth parts are larger and stronger in the female than in the male. Labrum (*neglectus* ♀) is strong, curved a little downwards with the apex; it has a less chitinised median tooth, and somewhat behind a more strongly chitinised lateral tooth on each side, and it is semi-tubular; hypopharynx a little shorter than labrum, elongated triangular, and likewise with the apex curved a little downwards; the maxillary palpi are oval, squamiform, and have some bristles, especially a stronger at the apex; in the male the palpi are much smaller than in the female (only a little smaller in *laesus*). The labium has the basal part a little longer than the labella, these latter are broad, with hairs at the margin. Thorax rectangular, but somewhat short, it is high and a little arched above; pro- and metathorax very small, the former with small hairs above; the acrostichal bristles are biserial, small but distinct, only in *laesus* they are very small; there are six long dorsocentral bristles; further there is a humeral bristle, and generally a pair of smaller hairs, a posthumeral, a præ-sutural, three supraalar, much diverging backwards, two notopleural and a postalar bristle; the front part of the disc has only a few very small hairs. The propleura have two or three small prothoracic bristles. Scutellum is bare with two strong marginal bristles and on each side a small bristle. Abdomen somewhat short and robust, not or slightly compressed; the first dorsal segment is shorter than the following; the first ventral segment exceedingly small and narrow; in the male there are six visible dorsal segments of about the same length, except the first; on the ventral side segments two to five are normal, the sixth is not chitinised and is folded in, so that the venter here looks as if excised; the seventh abdominal segment is small and hidden. Hypopygium small and not pedunculated, it lies at the end of abdomen, curved in under the excision, and as usual with the dorsal side downwards; it is thus more or less hidden, only the base of it with the eighth segment is seen at the end of abdomen; the eighth segment has generally (or always) some short, strong bristles; the hypopygium has the opening lying more posteriorly than ventrally; it has ventral lobes (or perhaps more probably lateral inner lamellæ, as they are somewhat claw-shaped and two-pointed as these organs in *Hercostomus*), they are directed dorsally, so that they may sometimes be seen below; there are small, hairy outer lamellæ.

which often may be seen below; the penis is long and so strongly curved that, when stretched quite out, it may be seen below the hypopygium, stretching backwards. In the female the abdomen has as usual five normal, visible, and three hidden segments, and it terminates with a number of small spines. The usual dot-like impressions are present on the second, third and fourth segment, and also somewhat visible on the fifth, at all events in the male. The abdominal segments have short hindmarginal bristles. Legs not long and somewhat robust; hind metatarsus a little longer than the second joint. The legs have short hairs; the coxæ have small, bristly hairs at the apex, the middle coxæ a longer bristle anteriorly at the outer edge, and the hind coxæ a bristle on the outer side; femora with small or more bristly hairs below on the posterior side of the front femora, on both sides of the middle femora and on the anterior side of the hind femora; sometimes they are present on both sides of all femora; they are always strongest and bristly at the apex, but there are otherwise no preapical bristles. Front tibiæ with two, one or no bristles above; middle tibiæ generally with two strong antero-dorsal bristles, and one to three small postero-dorsal; sometimes there is only one antero-dorsal or none at all; below there are no bristles; hind tibiæ with two dorsal rows of bristles, and in the males besides with a shorter or longer ciliation on the antero-dorsal and anterior side, continued more or less out on the tarsi; hind metatarsi without bristles. There are two small claws and pulvilli, and a narrow empodium with bristles below. Wings of usual shape; the mediastinal vein terminating in the subcostal vein; discal vein with a very small curve after the cross-vein, but for the rest parallel with the cubital vein; the posterior cross-vein in the middle or nearer the base; anal vein not reaching the margin. Axillary lobe moderately developed. The discal vein has the curve lying on a convexity. The wings are in rest borne somewhat open, at all events generally. Squamulæ small, the angular lobe distinctly developed, with a fan of rather long hairs; the inner part of the squamulæ short-haired.

The developmental stages of the genus are not known, as far as I am aware.

The species of *Chrysotus* are rather lively flies, and they are in nature easily known from most other Dolichopodids by their somewhat short shape and the, in rest, half open wings. Their walking occurs, as Kowarz states, somewhat at intervals, and they fly only short distances at a time. They occur on bushes, leaves and in low herbage and grass on more or less humid places as in fens and on meadows, especially at or in woods, and also near water, sometimes

in rather great numbers; they may be found both on shady and on more sunny places.

Of the genus about 22 species are known from the palaearctic region, besides some doubtful; 9 have hitherto been found in Denmark.

Table of Species.

Males.

1. Femora mainly yellow.....	2.
— Femora mainly black	3.
2. Femora quite yellow; front coxæ black-haired	1. <i>neglectus</i> .
— Hind femora black at apex; front coxæ pale-haired ...	2. <i>cilipes</i> .
3. Hind trochanters, and generally also base of femora yellow; anterior tibiæ yellow	4.
— Hind trochanters black or brownish, hind femora not yellow at base; anterior tibiæ black, brown or yellow..	5.
4. Third antennal joint not large; hind tibiæ distinctly ciliated with somewhat long cilia	3. <i>femoratus</i> .
— Third antennal joint large; hind tibiæ slightly ciliated	4. <i>pulchellus</i> .
5. Epistoma somewhat broad; acrostichal hairs very small; legs black, front coxæ pale-haired; colour cyaneous ..	5. <i>laesus</i> .
— Epistoma quite narrow or eyes touching; acrostichal hairs distinct	6.
6. Front coxæ more or less pale; bristles on posterior tibiæ small; legs black	6. <i>cupreus</i> .
— Front coxæ not pale; bristles on posterior tibiæ not specially small	7.
7. Front tibiæ distinctly ciliated; legs black, or only anterior tibiæ brownish.....	7. <i>blepharoscetes</i> .
— Front tibiæ not ciliated; anterior tibiæ yellow.....	8.
8. Antennæ black; hind tibiæ blackish.....	8. <i>gramineus</i> .
— Antennæ more or less reddish at base; hind tibiæ yellowish.....	9. <i>microcerus</i> .

Females.

1. Femora pale, only hind femora blackish at tip; front coxæ pale-haired	2. <i>cilipes</i> .
— Femora always more black	2.
2. Hind trochanters and generally base of femora yellow; tibiæ yellow.....	3.
— Hind trochanters black or brownish, hind femora not yellow at base.....	5.
3. Third antennal joint large; hind tibiæ yellow, at most brownish at the tip	4. <i>pulchellus</i> .
— Third antennal joint not specially large.....	4.
4. Hind tibiæ (generally) quite yellow	1. <i>neglectus</i> .
— Hind tibiæ black or brown at apex.....	3. <i>femoratus</i> .
5. Front coxæ distinctly white-haired; acrostichal hairs very small	5. <i>laesus</i> .

- Front coxæ black-haired, or only a little indistinctly pale-haired; acrostichal hairs distinct 6.
- 6. Front coxæ more or less yellow at apex 6. *cupreus*.
- Front coxæ not yellow at apex 7.
- 7. Anterior tibiæ yellow, hind tibiæ black 7. *blepharosceles*.
- All tibiæ yellow 8.
- 8. Antennæ black, third joint not very small 8. *gramineus*.
- Antennæ more or less reddish at base, third joint very small 9. *microcerus*.

1. *C. neglectus* Wied.

1817. Wied. Zool. Mag. I, 74, 22 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 41, 1, Tab. XXXV, Fig. 10. — 1862. Schin. F. A. I, 186. — 1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 458, 1, Taf. XIII, Fig. 1—5. — 1903. Kat. paläarkt. Dipt. II, 319. — *Chrysotus femoralis* Meig. 1824. Syst. Besch. IV, 42, 5. — *Chrysotus taeniomerus* Meig. 1830. Syst. Besch. VI, 362, 10. — 1843. Zett. Dipt. Scand. II, 485, 6, p. p. — *Dolichopus viridulus* Fall. 1823. Dipt. Suec. Dol. 18, 23. — *Chrysotus viridulus* 1843. Zett. Dipt. Scand. II, 482, 2.

Male. Vertex and frons green. Epistoma green, slightly whitish pruinose, very narrow downwards, the eyes almost touching. Palpi small, yellow. Occiput greenish, greyish pruinose; postocular bristles black above, yellowish below. Antennæ black, third joint of moderate

Fig. 67. Antenna of *C. neglectus* ♂, from the inside. $\times 110$.

size, broader than long. Thorax bright green, sometimes more æneous or coppery, slightly pruinose, shining. Pleura greenish, grey pruinose; propleura with two black bristles. Abdomen bright green, sometimes æneous or somewhat bluish; it is clothed with short, black hairs, and has hindmarginal bristles, long on the first segment; the eighth segment with a few, short, stubby bristles at the lower margin. Venter green or bluish green, with short, black hairs. Legs yellow, the front coxæ may be more or less grey at the base, posterior coxæ grey, with the trochanters yellow; sometimes the hind femora are more or less dark above, especially towards the apex, and they may here be metallic green; tarsi brownish or blackish towards the end, or darker

and with the apex of metatarsus and the four following joints blackish. The legs have short, black hairs, front femora a little longer hairs below, the middle femora have longish, bristly hairs below towards the apex on both sides, hind femora likewise on the anterior side; front tibiæ with a pair of small bristles above; middle tibiæ with two strong antero-dorsal and two or three small postero-dorsal bristles; hind tibiæ with two dorsal rows of bristles, and a somewhat long ciliation on the antero-dorsal and anterior side, continued out on the tarsi. Wings hyaline; veins blackish. Squamulæ whitish, with a yellow fringe. Halteres whitish.

Female. Epistoma broad, grey. Palpi large, grey. Front coxæ more grey than in the male; femora very varying in colour, when lightest the anterior femora with a dark stripe above, and the hind femora with a patch near the apex, when darkest all femora blackish and metallic green shining, except base and apex; also the hind tibiæ may then sometimes be a little darkened at the end.

Length 2.3—3 mm.

C. neglectus is common in Denmark; Charlottenlund, Ordrup Mose, Ermelund, Dyrehaven, Ruderhegn, Ørholm, Præstevang and Frerslev Hegn near Hillerød, Tisvilde, Faxe Ladeplads; on Langeland at Lohals; on Funen at Veflinge; in Jutland in Vejle Nørreskov, Horsens, Frijsenborg, Laven near Silkeborg, Hald near Viborg, Sæby and Frederikshavn, and finally on Bornholm at Hasle and Almindingen. It is seen during the whole summer, my dates are $31/5$ — $3/9$. It occurs on bushes and especially in grass and low herbage on humid meadows in woods and on similar places. I have taken it in copula on $13/7$.

Geographical distribution:— Northern and middle Europe and down into Spain; towards the north to northern Scandinavia, and in Finland.

2. *C. cilipes* Meig.

1824. Meig. Syst. Besch. IV, 41, 3. — 1855. Zett. Dipt. Scand. XII, 4620, 9—10. — 1862. Schin. F. A. I, 186. — 1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 460, 2, Taf. XIII, Fig. 18—20. — 1903. Kat. paläarkt. Dipt. II. 318.

Male. Vertex and frons green or bluish green. Epistoma green, very narrow downwards, the eyes almost touching. Palpi small, yellow. Occiput greenish, greyish pruinose; postocular bristles black above, whitish below. Antennæ black, third joint a little enlarged, relatively larger than in *neglectus*, broader than long. Thorax bright or golden green, a little pruinose, shining. Pleura greenish, greyish pruinose; propleura with two pale or brownish bristles. Abdomen

bright green, clothed with short, black hairs, and with hindmarginal bristles, a little longer on the first segment; the eighth segment with some longish hairs. Venter green, with yellow hairs. The ventral lobes of the hypopygium brownish. Legs yellow, front coxæ sometimes a little greyish at the base, posterior coxæ grey, with the trochanters yellow; hind femora black at the apex and likewise hind tibiæ; anterior tarsi with apex of metatarsus and the four following joints brownish or blackish; hind tarsi blackish except the base of metatarsus. The legs have short, black or brown hairs, front coxæ whitish-haired, and also the bristles at the end of the middle coxæ pale; femora with somewhat long, bristly hairs below at the apex, the front femora on the posterior, the middle femora on both sides and the hind femora on the anterior side; front tibiæ with a small bristle above near the base, middle tibiæ with two distinct antero-dorsal bristles, and generally a couple of very small postero-dorsal; hind tibiæ with small dorsal bristles, and a somewhat long ciliation on the antero-dorsal and especially on the anterior side, continued out on the first tarsal joints, besides there is a dense ciliation on the ventral side at the tip of the tibia. Wings a little tinged; veins blackish. Squamulæ yellow, with a yellow fringe. Halteres pale yellow.

Female. Epistoma broad, grey. Palpi large, greyish, the apical part yellowish. Hind tibiæ yellow or only slightly browned at the tip, the dorsal bristles more distinct than in the male.

Length 2—2.2 mm.

C. cilipes is rare in Denmark; Utterslev Mose (the author); in Jutland at Horsens, Ry near Silkeborg and Frederikshavn, and on Bornholm at Allinge and Hasle (H. J. Hansen); it was for the first time taken in 1881. My dates are in July. It occurs on humid meadows and in grass in woods.

Geographical distribution:— Europe down into Spain and Italy; towards the north to southern Sweden. Strobl notes (Mittheil. Ver. Steierm. 1892, 143) that he has taken a specimen at a height of 5000 feet.

3. *C. femoratus* Zett.

1843. Zett. Dipt. Scand. II, 483, 3, ♂. — 1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 461, 4, Taf. XIII, Fig. 22. — 1903. Kat. paläarkt. Dipt. II, 318.

Male. Vertex and frons green. Epistoma green, very narrow downwards. Palpi small, brownish or yellowish. Occiput greenish, greyish pruinose; postocular bristles black above, yellow below.

Antennæ black, third joint of moderate size, broader than long. Thorax green or bluish green, sometimes a little golden, slightly pruinose, shining. Pleura greenish, greyish pruinose; propleura with a pair of pale or darker bristles. Abdomen green or a little golden green; it is clothed with short, black hairs, and has short hindmarginal bristles, a little longer on the first segment, and somewhat strong on the sixth; the eighth segment with a couple of short bristles. Venter greenish, with yellowish hairs. Legs with the coxæ grey, the trochanters yellow; femora, except the very base and the apex, blackish, shining metallic green, hind femora almost quite dark, only the apex reddish; anterior tibiæ yellow, hind tibiæ black or brownish, often yellowish above; anterior tarsi with the apex of metatarsus and the four following joints blackish, hind tarsi quite blackish, or the very base of metatarsus pale. The legs have short, black hairs, the femora longish hairs below, the front femora on the posterior side, the posterior femora on the anterior side, they are longest and stronger towards the apex; on the middle femora they are present on both sides at the apex; front tibiæ with two small bristles above, or the lower indistinct or wanting; middle tibiæ with two strong antero-dorsal, and with small postero-dorsal bristles; hind tibiæ with dorsal bristles in two rows, and a long ciliation on the anterior side, continued somewhat out on the tarsi; also the ventral side is somewhat ciliated, especially towards the apex. Wings very slightly greyish tinged; veins blackish. Squamulæ pale yellow, with a yellow fringe. Halteres pale yellow.

Female. Epistoma broad, grey. Palpi large, likewise grey. Hind tibiæ yellow with the apical part brown, metatarsus sometimes more yellow than in the male. Abdomen sometimes a little coppery.

Length 2—2,7 mm.

This species shows in the female a very great resemblance to the female of *neglectus*, especially to those with the darkest legs, but it may generally be known by the dark apex of the hind tibiæ; also the third antennal joint is distinctly larger. Kowarz lays (l. c.) special stress on the size in the distinction of these females, but as my measurements show I have found this character of little value. — As Zetterstedt says: „Stæg. in litt.“ the name is originally due to Stæger.

C. femoratus is not common in Denmark; Amager, Rørvig, Tisvilde; on Funen at Odense; in Jutland at Hald and Monsted near Viborg, Gjerlev near Randers Fjord, Sæby and Frederikshavn, and on Bornholm at Almindingen and Allinge. My dates are $\frac{2}{7}$ —¹¹s. It occurs often in grass, and may be found on rather dry localities.

Geographical distribution:— Northern and middle Europe down into Corsica, and on Madeira; it seems to have its northern limit in Denmark (see below), and it occurs in England. Strobl mentions (Mittheil. Ver. Steierm. 1892, 143) that he has taken it at a height of 4000 feet.

Remarks: Zetterstedt describes l. c. the male from one Danish specimen, which he had got from Stæger; in connection with this he describes a female, about which he says: "cum mare descripto in Amager deprehensa, & ut femina hujus a Nobil. Stæger dubitanter missa, parum a *C. viriduli* femina differre videtur." Of Stæger's specimens we have four in our collection labelled as *femoratus*, one male and three females, but the females were all *neglectus*, and the female of *femoratus* was thus not known to Zetterstedt. Zetterstedt continues that he had found similar females in Scania, but as these no doubt also belong to *neglectus*, the species *femoratus* is probably not known north of Denmark; to be sure Wahlgreen records it (Entom. Tidskr. Årg. 33, 1912, 33, 4), but as he puts a query after it, I think he is not sure.

4. *C. pulchellus* Kow.

1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 461, 3, Taf. XIII, Fig. 15. — 1903. Kat. paläarkt. Dipt. II, 319. — ? *Chrysotus taeniomerus* Zett. 1843. Dipt. Scand. II, 486, 6, p. p. var. b.

Male. Vertex and frons green. Epistoma greenish, very slightly pruinose, narrow downwards, but distinctly observable. Palpi small, yellowish. Occiput greenish, grey pruinose; postocular bristles black

Fig. 68. Antenna of *C. pulchellus* ♂, from the outside. $\times 125$.

above, yellow below. Antennæ black, first joint somewhat thin, third joint large, somewhat triangular with the upper margin convex, and a little pointed, about as broad as long below. Thorax golden green, with the posterior part and the scutellum bluish green, slightly pruinose, shining. Pleura greenish, greyish pruinose; propleura with a pair of pale prothoracic bristles. Abdomen green, clothed with short, black

hairs, and with short hindmarginal bristles, a little longer on the first segment. Venter greenish. Legs with the coxæ grey, trochanters yellow; femora black, a little greenish shining, the very base yellow; the anterior femora also with the apex yellow; anterior tibiæ yellow, hind tibiæ brownish black, palest in the middle and above (according to Kowarz they may also be pale with only the apex dark); anterior tarsi with the apex of metatarsus and the four following joints blackish brown, hind tarsi blackish. The legs have short, black hairs, the front coxæ have some pale hairs but the bristles are black; femora with few, bristly hairs at the apex, arranged in the usual way on the posterior side of the front femora, on both sides of the middle, and on the anterior side of the hind femora; front tibiæ with one small bristle above, middle tibiæ with two strong antero-dorsal and two small postero-dorsal bristles; hind tibiæ with some bristles in two dorsal rows, and with a short ciliation on the antero-dorsal and anterior side, somewhat visible also on metatarsus. Wings slightly tinged; veins blackish. Squamulæ yellow, with a yellow fringe. Halteres yellow.

Female. I have not examined the female; according to Kowarz it has a broad epistoma, blackish, grey pruinose palpi, and the hind tibiæ yellow, at most with the apex brownish.

Length 1,7 mm.

C. pulchellus is very rare in Denmark, only one specimen, a male, has been taken on Bornholm at Allinge in July 1883 (H. J. Hansen).

Geographical distribution: — Europe down into Spain; towards the north in Denmark, and if Zetterstedt's *taeniomerus* var. b is this species, which is very probable, it was known to Zetterstedt from the southern Sweden; that it occurs there is also stated by Wahlgreen (Entom. Tidsskr. Årg. 33, 1912, 33, 3.), but he declares nothing about the synonymy.

5. *C. laesus* Wied.

1817. Wied. Zool. Mag. I, 75, 21 (*Dolichopus*). — 1823. Fall. Dipt. Succ. Dol. 19, 25, p. p. ♀ (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 47, 7. — 1843. Zett. Dipt. Scand. II, 485, 5, et 1855. XII, 4620, 5. — 1862. Schin. F. A. I, 186. — 1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 466, 9, Taf. XIII, Fig. 6—14. — 1903. Kat. paläarkt. Dipt. II, 319. — *Chrysotus umplicornis* Zett. 1849. Dipt. Scand. VIII, 3064, 5—6.

Male. Vertex and frons green, somewhat greyish or brownish dusted. Epistoma somewhat broad, greenish, but densely grey pruinose. Palpi somewhat large, greyish or brownish. Occiput greenish, greyish pruinose; postocular bristles black above, whitish below. Antennæ

black, third joint large, broader than long. Thorax green when seen from in front or from above, but when seen from behind it is cyaneous blue; it is a little brownish pruinose, shining; the acrostichal hairs very small and indistinct. Pleura green, greyish pruinose; propleura

Fig. 69. Antenna of *C. laesus* ♂, from the inside. $\times 110$.

with two or three white prothoracic bristles. Abdomen cyaneous blue, only down the sides dark green; it is clothed with short, black hairs, and has short hindmarginal bristles, only a little longer on the first segment. Venter green, with blackish or brown hairs. Legs black, coxæ somewhat grey, front coxæ greyish white pruinose anteriorly, sometimes a little brownish at the tip, and the trochanters a little pale; femora somewhat metallic green shining, the knees yellowish or the hind knees brownish; tibiæ and tarsi blackish or brownish black. The legs have short, black hairs, front coxæ with distinct, longish, white hairs; the bristly hairs on the femora somewhat small, arranged as usual; front tibiæ without distinct bristle, middle tibiæ only with two or three very small and indistinct bristles; hind tibiæ with two dorsal rows of bristles, and with a short and indistinct ciliation. Wings

Fig. 70. Wing of *C. laesus* ♂.

somewhat greyish or brownish tinged, most towards the anterior margin; veins somewhat strong, blackish; discal vein with a very small bend; posterior cross-vein about in the middle of the wing, not much less than half as long as the apical part of the postical vein. Squamulæ brownish yellow, with a brownish fringe. Halteres yellow.

Female. Epistoma broader than in the male. Third antennal joint a little smaller. Thorax green or æneous green; abdomen more bluish green. Anterior tibiæ yellowish or brownish, hind tibiæ brown, all darkest towards the apex; the antero-dorsal bristle near the base on the middle tibiæ distinct.

Length 2—2.5 mm.

This beautiful species is easily recognised in the male by the broad epistoma, the slightly haired legs and the colour, and in both sexes by the white-haired front coxæ and the small acrostichal hairs.

C. laesus is not at all common in Denmark; Bagsværd, Hillerød, Tisvilde; on Langeland at Lohals; on Funen at Veflinge; in Jutland at Ry near Silkeborg, Gjerlev near Randers Fjord and Sæby, and on Bornholm at Almindingen and Hasle. My dates are only $^{22}_{16}$ — $^{22}_{17}$. It occurs on bushes and in grass and low herbage on meadows in woods and on similar places.

Geographical distribution:—Northern and middle Europe down into France; towards the north to middle Sweden, and in Finland. Strobl mentions (Mittheil. Ver. Steierm. 1892, 143.) that he has taken it commonly at a height of 4000 feet.

Remarks:—We have in our collection the type specimen to Zetterstedt's *C. amplicornis*; the author compares it with *C. laesus* and says: "an vere distinctus?"; this is also correct, for the species is *laesus*, and not, as Zetterstedt describes, a female, but a male. Kowarz' *amplicornis* must thus have a new name, I propose *C. Kowarzi*.

6. *C. cupreus* Macq.

1827. Macq. Soc. Sc. Lille, 20, 5, et 1834. Suit. à Buff. I, 447, 6. — 1838. Meig. Syst. Besch. VII, 149, 12. — 1862. Schin. F. A. I, 185. — 1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 463, 6. — 1903. Kat. paläarkt. Dipt. II, 318.

Male. Vertex and frons green. Epistoma dark greenish, very narrow downwards, the eyes almost or quite touching. Palpi small, dark, shining a little yellowish at the apex. Occiput greenish, greyish pruinose; postocular bristles black above, whitish below. Antennæ black, third joint rather small, not much broader than long, slightly pointed. Thorax somewhat dark green or æneous green, slightly brownish pruinose, shining; the posterior part and the scutellum more bluish green. Pleura greenish or æneous, dark greyish pruinose; propleura with two black or brown prothoracic bristles. Abdomen dark green with the apical part more æneous or dark coppery, or quite of this colour; it is clothed with short, black hairs, and has

somewhat short hindmarginal bristles, longer on the first segment. Venter dark greenish or æneous, with black hairs. Legs black, front coxæ yellow, with the base blackish grey, somewhat whitish grey pruinose anteriorly; front trochanters yellow; femora slightly metallic shining, front femora pale at the very base, and sometimes also the middle femora a little pale at the base; front tibiæ and tarsi blackish brown. The legs have short, black hairs, the femora with hairs below, arranged in the usual way, but only bristly at the apex; front tibiæ with an indistinct or no bristle above, middle tibiæ only with one distinct antero-dorsal bristle, rarely with two; hind tibiæ only with few, small bristles, and with a distinct but somewhat short ciliation on the anterior and antero-dorsal side, indistinctly continued out on the first tarsal joints. Wings somewhat greyish tinged, most towards the anterior margin and here somewhat brownish; veins blackish; posterior cross-vein rather near the base. Squamulæ yellow, with a brownish or yellowish fringe. Halteres yellow.

Female. Epistoma broad, grey. Palpi large, greyish pruinose. Thorax and abdomen generally more brightly metallic green or somewhat coppery. Front coxæ generally more blackish grey, but always with the apex yellow; anterior tibiæ either yellowish at the base, or quite yellowish and the base of metatarsus likewise; front tibiæ with a bristle above, and middle tibiæ with two well developed antero-dorsal bristles; hind tibiæ with the bristles stronger than in the male. The squamular fringe darker than in the male, generally blackish.

Length 2.2—2.8 mm; the female longest.

This species is easily known by the more or less yellow front coxæ and the slightly bristly posterior tibiæ.

C. cupreus is rare in Denmark; Ordrup Mose, Lyngby Mose, Faxe Ladeplads, and on Langeland at Lohals (the author); on Funen at Odense (H. J. Hansen); only eight specimens in all. My dates are ³⁰/₆—²¹/₇. I have taken it in grass and low herbage in fens and meadows in woods.

Geographical distribution: — Europe down into Italy; its northern limit lies in Denmark, and it occurs in England. Macquart has recorded it from the Canary Islands, but according to Becker (Mittheil. zool. Mus. Berl. IV, 1908, 48, 70) this record is very doubtful.

7. *C. blepharosceles* Kow.

1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 462, 5, Taf. XIII, Fig. 21. — 1903. Kat. paläarkt. Dipt. II, 318.

Male. Vertex and frons green. Epistoma greenish, very narrow downwards, the eyes almost or quite touching. Palpi small, dark, a

little yellowish at the apex. Occiput greenish, greyish pruinose; post-ocular bristles black above, whitish below. Antennæ black, third joint smallish, a little broader than long, slightly pointed. Thorax dark green, æneous or coppery, slightly brownish pruinose, shining; the posterior part and the scutellum generally more bluish green. Pleura greenish or æneous, greyish pruinose; propleura with two brown or blackish prothoracic bristles. Abdomen green or dark green, sometimes more æneous or with coppery or bluish reflexes; it is clothed with black hairs, which are not short, and it has somewhat long hindmarginal bristles, rather long on the first segment; at the end of abdomen on the eighth segment there are a few, not long but strong bristles. Venter æneous, somewhat greyish pruinose, with black hairs. Legs black, front coxæ greyish pruinose, with brownish yellow trochanters; femora somewhat greenish metallic; anterior tibiæ and metatarsi generally more or less brown. The legs have short, black hairs; femora with distinct bristly hairs below, and on all femora present on both sides; front tibiæ distinctly ciliated both above and below, and with two bristles above, the lowermost only slightly marked against the ciliation; middle tibiæ with two strong antero-dorsal, and generally two small postero-dorsal bristles; hind tibiæ with two dorsal rows of somewhat long bristles, and with a rather long ciliation on the anterior and antero-dorsal side, continued out on the tarsi. Wings somewhat dark greyish tinged, towards the anterior margin almost blackish; veins black. Squamulæ dirty whitish or yellowish, the margin brownish; the fringe brown or blackish. Halteres yellow or dirty whitish.

Female. Epistoma broader than in the male, but however not broad greenish, grey pruinose. Palpi somewhat small, grey. Anterior tibiæ and basal part of metatarsi yellow, sometimes the tibiæ a little darker at the apex.

Length 2,3—2,8 mm.

C. blepharosceles is not at all common in Denmark; Ordrup Mose, Ermelund; on Langeland at Lohals, and on Bornholm at Rø, Hasle and Hammeren. My dates are $^{22}/_6$ — $^{16}/_8$. It occurs in grass and low herbage in fens and on meadows in woods, f. inst. I have taken it on the leaves of *Petasites*.

Geographical distribution: — Northern and middle Europe down into France; its northern limit is in Denmark, and it occurs in England.

8. *C. gramineus* Fall.

1823. Fall. Dipt. Suec. Dol. 19, 24 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 483, 4, et 1849. VIII, 3064, 4, et 1855. XII, 4620, 4. — 1862.

Schin. F. A. I, 186. — 1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 472, 15. — 1903. Kat. paläarkt. Dipt. II, 318. — *Dolichopus laesus* 1823. Fall. Dipt. Suec. Dol. 19, 25, p. p. ♂. — *Diaphorus minimus* Meig. 1830. Syst. Besch. VI, 360, 6.

Male. Vertex and frons green. Epistoma greenish, more or less whitish pruinose, very narrow downwards, the eyes almost or quite touching. Palpi small, dark, a little yellowish at the apex. Occiput greenish, greyish pruinose; postocular bristles black above, whitish below. Antennæ black, third joint rather small, a little broader than long. Thorax bright green, golden green or æneous, sometimes more bluish, somewhat greyish pruinose, shining. Pleura greenish or æneous, grey pruinose; propleura with two black or brown prothoracic bristles. Abdomen bright green or bluish green, clothed with short black hairs, and with somewhat short hindmarginal bristles, long on the first segment; the eighth segment has a few short, strong bristles. Venter green, with brownish hairs. Legs black, front coxæ greyish or whitish grey pruinose anteriorly; front trochanters yellow, middle trochanters yellowish or brownish, hind trochanters brownish or black; femora shining metallic green; anterior knees, tibiæ and metatarsi yellow; hind tibiæ and tarsi black or brownish black, sometimes the tibiæ paler above and the metatarsi pale at the base. The legs have short, black hairs, front coxæ a few pale hairs; femora with small hairs below, bristly at the apex and arranged as usual; front tibiæ with one small bristle above; middle tibiæ with two distinct antero-dorsal

Fig. 71. Wing of *C. gramineus* ♂.

and very small postero-dorsal bristles; hind tibiæ with a few bristles in two dorsal rows, and with a distinct ciliation on the anterior and antero-dorsal side, indistinctly continued out on the tarsi. Wings a little greyish tinged, bluish iridescent; veins black, posterior cross-vein rather near the base. Squamulæ yellow, with a pale brownish or generally yellow fringe. Halteres yellow.

Female. Colour often more golden or æneous than in the male.

Epistoma broad, grey. Palpi larger than in the male, grey. Hind tibiæ and metatarsi yellow, generally brownish at the apex.

Length 2—2.5 mm.

C. gramineus is common in Denmark; Amager, Vester Fæled, Utterslev Mose, Ordrup Mose, Ermelund, Dyrehaven, Lyngby Mose, Hillerød, Svenstrup between Roskilde and Ringsted, Faxe Ladeplads; on Funen at Odense, Veflinge and Hoffmansgave; in Jutland in Greisdalen and Hojenbæk Dal at Vejle, Horsens, Laven near Silkeborg, Frijsenborg, Gjerlev near Randers Fjord and Frederikshavn, and on Bornholm at Almindingen, Hammeren and Hasle. My dates are ²⁷/₆—³/₉. It occurs on bushes and in grass and low herbage in fens and woods. Verrall thinks that it possibly occurs in more dry localities than the other species, but this is not confirmed by my experience; only it is perhaps more commonly found outside woods.

Geographical distribution:— Europe down into Spain; towards the north to northern Scandinavia, and in Finland.

9. *C. microcerus* Kow.

1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 469, 12, Taf. XIII, Fig. 17. — 1903. Kat. paläarkt. Dipt. II, 319.

Male. Vertex and frons green or golden green. Epistoma greenish, very narrow downwards, the eyes almost or quite touching. Palpi small, yellowish at the apex. Occiput greenish, greyish pruinose; post-ocular bristles black above, whitish below. Antennæ with the two basal joints reddish or brownish, sometimes only the second joint, and the pale colour may be indistinct; third joint small, black, broader than long. Thorax green, golden green or somewhat coppery, a little greyish pruinose, shining. Pleura greenish or æneous, greyish pruinose; propleura with two black prothoracic bristles. Abdomen green or a little coppery, clothed with short, black hairs; it has short hind-marginal bristles, longer on the first segment; eighth segment with a couple of short, strong bristles. Venter greenish, with brownish hairs. Legs with coxæ grey, front coxæ paler grey anteriorly and a little yellowish at the tip; anterior trochanters yellow or the middle brownish, hind trochanters dark brown or black; femora blackish, shining metallic green; the apex of the anterior femora and all tibiæ yellow; anterior tarsi with metatarsus and generally also the second joint yellow, the others brown, hind tarsi blackish brown with the basal part of metatarsus yellow. (According to Kowarz l. c. the hind tibiæ may be darker at base and apex). The legs have short, black hairs, the femora small hairs below, arranged in the usual way, bristly at the

apex; front tibiæ with one bristle above; middle tibiæ with two distinct antero-dorsal, and one or two very small posterodorsal bristles; hind tibiæ with two dorsal rows of bristles, and a short but distinct ciliation on the anterior side, not distinct on the tarsi. Wings slightly greyish tinged, somewhat bluish iridescent; veins blackish. Squamulae yellow, with a brownish or somewhat yellowish fringe. Halteres yellow.

Female. Epistoma somewhat broad, light grey. Palpi a little larger than in the male, greyish, paler at the tip. The apex of the anterior femora may be a little more broadly yellow than in the male; hind tibiæ quite yellow, and hind metatarsi with only the apex dark.

Length 1.8—2 mm.

C. microcerus is very rare in Denmark, we have only three specimens, two males and a female; the two specimens are from earlier time, probably taken at Ordrup, the third was taken at Nebsager south of Horsens in July (H. J. Hansen).

Geographical distribution: — Northern and middle Europe down into Germany, Poland and Bohemia; its northern limit is in Denmark, and it occurs in England.

11. **Diaphorus** Meig.

This genus is in many respects similar to *Chrysotus*, but the species are as a rule of a somewhat more elongated and slender shape, and with longer legs and broader wings. The species are of small to medium size, of metallic or of dark, slightly metallic colours; sometimes the males have the abdomen yellowish at the base. Head as broad as or slightly broader than thorax, generally broadest in the female, short, semiglobular. Eyes large, oval, narrowed downwards densely short-haired; they are generally meeting on the frons above the antennae in the male (and this is the only genus of Dolichopodids in which this feature occurs), separated in the female; but sometimes (in non Danish species) the eyes are more or less separated on the frons in the male, the frons being from very narrow to rather broad, even broader than the epistoma; below the antennae the eyes are separated in both sexes, broadest in the female. The vertex is not excavated, in the males with touching eyes the small vertical triangle is prominent; in these males there are a pair of ocellar and a pair of smaller postvertical bristles, but no vertical bristles; the females on the contrary have outer vertical bristles as usual. (How the case is in the males with a broad frons I do not know, according to Loew's

figure in Mon. of Dipt. of N. Am. Pl. VI, fig. 29a it would seem that outer vertical bristles are present here). On the posterior side of the ocellar tubercle are a pair of small hairs. The eye-facets are in the male distinctly enlarged in the middle of the front side, towards the eye-suture; sometimes (*nigricans*) they are enlarged in the whole upper half, and this is marked off from the lower half by a sharp dividing line. (Whether the facets are enlarged in the males with separated eyes I do not know). The postocular hairs form a single row above, but the whole lower half of the occiput is covered with somewhat dense hairs, also present above the oral aperture. The antennæ are inserted near to each other; in the females and in the males with a broad frons they are placed almost in or a little above the middle, but in the males with touching eyes they are placed farther downwards, below the middle; they are short, shaped about as in *Chrysotus*, the third joint generally broader than long and generally rounded anteriorly; arista distinctly dorsal, or (in non Danish species) more or less subapical. The first antennal joint has no hairs above, the second has a circlet of bristles at the apex, longest above, the third is densely and somewhat strongly hairy and the arista distinctly haired. Epistoma of usual shape in the females and in the males with a broad frons, but in the males with touching eyes it is shorter, somewhat impressed and directed inwards, as it forms a small angle with the frons. The clypeus is short, only slightly marked off by a small elevation on each side; in the female it is a little arched; generally it does not reach the lower margin of eyes, though sometimes almost reaching it. Proboscis slightly protruding in the male, a little more in the female; it and the mouth parts somewhat stronger in the female than in the male. Thorax somewhat short, almost quadratic, somewhat high, and arched above; pro- and metathorax small, the former with small bristles above. Acrostichal bristles biserial and distinct; there are five dorsocentral bristles, a humeral bristle and a couple of small hairs, a posthumeral, two notopleural, three supraalar, much diverging backwards, and a postalar bristle; the propleura have some (about four), not strong bristles. Scutellum bare, with two strong marginal bristles, and on each side a small bristle or hair. Abdomen somewhat long, sometimes shorter; it is cylindrical or slightly compressed, for the rest constructed as in *Chrysotus*; the eighth segment has some, generally four, strong bristles. Hypopygium as in *Chrysotus*, and likewise almost quite hidden; the outer lamellæ narrow, hairy, sometimes larger and of varied shape. Abdomen has dot-like impressions on the second, third and fourth segments, and less obvious on the fifth. The abdominal segments have hindmarginal bristles. Legs

generally somewhat long and slender, hind metatarsus of about the same length as the second joint or slightly longer. Hind coxæ with a bristle on the outside; femora without preapical bristles; front femora with somewhat bristly hairs below; middle tibiæ with one or two antero-dorsal and a couple of small postero-dorsal bristles, besides a ventral bristle. The legs are sometimes specially haired in the male. There are two claws, two not small pulvilli, and a narrow empodium with bristles below and thus somewhat comb-shaped. The pulvilli on the front tarsi are in the males strongly enlarged, sometimes only moderately; they may also (in non Danish species) be enlarged on the middle or on all tarsi. In the males with their enlarged pulvilli on the front tarsi, these tarsi have no claws, and this curious feature may be very characteristic for the genus. I have only examined the three Danish species, and in all these the front tarsi in the males have no claws; how it may be in the cases where also the posterior tarsi have enlarged pulvilli, I do not know. Wings rather broad, especially towards the base, as the axillary lobe is somewhat large; the mediastinal vein terminating in the subcostal vein; discal vein straight, parallel with the cubital vein; posterior cross-vein in or about in the middle; anal vein not reaching the margin. The last part of the discal vein has a convexity about in the middle. Squamulæ small, with a small angular lobe, bearing a long fringe of somewhat few hairs; the inner part of the squamulæ short-haired.

The developmental stages are not known.

The species of *Diaphorus* occur on bushes and in low herbage, generally in more or less humid and shaded places.

Of the genus 13 species are at present known from the palæarctic region; 3 have been found in Denmark.

Table of Species.

1. Legs mainly black; abdomen in the male without yellow colour 3. *nigricans*.
- Legs more or less yellow; abdomen in the male yellow at the base 2.
2. Anterior femora blackish on the basal half, hind femora quite blackish; the male with the second abdominal segment quite, and generally more or less of the third, yellow; front tibiæ with short hairs below 1. *oculatus*.
- Anterior femora mainly yellow, hind femora with the basal half yellow; the male with the second abdominal segment only partly yellow; front tibiæ with long hairs below 2. *Hoffmannseggii*.

1. *D. oculatus* Fall.

1823. Fall. Dipt. Suec. Dol. 28, 22 (*Dolichopus*). — 1830. Meig. Syst. Besch. VI, 360. — 1843. Zett. Dipt. Scand. II, 491, 1, et 1855. XII, 4621, 1. — 1862. Schin. F. A. I, 187. — 1903. Kat. paläarkt. Dipt. II, 322. — *Diaphora bimaculata* Macq. 1827. Soc. Sc. Lille, 1827, 22, 2, et 1834. Suit. à Buff. I, 448, 2, Tab. X, fig. 22. — *Diaphorus bimaculatus* 1838. Meig. Syst. Besch. VII, 148, 7. — *Diaphorus flavocinctus* Meig. 1824. Syst. Besch. IV, 33, 1, Tab. XXXIV, Fig. 8.

Male. Vertex black, frontal triangle grey; eyes very approximated or touching for a short distance on the middle of the frons. Epistoma broad, grey. Palpi small, yellow. Occiput grey; postocular

Fig. 72. Antenna of *D. oculatus* ♂, from the inside. $\times 100$.

bristles black above, yellowish below. Antennæ black or brownish black, third joint short, rounded anteriorly; arista distinctly dorsal. Thorax green or æneous, strongly grey pruinose, almost not or only slightly shining. Pleura grey or dark grey. Abdomen black, slightly æneous, the second, and generally a smaller or larger part of the third segment yellow; the hind margin of the second segment narrowly black; abdomen clothed with short, black hairs, longer at the sides, and it has somewhat long hindmarginal bristles, longest on the first segment; the eighth segment has four long and strong bristles. The venter has the three basal segments yellow, the others dark, and it has somewhat long, blackish hairs, longest at the hind margins. Legs with the coxæ grey, front coxæ pale grey anteriorly, and with the apex and the trochanters yellow; the apex of the posterior coxæ and the trochanters may be brownish; femora brownish black, anterior femora with the apical third or half yellow, sometimes only below; tibiæ yellow, hind tibiæ brownish black at the apical part; anterior tarsi with apex of metatarsus and the four following joints brownish, hind tarsi quite brownish black. The legs have short, black hairs, front femora with long, somewhat bristly hairs below; middle femora with short hairs and hind femora with long hairs below at the slightly elevated apical part; front tibiæ with a few, small bristles above and short hairs below; middle tibiæ with a distinct antero-dorsal bristle near the base, two small postero-dorsal, and one ventral bristle below

the middle; hind tibiæ with a row of somewhat long dorsal bristles, and a few, very small ventral bristles; front tarsi with some long hairs at the apex above, and the front pulvilli much enlarged. Wings somewhat brownish tinged; veins blackish brown. Squamulæ yellow, with a black fringe. Halteres yellow.

Fig. 73. Wing of *D. oculatus* ♂.

Female. Frons broad, greenish black, somewhat greyish pruinose. Epistoma broad, grey. Palpi large, yellowish grey. Front femora with shorter hairs below, hind femora without long hairs at the apex, and middle tibiæ with two antero-dorsal bristles. Abdomen not yellow above but only at the base of the venter.

Length 3,3—4,2 mm.

D. oculatus is somewhat rare in Denmark, and has only been taken on a few occasions; Charlottenlund, Gurre (Stæger); on Funen at Veflinge, and in Jutland at Laven near Silkeborg and at Sæby (H. J. Hansen). The dates are from May to the first part of August. Stæger took it on Alnus.

Geographical distribution: — Northern and middle Europe down into France; towards the north to northern Sweden, and in Finland.

2. *D. Hoffmannseggii* Meig.

1830. Meig Syst. Besch. VI, 360, 5. — 1857. Loew, Neue Beitr. V, 47. — 1862. Schin. F. A. I, 187. — 1903. Kat. paläarkt. Dipt. II, 321.

Male. Vertex blackish green, frontal triangle grey; eyes touching. Epistoma broad, grey. Palpi small, yellow. Occiput grey; postocular bristles black. Antennæ black or brownish black, third joint short; arista distinctly dorsal. Thorax green or bluish green, densely grey pruinose, a little shining. Pleura grey pruinose. Abdomen dark green, with the light from behind a darker middle-line is seen; second segment more or less yellow on the basal part; abdomen clothed with short, black hairs, longer at the sides, and it has somewhat long hindmarginal bristles, longest on the first segment; the eighth segment

has four long, strong bristles. Venter greenish grey, somewhat yellow at the base, with long, black hairs, strongest at the hindmargins. The narrow outer lamellæ of the hypopygium are dark. Legs yellow, coxæ blackish grey, front coxæ with the very apex and the trochanters yellow, the posterior trochanters brownish; anterior femora somewhat brownish above; hind femora dark just at the base, and blackish brown on the apical half; anterior tibiæ yellow, hind tibiæ brownish, darkest towards the apex; anterior tarsi with the apex of metatarsus and the four following joints dark brown, hind tarsi blackish brown. The legs have short, black hairs, front femora with long, bristly hairs below, middle femora with short hairs; hind femora as in *oculatus* with long hairs below at the apex on the posterior side, but they are more bristly and less crowded, and continued beyond the apical half: on the anterior side there are long, bristly hairs on about the apical half, short hairs on the rest; front tibiæ with somewhat long hairs above among which a pair of longer bristles; on the postero-ventral side there are long hairs, continued out on the metatarsus, and finally there are on the ventral side somewhat long hairs and a long bristle below the middle; middle tibiæ with an antero-dorsal bristle near the base, two postero-dorsal bristles, and a ventral bristle below the middle; hind tibiæ with a row of dorsal bristles, and some small ventral bristles; front tarsi with long hairs above at the apex, and the front pulvilli very enlarged. Wings somewhat brownish tinged; veins blackish brown. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. I have not examined the female; according to the descriptions it differs from the male in the same way as the female of *oculatus*.

Length about 4.7 mm.

This species is in the male easily known from *oculatus* by the less extended yellow colour on abdomen and by the quite differently haired front tibiæ and hind femora; both sexes are known by the differently coloured legs and the black postocular bristles.

D. Hoffmannseggii is very rare in Denmark, only one specimen, a male, has been caught at Laven near Silkeborg in Jutland, in August 1881 (H. J. Hansen).

Geographical distribution:— Northern and middle Europe down into Austria, Hungary and Styria; its northern limit lies in Denmark, and it occurs in England.

Remarks: Verrall (Entom. Month. Mag. XVI, 1905, 81) expresses the opinion that *D. cyanocephalus* Meig., *Hoffmannseggii* Meig. and *tripilus* Loew, may be identical, partly lead by the labelling found in Kowarz' collection; I can say nothing else about this opinion, than that it seems somewhat probable.

3. *D. nigricans* Meig.

1824. Meig. Syst. Besch. IV, 33, 2. — 1857. Loew, Neue Beitr. V, 45. — 1862. Schin. F. A. I, 187. — 1893. Strobl, Mittheil. Ver. Steierm. 1892, 142. — 1903. Kat. paläarkt. Dipt. II, 321. — *Diaphorus obscurellus* Zett. 1838. Ins. Lapp. 706, 2, et 1843. Dipt. Scand. II, 492, 2, ♂. — *Chrysotus obscuripes* Zett. 1838. Ins. Lapp. 705, 4 et, 1843. Dipt. Scand. II, 487, 8, ♀. — 1874. Kow. Verhandl. zool. bot. Gesell. Wien. XXIV, 464, nota, et 476.

Male. Vertex and frontal triangle black; the eyes are touching. they have the facets in the upper half enlarged, and the two halves are divided by a sharp line. Epistoma broad, grey. Palpi small. dark yellowish. Occiput black, with black postocular bristles. Antennæ black, third joint short; arista distinctly dorsal. Thorax black, slightly greenish, it is brownish black pruinose, very slightly shining; in the middle there are two narrow, greyish brown, longitudinal stripes. Pleura greyish black. Abdomen somewhat short, black, with the light from behind very slightly greenish; it is clothed with short, black or brownish black hairs, longer at the sides, and it has hindmarginal bristles, long on the first segment; the eighth segment has four long and strong bristles. Venter black, somewhat greyish, with shortish, black hairs. Legs black, tibiæ and tarsi blackish brown. The legs have short, black hairs, front femora with somewhat long, bristly hairs below, middle femora with short hairs, hind femora with some bristly hairs at the apex on the antero-ventral side; front tibiæ with about two small bristles above; middle tibiæ with one or two small antero-dorsal, and a pair of indistinct postero-dorsal bristles; hind tibiæ with few bristles in a dorsal row. Front tarsi with only somewhat short hairs above at the apex, and the pulvilli moderately large. Wings brown tinged, most towards the anterior margin; veins blackish. Squamulæ brownish black, with a black fringe. Halteres blackish.

Female. Of more greenish colour than the male, thorax greenish, brownish pruinose, abdomen dark green. Frons broad, brownish grey. Epistoma blackish, greyish pruinose; palpi a little larger than in the male. Halteres with the knob yellow.

Length 2.6—3 mm.

D. nigricans is very rare in Denmark, only one specimen, a male, has been taken on the same place as the preceding species, viz. in Jutland at Laven near Silkeborg in August 1881 (H. J. Hansen).

Geographical distribution:— Europe down into Italy; towards the north to northern Sweden, and in Finland.

12. *Argyra* Macq.

Species of medium or somewhat large size, and of metallic green colour; the males have in most species a beautiful, silvery pruinosity

either only on abdomen or also on thorax; abdomen has often yellow side-spots on one or several of the basal segments. Head generally broader than thorax, about as broad as high, or, especially in the females, a little broader; it is semiglobular, but very short, and the occiput is flat, or, in the females, slightly arched. In a few species (*magnicornis*, *elongata*) the head is a little smaller, and also in the males less short and a little arched behind. The vertex is considerably excavated, the ocellar tubercle high and prominent. Frons a little decreasing in breadth towards the antennæ, most in the males, and in this sex narrower than in the females. In the females there are strong ocellar and outer vertical bristles, and a pair of postvertical bristles, but in the males there are generally no vertical bristles; I have found vertical bristles in the males of only *Loewii* and *magnicornis*, and these males have the frons somewhat broad.¹ On the posterior side of the ocellar tubercle there are a number, or only a pair of somewhat long, forwards curved hairs, longest in the males. The eyes are large, largest in the males, somewhat oval; in the living specimens they are dark metallic green, with strong, purplish or reddish reflexes, or almost quite purplish; they are densely hairy; the eye-facets are in the males slightly enlarged on the front side. The eyes are separated, the epistoma more or less narrow in the males, broader in the females. The postocular bristles or hairs form a single row on the upper half of occiput, but the whole lower half is covered with hairs, which are longer and less or not bristly; they are not interrupted above the mouth aperture: also above, at the vertex, there are a few bristles placed behind the row; the bristles in the row on the upper half are small in the male, longer and stronger in the female. Antennæ shorter or longer, longest in the male, it is especially the third joint which is longer; first joint cylindrical or a little obconical, second joint short, obconical, generally not or slightly overlapping the third joint, but in some species (*magnicornis*, *elongata*) more or less elongated above and on the inside, and overlapping the third; the third joint is more or less triangular, in the males elongated

¹ Kowarz says (Verhandl. zool. bot. Gesell. Wien, XXVIII, 1878, 438) in general that the males have short vertical bristles; one or several of the uppermost postocular bristles are stronger than the others, and it is evidently these Kowarz sometimes considers as vertical bristles, but this they cannot be, firstly because they are placed more posteriorly than the verticals, and secondly because they are also present in the females, which have vertical bristles; and that it is so is proved beyond doubt by those males, which have real vertical bristles, as these are placed much more anteriorly on a line with the ocellar bristles, and these males have also stronger upper postocular bristles.

triangular; arista inserted dorsally, near the apex of the third joint; it is two-jointed with the basal joint short, and it is generally longer than the antenna itself, but in some males shorter. The first antennal joint has bristles above and on the outer side, the second has a circlet of bristles at the apex, longest above, in *elongata* it has also hairs on the dorsal margin; the third joint very short-hairy, and the arista short- or microscopically pubescent. The epistoma is, as mentioned, narrower in the male than in the female; clypeus generally short, sometimes a little longer, it is in the males very slightly marked off from the epistoma; in the females the separation is more distinct, as there is at each side an elevation with a small notch, and the clypeus is in this sex generally a little arched; it does not reach the lower margin of the eyes. The proboscis and the mouth parts, as well as the mouth aperture, are considerably larger in the female than in the male, and the proboscis is not or slightly protruding in the male, but somewhat protruding in the female. Labrum (*diaphana* ♀) strong, high at the base, semitubular, with a longer, less chitinised median tooth, and two shorter, strongly chitinised lateral teeth, which on account of the semitubular shape lie more downwards; the upper or median tooth is serrated on the lower margin from a little behind the apex to the lateral teeth. Hypopharynx likewise strong, a little shorter than labrum, very broad at the base and somewhat suddenly narrowed into an elongated triangular apex, the point is curved a little downwards; the hypopharynx has the margins curved a little upwards, it is thus slightly semitubular with the cavity turned towards the cavity of the labrum; it has a distinct salivary duct, widened in the basal part. Maxillary palpi large, oval, squamiform and hairy; (they are considerably smaller in the male). Labium short and thick, the basal part shorter than broad, and shorter than the labella; these latter are broad, oval, with hairs at the margin. Thorax somewhat short, almost quadratic, high, and a little arched above; pro- and metathorax small, the former with a transverse row of small bristles. Acrostichal bristles biserial and generally somewhat long; there are six long dorsocentral bristles, a humeral bristle, and besides some hairs or (in the group *Lasiargyra*) a whole tuft, further a posthumeral, a præsutural, three supraalar, a postalar and two notopleural bristles; the front part of the disc has as usual smaller hairs, but in some of the species with a hairy scutellum (*Lasiargyra* Mik) the whole thoracic disc is clothed with somewhat long hairs, shorter in the females, and in this case the acrostichal hairs may in the male appear somewhat irregularly placed. Propleura with more or fewer hairs, some of which may be strong prothoracic bristles. The prothoracic spiracle distinctly hairy at the

margin. Scutellum bare, or hairy (*Lasiargyra* Mik), with four strong marginal bristles, the lateral often smallest. Abdomen somewhat long, cylindrical or almost so, a little narrowed towards the end; the first dorsal segment is short, and the first ventral segment likewise very short, in the male it has one or two tufts of long hairs; the anterior part of the second ventral segment is almost quite separated from the larger posterior part by a membranous space. In the male there are six visible dorsal segments, from the second of about the same length or slightly decreasing in length backwards; the sixth is always smaller; the first four ventral segments are in length answering to the dorsal, the fifth and sixth are more or less membranous and folded up to receive the hypopygium; the seventh abdominal segment is small, unsymmetrical and hidden. Hypopygium somewhat small and roundish, and resembling that in *Chrysotus*; it is not pedunculated, curved up under the fifth and sixth segments, and as usual with the dorsal side downwards; the eighth segment has short hairs, and sometimes longer bristles; the hypopygium has the cavity more posterior than ventral; the outer lamellæ are small or somewhat small, generally narrow, and hairy; there are generally broad and more or less oval, somewhat blade-shaped ventral lobes, and between them the inner lamellæ may be seen, but they are generally hidden. Penis is long and strongly curved, so that it may be directed backwards when the hypopygium is in situ. The female abdomen is more robust and more pointed, it has five normal segments, and as usual three hidden, and it terminates with some small spines above, and below them a pair of larger spines or styles. There are dot-like impressions at the side margins on the second to sixth segments in the males; they are less obvious or wanting towards the end of abdomen in the females. The abdominal segments have hindmarginal bristles. Legs somewhat slender, hind metatarsi from a little shorter to considerably longer than the second joint; the anterior coxæ have dense, bristly hairs, the hind coxæ have on the outer side a vertical row of from two (*grata*, non Danish) to several bristles, decreasing in length downwards; the femora have in the males more or less dense and long, bristly hairs below or on the sides towards below; preapical bristles on the posterior femora are only rarely marked between the strong hairs; in the females the femora are mainly short-haired, and preapical bristles may be more distinct; tibiæ with more or fewer bristles on the dorsal side, generally in two rows, middle tibiæ also with distinct bristles below; further the tibiæ have apical or preapical bristles; the front metatarsi have bristly hairs below, which are quite short, or longer, and in the latter case generally shorter in the female; hind metatarsi without

bristles above (in *confinis* with long hairs on the anterior and ventral side). There are two claws, two small pulvilli, and a narrow empodium with bristles below. Wings somewhat broad; the mediastinal vein terminating in the subcostal vein; this latter vein rather long, reaching about to the middle, rarely short; it is somewhat distant from the costa; discal vein with a larger or smaller bend on its last part, but the end-part parallel with the cubital vein; posterior cross-vein placed about in or after the middle, rarely a little anterior to it; anal vein not reaching the margin, though often traceable near to it. Axillary lobe well developed, but rounded. The discal bend lying on a convexity. Squamulæ with the angular lobe small, bearing a long fringe, the inner part of the squamulæ with short hairs.

The developmental stages of the genus are not known.

The species of *Argyra* are very characteristic, and in the male sex very beautiful flies, especially the species with silvery gloss. They occur in fens and woods, generally at the borders of water at ponds, streamlets and ditches, and also on other places where the ground is humid; in sunny weather the males are then flying very quickly to and fro quite low over the wet ground or muddy border, and resting on it, while the females are sitting in the vicinity on leaves of bushes and in low herbage; the males are also found resting on leaves especially in gloomy weather.

Of the genus 17 species are known from the palæarctic region; 9 have been found in Denmark.

Table of Species.

Males.

1. Scutellum hairy above.....	2.
— Scutellum not hairy above	4.
2. Arista longer than the antennæ	3.
— Arista shorter than the antennæ	3. <i>magnicornis</i> .
3. Abdomen silvery, with yellow spots on the sides of second and third segments.....	1. <i>diaphana</i> .
— Abdomen not silvery, without yellow spots	2. <i>Loewii</i> .
4. Thorax silvery above	5.
— Thorax not distinctly silvery above	7.
5. Antennæ shorter than the head; epistoma black	4. <i>leucocephala</i> .
— Antennæ as long as, or longer than the head; epistoma silvery white	6.
6. Arista as long as, or longer than the antennæ; front coxæ mainly grey	5. <i>argyria</i> .
— Arista shorter than the antennæ; front coxæ mainly yellow	6. <i>argentina</i> .
7. Hind metatarsus longer than the second joint; wings with the subcostal vein not short.....	8.

- Hind metatarsus not longer than the second joint; wings with the subcostal vein short..... 9. *elongata*.
- 8. Hind metatarsus with long hairs..... 7. *confinis*.
- Hind metatarsus without long hairs..... 8. *auricollis*.

Females.

- 1. Scutellum hairy above..... 2.
- Scutellum not hairy above..... 3.
- 2. Thorax hairy on the whole disc; front coxæ blackish grey, anterior femora more or less blackish at the base 1. *diaphana*.
- Thoracic disc only with the usual short hairs in front; front coxæ somewhat yellowish at the apex, anterior femora yellow..... 3. *magnicornis*.
- 3. Antennæ longer than the head; subcostal vein short.... 9. *elongata*.
- Antennæ shorter than, or at most as long as the head; subcostal vein not short..... 4.
- 4. Hind metatarsus as long as or shorter than the second joint..... 5.
- Hind metatarsus longer than the second joint..... 7.
- 5. Hind coxæ more or less yellow at apex; wings with the discal bend nearer the cross-vein than the apex; squamular fringe yellow; abdomen with yellow side-spots on second, or on this and third segment..... 6. *argentina*.
- Hind coxæ quite blackish grey..... 6.
- 6. Abdomen with yellow side-spots at the base; squamular fringe black or brown..... 4. *leucocephala*.
- Abdomen (generally) without yellow spots at the base; squamular fringe paler, pale brownish or yellow; discal bend in, or about in the middle between cross-vein and apex 5. *argyria*.
- 7. Coxæ more or less yellow..... 7. *confinis*.
- Coxæ almost quite blackish grey..... 8. *auricollis*.

The female of *A. Loewii* is unknown.

1. *A. diaphana* Fabr.

1775. Fabr. Syst. Entom. 783, 54, et 1781. Spec. Ins. II, 448, 70, et 1798. Ent. Syst. Suppl. 564, 126 (*Musca*). — 1824. Meig. Syst. Besch. IV, 46, 1, Tab. XXXV, Fig. 5, ♂, et 1830. VI, 362 (*Porphyrops*). — 1838. Meig. ibid. VII, 154, 1. — 1843. Zett. Dipt. Scand. II, 587, 76, et 1855. XII, 4635, 76 (*Dolichopus*). — 1862. Schin. F. A. I, 190. — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 443, 3, Taf. V, Fig. 1—12. — 1903. Kat. paläarkt. Dipt. II, 324. — *Dolichopus pellucens* Fall. 1823. Dipt. Suec. Dol. 17, 20. — *Porphyrops versicolor* Meig. 1824. Syst. Besch. IV, 50, 9, ♀.

Male. Vertex and frons black; eyes with blackish brown hairs. Epistoma somewhat narrow, velvet black. Palpi somewhat small, black. Occiput grey pruinose; postocular bristles black, downwards sometimes brownish. Antennæ black, longer than the head, third joint somewhat elongated, about as long as the two basal joints; arista about of the length

of the antennæ. Thorax dark metallic green, sometimes somewhat bluish, often with two faint darker stripes in the middle; it is a little greyish pruinose, and generally somewhat whitish at the humeri, shining; the thoracic disc somewhat densely hairy. Scutellum with somewhat longish

Fig. 74. Antenna of *A. diaphana* ♂, from the inside. $\times 55$.

hairs above; pleura grey, slightly greenish or æneous; prothoracic bristles strong, black. Abdomen somewhat metallic green, first segment greyish black, the rest densely covered with a silvery pruinosity; the second and third segments with a large, yellow, translucent spot at each side, the spots on the third segment may be indistinct or quite wanting; abdomen clothed with somewhat longish, black hairs, and it has long hindmarginal bristles, longest on the first segment; eighth segment with dense hairs, and some longer bristles at the apex. Venter grey, with black hairs, long at the base and at the hind margins. Legs black, coxæ somewhat greyish; anterior femora with the apex, and the anterior tibiæ yellow, hind tibiæ yellow, blackish at base and apex; anterior tarsi brownish or blackish towards the end, hind tarsi blackish, sometimes with the basal joint paler; hind metatarsus slightly longer than the second joint. The legs have short, black hairs, the anterior coxæ densely bristly anteriorly; hind coxæ with a row of bristles on the outer side; anterior femora with long, bristly hairs below, longest on the middle femora; hind femora with longish hairs both above and below; front tibiæ with some bristles above, middle tibiæ with two dorsal rows, and some smaller ventral bristles, hind tibiæ likewise with two dorsal rows; front metatarsi with a ventral row of long bristles. Wings almost hyaline, or a little brownish tinged; veins blackish; the bend of the discal vein somewhat large, lying nearer the cross-vein than the apex. Squamulæ dirtily whitish, with a black margin above and a long, black fringe. Halteres pale yellow or whitish.

Female. Vertex and frons greyish white; eyes with whitish hairs; postocular hairs white below. Antennæ shorter than in the male, third joint about as long as broad. Epistoma broad, grey; palpi large, grey. Thorax greyish white all about the humeri; the disc and the scutel-

lum shorter haired than in the male. Abdomen greenish or coppery, whitish pruinose at the sides, especially towards the front corners of the segments, without yellow spots. Femora yellow, front femora more or less blackish above, middle femora blackish at the base and

Fig. 75. Antenna of *A. diaphana* ♀, from the inside. $\times 55$.

hind femora at the apex; hind tibiae not blackish at the base. The femora mainly short-haired, only the front femora with longer hairs on the posterior side, and below towards the apex; middle femora with a distinct preapical bristle; front metatarsi with short hairs below.

Length 5.5—7 mm.

A. diaphana is common in Denmark; at Copenhagen, Damhussø, Charlottenlund, Ørdrup Mose, Ermelund, Dyrehaven, Lyngby Mose, Fure Sø, Hillerød, Tyvekrog and Præstevang at Hillerød, Roskilde, Faxe Ladeplads, Nyraad at Vordingborg and on the little island Eg-holm at Skelskør; on Langeland at Lohals; on Lolland at Maribo; in Jutland at Silkeborg and Laven near Silkeborg. My dates are ^{14.5}—³ 9. It occurs on bushes and in low herbage on humid places, especially in fens and at the borders of streamlets and ditches.

Geographical distribution:— Northern and middle Europe down into Corsica; towards the north to middle Sweden, and in Finland.

Remarks: Fabricius has in the last of his works, Syst. Antl. 1805, 270, 18, *Dolichopus diaphanus*, and gives as locality for it "in Americae insulis", and according to this the species should occur in America, but this is not so. It is curious to see that Fabricius in his earlier works, Syst. Ent. 1775, Spec. Ins. 1781, Mantiss. Ins. 1787 and Ent. Syst. Suppl. 1798, gives either, as in the two first "Lipsiæ" as locality, or, in the last "Europæ"; only in Mantiss. Ins. he gives no locality; he evidently had not this in mind when in 1805 he gave America as locality without mentioning its occurrence in Europe. Loew has (Mon. of Dipt. of North Am. II, 126) already discussed this, and he comes to the conclusion that Fabricius has either made a mere mistake with the locality in Syst. Antl., or he confounded later an American species with the European one: Loew thinks the first to

be more probable; my researches prove however that the latter is the case. In the collection of Tönder-Lund we have two specimens, which evidently are those which Fabricius had, when he made the statement in Syst. Antl. The specimens are labelled "*Dolichopus diaphanus*, ex Americæ insulis": the species is very like *diaphanus*, but is quite another species, with shorter antennæ and bare scutellum; it is evidently some American species very similar to *diaphanus* (but not *albicans* Loew). *A. diaphana* thus does not occur in America, and *Dol. diaphanus* in Syst. Antl. cannot be quoted under *A. diaphana*, but goes in as synonym under the American species in question. The type to *A. diaphana* is certainly in Kiel.

2. *A. Loewii* Kow.

1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 446, 5, Taf. V, Fig. 14. — 1903. Kat. paläarkt Dipt. II, 325. — *Argyra albiceps* Stæg. in litt. Zett. 1843. Dipt. Scand. II, 594.

Male. Vertex and frons dark grey, whitish shining; eyes with pale brownish or whitish brown hairs, palest downwards. Epistoma somewhat broad, brown, greyish shining when seen from above. Palpi not small, dark greyish. Occiput grey pruinose; postocular bristles black above, yellowish below, the lowermost somewhat brownish. Antennæ black, slightly longer than the head, third joint about as long as the two basal; arista considerably longer than the antennæ. Thorax metallic green, with two faint, dark stripes in the middle; it is somewhat brownish pruinose, shining; at the humeri it is whitish grey; the thoracic disc and scutellum longish haired. Pleura somewhat æneous, grey pruinose; prothoracic bristles strong, black. Abdomen æneous or somewhat coppery, the second, third and fourth segments whitish pruinose, especially at the sides, and here most broadly towards the front margin, the fifth and sixth segments somewhat silvery. Abdomen is clothed with black hairs, and has somewhat short hindmarginal bristles, long on the first segment. Venter dark grey, with black hairs, which are long at the base. Legs yellow, coxæ grey, front coxæ slightly yellowish brown at the apex; anterior femora brownish black with the apical part yellow, hind femora with the apical part brownish black; anterior tarsi blackish brown towards the end, the tip of the hind tibiæ and the hind tarsi blackish; hind metatarsus a little longer than the second joint. The legs are haired about as in *diaphana*, the bristly hairs below the anterior femora scarcely so long, on the hind femora distinctly shorter; anterior tibiæ with two rows of dorsal bristles, middle tibiæ also with two rows of smaller ventral bristles; the hind tibiæ with two dorsal rows; front

metatarsi with a row of bristles below, the bristles scarcely as long as in *diaphana*. Wings slightly tinged; veins brownish black, the discal bend large, nearer to the cross-vein than to the apex. Squamulae dirtily whitish, with a broad, blackish margin and a black fringe. Halteres yellow.

Female unknown.

Length fully 7 mm.

A. Loewii is very rare in Denmark, we have only one specimen, taken by Stæger in earlier time (1839) on Amager at the shore in August. The species was founded by Kowarz in 1878, but it was already known to Stæger as a new species in 1839, and mentioned as *A. albiceps* n. sp. in a letter to Zetterstedt; Kowarz' name will however have to be used as *albiceps* must be considered as a nomen nudum.

Geographical distribution: — The species is only known from Denmark and Bohemia.

3. *A. magnicornis* Zett.

1838. Zett. Ins. Lapp. 712, 19, et 1843. Dipt. Scand. II, 593, 81, et 1849. VIII, 3091, 81 (*Dolichopus*). — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 441, 1, Taf. V, Fig. 15—18. — 1903. Kat. paläarkt. Dipt. II, 325. — *Argyra aristata* Gerst. 1864. Stett. Ent. Zeitg. XXV, 31, 4.

Male. Head relatively somewhat small, and a little arched behind. Vertex and frons greyish white; eyes with whitish hairs. Epistoma somewhat narrow, white. Palpi small, black. Occiput grey pruinose; post-ocular bristles black above, yellowish below. Antennae black, long, almost twice as long as the head, third joint about as long as the two basal joints; arista short, only slightly longer than the third joint. Thorax metallic green, scutellum more bluish; the thoracic disc with a pair of faint, dark grey stripes in the middle; it is brownish grey pruinose, not much shining, about the humeri more whitish grey pruinose; the scutellum has shortish hairs, but the thoracic disc not, except the usual short hairs in front. Pleura grey, prothoracic bristles strong, black. Abdomen dark metallic green, the second and third segments with yellow, translucent spots at the sides (sometimes only present on the second segment); abdomen clothed with black, not short hairs, and it has hindmarginal bristles, which are long on the first segment; eighth segment with some long bristles at the end. Venter greenish grey, yellow on the basal part, with blackish hairs. Legs yellow, coxæ grey, front coxæ somewhat yellowish at the apex and behind; hind femora black above at the apex, and hind tibiae black at the apex; front tarsi blackish brown towards the end, the middle tarsi from the apex of the first joint, and the hind tarsi quite

black or blackish brown; hind metatarsus about of the length of the second joint. The legs have short, black hairs, the front coxæ bristles as usual, the hind coxæ one long and some small bristles on the outside; front and hind femora short-haired, middle femora with longer, bristly hairs below; posterior femora with a somewhat distinct preapical bristle; anterior tibiæ with two rows of bristles above, middle tibiæ also with two rows of small bristles below, the lowermost pair longer; hind tibiæ with two dorsal rows and with small ventral bristles; front tibiæ and metatarsi with short, fine hairs below. Wings slightly brownish tinged; veins brownish black, the discal bend moderately large, placed a little nearer the cross-vein than the apex; subcostal vein terminating before the middle. Squamulæ yellow with a broad, black margin above, and a long, yellow fringe. Halteres yellow.

Female. Epistoma broad, grey. Palpi large, grey. Antennæ shorter than in the male, third joint short, arista longer than the antennæ. Abdomen without yellow spots, metallic bluish green with white, pruinose, triangular spots at the sides towards the front margin of the segments, on the fifth segment united above. Femora quite short-haired, and middle femora without bristly hairs below.

Length 4.8—5.5 mm.

A. magnicornis is like the preceding very rare in Denmark, only two specimens, a male and a female, have been taken by Stæger in Dyrehaven on ³¹ 1846. As I have examined Zetterstedt's type-specimens my identification is certain.

Geographical distribution:—Northern and middle Europe down into Austria; towards the north to northern Scandinavia; it seems upon the whole to be a rare species.

4. *A. leucocephala* Meig.

1824. Meig. Syst. Besch. IV, 49, 8, ♀, et 1830. VI, 362 (*Porphyrops*), et 1838. VII, 154, 6. — 1843. Zett. Dipt. Scand. II, 589, 77, et 1849. VIII, 3089, 77 (*Dolichopus*). — 1862. Schin. F. A. I, 191. — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 447, 6. — 1903. Kat. paläarkt. Dipt. II, 324. — *Dolichopus diaphanus* 1823. Fall. Dipt. Suec. Dol. 16, 19, p. p. ♂. — *Porphyrops diaphanus* 1824. Meig. Syst. Besch. IV, 46, 1, ♀. — *Dolichopus pellucens* 1840. Zett. Ins. Lapp. 712, 18.

Male. Vertex and frons black, in certain directions shining white; eyes with pale brownish hairs. Epistoma narrow, velvet black. Palpi small, black. Occiput grey pruinose; postocular bristles black above, whitish below. Antennæ black, the third joint often brownish; they are short, shorter than the head, the third joint triangular, about as long as the basal joint; the arista twice or more than twice as long

as the antennæ. Thorax metallic green, distinctly silvery pruinose, especially when seen from in front, the hindmost part less pruinose; acrostichal bristles long; scutellum not hairy. Pleura greenish, whitish grey pruinose; the prothoracic bristles thin, whitish. Abdomen with the ground colour appearing dark greyish, seen from behind with a slight greenish colour, but from the base of the second segment densely silvery; the first segment greenish; the second, third and generally also the fourth segments with translucent yellow side spots, large on the second and third, small or sometimes wanting on the fourth segment. Abdomen clothed with short black hairs, longer at the sides, especially on the second segment; there are long hindmarginal bristles, longest on the first segment; the eighth segment short-haired. Venter yellow, with only the apical part grey; it has short, black hairs, and bristles at the hind margins; at the base there are two tufts of long, blackish hairs. Hypopygium with the ventral lobes and outer lamellæ small. Legs with the coxæ grey, front coxæ often more or less yellowish at the apex and behind, femora yellow, the anterior femora generally more or less brownish at the basal part, and the hind femora at the apical part, or the femora brownish or blackish, only the anterior femora yellow at the apex; tibiæ yellow, hind tibiæ brownish or blackish at the apex; the anterior tarsi blackish brown towards the end, hind tarsi quite black or blackish; hind metatarsus slightly shorter than the second joint. The legs have short, blackish hairs; hind coxæ with a row of four to five bristles on the outer side, decreasing in length downwards; the anterior femora have long and dense, somewhat bristly hairs below, the front femora also on the posterior side, and the middle femora on the anterior side towards the apex; the hind femora have shorter hairs above and below, longer at the base on the posterior side; front tibiæ with bristles above, middle tibiæ with two rows of dorsal, and two rows of smaller ventral bristles, hind tibiæ with antero-dorsal and small ventral bristles, and besides with a dense row of bristles or bristly hairs on the dorsal and posterior side. Wings slightly brownish or yellowish tinged; veins blackish brown, the discal bend even and not large, placed about in the middle between the cross-vein and the apex. Squamulæ dirtily yellowish with a black margin, and a long, black fringe. Halteres yellow.

Female. Epistoma broad, whitish grey. Palpi large, grey. Antennæ shorter than in the male, almost only half as long as the head, third joint short, not as long as broad. Thorax not silvery, only whitish pruinose, especially on the side parts, and most densely about the humeri. Abdomen metallic green or æneous, whitish pruinose, especi-

ally down the sides, with more or less distinct, yellow spots on the sides of the second and sometimes also of the third segment. Front coxæ quite or almost quite yellow; femora generally quite yellow, only sometimes the hind femora brownish at the apex; hind tibiæ likewise sometimes quite yellow. Femora mainly short-haired. Squamular fringe black or shining somewhat brownish.

Length. Somewhat varying in size, the length 4,5 to fully 8 mm; the female smallest.

A. leucocephala is a common species in Denmark; at Copenhagen, Vester Fælled, Charlottenlund, Ørdrup Mose, Dyrehaven, Lyngby Mose, Fure Sø, Ørholm, Hillerød, Hellebæk, Faxe Ladeplads; on Falster at Vejringe; on Funen at Odense and Veflinge; in Jutland at Snoghøj, in Højenbæk Dal at Vejle, at Vestbirk near Skanderborg and Tinbæk Mølle at Lindenberg Aa, finally on Bornholm at Almindingen and Hammeren. My dates are $^{11}/_6$ — $^{3}/_9$. It occurs in low herbage at humid places, in fens and in woods at the borders of water, often in great number; it is often seen in such places flying very rapidly to and fro in sharp curves, quite low over the wet ground and resting on it; it is especially the males, which are thus in activity, while the females rest on foliage in the vicinity.

Geographical distribution:— Europe down into Italy; towards the north to middle Sweden, and in Finland.

5. *A. argyria* Meig.

1824. Meig. Syst. Besch. IV, 46, 2, et 1830 VI, 362 (*Porphyrops*). — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 448, 7. — 1903. Kat. paläarkt. Dipt. II, 323. — *Argyra argentata* Macq. 1834. Suit. à Buff. I, 457, 2. — 1838. Meig. Syst. Besch. VII, 154, 2. — 1862. Schin. F. A. I, 191. — *Dolichopus argentatus* 1843. Zett. Dipt. Scand. II, 590, 78, et 1852. XI, 4297, 78, et 1855. XII, 4636, 78. — *Dolichopus argentellus* Zett. 1843. Dipt. Scand. II, 592, 80. — *Dolichopus diaphanus* 1823. Fall. Dipt. Suec. Dol. 16, 19 p. p. ♂.

Male. Vertex and frons silvery white; eyes with brownish or pale brownish hairs. Epistoma narrow, silvery grey or white. Palpi small, black. Occiput grey pruinose; postocular bristles black above, whitish below. Antennæ black, as long as or a little longer than the head, third joint about as long as the two basal joints; arista longer than, or at all events as long as the antennæ. Thorax metallic green, somewhat densely silvery pruinose, especially when seen from in front, except just in front of the scutellum; acrostichal bristles long; scutellum not hairy. Pleura greenish, grey or whitish grey pruinose; prothoracic bristles fine, whitish. Abdomen with the ground colour appearing dark grey or blackish, seen from behind with a slight greenish colour,

but from the base of the second segment densely silvery; the first segment greenish; on the sides of the second and third segments translucent yellow side spots, sometimes also a small, indistinct spot on the sides of the fourth segment; abdomen clothed with short, black hairs, longer at the sides, and it has long hindmarginal bristles, longest on the first segment; eighth segment with short hairs. Venter dark grey, more or less yellow on the first two segments and on the base of the third; it has short, blackish hairs and hindmarginal bristles; at the base there are two tufts of yellow hairs. Hypopygium with the outer lamellæ and ventral lobes small. Legs with the coxæ grey, the front coxæ may be a little yellowish at the apex and behind; femora either yellow with only the apical part of hind femora brown or blackish, or they are darker, the anterior femora more or less blackish or brown from the base outwards and above, and the hind femora quite or almost quite dark; tibiæ yellow, hind tibiæ more or less broadly blackish at the apex; anterior tarsi brownish black towards the end, hind tarsi blackish; hind metatarsus a little shorter than the second joint. The legs have short, black hairs, hind coxæ with about five to six bristles on the outside, decreasing in length downwards; the femora haired as in *leucocephala*, but the hairs scarcely so long; front tibiæ with some bristles above, middle tibiæ with two dorsal rows, and two ventral rows of small bristles, hind tibiæ with two dorsal rows, and with bristly hairs on the dorsal and posterior side, besides with some very small ventral bristles. Wings

Fig. 76. Wing of *A. argyria* ♂.

a little yellowish or brownish tinged; veins blackish brown, the discal bend somewhat shallow, placed in or about in the middle between the cross-vein and the apex. Squamulæ dirtily whitish with a black margin above, and with a long, black or brownish black, sometimes dark yellowish shining fringe. Halteres yellow.

Female. Epistoma broad, greyish white. Palpi large, grey. Antennæ shorter than in the male, shorter than the head, third joint

not longer than broad. Thorax not silvery, a little whitish grey pruinose, especially at the humeri. Abdomen metallic green or æneous, often with coppery reflexes; it is somewhat whitish pruinose, especially down the sides, and there is (generally) no yellow spots. Front coxæ more or less, often almost quite yellow; femora yellow, only the hind femora as a rule with black apex; the femora mainly short-haired. Squamular fringe brownish or yellow.

Length 4.4 to almost 6 mm.

A. argyria is less common in Denmark than the preceding species; Frederiksberg Have, Ørdrup Mose, Lyngby Mose, Hillerød, Faxe Ladeplads; in Jutland at Thisted, and on Bornholm at Almindingen. My dates are 8.7—25.8. It occurs in similar places as *leucocephala* and together with this and the following species. The female of *argyria* has appeared rare to me, and it may perhaps have another habit than the others; thus in Almindingen both *argyria* and *argentina* were present at a stony streamlet in the wood; by working with the net above the water and in the herbage at the border, I caught some males of both species, but while I caught about fifty females of *argentina*, I got not a single of *argyria*, and nevertheless I do not doubt the correctness of my identification. — All the females of *argyria* I have examined have the apex of the hind femora more or less black or blackish, and no yellow spots on abdomen, only the venter may be a little translucent at the base; but I have only had few females.

Geographical distribution: — Europe down into Spain and Italy, and further on the Canary Islands; towards the north to southern Sweden.

6. *A. argentina* Meig.

1824. Meig. Syst. Besch. IV, 47, 3, et 1830. VI, 362 (*Porphyrops*), et 1838. VII, 154, 3. — 1843. Zett. Dipt. Scand. II, 591, 79 (*Dolichopus*). — 1862. Schin. F. A. I, 191. — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 450, 8. — 1903. Kat. paläarkt. Dipt. II, 323. — *Dolichopus diaphanus* 1823. Fall. Dipt. Suec. Dol. 16, 17, p. p. ♂. — 1838. Zett. Ins. Lapp. 712, 17, p. p.

Male. Vertex and frons silvery white; eyes with yellowish or pale brownish hairs. Epistoma narrow, silvery white. Palpi small, black. Occiput grey pruinose; postocular bristles black above, whitish below. Antennæ black, distinctly longer than the head, third joint fully as long as the two basal joints; arista short, shorter than the antennæ. Thorax metallic green, silvery pruinose, especially when seen from in front; the part in front of the scutellum not pruinose; acrostichal bristles long; scutellum not hairy. Pleura greenish, grey or whitish

grey pruinose; prothoracic bristles thin, yellow. Abdomen with the ground colour appearing dark or blackish grey, seen from behind with a slight greenish colour, but densely silvery pruinose from the base of the second segment; the first segment greenish; on the sides of the second and third, sometimes also of the fourth segment, a yellow translucent spot, they are sometimes small on the third segment, and when present on the fourth they are indistinct; abdomen clothed with short, black hairs, longer at the sides, and it has long hindmarginal bristles, longest on the first segment; eighth segment with short hairs. Venter greyish black with the basal part yellow, it has black hairs, and hindmarginal bristles; at the base there are a few longer hairs in two tufts, and these hairs are black or dark brown. The ventral lobes and outer lamellæ of the hypopygium rather small. Legs with the coxæ grey, front coxæ yellow or a little blackish at the base, posterior coxæ more or less, but generally slightly yellow at the apex; femora yellow, hind femora generally blackish at the tip; tibiæ likewise yellow, generally with the tip of the hind tibiæ blackish; anterior tarsi blackish or brown towards the end, front tarsi sometimes only blackish just at the tip, hind tarsi black; hind metatarsus slightly shorter than the second joint. The legs have short, black hairs; hind coxæ with a row of only three, at most four bristles on the outer side; femora haired as in the two preceding species, but the hairs still shorter and less dense; front tibiæ with bristles above, middle tibiæ with two dorsal rows, and with one ventral row of small bristles, the bristles of the second ventral row wanting or indistinct; hind tibiæ with two dorsal rows, some almost hidden ventral bristles, and with short, indistinct, bristly hairs on the dorsal and posterior side.

Fig. 77. Wing of *A. argentina* ♂.

Wings a little brownish or yellowish tinged; veins blackish brown, the discal bend shallow, placed nearer to the cross-vein than to the apex. Squamulæ dirtily whitish with a black margin above, and a yellow fringe. Halteres yellow or whitish.

Female. Epistoma broad, greyish white. Palpi large, grey. Antennæ shorter than in the male, but almost as long as the head, third joint about as long as broad. Thorax not silvery, slightly greyish white pruinose, especially at the sides, and most densely at the humeri. Hind coxæ often more yellow than in the male. Abdomen metallic green or dark æneous, greyish white pruinose, especially down the sides, with a yellow side spot on the second and sometimes also on the third segment, and with the base of the venter yellow. Hind femora as a rule quite yellow, or very slightly brownish at the tip; the femora mainly short-haired.

Length 4 to about 5 mm.

A. argentina is perhaps a little more common in Denmark than *argyria*; Charlottenlund, Ordrup Mose, Lyngby Mose, Ørholm, Hillerød, Tørslev near Jægerspris, Sorø and Faxe Ladeplads; on Funen at Veflinge; in Jutland in Vejle Nørreskov, Ry and Laven near Silkeborg, Nebsager near Horsens, and on Bornholm in Almindingen. My dates are $20/6$ — $20/9$. It occurs in the same way as the two preceding species and sometimes in company with them.

Geographical distribution:— Europe down into Spain and Italy; towards the north to middle Scandinavia.

Remarks: The three species *leucocephala*, *argyria* and *argentina* are in the males rather easily distinguished by the antennæ, and also by other characters as the hairiness of the legs, the hairs of the base of the venter, and several others. The females are very similar, but may, I think, be distinguished with certainty; the antennæ are, as in the males, shortest in *leucocephala*, longer in *argyria* and longest in *argentina*; *leucocephala* has a black or brownish squamular fringe, *argyria* and *argentina* have it pale, generally palest in *argentina*; this latter is further distinguished from *argyria* by the hind coxæ being yellow at the apex, the generally quite yellow hind femora, which at most are somewhat brownish at the apex, the yellow spots on abdomen and the always yellow base of the venter; finally *argentina* has the discal bend placed nearer the cross-vein than the apex, while in *argyria* it lies in or about in the middle; I think this latter character together with the length of the antennæ are the best, while the colour of the tip of the hind femora is not to be relied upon; *argentina* is also a smaller species. A distinguishing character of these three species is also found in the small hairs on the posterior side of the ocellar tubercle, but as my material of *argyria* is rather small, I am not quite certain in this respect, and the character will have to be confirmed by a larger material; in the male of *leucocephala* these hairs are somewhat numerous and rather long, in the female there

are two or three pairs; in the male of *argyria* I found two to three pairs, in the female two pairs; in *argentina* I have always found one pair in both sexes.

7. *A. confinis* Zett.

1849. Zett. Dipt. Scand. VIII, 3090, 77--78 (*Dolichopus*). — 1862. Schin. F. A. I, 190. — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 452, 9, Taf. V, Fig. 19. — 1903. Kat. paläarkt. Dipt. II, 323.

Male. Vertex and frons greyish white or silvery; eyes with yellowish brown hairs. Epistoma narrow, black, seen from above more or less greyish or whitish shining. Palpi small, black. Occiput grey pruinose; postocular bristles black above, brown or paler to whitish below. Antennæ black, third joint more or less brownish; they are longer than the head, the third joint a little longer than the two basal joints; arista longer than the antennæ. Thorax metallic green, somewhat whitish or bluish white pruinose, most densely and somewhat silvery about the humeri; acrostichal bristles long; scutellum not hairy above. Pleura slightly greenish, grey pruinose; prothoracic bristles pale, short and fine. Abdomen with the ground colour appearing blackish grey or brown, seen from behind with a very slight green colour; from the base of the second segment it is silvery; the first segment is greenish yellow; on the sides of the second segment translucent yellow spots, generally also indistinctly present on the third segment; abdomen clothed with short, black hairs, longer at the sides, especially on the second segment; there are long hindmarginal bristles, longest on the first segment; the eighth segment with some long bristles at the end. Venter blackish grey with the first two or three segments yellow; it has short, blackish hairs and hindmarginal bristles; at the base there are a pair of longer, brownish hairs on each side. The outer lamellæ of the hypopygium somewhat long. Legs with the coxæ grey, yellowish at the apex, front coxæ often to a higher degree; femora and tibiæ yellow, anterior femora sometimes blackish or brown at the base below, hind femora and tibiæ blackish or brown at the apical part; anterior tarsi yellow with only the last joint black, or they are more or less dark to having the last four joints blackish or brown; hind tarsi black or brown, sometimes more or less yellow at the base; hind tibiæ a little thickened towards the apex and the hind metatarsi likewise somewhat thickened and almost twice as long as the second joint. The legs have short, black hairs, the hind coxæ about five bristles on the outer side; femora haired as in the preceding species, the bristly hairs on the middle femora not long; hind femora with rather long, bristly hairs below on the anterior side, being strong

at the apex; front tibiæ with some bristles above; middle tibiæ with two dorsal rows, and some few, smaller ventral bristles in two rows; hind tibiæ with two dorsal rows of bristles, and besides with short, bristly hairs above, and a row of longer, fine, bristly hairs below; front metatarsi with a row of fine, bristly hairs below, decreasing in length towards the apex; hind metatarsi with an antero-dorsal and antero-ventral row of long, bristly hairs, and distinctly spinulose beneath, besides it has at the base a peculiar, long, thin, forwards directed hair. Wings a little yellowish tinged; veins blackish brown, discal bend moderately large, placed a little nearer the cross-vein than the apex. Squamulæ yellowish with a black margin above, and with a yellowish to blackish fringe. Halteres yellow.

Female. Epistoma broader than in the male, but not specially broad, silver-white. Palpi somewhat large, grey. Antennæ shorter than in the male, not as long as the head, third joint about as long as broad. Abdomen metallic green or æneous, greyish white pruinose, first segment yellow and on the second large, yellow side spots, generally united above in front; sometimes there are also yellow spots on the third segment. The metaepimera and the front and hind coxæ yellow; femora and tibiæ quite yellow. The femora mainly short-haired, and front and hind tarsi without longer hairs.

Length 3,8—5,5 mm.

A. confinis is rare in Denmark and has only been taken on two occasions; Ordруп Mose (Stæger) and on Lolland at Maribo (Schliek). The dates are $^{29}/_6$ — $^{14}/_7$. As Zetterstedt says: "Stæg. in litt." the name is originally due to Stæger. The above mentioned specimens from Stæger are his type-specimens. — Kowarz says l. c. "Gesicht und Stirn schwarz, in schiefer Richtung besehen weiss schimmernd"; I have found the frons silver-white, should it be seen as black, it is only when seen from in front and obliquely from below. Kowarz gives also the greatest length to 6,5 mm; the species seems thus to reach a greater length than my specimens, for Kowarz' determination is no doubt correct.

Geographical distribution: — Europe down into Italy; it has its northern limit in Denmark, and it occurs in England; it seems to be a somewhat rare species.

8. *A. auricollis* Meig.

1824. Meig. Syst. Besch. IV, 47, 4 (*Porphyrops*), et 1838. VII, 154, 4. — 1843. Zett. Dipt. Scand. II, 596, 84 (*Dolichopus*). — 1862. Schin. F. A. I, 191. — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 453, 10. — 1903. Kat. paläarkt. Dipt. II, 323. — *Dolichopus pellucens* var. β , σ Fall. 1823. Dipt. Suec. Dol. 17, 20.

Male. Vertex and frons greenish white; eyes with pale brownish hairs. Epistoma narrow, black when seen from in front, but distinctly silver-white when seen from above. Palpi small, black. Occiput greenish, greyish pruinose; postocular bristles black, brownish quite below. Antennæ elongated, considerably longer than the head, third joint about as long as the two basal; arista shorter than the antennæ. Thorax metallic green, slightly whitish or bluish white pruinose, most densely at the humeri; acrostichal bristles long; scutellum not hairy above. Pleura greenish, dark grey pruinose; the prothoracic hairs fine, brown. Abdomen dark green or bluish green, from the base of the second segment silvery; it is clothed with short, black hairs, longer at the sides, especially on the second segment, and it has hindmarginal bristles, long on the first segment; the eighth segment with some long bristles. Venter greyish black, with longish, black hairs and hindmarginal bristles; at the base of the second segment the hairs are long, and at the base of the venter there is a single tuft of long, black hairs. The outer lamellæ of the hypopygium somewhat long, blackish; the ventral lobes somewhat spoon-like dilated at the apex. Legs with the coxæ greyish black; femora black or brownish black, anterior femora with the apex yellow; the anterior tibiæ yellow, hind tibiæ black; anterior tarsi with the metatarsus yellow, the apex and the following joints blackish or brownish, hind tarsi black; the hind metatarsus distinctly longer than the second joint. The legs have short, black hairs, hind coxæ with about four bristles on the outside; the femora haired as usual, hind femora quite short-haired above, but with the bristly hairs below on the anterior side rather long; front tibiæ with some bristles above; middle tibiæ with two dorsal rows, and a few, small bristles in two ventral rows; hind tibiæ with two dorsal rows, and besides with somewhat dense, bristly hairs above, and a short, fine, but dense ciliation below; front metatarsi with short, bristly hairs below, and the hind metatarsi a little spinulous below. Wings brown, a little more towards the anterior margin; veins brownish black, the discal vein with a somewhat large bend, placed nearer the cross-vein than the apex; the subcostal vein somewhat short and terminating somewhat before the middle. Squamulæ quite blackish brown or with a broad margin of this colour, and with a black fringe. Halteres yellow.

Female. Epistoma broad, grey. Palpi large, grey. Postocular bristles yellowish below. Antennæ shorter than in the male, shorter than the head, the third joint broader than long; arista much longer than the antennæ. Abdomen dark metallic green, whitish pruinose at the sides. Front coxæ generally more or less yellow at the apex

and behind, femora and tibiæ yellow, the hind ones blackish at the apex; anterior tarsi yellow, more or less brown towards the end, the front tarsi generally only on the last joint; hind tarsi black. The femora mainly short-haired; the front metatarsi bristly below almost as in the male, and the hind metatarsi likewise a little spinulose.

Length 4,8—5,5 mm.

A. auricollis is rare in Denmark, I only know eight specimens, and it was first taken in 1883; at Svenstrup between Roskilde and Ringsted and at Faxe Ladeplads; on Funen at Odense, and in Jutland in Greisdalen and Højenbæk Dal at Vejle (H. J. Hansen, the author). The dates are in July and August. It was taken in low herbage on humid places. — Kowarz uses the same terms in describing frons and epistoma as for *confinis*; I find the frons greenish white and only black when seen from in front and below; the epistoma is silvery white when seen more or less from above; only when seen just from in front or from below it is black; it is thus more white than in *confinis*, where it is whitish only when seen quite from above.

Geographical distribution: — Europe down into Italy; towards the north to middle Sweden.

9. *A. elongata* Zett.

1843. Zett. Dipt. Scand. II, 594, 82 (*Dolichopus*). — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 456, 13, Taf. V, Fig. 20—21. — 1903. Kat. paläarkt. Dipt. II, 324.

Male. Head somewhat small; vertex and frons metallic green, a little pruinose; eyes whitish hairy. Epistoma somewhat narrow, silvery greyish white. Occiput green, a little greyish pruinose; postocular bristles black above, whitish below. Antennæ black, third joint more or less brownish; they are long, much longer than the head, the

Fig. 78. Antenna of *A. elongata* ♂, from the inside. $\times 95$.

third joint not as long as the two basal, the second joint is elongated above and overlaps the third, which is excised basally; the second joint has hairs along the upper margin; arista considerably shorter than the antennæ. Thorax dark metallic green or bluish green, slightly

pruinose, a little more at the humeri, shining; acrostichal bristles moderately long; scutellum without hairs above. Pleura slightly greenish, grey pruinose; prothoracic bristles black, the lowermost somewhat strong. Abdomen dark metallic green, slightly whitish pruinose; at the sides of the second, or the second and third segment larger or smaller translucent yellow spots, often united in front; abdomen clothed with short, black hairs, which are not longer at the sides, and it has somewhat long hindmarginal bristles, longer on the first segment; the eighth segment has four long and strong bristles at the end. Venter greyish black, yellow at the base, with short hairs and not long hindmarginal bristles. The outer lamellæ of the hypopygium small, narrow and pointed, the ventral lobes moderately large, broader. Legs with the front coxæ yellow, posterior coxæ grey with the apical part more or less yellow; femora and tibiæ yellow, hind femora often a little blackish or brown at the apex, hind tibiæ blackish at the apex; anterior tarsi with the apex of metatarsus and the four following joints blackish or brown, hind tarsi black; hind metatarsus slightly shorter than the second joint. The legs have short, blackish hairs, hind coxæ about three bristles on the outer side; femora only with rather short hairs below; the posterior femora have one preapical bristle, and a similar bristle on the posterior side; front tibiæ with some dorsal bristles, and one or two very small ventral bristles; middle tibiæ with two dorsal rows and some smaller ventral bristles, the lowermost stronger; hind tibiæ with two dorsal rows and some small ventral bristles; all the dorsal bristles on the tibiæ strong; front and hind metatarsi with some small, fine bristles below. Wings a little brownish tinged; veins blackish brown, sub-

Fig. 79. Wing of *A. elongata* ♂.

costal vein very short; the discal bend small, placed nearer the cross-vein than the apex; the cross-vein before the middle of the wing (Kowarz' figure is not correct in this respect). Squamulæ pale yellowish with a black margin above, and a black fringe. Halteres yellow.

Female. Epistoma broad, silvery whitish grey. Palpi somewhat large, grey. Antennæ shorter than in the male, a little longer than the head, third joint short; arista about as long as the antennæ. Abdomen metallic green or æneous, with yellow side spots on the second segment (according to Kowarz these may also be wanting). Wings a little more tinged than in the male.

Length about 4 mm.

A. elongata is very rare in Denmark, only one specimen, a female, has been taken on Amager on $20/6$ 1909 (the author).

Geographical distribution:— Northern and middle Europe down into Bohemia; towards the north to middle Sweden.

13. **Leucostola** Loew.

This genus agrees in almost every respect with *Argyra*; it was separated by Loew in 1857 (Neue Beitr. V, 39) only with the bare first antennal joint as distinguishing character. Loew was led to separate the genus, as he laid great stress on this character, because he divided all the Dolichopodids into two groups by aid of it. The genus has since been generally accepted (though not by Schiner). — The head as in *Argyra*, the female has vertical bristles, the male not. Antennæ with the second joint overlapping the third somewhat on the inside; the first joint not hairy above. Scutellum bare above, with two strong marginal bristles and at each side a smaller hair. Abdomen somewhat more flat than in *Argyra*. Middle tibiæ with only one or two bristles below. Hind metatarsus shorter than the second joint.

The developmental stages of *L. vestita* have been described by Beling (Arch. für Naturgesch. XLVIII, 1, 1882, 225, 30). The larva is 10 mm long, 1 mm in diameter, cylindrical, yellowish white, somewhat hyaline. The last segment has five teeth or warts, three above and two larger below, the latter with a broader base and placed more backwards than the upper; of the upper teeth the median is smaller than the lateral; below the upper teeth lie the posterior spiracles. — The pupa is 4 mm long, 1.5 mm in diameter, dirtily yellow; the head has a small point in front, and four short hairs. At the front margin of the thoracic disc there are two long, approximated spiracular tubes. The first eight abdominal segments (probably the second to ninth) have above a transverse row of short, dense spines or teeth of unequal length. The larva was found in sandy mud at the border of a

streamlet, which in the summer was almost quite dried up; the imago escaped on $\frac{4}{8}$ s.

Of the genus two palæarctic species are known; one occurs in Denmark.

1. *L. vestita* Wied.

1817. Wied. Zool. Mag. I, 75, 24 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 48, 5 (*Porphyrops*), et 1838. VII, 154, 5 (*Argyra*). — 1843. Zett. Dipt. Scand. II, 595, 83, et 1859. XIII, 5063, 83 (*Dolichopus*). — 1862. Schin. F. A. I, 189 (*Argyra*). — 1878. Kow. Verhandl. zool. bot. Gesell. Wien, XXVIII, 458, 1, Taf. V, Fig. 26. — 1903. Kat. paläarkt. Dipt. II, 325.

Male. Vertex and frons greyish white; eyes with light brownish hairs. Epistoma somewhat narrow, silvery white, seen quite from below dark greyish. Palpi small, black. Occiput green, greyish pruinose; postocular bristles black above, yellowish below. Antennæ black.

Fig. 80. Antenna of *L. vestita* ♂, from the inside. $\times 90$.

considerably longer than the head, the third joint much longer than the two basal; arista a little shorter than the antennæ. Thorax metallic green, slightly whitish or bluish white pruinose, shining; scutellum without hairs above. Pleura greenish, grey pruinose; prothoracic bristles small, brownish or yellow. Abdomen with the ground colour appearing greyish, seen from behind with a very faint greenish hue; the first segment greenish, the rest densely silvery pruinose, the sixth blackish grey; abdomen clothed with short, black hairs, somewhat longer at the sides, and it has hindmarginal bristles, long on the first segment; the eighth segment has a couple of long bristles. Venter dark grey, with blackish hairs and hindmarginal bristles. Hypopygium small, outer lamellæ and ventral lobes likewise small. Legs with the coxæ grey, front coxæ more or less yellow at the apex; femora yellow, or generally the anterior femora more or less blackish or brown from the base to near the apex, most on the middle femora; hind femora brownish or black at the apex or sometimes almost

quite brown; tibiæ yellow, hind tibiæ sometimes dark at the apex; anterior tarsi more or less dark towards the end, hind tarsi quite brownish or blackish, or more or less pale at the base; hind metatarsus shorter than the second joint. The legs have short, black hairs, the hind coxæ two bristles on the outside; front femora with somewhat long, bristly hairs below and on the posterior side; the posterior femora have short hairs, and at the apex on the anterior side some bristles; front tibiæ generally with two small bristles above, middle tibiæ with a row of few, stronger antero-dorsal, and small postero-dorsal bristles, and with one or two small bristles below; hind tibiæ with two dorsal rows, and besides with a row of somewhat bristly hairs above, and a ciliation on the anterior side. Wings almost hyaline or a little yellowish; veins blackish brown, the discal bend moderate. Squamule yellowish with the tip black, and with a blackish or brownish, somewhat yellowish shining fringe. Halteres yellow.

Female. Frons a little greenish. Epistoma broad, greyish white. Antennæ short, shorter than the head, third joint not as long as broad; arista much longer than the antennæ. Abdomen metallic green. Femora yellow with only the hind femora blackish at the tip, and all femora short-haired.

Length 3.2—4.5 mm.

L. vestita is not rare in Denmark on suitable localities; Ordrup Mose, Dyrehaven, Grib Skov, at Sorø and at Faxe Ladeplads; on Funen at Odense and Veflinge; in Jutland at Frijsenborg. My dates are $16/6$ — $26/7$. It occurs in the same way as the species of *Argyra* and often in fens and at ponds in woods.

Geographical distribution: — Northern and middle Europe down into France; towards the north to middle Sweden.

III. Rhaphiinae.

14. **Porphyrrops** Meig.

Species of medium or somewhat large size, and of metallic green colours, rarely with yellow colour on abdomen; in the females the thorax not rarely densely pruinose and hence slightly metallic. Head a little broader than thorax, almost circular, or a little broader than high; it is semiglobular and slightly arched behind. Vertex a little excavated. Frons a little decreasing in breadth towards the antennæ, most in the males and here narrower than in the females. There are ocellar, outer vertical and smaller postvertical bristles in both sexes; on the hinder side of the ocellar tubercle there are some, or only a

pair of forwards curved hairs. The eyes are large, oval or almost semicircular; in the living specimens they are dark metallic green with reddish or purplish reflexes, or quite purplish; they are densely hairy. The facets are in the males slightly enlarged on the front side. The eyes are separated, the epistoma is narrow or very narrow in the males, broad in the females. The postocular bristles form a single row above, but below the whole occiput is densely covered with long or longish hairs. The antennæ are placed near to each other, somewhat high above the middle; they are longer or shorter, longest in the males; it is especially the third joint which varies in length, and in the males it is more or less oval or longer and lancet-shaped, in the females it is generally more or less short oval or triangular, rarely longer; the basal joint is cylindrical or slightly obconical, the second short, not overlapping the third. The arista is apical, it has sometimes (in non Danish species) a little dilatation at the apex; it is in the male shorter or longer than the antenna itself, in the female longer; its first joint is quite short. The basal antennal joint has no hairs above, the second has a circlet of longer or shorter bristles at the apex, longest above; the third joint is very short-haired or almost microscopically haired, so that it may be apparently bare¹; the arista very shortly pubescent, almost bare. The epistoma is, as said, much broader in the female than in the male; the clypeus is in the male slightly marked off, in the female it is somewhat large, distinctly separated from the epistoma by a transverse, elevated keel; it has in this sex a rounded lower margin and is a little arched, and it reaches almost as far down as the lower margin of the eyes, while it is shorter in the male. The proboscis, palpi and mouth aperture are considerably larger in the female than in the male; the proboscis is also rather protruding in the female, while it is not or almost not protruding in the male. Labrum (*crassipes* ♀) strong, somewhat long, high at the base, with a longer median tooth and two shorter lateral teeth; it is strongly semitubular, the margins almost touching below, and hence the lateral teeth turned downwards; the margins are distinctly haired; hypopharynx a little shorter than labrum, elongated triangular, curved a little downwards at the apex, and with a distinct salivary duct; maxillary palpi large (much smaller in the male) somewhat oval, squamiform and hairy. The labium is thick, it has the

¹) Loew says (Neue Beitr. V, 1857, 35) that all species of *Porphyrops*, except *nasutus* and *crassipes*, have the third antennal joint bare below, but this is not correct; the joint is haired all over, but very short, and I am unable to trace any difference in this respect between *nasutus* and *crassipes* and the other species.

basal part somewhat longer than the labella; posteriorly it is divided into two, somewhat long processes; the labella are broad, with hairs at the margin. Thorax rectangular or nearly quadratic, somewhat high, and a little arched above; pro- and metathorax small, the former with small bristles above. The acrostichal bristles biserial and somewhat long; there are six dorsocentral bristles, the first of which may sometimes be somewhat small; further there is a humeral bristle and some small hairs, a posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle; the front part of the disc has short hairs, some of which may however be somewhat long. The propleura have numerous hairs both above and below. Scutellum bare above, it has two long marginal bristles, and at each side one or several smaller hairs or bristles. Abdomen cylindrical, a little narrowed towards the end; the first dorsal segment is shorter than the second, the first ventral segment is very short, and seems to be somewhat connected with the second; in the male the segments two to five are of the same length, the sixth is shorter; on the ventral side the fifth sternite is shorter than the tergite, the sixth is membranous and folded up to receive the hypopygium; the seventh segment is small and hidden. The hypopygium is short and roundish, it is not pedunculated and is laid more or less up under the sixth segment; its appendages are generally more or less long and distinctly seen; there are ventral lobes of various shape, shorter or longer, generally styliiform or somewhat lancet-shaped; the outer lamellæ are generally long, attenuating thread-like from a somewhat broader base, and not rarely forked; sometimes, but rarely, they are broader and more lamelliform. In the female there are five normal abdominal segments, the others are hidden; sometimes the end of the sixth may be seen; the ovipositor terminates with some spines above. Dot-like impressions are visible on the second to fifth segments, and the abdominal segments have shorter or longer hindmarginal bristles. The legs are somewhat slender; sometimes the front legs are somewhat short, or the hind legs somewhat robust and elongated; the front tarsi in the males may have the first or the two first joints thickened towards the end, or a little curved, and the middle tarsi may have the last joints dilated; the hind metatarsus is from slightly longer to a little shorter than the second joint. In many species the middle or posterior coxæ have in the male a more or less strong, flat apical spine; these spines are in reality formed of a number of close-standing bristles, and sometimes they may be seen to be cleft at the end, or to split up into very close-standing bristles; when the leg is laid in potash and the coxa is pressed, the spine is easily divided into the

numerous bristles composing it. In some species as f. inst. *crassipes*, the coxæ have instead of such spines a brush of bristles. The coxæ are long-haired, the hind coxæ without bristles on the outer side; in the males the femora, especially the anterior, are generally more or less long-haired, and in both sexes the tibiæ have dorsal rows of bristles, the middle tibiæ also a couple of ventral bristles; besides there are apical or preapical bristles, small or wanting on the front tibiæ; there may be one or several preapical bristles on all or some of the femora, or they may be wanting. Hind metatarsus without bristles. There are two claws, two pulvilli, and a somewhat narrow empodium with bristles below. Wings of usual shape; the medial vein terminating in the subcostal vein, the discal vein with a larger or smaller even curve; the posterior cross-vein placed in or near the middle; the anal vein not reaching the margin; axillary lobe well developed, but rounded. The discal bend lies on a convexity. Squamulæ with a well developed angular lobe, bearing a long fringe; the inner part of the squamulæ short-haired.

Of the developmental stages the pupa of *P. fascipes* is described and figured by Heeger (Sitzungsber. d. Akad. d. Wissensch. Wien, math. nat. Cl. IX, 1852, 270, Taf. XXVII, Fig. 3—4); (the larva described as belonging to the pupa is not the *Porphyrops*-larva, but, as declared by Brauer in his work over the Dipterous larvæ, the larva of *Scatopse notata*). Heeger seems to have found the pupa both under the bark of Pinus, which was attacked by Tomicins, and in decaying leaves at the borders of water; he gives some data, but it is not possible to extract anything out of them on account of the confusion mentioned. Beling describes (Arch. für Naturgesch. 48, I, 1882, 226) the larva of *P. crassipes*. It is 11 mm long, 1.5 mm in diameter, cylindrical, of whitish colour; the last segment is short, with shallow, longitudinal furrows; at the end there are below two larger, membranous teeth with a broad base, and above and more forwards two smaller teeth, and between the latter a small or indistinct wart; the posterior spiracles lie below the upper teeth. The larva was found in the ground in a forest of beeches on $\frac{3}{5}$ and the imago came on $\frac{31}{5}$. I have examined the pupa of *P. elegantula*, which has been bred by Mr. Schlick. It is yellowish, of a length of about 8 mm (exuvia); the antennal sheaths lie in front of the head, directed downwards, but not well marked; at the base of them there are two conical, truncated teeth, very close-standing, almost united and forming together a short, thick, truncated process; farther downwards there are a pair of small, transverse teeth, between them are a pair of hairs, and to each side of the upper teeth is a strong bristle; further there are six

strong, short bristles on the thoracic disc, three on each side in an oblique transverse row, the lowermost standing about at the base of the wing sheaths; at the front margin of thorax there are above in the middle two rather approximated, long, cylindrical spiracular tubes, pointed at the end. The abdominal segments have each, except the first, a girdle of flat, short spines above, they are directed backwards and of unequal length, short and longer regularly alternating; the last segment terminates with two spines. There are seven pairs of abdominal spiracles. The pupa was found in the sand at the border of a pond on $12/7$. Mr. Schlick did not observe any cocoon, but no doubt such has been present. but has been destroyed by digging out the pupa.

The species of *Porphyrops* are beautiful flies, though generally of somewhat dark colours; they occur at the border of water, and are found on the leaves of bushes and in low herbage, and also running at the sand down at the water. The species are generally somewhat rare, and only found in single or a few specimens on a place; only two of our nine species, *spinicoxa* and *crassipes* are a little more common.

Of the genus about 28 species are known from the palæarctic region, and besides there are some doubtful and uncertain species; 9 have been found in Denmark.

Table of Species.

Males.

1. Middle coxæ with an apical spine	2.
— Middle coxæ without apical spine	5.
2. Epistoma black; lower postocular hairs black or blackish;
hind femora without preapical bristle	3.
— Epistoma white; lower postocular hairs whitish; hind femora
with one or more preapical bristles	4.
3. Arista longer than the antennæ; outer genital lamellæ
forked; front metatarsus as long as the four following
joints; hind tibiæ not dilated	1. <i>spinicoxa</i> .
— Arista shorter than the antennæ; outer genital lamellæ
not forked; front metatarsus scarcely as long as the three
following joints; hind tibiæ dilated	2. <i>fascipes</i> .
4. Arista longer than the antennæ; both middle and hind
coxæ with an apical spine; sixth abdominal segment steel-
blue or purplish	3. <i>elegantula</i> .
— Arista shorter than the antennæ; only middle coxæ with
an apical spine and this long; sixth abdominal segment
concolorous with the others	4. <i>nemorum</i> .
5. The last two joints of the middle tarsi dilated	5. <i>crassipes</i> .
— The last two joints of the middle tarsi normal	6.

6. Front femora with a row of strong bristles below 6. *consobrina*.
 — Front femora without strong bristles below 7.
 7. Outer genital lamellæ broad, prolonged into a long process
 on the outer side 7. *riparia*.
 — Outer genital lamellæ narrow, variously curved, with a
 tuft of curled hairs at the ventral margin. 8. *penicillata*.

Females.

1. Thorax brightly shining, without indications of stripes; hind
 femora with more than one preapical bristle; largest species 3. *elegantula*.
 — Thorax less shining, more or less pruinose, generally with
 two stripes 2.
 2. Antennæ rather long, arista not or slightly longer than
 the antennæ 9. *obscuripes*.
 — Antennæ short, arista longer than the antennæ 3.
 3. Hind tibiæ slightly compressed and dilated, whitish yellow
 on basal half. 2. *fascipes*.
 — Hind tibiæ not compressed or dilated, of a different colour. . 4.
 4. Epistoma brown; anterior coxæ with no black hairs at
 apex. 6. *consobrina*.
 — Epistoma grey or white 5.
 5. Epistoma silvery white; wings strongly brown 7. *riparia*.
 — Epistoma grey; wings less brown 6.
 6. Small species, not above 4 mm; femora mainly yellow;
 front coxæ with some black hairs at apex. 4. *nemorum*.
 — Larger species, or if small the femora darker, and front
 coxæ without black hairs at apex. 7.
 7. Third antennal joint longer than broad, arista not twice
 as long as the antennæ; femora mainly yellow; hind femora
 with a preapical bristle; front coxæ without black hairs
 at apex; cubital vein distinctly recurved at the end. 5. *crassipes*.
 — Third antennal joint not or almost not longer than broad;
 femora darker; cubital vein not recurved at the end. 8.
 8. Larger species; front coxæ with black bristles at the apex,
 middle coxæ mainly black- or dark-haired; hind femora
 without preapical bristle 1. *spinicoxa*.
 — Smaller species; anterior coxæ without black hairs at the
 apex, middle coxæ pale-haired; hind femora with a pre-
 apical bristle 8. *penicillata*.

1. *P. spinicoxa* Loew.

1850. Loew, Stett. ent. Zeitg. XI, 101, 3, Tab. I, Fig. 13—14, et 1857.
 Neue Beitr. V, 30 (*Rhaphium*). — 1862. Schin. F. A. I, 196. — 1903.
 Kat. paläarkt. Dipt. II, 330. — *Rhaphium commune* 1851. Walk. (nec Meig.)
 Ins. Brit. I, 202, 16. — *Medeterus bilineatus* Stæg. in litt. Zett. 1843. Dipt.
 Scand. II, 469.

Male. Vertex and frons dark green; eyes dark brown-hairy.
 Epistoma very narrow, black. Palpi black. Occiput greenish, a little

greyish pruinose; postocular hairs black or blackish. Antennæ black, not as long as the head, the third joint somewhat longer than the two basal; arista longer than the antennæ. Thorax dark green and dark pruinose, slightly shining; humeri greyish; in the middle two approximated, blackish stripes, disappearing behind. Pleura dark green, a little dark greyish pruinose; propleura with blackish hairs. Abdomen dark green, somewhat whitish grey pruinose, with narrow, black incisures; it is clothed with short, black hairs, at the sides of the three first segments longer and pale hairs; there are hindmarginal bristles, long on the first segment. Venter greenish, grey pruinose, with pale hairs, which are long towards the base. Hypopygium black, a little greyish pruinose; posterior ventral lobes long, styliform with the apex curved a little downwards, brownish black; the outer lamellæ forked, with the dorsal branch long, the ventral short; they are brown or brownish black, with long, but not dense hairs at the margin. Legs black, coxæ dark grey pruinose, the knees very narrowly reddish, and the hind tibiæ reddish or brown in the middle; the middle coxæ with a strong, black apical spine, more or less cleft at the apex; front tarsi with metatarsus as long as the following four joints, on the middle tarsi a little shorter, hind metatarsus slightly longer than the second joint. The legs have short, black or blackish hairs; the coxæ are long-haired, the hairs on the hind coxæ partly pale; front femora with long hairs on the posterior side, middle femora below, and with some bristles at the apex; hind femora shorter haired below, but with a long fringe on the postero-ventral side; tibiæ with two rows of long bristles above, middle tibiæ with a similar row below, and hind tibiæ with small bristles below; front metatarsi short spinulose on the postero-ventral side and with long hairs at the apex; middle metatarsi with scattered spinules below. Wings slightly greyish brown tinged; veins black, discal vein with an even curve. Squamulæ yellowish or brownish yellow, with a black fringe. Halteres yellow.

Female. Colour generally lighter than in the male or more æneous, thorax paler pruinose, and the stripes more distinct. Frons somewhat greyish pruinose. Epistoma broad, grey; palpi large, grey. Postocular hairs white below. Antennæ short, third joint not as long as the two basal, almost not longer than broad; arista distinctly twice as long as the antennæ. Legs generally with the knees and the basal half of the hind femora yellow; anterior tibiæ and base of tarsi yellow, hind tibiæ yellow with base and apex blackish; the legs short-haired, front coxæ pale-haired with some black bristles at the apex; middle femora with some bristles at apex on both sides, middle coxæ without spine, but with a slight, dark fringe. Front metatarsus about

as long as the four following joints, middle metatarsus somewhat shorter. Wings a little more tinged. Squamular fringe yellow.

Length 4.5—6 mm.

P. spinicoxa is somewhat common in Denmark; at Copenhagen, Charlottenlund, Ørdrup Mose, Ermelund, Dyrehaven, Lyngby Mose, at Fure Sø and at Nyraad near Vordingborg; it has thus hitherto only been taken on Sealand. My dates are $\frac{3}{6}$ — $\frac{3}{8}$, but I have records of its occurrence to the first days of September. It occurs in fens and in woods on humid places and at water on bushes and in low herbage.

Geographical distribution:— Northern and middle Europe down into Styria and Hungary; its northern limit is in Denmark, and it occurs in England.

Remarks: Zetterstedt quotes under *Rhaphium nasutum* Fall. *Medeterus bilineatus* Stæg. in litt. as sent to him from Stæger, but this is certainly a mistake; we do not have *P. nasuta* in Denmark; the mentioned specimen was certainly the present species, which stood in Stæger's collection determined as *nasuta*. As the specimen sent to Zetterstedt was a female, the mistake is easily understood. Loew mentions l. c. also *spinicoxa* from Denmark, sent from Stæger.

2. *P. fascipes* Meig.

1824. Meig. Syst. Besch. IV, 54, 20. — 1843. Zett. Dipt. Scand. II, 470, 10, et 1849. VIII, 3061, 10 (*Rhaphium*). — 1850. Loew, Stett. ent. Zeitg. XI, 103, Tab. I, Fig. 24 (*Rhaphium*). — 1862. Schin. F. A. I, 197. — 1903. Kat. paläarkt. Dipt. II, 329. — *Porphyrops latipes* Macq. 1827. Soc. Sc. Lille, 35, 15, et 1834. Suit. à Buff. I, 443, 7. — 1838. Meig. Syst. Besch. VII, 152, 29.

Male. Frons and vertex dark green; eyes brownish-hairy. Epistoma very narrow, black. Palpi black. Occiput greenish, dark greyish pruinose; postocular hairs brownish below. Antennæ black, somewhat long, longer than the head, the third joint much longer than the two basal; arista shorter than the antennæ. Thorax dark green, a little pruinose, shining, with two somewhat indistinct, approximated black lines in front. Pleura slightly greenish, dark grey pruinose; propleura with blackish hairs. Abdomen dark green, clothed with short, black hairs, a little longer and pale at the sides of the first segments; there are black hindmarginal bristles, longer on the first segment. Venter greenish, grey pruinose, with pale hairs. Hypopygium black, the outer lamellæ long, simple, lancet-shaped, attenuating from an ovate base into a narrow apex; they are of brownish colour, short-haired at the margin; ventral lobes not seen. Legs with the coxæ black, grey

pruinose; femora black, the anterior femora with the apex yellow; anterior tibiæ yellow; hind tibiæ compressed and dilated in the apical half, and furrowed on both sides (perhaps due to exsiccation), whitish yellow on the basal half, with the very base dark; anterior tarsi yellowish, dark towards the end, hind tarsi black. Middle coxæ with a black apical spine, less strong than in *spinicoxa*; front and middle tarsi with metatarsus scarcely as long as the three next joints, hind metatarsus about of the length of the second joint. The legs have short, black hairs; femora mainly short-haired, only the front femora with longer hairs on the posterior side; middle femora with a pair of preapical bristles on both sides; tibiæ with two dorsal rows of somewhat long bristles, and middle tibiæ with one ventral bristle; middle metatarsi with a pair of long bristles below at the apex. Wings a little brownish; veins black, discal vein with a small, even curve. Squamulæ yellow, with a blackish brown fringe. Halteres yellow.

Female. Of more æneous or olive colour, the stripes on thorax more distinct. Frons brownish pruinose. Epistoma broad, this and the large palpi brownish grey. Postocular hairs whitish below. Antennæ shorter than the head, the third joint scarcely as long as the two basal; arista longer than the antennæ. Legs paler than in the male, femora yellowish to brownish or blackish, hind femora blackish at the apex, often only above; hind tibiæ a little compressed and dilated, coloured as in the male; coxæ pale-haired, front coxæ with a few black hairs at the apex, middle coxæ without spine, but with a few black hairs at the apex; middle metatarsi with no long bristles below; front metatarsus scarcely as long as the three following joints. Wings a little more tinged than in the male. Squamular fringe yellow.

Length 3,6 to fully 4 mm.

The female of this species varies in the colour of the legs from rather pale to about as in the male, but the hind femora are always pale at the base; it is easily known by the hind tibiæ, which are a little compressed and coloured as in the male.

P. fascipes is rare in Denmark and has only been taken in earlier time; Amager (Stæger); in Jutland at Holstebro (Jacobsen) and at Skagen. I know no time for its capture.

Geographical distribution:— Europe down into Spain, and in Asia Minor; towards the north to northern Sweden, and in Finland.

3. *P. elegantula* Meig.

1824. Meig. Syst. Besch. IV, 51, 12. — 1843. Zett. Dipt. Scand. II, 464, 6 (*Rhaphium*). — 1850. Loew, Stett. ent. Zeitg. XI, 104, 6 (*Rhaphium*). — 1862. Schin. F. A. I, 199. — 1903. Kat. paläarkt. Dipt. II, 328.

Male. Vertex and frons æneous; eyes whitish-hairy. Epistoma very narrow, silvery white. Palpi small, greyish. Occiput green, a little greyish pruinose; postocular hairs black above, white below. Antennæ black, not long, shorter than the head, the third joint longer than the two basal; arista longer than the antennæ. Thorax bright green, not pruinose, shining. Pleura green, greyish pruinose; propleural hairs pale. Abdomen green or more or less coppery, especially towards the end, the sixth segment steel-blue or somewhat purplish; abdomen haired with short, black hairs, longer and pale at the sides of the three first segments; there are short hindmarginal bristles, longer on the first segment. Venter grey, with white hairs, which are long towards the base. Hypopygium black or blackish green; the ventral lobes somewhat long, blackish brown, a little dilated and hollowed and thus somewhat spoon-like; outer lamellæ rather long, simple, they are narrow, attenuated into a long apex, of dirtily yellowish or brownish colour, longish haired. Legs with the coxæ grey, femora yellow, hind femora black at the apex, especially above; tibiæ yellow, hind tibiæ black towards the apex; anterior tarsi blackish or brown about from the apex of metatarsus, hind tarsi black. Middle coxæ with a strong, hind coxæ with a small, black apical spine; front metatarsus as long as the two next joints, thickened below towards the apex; middle metatarsus likewise about as long as the next two joints; hind metatarsus shorter than the following joint. The legs have short, black hairs, the coxæ are whitish-haired, front coxæ with a few black bristles at the apex; front femora with short, middle femora with somewhat long, white hairs below, otherwise the femora only short-haired; they have all some bristles at the apex on both sides; all tibiæ with long bristles in two dorsal rows, the middle tibiæ besides with a ventral pair of bristles below the middle; middle metatarsi a little spinulous beneath. Wings somewhat brownish; veins black, discal vein with a slight and even curve. Squamulæ yellow, with a whitish yellow fringe. Halteres yellow.

Female. Similar to the male. Epistoma broad, this and the large palpi brownish grey. Antennæ shorter than in the male, third joint about as long as the two basal, somewhat longer than broad; arista not twice as long as the antennæ. Legs about as in the male, hind femora not or slightly dark at the apex; anterior metatarsi relatively longer, about of the length of the three next joints; there are no coxal spines and the front metatarsi are simple. Front and middle coxæ with some black, bristly hairs at the apex. Femora quite short-haired. Wings more brownish than in the male.

Length 5.8—7 mm.

The pupa is yellow, it has a length of about 8 mm (exuvia).

P. elegantula is somewhat rare in Denmark, but has been taken in several localities; at Copenhagen in Frederiksberg Have, Damhusso (the author), at Fure Sø (Wesenberg Lund), Donse Dam (Schlick, the author), Noddebo (the author); in Jutland at Madum Sø near Skørping (Kryger) and at Hulsig north of Frederikshavn (Th. Mortensen). My dates are $^{11}/_7$ — $^{16}/_8$. It has been taken at the borders of lakes and ponds. The pupa was found in the sand at the border of Donse Dam by Mr. Schick on $^{12}/_7$.

Geographical distribution:— Northern and middle Europe down into France; towards the north to northern Sweden, in Finland and in Siberia.

Remarks: Loew raises l. c. almost a doubt with regard to Zetterstedt's determination; it seems as if Loew has understood Zetterstedt's expression about the legs: "posticorum femoribus apice . . . tibiisque apice tarsisque omnibus . . . atris" as if all tibiæ were black at the apex, while Zetterstedt evidently means only the hind tibiæ; on the other hand Zetterstedt's expression: "seta longitudine antennæ" is erroneous.

4. *P. nemorum* Meig.

1830. Meig. Syst. Besch. VI, 359, 10 (*Rhaphium*), et 1838. VII, 151, 10. — 1850. Loew, Stett. ent. Zeitg. XI, 103, 5, Tab. I, Fig. 15—16 (*Rhaphium*). — 1862. Schin. F. A. I, 197. — 1903. Kat. paläarkt. Dipt. II, 329. — *Hydrochus laticornis* Fall. 1823. Dipt. Suec. Dol. 6, 3, p. p. var. a. — *Rhaphium laticorne* 1843. Zett. Dipt. Scand. II, 459, 2, et 1849. VIII, 3057, 2. — *Rhaphium nigripes* Macq. 1834. Suit. à Buff. I, 441, 4. — 1838. Meig. Syst. Besch. VII, 151, 11.

Male. Vertex and frons green; eyes pale brownish to whitish hairy. Epistoma narrow, silvery white. Palpi greyish. Occiput greenish, a little greyish pruinose; postocular hairs black above, whitish below. Antennæ black, long, longer than the head, the third joint almost thrice as long as the two basal; arista short, not much more than half as long as the third joint. Thorax dark green, generally a little brighter in the middle, slightly greyish pruinose, most in front, shining. Pleura green, a little greyish pruinose; propleura with pale hairs. Abdomen green, sometimes more or less æneous or coppery, a little greyish white pruinose and with very narrow, dark incisures; it is clothed with short, black hairs, longer and pale at the sides of the three first segments; there are short, black hindmarginal bristles, somewhat long on the first segment. Venter greenish, grey pruinose, with pale hairs, somewhat long towards the base. Hypopygium green,

the ventral lobes short, black; they are compressed, a little dilated towards the apex, with a spine at the lower apical corner and on the upper margin of the dilatation with short hairs, which are directed towards the base; the outer lamellæ are somewhat long, rhomboidal at the base with an angle on the ventral or outer side, from the base they are attenuated into an almost thread-like apical part; they are brownish, with hairs at the margin, somewhat long on the ventral or outer side. Legs with the coxæ grey; anterior femora blackish grey with the apex yellow, the tibiæ and tarsi yellow, the latter with the three or four last joints black or blackish brown; hind legs black; middle coxæ with a long, black apical spine; front tarsi with metatarsus about as long as the two next joints, slightly thickened towards the apex; the second joint slightly curved with the ventral side convex; middle tarsi with metatarsus as long as the next three joints, hind metatarsus a little shorter than the second joint. The legs have short, black hairs, the coxæ are pale-haired; the anterior femora have longish, white, partly bristly hairs at the base, and the hind femora a pale fringe on the postero-ventral side at the basal part; the front femora have black bristles on the apical part of the posterior side, the middle femora have one or a couple of bristles at the apex on both sides, hind femora one; the tibiæ have two rows of somewhat long dorsal bristles, rather few on the hind tibiæ; on the front tibiæ the bristles in the anterior row are numerous and stronger than those in the posterior row, which latter are present only on the basal half; the middle tibiæ have besides one ventral bristle; the front metatarsus with short but dense ciliation above, the middle metatarsus with one (sometimes two) long bristles at the ventral base. Wings somewhat greyish tinged; veins black, discal vein with a slight and even curve. Squamulæ pale yellow, with a whitish fringe. Halteres pale yellow.

Female. Colour sometimes more æneous olive than in the male. Frons somewhat pruinose. Epistoma broad, brownish grey; palpi large grey. Antennæ short, the third joint about as long as the two basal; arista somewhat longer than the antennæ. Legs more yellow than in the male; femora yellow or the anterior more or less darkened at the base, the hind femora at the apex; hind tibiæ yellow, tarsi black; middle coxæ without spine, but with some black hairs; front tarsi simple, metatarsus almost as long as the four following joints; middle metatarsus without ventral bristle, as long as the three following joints; front coxæ with some black hairs at the apex; femora short-haired, only front femora with longer, partly pale hairs on the posterior side.

Length 3.3—4 mm.

Remarks: The pale hairs on the legs of the male of this species are somewhat easily rubbed off.

P. nemorum is somewhat rare in Denmark; Amager (Jacobsen), Damhussø, Fure Sø (the author); in all only eight specimens. My dates are in July. It has been taken at the borders of lakes.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden.

5. *P. crassipes* Meig.

1824. Meig. Syst. Besch. IV, 50, 10, et 1830. VI, 362. — 1843. Zett. Dipt. Scand. II, 466, 7, et 1855. XII, 4617, 7 (*Rhaphium*). — 1862. Schin. F. A. I, 199. — 1903. Kat. paläarkt. Dipt. II, 328. — *Rhaphium cylindricum* Zett. 1838. Ins. Lapp. 705, nota. — *Rhaphium fulvipes* Meig. 1838. Syst. Besch. VII, 151, 17. — *Porphyrops rufipes* Meig. 1824. Syst. Besch. IV, 52, 14, et 1830. VI, 363.

Male. Vertex and frons green; eyes whitish-hairy. Epistoma narrow, silvery white. Palpi small, grey. Occiput green, a little greyish pruinose; postocular hairs black above, whitish below. Antennæ black, not as long as the head, third joint not twice as long

Fig. 81. Antenna of *P. crassipes* ♂. $\times 55$.

as the two basal; arista generally a little longer than the antennæ, but the third antennal joint may vary slightly in length so that the arista is sometimes only as long as the antennæ. Thorax dark green, with two darker stripes in the middle, abbreviated behind; it is slightly greyish pruinose, shining. Pleura green, greyish pruinose; propleura with pale hairs. Scutellum with rather many marginal hairs at the sides. Abdomen green, sometimes æneous or more or less coppery, with darker incisures, and slightly greyish pruinose; it is clothed with short, black hairs, somewhat longer and pale at the sides of the three first segments; there are short hindmarginal bristles, long on the first segment. Venter greenish, grey pruinose, with longish, pale hairs. Hypopygium blackish, the ventral lobes long, thin, attenuated

into a long point and curved a little downwards; they are of yellowish colour; the outer lamellæ very long, narrow, almost thread-like; they are forked about in the middle, the dorsal branch is the longest; the lamellæ are hairy at the margin, longest on the ventral side, and each branch ends with some hairs; the colour is dirtily yellowish or brownish. The front legs somewhat short, middle legs rather slender, hind legs robust. The coxæ are grey, the anterior femora whitish yellow, more or less black at the base, on the front femora the dark colour stretching more or less towards the apex, on the middle femora only present below; anterior tibiæ whitish yellow; front tarsi with the apex of metatarsus and the four following joints blackish, middle tarsi with only the two last joints black; hind legs black with only the very base of the femora yellow, they have the femora rather thick, especially towards the apex, tibiæ likewise thickened and somewhat compressed, and also the tarsi somewhat stout; the front tarsi short, shorter than the tibiæ, the metatarsus thickened at the apex, longer than the four following, short joints; middle tarsi as long as tibiæ, metatarsus as long as the two next joints, the last two joints flat and dilated, forming an oval disc; hind metatarsus about as long as the second joint. The legs have short, black hairs; the front coxæ are densely white or yellow-haired, the posterior coxæ have a dense tuft of black bristles at the apex; the hind coxæ are partly pale-haired on the outside; front femora with white hairs on the posterior side, middle femora, with some long,

Fig. 82. Wing of *P. crassipes* ♂.

white hairs below on the basal half; the tibiæ have two dorsal rows of bristles, but they are not numerous, the middle tibiæ have a pair of ventral bristles, and the hind tibiæ are short-ciliated above and below; the middle metatarsus has short bristles below. Wings rather broad in the middle, very slightly tinged; veins blackish brown; cubital vein curved downwards at the end, the apex a little recurved; discal vein with a not small curve, placed somewhat after the middle

of its last part, the lower angle of the curve a little angular. Squamulae pale yellow, with a white fringe. Halteres pale yellow.

Female. Frons aeneous, somewhat pruinose. Epistoma broad, this and the large palpi grey. Antennae short, the third joint about

Fig. 83. Antenna of *P. crassipes* ♀. $\times 55$.

as long as the two basal, longer than broad; arista not fully twice as long as the antennae. Legs simple, almost quite yellow, only the front femora a little darkened at the base and the hind femora at the apex above; anterior tarsi darkened towards the end; hind tibiae more or less darkened towards apex and hind tarsi black. Anterior metatarsi scarcely as long as the four following joints. Front coxae with no black hairs at the apex, posterior coxae without tufts of bristles at apex, but with black hairs; femora quite short-haired, anterior femora with a preapical bristle on each side, hind femora on the anterior side. Wings more tinged than in the male.

Length 4.8–6 mm.

P. crassipes is somewhat common in Denmark; Ordrup Mose, Ermelund, Lyngby Mose, at Soro and at Nyraad near Vordingborg; it has thus only been taken on Sealand. My dates are $18/5$ — $22/6$. It has been taken on bushes and in low herbage in fens.

Geographical distribution:— Northern and middle Europe down into France; towards the north to northern Sweden, and in Finland and Siberia.

Remarks: The females of the three species *spinicoxa*, *elegantula* and *crassipes* are somewhat similar; *elegantula* is easily known by the brightly shining thorax and more than one preapical bristle on the hind femora; it has the longest third antennal joint of the three species; *spinicoxa* has darker legs, the third antennal joint is short, almost as broad as long, the arista twice as long as the antennae; hind femora without preapical bristle; *crassipes* has the third antennal joint a little longer, and arista not twice as long as the antennae; the hind femora have one preapical bristle. Also *spinicoxa* has some black hairs at the apex of the front coxae, and the middle coxae mainly dark-haired, while *crassipes* has no black hairs on the front coxae, and pale-haired middle coxae; finally *spinicoxa* has more

numerous hairs on the hind side of the ocellar tubercle, while *crassipes* has only a few (4). Also the female of *penicillata* has some resemblance, but is known from *crassipes* by the shorter third antennal joint and not recurved cubital vein, and from *spinicoxa* by the front coxæ without black hairs at apex and the pale-haired middle coxæ.

6. *P. consobrina* Zett.

1843. Zett. Dipt. Scand. II, 471, 11, et 1849. VIII, 3061, 11 (*Rhaphium*).
 --- 1862. Schin. F. A. I, 199. — 1903. Kat. paläarkt. Dipt. II, 328. —
Rhaphium fascipes 1838. Zett. Ins. Lapp. 704, 7, p. p. var. b.

Male. Vertex and frons æneous green, somewhat pruinose; eyes pale-hairy. Epistoma narrow, silvery white. Palpi blackish. Occiput green, a little greyish pruinose; postocular hairs black above, whitish yellow below. Antennæ black, almost as long as the head, the third joint about twice as long as the two basal; arista shorter than the antennæ. Thorax dark green or somewhat olive, a little greyish pruinose, shining; there are a pair of faint, darker stripes in the middle. Pleura green, greyish pruinose, most behind; propleura with pale hairs. Abdomen green or a little æneous or coppery, with narrow, dark incisures, slightly greyish pruinose; it is clothed with short, black hairs, longer and pale at the sides of the three first segments; there are hindmarginal bristles, somewhat long on the first segment. Venter greenish, grey pruinose, with white hairs, which are long towards the base. Hypopygium blackish, the ventral lobes of moderate length, lancet-shaped, pointed with the apex curved a little downwards; the outer lamellæ not long, triangularly dilated at the apex with the angle dorsally; they are brownish, short-haired at the margin. Legs with the coxæ grey; femora black, the anterior with the apex yellow, the front femora somewhat metallic green; tibiæ yellow, or the hind tibiæ often darker to dark brown, and blackish at the apex; anterior tarsi blackish towards the end, hind tarsi more or less dark to quite black; the first joint of the front tarsi about as long as the second, slightly dilated below towards the apex; the second a little dilated at the base, the three last short; middle femora thin, middle metatarsus almost as long as the four following joints; hind metatarsus as long as the second joint. The legs have short, black hairs; the coxæ are pale-haired; front femora with a row of strong, black bristles below, and with longish, white hairs on the posterior side, the upper row of which are black; middle femora with long, white hairs on the basal half below, and with black bristles at the apex on both sides; hind femora with one or two preapical bristles; tibiæ with two dorsal rows of bristles, longest on

the anterior tibiæ, middle tibiæ besides with two antero-ventral and some small ventral bristles; front metatarsi short-ciliated above and below, the second joint above; middle metatarsus with small bristles below, longest at the base. Wings almost hyaline; veins black, discal vein with a small, even curve. Squamulæ yellow, with a white fringe. Halteres pale yellow.

Female. Frons æneous. Epistoma broad, brownish; palpi large, brownish grey. Antennæ short, the third joint about as long as the two basal; arista not twice as long as the antennæ. Legs with the femora yellow and quite short-haired; front tarsi simple, the first joint about as long as the two next, the middle metatarsi about of the length of the three next; anterior coxæ with no black hairs at apex. Wings somewhat brownish tinged.

Length 3.8—4.7 mm.

P. consobrina is rare in Denmark, we have only six specimens in all; Amager (Stæger, the author), at Fure So and on the little island Egholm at Skelskør (the author); in Jutland at Ringkøbing Fjord (Th. Mortensen). My dates are $28/5-19/8$. It has nearly always been taken in grass near the shore, and it seems to prefer salt marshes, which has also been previously recorded.

Geographical distribution: — Northern and middle Europe down into Germany; towards the north to northern Scandinavia, and in Finland. It is also recorded from North America. Aldrich thinks however the indentification somewhat premature.

7. *P. riparia* Meig.

1824. Meig. Syst. Besch. IV, 53, 18. — 1903. Kat. paläarkt. Dipt. II, 330. — *Rhaphium praerosum* Loew, 1850. Stett. ent. Zeitg. XI, 108, 9, Tab. I, Fig. 21—23. — *Porphyrops praerosus* 1862. Schin. F. A. I, 198. — *Porphyrops tenuis* Verr. 1876. Ent. Month. Mag. XII, 197.

Male. Vertex and frons greenish, somewhat greyish pruinose; eyes pale-hairy. Epistoma narrow, silvery white. Palpi dark. Occiput green, a little greyish pruinose; postocular hair black above, white below. Antennæ black, not fully as long as the head, the third joint about as long as the two basal, oval, not pointed; arista a little longer than the antennæ; the second antennal joint short-haired below and with a long hair above. Thorax dark green, a little pruinose, shining; it has two approximated, black stripes in the middle. Pleura greenish, grey pruinose; propleural hairs white. Abdomen dark green, with narrow, black incisures; it is clothed with short, black hairs, long and pale at the sides of the first three segments; there are hindmarginal bristles, long on the first segment. Venter greenish, grey

pruinose, with pale hairs, which are longish towards the base. Hypopygium blackish, the ventral lobes small, somewhat styliform, with some short hairs below; the outer lamellæ short, lamelliform, on the ventral or outer side they are prolonged into a somewhat long, recurved process; the apical margin is a little serrated; they are brownish or blackish brown, pale-hairy, longest at the margin. Legs with the coxæ grey; front femora black with yellow apex, middle femora yellowish, very slightly darker at the apex, hind femora yellowish with the apical part black, the colour stretching somewhat inwards above; anterior tibiæ and tarsi yellow, the latter with about the apex of metatarsus and the four following joints brownish or blackish; hind tibiæ and tarsi black; front metatarsi nearly as long as the four following joints, a little curved and thickened at the apex; middle metatarsi likewise about as long as the four following joints, hind metatarsi about of the length of the second joint. The legs have short, black hairs, the coxæ white-haired; posterior coxæ with a small, black fringe at apex; front femora with long, pale hairs on the posterior side, middle femora with shortish, pale hairs below, hind femora with a short, pale fringe below on the posterior side in the basal half; middle femora with a pair of preapical bristles on both sides, hind femora with one on the anterior side; tibiæ with two dorsal rows of somewhat long bristles, middle tibiæ also with a pair of ventral bristles below the middle, and hind tibiæ with small ventral bristles; middle metatarsi with some short bristles below. Wings brown; veins blackish, discal vein with a somewhat small, even curve; posterior cross-vein rather oblique. Squamulæ yellow, with a white fringe. Halteres yellow.

Female. Epistoma broad, somewhat silvery; palpi large, grey. Antennæ short, the third joint almost not longer than broad, the arista more than twice as long as the antennæ. Legs with femora yellow, front femora slightly dark at the apex, hind femora with black apex; hind tibiæ black at the base, the apical part more or less brownish, blackish towards the apex; anterior metatarsi about of the same relative length as in the male, front metatarsi simple; front coxæ with a single black hair at the apex, middle coxæ with some few; front femora with longish, pale hairs on the posterior side, middle femora with short, pale hairs below. Wings more brown than in the male.

Length about 5 mm.

P. riparia is very rare in Denmark, only one specimen, a male, has been taken in Jutland at Nymindesø on ¹/₆ 1907 (Th. Mortensen).

Geographical distribution:— Northern and middle Europe down into France; it has its northern limit in Denmark, and it occurs in England.

8. ***P. penicillata*** Loew.

1850. Loew, Stett. ent. Zeitg. XI, 109, 10, Tab. I, Fig. 26—27 (*Rhaphium*).
— 1862. Schin. F. A. I, 198. — 1903. Kat. paläarkt. Dipt. II, 330.

Male. Vertex and frons bluish green; eyes pale-hairy. Epistoma narrow, according to Loew “silberweis mit dunklem Schiller”, in my somewhat shrivelled specimen it appeared dark. Palpi greyish black. Occiput blackish green, greyish pruinose; postocular hairs black above, white below. Antennæ black, scarcely as long as the head, third joint somewhat short, pointed oval; arista somewhat longer than the antennæ; the second antennal joint short-haired below and with a long hair above. Thorax dark green or somewhat æneous, a little pruinose, shining. Pleura green, dark greyish pruinose, posteriorly almost blackish grey; propleural hairs pale. Abdomen dark green, clothed with black hairs, long and pale at the sides of the three first segments; there are black hindmarginal bristles, longest on the first segment. Venter greenish, grey pruinose, with pale hairs, longish towards the base. Hypopygium blackish, the ventral lobes somewhat roundly dilated with a styliform apex; the outer lamellæ short, variously curved, with a tuft of curved hairs on the ventral margin before the apex. Legs with the coxæ blackish grey; front femora black with the apex yellow, posterior femora varying in colour, from black to more or less brown or brownish yellow, the middle femora palest at the apex, the hind femora more or less blackish at the apex; anterior tibiæ and tarsi yellow or brownish yellow, the latter blackish or blackish brown about from the apex of metatarsus; hind tibiæ black or generally the basal half paler, especially above; hind tarsi black; anterior metatarsi almost as long as the other four joints, the front metatarsi a little thickened below at the apex; hind metatarsus as long as the second joint. The legs have short, black hairs, the coxæ are white-haired; the middle coxæ with a small black fringe at apex; front femora with long, whitish hairs on the posterior side, black and more bristly at the apex; middle femora with short pale hairs below, longest on the basal part; hind femora with a longish, pale fringe below in about the basal half, shorter outwards; the middle femora have generally a pair of, the hind femora one preapical bristle on each side; tibiæ with two dorsal rows of somewhat long bristles, the middle tibiæ also with a pair of ventral bristles, and the hind tibiæ with some small ventral bristles; the front tarsi have a distinct ciliation

above on the four first joints, and a couple of longer hairs at the apex; the middle metatarsi are slightly spinulose beneath. Wings brown; veins blackish brown, discal vein with a slight and even curve. Squamulae yellow, with a whitish fringe. Halteres yellow.

Female. Epistoma broad, this and the large palpi grey. Antennae short, third joint almost as broad as long. Legs chiefly coloured as in the male; front tarsi simple; the relative length of all metatarsi chiefly as in the male; femora short-haired; anterior coxae with no black hairs at apex.

Length 3—4.2 mm.

P. penicillata is very rare in Denmark, only one specimen, a male, has been taken in Jutland at Frederikshavn in July 1881 (H. J. Hansen).

Geographical distribution: — Northern and middle Europe down into France; it was not known to Zetterstedt from Scandinavia, but according to Wahlgren (Entom. Tidsskr. 33, 1912, 39) it occurs in southern Sweden.

9. *P. obscuripes* Zett.

1849. Zett. Dipt. Scand. VIII, 3061, 11—12 (*Rhaphium*). — 1859. Loew, Neue Beitr. VI, 16, 1. — 1862. Schin. F. A. I, 199. — 1903. Kat. paläarkt. Dipt. II, 331.

Of this species only the female is known (see below). Vertex and frons brown pruinose. Epistoma broad, this and the large palpi grey. Occiput grey pruinose; postocular hairs black above, white below. Antennae black, unusually long for a female, the third joint elongated, almost twice as long as the two basal; arista short, somewhat thick, especially its first joint, slightly longer than the antennae. Thorax dull greyish brown or olive, very slightly metallic, blackish at the sides and with two black middle stripes, abbreviated behind. Pleura green, greyish pruinose, especially behind; propleural hairs pale. Abdomen aeneous, clothed with short, black hairs, slightly pale in front; there are short hindmarginal bristles. Legs with the coxae grey, femora blackish or brown, the anterior at the apex, and the tibiae and tarsi yellow, the latter darkened about from the apex of metatarsus; hind tibiae and tarsi brownish black; the anterior metatarsi about as long as the three following joints, hind metatarsus slightly longer than the second joint. The legs have short, black hairs, coxae with longer whitish or, on the middle coxae, pale brownish hairs; hind femora with a preapical bristle, middle femora with one on each side; tibiae with two dorsal rows of few bristles, middle tibiae also with a pair of ventral bristles, and hind tibiae with some few ventral bristles.

Wings brown; veins blackish, the discal vein slightly bent. Squamulae and fringe yellow. Halteres yellow.

Length about 3 mm.

P. obscuripes is very rare in Denmark, we have only two specimens from Stæger's collection, taken in Ordrup Mose, one on ^{12.5} 1844.

Geographical distribution:— Denmark and Germany.

Remarks: The above description is made from the type-specimen of Zetterstedt, which he had lent from Stæger, and which, as Zetterstedt states, has lost the third joint of the antennæ, but I have had besides another Danish specimen; in all only three specimens seem to be known. There is however good reason to believe that the species is the female to *P. subnudipes* Zett. 1859. XIII, 5032, 11—12, as suggested by Raddatz (Stett. ent. Zeitg. XXXIV, 1873, 328, 5). In this case the species goes towards the north to southern Sweden, and towards the south into Styria.

15. **Syntormon** Loew.

Species of small or medium size, and of metallic green colour, sometimes with yellow spots at the base of abdomen. The genus is in its general organisation similar to *Porphyrops*, but the species are as a rule smaller, less robust and especially less hairy. The head is not or almost not broader than thorax, it is longer than in *Porphyrops*, somewhat semiglobular or quite globular. There are ocellar, outer vertical and smaller postvertical bristles, the latter placed somewhat distantly; the ocellar tubercle has a few hairs on its posterior side. The eyes are hairy; the facets slightly enlarged on the front side in the males. The front decreases a little in breadth towards the antennæ; the eyes are separated, the epistoma narrow in the male, rarely somewhat broad; in the female it is broad. The clypeus is short or somewhat short, it is marked from the epistoma by a small elevation at each side; in the male it is generally slightly arched, but in the female strongly arched and protruding; it may reach to or almost to the lower margin of the eyes in the male, in the female it is a little shorter. The postocular bristles form a single row, the lower part of the occiput is not densely haired as in *Porphyrops*, but has only a few bristles inwards to the row, and none above the oral aperture. The antennæ are rather long in the male, with the third joint elongated and generally thin in the apical part; they are short in the female; the second joint is of a peculiar shape, it has a thumb-like prolongation of the front margin which reaches in on the third joint; the prolongation is, in accordance with the length of the antennæ, longer in the male than in the female; in some species the

prolongation is visible only on the inside, in others it is visible both on the inside and also in a peculiar way on the outside above, and the third joint is then deeply incised in the base; the construction is in some respects as in *Dolichopus*, but the real shape of the second joint is rather intricate and not easily understood; when the prolongation is visible on both sides, it is somewhat canaliculated above, and the upper basal lobe of the third joint fits into this groove. The prolongation is of a curious shape; it is in reality on the inside formed partly from the prolonged basal part of the joint, partly from the same collar-shaped prolongation, which was mentioned under *Dolichopus*, while on the outer side it is exclusively formed of this latter; the position of the bristles indicates the border between these two parts; the mentioned prolongation is thus here not hidden in the interior of the third joint, but lies free in a canaliculation on the inside of the joint, the canaliculation going in some species through the joint, forming a deep incision, and the second joint does not overlap the third in the usual way. The arista is apical or, on account of the apex being obliquely cut, a little subapical (in *tarsatus* it is really dorsal); it is in the male shorter than or about as long as the antenna, in the female longer; its first joint is short or somewhat short¹. The basal joint of the antennæ is either bare above or it has a single hair or is more hairy; the second joint has bristles at the apical margin, the third joint is distinctly hairy all over and the arista is short-pubescent. The proboscis, palpi and oral aperture are larger in the female than in the male, but the proboscis is only slightly protruding in both sexes. Thorax as in *Porphyrops*; acrostichal bristles short, either uniserial or more or less irregularly biserial, especially behind; there are six dorsocentral bristles, the first placed quite in front (the fourth of the bristles is generally a little smaller than the others, and in some species it may be quite wanting); further there is a humeral bristle, and besides a smaller hair or bristle, a posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle. Scutellum with two strong marginal bristles, and a small or very small hair at each side; sometimes it has more hairs at the margin; it is bare above, or sometimes with some few hairs. Propleura with hairs, longest below; the pteropleura are a little hairy below, and the

¹ Zetterstedt and even Mik. say (Dipt. Unters. Jahresb. d. k. k. akad. Gymn. Wien, 1878, 13, Fig. 1—3) about the arista in the male of *S. rufipes* that it is not two-jointed and not articulated to the third joint (Zetterstedt however says: "quasi in unum cum illo coalita"), but this is erroneous; under the microscope the first joint of the arista and its articulation to the third joint are distinctly seen, even in a dried specimen.

metaepimera have hairs at the margin¹. Abdomen in the male with six visible segments above, five below. Hypopygium small and roundish; it is imbedded and its appendages generally not to be seen; there are (*pumilus*) short, stubby ventral lobes, and narrow, somewhat lamelliform, hairy outer lamellæ; the penis is long and has a strong double curvature in the middle. In the female the abdomen has five visible segments. Dot-like impressions are present on some of the segments though slightly obvious, most in the females. The abdominal segments have only short hindmarginal bristles, longer on the first segment. Legs not specially long; in the males sometimes some tarsal joints are more or less dilated. The legs have the coxæ and femora only short-haired, the middle coxæ have a bristle on the anterior side and the hind coxæ one on the outside; in the males there are often special bristles or spines below the anterior femora or on the hind tarsi; posterior femora with preapical bristles; hind metatarsus about of the length of the second joint, without bristles above. Wings a little narrower than in *Porphyrops*, sometimes narrowed towards the base, especially in the male, and then without axillary lobe; the mediastinal vein terminating in the subcostal vein, the discal vein with a very slight or almost imperceptible bend; the cross-vein placed about in or somewhat behind the middle. The discal vein has a convexity near the cross-vein. Squamulæ with a small but distinct angular lobe with a long fringe, the inner part of the squamulæ with longish hairs.

The chief character of the genus is the shape of the second antennal joint; for the rest it is distinguished from *Porphyrops* by the more globular head, the longer antennæ in the male the third joint of which is much more hairy, the short arista, the lower part of occiput being without dense hairs; further by the short-haired femora and coxæ, the hind coxæ with a bristle, and the small and hidden hypopygium; the wings are a little narrower and the bend of the discal vein very slight or almost wanting. In the female the protruding lower part of epistoma is characteristic.

The developmental stages are not known.

The species of *Syntormon* occur in grass and low herbage in fens and on humid meadows, especially at the borders of pools and

¹ As mentioned under *Eutarsus* this genus has also hairs on pteropleura and metaepimera, which is otherwise not the case in the Dolichopodids; it is possible that *Eutarsus* has its natural place near *Syntormon*, it seems in several respects nearly allied to this genus, perhaps especially to *pallipes*; also the structure of the second antennal joint in *Eutarsus* is rather like the appearance in *Syntormon*.

ditches; Schiner notes that he found them especially on *Veronica Beccabunga* and *Mentha silvestris*; several species prefer salt marshes.

Of the genus 20 species are known from the palæarctic region; 5 have hitherto been found in Denmark.

Table of Species.

Males.

1. Middle tarsi with dilated joints; arista subapical 1. *tarsatus*.
— Middle tarsi normal; arista apical 2.
2. Anterior femora without bristles below at the base; hind metatarsi with a curved spine, or with two erect spines; squamular fringe yellow 3.
— Anterior femora with one or several bristles below near the base; hind metatarsus without spines, at most with a pair of bristles; squamular fringe black or dark brown 4.
3. Hind metatarsus with a curved, bifid thorn beneath near base 2. *pallipes*.
— Hind metatarsus with two straight spines beneath near base 3. *punctatus*.
4. Anterior femora with one bristle below near base; hind tarsi with short bristles on the first joint and a long bristle on the second joint below; arista very much shorter than the third antennal joint 4. *rufipes*.
— Front femora with four, middle femora with three bristles below near base; hind tarsi without bristles below; arista about as long as the antennæ 5. *pumilus*.

Females.

1. Coxæ and metaepimera yellow 2.
— Posterior coxæ and metaepimera grey 3.
2. Arista subapical; abdomen only yellow at the sides 1. *tarsatus*.
— Arista apical; abdomen more yellow 3. *punctatus*.
3. Squamulæ with a yellow fringe; abdomen somewhat pale-haired at the sides 2. *pallipes*.
— Squamulæ with a black or dark brown fringe, abdomen not pale-haired at the sides 4.
4. Front coxæ and femora yellow 4. *rufipes*.
— Front coxæ and femora more or less grey at the base 5. *pumilus*.

1. *S. tarsatus* Fall.

1823. Fall. Dipt. Suec. Dol. 7, 4 (*Hydrochus*). — 1843. Zett. Dipt. Scand. II, 464, nota, et 608, 96, et 1849. VIII, 3096, 96, et 1859. XIII, 5068, 96 (*Dolichopus*). — 1903. Kat. paläarkt. Dipt. II, 333. — *Dolichopus graciosus* Meig. 1824. Syst. Besch. IV, 100, 47, ♀. — 1843. Zett. Dipt. Scand. II, 586, 75, ♀. — *Dolichopus obscurellus* (nec Fall.) 1838. Zett. Ins. Lapp. 700, 6, p. p. ♀ — *Porphyrops palmipes* Meig. 1824 Syst. Besch. IV, 55, 22, ♂. — *Porphyrops vittatus* Macq. 1834. Suit. à Buff. I, 144, 10, ♂. — 1838. Meig. Syst. Besch. VII, 152, 31, ♂.

Male. Vertex and frons blue. Epistoma narrow, silver-white, in certain directions dark on the upper half. Palpi dark. Occiput greenish, grey pruinose; postocular bristles black above, pale below. Antennæ black, long, much longer than the head, the third joint twice as long as the two basal, it is of about the same breadth in the whole length, obliquely cut at the apex and somewhat pointed; the thumb-like prolongation of the second joint only present on the inside; arista subapical, about as long as the third joint; the first joint has only a single hair above. Thorax æneous or greenish æneous, somewhat brownish pruinose, shining; the acrostichal bristles uniserial, posteriorly somewhat biserial. Pleura somewhat greenish, grey pruinose; metaepinera yellow; propleural hairs pale; scutellum with some hairs at the margin. Abdomen æneous, down the sides more or less yellow; it is clothed with short, black hairs, and has hindmarginal bristles, long on the first segment. Venter yellow, with yellow hairs. Legs yellow, front tarsi with the apex of the second joint and the three following joints black; posterior tibiæ long; middle tarsi with the first joint long and thin, as long as the four following, the second a little compressed and dilated towards the apex and here black, third and fourth compressed and dilated, and together with the fifth black; hind tibiæ thickened towards the apex and this black; hind tarsi black, or pale at the base, metatarsus a little thickened, as long as the second joint. The legs have short, black or blackish hairs; coxæ pale-haired, anterior coxæ with some black hairs at the apex, hind coxæ with a black bristle on the outside; middle femora with longish, black bristles below in the basal two thirds, posterior femora with a preapical bristle; front tibiæ with a short, dense ciliation above in the apical two thirds, and generally with a small bristle; middle tibiæ with two anterior and one ventral bristle, and generally also with a dorsal bristle near the base; hind tibiæ with dorsal bristles, and somewhat ciliated above and on the anterior side; hind tarsi with a short, dense ciliation above, which is brown on metatarsus, white at the apex of metatarsus and on the three following joints; the metatarsus has besides two bristles below at the apex, the upper long and curved, the lower short, straight. Wings somewhat greyish or brownish tinged; veins black, the discal vein with a very small bend. Squamulæ yellow with the upper margin dark, and with a brownish fringe. Halteres yellow.

Female. Epistoma broad, brownish grey, protruding towards the apex. Antennæ short, third joint not longer than broad, arista longer than the antennæ. Legs simple, short-haired, without bristles below middle femora and hind metatarsi, nor with ciliation above these

latter, but with the ciliation on the front tibiae as in the male; hind tibiae quite yellow.

Length 2,8—3,3 mm.

S. tarsatus is rather rare in Denmark; at Lersøen, somewhat numerous (Stæger) and in Jutland at Hald near Viborg (the author). The dates are $^{20}/_6$ — $^{22}/_7$.

Geographical distribution: — Northern and middle Europe down into France; towards the north to northern Sweden, and in Finland.

2. *S. pallipes* Fabr.

1794. Fabr. Ent. Syst. IV, 340, 16 (*Musca*), et 1805. Syst. Antl. 266, 2 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 55, 23 (*Porphyrops*). — 1850. Loew, Stett. ent. Zeitg. XI, 124, 23 (*Rhaphium*). — 1862. Schin. F. A. I, 192. — 1903. Kat. paläarkt. Dipt. II, 332. — *Rhaphium ensicorne* Meig. 1824. Syst. Besch. IV, 30, 6. — *Rhaphium hamatum* Zett. 1843 Dipt. Scand. II, 475, 17, et 1849. VIII. 3063, 17, et 1855. XII, 4618, 17.

Male. Vertex and frons green or bluish-green. Epistoma somewhat broad, white, somewhat silvery, green just below the antennae.

Fig. 84. Antenna of *S. pallipes* ♂, from the inside. $\times 75$.

Palpi grey. Occiput green, greyish pruinose, postocular bristles black above, white below. Antennae black, long, more than twice as long as the head, third joint lancet-like, attenuated to a somewhat long,

Fig. 85. Antenna of *S. pallipes* ♂, from the outside. $\times 75$.

thin point; arista a little subapical, almost apical, shorter than the third joint; the thumb-like prolongation of the second joint fits into an excision in the third in such a way that it is visible both on the inside and above on the outside; the basal joint has no hairs above.

Thorax green or bluish green, somewhat greyish pruinose, shining; acrostichal bristles practically uniserial, a little irregular. Pleura green, grey pruinose; propleural hairs white. Abdomen green, sometimes somewhat æneous; the second and third segments generally more or less yellow and either quite or almost quite yellow, or with larger or smaller side spots, or sometimes without spots; abdomen clothed with short, black hairs, at the sides there are pale hairs, and there are hindmarginal bristles, long on the first segment. Venter greenish, grey pruinose, more or less yellow at the base in accordance with the colour of the dorsal side; it has pale hairs. Legs with the front coxæ yellow, greenish grey at the very base; posterior coxæ grey; for the rest the legs yellow but somewhat varying; either femora and tibiæ quite yellow, anterior tarsi black from the apex of metatarsus, and hind tarsi black with the base of metatarsus yellow; or the hind femora and tibiæ are more or less broadly black at the apex, and the hind tarsi quite black; also the anterior tarsi are then more black with only the base pale, or middle tarsi quite black and even the apex of the middle tibiæ brownish; the dark-legged specimens have generally abdomen without yellow colour, they are thus upon the whole darker, also their legs are more strongly bristly, and they seem upon the whole to be more robust, but all intermediates are present; the hind metatarsus is of the length of the second joint. The legs have short, black hairs; coxæ white-haired, hind coxæ with a black bristle on the outside; posterior femora with a preapical bristle; front tibiæ generally with a small bristle above near the base, middle tibiæ with three antero- and two postero-dorsal bristles, and sometimes with one ventral bristle; hind tibiæ with two dorsal rows and some ventral bristles, and besides with a row of somewhat (more or less) long, bristly hairs on the anterior side, and with shorter, somewhat bristly hairs above and below; hind tarsi with a short ciliation on the anterior side, longest on metatarsus, and this latter

Fig. 86. Antenna of *S. pallipes* ♀, from the inside. $\times 75$.

excised below at the base and above the excision with a strong, curved, bifid spine. Wings more or less brownish, sometimes almost blackish tinged towards the anterior margin, sometimes almost hyaline; veins black, discal vein with a very slight bend quite near the posterior

cross-vein. Squamulae yellow with a blackish margin above, and a yellow fringe. Halteres yellow.

Female. Epistoma broad, grey, protruding below. Antennae short, arista longer than the antennae. Abdomen varying in colour as in the male. Legs always with femora, tibiae and base of tarsi yellow; they are simple and simply haired, without spines or ciliation.

Length 2.5—3.5 mm.

S. pallipes is common in Denmark; at Lersøen, Amager, Dyrehaven, Tyvekrog, and on the little island Egholm at Skelskor; on Funen at Hoffmangave, and on Fænø; in Jutland in Grejsdalen at Vejle, at Horsens, Nymindesø and Ringkøbing Fjord, Frijsenborg, Gjerlev near Randers Fjord, Holstebro, Struer, and Ravunkilde near Skorping; finally on Bornholm at Rønne, Hasle, Allinge and in Almindingen. My dates are $^{28}/_5$ — $^{30}/_{10}$. It occurs at the borders of water in grass and low herbage, and not rarely on commons and marshes near the shore, sometimes in great numbers; on Egholm I found it swarming over small pools on the salt marshes on $^{28}/_5$. The different varieties occur together.

Geographical distribution:— *S. pallipes* is a common and very widely distributed species; all Europe down into Spain and Italy; towards the north to middle Scandinavia; further in Asia Minor, on Madeira and the Canary islands.

3. *S. punctatus* Zett.

1843. Zett. Dipt. Scand. II, 477, 18, et 1849. VIII, 3063, 18 (*Rhaphium*).
— 1903. Kat. paläarkt. Dipt. II, 332.

Male. Vertex and frons greenish, blue or chalybeus, somewhat pruinose. Epistoma rather narrow, white. Palpi grey. Occiput greenish or æneous, greyish pruinose; postocular bristles black above, whitish below. Antennae black, somewhat long but shorter than in *pallipes*; arista apical, about as long as the third joint; the second joint inserted into the third in the same way as in *pallipes*; the first joint (as far as I could detect) without hairs above. Thorax æneous, densely greyish brown pruinose, slightly shining; acrostichal bristles irregularly biserial, especially behind. Pleura greenish, greyish pruinose; metaepimera yellow; propleural hairs white; scutellum with some hairs at the margin and some few above. Abdomen blackish, the most of the second segment and the sides yellow in such a way that abdomen may be termed yellow with somewhat triangular, blackish spots above, turning the point forwards and connected with each other; on the second segment the spot is small and thus the segment almost quite yellow; the first segment is likewise yellow, a little darkened at the hind margin; the

visible part of the hypopygium yellow; abdomen clothed with short, black hairs, and it has hindmarginal bristles, long on the first segment. Venter yellow, with pale hairs. Legs yellow, middle coxæ somewhat darkened towards the base; anterior tarsi darkened towards the apex; hind tarsi with the apex of metatarsus and the four following joints blackish, metatarsus shorter than the second joint. The legs have short, blackish hairs; the coxæ are slightly pale-haired, front coxæ with black hairs at the apex, hind coxæ with a black bristle on the outside; posterior femora with a preapical bristle (or a pair); front tibiæ with a small bristle above near the base; middle tibiæ with three antero-dorsal and one or two postero-dorsal bristles, and with a ventral bristle; hind tibiæ with two dorsal rows and some smaller ventral bristles, the lowermost the longest, besides with a short ciliation above and on the anterior side, and a less distinct ciliation below; hind tarsi with a short, dense ciliation above and below, metatarsus very slightly curved and with two, approximated, straight spines below at the base. Wings somewhat narrowed towards the base, slightly brownish tinged; veins blackish, discal vein with a very slight bend near to the cross-vein. Squamulæ whitish yellow with the upper margin a little darkened, and with a yellow fringe. Halteres yellow.

Female. Epistoma broad, grey, protruding downwards. Antennæ short, arista longer than the antennæ. Abdomen yellowish with only the incisures blackish, it is a little æneous green towards the end. Legs coloured as in the male, hind metatarsus without spines at the base, but with a short bristle below about in the middle.

Length 3—3,3 mm.

S. punctatus is very rare in Denmark, we have only two specimens, a male and a female (Stæger's type-specimens) as far as known taken on Amager at the border of a ditch; there seems to have been one or a couple more specimens, as Zetterstedt mentions two males and a female. The species was detected by Stæger, and as Zetterstedt says: "Stæger in litteris" the name is originally due to Stæger, as is also the description in Zetterstedt II, 477.

Geographical distribution: — Besides from Denmark the species is only known from Sweden.

4. *S. rufipes* (Meig.?) Zett.

1824. Meig. Syst. Besch. IV, 30, 7 (*Rhaphium*)? et 1838. VII, 151, 7 (*Porphyrops*)? — 1849. Zett. Dipt. Scand. VIII, 3060, 5—6 (*Rhaphium*). — 1878. Mik. Dipt. Unters. Jahresber. d. k. k. akad. Gymn. Wien, 1878, 13, 4, Taf. 1, Fig. 1—5. — 1903. Kat. paläarkt. Dipt. II, 332.

Male. Vertex and frons blackish, with brown pruinosity. Epistoma whitish grey, very broad for a male. Palpi dark. Occiput grey; postocular bristles black above, whitish below. Antennæ black, long, the third joint somewhat lancet-like, attenuated into a long and thin apex; arista apical, very short, scarcely one third of the length of the third joint; the thumb-like prolongation of the second joint is only present on the inside; the basal joint bare above (according to Mik it may sometimes have a single hair). Thorax slightly æneous, greyish brown pruinose (according to Mik it has, when seen from behind, three narrow, black stripes; my specimen is not in so good a condition as to show them); acrostichal bristles uniserial. Pleura greyish. Abdomen dark æneous green, the second segment translucent yellowish, especially towards the sides, also the third segment with an indication of this colour; abdomen clothed with short, black hairs, and it has hindmarginal bristles, long on the first segment. Venter chiefly yellowish, with pale hairs. Legs yellow, posterior coxæ grey; anterior tarsi with the apex of metatarsus and the four following joints blackish; hind tarsi black, the metatarsus very slightly longer than the second joint. The legs have short, blackish hairs; coxæ pale-haired, with some black hairs at the apex, the hind coxæ with a black bristle on the outer side; front femora with a brownish bristle below at the base (according to Mik also the middle femora have a similar, but weaker bristle more distant from the base, in my specimen it is wanting); middle femora with a preapical bristle on each side, hind femora with one on the anterior side; front tibiæ with a distinct bristle above near the base; middle tibiæ with three antero-dorsal, one postero-dorsal and one ventral bristle; hind tibiæ with two rows of dorsal bristles, a ventral bristle below and some smaller above it; hind metatarsus with two longer bristles below, the second joint a little excised below on the apical part and here with a long, erect bristle. Wings a little brownish tinged; veins blackish, the discal vein with a scarcely observable bend. Squamulæ yellowish with a dark spot above, the fringe dark brown or blackish brown. Halteres yellow.

Female. I do not know the female, and it was also unknown to Meigen and Zetterstedt; according to Mik the antennæ are short, the arista longer than the antennæ. Frons and epistoma very broad, the latter whitish grey, protruding downwards. Legs without the special bristles.

Length 2,3 mm.

Remarks: As already remarked by Zetterstedt and Mik it is a question whether this species is identical with the *rufipes* of Meigen, as

neither Meigen's description nor his figure of the antenna (IV, Tab. 34, Fig. 2) is in agreement. The above described specimen is Zetterstedt's type-specimen; the author mentions the vestiges of two yellow bands at the base of abdomen; Mik mentions nothing about this (he describes the abdomen not at all), perhaps the species may be varying in this respect like *pallipes*.

S. rufipes is very rare in Denmark, only one specimen, a male, has been taken by Stæger on Amager on June 1844. It seems to occur on salt marshes, as Mik also took his specimens in such a locality.

Geographical distribution: — Denmark and down into Austria; if Macquart's *rufipes* is the same species it goes down into France.

5. *S. pumilus* Meig.

1824. Meig. Syst. Besch. 53, 17, et 1830. VI, 363 (*Porphyrops*). — 1843. Zett. Dipt. Scand. II, 487, 9 ♀ (*Chrysotus*). — 1862. Schin. F. A. I, 193. — 1903. Kat. palæarkt. Dipt. II, 332. — *Rhaphium longiseta* Zett. 1843. Dipt. Scand. II, 471, 12, ♂. — 1850. Loew, Stett. ent. Zeitg. XI, 119, 20.

Male. Vertex and frons blue. Epistoma narrow, silvery white. Palpi dark. Occiput green, greyish pruinose; postocular bristles black above, white below. Antennæ black, somewhat longer than the head,

Fig. 87. Antenna of *S. pumilus* ♂, from the outside. × 65.

third joint somewhat lancet-like, pointed; arista apical, about as long, as the antennæ; the thumb-like prolongation of the second joint only present on the inside; the basal joint a little hairy above. Thorax dark green with indications of a pair of lighter stripes in the middle; it is brownish pruinose, a little shining; acrostichal bristles somewhat irregular, but distinctly biserial. Pleura greenish, greyish pruinose; propleural hairs pale. Abdomen dark green, somewhat æneous above, clothed with short, black hairs; it has hindmarginal bristles, longer on the first segment. Venter green, greyish pruinose, with yellowish hairs. Legs yellow, front coxæ more or less greyish at the base, sometimes almost quite grey, posterior coxæ grey; front femora more or less blackish grey in about the basal half, the middle femora sometimes a little darkened at the base, and hind femora on the apical part above; anterior tarsi with the apex of metatarsus and the four

following joints brown or blackish, hind tarsi blackish with the base of metatarsus yellow; the front tarsi somewhat short, metatarsus as long as the four following joints, which are short and of equal length, the second joint a little dilated below and the apex drawn a little out; hind metatarsus about as long as the second joint. The legs have short, blackish hairs, the coxæ are pale-haired, hind coxæ with a black bristle on the outside; the front femora have about four erect bristles below at the base, and the middle femora three in a row likewise at the base; generally the former are black, the latter pale; middle femora with a preapical bristle on each side, hind femora with one on the anterior side; front tibiæ generally with a small bristle above, and with a short, dense ciliation; middle tibiæ generally with two antero-dorsal, one postero-dorsal and one ventral bristle; hind tibiæ with two dorsal rows of bristles, a row of short, bristly hairs above, and small and fine ventral bristles; middle metatarsi with distinct, hind metatarsi with very small bristles below. Wings

Fig. 88. Wing of *S. pumilus* ♂.

narrow towards the base, without axillary lobe, somewhat greyish tinged; veins black, discal vein almost without bend. Squamulæ yellow with a dark point above, and a blackish fringe. Halteres yellow.

Female. Epistoma broad, grey, protruding downwards. Antennæ short, arista longer than the antennæ. Legs coloured as in the male, front tarsi simple; femora and posterior metatarsi without bristles, but the front tibiæ ciliated as in the male. Wings less narrowed at the base.

Length 2.4—2.8 mm.

S. pumilus is common in Denmark; at Lersøen, Amager, Lyngby Mose, Ørholm, Faxe Ladeplads; on Fænø; in Jutland at Horsens, Hald near Viborg and Frederikshavn, and on Bornholm at Hasle and Allinge. My dates are $\frac{3}{6}$ — $\frac{11}{8}$. It occurs in grass and low herbage on humid meadows, especially at the borders of lakes and ditches,

thus I took it on 3rd at Orholm swarming numerous over a ditch in a meadow.

Geographical distribution:— Northern and middle Europe down into Styria and Hungary; towards the north to southern Sweden.

16. **Machaerium** Hal.

This genus again shows resemblance to *Porphyrops*, but is in some respects characteristically different. The frons is broad, somewhat decreasing in breadth towards the antennæ. There are the usual ocellar, outer vertical and postvertical bristles, and a pair of small hairs on the ocellar tubercle. The eyes are hairy, the facets very slightly enlarged on the front side. The eyes are well separated in both sexes, the epistoma somewhat broad in the male, but a little narrowed upwards; in the female it is broader and with parallel borders; the clypeus is somewhat marked off by a little elevation at each side, it is widened downwards in the male; the lower margin is somewhat angular and a little pointed; it reaches as far down as the lower margin of the eyes. The postocular bristles form a single row above, but below the whole occiput is covered with longish hairs, not interrupted above the oral aperture. The antennæ inserted near to each other, slightly above the middle; they are long or short, of the same length and the same shape in both sexes; the two basal joints are short, the second not overlapping the third; this latter is long or (in non Danish species) short, but in both cases thick at the base but incised below from near the base towards the apex, so that the last part in the long antennæ is thin¹; the arista is apical, its first joint short and somewhat thick, the second thin and exceedingly fine towards the apex; in the long antennæ the arista is shorter than the third joint, in the short antennæ it is longer than the antennæ; the basal antennal joint is bare above, the second has small bristles at the apex, the third is very short-haired, somewhat longer below, and the arista apparently bare. The proboscis, palpi and mouth aperture are only a little larger in the female than in the male, and the proboscis somewhat protruding in both sexes. Haliday figures (Zool. Journ. V, 1831, 351, Tab. XV, fig. 12) the mouth parts, which are seen to be of the usual structure (the author considers the teeth on the lower side of labrum as mandibles and figures below them a

¹ In *M. maritimæ* the third joint shows a curious structure, only seen by the microscope; it has a thin-skinned, translucent area below (Fig. 89, marked by the dotted line), and this area is in front a little projecting, forming, as it were, a small tooth; in the dried condition it is not seen.

small, triangular lobe, interpreted as maxilla, it seems to be a part of labium). Thorax with somewhat numerous, biserial acrostichal bristles of medium length; there are six dorsoecentral bristles, further a humeral, and often a weaker, about two posthumeral, two notopleural, a præsutural, (or one posthumeral and two præsutural), three supraalar and a postalar bristle; the front part of the disc has, as usual, short hairs, some of them may be longer, and especially there may be two or three in a row between the præsutural and the dorsocentrals, and also in front of the dorsocentrals one or a pair may appear, so that we get more than six dorsocentrals; upon the whole some irregularity appears here. The propleura have some small hairs above and longer bristles below. Scutellum bare above, with two marginal bristles and on each side a smaller hair. Abdomen somewhat robust and somewhat flattened; in the male there are only five visible dorsal segments and four ventral, the others are hidden; hypopygium small and imbedded, generally not to be seen; in the female there are five visible abdominal segments. I observed no dot-like impressions on the abdominal segments; hindmarginal bristles are present. The legs are somewhat short and robust, the front and hind femora a little thickened; the tarsi, especially the hind tarsi, somewhat short, hind metatarsus a little longer than the second joint. The coxæ have bristly hairs, the hind coxæ a few (2—3) bristles on the outer side; the femora have longish hairs below in the male, and the hind femora have some preapical bristles above; the tibiæ have long bristles, and they have apical bristles, most numerous on the posterior tibiæ; hind metatarsus without bristles. In the male the front pulvilli are enlarged. Wings of usual shape; the mediastinal vein terminating in the subcostal vein; the discal vein with a slight curve; the posterior cross-vein a little behind the middle; axillary lobe well developed. The last part of the discal vein with a convexity on the curve. Squamulæ with a distinct angular lobe, bearing a long fringe, the inner part of squamulæ with longish hairs.

This genus is characteristic by the curious similarity of the two sexes; further it is distinguished by the shape of the antennæ, the abdomen of the male with only five visible dorsal segments, the somewhat short and strong legs and the enlarged pulvilli on the front tarsi in the male.

Of the developmental stages the pupa is described by Snellen van Vollenhoven (Tijdschr. v. Entomol. XX, 1876—77, 56, Pl. IV, Fig. 1—5); it is whitish yellow; the antennal sheaths lie below on the front side of the head and curved down under it, at the base there

are two (pairs of) short, brown teeth, one above the other, and the apex of the sheath is bent out and free (perhaps not natural); the thorax has some short bristles above, and at its front margin there are two very long, pointed spiracular tubes, almost as long as the pupa; the abdominal segments, except the first, have girdles of short, brown spines above; the last segment has two somewhat larger spines above, and two curved spines below. — The pupæ were found at the shore, and rested in cocoons formed of sand and clay; the author says that the cocoon was smooth on the inside, no doubt there has been a film as described under *Dolichopus*. The pupæ were found on $\frac{19}{100}$ and developed soon after. The pupa is further mentioned by Brown (Entomologist VII, 1874, 207) and Smith (Proc. Entom. Soc. London, 1874, p. XIX), but these papers I have not seen.

The species of *Machaerium* occur exclusively at shores.

Of the genus three species are known; one occurs in Denmark.

1. *M. maritimae* Hal.

1831. Hal. Zool. Journ. V, (1835), 352, 1, Pl. XV, figs. 11—12. — 1850. Loew, Stett. ent. Zeitg. XI, 110, 13, Tab. I, Fig. 25 (*Rhaphium*). — 1903. Kat. paläarkt. Dipt. II, 334.

Male. Vertex and frons green. Epistoma broad, widening downwards, silvery whitish grey; palpi large, of the same colour. Occiput green, a little greyish pruinose; postocular hairs black above, yellowish below. Antennæ black, long, about twice as long as the head; the

Fig. 89. Antenna of *M. maritimae* ♂. $\times 50$.

basal joints short, the third very long, thick at the base but excised below so that the long apical part is thin; the arista much shorter than the third joint. Thorax bright green or more golden green, with two more golden or æneous stripes in the middle; it is somewhat greyish pruinose, not much shining. Pleura green, slightly greyish pruinose; propleura with pale hairs above, and with some black bristles below, one of which is long. Abdomen green or golden green with some æneous or coppery reflexes, somewhat greyish pruinose; it is clothed with short, black hairs, and has hindmarginal bristles,

somewhat long on the first segment. Venter green, grey pruinose, with black hairs, longer and pale towards the base. Legs somewhat short and robust, yellow; coxæ grey, the front coxæ metallic green, whitish grey anteriorly; femora somewhat thick, especially front and hind femora; anterior tarsi with the apex of metatarsus, the apical half of the second joint, and the three last joints black; hind tarsi black with only the base of metatarsus pale; the tarsi somewhat short, hind metatarsus longer than the second joint; the pulvilli on the front tarsi large and elongated. The legs are haired with black hairs, which are longer than usual; the coxæ have bristly hairs anteriorly, the hind coxæ two or three bristles on the outside; the femora have rather long hairs below, somewhat bristly towards the apex; the hind femora have some preapical bristles, placed above; front tibiæ with bristles above and two ventral or postero-ventral bristles; posterior tibiæ with two rows of dorsal bristles, the middle tibiæ have no ventral bristles, the hind tibiæ two ventral or antero-ventral bristles; all bristles somewhat long, especially those on the hind tibiæ. Wings slightly greyish tinged, almost hyaline; veins blackish brown, a little paler at the base; the discal vein with a slight curve. Squamulæ yellow, with a pale yellow fringe. Halteres yellow.

Female. Quite similar to the male; epistoma somewhat broader and with parallel margins, grey; palpi a little larger, likewise grey. Antenna as in the male. Also the legs as in the male, but the femora much shorter-haired below, the middle tibiæ with a ventral bristle near the apex and the front pulvilli not enlarged.

Length 4.5 mm.

M. maritimæ is a very interesting species, but it seems to be very rare in Denmark, only one specimen, a female, has been taken in Jutland at Horsens on the shore in July 1878 (H. J. Hansen). It occurs at the shore where also the pupæ are found.

Geographical distribution:— Europe down into Spain; its northern limit is in Denmark, and it occurs in England, where it was originally detected.

17. **Xiphandrium** Loew.

Somewhat slender species of small or smallish size, and of rather dark metallic green colours, sometimes with yellow colouration on abdomen. Also this genus is related to and similar to *Porphyrops*. Head a little broader than thorax, semiglobular; there are as usual a pair of ocellar, outer vertical and smaller postvertical bristles, and small hairs on the ocellar tubercle. The eyes are hairy; the facets

very slightly enlarged in front towards the epistoma in the males. The frons decreases a little in breadth towards the antennæ. The eyes are separated in both sexes, the epistoma is somewhat narrow in the male, but not as narrow as in *Porphyrops*, narrowed downwards; in the female it is broader, but not as broad as in *Syntormon*, with parallel borders. The clypeus is slightly marked off in the males; in the females it is more distinctly marked off by an elevation at each side and a more or less distinct, transverse, impressed line; its lower margin is in this sex triangularly rounded; it does not reach the lower margin of the eyes. The postocular bristles form a single row above, but the lower half of occiput is covered with hairs, which are also present above the oral aperture; they are however not so long and dense as in *Porphyrops*. The antennæ are long in the males, with the third joint very elongated, band-shaped, from six to ten times as long as broad, rarely shorter (*brevicornæ*, non Danish); they are short in the female with the third joint more or less triangular; the arista is apical (rarely a little subapical), short or very short in the male, longer than the antennæ in the female; the second antennal joint is simple, not overlapping the third. The first joint is bare above, the second has small bristles at the end, the third and the arista are short but distinctly hairy. The mouth parts and oral aperture are considerably larger in the female than in the male, and in the former sex the proboscis is somewhat protruding. The thoracic disc has short, biserial acrostichal bristles; the dorso-central bristles are somewhat varying; there are generally six, but the foremost is small, and sometimes indistinct, so that there are only five; in *fasciatum* I found always only four; there is as usual a humeral, a posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle. The front part of the disc has only a few small hairs. Scutellum is bare above, with two marginal bristles and on each side a small hair. Propleura with few, short hairs. Abdomen cylindrical, in *fasciatum* somewhat compressed; in the male there are six visible dorsal segments and five ventral. The hypopygium is small, roundish, but exposed, and the appendages are visible; there are shorter or longer ventral lobes, variously provided with hairs and bristles; the outer lamellæ are likewise shorter or longer, hairy and sometimes with long hairs. In the female there are five visible abdominal segments. Dot-like impressions are present on some of the segments, at all events in the female. The abdominal segments have somewhat short hindmarginal bristles. The legs have the coxæ and femora only short-haired; in the male the middle coxæ have, as in species of *Porphyrops*, an apical spine, but it is small, of pale colour,

only dark in *fasciatum*; it is also here formed of coalesced bristles; the front coxæ have generally some bristles or bristly hairs at the apex; the middle coxæ have one or two bristles anteriorly at the outer margin, the hind coxæ one on the outer side; hind femora with or without preapical bristle. Tibiæ with rather few bristles. The males may have the front metatarsus a little thickened at the end below; hind metatarsus more or less shorter than the second joint, without bristles. Wings not broad, the mediastinal vein terminating in the subcostal vein, the discal vein slightly curved; the posterior cross-vein about in the middle. The discal vein with a convexity on the curve. Squamulæ with a distinct angular lobe, bearing a long fringe; the inner part of squamulæ with somewhat short hairs.

The genus is distinguished from *Porphyps* by the more slender shape and the less hairy and less bristly legs, by the much longer antennæ in the male, with a very short arista, the distinct pubescence of the third antennal joint and the arista, and by the bristle on the hind coxæ; the wings are also less broad, and the curve of the discal vein slight. It is distinguished from *Syntormon* especially by the simple second antennal joint, further by the longer antennæ in the male, the more haired occiput, and the exposed hypopygium.

The developmental stages are not known.

The species of *Xiphandrium* occur on bushes, in low herbage and grass in fens and on humid meadows, especially at the borders of ponds and streamlets; they are generally not common, but perhaps somewhat overlooked on account of their small size. I have several times seen specimens of *X. monotrichum* and *caliginosum* sucking on spots of dew on the leaves, they stood then in a position with the head quite down towards the leaf and the long antennæ lying on it.

Of the genus 19 species are known from the palæarctic region; 5 have hitherto been found in Denmark.

Table of Species.

Males.

1. Coxæ yellow, apical spine on middle coxæ dark; abdomen with yellow colouration; black coxal bristles about 3:2:1..... 1. *fasciatum*.
- Posterior coxæ more or less grey; apical spine on middle coxæ pale; abdomen without yellow colouration.. 2.
2. Hind femora with a preapical bristle..... 3.
- Hind femora without a preapical bristle; black coxal bristles 2—3:1—2:1 4.
3. Outer lamellæ ending with a single, long hair; coxal bristles 2—3:1—2:1, those on front coxæ white.. 2. *monotrichum*.

- Outer lamellæ not ending with a single, long hair; black coxal bristles 3—4:1—2:1 3. *auctum*.
- 4. Ventral lobes of hypopygium ending in a long, simple, curved hair; outer lamellæ short, triangular..... 4. *caliginosum*.
- Ventral lobes of hypopygium ending in a long thread, breaking up into hairs at the tip; outer lamellæ long, band-shaped 5. *appendiculatum*.

Females.

- 1. Coxæ all yellow 1. *fasciatum*.
- Posterior coxæ more or less grey..... 2.
- 2. Hind femora with a preapical bristle 3.
- Hind femora without a preapical bristle 4.
- 3. Coxal bristles 3:1—2:1, black (or those on front coxæ white?, see under the species); arista not twice as long as the antennæ; front metatarsus shorter than the four following joints, hind metatarsus a little shorter than second joint..... 2. *monotrichum*.
- Black coxal bristles 3—4:1—2:1; arista twice as long as the antennæ; front metatarsus as long as the four following joints, hind metatarsus considerably shorter than second joint..... 3. *auctum*.
- 4. Smaller species; hind tibiæ yellow 4. *caliginosum*.
- Larger species; hind tibiæ brownish yellow or dark brown 5. *appendiculatum*.

1. *X. fasciatum* Meig.

1824. Meig. Syst. Besch. IV, 31, 9, Tab. XXXIV, Fig. 5 (*Rhaphium*), et 1838. VII, 151, 9 (*Porphyrops*). — 1843. Zett. Dipt. Scand. II, 463, 5, et 1849. VIII, 3060, 5 (*Rhaphium*). — 1850. Loew, Stett. ent. Zeitg. XI, 126, 24 (*Rhaphium*). — 1862. Schin. F. A. I, 195 (*Rhaphium*). — 1903. Kat. paläarkt. Dipt. II, 335.

Male. Vertex and frons cyan-blue. Epistoma somewhat narrow, silvery white, below the antennæ dark. Palpi small, yellow. Occiput blackish, greyish pruinose; postocular hairs black above, whitish below. Antennæ black, long, the third joint elongated, band-shaped, about thrice as long as the short arista. Thorax dark, almost blackish green, shining. Pleura dark green, greyish pruinose; propleural hairs pale. Abdomen somewhat compressed, green or dark green, the second and third segments yellow, with only the hind margin dark, there are thus two yellow bands; sometimes also the fourth segment a little yellow in front; abdomen clothed with short, blackish hairs, and it has fine hindmarginal bristles, somewhat longer on the first segment. Venter yellow, darker towards the apex, with pale hairs. The ventral lobes of the hypopygium, as far as I could see, somewhat styliform, flat; the outer lamellæ somewhat lamelliform, not

long; they are obliquely cut at the apex, narrow, of brownish or pale brownish colour and hairy, especially with a somewhat long hair at the apex. Legs yellow, also the coxæ; the tarsi with about the three last joints dark, or on the hind tarsi the four last joints; hind metatarsus slightly shorter than or almost as long as the second joint. The legs have short, black hairs; the middle coxæ have a somewhat strong, flat, black apical spine; front coxæ with about three, middle coxæ with two, and hind coxæ with one black bristle; the middle femora have a preapical bristle; front tibiæ with a bristle above near the base, and below it a short ciliation; middle tibiæ with about two antero- and two postero-dorsal bristles, and hind tibiæ likewise. Wings somewhat brownish or greyish tinged; veins black, cubital and discal vein about parallel. Squamulæ yellow, with a yellow fringe. Halteres pale yellow.

Female. Epistoma broader than in the male, grey. Palpi large, yellow. Antennæ short, third joint somewhat triangular. Abdomen without yellow bands. Legs as in the male, middle coxæ without spine.

Length 2—2.4 mm.

X. fasciatum is rare in Denmark; Ordrup Mose, Bøllemosen, Ryget Skov at Farum Sø and at Boserup near Roskilde. My dates are in May. It occurs on somewhat humid places.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden, but rare.

2. *X. monotrichum* Loew.

1850. Loew, Stett. ent. Zeitg. XI, 132, 30, Tab. I, Fig. 36—37, et 1857. Neue Beitr. V, 31 (*Rhaphium*). — 1862. Schin. F. A. I, 195 (*Rhaphium*). — 1903. Kat. paläarkt. Dipt. II, 335. — *Rhaphium caliginosum* 1843. Zett. Dipt. Scand. II, 461, 4, p. p. — *Rhaphium macrocerum* 1849. Zett. Dipt. Scand. VIII, 3057, 3.

Male. Vertex and frons cyan-blue. Epistoma somewhat narrow, silvery white. Palpi small, greyish. Occiput greenish, greyish pruinose; postocular hairs black above, whitish below. Antennæ black, long, the third joint elongated, band-shaped, more than twice as long as the short arista. Thorax dark or blackish green, a little pruinose, somewhat shining. Pleura greenish, grey pruinose; propleura with pale hairs. Abdomen dark green, more or less with æneous or coppery reflexes; it is clothed with short, black hairs, a little longer and paler at the sides in front, and it has small hindmarginal bristles, a little longer on the first segment; the eighth segment with longish, somewhat dense hairs. Venter greenish, grey pruinose, with longish.

pale hairs. The ventral lobes of the hypopygium are short, somewhat triangular, with a hair at the apex and a brush of hairs at the dorsal angle¹: the outer lamellæ are long, they have an angle at the base

Fig. 90.
X. monotrichum. Apical part of hypopygium with ventral lobe and outer lamella.

on the outer side and are from here triangularly attenuated, so that their shape is elongated, triangular with a thin apex; they are of brownish colour, hairy at the margin, and with a long, a little curved hair at the apex. Legs yellow, front coxæ slightly greyish at the base, posterior coxæ grey, more or less yellow at the apex; anterior tarsi darkened towards the end; hind femora darkened at the apex, hind tibiæ and tarsi black or blackish. Middle coxæ with a somewhat long, yellowish apical spine; the front tarsi have the metatarsus a little shorter than the four following joints, it is a little thickened

towards the apex below: hind metatarsus a little shorter than the second joint. The legs have short, black hairs, the coxæ are pale-haired, the front coxæ with specially long and dense hairs; the middle coxæ have one or two, the hind coxæ one black bristle; also the front coxæ have about three bristly hairs at the apex, but they are white; the posterior femora have a preapical bristle; the front tibiæ have some bristles above, the posterior tibiæ about two antero- and two postero-dorsal bristles, the latter smallest: the front tarsi have a ciliation above, longest on metatarsus. Wings somewhat brownish tinged; veins blackish, the discal vein slightly curved, its last part parallel with the cubital vein. Squamulæ, with a yellow fringe. Halteres yellow.

Female. Epistoma broad, together with the large palpi grey. Antennæ short, third joint triangular, somewhat pointed, the arista not twice as long as the antennæ. Wings a little more brown than in the male. The legs as in the male, but the hind tibiæ yellow or only dark towards the apex, and the hind tarsi sometimes pale at the base; middle coxæ without apical spine; middle tibiæ with one or two small ventral bristles; the coxal bristles as in the male, but the three bristles at the end of the front coxæ black, not white as in the male.

Length 2.5—3 mm.

With regard to the female, as I have described it above, a question arises; I possess some females taken together with males.

¹ Loew's figure (l. c.) is not correct.

and which I feel certain belong to this species; but, as mentioned, they have the bristles at the end of the front coxæ black, and this fact troubles me somewhat; Verrall notes (Ent. Month. Mag. XII, 1875, 148), that the female has no black bristles on the front coxæ. Yet I have no doubt that my specimens are *monotrichum*; moreover they cannot be *auctum*, and *lanecolatum* has according to Kowarz (Wien. entg. Zeitg. III, 1884, 108) the third antennal joint "fast nierenförmig und stumpf". Perhaps the bristles in question may vary in colour.

X. monotrichum is somewhat rare in Denmark; Dyrehaven at Røde Bro. Lyngby Mose, and on Langeland at Lohals (the author); in Jutland at Holstebro (H. J. Hansen). My dates are $\frac{3}{7}$ to the first part of August. It has been taken in fens and on meadows; I took my specimens especially on leaves of *Alnus* and *Rubus*.

Geographical distribution:— Northern and middle Europe, down into Styria and Hungary; towards the north to middle Sweden, and in Finland.

3. *X. auctum* Loew.

1857. Loew, Neue Beitr. V, 32 (*Rhaphium*). — 1862. Schin. F. A. I, 195 (*Rhaphium*). — 1903. Kat. paläarkt. Dipt. II, 334.

Male. Of this species I have only been able to examine the female, I therefore take the following from Loew: Similar to *monotrichum*, but larger; the third antennal joint longer than in *monotrichum*, the arista relatively shorter, not quite half as long as the antennæ.¹ The outer lamellæ of the hypopygium similar to those in *monotrichum*, a little shorter, without any long hair at the apex; the ventral lobes small and hidden. The front tarsi as in *monotrichum* with the first joint somewhat thickened below at the apex, but it is longer, a little longer than the four following joints; the second joint scarcely as long as the third and fourth together; the front tarsi have somewhat stronger hairs above; the second joint of the hind tarsi is almost one and a half times as long as the first, while in *monotrichum* it is only a little longer, the third joint is as long as the first. The colour of the body and legs as in *monotrichum*, but the scutellum steel-blue. According to Verrall (l. c.) the coxal bristles are 3—4: 1—2: 1, and the hind femora have a preapical bristle.

¹ Here may certainly be some mistake, since in *monotrichum* the arista is about one third of the antennæ. Verrall (Entom. Month. Mag. XVI, 1905, 168) found also the arista to be less than one third of the third antennal joint. If Loew's measurement is due to a mistake, the doubt about the identification expressed by Verrall disappears.

Female. Epistoma broad, whitish grey; palpi large, grey. Antennæ short, the third joint almost as broad as long, somewhat stubby, the arista twice as long as the antennæ. Scutellum steel-blue as in the male. Wings brown.

Length 3,8 mm.

X. auctum is very rare in Denmark, we have only one specimen, a female, taken on Funen at Odense (H. J. Hansen). I take it to be *auctum* on account of its short antennæ, the preapical bristle on the hind femora, the number of coxal bristles, the relative length of the tarsal joints, and the steel-blue scutellum.

Geographical distribution:— Northern and middle Europe down into Austria; its northern limit is in Denmark, and it occurs in England.

4. *X. caliginosum* Meig.

1824. Meig. Syst. Besch. IV, 29, 4 (*Rhaphium*), et 1838. VII, 151, 4 (*Porphyrops*). — 1843. Zett. Dipt. Scand. II, 461, 4 p. p., et 1849. VIII, 3059, 4, et 1853. XI, 4274, 4 (*Rhaphium*). — 1850. Loew, Stett. ent. Zeitg. XI, 130, 28, Tab. I, Fig. 32—33 (*Rhaphium*). — 1862. Schin. F. A. I, 194 (*Rhaphium*). — 1903. Kat. paläarkt. Dipt. II, 334. — *Hydrochus laticornis* Fall. 1823. Dipt. Suec. Dol. 6, 3 p. p. — *Rhaphium macrocerum* Meig. 1824. Syst. Besch. IV, 29, 3, et 1838. VII, 151, 3 (*Porphyrops*). — 1843. Zett. Dipt. Scand. II, 460, 3 p. p. — *Porphyrops nemoralis* Meig. 1824. Syst. Besch. IV, 52, 15. — *Rhaphium xiphias* Meig. 1824. *ibid.* IV, 30, 5. — *Porphyrops xiphias* Meig. 1838. *ibid.* VII, 151, 5.

Male. Vertex and frons cyan-blue. Epistoma somewhat narrow, silvery white. Palpi small, grey. Occiput slightly greenish, grey pruinose; postocular hairs black above, white below. Antennæ black,

Fig. 91. Antenna of *X. caliginosum* ♂. $\times 60$.

long, the third joint very elongated, band-shaped, about four times as long as the very short arista. Thorax dark greenish, æneous or somewhat coppery, shining; scutellum brighter green or sometimes bluish. Pleura greenish, grey pruinose; propleural hairs pale. Abdomen æneous or coppery, clothed with short, black hairs, a little longer and pale at the sides in front; there are hindmarginal bristles, longer on the first segment; the eighth segment with short hairs. Venter

grey pruinose, with yellow hairs. Hypopygium blackish; the ventral lobes short, flat, a little dilated at the apex and here with dense hairs, and at the upper corner with a long, pale, curved hair (formed of coalesced hairs); the outer lamellæ short, elongated triangular, blackish, hairy at the margin. Legs yellow, posterior coxæ grey with the apical part yellow, often more than the apical half; the legs for the rest either quite yellow, the anterior tarsi darkened towards the end, the hind tibiæ yellowish brown, and the hind tarsi brown or blackish brown, or, in the darker varieties, the front femora are darkened above, the hind femora blackish above and at the apex, the anterior tarsi with the apex of metatarsus and the four following joints black, hind tibiæ and tarsi quite black or blackish brown. The middle coxæ have a small, yellowish apical spine; the front metatarsus is as long as the three following joints, slightly thickened at the apex below; hind metatarsus somewhat shorter than the second joint. The legs have short, black hairs, coxæ pale-haired; the front coxæ have about two, the middle coxæ one or two and the hind coxæ one black bristle; middle femora with one or a pair of small preapical bristles on each side, hind femora without preapical bristle;

Fig. 92. Wing of *X. caliginosum* ♂.

front tibiæ with a bristle above near the base, and sometimes with one or two smaller farther downwards; posterior tibiæ with about two antero- and two postero-dorsal bristles. Wings brown or blackish brown tinged; veins black, discal vein slightly curved. Squamulæ yellow, with a yellow fringe. Halteres pale yellow.

Fig. 93. Antenna of *X. caliginosum* ♀. $\times 60$.

Female. Epistoma broad, whitish grey. Palpi large, grey, a little pale at the apex. Antennæ short, third joint triangular, arista about

twice as long as the antennæ. The legs as in the palest varieties of the male, hind tibiæ yellow, hind metatarsi often pale at the base; middle coxæ without apical spine; middle tibiæ with one or two small ventral bristles.

Length 2.6—3 mm.

X. caliginosum is not rare in Denmark, though it can scarcely be termed common; at Lersøen, Ordrup Mose, Ermelund Lyngby Mose, Faxe Ladeplads, and in Jutland in Grejsdalen at Vejle. My dates are $\frac{4}{6}$ to the first part of August. It occurs in low herbage on humid places, and at the borders of water; I have taken it together with *monotrichum* on leaves of *Alnus* and *Rubus*. In an old manuscript from Steger I find the note, that the species was common on hedges at the lake Lersøen in two generations, one in June and a second in August.

Geographical distribution: — Europe down into Spain and Italy; towards the north to northern Sweden, and in Finland.

5. *X. appendiculatum* Zett.

1849. Zett. Dipt. Scand. VIII, 3058, 3—4, et 1859. XIII, 5029, 3—4 (*Rhaphium*). — 1850. Loew, Stett. ent. Zeitg. XI, 133, 31, Tab. I, Fig. 38—39, et 1857. Neue Beitr. V, 31 (*Rhaphium*). — 1862. Schin. F. A. I, 195 (*Rhaphium*). — 1903. Kat. paläarkt. Dipt. II, 334. — *Rhaphium macrocerum* 1843. Zett. Dipt. Scand. II, 460, 3 p. p.

Male. Vertex and frons cyaneous blue. Epistoma narrow, silvery white. Palpi small, greyish. Occiput green, greyish pruinose; post-ocular hairs black above, white below. Antennæ black, very long, the third joint strongly elongated, band-shaped, the very short arista about one eighth part of it in length. Thorax dark green, somewhat pruinose, not much shining; scutellum brighter. Pleura green, greyish pruinose; propleural hairs pale. Abdomen green, more or less æneous or coppery, especially above and towards the apex; it is clothed with short, black hairs, a little longer and pale at the sides in front; there are hindmarginal bristles, long on the first segment; the eighth segment with short hairs, slightly longer than in *caliginosum*. Venter greenish, grey pruinose, with yellow hairs. Hypopygium blackish; the ventral lobes black, flat, a little dilated towards the end, and curved a little downwards; they are densely haired at the end, and have above a long, thick, yellow bristle (closely gathered hairs), which at the end breaks up into downwards curved hairs; the outer lamellæ are long, band-shaped, slightly dilated towards the apex, brown or yellowish brown, and hairy at the margin. Legs yellow, posterior coxæ grey with the apical part yellow; hind femora more or less darkened

above and at the apex; anterior tarsi with about the apex of metatarsus and the four following joints brown; hind tibiæ brown or blackish, generally darkest at the base, hind tarsi black or blackish. Middle coxæ with a distinct, yellow apical spine; the front metatarsus fully as long as the three following joints, a little dilated below at the apex; hind metatarsus shorter than the second joint. The legs have short, black hairs, the coxæ are pale-haired; front coxæ with two or three, middle coxæ with one or two and hind coxæ with one black bristle; middle femora with one or a pair of preapical bristles on both sides, hind femora without preapical bristle; front tibiæ with some bristles above, posterior tibiæ with two antero- and two postero-dorsal bristles. Wings brownish tinged; veins black, discal vein somewhat curved, and the discal and cubital vein somewhat converging. Squamulæ yellow, with a yellow fringe. Halteres pale yellow.

Female. Epistoma broad, whitish grey. Palpi large, grey. Antennæ short, the third joint triangular, the arista twice as long as the antennæ. Legs as in the male, hind tibiæ generally paler, but not yellow, yellowish brown to dark brown, especially at the base and apex; middle tibiæ with one or two small ventral bristles; middle coxæ without apical spine. Wings a little more strongly tinged.

Length 3.2—3.7 mm.

While this species is in the male easily recognised, the female is very difficult to distinguish from the female of *caliginosum*; Loew says (Stett. ent. Zeitg. l. c.) that the tarsi are longer, but this I find scarcely confirmed, perhaps the anterior tarsi may prove to be very slightly longer; the characters by which I distinguish it, is that the arista seems to be a little longer, the hind tibiæ are darker, though sometimes only slightly, the hind metatarsus not pale at the base, the wings more tinged, and the size larger. As Zetterstedt says: "Stæg. in litt." the species is originally separated off by Stæger, and the name due to him.

X. appendiculatum is as common in Denmark as *caliginosum*; at Copenhagen, Ordrup Mose, Hillerød, Nyraad at Vordingborg, and on Bornholm in Almindingen, at Rø and Læsaa. My dates are ⁸/₁₆—³⁰/₈. It occurs in similar localities as *caliginosum*.

Geographical distribution:—Northern and middle Europe down into Austria and Hungary, and further in Asia Minor; towards the north to southern Sweden, and in Finland.

18. **Systemus** Loew.

Species of small size. This genus is the last of the genera more or less related to *Porphyrrops*, and it stands somewhat more apart

than the others. Head about of the breadth of thorax; there are the usual ocellar, outer vertical and smaller postvertical bristles. The eyes are very short- almost microscopically hairy; the facets in the male slightly enlarged towards the epistoma. The eyes are separated in both sexes, the epistoma a little broader in the female than in the male; the clypeus does not reach the lower margin of the eyes. The postocular bristles form a single row. The antennæ are long in the male, the third joint elongated, more or less lancet-shaped; in the female they are shorter; the arista is apical, in the male much shorter than the antennæ, in the female as long as the antennæ or longer. The second antennal joint is simple. The first joint is bare above, the second has small bristles at the apex, the third is distinctly hairy and the arista short-hairy. The proboscis is only slightly stronger in the female than in the male, and the palpi large in both sexes. Thorax has somewhat numerous, distinct and distinctly biserial acrostichal bristles; there are (*leucurus*) six dorsocentral bristles, further a humeral, a posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle; the disc has only few hairs on the front part. Scutellum bare above, with two strong marginal bristles, and at each side a smaller bristle or hair. Propleural hairs few, one of them may be bristly. Abdomen in the male compressed towards the end, with six visible dorsal segments; the hypopygium is rather large, curved up under abdomen, pedunculated, with a shorter or longer, to rather long peduncle (seventh segment), which may be longer than the hypopygium itself; there are shorter or longer ventral lobes, and likewise shorter or longer outer lamellæ, sometimes furcated. In the female the abdomen has five normal segments, generally also a smaller sixth may be seen. Dot-like impressions are present on the second, third and fourth segments, but I have only seen them in the female. The abdominal segments have only short hindmarginal bristles, longer on the first segment. Legs somewhat long and slender, especially the tarsi; they are simple in both sexes; coxæ and femora only short-haired, the hind coxæ with a bristle on the outer side; femora without preapical bristles; front tibiæ without bristles; posterior tibiæ with only few. Hind metatarsus short, about half as long as the second joint, without bristles. Wings of usual shape (in the male of *Scholtzii* excised in the hind margin before the apex); the mediastinal vein terminating in the subcostal vein, the discal vein very slightly, or more, curved, parallel with the cubital vein or converging towards it; posterior cross-vein in or about in the middle. The discal vein with a small convexity on the curve. Squamulæ with a somewhat

large angular lobe with a long fringe, the inner part of squamulæ with short hairs.

The chief character of the genus is the quite free, pedunculated hypopygium, and further it is well distinguished by the short hind metatarsus.

The developmental stages of *S. adpropinquans* have been described and figured by Laboulbène (Ann. Soc. Ent. de Fr. 5, III, 1873, 49, Pl. V, fig. I, 1—11); the author found the larvæ and pupæ in the sap on decaying elms at Sevres in France; already in 1870 (Bull. de la Soc. Ent. de Fr. 1870, LXX) he had given a note about the breeding of this species. The larva of *S. leucurus* is described from Germany by Beling (Arch. f. Naturgesch. 48, I, 1882, 226), who found them in a decaying beech on $16/5$, and the imagines developed from the end of May to $3/7$. Further *leucurus* has been bred by von Heyden at Frankfort on the Main (Loew, Neue Beitr. VI, 14, 2), and in England by Dr. Sharp from a decaying beech on $4/4$ and $5/5$ (Verrall, Ent. Month. Mag. XVI, 1905, 251), and finally by myself from a beech at Ørholm in July (see below). *S. adpropinquans* was bred in England from an elm (Verrall l. c. 169), and it was bred in our country by Mr. Schlick from a decaying tree in Dyrehaven in August (see below); *Scholtzii* was bred in England from a beech fungus on $8/5$ (Verrall l. c. 169); *tener* was bred from a decaying beech in July, and finally *bipartitus* was bred from rotten wood in July, both likewise in England (Verrall l. c. 251). The larva is yellowish white, cylindrical, narrowed towards the anterior end; the last segment has behind two large and broad, approximated teeth or warts below, and two very short, tubercle-shaped warts above and more forwards; below these latter the very small posterior spiracles lie; the anterior spiracles are found at the sides of prothorax, towards the front margin (Laboulbène; they are not mentioned by Beling); on the ventral side the abdominal segments have each a transverse swelling at the front margin, beset with small, chitinous hooks. The larva has a length of 5 mm (*leucurus*) to about 8 mm (*adpropinquans*). Besides the pupa described by Laboulbène I have myself examined a pupal skin of *adpropinquans*. The pupa has, as usual, two triangular, approximated spines on the front edge of the head at the base of the antennal sheaths, and further downwards two smaller spines; between these spines are two short bristles, and more above, to each side of the upper spines is a similar bristle; the antennal sheaths lie on the lower side, stretching back-

¹ The two organs stretching downwards, seen on Laboulbène's figure 9, are the antennal sheaths, which is not mentioned by the author.

wards, and their apices are free¹; thorax has, as usual, some short bristles above; at the front edge of thorax there are two, long spiracular tubes. Abdomen has seven pairs of small spiracles; the abdominal segments have each, except the first, a girdle of small, flat, brown spines above; the apex of adomen is bilobate. Laboulbène notes that the pupa rested in a cocoon, from which it worked half way out at the time for the final development, and at the escape of the imago the pupal skin remains sticking in the cocoon. The cocoon was on the inside clothed with a thin film.

The species of *Systemus* have, I think, exclusively been found on the ulcerative sap of trees as *Fagus*, *Betula*, *Ulmus* and *Aesculus*, and the larvæ live in this sap and in the decaying wood, and here the pupæ are also found. It is remarkable that the species have most often been bred, and that all the known five species have been bred, and one of them, *leucurus*, is only known from bred specimens.

Of the genus 5 species are known from the palæarctic region; 2 have hitherto been found in Denmark.

Table of Species.

As there is every reason to believe that all five European species occur in Denmark, since they have all been found in England, I shall give a table over them all, chiefly after Verrall (l. c. 251); the two species hitherto found in Denmark will easily be determined after the table.

1. Cubital and discal veins strongly approximated before the tip 2.
- Cubital and discal veins almost parallel 3.
2. Wings with a dark spot at the apex (only the male known) .. *Scholtzii*.
- Wings with the apex uncoloured 1. *adpropinquans*.
3. Antennæ entirely black 4.
- Antennæ with the basal joint conspicuously pale yellow .. *tener*.
4. Third joint of the antennæ in the male conical and broad, arista shorter than the third joint; hypopygium small, with a long, black peduncle, outer lamellæ long, forked, dirtily whitish; middle tibiæ in both sexes with only two bristles at the base, hind femora with a blackish ring near the apex¹ *bipartitus*.

¹ The female of *S. bipartitus* is not described, but according to Loew's remarks under *S. leucurus* l. c. it seems then to have been known to him; he gives the distinctive character of the bristles on the middle tibiæ, and further he says that the female of *leucurus* has a longer third antennal joint, and a black arista; it would thus seem, that *bipartitus* has another colour of the arista, but in the description of *bipartitus* he says nothing of the colour of the arista.

- Third joint of the antennæ in the male long and pointed, arista not half as long as the third joint; hypopygium large, white, with a short, brown peduncle; outer lamellæ short, white with black apex. Middle tibiæ in both sexes with two bristles in the middle and two at the base, hind femora slightly darkened at the apex 2. *leucurus*.

1. *S. adpropinquans* Loew.

1857. Löew, Neue Beitr. V, 32 et 33 (*Rhaphium*). — 1862. Schin. F. A. I, 200. — 1880. Mik, Verhandl. zool. bot. Gesell. Wien, XXX, 593. — 1903. Kat. paläarkt. Dipt. II, 336. — *Rhaphium Scholtzii* Loew, 1850. Stett. ent. Zeitg. XI, 115 p. p. ♀.

Of this species I have only examined a female, I give therefore the description of the male chiefly after Loew: Frons greenish grey. Epistoma narrow, black, the lower half somewhat shining. Palpi yellow. Occiput greenish grey, postocular bristles yellowish white. Antennæ rather long; the two basal joints black, the third somewhat broad, pointed from the middle to the apex, brown, the base and the first half of the lower side reddish yellow; the arista about three quarters of the length of the third joint. Thorax and scutellum green, grey pruinose, with indication of a slightly darker middle stripe. Pleura green, dark greyish pruinose. Abdomen green, slightly pruinose, shining; it is clothed with short, black hairs, and there are small hindmarginal bristles, longer on the first segment. Venter greenish grey. Hypopygium with the peduncle (seventh segment) thin and rather long, black; the hypopygium itself large, swollen, chiefly black, shining; the lamellæ whitish yellow. Legs pale yellow, front coxæ whitish; posterior coxæ grey from the base outwards, towards the apex yellow; tarsi a little brownish towards the end. Front metatarsus as long as the two following joints together, hind metatarsus half as long as the second joint. Legs with short, brown to pale hairs, pale especially below the femora; anterior coxæ with pale, bristly hairs at the apex, hind coxæ with a pale bristle on the outside; front legs without bristles; middle tibiæ with about four black bristles, hind tibiæ with five or six very small bristles above. Wings hyaline, very slightly greyish; veins brown; the discal vein is curved upwards from the middle of its last part, terminating a little above the apex of the wing, the first posterior cell thus narrowed towards the end, as also the cubital vein is curved rather strongly downwards. Squamulæ pale yellow, with a whitish yellow fringe. Halteres pale yellow.

Female. Epistoma broad, grey above, metallic blue below. Antennæ short, the third joint much shorter than in the male, elongated oval, pointed; arista about of the length of the antennæ.

Length 3—3.6 mm; it is recorded to be rather varying in size.

S. adpropinquans is very rare in Denmark, only one specimen is known, a female, which was bred by Mr. Schlick from a decaying tree in Dyrehaven in August 1882.

Geographical distribution:— Northern and middle Europe down into France; it is not known north of Denmark, but occurs in England.

2. *S. leucurus* Loew.

1859. Loew, Neue Beitr. VI, 14, 2. — 1862. Schin. F. A. I, 201. — 1903. Kat. paläarkt. Dipt. II, 336.

Male. Vertex and frons green, somewhat brownish pruinose. Epistoma somewhat narrow, greenish, grey pruinose, (according to Loew blackish blue shining below). Palpi large, brownish yellow. Occiput greenish grey; postocular bristles pale. Antennæ black or

Fig. 94. Antenna of *S. leucurus* ♂. X 85. From a dried object.

blackish brown, long, the third joint elongated, lancet-shaped, the apex attenuated and pointed; arista short, not half as long as the third joint. Thorax green or bluish green, greyish pruinose, slightly shining; scutellum somewhat brighter. Pleura green, a little greyish pruinose, especially behind; propleural hairs pale. Abdomen green, clothed with short, black hairs; there are very short hindmarginal bristles, long at the first segment. Venter greenish grey. Hypopygium thick, white, the peduncle (seventh segment) thin and short, dirtily brownish; ventral lobes thin and short, somewhat hook-like, with the apex curved downwards; the outer lamellæ short, dilated at the apex, white with the apex black; they are hairy at the margin. Legs pale yellow, coxæ a little brownish at the base; hind femora more or less dark at the apex above; hind tibiæ somewhat brownish, all tarsi more or less dark towards the apex; anterior metatarsi almost as long as the two following joints, hind metatarsus not half as long as the second joint. Legs with short, blackish hairs, below the femora pale; coxæ pale-haired, anterior coxæ with some pale, bristly hairs at the apex, hind coxæ with a pale bristle on the outer side; front tibiæ without bristles, middle tibiæ with two antero- and two postero-dorsal bristles, one pair near the base the other in the middle; hind tibiæ with a dorsal

row of few bristles and one on the anterior side near the base. Wings almost hyaline; veins black, discal vein parallel with the cubital vein, but with a small curve about in the middle of its last part. Squamulae yellow, with a yellow fringe. Halteres pale yellow.

Fig. 95. Antenna of *S. leucurus* ♀. $\times 85$. From a dried object.

Female. Epistoma broad, coloured as in the male, and bluish and shining below. Antennae shorter than in the male, the third joint pointed oval, arista a little longer than the antennae.

Length 2,5 to about 3 mm.

S. leucurus is rare in Denmark, we have only three specimens, two males and a female, which I bred from a hollow beech at Ørholm. In the beech were larvæ of *Xylomyia maculata* and on the 1st 1908 I took home a portion of the quite loamy decaying wood; in the following week came the *Systemus*, but I did not detect the pupæ.

Geographical distribution:— Northern and middle Europe down into Germany; it occurs in England, but is not known north of Denmark. The species is only known from bred specimens.

IV. Hydrophorinae.

19. **Achaleus** Loew.

Species of very small size and of not or only slightly metallic, blackish, greyish or yellowish colour. Head about as broad as or a little broader than thorax, somewhat semiglobular. There are ocellar, outer vertical and postvertical bristles, and a pair of small bristles on the posterior side of the ocellar tubercle. The eyes are slightly and short-hairy, almost microscopically; they are separated in both sexes; the epistoma is narrow in both sexes, and only slightly broader in the female than in the male. The postocular bristles form a single row. The antennae placed near to each other, somewhat above the middle; they are not long, a little longer in the male than in the female; the first joint short, the second small and simple, the third somewhat pointed oval, a little longer in the male than in the female, and in this latter sex less pointed; it has a characteristic shape as the upper margin is convex, the lower straight or nearly so.

so that the apex is lying somewhat downwards: the arista is apical or subapical,¹ about as long as or a little longer than the antennæ; its first joint is short; the basal antennal joint is bare above, the second has bristles at the apex, the third is distinctly and somewhat strongly hairy, and the arista short-hairy. Clypeus separated from epistoma by a slight transverse ridge, it does not reach the lower margin of the eyes. Proboscis somewhat protruding, and only slightly larger in the female than in the male. Thorax rectangular, a little arched above, and it has a small, flat, slightly declining area behind, in front of the scutellum. Acrostichal bristles small, distinctly biserial; there are five dorsocentral bristles, a humeral, a posthumeral, two notopleural, a præsutural, only two supraalar, and a postalar bristle. Scutellum bare above, with two strong marginal bristles, and sometimes a small hair at each side; propleura with one prothoracic bristle. Abdomen somewhat cylindrical, in the male it has five or six visible dorsal segments according as the sixth segment is visible (*melanotrichus*, non Danish) or hidden (*cineus*); in *flavicollis* it is visible, but very small; on the ventral side there are four developed segments. The hypopygium is roundish; it is exposed, but not pedunculated; there seem to be ventral lobes of various shape; the outer lamellæ are somewhat long, more or less lancet-shaped; the eighth segment has shorter or longer hairs. In the female the abdomen has six normal segments of about equal length, and it terminates with a somewhat thick ovipositor with small spines above². There are dot-like impressions on some of the segments, at all events in the female. The abdominal segments with very short hindmarginal bristles. Legs somewhat slender, simple; hind metatarsus shorter than the second joint, without bristles; hind coxæ with a bristle on the outer side; posterior femora with a preapical bristle; tibiæ with few bristles, front tibiæ only with one above; middle tibiæ without ventral bristles; otherwise the tibiæ with apical bristles, small or wanting on the front tibiæ. There are two small claws, two pulvilli, and a small, linear empodium with bristles below. Wings with the mediastinal vein somewhat indistinct, terminating in the subcostal vein, the discal vein straight, nearly parallel with the cubital vein; the posterior cross-vein about in the middle; no anal vein, and also the lower

¹ The arista is generally termed subapical, but in *cineus* I find it apical.

² I have seen these spines distinctly in *A. flavicollis*; Loew says in his diagnosis of *Achalcus* (Mon. of Dipt. of N. Am. II, 1864, 217) that there is no "coronet of bristles", but this is not correct. Also Mik says about *A. melanotrichus* (Dipt. Unters. Jahresh. k. k. akad. Gymn. Wien, 1878, 20) with regard to the ovipositor: "die Klappen . . . nicht gedörnelt".

branch of the postical vein wanting; axillary lobe small and rounded; alula without hairs. The discal vein without any convexity. Squamulae with a small angular lobe, with a fringe of somewhat strong hairs, the inner part of squamulae with longish hairs.

The developmental stages are not known.

The species of *Achalcus* seem to be somewhat different in their habits. *A. cinereus* occurs at water among reeds, *flavicollis* has been taken in sandy localities, or (Zetterstedt. II, 480) "in uliginosis (ad fontes)", while *melanotrichus* was taken by Mik on ulcerative trunks of Aesculus. *A. cinereus* is recorded to have two broods in the year.

Of the genus 3 species are known from the palæarctic region; two occur in Denmark.

Table of Species.

1. Thorax greyish	1. <i>cinereus</i> .
— Thorax yellow or ferruginous.....	2. <i>flavicollis</i> .

1. *A. cinereus* Walk.

1851. Walk. Ins. Brit. I, 195, 2 (*Rhaphium*). — 1878. Mik. Dipt. Unters. Jahresb. k. k. akad. Gymn. Wien, 1878, 21, Tab. I, Fig. 16. — 1903. Kat. paläarkt. Dipt. II, 336. — *Rhaphium pygmaeum* Zett. 1855. Dipt. Scand. XII, 4618, 17–18.

Male. Vertex and frons blackish. Epistoma narrow, whitish. Palpi brown. Occiput dark greyish; postocular bristles whitish. The bristles on vertex yellowish brown. Antennae about as long as the

Fig. 96. Antenna of *A. cinereus* ♂. $\times 130$. From a dried object.

head, third joint triangular; the basal joints and the lower part of the third joint yellowish. Thorax dark grey, brownish or brownish grey pruinose, slightly shining; the bristles all dark yellowish or ferruginous. Pleura dark grey; propleura with a ferruginous bristle. Abdomen dark grey, with very short, brown hairs, and likewise very short hindmarginal bristles, almost not longer on the first segment; they are a little longer towards the apex. Venter grey, with brown

hairs. Hypopygium relatively not small, roundish, with some hairs at the end; of appendages I find farthest forwards (the hypopygium in situ) a pair of yellow, somewhat lancet-shaped lamellæ, with a bristle on the upwards turned margin, probably the ventral lobes; behind them a small, flat, black process, cleft at the apex, perhaps the penis-sheath,¹ and then the outer lamellæ, which are pale yellow, pointed oval or lancet-shaped, with dark hairs. Legs yellow, posterior coxæ a little brown at the base; tarsi blackish towards the apex, the front tarsi quite dark and the apical part of the front tibiæ more or less darkened; the hind metatarsus is considerably shorter than the second joint. The legs have short, blackish or brownish hairs, the coxæ pale-haired; the anterior coxæ have besides brownish, bristly hairs anteriorly, the hind coxæ a bristle on the outer side; the front femora have a little longer hairs below, and a pale bristle below near the base; the posterior femora have one or a pair of preapical bristles; the front tibiæ have a small bristle above near the base, the middle tibiæ two antero-dorsal bristles, and one postero-dorsal near the base; hind tibiæ with two dorsal rows of bristles. Wings a little yellowish; veins brown, discal and cubital veins almost parallel, slightly diverging towards the apex. Squamulæ dark yellow, with a yellow fringe. Halteres yellow.

Female. Similar to the male. Epistoma slightly broader, grey. Antennæ a little shorter, quite dark. Front femora without any bristle below near the base.

Length 2—2.4 mm.

A. cinereus is very rare in Denmark, only one specimen, a female, has been taken in Geel Skov in a fen on ^{15.9} 1909 (the author). It is observed to occur at the borders of water among reeds, and to have two generations, one in early spring and a second in late summer or autumn.

Geographical distribution:— Northern and middle Europe down into Austria and Bohemia; towards the north to southern Sweden.

2. *A. flavicollis* Meig.

1824. Meig. Syst. Besch. IV, 56, 24 (*Porphyrops*). — 1843. Zett. Dipt. Scand. II, 480, nota, et 619, 106, et 1849. VIII, 3100, 106, et 1855. XII, 4640, 106 (*Dolichopus*). — 1862. Schin. F. A. I, 184. — 1903. Kat. paläarkt. Dipt. II, 337. — *Rhaphium pallidum* Zett. 1843. Dipt. Scand. II, 480, 22, et 1849. VIII, 3063, 22.

¹ It seems to be this organ, which Mik l. c. considers as inner lamellæ.

Male. Vertex and frons blackish grey. Epistoma narrow, whitish. Palpi pale yellow. Occiput blackish grey; postocular bristles black, quite below a little paler; the bristles on vertex blackish. Antennæ about as long as the head, brownish black, yellow at the base and below. Thorax yellow or ferruginous, the bristles black. Pleura likewise yellow, below the wing root a black spot; propleura with a black bristle. Abdomen blackish or blackish brown, clothed with short, blackish hairs, and with hindmarginal bristles, which are a little longer on the first segment. Venter yellow, with pale hairs. Hypopygium with some longish hairs at the end; of appendages I could only see the outer lamellæ, which are somewhat long, pale yellow, narrow and lancet-shaped, with longish hairs. Legs yellow, tarsi with the last joint blackish; hind metatarsus somewhat shorter than the second joint. The legs have short, blackish hairs; the anterior coxæ with blackish or brown bristles or bristly hairs anteriorly, hind coxæ with a bristle on the outer side; front femora with a little longer hairs below, and here with a bristle near the base; posterior femora

Fig. 97. Wing of *A. flavicollis* ♀.

with a preapical bristle; front tibiæ with a small bristle above near the base; middle tibiæ with two antero-dorsal bristles, and with one postero-dorsal near the base; hind tibiæ with dorsal rows of bristles. Wings slightly yellowish tinged; veins brown or pale brown; discal and cubital veins almost parallel, slightly diverging outwards. Squamulæ yellow, with a blackish or brown fringe. Halteres yellow.

Female. Epistoma very slightly broader, and the antennæ only slightly shorter than in the male; the spot on the pleura more brownish. No bristle below at the base of the front femora; for the rest quite similar to the male.

Length 2—2,2 mm.

A. flavicollis is, as the preceding species, rare in Denmark, we have only three specimens, all females; two taken on a sandy field

at Charlottenlund on ²⁰/₆ 1847 (Stæger), and one in Jutland at Sæby in August 1881 (H. J. Hansen).

Geographical distribution:— Northern and middle Europe down into Germany and Styria; towards the north to middle Sweden.

20. **Thrypticus** Gerst.

Species of small or very small size, and of bright metallic colour. Head about of the breadth of thorax, semiglobular. Vertex somewhat excavated; the ocelli very distant from each other; frons decreasing in breadth towards the antennæ. There are a pair of ocellar and of outer vertical bristles, and a pair of small postvertical bristles. The eyes are short-hairy, almost microscopically; they are separated in both sexes, most broadly in the female. The postocular bristles seem to form a single row. Antennæ inserted near to each other, a little above the middle; they are short, equally shaped in both sexes; the third joint somewhat roundish, with an apical arista, the first joint of which is very short; the first antennal joint is, as far as I could see, bare above, the second has small bristles at the apex, the third and the arista are very short- or almost microscopically haired. The epistoma is separated from clypeus by a small, transverse keel; the clypeus is rather high, reaching almost half way up to the antennæ; it does not reach the lower margin of the eyes. Proboscis a little stronger in the female than in the male, very slightly, almost not protruding, but I have otherwise not been able to examine the mouth parts. Thorax almost quadratic, high and a little arched above; acrostichal bristles biserial; there are five long dorsocentral bristles, longest behind; as far as my material allowed me to see there are further a humeral, two notopleural, a præsutural, two supraalar and a postalar bristle; the front part of the disc has somewhat dense, short hairs.¹ Scutellum with two long marginal bristles. Bristles on propleura small. Abdomen somewhat short, conical, compressed towards the end; the first segment as usual somewhat short; in the male the following segments of about equal length, the sixth a little smaller, the seventh small and hidden: the hypopygium is long and somewhat slender; it is laid up under the venter and exposed, but not pedunculated; with regard to its construction I can say nothing definite, but it seems to me to answer well to the description by

¹ Gerstäcker says (Stett. ent. Zeitg. XXV, 1864, 43) in the description of the genus that the thoracic disc has no longer bristles; no doubt these have been broken off, as Loew suggested (Beschr. eur. Dipt. I, 1869, 304, Nota).

Gerstäcker l. c., that is to say, it has at the end a long, undivided appendage, but in my specimens I could see no lamellæ above this appendage, probably they are hidden in it; the mentioned appendage seems to answer to ventral lobes, and I could detect no outer lamellæ. Penis is long. Lübben gives (Zool. Jahrbüch. Abtheil. für Syst. XXVI. 1908, 323) a figure of the hypopygium of *T. smaragdinus*, but he gives no explanation, and I do not quite understand the figure. In the female the abdomen has five visible segments, and it terminates with a long, somewhat strong, knife-shaped ovipositor. I could observe no dot-like impressions. The abdominal segments have only indistinct hindmarginal bristles. Legs somewhat short, hind metatarsus shorter than the second joint. The legs have short hairs, anterior coxæ bristly hairs, middle coxæ with a stronger bristle near the outer margin; hind coxæ with two bristles on the outer side; middle tibiæ with a strong, hind tibiæ with a small apical bristle or spine, otherwise the tibiæ without bristles. There are two claws, two small pulvilli, and a narrow, somewhat comb-shaped empodium. Wings with the mediastinal vein somewhat indistinct towards the apex, but however terminating in the subcostal vein; discal vein without bend, parallel with the cubital vein; the posterior cross-vein placed before the middle; anal vein wanting, and also the lower postical branch obliterated; axillary lobe well developed; the alular margin without hairs. No convexity on the discal vein. Squamulæ with a distinct angular lobe, bearing a long fringe, the inner part of the squamulæ short-haired.

With regard to the developmental stages Lübben has (l. c.) described what he declares to be the larva and pupa of *T. smaragdinus*. The larva is described as elongated, cylindrical, with a rounded posterior end, 12 mm in length (while the imago is 2,5—3,8 mm); on the ventral side there are eight transverse swellings, armed with chitinous rods with stellately shaped ends, and with curved spines; the mouth parts are described as asymmetrical mandibles, one inserted by articulation in the other. The larva is declared to have eight pairs of spiracles along the sides (prothoracic or posterior spiracles are not mentioned). The pupa resembles somewhat other Dolichopodid pupæ: it has on the front part of the head two strong, triangular, quite approximated teeth, which project forwards and are serrated on the outer edge (they are called mandibles in the paper). There are a pair of prothoracic, and four pairs of abdominal spiracles, all prolonged into long, somewhat curved spiracular tubes, the prothoracic are the shortest. The abdominal segments have girdles of spines above. — The larvæ live in the stalks of *Phragmites*, in the upper,

fresh parts, they are thus phytophagous; in winter they go down into the root, and in next spring they go again up into the growing stalk. When the larva is ready for pupation, it forms a cavity and eats a transverse canal out towards the surface, so that here a round hole is formed, only covered by the dermis of the stalk. The pupa rests in the cavity, and when time for escape comes, it works out through the weak covering of the hole, and here the pupa-skin remains sticking in the hole, while the imago escapes.

There is no doubt that the species bred by Lübben is *T. smaragdinus*, and its larva thus evidently lives in the stalks of Phragmites; but the occurrence of a peripneustic larva in the family of the *Dolichopodidae* or upon the whole in the *Orthorrhapha brachycera* is so astonishing that I cannot but think, that there may be some mistake, either with regard to the larva, or with regard to the description of the tracheal system.

The female, according to Lübben, deposits the eggs in the stalks of Phragmites by aid of the strong ovipositor; as *T. bellus* has a similar ovipositor, it no doubt lives as larva in a similar way. As said, the larva hibernates in the Phragmites in about half-grown condition, and the further development and transformation to pupa and imago follow in next spring or summer.

The known species of *Thrypticus* are found on meadows, and in fens and at streamlets with reeds.

Of the genus two species are known from the palæarctic region, but according to Verrall (Ent. Month. Mag. XVI, 1905, 83) and Loew (l. c.) one or two more may exist, yet undescribed. One species has been found in Denmark.

1. *T. bellus* Loew.

1869. Loew, Besch. eur. Dipt. I, 303, 181. — 1903. Kat. paläarkt. Dipt. II, 326.

Male. Vertex and frons metallic green. Epistoma somewhat narrow, metallic green, a little pruinose on the lower half. Palpi dark. Occiput greenish; postocular bristles yellowish. Ocellar and vertical bristles blackish or brownish, somewhat yellowish shining. Antennæ short, black, third joint roundish; arista apical. Thorax green or bluish green, slightly brownish pruinose, shining; all bristles yellow. Pleura green, slightly brownish pruinose, especially downwards. Abdomen green or slightly bluish green; it is clothed with short, yellow hairs, and has very short hindmarginal bristles, slightly longer on the first segment. Venter greenish. Hypopygium green, the ventral lobes

long, brownish or yellow. Legs with the coxæ greenish, greyish pruinose, the apex yellow, or on the front coxæ brownish; femora green with the apex yellow; tibiæ and tarsi brown or dark brown,

Fig. 98. Antenna of *T. bellus* ♂. $\times 115$.

the former a little paler at the base. The legs have short, pale or brownish hairs, the anterior coxæ yellow, bristly hairs; hind coxæ with two yellow bristles on the outside; femora with short hairs, middle femora with a very small preapical bristle, hind femora with somewhat bristly hairs on the anterior side, especially at the apex; tibiæ without bristles, middle tibiæ with a somewhat strong apical spine on the inside, hind tibiæ with a smaller, and with a very short, not always distinct ciliation on the antero-ventral side, continued out

Fig. 99. Wing of *T. bellus* ♂.

on the first tarsal joints; hind metatarsus considerably shorter than the second joint. Wings almost hyaline; veins brownish black. Squamulæ yellow, with a yellow fringe. Halteres yellow.

Female. Epistoma somewhat broader than in the male; for the rest the two sexes quite similar, except for the genital differences.

Length 1.7–2 mm.

T. bellus is rare in Denmark, only nine specimens have been taken; Amager (Stæger), and in Jutland at Horsens and Frederikshavn (H. J. Hansen). It is a beautiful, but very small species, and perhaps it has been overlooked on account of its very small size. It was first described in 1869 by Loew, but it was found in Stæger's collection from earlier time, though erroneously determined.

Geographical distribution:— Europe down into Spain; its northern limit is in Denmark, and it occurs in England, where the first specimen, a female, on which Loew described the species, was taken.

21. **Medeterus** Fisch.

Species of small or medium size; the colours are metallic, but more or less hidden by a greyish or brownish pruinosity, and generally only slightly visible; sometimes they are quite dark and non-metallic. Head a little broader than thorax; it is a little broader than high, and somewhat narrowed downwards; it is not arched behind, but somewhat excavated above. The vertex is distinctly and broadly excavated, the ocellar tubercle slightly prominent. Frons broad, but much decreasing in breadth towards the antennæ; there are ocellar and outer vertical bristles, and a pair of small postvertical bristles, placed quite distantly at the upper eye-corners, so as to be taken for the uppermost of the postocular bristles; on the posterior side of the ocellar tubercle are a pair of exceedingly small bristles. Eyes large, somewhat oval, narrowed downwards; in the living specimens they are metallic green, generally with the upper corner reddish, and sometimes banded; they are bare. The facets are slightly enlarged towards the epistoma in both sexes. The eyes are well separated, and the epistoma is of the same breadth in both sexes, or only slightly, almost imperceptibly broader in the female. The postocular bristles are somewhat strong, they form a single row along the eye-margin, but on the lower half of the occiput there is a second row more inwards; above the oral aperture are no bristles; the upper bristles are short or quite short. Antennæ placed near to each other, rather high above the middle; they are short, the second joint simple, the third short and rounded, or slightly elongated and pointed oval; in a few cases it has in the male an emargination in or at the apex; the arista is subapical or almost apical¹, considerably or much longer than the antennæ; its first joint is quite short. The first antennal joint is bare, the second has small bristles at the apex, the third is distinctly haired; the arista is more or less, generally quite short-pubescent. The epistoma with clypeus reaches to the lower margin of the eyes; the clypeus is about quadratic, its separation from the epistoma is distinctly marked by a straight or somewhat angular, transverse keel or ridge. Proboscis thick and strong, and strongly chitinated; it is

¹ I think the arista is in reality always subapical, placed in both sexes in a (variously shaped) emargination, but this is generally very slight and scarcely observable.

sack-like protruding; it and the oral aperture are of the same or practically the same size in both sexes. Labrum (*diadema*) is rather curious; it is broad and rounded in front, and without any median tooth, but on each side below there is a strong, black tooth; it is thus almost divided into two as the middle part is slightly chitinated; hypopharynx likewise of a curious shape; it is a little longer than labrum, not very broad at the base, but very strong and strongly chitinated; it is curved downwards with the apex and this latter is two-pointed, as there is a strong hook behind the apex on the lower side; the maxillary palpi are irregularly oval, squamiform, not specially large, with hairs and bristles. Labium strong, and both basal part and labella strongly chitinated; the basal part is roundish quadratic, with two short triangular processes behind; the labella are large and broad, soft on the inside, but here with radiating chitinous ridges; when closed the labella form a compressed, somewhat wedge-shaped piece, when spread out they are circular, enclosing a cylindric hole. The mouth parts are provided with rather enormous muscles. Of all Dolichopodids I have examined *Medeterus* has the most powerful mouth. Thorax rectangular, somewhat high, and arched above; behind, in front of the scutellum, there is a flat or somewhat concave area. Pro- and metathorax small, the former with small bristles above. Acrostichal bristles distinctly biserial; they are somewhat long, or short to very short; the rows of dorsocentral bristles are generally formed of more or fewer small bristles in front, and two to six longer bristles behind, or only of long bristles in various number (3—6); further there is a humeral bristle, and generally a weaker, a post-humeral, two notopleural, the posterior generally small, three supraalar, the median generally small and in *micaceus* I found only two supraalar, the median quite wanting; finally one postalar bristle; there is no praesutural bristle. Scutellum bare above, it has two or four marginal bristles, in the latter case the median pair strongest. The propleura have two to six bristles in a vertical row. Abdomen somewhat short, more or less cylindrical, narrowed towards the end and thus conical. In the male there are six dorsal segments of about the same length, the first not being shorter; also on the ventral side there are six distinctly chitinated segments of about the same length, except the first, which forms a very narrow chitination; but the ventral segments are folded somewhat up between the dorsal; the seventh segment forms a somewhat long peduncle for the hypopygium, it has both a chitinated tergite and sternite. The hypopygium is smaller or larger, but generally rather large; it is pedunculated and laid up under abdomen, its appendages often reaching to the base of

abdomen; its shape recalls that in *Dolichopus*; there are generally long ventral lobes, variously shaped at the apex, often a little dilated, incised or cleft; also small, hook-shaped middle lobes may be present, but not seen when the hypopygium is in situ; the outer lamellæ are shorter or longer, generally broadest at the base, more or less triangular, and hairy; they are somewhat united in the middle line. In the female there are five normal abdominal segments, three hidden, and a small ovipositor, terminating with two small lamellæ and above them two small spines. There are distinct dot-like impressions on the second, third and fourth segments; they are elongated, almost linear. Abdomen has hindmarginal bristles only on the first segment, on the others they are very indistinct or wanting. Legs somewhat long and slender; they are simple, only the hind metatarsus may in the males be excised at the base, and here with a small tooth; the hind metatarsus is short, from a third part of to about half as long as the second joint. The legs are short-haired; the anterior coxæ have a little longer, bristly hairs, the middle coxæ a bristle anteriorly near the outer margin, and the hind coxæ a bristle on the outside. The femora have sometimes a little longer and stronger hairs below, the front femora on the posterior and the posterior femora on the anterior side, but generally they are small and fine; there are no preapical bristles. The front tibiæ have no bristles, middle tibiæ likewise, or generally with one or a pair of bristles above near the base; the hind tibiæ may also have a small bristle near the base; in a few cases the middle tibiæ may in the male have a bristle above in the middle; in the males the hind tibiæ have generally a more or less distinct bristle above near the apex, and here are also generally some longer hairs; the tibiæ have apical bristles, especially the posterior tibiæ a stronger bristle below; on the front tibiæ the apical bristles are small; hind metatarsus without bristles above. There are two claws, two small pulvilli, and a very small, but broad and pulvilli-form empodium. Wings of usual shape; the mediastinal vein terminating in the subcostal vein, the cubital vein curved a little downwards, the last part of the discal vein without bend, straight or slightly curved, more or less, sometimes strongly converging towards the cubital vein; the posterior cross-vein in or generally behind the middle; anal vein very weak, and also the posterior branch of the postical vein weak and somewhat obliterated. The discal vein without convexity. Squamulæ with a large, almost circular angular lobe, with a long fringe, the inner part of the squamulæ with longish hairs.

The developmental stages of some species are known. The pupa of *M. tristis* is described and figured by Damianitsch (Verh. zool. bot.

Gesell. Wien, XV, 1865, 238); it was found under the bark of a spruce in the holes of Tomicins, and it was lying in a fine web; it was taken in May and developed in June. Perris describes and figures (Ann. de la Soc. Ent. de Fr. 4, X, 1870, 321, Pl. 4, fig. 105—111) larva and pupa of *M. ambiguus*; the author found likewise the larvæ under the bark of firs between larvæ of *Tomicus*; the pupa was resting in a fine, white, silky cocoon; the larvæ were seen feeding on larvæ and pupæ of *Tomicus*. Kowarz mentions in his monograph (42, nota) that *M. signaticornis*, *pinicola* and *pallipes* have been bred from pupæ found under the bark of spruces between Tomicins. Kleine (Berl. Ent. Zeitschr. LII, 1908, 110, and Zeitschr. für Naturwissensch., Halle, 81, 1909, 188) observed larvæ and pupæ of *M. obscurus* (the author says *obscurus* Egger) in the holes of *Myelophilus piniperda* in *Pinus silvestris*; the larvæ and pupæ were present in both generations of the beetle. The larva fed on the larvæ of the bark-beetle, but also on other larvæ present in the holes. (In the first cited place Kleine describes the larva as amphipneustic and with eyes and prolegs; in the latter place he says: „Fuss- und augenlos. Stigmen nicht sichtbar“; there seems here to be some mistake.) The pupa was obstructed by a fine, white web or film. Aldrich records (Williston: Manual of N. Am. Dipt. New Haven 1908, 229) that Dr. Hopkins has found larvæ of *Medeterus* in burrows of *Scolytidae* in America. Finally Mr. Kryger has with us bred the species described below as *M. melancholicus* from a larva taken under the bark of an ash, in Hareskov on $18/4$, it pupated on $11/5$ and the imago came on $7/6$. — The larva of *M. ambiguus* (Perris) is cylindrical, narrowed in front, broader towards the end; the seven first abdominal segments have each a small, transverse swelling below; the eighth abdominal segment is somewhat rounded, it is exised above at the end so that two small teeth or warts are formed, and below them are two lower, smaller and more approximated teeth or warts. The anterior spiracles are placed a little behind the middle of the prothoracic segment, the posterior on the upper terminal warts. — Besides the described pupæ I have myself examined a pupal skin of *M. melancholicus* n. sp.; it is of the usual type, the antennal sheaths lie in front down the lower side; at the base of them at the front margin of the head there are two, quite approximated, brown teeth, and lower down two smaller, less close-standing teeth; between those teeth are two short bristles, and more above, to each side of the upper teeth, a similar bristle. Thorax has some short bristles above, and at the front margin two, somewhat long, pointed spiracular tubes, which have a black ring below the apex. The abdominal segments have each a girdle of flat

spines above; the last segment terminates with some hairs. The pupa was resting in a cocoon, formed of particles of decaying wood, and on the inside clothed with a thin film. Perris says in his description of the pupa, about the first abdominal segment: "ayant de chaque côté un trait corné, roux et arqué, atteignant le bord postérieur". I find in the examined pupal skin exactly the same; the first abdominal segment has on each side, somewhat above the side margin, a reddish brown, curved, horn-like formation, issuing somewhat behind the front margin and reaching the posterior margin; but the horn is lying on the inside of the skin, and I cannot say at present, what it may be.

According to what is said above the developmental stages, larva and pupa, or only pupa, of seven species are known; they have all been found under bark, and generally in company with Tomicins; it may thus be considered as rather certain that the larvæ feed on the larvæ and pupæ of Tomicins, as had been directly observed in two cases; but probably they feed also on other larvæ found under the bark, as stated by Kleine. The larva forms, before pupation, a cocoon of some silky substance, to which is, or is not, added particles of the surrounding matter.

The species of *Medeterus* are very characteristic flies; they occur on tree-trunks, walls, boardings and the like, generally in great numbers, some seem especially to occur on stones. They sit in a very characteristic fashion, with the head and front part of the body in an upright position, and they move in a very curious manner, running sideways, backwards and in every direction without turning; they run swiftly, and when chased they fly only a short distance. They are perhaps the most strong robbers among the Dolichopodids, as also indicated by their very strong mouth. I have however never observed any of them with prey, but there are many records of it; already Fischer de Waldheim observed that *M. diadema* lived on small insects, especially *Psychoda phalaenoides*; Schiner and Kowarz note that they are strong robbers; Zetterstedt says about *M. diadema (rostratus)* "Diptera minora prædans", and Poulton records (Trans. Ent. Soc. London, 1906, 391) *M. truncorum* with a small species of *Collembola (Degeeria cincta)* Lubb.?) as prey; also Kleine mentions (Berl. Ent. Zeitschr. l. c.) *M. obscurus* as rapacious and says that it hangs on the lower side of leaves, spying for prey, and he continues: "Alles was nur einigermassen zu bezwingen ist fällt diesem kühnen Räuber zum Opfer". Finally Mr. Kryger told me that he has observed *M. truncorum* chasing and devouring Aphids.

Of the genus about 33 species are known from the palæarctic region, and besides some uncertain; 13 have been found in Denmark, but of these one is here described as new, the number of palearctic species thus increasing to about 34. Certainly some more species will be found in Denmark.

Table of Species.

1. Scutellum with two bristles	2.
— Scutellum with four bristles	4.
2. The whole epistoma densely whitish pruinose	3.
— Epistoma brownish pruinose above the transverse ridge, metallic shining below	3. <i>micaceus</i> .
3. Legs yellow	1. <i>plumbellus</i> .
— Legs black	2. <i>seniculus</i> .
4. Middle tibiæ without bristles above near the base .	4. <i>muralis</i> .
— Middle tibiæ with one or a pair of bristles above near the base	5.
5. Acrostichal bristles distinct, not short; thorax not striped; legs with at least the knees pale (only very slightly in <i>melancholicus</i>)	6.
— Achrostichal bristles short or very short; thorax striped, except in <i>ambiguus</i> , which has the front coxæ almost silvery pruinose, and <i>infumatus</i> , which has the epistoma brown pruinose above, black below; both species with quite black legs	8.
6. The last part of the postical vein one and a half times as long as the cross-vein	7.
— The last part of the postical vein about as long as the cross-vein	7. <i>melancholicus</i> .
7. Larger species; legs chiefly black and coxæ dark-haired	5. <i>apicalis</i> .
— Smaller species; legs chiefly pale and pale-haired .	6. <i>pallipes</i> .
8. Legs chiefly yellow	10. <i>diadema</i> .
— Legs black, or only the knees reddish or yellow	9.
9. Legs quite black	10.
— Legs with the knees pale	11.
10. The whole epistoma metallic, shining; front coxæ almost silvery pruinose	8. <i>ambiguus</i> .
— Epistoma brown pruinose above the transverse ridge; front coxæ not silvery pruinose	9. <i>infumatus</i> .
11. The whole epistoma greyish pruinose	11. <i>jaculus</i> .
— Epistoma metallic shining below the transverse ridge . .	12.
12. The last part of the postical vein longer than the cross-vein; first and second part of the discal vein of about the same length	12. <i>truncorum</i> .
— The last part of the postical vein shorter than the cross-vein; first part of the discal vein considerably longer than the second	13. <i>petrophilus</i> .

1. *M. plumbellus* Meig.

1824. Meig. Syst. Besch. IV, 69, 20. — 1857. Loew, Neue Beitr. V, 54. — 1862. Schin. F. A. I, 238. — 1877. Kow. Verh. zool. bot. Gesell. Wien, XXVII, 45, 1. — 1903. Kat. paläarkt. Dipt. II, 339. — *Hydrophorus jaculus* Fall. 1823. Dipt. Suec. Dol. 5, 7, p. p. var. γ. — *Hydrophorus minutus* Zett. 1843. Dipt. Scand. II, 456, 17, et 1855. XII, 4616, 17, et 1859. XIII, 5028, 17.

Male. Vertex and frons greyish white or yellowish. Epistoma silvery white. Palpi whitish. Occiput brownish grey; postocular bristles whitish. Antennæ black or brownish black, third joint short; arista almost apical, more than twice as long as the antennæ. Thorax light grey pruinose, generally with a middle stripe and the sides yellowish brown, or the thorax upon the whole more yellowish brown, especially in the male, and generally so on the posterior part and at the margin of the scutellum; acrostichal hairs very short; three dorsocentral bristles. Scutellum with two bristles. Pleura light grey, seen from behind the metallic green ground colour may be seen; propleura with two or three white prothoracic bristles. Abdomen light grey pruinose, seen from behind the metallic green ground colour is distinct; it is clothed with short, whitish yellow hairs, slightly longer at the hind margins of the segments and somewhat longer on the first segment. Venter light grey, with whitish hairs. Hypopygium somewhat large, blackish; the eighth segment greyish pruinose; ventral lobes long, band-shaped, the outer lamellæ shorter, both pairs brownish, the amellæ pale-haired. Legs yellow, posterior coxæ grey; front coxæ a little greyish at the base and whitish pruinose anteriorly; the femora may be a little brownish at the base; the very apex of the tibiæ, the apex of the first tarsal joints and the whole fifth, or fourth and fifth joint blackish; hind metatarsus not half as long as the second joint, excised at the base below, and with a small tooth, and besides with a brush of short, black hairs above at the extreme base. The legs have short, pale hairs; the anterior coxæ have bristly hairs, the hind coxæ one bristle on the outer side, all whitish; the hairs below the femora short and fine, hind femora with longer hairs above on the basal part; middle tibiæ with two black dorsal bristles near the base, hind tibiæ with one small. Wings yellowish tinged; veins blackish brown, the last part of the discal vein straight, not much converging towards the cubital vein; the last part of the postical vein about as long as the cross-vein. Squamulæ yellow, with a white fringe. Halteres pale yellow.

Female. Epistoma slightly broader than in the male. Thorax as in the male generally with somewhat distinct yellowish brown middle

stripe and sides. Abdomen generally with the front margins of the segments brown.

Length 2—2.5 mm.

M. plumbellus is rare in Denmark, and was for the first time taken in 1881; it has only been taken in Ruderhegn (the author); in Jutland at Sæby, on Læsø, and on Bornholm at Hasle (H. J. Hansen); in all six specimens. The dates are from July to ²⁰/₉. It seems to occur in sandy districts.

Geographical distribution:— Northern and middle Europe down into Austria and Hungary; towards the north to southern Sweden.

2. *M. seniculus* Kow.

1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 46, 2. — 1903. Kat. paläarkt. Dipt. II, 339.

Vertex and frons whitish or greyish white. Epistoma silvery white. Palpi whitish. Occiput greyish; postocular bristles white. Antennæ black, third joint about as long as broad, arista a little subapical, more than twice as long as the antennæ. Thorax light grey or yellowish grey pruinose, with a distinct brown middle stripe, and with the sides more or less brown; acrostichal hairs very short; three equally long dorsocentral bristles. Scutellum with two bristles. Pleura light grey; propleura with two white prothoracic bristles. Abdomen dark æneous or greenish, greyish white pruinose at the sides; it is clothed with short, yellow hairs, and has a little longer hindmarginal bristles at the sides of the first segment. Venter dark greyish. Hypopygium (according to Kowarz) somewhat large, the ventral lobes somewhat long, straight, slightly dilated towards the apex, black; the outer lamellæ triangular, yellowish, the margin black. Legs black, coxæ grey pruinose; the knees reddish; hind metatarsus not half as long as the second joint, excised at the base. The legs have short, brownish hairs; the bristly hairs on the anterior coxæ and the bristle on the hind coxæ white; the hairs below the femora pale and indistinct; hind femora with a little longer, black hairs above in the basal part; middle tibiæ with a bristle above near the base. Wings brown, most towards the anterior margin; veins blackish, the last part of the discal vein straight, not much converging towards the cubital vein; the last part of the postical vein about as long as or slightly longer than the cross-vein. Squamulæ yellowish with a brownish margin, and a yellow fringe. Halteres dirtily yellowish.

Length fully 2 mm.

Of this species I have only had the female, while Kowarz describes only the male, so that I have taken the male characters given above

from him. I do not doubt the determination, as Kowarz's description agrees in every respect, only the abdomen is in my specimen more greyish æneous than green.

M. seniculus is very rare in Denmark, we have only one specimen, a female, taken in Jutland at Jerup north of Frederikshavn on 14.7 1908 (Th. Mortensen).

Geographical distribution:— Besides from Denmark the species is only known from Poland.

3. *M. micaceus* Loew.

1857. Loew, Neue Beitr. V, 55. — 1862. Schin. F. A. I, 238. — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 47, 3, Taf. II, Fig. 19—20. — 1903. Kat. paläarkt. Dipt. II, 338. — *Hydrophorus apicalis* Zett. 1843. Dipt. Scand. II, 452, 12, p. p, var. b, et 1849. VIII, 3055, 12, et 1855. XII, 4616, 12. — *Hydrophorus jaculus* Fall. 1823. Dipt. Suec. Dol. 5, 7, p. p. var. β .

Male. Vertex and frons brown. Epistoma brown above, below blackish green, a little shining, and a little greyish pruinose, especially at the sides. Palpi black. Occiput greenish, greyish pruinose; postocular bristles whitish. Antennæ black, third joint short, roundish; arista almost apical. long. Thorax brown or somewhat coppery pruinose, with three, often indistinct, brown stripes, the median most distinct; acrostichal bristles very short; three equally long dorsocentral bristles; only two supraalar bristles. Scutellum with two bristles. Pleura brownish grey or grey pruinose, the æneous ground colour somewhat visible; propleura with two or three whitish prothoracic bristles. Abdomen æneous or sometimes more greenish, a little greyish pruinose; it is clothed with short, yellow hairs, and has slightly longer hindmarginal bristles at the sides of the first segment. Hypopygium somewhat large, black or slightly greenish; the eighth segment greyish pruinose; the ventral lobes somewhat long, straight, brownish; the outer lamellæ shorter, somewhat triangular, likewise brownish. Legs with the coxæ black, greyish pruinose; femora blackish, often greenish shining, with the apical part yellowish to a greater or smaller extent; tibiæ yellowish or brownish yellow, generally darker at the apex; tarsi brown or blackish brown, sometimes paler at the base; sometimes the legs are darker; hind metatarsus not half as long as the second joint, strongly excised at the base below, and with a small tooth. The legs have short, brownish or yellowish hairs; the bristly hairs on the anterior coxæ and the bristle on the hind coxæ whitish; the hairs below the femora pale and very short; middle tibiæ with one or a pair of bristles near the base, hind tibiæ here with a very

small bristle. Wings slightly yellowish or brownish tinged; veins blackish, the last part of the discal vein straight, very slightly converging towards the cubital vein; the last part of the postical vein a little longer than the cross-vein. Squamulae yellow, with a slight brownish margin and a pale yellow fringe. Halteres yellow.

Female. Epistoma very slightly broader than in the male, for the rest quite similar to it.

Length 2—2.2 mm.

M. micaceus is rare in Denmark; Charlottenlund (Stæger); in Jutland at Hald near Viborg, Sæby, Frederikshavn and Skagen, and on Bornholm at Rønne (H. J. Hansen). The dates are in July and August.

Geographical distribution:— Europe down into Spain and Sicily; towards the north to northern Sweden.

4. *M. muralis* Meig.

1824. Meig. Syst. Besch. IV, 62, 5. — 1843. Zett. Dipt. Scand. II, 455, 16, p. p. var. c, et 1859. XIII, 5028, 16 (*Hydrophorus*). — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 50, 6, Taf. II, Fig. 21. — 1903. Kat. paläarkt. Dipt. II, 339. — *Hydrophorus jaculus* Fall. 1823. Dipt. Suec. Dol. 5, 7, p. p. — *Medeterus melanopleurus* Loew, 1857. Neue Beitr. V, 52.

Male. Vertex and frons greyish pruinose. Epistoma blackish or brownish black, below black and somewhat shining. Palpi black. Occiput greenish or bluish, greyish pruinose; postocular bristles black, or somewhat brownish reflecting. Antennae black, third joint short, roundish; arista almost apical, long. Thorax green or bluish green, somewhat whitish grey pruinose; acrostichal bristles very short; the dorsocentral rows consisting of about three small bristles in front, then a somewhat longer, and two long behind. Scutellum with four bristles. Pleura bluish or almost purplish, a little brown pruinose; propleura with two to three dark brown prothoracic bristles. Abdomen dark metallic green or bluish green, very slightly pruinose; it is clothed with short, dark brown hairs, and has longer bristles at the hind margin of the first segment on the sides. Hypopygium of medium size; the ventral lobes long, yellow, black at the base; they are curved rectangularly downwards at the apex, (the shape figured by Kowarz l. c. Fig. 21 I could not see distinctly on my few specimens); the outer lamellae triangular, yellow. Legs with the coxae blackish, greyish pruinose; the legs otherwise either quite black, or the tibiae and tarsi brown, the hind metatarsus more or less yellow, or the legs are paler with the apex of the femora, the tibiae, especially on the apical part, and the tarsi except the last joint yellowish; hind

metatarsus more than half as long as the next joint, not excised at the base. The bristly hairs on the anterior coxæ and the bristle on the hind coxæ dark brown or blackish; for the rest the legs with short, pale or whitish hairs, which are specially conspicuous on tibiæ and tarsi; the hairs below the femora indistinct; middle and hind tibiæ without bristles near the base. Wings hyaline or slightly yellowish; veins brown, the last part of the discal vein a little curved, somewhat converging towards the cubital vein; the last part of the postical vein about one and a half times as long as the cross-vein. Squanulæ brownish yellow, with a brown margin and a yellow fringe. Halteres yellowish or brownish.

Female. Quite similar to the male.

Length 1,7—2 mm.

M. muralis is rare in Denmark, only five specimens have been taken on Funen at Odense (H. J. Hansen); I know no time for its capture.

Geographical distribution:— Europe down into Italy; towards the north to northern Scandinavia, and in Finland.

5. *M. apicalis* Zett.

1843. Zett. Dipt. Scand. II, 452, 12, ♀ (excl. var. b) (*Hydrophorus*). — 1857. Loew, Neue Beitr. V, 53. — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 54, 10. — 1903. Kat. paläarkt. Dipt. II, 337.

Vertex and frons greenish, greyish pruinose. Epistoma metallic green, a little pruinose above, darker and more shining below. Palpi black. Occiput greenish, grey pruinose; postocular bristles whitish or yellow, black above. Antennæ black, third joint short; arista sub-apical, long. Thorax metallic green or bluish green, somewhat greyish or brownish grey pruinose; acrostichal bristles distinct; the dorso-central rows formed of three to five small bristles in front and three or four longer bristles behind. Scutellum with four bristles. Pleura greenish or bluish green, a little greyish pruinose; propleura with two or three pale or darker prothoracic bristles. Abdomen green or dark green, almost not pruinose; it is clothed with short, yellow or darker to blackish hairs, which are very slightly longer at the sides of the first segment. Venter greenish, grey pruinose. Legs with the femora, especially the hind femora, robust, and the latter shining on the posterior side; the legs are black, the knees yellowish, sometimes to so great an extent that a larger apical part of the femora and the basal part of the tibiæ are pale; middle metatarsus sometimes a little pale at the base; hind metatarsus somewhat shorter than the second joint. The legs have short, chiefly yellowish or brownish hairs; the

hairs on the anterior coxæ are brownish or blackish, the bristle on the hind coxæ black; the hairs below the femora are somewhat long and distinct, on the apical part bristly; they are brownish to blackish; the hind femora have also some black, bristly hairs above at the apex on the anterior side; middle tibiæ with a pair of bristles near the base. Wings a little greyish tinged; veins blackish brown, paler towards the base; the last part of the discal vein slightly curved, strongly converging towards the cubital vein; last part of the postical vein fully one and a half times as long as the cross-vein. Squamulæ dirtily yellowish, with a blackish brown margin and a brown or dark yellowish fringe. Halteres yellow.

Length 2.7 to fully 3 mm.

Of this species only the female has been described, and I also possess only this sex, but Verrall says (Entom. Month. Mag. XVI, 1905, 189) that he has had numerous specimens of both sexes; he however does not describe the male. Kowarz suggests (l. c.) that *apicalis* may be only a variety of *tristis* and means that only knowledge of the male will solve this question; Verrall however is seen to keep both species. — Loew and Kowarz say that the coxæ are black-haired, and that the stronger hairs below the posterior femora are black, but I find them often brownish; I have examined one of Stæger's type-specimens. As Zetterstedt says "Stæger. in litt." the name is originally due to Stæger.

M. apicalis is rare in Denmark; Hellerup, Charlottenlund, Dyrehaven, and in Jutland at Aalborg; only few specimens in all. My dates are $14/7$ — $10/8$. I have taken it on tree-trunks; Stæger took it in the same way in September and October.

Geographical distribution:— Northern and middle Europe down into Austria; towards the north to southern Sweden.

6. *M. pallipes* Zett.

1843. Zett. Dipt. Scand. II, 453, 13 (*Hydrophorus*). — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 55, 11, Taf. II, Fig. 17. — 1903. Kat. paläarkt. Dipt. II, 339. — *Hydrophorus jaculus* 1838. Zett. Ins. Lapp. 702, 7, p. p. var. b, ♀. — *Medeterus muralis* Loew (nec Meig.) 1857. Neue Beitr. V, 55. — 1862. Schin. F. A. I, 238.

Male. Vertex and frons whitish grey pruinose. Epistoma green, a little pruinose above, darker and more shining below. Palpi black. Occiput greenish, grey pruinose; postocular bristles white. Antennæ black, third joint short; arista subapical, long. Thorax green or æneous, sometimes somewhat bluish, distinctly greyish or yellowish grey pruinose; acrostichal bristles distinct; the dorsocentral rows consist

of about three small hairs in front and four longer bristles behind, increasing in length backwards; some of the short hairs on the front part of thorax are yellowish. Scutellum with four bristles. Pleura greenish or æneous, a little greyish pruinose; propleura with two small, yellowish prothoracic bristles. Abdomen green or somewhat æneous, almost not pruinose, clothed with short, yellow hairs, very slightly longer at the sides of the first segment. Venter somewhat greenish. Hypopygium narrow, but somewhat long, black or slightly metallic; ventral lobes and outer lamellæ of about the same length, brownish. Legs with the coxæ black or blackish, femora black, the apex, tibiæ and the four first tarsal joints yellow, the very apex of the tibiæ and the last tarsal joint brown or blackish; the apex of the tarsal joints may also be dark, and the tarsi and tibiæ are sometimes more dark; hind metatarsus a little more than half as long as the second joint, without excision. The legs have short, chiefly pale hairs; the hairs on the anterior coxæ and the bristle on the hind coxæ

Fig. 100. Wing of *M. pallipes* ♂ (after a dried specimen, the wing not quite level, and hence the postical cross-vein not seen in full length).

yellowish or the latter darker; the hairs below the femora, especially the posterior femora, somewhat bristly, yellow; middle tibiæ with one or a pair of bristles near the base. Wings slightly yellowish tinged; veins brown, last part of the discal vein somewhat curved, strongly converging towards the cubital vein; the last part of the postical vein twice as long as the cross-vein or even more. Squamulæ yellow, sometimes a little darker at the margin, with a yellow fringe. Halteres yellow.

Female. Quite similar to the male.

Length 2—2,2 mm.

This species shows some resemblance to *apicalis*, but it may be known by the lighter, paler haired abdomen, the generally paler and paler haired legs and the smaller size; also some of the short hairs on the front part of thorax are, at all events generally, somewhat

pale. As Zetterstedt says "Stæg. in litt." the name is originally due to Stæger.

M. pallipes is rare in Denmark; Hellerup, Ordrup Krat, and in Jutland at Frijsenborg and at Hald near Viborg (H. J. Hansen, the author). My dates are $^{21}/_6$ — $^{10}/_8$. It occurs on tree-trunks. Stæger took it in September.

Geographical distribution:— Northern and middle Europe down into Austria, Hungary and Styria; towards the north to northern Sweden, and in Finland.

7. *M. melancholicus* n. sp.

Male. Vertex and frons blackish, somewhat greyish pruinose. Epistoma dark metallic green, a little greyish pruinose just above the transverse ridge, the lower part a little pruinose at the sides. Palpi black. Occiput blackish, greyish pruinose; postocular bristles black

Fig. 101. Antenna of *M. melancholicus* ♂. $\times 65$. From a dried object.

above, pale below. Antennæ black, the third joint longer than broad, with a little excision above just before the apex, in which the arista is inserted; this latter is short, only somewhat longer than the antennæ. Thorax greyish black, somewhat brownish pruinose, dull; in the middle there are two more grey stripes; the acrostichal bristles distinct: the dorsocentral rows consisting of numerous short bristles in front and four to five longer bristles behind, longest backwards; the small hairs on the front part of the disc somewhat numerous. Scutellum with four bristles. Pleura dark grey pruinose; propleura with about four blackish prothoracic bristles. Abdomen black, slightly metallic, almost not pruinose, shining; it is clothed with short, blackish hairs, and has somewhat long hindmarginal bristles on the first segment. Venter greyish black. Hypopygium long but not thick, shining black; the eighth segment a little greyish pruinose, with somewhat bristly hairs at the upper margin; the ventral lobes and the outer lamellæ small, brownish. Legs black, coxæ greyish pruinose; the knees very slightly and narrowly, almost not, reddish; hind metatarsus about half as long as the second joint, without excision. The legs have short, blackish, on the posterior side of the hind tibiæ more brownish, hairs; the bristly hairs on the anterior coxæ and the bristle on the hind

coxæ black; the hairs below the femora distinct, but not strong; hind femora with somewhat longer hairs above on the basal part; middle tibiæ with a pair of bristles near the base; the bristle above the apex of the hind tibiæ distinct. Wings a little greyish or brownish tinged; veins black, the last part of the discal vein somewhat curved, much converging towards the cubital vein; the last part of the postical vein about as long as or slightly shorter than the cross-vein. Squamulæ dirtily whitish or yellowish, with a blackish brown margin and a yellow fringe. Halteres dirtily yellowish, the peduncle brownish.

Female. Quite similar to the male; the third antennal joint with the arista subapical, but without any observable excision.

Length 3 mm.

This species is very nearly related to *dichrocerus* and *obscurus*, but is certainly distinct; from the former it is distinguished by the quite black antennæ and (according to Kowarz's figure) quite another shape of the third antennal joint, and by the want of a bristle in the middle on the middle tibiæ; from the latter by the smaller hypopygium of another shape, and finally from both by the smaller size.

M. melancholicus is very rare, I have only two specimens; one, a male, was bred from a larva taken under the bark of an ash in Hareskov on $18\frac{1}{4}$ 1909, the imago came on $7\frac{1}{6}$ (Kryger), the other, a female, was taken at Copenhagen $2\frac{2}{7}$ 1911 (the author); as both specimens agree in every respect I do not hesitate in considering them as the same species.

Geographical distribution:— The species is hitherto only known from Denmark.

8. *M. ambiguus* Zett.

1843. Zett. Dipt. Scand. II, 456, 18, et 1855. XII, 4616, 18 (*Hydrophorus*). — 1857. Loew, neue Beitr. V, 51. — 1862. Schin. F. A. I, 237. — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 65, 21. — 1903. Kat. paläarkt. Dipt. II, 337.

Male. Vertex and frons dark metallic green or bluish green, a little brownish pruinose. Epistoma somewhat broad, metallic bluish green above, steel-blue or somewhat violet below, shining; the transverse ridge straight. Proboscis rather thick; palpi black. Occiput black or slightly metallic, a little pruinose; postocular bristles black quite above, whitish below. Antennæ black, third joint longer than broad; arista subapical, a little more than twice as long as the antennæ. Thorax black, slightly greenish or bluish and slightly pruinose, shining; acrostichal bristles short, but somewhat distinct; the dorsocentral rows consisting of some small bristles in front and four longer bristles

behind, longest backwards. Scutellum with four bristles. Pleura dark bluish or bluish green, grey or dark grey pruinose; propleura with three or four yellowish prothoracic bristles. Abdomen black, slightly greenish or bluish, shining; it is clothed with short, black hairs, and has longer hindmarginal bristles on the first segment. Venter greyish pruinose. Hypopygium somewhat large, black; the eighth segment slightly pruinose, with some pale hairs; the ventral lobes somewhat long, straight, a little dilated at the end; the outer lamellæ short, somewhat triangular, hairy; both pairs brownish or blackish brown. Legs quite black, coxæ grey, especially the front coxæ whitish grey, almost silvery pruinose anteriorly; hind metatarsus a little more than a third part of the second joint, a little excised at the base. The legs have short, blackish or dark brown hairs; the bristly hairs on the anterior coxæ and the bristle on the hind coxæ whitish; the hairs below the femora short and indistinct, pale, hind femora with longer hairs above on the basal part; middle tibiæ with a pair of bristles near the base, hind tibiæ here with a small bristle. Wings hyaline or very slightly tinged; veins black, the last part of the discal vein slightly curved or almost straight, somewhat converging towards the cubital vein; the last part of the postical vein as long as or almost as long as the cross-vein. Squamulæ dirtily yellowish, with a blackish brown margin and a yellowish or pale brownish fringe. Halteres brown or blackish brown, especially the knob dark above.

Female. Quite agreeing with the male; abdomen a little pruinose at the sides.

Length 3,2—3,7 mm.

M. ambiguus is rare in Denmark, we have only two specimens, a male taken in Grib Skov on ¹²/₁₆ 1911 (Kryger), and a female taken in Tyvekrog, the southern part of Grib Skov, on ¹/₁₀ 1907 (the author); it was taken on tree-trunks.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden.

9. *M. infumatus* Loew.

1857. Loew, Neue Beitr. V, 52. — 1862. Schin. F. A. I, 238. — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 66, 22. — 1903. Kat. paläarkt. Dipt. II, 338. — *Hydrophorus muralis* 1843. Zett. Dipt. Scand. II, 455, 16, p. p. var. a et b.

Male. Vertex and frons dark, brownish pruinose. Epistoma likewise dark, brownish pruinose above, black and shining below. Palpi black. Occiput black, a little greyish pruinose; postocular bristles yellowish, the uppermost are black, and likewise generally one or two

of the lowermost. Antennæ black, third joint short, roundish; arista long, apical or almost so. Thorax dark brownish pruinose, dull, the area in front of the scutellum and this latter grey pruinose, and sometimes thorax somewhat grey; the acrostichal bristles short, but generally distinct; the dorsocentral rows consisting of some short hairs in front, then follow generally two a little longer bristles, and two long bristles behind. Scutellum with four bristles. Pleura dark grey pruinose; propleura with two or three black prothoracic bristles. Abdomen black, somewhat greyish pruinose, clothed with short, black hairs, and with a little longer hindmarginal bristles on the first segment. Hypopygium somewhat large, black; the eighth segment very slightly pruinose, with some dark hairs; the ventral lobes long, straight, with an excision and two downwards turned points at the apex, and here with some hairs; the outer lamellæ somewhat narrow, only a little shorter than the ventral lobes, hairy; both pairs brownish or dark brown. Legs black, coxæ slightly greyish pruinose; hind metatarsus almost half as long as the second joint, only with a small excision but a pair of somewhat distinct teeth at the base. The legs with short, black or brownish black hairs; the bristly hairs on the anterior coxæ and the bristle on the hind coxæ black; the hairs below the femora very short and indistinct, hind femora with long hairs above on the basal half; middle tibiæ with one or a pair of bristles near the base, hind tibiæ with the bristle above the apex somewhat distinct. Wings slightly brownish grey tinged, or almost hyaline; veins black, the last part of the discal vein straight or almost so, somewhat converging towards the cubital vein; the last part of the postical vein a little longer than the cross-vein. Squamulæ dirtily yellowish or brownish, with a blackish margin and a brown or pale brown fringe. Halteres blackish, brownish or paler, but then the upper part of the knob dark.

Female. Quite agreeing with the male.

Length 2,2—2,5 mm.

M. infumatus is rare in Denmark, only seven specimens are known, taken in Geel Skov and Tyvekrogen in 1908 and 1909 on ¹⁵/₅—²⁸/₅ (the author). It was taken on tree-trunks.

Geographical distribution:— Europe down into Italy; towards the north to northern Sweden.

10. *M. diadema* L.

1767. Linn. Syst. Nat. XII, 2, 982, 19 (*Musca*). — 1857. Loew, Neue Beitr. V, 54. — 1862. Schin. F. A. I, 237. — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 62, 18, Taf. II, Fig. 14—16. — 1903. Kat. paläarkt. Dipt. II, 337. — *Medetera carnivora* Fisch. 1819. Programme etc.

Moscou, 11. — *Hydrophorus aeneivittatus* Macq. 1827. Soc. Sc. Lille, 1827, 38, 2. — *Medeterus aeneivittatus* 1838. Meig. Syst. Besch. VII, 156, 27. — *Musca rostrata* Fabr. 1775. Syst. Ent. 783, 53. — *Dolichopus rostratus* 1805. Fabr. Syst. Antl. 269, 15. — *Hydrophorus rostratus* 1823. Fall. Dipt. Suec. Dol. 4, 6. — 1843. Zett. Dipt. Scand. II, 449, 9, et 1849. VIII, 3055, 9. — *Medeterus rostratus* 1824. Meig. Syst. Besch. IV, 61, 3.

Male. Vertex and frons brownish grey. Epistoma somewhat broad, metallic green or bluish, shining, especially below, a little greyish pruinose just above the transverse ridge and below the antennæ. Palpi black. Occiput grey; the postocular bristles yellowish, somewhat long and dense, the uppermost are small and darker. Antennæ black, third joint a little longer than broad; the arista subapical, long, more than thrice as long as the antennæ. Thorax grey pruinose, dull; seen from behind the metallic green ground colour is seen; the disc has three brown or somewhat coppery stripes, the median abbreviated behind, the lateral in front; the acrostichal

Fig. 102. Antenna of *M. diadema* ♂. $\times 65$.

bristles very short; the dorsocentral rows consisting of two somewhat short bristles in front, and two longer behind; the rows do not reach much forwards; the hairs on the front part of the disc are very small and partly pale. Scutellum with four bristles. Pleura somewhat greenish or æneous, pale grey pruinose; propleura with three to five whitish prothoracic bristles. Abdomen green, æneous or more coppery, densely clothed with short, pale yellow hairs, and with pale hindmarginal bristles on the first segment. Venter greyish, with pale hairs. Hypopygium somewhat large, black; the eighth segment greyish, with pale hairs at the margin; the ventral lobes somewhat long, dilated and variously excised at the apex; the outer lamellæ shorter; both pairs yellowish or brownish. Legs with the coxæ grey, femora yellow, the front femora, or the front and hind, or all femora with the basal part more or less brown or blackish brown; tibiæ and tarsi yellow, the very apex of the tibiæ and the apex of the four first tarsal joints dark, the last joint quite dark; sometimes the apex of the tibiæ dark to a greater extent, and likewise the tarsi more darkened on the apical part; hind metatarsus very short, about one

third of the second joint, excised at the base and here with a small, black tooth, and a similar above at the base. The legs with short, pale hairs; the hairs on the anterior coxæ and the bristle on the hind coxæ likewise pale; the hairs below the femora very short and indistinct, the hind femora with long pale hairs above on the basal half; middle tibiæ with a pair of bristles near the base, hind tibiæ with a similar, small bristle, and with the bristle above the apex distinct. Wings hyaline; veins black, the last part of the discal vein

Fig. 103. Wing of *M. diadema* ♂.

almost straight, somewhat converging towards the cubital vein; the last part of the postical vein half as long as the cross-vein. Squamulæ whitish, the margin a little darker, the fringe whitish. Halteres yellow or pale yellow.

Female. Quite agreeing with the male; the epistoma very slightly broader.

Length 4—4.5 mm.

Remarks: I do not quite understand Kowarz's expression: "Thorax ... erzgrün oder metallisch blaugrün, wenig grau bestäubt" as I find thorax grey, only slightly metallic when seen from behind. — I have examined Fabricius's type-specimens (two) of *rostratus* in the collection of Tönder-Lund, and find them to be *diadema*.

M. diadema is rather common in Denmark, but however somewhat local; Amager, Dyrehaven, Hornbæk, Rørvig, Tisvilde; on Funen at Odense; in Jutland at Søndervig and Holstebro, and on Bornholm at Rønne. My dates are $30/6$ — $16/9$. It is especially found on walls and boardings, and it seems to prefer sandy districts.

Geographical distribution: — Europe down into Italy, and in Asia Minor; towards the north to middle Sweden.

11. *M. jaculus* Fall.

1823. Fall. Dipt. Suec. Dol. 5, 7, p. p. var. α (*Hydrophorus*). — 1824. Meig. Syst. Besch. IV, 66, 14. — 1843. Zett. Dipt. Scand. II, 450, 10 (*Hydrophorus*). — 1857. Loew, Neue Beitr. V, 53. — 1862. Schin. F. A.

I, 238. — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 67, 23, Taf. II, Fig. 1—11. — 1903. Kat. paläarkt. Dipt. II, 338. — *Medeterus nigricans* Meig. 1824. Syst. Besch. IV, 67, 16. — *Hydrophorus truncorum* 1838. Zett. Ins. Lapp. 702, 8, p. p.

Male. Vertex and frons grey pruinose. Epistoma grey or whitish grey pruinose, but not densely and generally the metallic green or blue ground colour slightly visible. Palpi black. Occiput grey; the postocular bristles whitish, the uppermost blackish. Antennæ black, third joint about as long as broad; arista subapical, long. Thorax slightly metallic green, especially in the middle, grey pruinose with a brown stripe at each side; sometimes also the stripe in the middle is more brown than green; the acrostichal bristles short; the dorsocentral rows consist of four long bristles and in front of them generally one or two shorter. Scutellum with four bristles. Pleura greenish or æneous, grey pruinose; propleura with three or four white prothoracic bristles. Abdomen green or bluish green, grey pruinose, clothed with short, pale yellow or whitish hairs, very slightly longer at the hind margins, and with longer hindmarginal bristles on the first segment. Venter somewhat greenish, slightly pale-haired. Hypopygium large, black; the eighth segment grey pruinose, with pale hairs; the ventral lobes long, somewhat curved, cleft or incised at the apex, and with a pair of bristles; the outer lamellæ shorter, somewhat narrow, especially towards the apex, hairy; both pairs yellowish or brownish. Legs black, coxæ and also the femora somewhat greyish pruinose; the knees distinctly yellow; hind metatarsus not half as long as the second joint, very slightly excised at the base. The legs have short, pale hairs; the bristly hairs on the anterior coxæ and the bristle on the hind coxæ whitish; the hairs below the femora distinct, on the hind femora long, and the hind femora have also long hairs above on the basal half; middle tibiæ with one or generally a pair of bristles near the base, hind tibiæ here with a small bristle, and the bristle above the apex also somewhat distinct. Wings hyaline or almost so; veins brownish black, the last part of the discal vein a little curved, especially near the base, and a little converging towards the cubital vein; the last part of the postical vein about half as long as the cross-vein, this latter perpendicular, the inner angle between it and the postical vein acute. Squamulæ pale yellow, the margin slightly darkened, the fringe whitish. Halteres whitish or yellowish.

Female. Quite similar to the male.

Length 3,3 to about 4 mm.

M. jaculus is very common in Denmark, and it has been taken in almost every part of our country including Bornholm. My dates

are $21/6$ — 22 μ . It is found on tree-trunks, boardings and walls, often in great number.

Geographical distribution: — Europe down into Italy and further into North Africa; towards the north to northern Sweden, and in Finland.

12. *M. truncorum* Meig.

1824. Meig. Syst. Besch. IV, 67, 15. — 1843. Zett. Dipt. Scand. II, 452, 11, et 1849. VIII, 3055, 11 (*Hydrophorus*). — 1857. Loew, Neue Beitr. V, 54. — 1862. Schin. F. A. I, 238. — 1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 68, 24. — 1903. Kat. paläarkt. Dipt. II, 340.

Male. Vertex and frons greyish brown pruinose. Epistoma brown below the antennæ, lower downwards the green ground colour is more or less visible, and just at the transverse ridge it is whitish grey; below the ridge it is metallic green or bluish. just along the sides is a narrow, whitish grey line. Palpi black. Occiput grey pruinose; postocular bristles whitish, the uppermost dark. Antennæ black, the third joint short, truncate: the arista almost apical, long. Thorax slightly metallic green, grey pruinose, with three brown or almost coppery stripes, the median often more green; the acrostichal bristles short; the dorsocentral rows consist of four long bristles and in front of them a few very short. Scutellum with four bristles. Pleura a little greenish or æneous, grey pruinose; propleura with two or three yellow or brownish prothoracic bristles. Abdomen somewhat metallic green, æneous or coppery, it is somewhat greyish pruinose, clothed with short, whitish hairs, and with longer hindmarginal bristles on the first segment. Venter somewhat greenish, slightly pale-haired. Hypopygium small, black; the eighth segment greyish pruinose, with pale hairs; the ventral lobes long, somewhat excised at the apex and with some bristles; the outer lamellæ rather long and narrow, but shorter than the lobes, also somewhat excised at the apex, and hairy. Legs black, the knees reddish yellow; hind metatarsus about half as long as the second joint, slightly excised at the base. The legs have short, chiefly pale hairs; the bristly hairs on the anterior coxæ and the bristle on the hind coxæ yellowish or sometimes brownish; the hairs below the femora somewhat distinct, especially on the hind femora, and these latter with longer, somewhat darker hairs above on the basal half; middle tibiæ with a pair of bristles near the base, and hind tibiæ here with a small bristle. Wings very slightly tinged; veins blackish brown, the last part of the discal vein very slightly curved, a little converging towards the cubital vein; the last part of the postical vein a little longer than the cross-vein. Squamulæ yellow, the margin brownish, the fringe pale yellow. Halteres yellow.

Female. Quite agreeing with the male.

Length 2.2—2.8 mm.

M. truncorum is common in Denmark, though scarcely as common as *jaculus*; Amager, Vester Fælled, Dyrehaven, Hareskov, Hillerød, Tyvekrog, Vedbæk, Tisvilde, Rørvig, Slagelse; on Funen at Odense and Strib; in Jutland at Hald near Viborg and at Frederikshavn. My dates are ²⁶/₆—²⁰/₉. It occurs on walls, generally in great number, and also on tree-trunks; Verrall states that it prefers walls and houses. Kowarz quotes Zetterstedt with a query; I have examined Stæger's specimens, and as these are no doubt identical with Zetterstedt's species, this is certainly *truncorum*.

Geographical distribution:— Europe down into Spain and Italy; towards the north to northern Sweden, and in Finland.

13. *M. petrophilus* Kow.

1877. Kow. Verhandl. zool. bot. Gesell. Wien, XXVII, 71, 27, Taf. II, Fig. 18. — 1903. Kat. paläarkt. Dipt. II, 339.

Male. Vertex and frons brownish grey pruinose. Epistoma metallic green, below the antennæ brownish pruinose, at the transverse ridge greyish and below the ridge shining. Palpi black. Occiput grey pruinose; postocular bristles whitish, the uppermost darker. Antennæ black, third joint short, roundish; arista almost apical, long. Thorax densely grey pruinose with three brown or somewhat coppery stripes, the lateral less distinct or almost wanting; the acrostichal bristles very short, yellowish; the dorsocentral rows consisting of four long bristles, and according to Kowarz sometimes with a small bristle in front. Scutellum with four bristles. Pleura æneous, greyish pruinose; propleura with three or four whitish prothoracic bristles. Abdomen somewhat metallic green or æneous and somewhat greyish pruinose, clothed with short, yellow hairs, and with long hindmarginal bristles on the first segment. Hypopygium of medium size or somewhat large, black; the eighth segment greyish pruinose, with pale hairs. Legs black, coxæ grey pruinose, the knees reddish yellow; hind metatarsus short, almost only one third of the second joint, a little excised and with a small tooth at the base. The legs have short, pale hairs; the bristly hairs on the anterior coxæ and the bristle on the hind coxæ likewise pale; the hairs below the femora distinct, especially on the hind femora which also have longer hairs above on the basal part; middle tibiæ with a pair of bristles near the base, hind tibiæ here with a small bristle. Wings somewhat narrow and rather broadly rounded at the apex, about hyaline; veins blackish brown, the last

part of the discal vein very slightly curved, and slightly converging towards the cubital vein, it is considerably shorter than the first part of the vein; the last part of the postical vein shorter than the cross-vein; this latter somewhat oblique and its lower inner angle rectangular. Squamulae yellow, with a pale yellow fringe, the margin very slightly darkened. Halteres yellow.

The female I do not know.

Length fully 3 mm.

This species resembles *jaculus*, but is easily distinguished by the epistoma, which is shining below the ridge, and by the relative length of the two parts of the discal vein, and the oblique cross-vein causing the lower inner angle to be rectangular.

M. petrophilus is very rare in Denmark, we have only one specimen, a male, taken many years ago, probably in the vicinity of Copenhagen. It is recorded to occur on rocks and stones on dry beaches.

Geographical distribution:— Europe down into Italy; its northern limit is in Denmark, and it occurs in England.

22. **Scellus** Loew.

Species of medium or somewhat large size, and of dark metallic colour. This genus agrees in most essential respects with the following, *Hydrophorus*. Head a little broader than thorax; it is higher than broad, narrowed downwards, slightly arched behind. Vertex a little excavated, the ocellar tubercle prominent. Frons somewhat broad, decreasing in breadth towards the antennae. There are ocellar and postvertical bristles, but the vertical bristles are only represented by a very small hair; on the ocellar tubercle are a pair of likewise very small hairs. Eyes large, somewhat oval but narrowed below; the hind margin is curved very slightly forwards; in the living specimens (of *notatus*) they are reddish with a green, transverse band at the height of the antennae; they are densely short-hairy. The facets are in the male enlarged on the front side towards the epistoma. The eyes are well separated in both sexes, a little more in the female than in the male. Jowls very narrow or almost absent. The postocular bristles form a single row, only present on the upper half of the occiput, the whole lower half densely covered with somewhat long hairs. Antennae placed near to each other, high above the middle; they are a little elongated, about as long as the head or longer; the first joint somewhat elongated, linear, the second short and simple, the third generally short, as long as, or a little longer than broad; in a few cases it is (in non Danish species) more elongated; it may be

a little notched in the lower margin¹. Arista dorsal, placed on a small peduncle; in a single case (the American species *virago* Aldrich) it is apical; it is somewhat short, or a little longer than the antennæ; the first joint is not long. The antennæ are of about the same shape and length in the two sexes, only when they are elongated, they are longest in the male. The basal antennal joint is bare, the second has bristles at the apex, the third is short-haired, and the arista very short-haired, almost bare. Epistoma somewhat narrowed above, at its lower end with a small tubercle on each side at the eye-margin, separating it from the clypeus; this latter is a little arched with a rounded lower margin, reaching about to the lower margin of the eyes. Proboscis and oral aperture as in *Hydrophorus*, and of the same size in both sexes. Thorax as in *Hydrophorus*, but still longer, with a small and indistinct declining part behind; postscutellum somewhat large; metaepimera broad, and metathorax distinctly seen above. The acrostichal bristles uniserial, the dorsocentral bristles numerous; further a humeral bristle, and a smaller one, a posthumeral, only one notopleural, one supraalar and a postalar bristle; the præ-sutural and anterior supraalar bristles still more reduced than in *Hydrophorus*, only represented by very small hairs. There are only few and small hairs on the front part of the disc. Scutellum bare above, with two marginal bristles. Propleura with hairs, and with some prothoracic bristles below. Abdomen short; in the male there are five dorsal segments of about the same length, the first the longest; the fifth segment is narrowed, and behind it the small sixth is seen; the seventh is small and hidden, and at the apex the eighth is seen. The first ventral segment is small, the second, third and fourth about normal, but the fourth arched downwards and somewhat forwards; the rest are folded somewhat in for the reception of the hypopygium; this latter is of medium size, not pedunculated, but somewhat visible at the end of abdomen; it is bent downwards and somewhat forwards, and the eighth segment is not lying much asymmetrically; there are long posterior ventral lobes, as the sides of the cavity of the hypopygium are prolonged into two processes, which are somewhat narrow at the base and thus stalked, but broad in the apical part and with a large, round excision at the end; they are only seen by dissection; the penis and its sheath are short. The outer lamellæ are lancet-shaped, they are inserted inwards on the dorsal side, and they are not quite free, but as in *Medeterus* somewhat united in the

¹ Loew says about the antennæ (Mon. of Dipt. of N. Am. II, 1864, 200) in the diagnosis of the genus that they are not excised on the edge; but in *notatus* there is a small, but quite distinct excision (Fig. 104).

middle; they are hairy. On the dorsal side, behind the fourth segment, at the sides there issue two curious appendages, which I term the subanal appendages; they are somewhat variously shaped in the various species, generally more or less band-shaped, and of pale colour; they are generally termed outer lamellæ, but this is erroneous, as they have nothing to do with the hypopygium, but in reality issue from the fifth ventral segment with a long peduncle, and are directed upwards along the hind margin of the fourth dorsal segment; whether they have anything to do with the copulation I do not know¹. In the female there are five normal abdominal segments, and the abdomen terminates with an ovipositor with hairs, and with small spines above. There are distinct dot-like impressions on the first to fourth segments. Abdomen thinly clothed with short hairs, and there are no hindmarginal bristles. Legs chiefly as in *Hydrophorus*; the front legs raptorial, with the coxæ somewhat elongated, femora and tibiæ somewhat short, the femora thickened towards the base, and both femora and tibiæ armed with long spines; these latter are present in both sexes, but besides the males have on the tibiæ a strong apical tooth and another on the ventral side; the apical tooth is also present in the female, but small; the posterior legs are long and slender, in the males they may be variously provided with hairs and bristles; hind metatarsus longer than the second joint, without bristles. The hind coxæ have a pair of small bristles on the outer side; femora without preapical bristles; the posterior legs otherwise with scattered bristles, and the posterior tibiæ with some apical or preapical bristles. There are two claws, two well developed pulvilli, and a somewhat large, narrow, lobe-shaped but not pulvilliform empodium, with bristles below. Wings long and narrow, generally more or less marked with dark markings; the mediastinal vein elongated, not terminating in the subcostal vein; the last part of the discal vein with a larger or smaller curve and somewhat converging towards the cubital vein; posterior cross-vein behind the middle, the last part of the postical vein not longer than the cross-vein; anal vein short. The axillary lobe somewhat well developed. The discal vein with a convexity on the curve. Squamulæ as in *Hydrophorus* with a small

¹ Loew (Mon. of Dipt. of N. Am. II, 1864, 201) was clear with regard to the fact that these organs could not be the outer lamellæ; he had correctly seen that they issue farther downwards than is apparently the case, and he therefore thinks that they might perhaps be the inner lamellæ; he says that inner lamellæ would otherwise be wanting, as he had not, because of their hidden position, seen the organs (posterior ventral lobes), which he terms inner lamellæ.

angular lobe and a well developed inner part, the fringes of both of almost the same length.

The developmental stages are not known.

The species of *Scellus* are rather characteristic flies; they seem to be somewhat different with regard to occurrence; they may be found on commons at the shore in grass and low herbage at water pools, but also quite inland and on dry fields, as remarked under *notatus*. Aldrich says with regard to the American species (Entom. News, 1907, 133) that they are never seen at water, but are found on bark of trees, on the ground, or in grass, and he adds, "(exceptionally perhaps on stones)". This does not hold good with regard to the European species, at all events not as far as concerns *notatus*, and Zetterstedt says about *spinimanus* "in pratis humidis", and also *gallicanus* Beck. is by the author recorded to occur: "am Rande mooriger Stellen". It is however rather curious that I have taken *notatus* in so very different localities, and it seems to show that they are not bound to humid places.

Of the genus 4 species are known from the palæarctic region; one occurs in Denmark.

1. *S. notatus* Fabr.

1781. Fabr. Spec. Ins. II, 448, 65 (*Musca*), et 1805. Syst. Antl. 269, 10 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 62, 6, Tab. XXXV, Fig. 15 (*Medeterus*). — 1843. Zett. Dipt. Scand. II, 446, 6 (*Hydrophorus*). — 1862. Schin. F. A. I, 230 (*Hydrophorus*). — 1903. Kat. paläarkt. Dipt. II, 341. — *Hydrophorus armiger* Fall. 1823. Dipt. Suec. Dol. 4, 5. — *Musca unguolata* Linn. 1761. Fn. Suec. Ed. II, 457, 1858, p. p.

Male. Vertex and frons æneous, but densely grey pruinose. Epistoma somewhat narrow, brown, just below the antennæ greyish. Palpi brownish pruinose. Occiput greenish, densely grey pruinose; postocular bristles black, the hairs on the lower part of occiput red-

Fig. 104. Antenna of *S. notatus* ♂. $\times 65$.

dish. Antennæ not quite as long as the head, black, somewhat greyish; the first joint almost as long as the two others, the third oval, slightly notched in the lower margin; arista slightly longer than the antennæ. Thorax dark metallic, æneous or coppery, almost purplish, at the sides generally somewhat greenish; in the middle there is a

dark or brownish stripe, which again has a greyish, somewhat interrupted stripe along the middle line, so that narrow, approximated, dark stripes are formed; the disc is somewhat greyish pruinose. Pleura greenish, æneous or coppery, somewhat greyish yellow pruinose; propleura with three or four strong, black prothoracic bristles. Abdomen green or æneous, with coppery reflexes, grey pruinose along the side margin; it is thinly clothed with short, black hairs, longer and yellowish at the sides of the first two segments; no hindmarginal bristles. Venter grey pruinose, with pale hairs. Hypopygium blackish, grey pruinose; the eighth segment with a long thread of coalesced hairs at the apical margin; the outer lamellæ triangularly lancet-shaped, grey, pale-haired. The subanal appendages white or yellowish white, broad and somewhat band-shaped, at the upper apical corner with a curved process, a little dilated towards the apex; they have long white hairs on the inside at the base and along the margin. Legs metallic æneous, greenish or bluish, tarsi black; coxæ densely grey pruinose, femora and tibiæ a little pruinose. The legs have short, black hairs, coxæ a little pale-haired; front coxæ with some bristles anteriorly, longest towards the apex, hind coxæ with a pair of small bristles on the outside; front femora thickened towards the base, with a row of long and strong spines below, and with rows of short spines on the anterior side; front tibiæ with a large, bifid tooth on the antero-ventral side above the middle, and at the apex prolonged ventrally into a long tooth; on the space between the teeth are long bristles, and anteriorly to them a row of short bristles; the posterior femora long, they have some shorter and longer bristles on the various sides in various places; the middle tibiæ are somewhat dilated at the apex and have above the apex on the ventral and

Fig. 105. Wing of *S. notatus* ♂.

posterior side a large tuft of curled hairs, and above this a long bristle, and the middle metatarsus has long, bristly hairs below; the hind tibiæ have a strong, curved apical spine below; besides the posterior tibiæ have various shorter and longer bristles. Wings some-

what long and narrow, greyish brown tinged, with the apical part of the subcostal cell brown, and with the cubital, discal and postical veins brown seamed, besides with a blackish brown spot on the posterior cross-vein and on the last part of the discal vein at the bend; the brown seaming of the apical part of the radial and cubital vein more or less coalescing so that the anterior apical part of the wing is brown. Veins blackish, discal vein with a somewhat large bend. Squamulae yellowish brown, with a pale fringe. Halteres yellow or yellowish brown.

Female. Epistoma somewhat broader than in the male, especially above. Antennae of about the same length. Thorax more brown pruinose. Legs about as in the male, front femora likewise thickened, and posterior femora long; the tibiae more bristly; but the legs are simple, the front tibiae have not the bifid spine and the apical spine is smaller, the middle tibiae and tarsi quite simple, without curled hairs or long bristles, and the hind tibiae without the strong apical spine.

Length 4.5 to fully 6 mm.

S. notatus is not common in Denmark; Copenhagen in a garden, Amager; on Funen at Hoffmansgave, and in Jutland at Thisted. My dates are $27/6$ — $17/8$. It occurs in grass and low herbage, and it may be found on commons near the shore at water pools, but also on quite dry fields, thus I took a number, but only females, on a dry, stony field at Thisted.

Geographical distribution:— Europe down into Italy; towards the north to middle Sweden, and in Finland and also in Siberia. Verrall records it (Ent. Month. Mag. XVI, 1905, 191) from England from: "amongst marshy herbage near the sea-coast".

23. **Hydrophorus** Fall.

Species of small or medium size and of a characteristic short, congested shape. The colours are dark, olive or greenish to coppery, but generally not much metallic. Head as broad as or a little broader than thorax, either higher than broad, or with height and breadth about equal; it is a little arched behind. Vertex more or less, generally distinctly, excavated, the ocellar tubercle somewhat prominent. Frons broad, a little decreasing in breadth towards the antennae. There are ocellar, outer vertical and postvertical bristles, the outer vertical are the smallest; on the ocellar tubercle are a pair of very small hairs. Eyes large, somewhat oval, narrowed below; the hind margin is slightly curved in downwards. In the living specimens the

eyes are metallic green, generally with a red part above; they are densely hairy. The facets are of the same or almost the same size. The eyes are well separated in both sexes, the epistoma being of the same breadth or slightly broader in the female. Jowls absent or present, when present narrow or broader. The postocular bristles form a single row, but are only present on the upper half, the lower half of occiput is densely covered with somewhat long hairs, and there are also hairs above the mouth aperture. Antennæ situated near to each other, somewhat high above the middle; they are short, not as long as the head, of the same length in the two sexes; the first joint somewhat obconical, the second short and simple, the third short, roundish or almost so, and rounded or a little pointed at the end; it has a little excision or notch in the lower margin behind the tip, so that a little, triangular point is formed; the arista is dorsal, somewhat thick, as long as or somewhat longer than the antennæ; its first joint is shorter or longer but always somewhat long; the arista terminates in a long, hair-like part. The first antennal joint is bare, the second has bristles at the apex, the third joint and the arista are short- almost microscopically hairy. Epistoma a little narrowed above, sometimes more in the male than in the female; it is plane or a little concave; below it has a small tubercular prominence at each side at the eye margin, separating it from the clypeus; this latter is a little arched with a rounded lower margin; it reaches either to the lower margin of the eyes or is a little shorter. The proboscis is short, almost not protruding, it and the oral aperture are of the same or almost the same size in both sexes; labrum (*balticus*) is of a curious structure, it is short, with a not or slightly chitinised middle process, and with two relatively long and pointed lateral teeth, reaching fully as long forwards as the median process; from the basal part of labrum a strong process goes backwards; hypopharynx of the usual shape, pointed triangular, curved a little downwards; the maxillary palpi oval, squamiform, hairy. Labium with the basal part longer than the labella, it is cleft behind into two processes; the labella are broad, oval, when spread out forming a circular disc. As in *Medeterus* the mouth parts have very strong muscles. Thorax rectangular, somewhat long, it is high, and somewhat arched above; behind, in front of the scutellum there is a small, flat, somewhat indistinct, declining space; the side parts of the transverse furrow lie somewhat backwards, about in the middle. Pro- and metathorax small, the former with a row of small hairs above; metaepimera rather broad. Acrostichal bristles small, uniserial; the dorsocentral bristles are shorter or longer, generally somewhat numer-

ous, from five to a greater number (about 12) and then not quite constant in number; there is a humeral bristle and one or two weaker, a posthumeral, two notopleural and a postalar bristle; these bristles are constant; then there is as usual a præsutural bristle and three or four supraalar bristles, but these are generally small and not quite constant; only the hindmost supraalar is longer. The small hairs on the front part of the disc are not numerous, some of them may sometimes be rather strong. Propleura have fine hairs above and below, and one or several bristles below. Scutellum bare, with four marginal bristles, in a single case (*bisetus*) with only two. Abdomen generally short, sometimes shorter than thorax; it is a little flattened or more cylindrical or even a little compressed, especially in the males, and often truncate behind. In the male there are five dorsal segments of nearly the same length, the first not shorter or even a little longer than the following; the fifth is narrow, triangular, or sometimes broader and with an excision in the hind margin at each side; sometimes the sixth segment may just be seen at the end; the seventh segment is very small and quite hidden; on the ventral side the first segment is short but distinct, the three next are normal, but the fourth often arched downwards or folded in the middle line and here somewhat cleft; the other ventral segments are folded in forming the obliquely truncate end or cavity enclosing the hypopygium; this latter is quite imbedded, only the end of it, the eighth segment, may just be seen at the apex of abdomen, and generally the outer lamellæ are protruding downwards. The hypopygium (*balticus*) is small, the basal part somewhat roundish, but the sides of the cavity prolonged into two long posterior lobes, the outer lamellæ are therefore inserted quite dorsally, at the base; they are somewhat short, oval or roundish, lancet-shaped and hairy; as in *Medeterus* they are not free, but somewhat united in the middle. (This hypopygium answers in shape to that of *H. algens* figured by Snodgrass in Proc. Californ. Acad. of Sc. III, 1904, Pl. XXXIII, fig. 2, only *balticus* has the basal part relatively more developed). In situ the hypopygium lies imbedded at the oblique end of abdomen, with the posterior lobes pointing forwards. In the female there are five visible abdominal segments, the others hidden; the last terminates with an ovipositor with hairs at the end. The abdomen is more or less thinly clothed with short hairs, and there are no hindmarginal bristles; the eighth segment in the male has fine hairs. There are distinct dot-like impressions at the sides of the first to the fourth or fifth segments, those on the first generally hidden by the metaepimera. The legs have the front coxæ a little elongated, and the front legs are of raptorial construction; they are

not long, the femora somewhat, more or less, thickened in the basal part, and femora and tibiæ are armed with spines below; these spines show generally sexual characters, they are sometimes most numerous in the female, sometimes on the contrary only present in the male, and again in other cases equal in both sexes; the posterior legs are long and slender; the hind metatarsus considerably longer than the second joint, without bristles. The hind coxæ have no bristles on the outer side; the posterior legs have scattered bristles, but the hind femora no special preapical bristles; the tibiæ have (generally) only small apical bristles. There are two claws, two well developed pulvilli, and a large and well developed, more or less pulvilliform empodium, which is sometimes narrower, sometimes as broad as or almost as broad as the pulvilli. Wings somewhat long and narrow, sometimes more or less spotted; the mediastinal vein somewhat elongated, not terminating in the subcostal vein; the last part of the discal vein a little curved or undulated, and slightly converging towards the cubital vein; posterior cross-vein placed after the middle, the last part of the postical vein not longer than the cross-vein; anal vein short. Axillary lobe well developed. The discal vein with a convexity. Squamulæ with the angular lobe small, bearing a dense, but not specially long fringe; the inner part of the squamulæ well developed, with a fringe, which is nearly as long as that on the angular lobe.

The developmental stages are not known, but once Mr. Kryger and I have taken quite fresh and still white specimens of *H. praecox* at the shore below sea-weed; it is thus probable that the larvæ and pupæ live here, and I think the same is the case with regard to the other species; the mentioned specimens were observed on ³/₈.

The species of *Hydrophorus* are characteristic by their somewhat dull colours, the raptorial front legs and long posterior legs, and by their short shape. They occur all at water, some especially at the shores, others at fresh water, and others again on both places; most or all specimens are able to run on the surface of the water with great ability. They show in exterior and partly in the behaviour some resemblance to the species of *Clinocera*, and also to some degree to some Ephydrids.

Of the genus about 19 species are known from the palæarctic region; 7 have hitherto been found in Denmark.

Table of Species.

1. Wings unspotted.....	2.
— Wings with two or numerous spots.....	5.

2. Scutellum with only two bristles.....	1. <i>bisetus</i> .
— Scutellum with four bristles.....	3.
3. Epistoma bright metallic above	2. <i>balticus</i> .
— Epistoma quite whitish.....	4.
4. Jowls present; front tibiæ with an apical tooth on the ventral side	3. <i>præcox</i> .
— Jowls practically absent; front tibiæ without tooth at the apex	4. <i>litoreus</i> .
5. Wings with two spots	6.
— Wings with numerous spots	7. <i>nebulosus</i> .
6. Epistoma metallic above.....	5. <i>bipunctatus</i> .
— Epistoma almost quite whitish in the male, brown in the female	6. <i>borealis</i> .

1. *H. bisetus* Loew.

1857. Loew, Neue Beitr. V, 24. — 1903. Kat. paläarkt. Dipt. II, 342.
 — *Hydrophorus inaequalipes* 1851. Walk. (nec Macq.) Ins. Brit. I, 186, 10.

Male. Head about as high as broad; frons and vertex brownish grey. Epistoma broad, very slightly narrowed above, greyish white. Palpi grey. Occiput greenish, greyish brown pruinose above, whitish grey below; postocular bristles black, the hairs below whitish. No distinct jowls. Antennæ black, third joint almost not longer than broad, pointed; arista about as long as the antennæ. Thorax brownish olive, dull, sometimes a little greenish, especially at the sides; in the middle two darker, narrow and approximated stripes; the dorso-central bristles somewhat strong, numerous. Scutellum with two bristles. Pleura slightly greenish or æneous, grey pruinose; propleura with about three black prothoracic bristles. Abdomen green, somewhat greyish pruinose, especially at the sides; it is clothed with short, pale hairs, slightly longer at the sides, and especially at the hind margins towards the apex. Venter greyish. Hypopygium quite hidden, only the short, brown or dark brown outer lamellæ sometimes seen below. Legs green, coxæ grey pruinose and also femora and tibiæ somewhat pruinose; tarsi blackish. The legs have short, chiefly black hairs, and also a fine, pale pubescence, especially distinct towards the end of the tibiæ and on the tarsi, and the front tibiæ are silvery pubescent on the anterior side; coxæ pale-haired, front coxæ with some black bristles; front femora with two rows of spines below, not reaching to the apex; front tibiæ a little curved, and thickened towards the end, with a row of short spines below; posterior femora and tibiæ with various scattered and not long bristles. Wings somewhat long and narrow, a little brownish; veins brownish black, paler at the base; the last part of the discal vein very slightly curved, a

little converging towards the cubital vein. Squamulæ pale yellow, with a pale fringe. Halteres yellow.

Female. Epistoma a little broader than in the male, grey, the greenish ground colour shining a little through. The arista a little longer than in the male. The spines below the front femora towards the anterior side reaching to the apex, and besides the two rows there are some spines posteriorly towards the apex; the front tibiæ have two ventral rows of spines, and a row of a few bristles on the dorsal side; the bristles on the posterior legs a little longer.

Length 2.8—5.3 mm, the female longest.

This species besides by the two scutellar bristles is also easily known by the bristles on the front coxæ.

H. bisetus is rare in Denmark, or perhaps more correctly very local; Jutland at Skagen (four specimens taken many years ago), and on Læsø, in rather great number (H. J. Hansen). It occurs at sea-coasts.

Geographical distribution:— England, Denmark and Spain; it has been known as common in England for more than fifty years, but it was first recorded from the continent by Strobl in 1909 (Verhandl. zool. bot. Gesell. Wien, 59, 192), who took it in Spain; as said above it has stood undetermined in our collection for many years.

2. *H. balticus* Meig.

1824. Meig. Syst. Besch. IV, 66, 12 (*Medeterus*). — 1849. Zett. Dipt. Scand. VIII, 3050, 3. — 1862. Schin. F. A. I, 231. — 1903. Kat. paläarkt. Dipt. II, 341. — *Hydrophorus litoreus* 1838. Zett. Ins. Lapp. 700, 3, p. p., et 1843. Dipt. Scand. II, 443, p. p.

Male. Head about as high as broad; vertex and frons brown. Epistoma broad, bright metallic green above, whitish grey below.

Fig. 106. Antenna of *H. balticus* ♂. $\times 95$.

Palpi brown. Occiput greenish or æneous, greyish pruinose; post-ocular bristles black, the hairs below white. Jowls distinct, grey. Antennæ black, third joint roundish, arista longer than the antennæ. Thorax dark green, æneous or dark coppery, brown pruinose, especi-

ally in front and here dull; dorsocentral bristles about six to seven. Scutellum with four bristles. Pleura greenish, æneous or coppery, brownish yellow pruinose, behind more greyish; propleura with a strong, black prothoracic bristle, and below it some paler hairs. Abdomen rather short, somewhat obliquely truncated at the end, green or æneous, sometimes with coppery reflexes, greyish pruinose at the sides; it is very thinly clothed with short hairs, which are black above, pale at the sides and here a little longer in front. Venter grey, with pale hairs. Hypopygium hidden, only the short, blackish grey outer lamellæ are seen behind, projecting downwards. Legs metallic green, front coxæ somewhat yellowish grey pruinose, posterior coxæ grey pruinose; also the femora a little pruinose; tarsi blackish towards the end. The legs have short, blackish hairs, but also, especially on front femora, the tibiæ and tarsi, pale hairs; 'coxæ pale-haired; the front femora have two rows of strong bristles below, those in the posterior row longest, but less dense and not reaching the apex; front tibiæ slightly curved, with a dense ventral row of short spines, and with a few dorsal bristles; posterior femora and tibiæ with various scattered bristles, especially some antero-dorsal on the apical half of the middle tibiæ. Wings a little brownish, especially towards

Fig. 107. Wing of *H. balticus* ♂.

the anterior margin; veins blackish; the last part of the discal vein very slightly undulated, and almost not converging towards the cubital vein. Squamulæ dark yellow, with a pale fringe. Halteres yellow.

Female. Epistoma not broader than in the male, more or less brown below. Legs chiefly as in the male, only the row of spines below the front tibiæ still more dense. Wings sometimes slightly more brownish on the anterior part.

Length 3—3.8 mm.

H. balticus is not rare in Denmark; Amager, Bøllemosen, Skelskør; on Funen at Veflinge; in Jutland at Horsens, Holstebro, Silkeborg, Gjerlev near Randers Fjord, Hulsig north of Frederikshavn, and on Læsø; on Bornholm at Rønne. The dates are in July and August;

Drewsen has recorded it from Bollemosen at the end of November. It prefers the sea-shore and is only rarely found inland.

Geographical distribution:— Europe down into Spain and Italy; towards the north to northern Scandinavia.

3. *H. praecox* Lehm.

1822. Lehm. Programm Hamburg, 41 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 64, 8 (*Medeterus*). — 1903. Kat. paläarkt. Dipt. II, 343. — *Medeterus inaequalipes* Macq. 1834. Suit. à Buff. I, 453, 5. — 1838. Meig. Syst. Besch. VII, 158, 34. — *Hydrophorus inaequalipes* 1843. Zett. Dipt. Scand. II, 444, 4, et 1849. VIII, 3052, 4, et 1852. XI, 4273, 4. — 1857. Loew, Neue Beitr. V, 24. — 1862. Schin. F. A. I, 230. — *Hydrophorus litoreus* Fall. 1823. Dipt. Suec. Dol. 3, 3, p. p.

Male. Head as high as broad; vertex and frons æneous, somewhat greyish pruinose at the sides. Epistoma broad, greyish white, and palpi of the same colour. Occiput greenish, grey pruinose; post-ocular bristles black, the hairs below white. Jowls distinct, not broad, grey. Antennæ black, third joint slightly longer than broad, pointed; arista a little longer than the antennæ. Thorax olive, sometimes greenish, especially at the sides, and more or less with coppery reflexes, a little pruinose, somewhat shining; in the middle there is a dark stripe, divided by a very fine, pale line, and to each side of the dark stripe the green colour forms more or less distinct stripes; dorso-central bristles numerous. Scutellum with four bristles. Pleura greenish or æneous, densely whitish grey pruinose; propleura with pale hairs and one black prothoracic bristle. Abdomen somewhat flattened, greenish, æneous or coppery, rather densely greyish white pruinose; it is somewhat densely clothed with pale hairs, a little longer at the sides. Venter grey. Hypopygium generally quite hidden. Legs quite green, coxæ light grey pruinose, femora and tibiæ somewhat pruinose, tarsi blackish. The legs have short, black hairs intermingled with pale pubescence, the latter especially distinct towards the end of the tibiæ and on the tarsi; coxæ pale-haired; front femora with a row of short spines below towards the anterior side, and front tibiæ with a dense row of short spines below, the apical large and strong, besides with a few small dorsal bristles; posterior femora and tibiæ with various scattered, not long bristles. Wings somewhat long, hyaline; veins black, paler towards the base; the last part of the discal vein slightly curved, a little converging towards the cubital vein. Squamulæ whitish, with a white fringe. Halteres whitish or whitish yellow.

Female. Epistoma not broader than in the male. Front femora with two rows of spines, as there is, besides the row found in the

male, one more posteriorly; the apical spine below the front tibiæ shorter than in the male.

Length 2.5—4.5 mm, the female is longest.

H. praecox is the most common species of the genus in Denmark; Amager, Fure Sø, Tisvilde; on Funen at Hoffmansgave; in Jutland at Ringkøbing Fjord, Struer, Kandestederne north of Frederikshavn, Skagen, and on Læsø; finally on Bornholm. My dates are $\frac{1}{6}$ to the first part of August; I have taken it in copula on $\frac{6}{6}$ and $\frac{3}{8}$. It occurs at lakes, ponds and small pools, and it may even be found running on the surface of water in tracks, but it is also common at the shore.

Geographical distribution: — A widely distributed species; Europe down into Spain and Italy, and further into Africa and on the Canary islands; towards the north to middle Scandinavia, and in Finland.

4. *H. litoreus* Fall.

1823. Fall. Dipt. Suec. Dol. 3, 3, p. p. — 1843. Zett. Dipt. Scand. II, 443, 3, p. p., et 1849. VIII, 3051, 3—4. — 1857. Loew, Neue Beitr. V, 24. — 1862. Schin. F. A. I, 231. — 1903. Kat. paläarkt. Dipt. II, 342. — *Medeterus aquaticus* Meig. 1824. Syst. Besch. IV, 66, 13.

Male. Head higher than broad; vertex and frons brown. Epistoma narrowed above, greyish white. Palpi grey. Occiput light grey pruinose, above a little greenish and here brownish pruinose; postocular bristles black, the hairs below white. Jowls very narrow, almost wanting. Antennæ black, third joint roundish, a little pointed; arista slightly longer than the antennæ. Thorax dark olive, somewhat green or coppery, especially behind; it is somewhat brownish pruinose, especially in front; dorsocentral bristles numerous. Scutellum with four bristles. Pleura greenish or æneous, somewhat densely grey pruinose; propleura with pale hairs and one black prothoracic bristle. Abdomen green or sometimes bluish, grey pruinose at the sides, with short hairs, which are black above, pale and a little longer at the sides. Venter grey. Hypopygium almost quite hidden, the short, blackish grey outer lamellæ somewhat protruding downwards behind. Legs green or bluish green; coxæ grey pruinose, also femora and tibiæ a little pruinose; tarsi blackish. The legs have short, black or chiefly black hairs, only a little pale pubescence below towards the apex of the tibiæ and below the tarsi; coxæ pale-haired; front femora with a row of spines of unequal length below towards the anterior side, the row stretches a little beyond the middle; after a little interval there are three flat, brown spines, and still more apically a little tubercle with short bristles; the front tibiæ have an antero-ventral

row of short spines, which gradually become very short and dense in about the basal half; on the postero-ventral side there is a row of bristly hairs; the posterior femora and tibiæ have few, small, variously scattered bristles. Wings a little greyish or brownish tinged; veins black, the last part of the discal vein very slightly curved, almost not converging towards the cubital vein. Squamulæ yellow or brownish yellow, with a white fringe. Halteres yellow, with the knob dark above but with a yellow margin along the inner side.

Female. Epistoma broader than in the male and much less narrowed above. Front femora only slightly thickened, the spines below a little shorter, after the interval two or three black spines of common shape, not flat, and no tubercle more apically; the spines below the front tibiæ more equal and less crowded in the basal half.

Length 3.5—4 mm.

H. litoreus is somewhat rare in Denmark; Fure Sø, at Sorø, and in Jutland at Skagen. My dates are $11\frac{1}{7}$ — $1\frac{1}{8}$. It occurs at borders of fresh water, and perhaps prefers such localities, but it is also found at the coast.

Geographical distribution: — Northern and middle Europe down into Austria and Hungary; towards the north to middle Sweden, and in Finland.

5. *H. bipunctatus* Lehm.

1822. Lehm. Programm Hamburg, 41 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 63, 7 (*Medeterus*). — 1843. Zett. Dipt. Scand. II, 442, 2, p. p., et 1849. VIII, 3047, 2. — 1862. Schin. F. A. I, 230. — 1903. Kat. paläarkt. Dipt. II, 342. — *Hydrophorus binotatus* Fall. 1823. Dipt. Suec. Dol. 3, 2.

Male. Head higher than broad; vertex and frons blackish brown, a little greenish at the sides. Epistoma broad, bright metallic green above, brown below. Palpi brown. Occiput green or æneous, brownish pruinose above, grey below; postocular bristles black, the hairs below yellowish or reddish. Jowls absent. Antennæ black, third joint roundish, pointed in front; arista longer than the antennæ. Thorax dark olive or almost blackish, shining, with a slight greenish or blackish violet reflex; along the margin it is dark brown pruinose; in the middle there is a very narrow, brown stripe, and along the dorso-central rows there are two stripes of small, whitish spots, about a spot between each two bristles; dorsocentral bristles somewhat short, numerous¹. Scutellum with four bristles. Pleura greenish or æneous,

¹ Mik says (Wien. ent. Zeitg. VII, 1888, 142) that this species and *borealis* have at most eight dorsocentral bristles, but I find in both species about nine to eleven.

grey pruinose; propleura with pale hairs and one black prothoracic bristle. Abdomen short, obliquely truncate behind, the fourth ventral segment arched downwards; it is green or more or less æneous, grey pruinose at the sides, and clothed with short hairs, which are black above, pale and a little longer at the sides in front. Venter grey, with pale hairs. Hypopygium almost hidden, the outer lamellæ protruding downwards, not short, somewhat lancet-like, brownish. Legs green, coxæ grey, the front coxæ æneous anteriorly and yellowish pruinose; front femora somewhat, posterior femora very slightly pruinose; tarsi blackish; the legs have short, chiefly blackish hairs, and a little pale pubescence towards the end of the tibiæ, especially the hind tibiæ, and below the tarsi; the coxæ are pale-haired; the front femora have irregular rows of very short spines below and partly on the posterior side; only a row on the basal part with the spines a little longer; besides they have on the antero-ventral side dense, somewhat curled, brown hairs; the front tibiæ have on the antero-ventral side a dense row of exceedingly short, scarcely perceptible spines, and on the postero-ventral side somewhat dense hairs; the posterior femora and tibiæ have various, scattered bristles. Wings a little brownish tinged; veins black; there is a brown spot about on the middle of the discal vein, and one on the upper part of the posterior cross-vein; the last part of the discal vein slightly undulated, a little converging towards the cubital vein. Squamulæ yellow or reddish yellow, with a whitish fringe. Halteres yellow, the knob blackish or brown above, but yellow along the inner margin.

Female. Epistoma as in the male, a little broader above, with more parallel borders. Front femora less thickened than in the male, without spines; front tibiæ without the row of short spines, but with a few, somewhat strong, short bristles. Wings slightly more brownish on the anterior half.

Length 4.3—5 mm.

H. bipunctatus is rare in Denmark, and has chiefly been taken in earlier time; Dyrehaven, Hillerød, Roskilde; Mr. Becker has kindly communicated to me that he has taken it on Bornholm. My dates are in July; Drewsen has recorded it from Bøllemosen at the end of November. It is recorded to occur at slowly flowing streamlets with muddy borders.

Geographical distribution:— Northern and middle Europe down into France; towards the north to middle Sweden.

6. *H. borealis* Loew.

1857. Loew, Neue Beitr. V, 23. — 1903. Kat. paläarkt. Dipt. II, 342.
— *Hydrophorus binotatus* 1849. Zett. (nec Fall.) Dipt. Scand. VIII, 3048,

2—3. — *Hydrophorus bipunctatus* 1838. Zett. Ins. Lapp. 700, 2, p. p., et 1843. Dipt. Scand. II, 442, 2, p. p.

Male. Head higher than broad; vertex and frons dark brown, a little greenish at the sides. Epistoma broad, white, just below the antennæ a little brown, and the green ground colour may here be slightly seen. Palpi blackish. Occiput æneous, brownish pruinose above, grey below; postocular bristles black, the hairs below yellow. No jowls. Antennæ black, third joint roundish, pointed in front; the arista longer than the antennæ. Thorax dark olive or blackish, with greenish or dark violet reflex, shining; it is dark brown pruinose along the margin; on the middle there is a very narrow, brown pruinose line; dorsocentral bristles not short, numerous. Scutellum with four bristles. Pleura a little greenish or æneous, grey pruinose, brown above; propleura with pale hairs and a black prothoracic bristle. Abdomen short, obliquely truncate at the end; it is green or æneous, grey pruinose at the sides, clothed with short hairs, which are black above, longer and pale at the sides in front. Venter greyish, with pale hairs. Hypopygium hidden, the outer lamellæ short, blackish. Legs green, coxæ grey pruinose; femora very slightly pruinose, tarsi blackish; the legs have short, chiefly black hairs, and some pale pubescence below the tibiæ towards the end and below the tarsi; the coxæ are blackish-haired, the front coxæ more brownish, and with some black bristles; front femora not much thickened, with a short row of rather thin spines or bristles in the middle on the antero-ventral side, and besides with somewhat dense hairs; before the apex there are four slightly stronger spines, two of which are curved, and still more apically a little tubercle; the front tibiæ have a dense row of short spines, decreasing in size towards the base, and at the base there is a small tubercle; the posterior femora and tibiæ have various scattered bristles. Wings a little greyish tinged, with two spots placed as in *bipunctatus*, but often smaller and less conspicuous; veins black, the last part of the discal vein very slightly curved, and slightly converging towards the cubital vein. Squamulæ yellow, with a yellowish fringe. Halteres yellow, with the knob brown or blackish, but with the inner margin yellow.

Female. Epistoma very slightly broader above than in the male, brown, the æneous green ground colour a little observable below the antennæ. Front femora and tibiæ simple and unarmed. Wings more tinged on the anterior half.

Length 4—5 mm.

H. borealis is rare in Denmark, we have only four specimens, three from earlier time, without locality given, and one taken in

Jutland at Hulsig north of Frederikshavn on 11/7 1909 (Th. Mortensen).

Geographical distribution:— Northern and middle Europe down into Austria, Styria and Switzerland; towards the north to northernmost Scandinavia, and in Finland; it seems especially to be a mountain species; Zetterstedt records that he has taken it in the mountains to a height of 3500 feet, and he says: "in nive perenni ambulans".

7. *H. nebulosus* Fall.

1823. Fall. Dipt. Suec. Dol. 3, 4. — 1824. Meig. Syst. Besch. IV, 68, 19 (*Medeterus*). — 1843. Zett. Dipt. Scand. II, 447, 7 et 1849. VIII, 3053, 7. — 1862. Schin. F. A. I, 231. — 1903. Kat. paläarkt. Dipt. II, 343.

Male. Head higher than broad; vertex and frons brown. Epistoma not broad, yellowish brown. Palpi dark brown. Occiput æneous above, grey below; postocular bristles black, the hairs below yellowish white. Jowls present, but narrow. Antennæ black, not specially short, the third joint a little longer than broad, pointed in front; arista about as long as the antennæ. Thorax dark olive, æneous or coppery, shining, brown pruinose at the sides; there is a whitish, longitudinal stripe in the middle, narrowed and abbreviated behind, and on the front part of the disc there are some whitish spots, especially four more distinct, two more approximated in front and two more distant behind; five dorsocentral bristles. Scutellum with four bristles. Pleura somewhat æneous, grey pruinose, brown just above; propleura with a few white hairs, the lower somewhat bristly. Abdomen short, obliquely truncate at the end, green, æneous or somewhat coppery, broadly greyish pruinose at the sides and at the apex; it is very thinly clothed with short, black hairs, at the sides of the first segment there are a few, pale, slightly longer hairs. Venter grey, with short, pale hairs. Hypopygium hidden, the outer lamellæ small, greyish black. Legs green or æneous, coxæ grey pruinose; also the femora, especially the front femora, and the tibiæ slightly pruinose; tarsi black; the legs have short, black or blackish hairs, only the tarsi with pale pubescence below; the coxæ are pale-haired, the front coxæ have black bristles anteriorly; the front femora have a row of black spines below, longest at the base, not reaching the apex, and besides there are numerous quite short spines or bristles on the antero-ventral side, not placed in rows; the front tibiæ have two rows of short spines below, and a long, somewhat strong spine just before the apex; the posterior femora and tibiæ have various, scattered bristles. Wings somewhat greyish tinged, with a number of more or less confluent, roundish, or some square, brown spots in the subcostal and cubital

cells, and one at the apex of the cubital vein, one at the middle of the last part of the discal vein and one on the posterior cross-vein; besides there are brown patches in the first posterior cell, the discal cell and below the postical vein; the veins are blackish, the last part of the discal vein a little undulated. Squamulae brown, with a pale fringe. Halteres yellow.

Female. Epistoma a little broader than in the male, especially above, grey, slightly yellowish. Legs quite as in the male.

Length 2.2 to about 3 mm.

H. nebulosus is not common in Denmark; Dyrehaven; in Jutland at Silkeborg, at Hulsig north of Frederikshavn and on Læsø; on Bornholm at Almindingen. My dates are in July; Drewsen has recorded it from Bøllemosen at the end of November. It occurs both at fresh water and at the shore.

Geographical distribution:— Northern and middle Europe down into France; towards the north to northern Scandinavia, and in Finland.

24. **Liancalus** Loew.

Beautiful species of large or medium size and of green colours. The genus is closely allied to *Hydrophorus*. Head a little broader than thorax, broader than high, a little arched behind. Vertex excavated, the ocellar tubercle prominent. Frons broad, decreasing in breadth towards the antennae. There are ocellar, outer vertical and postvertical bristles, but no small hairs on the ocellar tubercle. Eyes large, somewhat oval, only slightly narrowed downwards; in the living specimens they are green, with reddish reflexes above; they are densely hairy. The facets are of the same size. The eyes are well separated in both sexes, the epistoma considerably broader in the female than in the male. Jowls absent. The postocular bristles form a single row on the upper half of the occiput, the lower half is densely covered with long hairs. Antennae inserted near to each other, somewhat high above the middle; they are short, the first joint obconical, the second simple, the third triangular or triangularly ovate; the arista is dorsal (sometimes near the apex, *humilis*, non Danish), long, its first joint somewhat short. The first antennal joint is bare, the second has bristles at the apex, the third is short-haired and the arista very short- or microscopically haired. Epistoma flat, below it is separated from the clypeus by a small tubercle on each side at the eye-margin, and between these is a somewhat indistinct, transverse keel; the clypeus is arched and angularly rounded below; it reaches to, or in the male almost to the lower margin of the eyes.

The proboscis is a little protruding; it and the oral aperture are slightly larger in the female than in the male; the maxillary palpi are large, squamiform, oval. Thorax rectangular and somewhat long; behind, in front of the scutellum, there is a distinct, flat or slightly concave declining area; postscutellum rather large. Acrostichal bristles uniserial, few in number; there are six long dorsocentral bristles; *lacustris* (non Danish) has, according to Mik (Jahresber. k. k. Akad. Gymn. Wien, 1878, 8) seven dorsocentrals, and no small hairs in front; further a humeral bristle, and a pair of weaker, a posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle, all well developed; only few and very small hairs on the front part of the disc; the scutellum has six, or (in non Danish species) four marginal bristles (gen. *Alloeoneurus* Mik). The propleura have long hairs, but no prothoracic bristles; the mesopleura are in front, just behind the base of the front coxæ, prolonged downwards into a strong spine. Abdomen somewhat long, about cylindrical; in the male there are six dorsal segments of about the same length; the fifth has on each side at the hind margin an excision, or more correctly, an impression, so that the hind margin appears somewhat excised (as in some species of *Hydrophorus*), and the sides of the segment are prolonged downwards, meeting in the middle on the ventral side; the seventh segment is small and quite hidden; there are four normal ventral segments, the first as usual very short; behind the fourth segment meet the sides of the fifth dorsal segment; the following ventral segments are folded up and hidden by the hypopygium, they form together with the lower side parts of the fifth dorsal segment a sort of cavity for the reception of the hypopygium; this latter (*virens*) is short and rounded, but broad, robust and somewhat knob-like; it is not imbedded, but lies closely pressed to the end of abdomen, directed downwards and forwards; the eighth segment is a large plate, covering almost the whole left side of the hypopygium; the hypopygium has below small, triangular, somewhat knob-like ventral lobes; there are also two pairs of curved, complicated inner lamellæ with dilated ends; the outer lamellæ have a broad, somewhat triangular or crescent-shaped basal part, from its dorsal side issues a long filament with long hairs; the basal parts are somewhat united in the middle. In foreign species the outer lamellæ may be more lamelliform, or on the contrary quite filiform, without broad base. In the female there are five visible abdominal segments. The abdominal segments have hindmarginal bristles, which are however small, except on the first segment; in *lacustris* the bristles are stronger according to Mik l. c. There are dot-like impressions at the sides on the second

to fifth abdominal segments. Legs long and slender, the front legs not short and not raptorial, without armature, but with the coxæ somewhat elongated; sometimes the second joint of the front tarsi short and a little dilated in the males; the hind metatarsus as long as the second joint, without bristles. The hind coxæ have a bristle on the outside; posterior femora with a preapical bristle; for the rest the legs with scattered bristles, and the tibiæ with apical bristles. There are two claws, two pulvilli and a distinct, narrowly lobiform empodium with bristles below. Wings long and somewhat narrow, generally more or less marked with dark patches, especially in the male; the mediastinal vein terminating in the subcostal vein; the last part of the discal vein almost straight, or more or less curved, and more or less converging with the cubital vein; posterior cross-vein behind the middle, oblique, and near the margin, the last part of the postical vein thus short; anal vein somewhat short. Axillary lobe well developed. The discal vein has a small convexity. Squamulæ with the angular lobe well developed, with a long fringe, between the hairs of which there are quite short, almost microscopical hairs; the inner part of the squamulæ somewhat developed, with shorter hairs.

The developmental stages are not known.

The species of *Lianculus* are very beautiful flies: they occur at water, especially on stones and rocks in or at rapidly flowing streams and at waterfalls, on quite shady and somewhat cool places, and they sit generally on perpendicular surfaces.

Of the genus 5 species are known from the palæarctic region; one is found in Denmark.

1. *L. virens* Scop.

1763. Scop. Ent. carn. 342, 291 (*Musca*). — 1862. Schin. F. A. I, 229. — 1903. Kat. paläarkt. Dipt. II, 344. — *Dolichopus regius* Fabr. 1805. Syst. Antl. 267, 5. — *Medeterus regius* 1824. Meig. Syst. Besch. IV, 60, 1, Tab. XXXV, Fig. 16—17. — *Hydrophorus regius* 1843. Zett. Dipt. Scand. II, 441, 1.

Male. Vertex and frons green. Epistoma green, a little greyish pruinose. Palpi grey. Occiput greenish or æneous, greyish pruinose; postocular bristles black, the hairs below white. Antennæ black, short, third joint somewhat triangular, pointed. Thorax green, a little greyish pruinose, dull, somewhat velvety; in the middle there are two approximated, purplish stripes, which are abbreviated behind but here continued by a more or less distinct middle stripe; further there is at each side a purplish stripe following the upper margin of the præ-sutural depression and stopping at the wing-root, and between these

and the middle stripes, behind the transverse furrow, there is a third stripe. Scutellum a little shining, with six bristles. Pleura greenish or æneous, greyish pruinose; propleura with longish, white hairs. Abdomen green, greyish white pruinose, dull; the hind margin

Fig. 108. Antenna of *L. virens* ♂. $\times 65$.

of the second, third and fourth segments and the front margin of the second segment black or purplish black; on the fourth segment the purplish hind margin is often more or less replaced by a shining green or coppery colour; the fifth segment-shining, the sixth often a little æneous or bluish and slightly pruinose; abdomen clothed with whitish hairs, which are rather long at the sides; on the first segment there are long hindmarginal bristles, which are black above, white at the sides; the following segments have short and not very distinct hindmarginal bristles, which are also black above, but on the sides not discernible between the long hairs. Venter green, greyish pruinose, with long, white hairs. The hypopygium is green or æneous, a little pruinose; the outer lamellæ greyish black, the filaments blackish, with long, pale hairs; the eighth segment has longish, pale hairs. Legs green or æneous, coxæ grey pruinose; also the femora somewhat pruinose; tarsi black; the front metatarsi a little dilated at the apex and the second joint quite short, a little compressed and dilated, with short, erect hairs below. The legs have short, black hairs, the coxæ somewhat long, white hairs; the front coxæ with black bristles at the apex, middle coxæ with a bristle anteriorly near the outer margin, hind coxæ with one on the outside; anterior femora with short, pale hairs below, on the middle femora they are longer about in the middle and followed apically by some black hairs; hind femora with some pale hairs at the base, longest above; the posterior femora with a preapical bristle; the tibiæ have bristles on the various sides, they are not long nor numerous; the front tarsi have a very short, whitish pubescence below on the four last joints. Wings a little yellowish tinged, with the apical part of the subcostal and cubital cells brown, forming a large, brown spot; in the first posterior cell there is a brown patch above the end of the discal cell, continued as a line

towards the end and here forming another patch; at the very apex there is an oval milk-white spot; the veins are black. Squamulæ white with the upper margin dark brown, and with a yellow fringe. Halteres yellow.

Fig. 109. Wing of *L. virens* ♂.

Female. Epistoma considerably broader than in the male. Legs as in the male, only the front tarsi simple. Wings hyaline, only with the spot above the end of the discal cell present.

Length 6—7 mm.

L. virens is a very interesting and beautiful species; it is rare in Denmark as it has only been taken on Bornholm, where I took it in no small number, sitting on blocks of stone in a brook in the wood Almindingen in August 1911; the places of its occurrence were always very shady.

Geographical distribution:— Widely distributed species; Europe down into Spain and Italy, and further in North Africa and on Madeira; towards the north to northern Sweden.

25. **Campsienemus** Walk.

Species of small to very small size, and of dark metallic, generally somewhat olive colours. Head broader than thorax, about as broad as high or a little broader; it is almost somewhat square in circumference, but somewhat narrowed downwards; it is slightly arched behind. Vertex slightly excavated, the ocellar tubercle prominent. Frons broad, decreasing in breadth towards the antennæ. There are ocellar, outer vertical and postvertical bristles, and a pair of small hairs on the ocellar tubercle. Eyes large, somewhat oval, but with the inner margin angular; they are densely hairy. The facets are distinctly enlarged on the front side towards the epistoma in both sexes. The eyes are separated in both sexes, but very near to each other below the antennæ, and sometimes almost touching; they are only slightly, sometimes almost not, more separated in the female than in the male. The postocular bristles form a single row,

but besides the lower half of the occiput is covered, but not densely, with somewhat bristly hairs, also present above the oral aperture. The antennæ are inserted near to each other, above the middle; they are short, the first joint cylindrical or somewhat obconical, the second short and simple, the third sometimes a little elongated in the male, triangular or elongated triangular, more or less pointed; the arista is dorsal, inserted near the base of the joint, it is longer than the antennæ, its first joint not quite short. The first antennal joint is bare, the second has bristles at the apex, the third is distinctly hairy, and the arista short-pubescent. Epistoma very narrowed above, generally slightly broader in the female; it is widened downwards; the clypeus is only indistinctly separated by a little notch at each side, it does not reach the lower margin of the eyes, except, according to Mik (Jahresb. k. k. Akad. Gymn. Wien, 1878, 8), in the male of *marginatus*. Proboscis not or almost not protruding; it and the oral aperture are of the same size in both sexes. Labrum (*scambus*) high, with a somewhat chitinised, long median tooth with the apex curved downwards, and with a strong and more chitinised lateral tooth on each side below about at the base; behind, the labrum has a strong, upwards directed process; hypopharynx strong, triangular, somewhat broad at the base, with the outer apex curved a little downwards; it is slightly longer than labrum. The maxillary palpi are squamiform, almost roundish, with bristles at the margin. Labium with the basal part longer than the labella, roundly excised behind so that it goes out into two processes; the labella are short and broad. Thorax rectangular, somewhat high, and distinctly arched above; postscutellum rather large with two impressed lines, converging behind; pro- and metathorax small, the former with small bristles above; propleura with fine hairs and one prothoracic bristle. The acrostichal bristles are short, uniserial, or a little irregularly biserial behind; there are five dorsocentral bristles, increasing in length backwards, the first is small, and sometimes so small as to be almost wanting, and this may be different in various specimens of the same species; further there is a humeral bristle, and one or two weak, a posthumeral, two notopleural, a præsutural quite in front, three supraalar and a postalar bristle; there are only very few hairs on the front part of the disc. Scutellum is bare, it has two marginal bristles, besides there is a small hair on each side, and four hairs between the bristles; according to Mik l. c. *umbripennis* forms an exception, but these hairs are on the whole not constant in number, in *scambus* I find often, almost generally, six or five, and in *curvipes* sometimes only three. Abdomen short and more or less flattened; in the male there

are five dorsal segments of the same length, and the sixth dorsal segment is also visible, but smaller; the seventh segment is small and quite hidden; on the ventral side there are five segments of equal length, except the first, which is as usual very short, and lying as a very small chitinisation at the front end of the second. The hypopygium is small and roundish; I could not detect any ventral lobes, but there seem to be small, hairy outer lamellæ, situated in a dorsal excision, and probably somewhat united; the hypopygium is directed downwards and imbedded, only the end of it with the eighth segment may just be seen at the apex of abdomen, and here also the small, hairy piece, which I take to be the outer lamellæ, is often seen, and sometimes the thin penis projects downwards. In the female there are five normal segments, the rest hidden. Dot-like impressions are present on some (second to fourth) segments. Abdomen has short and generally not very distinct hindmarginal bristles at the sides of the segments, only on the first segment they are long; the eighth segment has fine hairs. Legs somewhat long and slender; in the male they are in most species peculiarly formed or armed with bristles, and it may be either all legs or only the anterior or middle ones which are thus remarkable, and it may be both femora, tibiæ and tarsi, or only femora and tibiæ; in many species especially the middle tibiæ and tarsi are very peculiar, the metatarsus short and remarkably shaped. The hind metatarsus is about of the length of the second joint or a little shorter, without bristles. The legs have some ordinary bristles, which in the species with peculiar legs are present only in the females; there are generally on the front tibiæ one dorsal and one postero-ventral bristle, on the middle tibiæ three antero-dorsal, one postero-dorsal, and two, sometimes only one ventral; the hind tibiæ have dorsal bristles and generally two ventral. The hind femora have a preapical bristle, and all tibiæ have apical or preapical bristles; hind coxæ with a bristle on the outside. There are two claws, two pulvilli, and a well developed, somewhat comb-shaped empodium with long bristles below.¹ Wings somewhat long and narrow; the mediastinal vein terminates in the subcostal vein; the discal vein is straight and parallel or about parallel with the cubital vein; the posterior cross-vein placed in or a little behind the middle; anal vein not specially short. Axillary lobe well developed. Costa has a long bristle at the base. The last part of the discal vein

¹ De Meijere says (Zool. Jahrbüch. Abtheil. für Anat. XIV, 1901, 443): "Bisweilen, so bei *Campsicnemus*, ist das Sohlenläppchen breit." All the species I have examined (especially *scambus* and *curvipes*) have a narrow, rather decidedly comb-shaped empodium.

with a convexity near the cross-vein. Squamulae with a well developed angular lobe with a long fringe; also the inner part of the squamulae well developed, with long hairs.

The developmental stages are not known.

The species of *Campsicnemus* are rather characteristic, especially in the males with their peculiar legs, which reach, I think, their climax in *C. magius* (non Danish); as Verrall notes (Entom. Month. Mag. XVI, 1905, 194) Loew, when he had described this species, was blamed by Gerstäcker for making a new species from a fly whose legs were deformed by fungoid growth. The species occur in grass and low herbage in fens, at the borders of lakes and streamlets, especially where there is a rich vegetation of water plants; some species occur on commons at the shore. They are strong robbers; I have never myself seen them with prey, but Schiner states that they: "verzehren, auf einem schwimmenden Blatte oder einem aus dem Wasser vorragenden Steine sitzend, ihre Beute, die, soweit meine Beobachtungen reichen, in winzigen Wasserthierchen besteht. Sie können auch auf dem Wasser gehen." This latter fact I have not observed. — The species are in the males easily recognisable on account of the secondary sexual characters, but the females are very difficult to determine.

Of the genus about 27 species are known from the palæarctic region; 7 have been found in Denmark.

Table of Species.

Males.

1. Legs more or less peculiarly formed or armed; antennæ quite black.....	2.
— Legs simple and unarmed; antennæ yellow at the base ..	7. <i>picticornis</i> .
2. Basal joint of middle tarsi much or somewhat shorter than the second joint.....	3.
— Basal joint of middle tarsi much longer than the second joint	5.
3. Anterior femora with bristles below; middle tibiæ remarkably dilated, curved and ciliated, and metatarsus with teeth	1. <i>scambus</i> .
— Front femora without bristles below	4.
4. Posterior femora with bristles below, middle tibiæ not curved in the middle.....	2. <i>curvipes</i> .
— Only middle femora with bristles below; middle tibiæ curved in the middle.....	3. <i>loripes</i> .
5. Middle femora and tibiæ with rather long bristles below ..	6.
— Middle femora and tibiæ with only very short bristles below	6. <i>pumilio</i> .
6. Middle femora with moderately long, dense bristles below in the whole length; hind tibiæ without long hairs and bristles	4. <i>armatus</i> .

- Middle femora with long, distant bristles below in the middle; hind tibiæ with long hairs and bristles 5. *pilosellus*.

Females.

1. Antennæ quite black 2.
- Antennæ yellow at the base 7. *picticornis*.
2. Epistoma quite brownish yellow; largest species 1. *scambus*.
- Epistoma more or less white or greyish above 3.
3. Front coxæ grey or chiefly grey 2. *curvipes*.
- Front coxæ yellow or only grey at the base 4.
4. The convexity on the last part of the discal vein a little darkened; hind metatarsus shorter than the second joint . . 3. *loripes*.
- The convexity on the last part of the discal vein generally not darkened; hind metatarsus as long as or about as long as the second joint 5.
5. Larger species, 2—2.3 mm; epistoma grey above 4. *armatus*.
- Quite small species, 1.5—1.7 mm; epistoma more yellowish 6. *pumilio*.

The female to *pilosellus* is unknown.

1. *C. scambus* Fall.

1823. Fall. Dipt. Suec. Dol. 19, 36 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 68, 18, et 1830. VI, 364 (*Medeterus*). — 1843. Zett. Dipt. Scand. II, 598, 85, et 1855. XII, 4637, 85 (*Dolichopus*). — 1862. Schin. F. A. I, 234. — 1903. Kat. paläarkt. Dipt. II, 346. — *Medeterus prodromus* Meig. 1824. Syst. Besch. IV, 69, 9.

Male. Vertex and frons bluish black. Epistoma brownish yellow. Palpi dark brown. Occiput somewhat æneous, greyish pruinose; post-ocular bristles black, the hairs below white. Antennæ black, third

Fig. 110. Antenna of *C. scambus* ♂. × 75.

joint triangular. Thorax dark olive or somewhat æneous or dark greenish, dark violet behind, generally with a more greenish middle stripe; it is slightly brown pruinose; scutellum bluish. Pleura greenish or æneous, grey pruinose, especially below and behind; propleura with some pale hairs and a black prothoracic bristle. Abdomen green, sometimes æneous or coppery, or with violet reflexes above, especially along the middle, slightly greyish pruinose; it is clothed with short, black hairs and has very short hindmarginal bristles at the sides, long on the first segment. Venter grey. Legs yellow, posterior

coxæ grey, front coxæ a little dark at the base; front femora with a more or less distinct, dark stripe above and below, middle femora sometimes with similar stripes, or only below; middle tibiæ except the base black, a little grey pruinose; the tarsi with the apex of metatarsus and the following joints black. Legs with short, black or brown hairs, coxæ pale-haired; front coxæ with black bristles at the apex, posterior coxæ each with a black bristle; front femora a little thickened, with a small elevation below towards the apex, and with short bristles below, stopping on the elevation and here crowded, besides with long, fine hairs on the antero-ventral side, and stronger hairs on the posterior side; front tibiæ slightly dilated below about the middle, with a bristle above, somewhat long hairs on the postero-ventral side in about the apical half, and a ventral bristle below the middle; the front tarsi have long hairs below on the first joint, and still longer on the second; the first joint has a pair of long, thin bristles at the apex; middle femora a little thickened and excised before the apex, with a row of short bristles below, shortest and crowded at the excision; middle tibiæ thin at the base, the other part thickened, dilated and somewhat curved with the posterior or postero-ventral side concave; it has a curved dorsal bristle above, a row of long antero-dorsal bristles, and a row of shorter antero-ventral bristles, both rows directed forwards, further a row of short, curved bristles below on the ventral margin, directed backwards, and increasing a little in length towards the apex, and finally a group of short, strong bristles on the postero-ventral side near the base; the apical bristles are long and curved; the middle metatarsus is short, much shorter than the long second joint; it is prolonged beyond the insertion of the second joint on the anterior side as a strong tooth with some flat spines at the apex; below it has a curved spine at the base, and above a strong tooth with some bristles; besides there is a row of bristles on the anterior side; the other tarsal joints have longish hairs on both sides, longest anteriorly; hind femora with a preapical bristle, hind tibiæ with two rows of dorsal bristles, and about two ventral bristles; hind metatarsus somewhat shorter than the second joint. Wings brownish tinged, veins black, the convexity on the last part of the discal vein a little darkened; the posterior cross-vein about in the middle, the part of the discal vein from the small cross-vein to the posterior cross-vein a little shorter than, sometimes almost as long as the second part. Squamulæ brownish or brownish yellow, with a black fringe. Halteres yellow or brownish yellow.

Female. Epistoma slightly wider than in the male. Antennæ a little shorter with the third joint shorter and more rounded. Legs

simple, front coxæ sometimes darker, and the legs may on the whole sometimes be darker, with the tibiæ more or less brownish; middle tibiæ with three antero-dorsal and one postero-dorsal bristle, and with two ventral bristles.

Length 2,5—3,3 mm.

C. scambus is common in Denmark; Ermelund, Bollemosen, Geel Skov, Ruderhegn, Hillerød, Tyvekrog, Frerslev Hegn, Sorø; on Funen at Odense; in Jutland in Greisdalen at Vejle, Nebsager near Horsens, Laven near Silkeborg and Thisted; on Bornholm at Hammeren and Almindingen. My dates are $17\frac{1}{6}$ — $20\frac{1}{12}$. It occurs in low herbage in fens and at the borders of water, both in woods and outside.

Geographical distribution:— Northern and middle Europe down into France; towards the north to northern Scandinavia, and in Finland.

2. *C. curvipes* Fall.

1823. Fall. Dipt. Suec. Dol. 20, 27 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 65, 10 (*Medeterus*). — 1843. Zett. Dipt. Scand. II, 599, 86, et 1859. XIII, 5064, 86 (*Dolichopus*). — 1862. Schin. F. A. I, 234. — 1903. Kat. paläarkt. Dipt. II, 345.

Male. Vertex and frons dark blue. Epistoma very narrow above, brown or brownish yellow, palest above. Palpi greyish white. Antennæ black, third joint elongated triangular, pointed. Occiput greenish,

Fig. 111. Antenna of *C. curvipes* ♂. $\times 75$.

greyish pruinose; postocular bristles black above, the hairs below whitish. Thorax olive, æneous or almost purplish, generally with a greenish stripe in the middle, slightly pruinose at the margin; scutellum bluish. Pleura æneous, grey pruinose, especially below; propleura with pale hairs and a black prothoracic bristle. Abdomen green or æneous, more or less with coppery or violet reflex, slightly greyish pruinose; it is clothed with short, black hairs, and has short hind-marginal bristles at the sides, long on the first segment. Venter grey, with whitish hairs. Legs yellow, coxæ grey, front coxæ often more or less yellow on the apical part, sometimes to a rather high degree, they are greyish white pruinose anteriorly; anterior femora with more or less distinct and extended dark stripes above and below; tibiæ a little blackish at base and apex, the apex of the middle tibiæ most;

tarsi black except the base. The legs have short, black hairs, coxæ pale-haired; front coxæ with a single or a pair of black, bristly hairs at the apex, posterior coxæ each with a black bristle, small or very small on the middle coxæ; front femora slightly thickened at the base, but, for the rest, together with tibiæ simple and without bristles; middle femora slightly dilated below, and slightly and evenly excised before the apex; they have fine hairs below at the base and two rows of bristles on the apical half, the postero-ventral row strongest and its first bristle long; the middle tibiæ are thin at the base, then suddenly somewhat thicker, and again a little thinner at the apex; they have an antero-ventral row of short bristles, very short on the thin basal part, and a postero-ventral row of long, distant bristles with the apex truncate, not pointed (as is also the case with the bristles on the femora); on the elevated part before the apical thinning there are short, strong and dense hairs and some bristles on the dorsal and anterior side, and finally a dorsal bristle about in the middle; the middle metatarsus is short and thick, three or four times shorter than the long second joint and ending with some spines and hairs; hind femora with a ventral row of alternating long and short bristles, and with a preapical bristle; hind tibiæ with a few dorsal bristles, and about two ventral; hind metatarsus somewhat shorter than the second joint. Wings brown tinged; veins black, the convexity on the last part of the discal vein with a generally very slight darkening; the posterior cross-vein most often a little behind the middle, the part of the discal vein from the small to the posterior cross-vein about as long as or slightly shorter than the second part. Squamulæ yellow or reddish yellow, with a blackish fringe. Halteres yellow or dark yellow.

Female. Epistoma slightly broader than in the male, white above, brownish yellow below; frons a little greyish pruinose, especially below.

Fig. 112. Antenna of *C. curvipes* ♀. $\times 75$.

Antennæ with the third joint shorter than in the male, but relatively longer than in the female of *scambus*. Legs simple, front tibiæ with a dorsal and a posterior bristle; middle tibiæ with three antero-dorsal and one postero-dorsal bristle, and with two ventral bristles.

Length 2.3—2.7 mm.

C. curvipes is very common in Denmark, and the most common species of the genus, and it has been taken in all parts of our country, including Bornholm. My dates are $^{16}/_4$ — $^{13}/_{10}$. It occurs on similar localities as *scambus*.

Geographical distribution:— Widely distributed; Europe down into Spain and Italy, further on the Canary Islands and Madeira; towards the north to northern Sweden, and in Finland.

3. *C. loripes* Hal.

1831. Hal. Zool. Journ. V, 357, 11 (*Camptosceles*). — 1903. Kat. paläarkt. Dipt. II, 345. — *Dolichopus femoralis* Zett. 1843. Dipt. Scand. II, 600, 87, et 1859. XIII, 5064, 87.

Male. Vertex and frons dark blue or blackish blue. Epistoma very narrow, white above, yellowish brown below. Palpi dark grey. Occiput green, greyish pruinose; postocular bristles black above, the hairs below pale yellow. Antennæ black, third joint short, triangular. Thorax dark olive or æneous, shining more or less bluish or violet, in the middle with a greenish stripe; it is somewhat brownish pruinose. Scutellum bluish or violet. Pleura greenish, grey pruinose; propleura with pale hairs and a black prothoracic bristle. Abdomen greenish, more or less with coppery or somewhat violet reflexes, and somewhat greyish pruinose; it is clothed with short, black hairs, and has few, very short hindmarginal bristles at the sides, long on the first segment. Venter grey. Legs yellow, front coxæ a little grey at the base, posterior coxæ grey; front femora with a dark stripe above and below, middle femora with a similar one below; tibiæ slightly blackish or brownish at base and apex, middle tibiæ with about the apical half greyish black; tarsi blackish, with the base of metatarsus more or less pale. The legs have short, black hairs, coxæ pale-haired; the front coxæ have some black bristles at the apex and a little way up, the posterior coxæ each with a black bristle; front femora a little thickened on the basal part, front legs without bristles; middle femora with two, quite close-standing rows of long bristles below in the middle, and after an interval with a row of short bristles at the apex; middle tibiæ a little angularly bent in the middle, the lower part very slightly dilated; on the upper half there is a postero-ventral row of short bristles and on the lower half a dense ventral row of short bristles, a posterior row of longer, distantly placed bristles, and an anterior row of long, likewise distant bristles; besides there are two antero-dorsal bristles; the angular bend in the middle of the tibiæ is bare; the middle metatarsus is somewhat more than half the length of the second joint, a little thickened towards the apex; the second joint as long as the

third; hind femora with a preapical bristle; hind tibiæ with two dorsal rows, and about two ventral bristles; hind metatarsus a little shorter than the second joint. Wings somewhat blackish tinged; veins black, the convexity on the last part of the discal vein slightly darkened; posterior cross-vein about in the middle, the part of the discal vein from the small to the posterior cross-vein shorter than the second part. Squamulæ yellow, with a brown or black fringe. Halteres yellow.

Female. Epistoma very slightly broader than in the male, somewhat greyish above. Antennæ as in the male. Legs simple; front tibiæ with a dorsal and a postero-ventral bristle, middle tibiæ with three antero-dorsal, one postero-dorsal, and two ventral bristles.

Length 2,2—2,5 mm.

The female of this species resembles very much that of *curvipes*, but according to my specimens it is distinguished from it by the yellow front coxæ, which have more bristles; also the first part of the discal vein is shorter than the second, but this character is scarcely quite valid; on the other hand the hind metatarsus seems to be not so much shorter than the second joint as in *curvipes*. The female is also difficult to distinguish from the female of the following species.

C. loripes is very rare in Denmark, I know only five specimens, one from earlier time, probably taken in the vicinity of Copenhagen, the others from Jutland at Struer and Gjerlev near Randers Fjord (H. J. Hansen), and on Bornholm at Hammeren and Almindingen (the author). The dates are in July and August.

Geographical distribution:— Northern and middle Europe down into France; towards the north to northern Sweden, and in Finland. As Verrall notes (Entom. Month. Mag. XVI, 1905, 194) the species is common in England, but it seems to be very rare on the Continent.

4. *C. armatus* Zett.

1849. Zett. Dipt. Scand. VIII, 3093, 87—88, et 1855. XII, 4637, 87—88 (*Dolichopus*). — 1862. Schin. F. A. I, 235. — 1903. Kat. paläarkt. Dipt. II, 344.

Vertex and frons somewhat bluish, but more or less brown pruinose. Epistoma very narrow above, yellowish brown. Palpi brownish grey. Occiput greenish, grey pruinose; postocular bristles black above, the hairs below yellowish white. Antennæ black, elongated, the third joint elongated triangular, pointed. Thorax olive with slight violet reflexes, and a faint, greenish stripe in the middle; it is distinctly brown pruinose, dull, only a little shining in the middle. Scutellum somewhat bluish. Pleura æneous or greenish, grey pruinose, especially behind; propleura with pale hairs and a black prothoracic bristle.

Abdomen greenish or æneous, with coppery or violet reflexes above, slightly pruinose; it is clothed with short, black hairs, and has short hindmarginal bristles at the sides, long on the first segment. Venter greyish, with pale hairs. Legs yellow, posterior coxæ grey, tarsi, except the basal part of metatarsus, blackish or dark brown. The legs have short, black hairs; coxæ pale-haired, front coxæ with some black bristles at the apex, posterior coxæ each with a black bristle; front femora slightly thickened at the base, for the rest the front legs simple, the femora with longish hairs below on the basal part, tibiæ with a dorsal and a postero-ventral bristle; middle femora somewhat thickened on the basal part, with short, dense bristles below in more than one row; they are very short at the apex, and here only in one row; middle tibiæ with a postero-ventral row of long, truncate, not pointed bristles, and with rows of short bristles on the antero-ventral and anterior sides, further with three antero-dorsal and one postero-dorsal bristle; middle metatarsus simple, about as long as the next two joints; hind femora with a preapical bristle; hind tibiæ with two

Fig. 113. Wing of *C. armatus* ♂.

rows of dorsal bristles, and two ventral bristles; hind metatarsus as long as the second joint. Wings brownish tinged; veins blackish, the last part of the discal vein without or almost without darkening on the convexity; posterior cross-vein about in the middle, the part of the discal vein from the small to the posterior cross-vein shorter than the second part. Squamulæ yellow, with a black fringe. Halteres yellow.

Female. Epistoma slightly broader than in the male, grey or dark grey above, whitish yellow below. Antennæ with the third joint shorter. Legs simple, middle tibiæ besides the dorsal bristles with two ventral bristles.

Length 2—2.3 mm.

As said above the female of this species is somewhat difficult to distinguish from that of *loripes*; it has, I think, thorax a little more pruinose, and the darkening on the convexity of the discal vein almost or quite wanting; but the best character is that the hind metatarsus

is not shorter than the second joint; finally it is a little smaller. As Zetterstedt says: "Stæg. in litt." the name is originally due to Stæger.

C. armatus is rare in Denmark; Stæger detected it on Amager, where he took it in some number, of which he sent Zetterstedt the type-specimens; further it has been taken on Funen at Hoffinansgave, and in Jutland at Horsens, Gjerlev near Randers Fjord and Struer (H. J. Hansen). The dates are in August. It occurs especially on commons near the shore.

Geographical distribution:— Northern and middle Europe down into Germany; towards the north to southern Sweden, and in Finland.

5. *C. pilosellus* Zett.

1843. Zett. Dipt. Scand. II, 606, 92 (*Dolichopus*). — 1903. Kat. paläarkt. Dipt. II, 346.

Male. Vertex and frons æneous, somewhat pruinose. Epistoma narrow, yellowish, darkest below. Palpi yellowish grey. Occiput greenish, greyish pruinose; postocular bristles black above, the hairs below whitish. Antennæ black, third joint triangular, slightly elongated. Thorax dark olive or somewhat æneous, with a greenish middle stripe; it is somewhat brownish pruinose. Scutellum bluish or violet. Pleura greenish or bluish, a little grey pruinose; propleura with pale hairs and black prothoracic bristle. Abdomen greenish, a little greyish pruinose, with short, black hairs and short hindmarginal bristles at the sides, long on the first segment. Venter greyish. Legs yellow, front coxæ grey at the base, and whitish pruinose anteriorly; posterior coxæ grey; front femora narrowly darkened above and below, and middle femora below; tarsi, except the basal part of metatarsus, blackish or brown. The legs have short, black hairs; coxæ pale-haired, front coxæ with some black bristles at the apex, hind coxæ with a black bristle on the outside; front femora very slightly thickened, front legs without bristles; middle femora with a row of about six bristles below, longest towards the base, and at the apex with a very small excision and some short hairs; middle tibiæ thin at the base and here with a flat lobe below, further with a row of short hairs on the ventral side, a row of long, not pointed bristles on the posterior side, and three bristles in the middle and one before the apex on the anterior side; middle metatarsus simple, about as long as the two following joints; hind femora with some thin bristles below in the middle and towards the apex on the posterior side, and with a preapical bristle; hind tibiæ with long, thin bristles and hairs on the antero- and postero-ventral side, not going quite to the apex, and with some dorsal bristles in two rows; hind metatarsus a little shorter

than the second joint. Wings brownish tinged; veins blackish; the convexity on the discal vein not darkened; posterior cross-vein about in the middle, the part of the discal vein from the small to the posterior cross-vein shorter than the second part. Squamulæ yellow, with a blackish fringe. Halteres yellow.

Female. Unknown.

Length 1,5 mm.

C. pilosellus is very rare in Denmark, only one specimen, a male, has been taken at Lersøen, many years ago (Stæger).

Geographical distribution: — Only known from southern Sweden and Denmark.

6. *C. pumilio* Zett.

1843. Zett. Dipt. Scand. II, 606, 93 (*Dolichopus*). — 1903. Kat. paläarkt. Dipt. II, 346. — *Campsicnemus pectinulatus* Loew, 1864. Zeitschr. für gesamt. Naturwissensch. XXIV, 390, 83. et 1871. Beschr. eur. Dipt. II, 302, 164. — 1903. Kat. paläarkt. Dipt. II, 345.

Male. Vertex and frons somewhat bluish, a little pruinose. Epistoma very narrow, yellowish brown. Palpi greyish brown. Occiput greenish, greyish pruinose; postocular bristles black above, the hairs below yellowish. Antennæ black, third joint a little longer than broad, rounded at the apex. Thorax olive, a little violet, with a greenish or bluish middle stripe, a little brownish pruinose. Scutellum somewhat bluish. Pleura greenish or æneous, grey pruinose, especially behind; propleura with pale hairs and a dark prothoracic bristle. Abdomen greenish, with a slight violet reflex, somewhat greyish pruinose; it has short, black hairs, and very short hindmarginal bristles at the sides, longer on the first segment. Venter greyish. Legs yellow; front coxæ grey at the base, posterior coxæ grey; front femora slightly darkened above and below, middle femora below at the base; tibiæ a little darkened at base and apex; tarsi quite dark. The legs have short, black hairs; coxæ pale-haired, front coxæ with a few, black bristles at the apex, hind coxæ with a black bristle on the outside; front legs simple, the femora with pale hairs below, tibiæ with two small dorsal and one ventral bristle; middle femora with a row of short bristles below, thin and hair-like at the base, stronger towards the apex; middle tibiæ with a row of short bristles on the ventral side, and with about seven long, not pointed bristles above on the postero-ventral side, besides with three antero- and one postero-dorsal bristle; middle metatarsus simple, about as long as the two next joints; hind femora with a preapical bristle, hind tibiæ with some dorsal bristles in two rows, and with two ventral bristles; hind metatarsus about

of the length of the second joint. Wings greyish tinged; veins blackish; the convexity on the last part of the discal vein not darkened; posterior cross-vein in or almost anterior to the middle, the part of the discal vein from the small to the posterior cross-vein distinctly shorter than the second part. Squamulae yellow, with a brown or blackish fringe. Halteres yellow.

Female. Epistoma somewhat broader than in the male, yellowish or greyish yellow, palest above. Antennae with the third joint shorter than in the male, roundish triangular. Legs quite simple; middle tibiae besides the dorsal bristle with two ventral bristles.

Length 1.5—1.7 mm.

Remarks: I have no doubt that *pumilio* Zett. and *pectinulatus* Loew are identical; the specimens in our collection are from Stæger, and probably the determination has been confirmed by Zetterstedt, but they quite agree with Loew's description. Verrall (Entom. Month. Mag. XVI, 1905, 195) already suggests this identification, but has doubt on account of Zetterstedt's remark: "femoribus posterioribus . . . parce ciliatis"; no doubt this is an error of Zetterstedt.

C. pumilio is very rare in Denmark; we have only seven specimens, taken by Stæger on Amager many years ago.

Geographical distribution:—Northern and middle Europe down into Bohemia; towards the north to southern Sweden.

7. *C. picticornis* Zett.

1843. Zett. Dipt. Scand. II, 607, 94, et 1859. XIII, 5066, 94 (*Dolichopus*). — 1862. Schin. F. A. I, 235. — 1883. Mik, Verhandl. zool. bot. Gesell. Wien, XXXIII, 189, 9. — 1903. Kat. paläarkt. Dipt. II, 346. — *Campsicnemus varicornis* Loew, 1864. Zeitschr. für gesamt. Naturwissensch. XXIV, 391, 84, et 1871. Beschr. eur. Dipt. II, 301, 163.

Male. Vertex and frons bluish black. Epistoma very narrow, brownish yellow, palest above. Palpi yellowish. Occiput greenish, greyish pruinose; postocular bristles black above, the hairs below whitish. Antennae with the two basal joints yellow, the third blackish, elongated triangular, pointed. Thorax olive or æneous, sometimes with a slight violet reflex, and with a faint or indistinct greenish middle stripe; it is somewhat brown pruinose. Scutellum green or bluish. Pleura greenish or æneous, grey pruinose; propleura with pale hairs and a black prothoracic bristle. Abdomen green, more or less with æneous or violet reflexes above; it is slightly greyish pruinose, and it has short, black hairs, and relatively long hindmarginal bristles at the sides, longest on the first segment. Venter greyish. Legs simple, yellow, posterior coxae grey; tarsi blackish, or with metatarsus

except the apex more or less pale. The legs have short, blackish hairs, coxæ pale-haired; front coxæ with pale, bristly hairs at the apex, hind coxæ with a black bristle; femora slightly pale-haired below; front tibiæ with a dorsal and a postero-ventral bristle; middle tibiæ generally with three antero-, one postero-dorsal bristle, and one ventral bristle; hind femora with a preapical bristle, hind tibiæ with some dorsal bristles in two rows, and two ventral bristles; hind metatarsus as long as the second joint. Wings slightly brownish tinged; veins black; the convexity on the last part of the discal vein not darkened; posterior cross-vein about in the middle, the part of the discal vein from the small to the posterior cross-vein shorter than the second part. Squamulæ yellow, with a brown fringe. Halteres yellow.

Female. Similar to the male, epistoma very slightly broader, more greyish.

Length 1,7 mm.

Remarks: I have followed the *Kat. paläarkt. Dipt.* in the synonymy, but I am not sure on this point, as Loew says about *varicornis* "alle Hüften schwarz" while *picticornis* has quite yellow front coxæ; this fact seems to have been overlooked by Mik (l. c.); besides Loew's species has dark front femora.

C. picticornis is rare in Denmark; Amager (Stæger), Damhussøen (the author). I took my specimens on ¹²/₉. One of my specimens wants the posterior cross-vein entirely.

Geographical distribution:— Northern and middle Europe down into Austria, towards the north to middle Sweden.

26. **Ectomus** Mik.

This genus, which was separated from *Campsicnemus* by Mik in 1878, is in most respects similar to the latter genus. The characters are chiefly the following: The clypeus reaches in the male below the lower margin of the eyes, and is broader and rounded below; epistoma very narrow above, the eyes of the male almost or really touching below the antennæ, in the female very narrowly separated. Antennæ short, the third joint roundish, not longer than broad. Acrostichal bristles absent. Scutellum with two small hairs between the marginal bristles. Abdomen short, with the same number of visible segments as in *Campsicnemus*. Legs slender, simple; hind femora with a preapical bristle; middle tibiæ with one ventral bristle, for the rest the legs with bristles as in *Campsicnemus*; hind metatarsus a little shorter than the second joint. Wings in the male long, narrow in the basal

part, the posterior margin with a shallow excision between the anal vein and the end of the postical vein; cubital vein curved upwards towards the apex, thus the first posterior cell widened towards the end. In the female the wings of usual shape.

The developmental stages not known.

Of the genus only one species is known, and besides a doubtful species, *E. atomus* Zett.

1. *E. alpinus* Hal.

1833. Hal. Ent. Mag. I. 163 (*Medeterus*). — 1878. Mik, Dipt. Unters. Jahresber. d. k. k. akad. Gymn. Wien, 1878, 8, 10, Tab. I, Fig. 13—14. — *Dolichopus punctipennis* Zett. 1849. Dipt. Scand. VIII, 3091, 86—87.

Male. Vertex and frons bluish. Epistoma narrow, silvery white, quite disappearing above on account of the eyes meeting. Occiput greenish, greyish pruinose; postocular bristles white, the uppermost black. Antennæ black, short, third joint somewhat roundish. Thorax dark olive, slightly violet, and brown pruinose; propleura with pale hairs and a small, pale prothoracic bristle. Abdomen greenish or æneous, somewhat greyish pruinose at the sides; it is thinly clothed with short, black hairs, and has short hindmarginal bristles, only slightly longer on the first segment. Legs yellowish, front coxæ somewhat grey at the base, and greyish white pruinose anteriorly; posterior coxæ grey; front femora a little darkened above and below; tarsi with the apex of metatarsus and the following joints blackish. The legs have short, blackish hairs, coxæ pale-haired; front coxæ with a few, black bristles at the apex; the front tibiæ have a dorsal and a postero-ventral bristle; middle femora with about six, short, somewhat strong bristles below, about in the middle, nearer the apex than the base; middle tibiæ with three antero-, one postero-dorsal bristle, and one, somewhat long ventral bristle below the middle; hind femora with a preapical bristle, hind tibiæ with some dorsal bristles in two rows, and two ventral bristles. Wings narrow, with a shallow excision in the posterior margin between the anal vein and the apex of the postical vein, and thus narrow towards the base; they are brown, especially on the apical part; there is a roundish, indefinitely bordered, hyaline spot behind the end of the discal cell; the posterior cross-vein is a little seamed, and on the middle of the last part of the discal vein and in the apex of the cubital cell there is a somewhat darker, brownish spot¹; the veins are brownish black,

¹ The wings in my specimen are coloured quite as in Mik's figure l. c., but they are much less dark.

the cubital vein curved upwards at the apex so that the first posterior cell is widened towards the end; the discal vein straight. Squamulae yellowish, with a dark fringe. Halteres yellow.

Female. I do not know the female; according to the descriptions it has the eyes separated by the epistoma, but this is very narrow above; the wings of usual shape, with the discal and cubital veins almost parallel, and the wings less brown than in the male.

Length about 1.4 mm.

E. alpinus is very rare in Denmark, we have only one specimen, a male, taken on Læsø in July 1884 (H. J. Hansen).

Geographical distribution: — Northern and middle Europe down into Austria; towards the north to northern Sweden. It was first detected in England. — For the rest I am not sure with regard to the southern distribution of this species, and perhaps it is not known south of Denmark and England; the *Kat. paläarkt. Dipt.* says "Europa centr. et sept." I think that *Europa centr.* is caused by Mik's mention of the species, but he does not say from where he had it.

27. **Teuchophorus** Loew.

Species of very small size and of green colour. Head about of the breadth of thorax, slightly arched behind. Vertex almost not excavated. Frons broad, decreasing in breadth towards the antennæ; ocellar, outer vertical and postvertical bristles present, and besides a pair of not quite small bristles on the posterior side of the ocellar tubercle. Eyes large, separated in both sexes, but near to each other below at the end of the epistoma, nearest in the male; they are hairy. The facets seem to be a little enlarged on the front part. The postocular bristles form a single row, and besides there are some bristles on the lower part of the occiput. Antennæ inserted near to each other above the middle; they are short, of the same or about the same shape in both sexes; the second joint simple, the third short, not longer than broad, triangularly roundish or almost reniform; arista dorsal, its first joint not quite short. The basal antennal joint is bare, the second has bristles at the apex, the third and the arista are distinctly haired. Epistoma a little broad above, but narrowed downwards, especially in the males and in this sex very narrow below; the clypeus is separated by a slight, transverse ridge; it does not at all reach the lower margin of the eyes. Proboscis not or almost not protruding; it and the oral aperture somewhat larger in the female than in the male. Thorax rectangular, high, and arched above; post-scutellum rather large with an impressed line at each side; pro- and

metathorax small, the former with bristles above; propleura with a few, fine hairs. The acrostichal bristles short, uniserial in front, irregularly biserial behind; there are six dorsocentral bristles; further a humeral bristle, a posthumeral, two notopleural, a presutural, three supraalar and a postalar bristle; there are only few, small hairs on the front part of the disc. Scutellum has two marginal bristles, between them are four small hairs, and one outwards at each side. Abdomen somewhat short and compressed; in the male there are six visible dorsal segments of nearly the same length, or the sixth a little shorter; on the ventral side there are five segments of the same length, except the first, which is, as usual, very short; the seventh segment is quite small and hidden. The hypopygium is small and roundish; it lies imbedded at the end of abdomen, directed downwards, the end of it with the eighth segment is seen at the apex of abdomen; as far as I could see it is shaped as in *Campsicnemus*, with a deep dorsal incision in which the united and hairy outer lamellæ lie, they are thus seen just at the end of abdomen. In the female the abdomen consists of five normal segments, the others are hidden. There are small dot-like impressions at the sides on some of the abdominal segments, and the segments have short hindmarginal bristles, long on the first segment. Legs somewhat slender; hind metatarsus from slightly shorter to considerably longer than the second joint, without bristles above. (In the Danish species it is slightly shorter to as long as the second joint). In the males the hind tibiæ are more or less peculiarly formed and armed, and also the middle femora and tibiæ have special bristles. In both sexes the front legs are without bristles, the middle tibiæ have two antero-, one postero-dorsal, and one ventral bristle, in the males besides a second ventral bristle (*T. simplex* Mik (non Danish) makes an exception; the male has the hind tibiæ simple, and only one ventral bristle on the middle tibiæ, the female none). The hind coxæ have a bristle on the outside; posterior femora with a preapical bristle, and the tibiæ with apical or preapical bristles, small or wanting on the front tibiæ. There are two small claws and pulvilli, and a narrowly lobe-shaped empodium with bristles below, and thus somewhat comb-shaped. Wings of usual shape, not long; the costa has in the male a long thickening from the apex of the subcostal vein outwards, decreasing in thickness towards the end and thus elongated cuneiform¹; the mediastinal vein terminates in the subcostal vein; the cubital and

¹ Wanting in *T. tenuemarginatus* Strobl (Verh. zool. bot. Gesell. LIX, 1909, 188) if this species is really a *Teuchophorus*.

discal veins are parallel, the latter is straight and has a small convexity lying just outside the posterior cross-vein; this latter is placed in the middle, somewhat oblique; anal vein short and weak. Axillary lobe small. Squamulæ with a small angular lobe, bearing a long fringe, and with the inner part with longish hairs.

The developmental stages are not known.

The species of *Teuchophorus* occur at the borders of water in low herbage and on the water plants, and also on the wet earth.

Of the genus 10 species are known from the palæarctic region: 3 have been found in Denmark.

Table of Species.

1. Hind tibiæ in the male bent before the tip, the apical part more or less thickened, hairy or with a spine, and with a curved subapical spine on the ventral side. Squamular fringe dark 2.
- Hind tibiæ in the male not bent before the tip, not thickened, and without any curved subapical spine. Squamular fringe yellow..... 3. *signatus*.
2. Hind tibiæ in the male with no long straight spine at the beginning of the thickening; vertex and frons blue, shining; hind metatarsus in the female a little shorter than the second joint 1. *spinigerellus*.
- Hind tibiæ in the male with a long, straight spine at the beginning of the thickening; vertex and frons green, a little pruinose; hind metatarsus in the female of the length of the second joint 2. *monacanthus*.

Of *signatus* the female is not known; should it be found, it will, I think, be known by the yellow squamular fringe.

1. *T. spinigerellus* Zett.

1843. Zett. Dipt. Scand. II, 604, 90, et 1849. VIII, 3096, 90 (*Dolichopus*). — 1862. Schin. F. A. I, 236. — 1903. Kat. paläarkt. Dipt. II, 347. — ? *Porphyrops flavicoxa* Meig. 1824. Syst. Besch. IV, 57, 27.

Male. Vertex and frons blue, shining. Epistoma narrow downwards, white. Palpi brownish. Occiput greenish, greyish pruinose; postocular bristles black above, pale below. Antennæ black or brownish black. Thorax green, a little brownish pruinose. Pleura greenish, greyish pruinose; propleura with a few pale hairs. Abdomen green or æneous green, clothed with short, black or brownish hairs, and with hindmarginal bristles, longest on the first segment. Venter grey, with pale hairs. Legs yellow, hind femora a little darkened at the apex, and hind tibiæ more or less darkened on the apical part; tarsi

with the last two or three joints dark to blackish. The legs have short, blackish hairs, coxæ pale-haired, hind coxæ with a long bristle on the outside; middle femora with two black bristles at the base below, and a small, less black bristle more basally; middle tibiæ with

Fig. 114. Antenna of *T. spinigerellus* ♂. $\times 140$.

two antero-dorsal, one postero-dorsal bristle, and two long ventral bristles in the middle, near to each other; hind femora with longish hairs above; hind tibiæ with the apex rather strongly thickened and curved forwards; they are somewhat ciliated on the various sides, longest on the anterior side; on the ventral side of the thickened part is a brush of somewhat curled hairs, and below it a downwards curved bristle or spine; on the dorsal side there are some bristles; posterior femora with a preapical bristle; hind metatarsus about of the length of the second joint, with hairs and some small bristles

Fig. 115. Wing of *T. spinigerellus* ♂.

below. Wings about hyaline or slightly brownish yellow tinged; veins blackish; costa with a long and strong thickening from the apex of the subcostal vein outwards and decreasing towards the end. Squamulae yellow, the margin a little dark, and with a black or brownish fringe. Halteres yellow.

Female. Epistoma less narrowed downwards than in the male. Legs simple and without special bristles; middle tibiæ with one ventral bristle; hind tibiæ not darkened on the apical part; hind metatarsus a little shorter than the second joint. Costa without thickening.

Length 1.5—1.7 mm.

T. spinigerellus is rare in Denmark; at Lersøen (Stæger), Faxe Ladeplads (the author), and on Funen at Odense (H. J. Hansen). Stæger's specimens had been examined by Zetterstedt. My dates are in July. At Faxe Ladeplads it was present in some number at a ditch, it was seen sitting on the water and flying quite low over it, and the males hovered in the air above the females in the usual way.

Geographical distribution:— Europe down into Spain and Italy, and further in Egypt; towards the north to middle Sweden.

Remarks: Schiner's description of the hind tibiæ seems to make it uncertain that he has really had *spinigerellus*, it would more refer to *monacanthus*, but perhaps the tuft of hairs has been coalesced so as to give the impression of a spine.

2. *T. monacanthus* Loew.

1859. Loew, Neue Beitr. VI, 21, 1, et 1864. Mon. Dipt. N. Am. II, Pl. VI, fig. 32. — 1884. Kow. Wien. Ent. Zeitg. III, 111. — 1903. Kat. paläarkt. Dipt. II, 347.

Male. Vertex and frons green, somewhat pruinose, especially at the margin. Epistoma narrow downwards, white or greyish white. Palpi greyish. Occiput green, greyish pruinose; postocular bristles black above, yellow below. Antennæ black. Thorax green or æneous green, somewhat brownish or greyish pruinose, slightly or almost not shining. Pleura greenish, grey pruinose; propleura with very few, pale hairs. Abdomen green or æneous green, clothed with short, dark hairs, paler at the sides in front, and with short hindmarginal bristles, longer on the first segment. Venter greyish, with pale hairs. Legs yellow, posterior, especially middle, coxæ more or less grey; front femora very slightly darkened above, sometimes almost not; hind femora brownish or blackish above, and towards the apex all round; hind tibiæ brownish, blackish in about the apical half; tarsi with the apical part of metatarsus and the following joints blackish, on the hind tarsi generally only the base of metatarsus pale. The legs have short, blackish hairs, coxæ pale-haired, hind coxæ with a black bristle on the outside; middle femora with four bristles below at the base, the two middle ones strong, black, the two others smaller and less black; middle tibiæ with two antero-dorsal and one postero-dorsal bristle, and with two strong ventral bristles in the middle near to each other; hind femora with longish hairs above; hind tibiæ with the apical part a little thickened and bent a little forwards, the thin basal part has a little elevation in the middle on the ventral side; they are somewhat ciliated on the various sides and with bristles above; on the ventral side, at the beginning of the thickening is a

long, erect, straight spine, and towards the apex a downwards curved bristle or spine; posterior femora with a preapical bristle; hind metatarsus a little shorter than the second joint, with hairs and small bristles below. Wings about hyaline; veins black; costa with a thickening as in *spinigerellus*. Squamulae yellow, with the extreme margin black and a black fringe. Halteres yellow.

Female. Epistoma less narrow than in the male. Legs simple and without special bristles; middle tibiae with one ventral bristle; hind femora very slightly darkened above at the apex and hind tibiae yellow; hind metatarsus of the length of the second joint. Wings without costal thickening.

Length 1.6—1.9 mm.

This species is very similar to *spinigerellus*, but it is in the male at once recognised by the different ornamentation of the hind tibiae. The females are very like each other, *monacanthus* is best distinguished by the green, a little pruinose frons, this being blue and shining in *spinigerellus*; also the posterior or middle coxae are as a rule more or less greyish in *monacanthus*, while they are generally yellow in *spinigerellus*. The length of the hind metatarsus seems also to give a character, as I find it shorter than the second joint in *spinigerellus*, and of the same length in *monacanthus*; this is somewhat curious, for in the male of *spinigerellus* the two joints are of about equal length, while in the male of *monacanthus* the metatarsus is a little shorter than the second joint.

T. monacanthus is rare in Denmark, and was not known as Danish until this year (1912), when I took 9 males and one female on $21\frac{1}{7}$ — $23\frac{3}{7}$ at Faxe Ladeplads; they occurred at a ditch together with *spinigerellus*, and they were seen sitting on the water and flying quite low over it, behaving quite as *spinigerellus*.

Geographical distribution:— Middle Europe down into Bohemia and Hungary; its northern limit is in Denmark and it occurs in England.

3. *T. signatus* Zett.

1849. Zett. Dipt. Scand. VIII, 3065, 9—10 (*Chrysotus*). — 1903. Kat. paläarkt. Dipt. II, 347. — *Medeterus signatus* Stæg. in litt. 1849. Zett. Dipt. Scand. VIII, 3096, Obs.

Male. Vertex and frons green. Epistoma narrow downwards, white. Palpi brownish. Occiput greenish, greyish pruinose; postocular bristles blackish above, paler downwards. Antennae black or brownish black. Thorax green or a little bluish green, slightly pruinose. Pleura green or bluish, a little greyish pruinose. Abdomen green, with short,

black hairs, and short hindmarginal bristles, long on the first segment; at the sides of the first segment there are some paler hairs. Venter greyish or a little yellowish, with pale hairs. Legs yellow; hind femora slightly darkened at the tip; tarsi with the three to four last joints darkened, brownish. The legs have short, blackish or brownish hairs, coxæ pale-haired; front coxæ with some bristly hairs at the apex, hind coxæ with a small bristle on the outside, all pale; the front metatarsus is slightly excised below and has on the basal half

Fig. 116.
Hind tibiæ of
T. signatus ♂.
× 55.

a row of longer hairs; middle femora with four bristles below at the base, the two middle the longest; the middle tibiæ have two antero-dorsal and one postero-dorsal bristle, and two ventral bristles in the middle; hind femora with longish hairs above; the hind tibiæ are somewhat short, slightly thickened; they have in the middle, in a very slight emargination, a number (probably six or seven) of flat bristles, which are thickened towards the end; the bristles are very close-standing and therefore not easily counted; just below these bristles there is a tuft of longer, somewhat curled hairs, which may be somewhat coalesced; between this ornamentation and the apex are two long bristles; besides the hind tibiæ have fine, longish hairs on the postero-ventral side, some hairs and bristles above, and some bristles on the basal half of the anterior side; the posterior femora have a preapical bristle; hind metatarsus as long as the second joint, with longish hairs and some bristles below, longest at the base. Wings about hyaline or slightly tinged; veins blackish; costa with a thickening as in the preceding species, but still larger and longer. Squamulæ yellow, with a yellow or dark yellow fringe. Halteres yellow.

Female unknown.

Length 1,5 mm.

This species is very closely allied to *pectinifer* Kowarz (Verhandl. zool. bot. Gesell. Wien, XVIII, 1868, 218); the ornamentation on the hind tibiæ is very similar, but however different, and *signatus* is moreover distinguished by the hind metatarsus being not longer than the second joint, and by the yellow squamular fringe. — The species was described by Zetterstedt l. c. as *Chrysotus signatus* from a single male specimen, sent from Stæger, and this specimen I have examined, but there is still another specimen in our collection; Zetterstedt does not mention the armature of the hind tibiæ; on pag. 3096 of the

same volume Zetterstedt mentions "*Medeterus signatus* n. sp." from Stæger, and gives in Danish some remarks written to him from Stæger, and he adds: "Hæc species (*Medet. signatus*) mihi de cetero ignota"; it is curious that he was not aware, that it was the same species, which he had described as *Chrysotus signatus* a few pages before. In the remarks mentioned, written from Stæger to Zetterstedt, the former says that the hind tibiæ have a double spine below in the middle, but this is, as seen in my description, a mistake, it is however easily understood that the close-standing spines may have presented themselves as such by a not sufficient enlargement. As Zetterstedt says: "Stæg. in litt." the name is originally due to Stæger.

T. signatus is very rare in Denmark; there exist in all only two specimens, both without any exact locality given; one of them is in Zetterstedt's collection, the other (rather damaged) in ours.

Geographical distribution:— The species is only known from Denmark, the two specimens mentioned being the only existing.

28. **Sympyenus** Loew.

Species of small size, of dark metallic colour, and not or slightly shining. Head a little broader than thorax, as broad as high or a little higher than broad, slightly narrowed downwards and about semiglobular, with the occiput slightly arched. Vertex a little excavated, ocellar tubercle a little prominent. Frons broad, broadest in the females, narrowed towards the antennæ. There are ocellar, outer vertical, and somewhat distantly placed postvertical bristles; besides a pair of small hairs on the ocellar tubercle. Eyes large, somewhat oval, a little narrowed downwards; they are short-hairy. The facets are a little enlarged towards the epistoma in both sexes. The eyes are separated, most broadly in the female, more or less narrowly in the male, and in this sex nearest to each other below. The ocellar bristles form a single row, but besides there are some bristly hairs on the lower part of occiput. Antennæ inserted near to each other above the middle; they are short, the first joint obconical, the second short and simple, the third more or less triangular, and more or less pointed, generally a little longer in the male than in the female; arista dorsal, much longer than the antennæ, its first joint somewhat short. The basal antennal joint is bare, the second has bristles at the apex, the third is distinctly and somewhat strongly hairy and the arista pubescent. Epistoma narrow in the male, broadest above, more or less contracted downwards; it is broader in the female and with parallel or almost parallel margins: the clypeus is short and only indistinctly

separated from the epistoma; it does not reach the lower margin of the eyes. Proboscis and oral aperture larger in the female than in the male, and in the former it is a little protruding, in the latter not. Labrum (*annulipes* ♀) strong, it is strongly canaliculated, with a long, somewhat chitinated median tooth, curved a little downwards at the apex, and with two lower, likewise long, strongly chitinated lateral teeth, directed forwards; hypopharynx of the same length as labrum, elongated triangular, broad at the base, curved downwards at the apex, with a distinct salivary duct; it is somewhat canaliculated with the margins upwards; the maxillary palpi are squamiform, triangularly oval and somewhat pointed. Labium has the basal part as long or a little longer than the labella, it is cleft behind, going out into two long processes; the labella are obliquely ovate, somewhat broad, with distinct, radiating ribs. Thorax rectangular, high, and somewhat arched above; behind, in front of the scutellum, there is a small and indistinct, flat, somewhat declining area; postscutellum somewhat large, with two impressions, converging behind; pro- and metathorax small, the former with small bristles above; propleura with a few hairs. Acrostichal bristles uniserial, a little irregularly biserial behind; there are six dorsocentral bristles; further a humeral bristle, and a weaker, a posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle; there are only few, short hairs on the front part of the disc. Scutellum with two marginal bristles and at each side a small hair, besides there are some (4) very small hairs between the bristles. Abdomen somewhat longer than thorax, about cylindrical, but somewhat compressed. In the male there are six visible dorsal segments, the first a little shorter, the others of the same length; on the ventral side there are five segments, the first as usual very small, the second to fourth of equal length, the fifth shorter; the sixth is folded up for the reception of the hypopygium; the seventh is quite small and hidden. The hypopygium (*annulipes*) is small and round; the eighth segment is large, covering almost the whole left side of the hypopygium; there are small, knob-like ventral lobes, and a pair of triangularly lancet-shaped, hairy outer lamellæ, which are somewhat united in the middle; the end of penis and its sheath are straight. The hypopygium lies somewhat imbedded at the apex of abdomen, directed downwards and a little forwards; generally the outer lamellæ are seen, protruding downwards, and in front of them the penis. In the female the abdomen is pointed, it has five normal segments, the rest hidden; it terminates with a small, generally hidden ovipositor, which is curved a little upwards and has hairs and some small spines at the apex. There are dot-like impressions at the sides of the second,

third and fourth segments. The abdominal segments have short hind-marginal bristles, long on the first segment. Legs somewhat slender; hind tarsi somewhat robust, shorter than tibiæ, the metatarsus about as long as or slightly shorter than the second joint, without bristles above. In the males of most species the third, or the third and fourth joint on the hind tarsi are bearded with hairs or bristles on the posterior side, or otherwise armed. The posterior coxæ have each a bristle, the posterior femora a preapical bristle; front tibiæ generally with a very small postero-dorsal bristle, middle tibiæ with three antero-dorsal and one postero-dorsal bristle, generally also a ventral bristle; the posterior tibiæ have apical or preapical bristles. There are two small claws, two pulvilli, and a narrow, linear empodium with bristles below. Wings of usual shape, the mediastinal vein terminates in the subcostal vein; the discal vein has a bend somewhat after the posterior cross-vein, but its last part is parallel with the cubital vein; the posterior cross-vein on or anterior to the middle of the wing; the anal vein is weak. The axillary lobe very small in the male, larger in the female. The discal bend lies on a distinct convexity. The squamulæ have a small angular lobe, with a long fringe, the inner part of the squamulæ has short hairs.

The developmental stages are not known.

The species of *Sympycnus* occur in grass and low herbage, especially at the borders of water, in fens and on the whole in humid, more or less shady places.

Of the genus about 13 species are known from the palæarctic region; 2 have been found in Denmark.

Table of Species.

1. Third antennal joint roundish, slightly pointed; front coxæ yellow, only grey at the very base. In the male the third and fourth joint of the hind tarsi short-bearded on the posterior side..... 1. *aeneicoxa*.
- Third antennal joint triangular, distinctly pointed; front coxæ grey, only yellow at the apex. In the male the third and the basal part of the fourth joint of the hind tarsi with longish bristles on the posterior side, and the third with two or three long hairs at the base..... 2. *annulipes*.

1. *S. aeneicoxa* Meig.

1824. Meig. Syst. Besch. IV, 57, 26 (*Porphyrops*), et 1838. VII, 155 (*Medeterus*). — 1859. Loew, Neue Beitr. VI, 21, 1. — 1862. Schin. F. A. I, 232. — 1889. Kow. Wien. Ent. Zeitg. VIII, 181, 6. — 1903. Kat. paläarkt. Dipt. II, 348. — *Dolichopus brevicornis* Zett. 1843. Dipt. Scand.

II, 603, 89, et 1849. VIII, 3095, 89, et 1855. XII, 4638, 89. — *Sympycnus brevicornis* 1857. Loew, Neue Beitr. V, 43. — *Dolichopus nigrifibialis* Zett. 1855. Dipt. Scand. XII, 4638, 89—90. — *Dolichopus pulicarius* Fall. 1823. Dipt. Suec. Dol. 20, 28, p. p. — 1843. Zett. Dipt. Scand. II, 603, p. p. var. b.

Male. Vertex and frons grey pruinose. Epistoma narrow, especially below, greyish white. Palpi whitish. Occiput grey; postocular bristles black above, white below. Antennæ black, third joint short,

Fig. 117. Antenna of *S. aeneicoxa* ♂. × 110.

roundish triangular, scarcely as long as broad, slightly pointed. Thorax green or æneous, brownish or greyish brown pruinose and somewhat dull. Pleura greenish, greyish pruinose; propleura with a few, pale hairs. Abdomen green or æneous, sometimes somewhat coppery, a little grey pruinose at the sides; it is clothed with black hairs, just at the sides there are some pale hairs, especially in front; there are distinct hindmarginal bristles, long on the first segment, and some of these latter at the sides are pale. Venter greyish, with pale hairs. Legs yellow, front coxæ grey at the very base, posterior coxæ grey, yellow just at the apex; hind femora blackish at the apex; hind tibiæ more or less blackish or brown, paler towards the base; tarsi black or brownish black, the anterior with the base pale; the front tarsi shorter than tibiæ and with the four last joints short and a little broad. The legs have short, black hairs, coxæ pale-haired, the hairs on the front coxæ long; posterior coxæ each with a black bristle, or the bristle on the middle coxæ often pale; the front femora have a row of postero-ventral bristles on the apical half, longest towards the apex, front tibiæ with a very small postero-dorsal bristle near the base, and short ciliated above; posterior femora with somewhat bristly hairs below towards the apex on both sides, and with a preapical bristle; middle tibiæ with three antero-dorsal and one postero-dorsal bristle; hind tibiæ with some bristles above in two rows; the hind tarsi are short-bearded on the posterior side of the third and fourth joints. Wings brownish tinged; veins blackish. Squamulæ yellow, with a yellowish fringe. Halteres yellow.

Female. Epistoma broader than in the male, not narrowed downwards. Third antennal joint still shorter, distinctly broader than long.

Legs with the front tarsi simple; femora without bristles or bristly hairs below, and hind tarsi not bearded.

Length 2,3—2,7 mm.

S. aeneicoxa is not rare in Denmark, but however much less common than the following; Lersøen, Charlottenlund, Ordrup Mose, Dyrehaven, Fure Sø, Hillerød, Svenstrup and Faxe Ladeplads; on Funen at Odense and Veflinge; in Jutland at Hald near Viborg, and finally on Bornholm at Rønne, Allinge and Almindingen. My dates are $24/6$ — $25/8$. It occurs at the borders of water in low herbage and on water plants, thus not rarely among reeds.

Geographical distribution:— Northern and middle Europe down into France; towards the north to southern Sweden.

2. *S. annulipes* Meig.

1824. Meig. Syst. Besch. IV, 56, 25 (*Porphyrops*), et 1838. VII, 155 (*Medeterus*). — 1862. Schin. F. A. I, 232. — 1889. Kow. Wien. Ent. Zeitg. VIII, 179, 4. — 1903. Kat. paläarkt. Dipt. II, 348. — *Chrysotus cinerellus* Zett. 1838. Ins. Lapp. 705, 88. — *Dolichopus pulicarius* Fall. 1823. Dipt. Suec. Dol. 20, 28, p. p. — 1843. Zett. Dipt. Scand. II, 602, 88, et 1849. VIII, 3095, 88, et 1859. XIII, 5066, 88.

Male. Vertex and frons grey. Epistoma narrow and somewhat narrowed downwards, but less than in *aeneicoxa*, greyish white. Palpi whitish. Occiput a little greenish, grey pruinose; postocular bristles

Fig. 118. Antenna of *S. annulipes* ♂. $\times 110$.

black above, white below. Antennæ black, third joint a little elongated, triangular and pointed. Thorax green or æneous, brownish or brownish grey, anteriorly more grey pruinose, dull, with three more or less distinct, narrow, dark stripes. Pleura a little greenish or æneous, grey pruinose; propleura with a few, pale hairs. Abdomen green, æneous or more coppery; it is clothed with short, black hairs, pale at the sides, especially in front and partly on the dorsum of the first segment; there are short hindmarginal bristles, long on the first segment. Venter greyish, with pale hairs. Legs yellow, coxæ grey, front coxæ yellowish at the apex; front femora with a more or less distinct blackish ring at the base, reaching about to the middle or

beyond it; hind femora blackish on the apical part, especially above; hind tibiæ more or less darkened at the apex; tarsi blackish, with the basal part of metatarsus yellow, only slightly on the hind tarsi; front tarsi as long as or a little longer than tibiæ. The legs with short, black hairs, coxæ pale-haired, the hairs on the front coxæ long; the posterior coxæ each with a pale bristle; femora only with short hairs, slightly longer on the antero-ventral side of the front femora; posterior femora with a preapical bristle; front tibiæ short ciliated above, and with a very small postero-dorsal bristle near the base; middle tibiæ with three antero-dorsal, one postero-dorsal and one ventral bristle; hind tibiæ with some bristles above in two rows; the hind tarsi have the third and to some degree the fourth joint compressed, and the third somewhat excised on the posterior side and shining; on this excised part and on the basal part of the fourth joint are somewhat long, bristly hairs, and on the not compressed base of the third joint are two, sometimes three, long hairs; these latter are sometimes lying down between the other hairs, and then slightly visible. Wings somewhat brownish tinged; veins blackish. Squamulæ pale yellow, with a yellow fringe. Halteres yellow.

Fig. 119.
S. annulipes
♂, hind
tarsus. $\times 55$.

Female. Epistoma broader than in the male, not narrow downwards. Antennæ with the third joint shorter, longer than broad, but pointed. Legs with the hind tarsi not bearded; the bristle on the hind coxæ often black.¹

Fig. 120. Wing of *S. annulipes* ♂.

Length 2,5—2,8 mm.

S. annulipes is common in Denmark; Lersøen, Amager, Dyrehaven, Lyngby Mose, Ørholm, Rørvig, Boserup near Roskilde; on Langeland

¹ Kowarz says (l. c.) that the bristle is black, but it may also be yellow.

at Lohals; on Fænø; in Jutland at Horsens, Søndervig, Frijsenborg, Holstebro, Hald near Viborg, Tinbæk Mølle at Lindenberg Aa, Frederikshavn, Hulsig, Skagen, and on Læsø; finally on Bornholm at Allinge

Fig. 121. Antenna of *S. annulipes* ♀. $\times 110$.

and Hammeren. My dates $3/6$ — $14/9$. It occurs in the same way as the preceding species.

Geographical distribution:— Europe down into Spain and further on the Canary Islands; towards the north to northern Sweden, and in Finland.

29. **Chrysotimus** Loew.

Very small species of bright green colour, with abdomen yellow in the female. Head about of the breadth of thorax, as broad as high or a little broader, semiglobular, but a little narrowed downwards; it is slightly arched behind. Vertex almost not excavated. Frons broad, decreasing in breadth towards the antennæ; there are ocellar, outer vertical, and somewhat distantly placed postvertical bristles; besides a pair of small hairs on the ocellar tubercle. Eyes large, somewhat oval, a little narrowed downwards; they are very short-hairy, almost microscopically. The facets are of the same or about the same size. The eyes are equally separated in both sexes. The postocular bristles form a single row, and besides there are only a few hairs on the lower part of occiput. Antennæ inserted near to each other, a little above the middle; they are very short, of the same shape in both sexes, the third joint shorter than broad; it is hollowed behind and thus almost cup-shaped, in profile it is almost reniform; arista dorsal, but somewhat subapical, much longer than the antennæ; its first joint is short. The first antennal joint is bare, the second has small bristles at the apex, the third joint and the arista with short but distinct hairs. Epistoma not specially narrow; the clypeus is indistinctly separated by a small notch at each side, it is short and does not reach the lower margin of the eyes. Proboscis a little protruding, it and the oral aperture are of the same or about the same size in the two sexes. Thorax rectangular, somewhat high, and a little arched above; behind, in front of the scutellum, there is

a flat or a little concave, declining area; pro- and metathorax small, the former with small bristles above; propleura with a prothoracic bristle. Acrostichal bristles absent; in *molliculus* there are however a few quite in front, and farther backwards a single may be found; there are five distinct dorsocentral bristles, and often a quite small one in front; further a humeral bristle, a posthumeral, two notopleural, a præsutural, two or three supraalar (in *concinus* I could find only two), and a postalar bristle. Small hairs on the front part of the disc very few, almost wanting. Scutellum has two marginal bristles and a small hair on each side. Abdomen somewhat short, a little compressed; in the male there are five visible dorsal segments of about the same length, only the first a little shorter; also the sixth segment is seen, but short; on the ventral side there seem to be four normal segments, the first as usual quite small. The seventh segment is small and hidden. Hypopygium small, it lies somewhat imbedded at the end of abdomen, directed downwards and more or less forwards; its dorsal side and the eighth segment are just seen; as far as I could detect without dissection there are a pair of small outer lamellæ, probably somewhat united, lying in a dorsal incision. The eighth segment has longish hairs. In the female the abdomen is pointed, it has five segments of nearly the same length, but the sixth and seventh or more are generally also seen; at the apex there is an ovipositor with two lamellæ. There are distinct dot-like impressions at the side of the second, third and fourth segments. The abdomen is clothed with somewhat strong hairs, and has distinct hindmarginal bristles, longest on the first segment. Legs rather slender, simple, the hind tarsi about of the length of tibiæ, metatarsus a little longer than the second joint, without bristles. Posterior coxæ each with a bristle; the posterior femora have preapical bristles; middle tibiæ with two antero-dorsal and two postero-dorsal bristles; the posterior tibiæ have apical or preapical bristles. There are two very small claws, likewise short and small pulvilli, and a short, narrow empodium with bristles below. Wings of usual shape; the mediastinal vein terminating in the subcostal vein, discal vein curved a little upwards and parallel with the cubital vein; the posterior cross-vein placed more or less anterior to the middle; anal vein not specially short. Axillary lobe somewhat developed. The discal vein has a convexity just behind the posterior cross-vein. Squamulæ with a small angular lobe, with a long fringe; the inner part of squamulæ shorter-haired.

The developmental stages are not known.

The species of *Chrysotimus* are somewhat characteristic by their brilliant bright green colour, and the yellow abdomen of the female.

They occur on the leaves of bushes and in low herbage in shady places, and often near water.

Of the genus 3 species are known from the palaearctic region; two of them are European and both occur in Denmark.

Table of Species.

1. Antennæ black; posterior cross-vein behind the middle of the postical vein 1. *molliculus*.
- Antennæ with the basal joints yellow, the third brown; posterior cross-vein before the middle of the postical vein 2. *concinus*.

1. *C. molliculus* Fall.

1823. Fall. Dipt. Suec. Dol. 23, 35 (*Dolichopus*). — 1843. Zett. Dipt. Scand. II, 488, 10 (*Chrysotus*). — 1862. Schin. F. A. I, 185. — 1903. Kat. paläarkt. Dipt. II, 349. — *Chrysotus laetus* Meig. 1824. Syst. Besch. IV, 43, 8.

Male. Vertex and frons green, slightly greyish pruinose. Epistoma green. Palpi yellowish white. Occiput green, slightly greyish pruinose; postocular bristles whitish. The vertical bristles yellow. Antennæ black.

Fig. 122. Antenna of *C. molliculus* ♂. × 115.

Thorax bright green or somewhat golden green, a little greyish pruinose; all bristles yellow. Pleura green, more or less greyish pruinose, most posteriorly; metaepimera yellow; propleura with a pale prothoracic bristle. Abdomen green or golden green, sometimes a little coppery, clothed with somewhat longish, yellow hairs; there are distinct and somewhat long hindmarginal bristles, longest on the first segment. Venter yellow, with pale hairs. Legs yellow, the last tarsal joint blackish. The legs have pale hairs, somewhat bristly at the apex of the front coxæ; posterior coxæ with a pale bristle; femora mainly short-haired, posterior femora with a little longer hairs below towards the apex; middle femora with one preapical bristle, hind femora with two, one above the other; middle tibiæ with two antero- and two postero-dorsal bristles, hind tibiæ with some dorsal bristles; all bristles yellow. Wings yellowish tinged; veins yellow; posterior cross-vein a little before the middle of the wing, but behind the middle of the postical vein. Squamulæ yellow, with a yellow fringe. Halteres yellow.

Female. Epistoma not broader than in the male. Abdomen yellow, the first segment more or less æneous or greenish; in the middle of the second segment, at the hind margin, a small, black, sometimes brown spot, and the apex black.

Fig. 123. Wing of *C. molliculus* ♂.

Length 2,2—2,5 mm.

C. molliculus is not common in Denmark, and has only been taken in Ordrup Mose (Stæger, the author). The dates are in July. Stæger took his specimens on *Corylus*.

Geographical distribution:— Europe down into Italy; towards the north to middle Sweden.

2. *C. concinnus* Zett.

1843. Zett. Dipt. Scand. II, 489, 11, et 1859. XIII, 5037, 11 (*Chrysotus*). — 1903. Kat. paläarkt. Dipt. II, 349. — *Dolichopus molliculus* Fall. 1823. Dipt. Suec. Dol. 23, 35, p. p.

Male. Vertex and frons green, slightly pruinose. Epistoma green. Palpi yellowish. Occiput greenish, a little greyish pruinose; postocular bristles white. The vertical bristles yellow. Antennæ with the two basal joints yellow, the third brown. Thorax bright green or golden green, a little greyish pruinose; all bristles yellow. Pleura green, greyish pruinose, especially behind; metaepimera of the same colour; propleura with a pale prothoracic bristle. Abdomen bright green, sometimes somewhat coppery, clothed with yellow hairs; there are somewhat short hindmarginal bristles, long on the first segment. Venter yellowish with pale hairs. Legs yellow, the last tarsal joint more or less brown at the apex. The legs have pale hairs, the front coxæ somewhat bristly hairs at the apex; posterior coxæ each with a pale bristle; femora short-haired; middle femora with one preapical bristle, hind femora with two, one above the other; middle tibiæ with two antero- and two postero-dorsal bristles; hind tibiæ with a few bristles above; all bristles yellow. Wings slightly yellowish

tinged; veins yellow; posterior cross-vein much before the middle of the wing, and before the middle of the postical vein. Squamulae pale yellow, with a whitish fringe. Halteres pale yellow.

Female. Epistoma not broader than in the male. Abdomen yellow, with the apex green.

Length 1,5—1,8 mm.

C. concinnus is very rare in Denmark, and seems to be rarer than the preceding, though taken in more localities; Dyrehaven (Stæger, type-specimens); on Funen at Odense, and in Jutland at Hald near Viborg (H. J. Hansen); in all six specimens. The dates are in August. Stæger took it on *Corylus*. As Zetterstedt says: "Stæger in litteris" the name is originally due to Stæger, who first detected the species.

Geographical distribution:— Northern and middle Europe down into Hungary; towards the north to southern Sweden. The species is everywhere generally rare; Verrall says (Entom. Month. Mag. XVI, 1905, 248) that beyond a capture in England in 1904, when it was taken in abundance, he could trace only about five specimens from Scandinavia and one from Hungary; there were however some more known; in Stæger's collection are four specimens, and Zetterstedt mentions in Vol. II four specimens, and in Vol. XIII he says that it had further been taken "rarissime"; finally Lichtwardt mentions (Zeitschr. für Hymenopt. und Dipt. II, 1902, 286) besides the specimen from Hungary three from near Berlin.

30. **Xanthochlorus** Loew.

Species of small size, more or less yellow and slightly metallic in colour. Head about as broad as thorax, a little broader than high, slightly arched behind. Vertex slightly excavated, ocellar tubercle a little prominent. Frons broad, a little narrower towards the antennae. There are ocellar, outer vertical, and somewhat large postvertical bristles, besides a pair of small hairs on the ocellar tubercle. Eyes large, oval, slightly, almost microscopically hairy; in the living specimens they are bright green, with a little reddish reflexes. The facets are of the same size. The eyes are separated in both sexes, a little more in the female than in the male, and in the latter sex the eyes are most approximated below. The postocular bristles form a single row, but besides there are a number of bristles on the lower part of the occiput. Antennae inserted near to each other, slightly above the middle, in the female almost in the middle; they are short, of the same shape in both sexes; the third joint is shorter than broad,

somewhat reniform, a little pointed towards below; the arista is dorsal, apparently inserted near the base, in reality in the front margin near the upper edge; it is much longer than the antennæ, its first joint short. The basal antennal joint is bare, the second has small bristles at the apex, the third and the arista with short but distinct hairs. Epistoma narrow in the male and narrowest downwards, in the female a little broader and with the margins about parallel; the clypeus is small, it is separated from the epistoma by a small notch at each side; it does not quite reach the lower margin of the eyes. Proboscis a little protruding, it and the oral aperture a little larger, and the proboscis more protruding in the female than in the male. Labrum chiefly of the usual shape, high at the base, strongly canaliculated, with a somewhat rounded, slightly chitinated median tooth, and below two more chitinated lateral teeth of the same length as the median; hypopharynx triangularly elongated, of the same length as labrum, with the apex curved downwards, and with a distinct salivary duct; the maxillary palpi triangularly oval, pointed, short hairy, with a single bristle on the front side. Labium less chitinated than usual, yellow; the basal part about of the length of the labella, cleft into two processes behind; the labella are somewhat long, not very broad, with radiating ribs, and with bristles at the margin. Thorax rectangular, somewhat high, and arched above; behind, in front of the scutellum, it has a somewhat large, flat or slightly concave area; pro- and metathorax small, the former with a few, small bristles above. Acrostichal bristles practically absent (there are in reality a few quite in front); there are five dorsocentral bristles; further a humeral bristle, and generally a weaker, a posthumeral, two notopleural, a præsutural, three supraalar and a postalar bristle; the front part of the disc with very few, small hairs. Propleura with one prothoracic bristle. Scutellum with two marginal bristles, and with a very small hair at each side. Abdomen not long, a little depressed, knobbed behind in the male on account of the hypopygium; in the male there are six visible dorsal segments of about the same length, only the first a little shorter; on the ventral side there are five segments seen, the first of which as usual very small; the sixth is folded up; the seventh segment is small and quite hidden. Hypopygium large and swollen; it is not imbedded but lies free at the end of abdomen, directed downwards and a little forwards; the eighth segment is rather large; the hypopygium is roundish; there are somewhat long, forwards directed posterior lobes (or inner lamellæ), which are curved towards each other, and there are small, somewhat lancet-shaped, hairy outer lamellæ, with a narrowed apical part, and united in the middle, with

only the apices free; these latter are generally seen, when the hypopygium is in situ, and often also the lobes; more basally on the ventral side there are a pair of flat pieces each with some teeth. Penis short. In the female the abdomen is truncate; it has seven visible segments, and at the end generally also the somewhat smaller, eighth segment is seen. Dot-like impressions are, I think, present on some of the segments, but rather indistinct. The abdominal segments have distinct hindmarginal bristles, long on the first segment. Legs slender and rather long, hind tarsi somewhat short, shorter than the tibiæ, with the first joint somewhat longer than the second, without bristles¹. Posterior coxæ each with a bristle; femora without preapical bristles; middle tibiæ with two antero-dorsal and one postero-dorsal bristle; posterior tibiæ with apical or preapical bristles. There are two small claws, two small and short pulvilli, and a narrowly lobe-shaped empodium with bristles below. Wings of usual shape; the mediastinal vein terminating in the subcostal vein; discal vein slightly curved, a little converging towards the cubital vein; posterior cross-vein about in, or a little before the middle; anal vein short. Axillary lobe moderately developed. There is a distinct convexity in the middle of the last part of the discal vein. Squamulæ with a distinct angular lobe, bearing a long fringe; the inner part of squamulæ with short hairs.

The developmental stages are not known.

The species of *Xanthochlorus* are rather characteristic by their prevailing yellow colour, and the abdomen which is knobbed at the end in the male and rather truncate in the female. They occur in bushes and low herbage in more or less shady places, thus often in low herbage on humid ground in woods, but also outside woods at ditches and the like.

Of the genus 2 palæarctic species are known, both occurring in Denmark.

Table of Species.

1. Thorax and scutellum green or æneous, grey pruinose 1. *ornatus*.
- Thorax yellow, with a green or æneous patch, scutellum yellow 2. *tenellus*.

1. *X. ornatus* Hal.

1831. Hal. Zool. Journ. V, 358, 17 (*Medeterus*). — 1862. Schin. F. A. I, 184. — 1903. Kat. paläarkt. Dipt. II, 350. — *Dolichopus tenellus* Fall. (nec

¹ Loew says both in Neue Beitr. V, 42, and in Mon. of Dipt. of N. Am. II, 223, in the description of the genus, that the hind metatarsus is shorter than the second joint, while it is in reality somewhat longer in both European species, and in Loew's figure of *X. helvinus* in the latter work Pl. VII, fig. 41 it is also longer.

Wied.) 1823. Dipt. Suec. Dol. 22, 34. — 1843. Zett. Dipt. Scand. II, 616, 103, et 1855. XII, 4640. 103.

Male. Vertex and frons brownish yellow or more grey pruinose. Epistoma narrow, whitish. Palpi yellow. Occiput greenish, somewhat

Fig. 124. Antenna of *X. ornatus* ♂. 115.

grey pruinose; postocular bristles yellow. The vertical bristles yellow. Antennæ with the two basal joints yellow, the third brownish. Thorax metallic green or æneous, greyish pruinose, and slightly or not shining, generally with a narrow, more shining middle stripe; the bristles yellow. Scutellum green or bluish green, postscutellum greenish grey. Pleura slightly green or æneous, grey pruinose; the hypopleura with the metaepimera more or less yellow; propleura with a whitish prothoracic bristle. Abdomen olive green or æneous above, more or less translucent yellow, especially at the sides; it is clothed with brown hairs, and has distinct hindmarginal bristles, long on the first segment. Venter yellow, with pale hairs. Hypopygium yellow. Legs yellow, tarsi more or less darkened towards the end, the last joint black or blackish. The legs have short, blackish or brownish hairs, coxæ pale-

Fig. 125. Wing of *X. ornatus* ♂.

haired; the front coxæ have bristly hairs at the apex, the posterior coxæ each a yellow bristle; for the rest the legs short-haired, femora with slightly longer hairs below; the front tibiæ and especially the metatarsi short-ciliated below; middle tibiæ with two antero-dorsal and one postero-dorsal bristle; hind tibiæ with a few bristles above.

Wings slightly yellowish tinged, most towards the anterior margin; veins brown; the discal vein a little curved towards the apex, and a little converging towards the cubital vein. Squamulae and the fringes yellow. Halteres yellow.

Female. Epistoma a little broader than in the male. Pleura often more yellow, sometimes also the præsutural depression and the humeri yellow. Abdomen often more yellow. Femora not with longer hairs below, and front tibiae and tarsi not ciliated.

Length 2.6—3 mm.

X. ornatus is common in Denmark; Charlottenlund, Ordrup Mose, Ermelund, Ørholm, Tyvekrog, Rørvig, Tisvilde, Faxe Ladeplads; on Langeland at Lohals; on Funen at Odense and Veflinge; in Jutland at Hald near Viborg and at Frederikshavn, and on Bornholm at Rønne, Hasle and Rø. My dates are $7/6$ — $28/7$. It occurs in grass and low herbage and on bushes in shaded places in woods, and also outside.

Geographical distribution:— Europe down into Italy, and further on the Canary Islands; towards the north to middle Sweden.

2. *X. tenellus* Wied.

1817. Wied. Zool. Mag. I, 73, 20 (*Dolichopus*). — 1824. Meig. Syst. Besch. IV, 69, 21 (*Medeterus*). — 1862. Schin. F. A. I, 184. — 1903. Kat. paläarkt. Dipt. II, 350. — *Dolichopus flavellus* Zett. 1843. Dipt. Scand. II, 618, 105.

Male. Vertex and frons yellowish grey or grey pruinose. Epistoma white. Palpi yellow. Occiput greenish, greyish pruinose; postocular bristles yellow. The vertical bristles yellow. Antennae with the two basal joints yellow, the third brown. Thorax yellow, greyish pruinose, the flat area in front of scutellum green or æneous green, this colour sometimes extended beyond the area; the bristles dark yellow or ferruginous. Scutellum and postscutellum yellow. Pleura yellow, slightly greyish pruinose; at the upper corner of the metapleura and at the sides of postscutellum a small, blackish spot; propleura with a whitish prothoracic bristle. Abdomen yellow, more or less darkened or green above on one or more of the middle segments; it is clothed with brown hairs, and has distinct hindmarginal bristles, long on the first segment. Venter yellow, with pale hairs. Hypopygium yellow. Legs yellow, tarsi slightly darkened towards the end, the last joint blackish. The legs have short, brown hairs, coxae pale-haired; front coxae with bristly hairs at the apex, posterior coxae each with a yellow bristle; the legs for the rest short-haired, a little longer hairs only below the middle femora; front tibiae and metatarsi not ciliated above; middle tibiae with two antero-dorsal and one postero-dorsal bristle; hind

tibiæ with a few bristles above. Wings a little yellowish tinged, most towards the anterior margin; veins brown; discal vein slightly curved and slightly converging towards the cubital vein. Squamulæ and fringes yellow. Halteres yellow.

Female. Epistoma a little broader than in the male, for the rest quite similar to it.

Length 2,5—2,8 mm.

X. tenellus is much rarer in Denmark than the preceding species; Ordrup Mose, Ermelund, Tisvilde, Faxe Ladeplads; it has thus hitherto only been taken on Sealand. My dates are ²⁹/₆—²⁸/₈. It occurs in similar localities as *ornatus*.

Geographical distribution:— Europe down into Italy; towards the north to middle Sweden, and in Finland.

31. **Bathycranium** Strobl.

Somewhat similar to *Xanthochlorus* in the exterior, but quite distinct. Head a little broader than thorax, about semiglobular, slightly arched behind. Vertex a little excavated (not strongly as Strobl says, his specimen may have been shrivelled), ocellar tubercle a little prominent. Frons broad, slightly narrowed towards the antennæ. Ocellar, outer vertical and postvertical bristles present, and besides a pair of small hairs on the posterior side of the ocellar tubercle. Eyes large, short-hairy; they are touching (or almost so) below the antennæ for a long distance in the male, well separated in the female. The postocular bristles in a single row, besides some hairs on the lower part of occiput. Antennæ inserted near to each other, highest in the male; they are a little elongated in the male, short in the female; the first joint obconical, the second short, on the inside triangularly overlapping the third, this latter is elongated triangular and pointed in the male, short and roundish triangular in the female; arista dorsal, rather near the apex; it is longer than the antennæ, its first joint somewhat short. The first antennal joint is distinctly hairy above, the second has bristles at the apical margin, longest above, the third is somewhat long-hairy, the arista distinctly pubescent. Epistoma in the male only present above as an elongated triangle, in the female moderately narrow; clypeus short and small, very small in the male, indistinctly separated from the epistoma, and not reaching the lower margin of the eyes. Proboscis not or almost not protruding, it and the oral aperture somewhat larger in the female than in the male. Thorax rectangular, high, and somewhat arched above; it has only an indistinct flat area behind (Strobl says about this "sehr deutlich"). Pro- and metathorax

small, the former with distinct bristles above in a transverse row. Acrostichal bristles present, short, uniserial; there are six dorsocentral bristles, further a humeral bristle and a couple of weak, a post-humeral, two notopleural, a præsutural, three supraalar and a postalar bristle; the front part of the disc with some small hairs. Propleura, with fine hairs but no bristle. Scutellum with two marginal bristles and with a small hair on each side, besides with some (4) very small hairs between the bristles. Abdomen a little elongated, compressed; in the male there are six visible dorsal segments, the first shorter than the following; on the ventral side there are, as far as I could see, five segments, the first as usual very small; the abdomen is rounded at the end, the hypopygium quite imbedded, the eighth segment however, and the small, as far as I could detect, united outer lamellæ may be seen. In the female there are five visible abdominal segments. Dot-like impressions are present on some of the segments, but not very distinct. The abdominal segments have short hind-marginal bristles. Legs somewhat slender, hind tarsi short, much shorter than the tibiæ, the metatarsus a little shorter than the second joint, without bristles. Posterior coxæ with a bristle, and posterior femora with a preapical bristle; front tibiæ with a dorsal bristle, middle tibiæ with three antero-dorsal, one postero-dorsal and one ventral bristle; posterior tibiæ besides with apical or preapical bristles. Claws, pulvilli and empodium small, the latter somewhat comb-shaped, with long bristles below. Wings in the male somewhat narrowed towards the base with the axillary lobe almost wanting, they are broader in the female with the axillary lobe moderate. The mediastinal vein terminating in the subcostal vein; discal and cubital vein almost parallel; posterior cross-vein a little behind the middle; anal vein quite short. The discal vein has a distinct convexity a little behind the posterior cross-vein. Squamulæ with a small angular lobe, bearing a long fringe, the inner part of squamulæ with longish hairs.

The developmental stages are not known.

Of the genus only one species is known, also occurring in Denmark.

1. *B. bicolorellum* Zett.

1843. Zett. Dipt. Scand. II, 617, 104 (*Dolichopus*). — 1862. Schin. F. A. I, 184 (*Xanthochlorus*). — 1892. Strobl, Wien. ent. Zeitg. XI, 102, 1. — 1903. Kat. paläarkt. Dipt. II, 350.

Male. Vertex and frons green, somewhat pruinose. Eyes touching for a long distance, epistoma only seen above, white. Palpi yellowish brown. Occiput greenish, grey pruinose; postocular bristles whitish, the uppermost are black. Antennæ somewhat elongated, third joint

elongated triangular, pointed, arista near the apex; the antennæ are yellow, the third joint a little brownish, especially towards the apex. Thorax and scutellum æneous or greenish, densely grey or greyish

Fig. 126. Antenna of *B. bicolorellum* ♂, from the inside. $\times 100$.
From a dried object.

brown pruinose, dull. Pleura slightly æneous, grey pruinose, hypopleura somewhat yellowish; propleura with fine, white hairs. Abdomen yellow, more or fewer of the posterior segments (in my sole male the three last) with indefinitely bordered dark brown, transverse bands towards the front margin; sometimes abdomen quite yellow; it is clothed with short, blackish hairs, and has short hindmarginal bristles, long on the first segment. Venter yellow, with pale hairs. Legs yellow, tarsi a little darkened towards the end. The legs have short, blackish hairs, coxæ pale-haired; the posterior coxæ each with a black bristle; the anterior femora have distantly placed, fine, longish hairs below, most obvious on the middle femora; posterior femora with a preapical bristle; front tibiæ with a dorsal bristle, middle tibiæ with three antero-dorsal, one postero-dorsal and one antero-ventral bristle; hind tibiæ with two rows of dorsal, and a pair of small ventral bristles. Wings a little yellowish tinged; veins brownish. Squamulæ pale yellow, with a yellow fringe. Halteres yellow.

Fig. 127. Antenna of *B. bicolorellum* ♀, from the inside. $\times 100$.
From a dried object.

Female. Frons somewhat bluish; epistoma somewhat broad, greyish white. Antennæ short, third joint not longer than broad, rounded in front. Thorax somewhat less densely pruinose than in the male. Length 2.5—2.7 mm.

B. bicolorellum is rare in Denmark, it has only been taken in Charlottenlund (Stæger) and in Lyngby Mose (the author); I took it on $\frac{3}{9}$. We have in all eight specimens, among which only one male, but some specimens were sent to Zetterstedt. In some manuscript notes from Stæger I read, that he took it on Alnus from June to October, and he suggests that there is more than one brood in the year.

Geographical distribution:— Northern and middle Europe down into Styria; towards the north to middle Sweden.

32. **Anepsiomyia** Bezzi.

(*Anepsius* Loew.)

Very small species. Head of the breadth of thorax or a little broader, somewhat semiglobular, a little arched behind. Vertex not excavated; ocellar tubercle a little prominent. Frons broad, broadest in the female, decreasing in breadth towards the antennæ. There are ocellar, outer vertical and postvertical bristles, and besides a pair of small hairs on the ocellar tubercle. Eyes large, somewhat oval, a little narrowed downwards, with short, almost microscopic hairs. The facets are slightly enlarged towards the epistoma in the male. The eyes are touching below the antennæ in the male¹, well separated in the female. The postocular bristles form a single row; on the lower part of occiput there are only a few hairs. Antennæ inserted near to each other above the middle; they are elongated in the male, short in the female; the basal joints are short, the second nearly simple; the third is in the male elongated, somewhat band-shaped, rounded at the end, in the female it is short, triangular, pointed; the arista is dorsal, inserted at the base of the third joint, in the female less near the base; it is longer than the antennæ, its first joint long. The basal antennal joint is hairy above, the second has small bristles at the apex, the third and the arista are distinctly haired, the former somewhat strongly. Epistoma narrow and disappearing above in the male, moderately broad in the female; the clypeus is short, indistinctly separated from the epistoma, bent a little angularly inwards; it does not reach the lower margin of the eyes. The proboscis is very slightly protruding, and only in the female, it and the oral aperture are somewhat larger in this sex than in the male. Thorax rectangular, somewhat high, and distinctly arched above; behind there is a flat

¹ Loew figures in Mon. of Dipt. of N. Am. II, Pl. IV, fig. 14a the head of the male, it shows a distinct, not quite narrow epistoma; if this is correct, my male may have the face contracted by exsiccation. Loew's figure of the antenna of the male, 14b, is not correct, the third joint is relatively longer and not pointed.

or slightly concave space. Acrostichal bristles absent; there are six dorsocentral bristles, further a humeral bristle, a posthumeral, two notopleural, a præsutural, only two supraalar, and a postalar bristle; there are only few, small hairs on the front part of the disc. Propleura have small hairs. Scutellum with two marginal bristles, and at each side a very small hair. Abdomen compressed; in the male there are five visible dorsal segments, the first shorter than the following; as far as I could see there are four visible ventral segments, the others being folded up. The hypopygium lies exposed at the end of abdomen, directed downwards and forwards; the eighth segment is rather large, with some (2) bristles; there seem to be distinct ventral lobes with small spines at the apex, and there are linear outer lamellæ, with long hairs; they are not united, but quite free. In the female there are five visible abdominal segments, the last somewhat long, and the abdomen terminates with a small ovipositor with longish hairs, and some small spines above at the apex. The abdominal segments have short hindmarginal bristles, somewhat longer on the first segment. Legs slender and somewhat long; hind metatarsus of the length of the second joint, without bristles; in the male the front femora are slightly thickened, and these and the tibiæ armed with bristles below, and likewise the middle femora; the posterior coxæ have each a bristle; femora without preapical bristles; middle tibiæ with about two antero-dorsal, two postero-dorsal bristles, and one or two small ventral bristles; posterior tibiæ with small apical or preapical bristles. There are two small claws and pulvilli, and a narrow, linear empodium with bristles below. Wings with the mediastinal vein terminating in the subcostal vein; the discal vein almost straight, parallel with the cubital vein; posterior cross-vein about in the middle; anal vein weak and short. Axillary lobe somewhat developed. The discal vein has a little convexity somewhat behind the posterior cross-vein. Squamulæ with a small angular lobe and a long fringe; the inner part of squamulæ with short hairs.

The developmental stages are not known.

Of the genus only one palæarctic species is known, also occurring in Denmark.

1. *A. flaviventris* Meig.

1824. Meig. Syst. Besch. IV, 58, 28, et 1830. VI, 363 (*Porphyrops*), et 1838. VII, 155 (*Medeterus*). — 1862. Schin. F. A. I, 191. — 1903. Kat. paläarkt. Dipt. II, 350.

Male. Vertex and frons blackish, dark grey pruinose. Eyes touching below the antennæ, the epistoma only visible below, white.

Palpi white. Occiput black, grey pruinose downwards; postocular bristles black above, yellowish below. Antennæ black, third joint long, somewhat band-shaped, rounded at the apex, brownish; arista inserted at the base. Thorax black, a little greenish or bluish, much

Fig. 128. Antenna of *A. flaviventris* ♂, from the inside. $\times 135$.
From a dried object.

shining. Pleura yellow, below the wing-root a black, triangular spot; propleura with some pale hairs. Abdomen black, the larger basal part (the four first segments) yellowish; it is clothed with short, blackish hairs, and has short hindmarginal bristles, a little longer on the first segment. Venter yellowish. Hypopygium black, the outer lamellæ dark brownish, linear, with long hairs. Legs yellow, tarsi a little darkened towards the end. The legs have short, black hairs; posterior coxæ each with a black bristle; front femora a little thickened towards the base, with two rows of long bristles below; front tibiæ likewise with two rows of finer bristles; front tarsi, especially metatarsus, ciliated below; middle femora with a row of about six ventral bristles in the middle, the tibiæ with two antero-dorsal, one or two postero-dorsal, and likewise one or two small ventral bristles below the middle; hind femora with a ventral bristle before the middle, and

Fig. 129. Antenna of *A. flaviventris* ♀, from the inside. $\times 135$.
From a dried object.

the tibiæ with a few, small dorsal bristles. Wings somewhat brownish tinged; veins black. Squamulæ yellow, with a blackish fringe. Halteres yellow.

Female. Epistoma somewhat broad, grey or whitish grey. Palpi greyish brown. Antennæ considerably shorter than in the male, third

joint slightly longer than broad, triangular, pointed. Abdomen quite black. Legs without the special bristles on the front femora and tibiæ and the middle femora.

Length 2 to fully 2 mm.

A. flaviventris is very rare in Denmark, only four specimens, a male and three females, have been taken in Jutland at Hald near Viborg on ²⁸/₆ 1910 (the author); it was taken with the net in grass and low herbage on a shaded place near a streamlet.

Geographical distribution:— Northern and middle Europe down into Germany and Bohemia; its northern limit is in Denmark, and it occurs in England.

33. **Acropsilus** Mik.

This genus has been found to show some resemblance to *Chrysotus*, and it was first separated from this by Mik in 1878; Loew, the founder of the sole species, and Kowarz had however earlier both declared that it was no real *Chrysotus*, and I think the genus is better placed in the *Hydrophorinae* than in the *Diaphorinae*; already Loew called (l. c.) attention to its relation with *Medeterus*, on account of the short metatarsus, the bristles on thorax and some other characters; but I think its place may be near *Schoenophilus*, as it has no acrostichal bristles. It is, with regard to its relations, interesting to see, that Strobl erroneously formed the genus *Pseudacropsilus* (Wien. ent. Zeitg. XVIII, 1899, 122), which should be nearly related to *Acropsilus*, on *Schoenophilus versutus* and *Micromorphus albipes*, thus giving thereby in reality an indication of the relation of *Acropsilus* to these genera. The only species is small, of dark, blackish colour. As I have examined only one female specimen, I shall only give some characters, partly from the cited authors. The frons is broad; there are ocellar, outer vertical and postvertical bristles. The eyes are hairy; they are somewhat narrowly separated below in the male, as the epistoma is narrowed downwards; in the female they are more separated, the epistoma being broader, and in this sex the clypeus is somewhat prominent below and bears here some bristles; it does not reach the lower margin of the eyes. The postocular bristles form a single row. Antennæ short, of a shape about as in *Medeterus*, the third joint small, somewhat roundish; the arista is dorsal, but somewhat subapical, longer than the antennæ¹. The first antennal joint

¹ Mik gives as distinguishing character against *Chrysotus* that the arista is distinctly dorsal, but in several species of *Chrysotus* it has a similar dorsal position. Loew says about the arista "endständig".

has no hairs, the second small bristles, the third and the arista are hairy. The palpi are larger in the female than in the male. Thorax has no acrostichal bristles; in my specimen there are five dorso-central bristles, but alternating with them some small hairs. Scutellum bare, with two strong marginal bristles, and at each side a small hair. Propleura with a few hairs below, among which one a little stronger. Abdomen somewhat short; the hypopygium free (Mik), without bristles on the eighth segment; the outer lamellæ small, elongated oval, hairy. Abdomen in the female with five visible segments. There are dot-like impressions at the side margins of the second, third and fourth segments. The abdominal segments, except the first, have no distinct hindmarginal bristles. Legs somewhat short, the hind metatarsi very short, about a quarter of the length of the second joint, in the female scarcely half as long as the second joint. The legs have very few bristles, femora without preapical or other bristles; front tibiæ without bristles, middle tibiæ with two antero-dorsal and one postero-dorsal bristle. Wings of usual shape; the mediastinal vein terminating in the subcostal vein; the discal vein straight, quite parallel with the cubital vein; posterior cross-vein placed behind the middle, the last part of the postical vein only a little longer than the cross-vein; anal vein not reaching the margin. Axillary lobe moderately developed. The discal vein has no convexity. Squamulæ small, with a small angular lobe, bearing a long fringe, and with shorter hairs on the inner part of the squamulæ.

The genus only contains one species, also occurring in Denmark.

1. *A. niger* Loew.

1869. Loew, Besch. eur. Dipt. I, 198, 177 (*Chrysotus*). — 1874. Kow. Verhandl. zool. bot. Gesell. Wien, XXIV, 476 (*Chrysotus*). — 1878. Mik, Dipt. Unters. Jahresber. k. k. akad. Gymn. Wien, 6, Taf. I, Fig. 6—9. — 1903. Kat. paläarkt. Dipt. II, 320.

Of this species I have only examined the female which I therefore describe, and I then add the special male characters, taken from Loew's description.

Vertex and frons black, shining. Epistoma somewhat broad, black, below a little prominent, and here bearing some distinct bristles. Palpi somewhat large, blackish grey. Occiput black, a little greyish pruinose; postocular bristles black. Antennæ black, short, the third joint roundish. Thorax black, somewhat brownish pruinose, but shining. Pleura dark grey pruinose. Abdomen black, somewhat pruinose, slightly shining; it is clothed with short, black hairs, almost

not longer at the hind margins of the segments; only the first segment with longer hindmarginal bristles. Venter greyish, with brownish hairs. Legs quite blackish or dark brownish, coxæ a little greyish, trochanters paler brown; hind metatarsus scarcely half as long as the second joint. The legs have very short, black hairs; front tibiæ without bristles; middle tibiæ with two distinct antero-dorsal and one postero-dorsal bristle; hind tibiæ with a pair of dorsal bristles near the base and one just above the apex, and on the ventral side with a couple of very small bristles. Wings brown, almost blackish brown; veins blackish. Squamulæ brownish or blackish, with a black fringe. Halteres yellowish brown.

The male has the epistoma narrow downwards, and without bristles. Palpi smaller than in the female, black. Hypopygium short, black, the outer lamellæ elongated oval, yellow, hairy. The hind metatarsus still shorter than in the female, about a quarter of the length of the second joint.

Length 1,8 mm.

A. niger is very rare in Denmark, only one specimen, a female, has been taken in July 1883, on Bornholm at Allinge (H. J. Hansen).

Geographical distribution:— The species has otherwise only been found in Hungary.

34. **Thinophilus** Wahlbg.

Species of medium size, and of dark, slightly metallic colours. Head a little broader than thorax, about as broad as high, almost squarely roundish in circumference, a little narrowed downwards; it is slightly arched behind. Vertex a little excavated, ocellar tubercle prominent. Frons broad, a little decreasing in breadth towards the antennæ. There are ocellar, outer vertical and postvertical bristles, the latter placed towards the middle; besides there are some small hairs on the posterior side of the ocellar tubercle. Eyes large, somewhat oval, narrowed downwards; they are densely hairy. The facets are slightly enlarged towards the epistoma. In the living specimens the eyes are metallic green, with the upper corner reddish; they are broadly separated in both sexes, most in the female. The postocular bristles form a single row above, the lower part of the occiput is covered with hairs; just above, at the upper eye-corner, there are about three small bristles outside to the row. The antennæ are inserted near to each other, somewhat high above the middle; they are short, of the same shape in both sexes, the third joint is roundish

or slightly and truncately pointed; the second overlaps the third triangularly in the middle on the inside, and above on the outside; arista dorsal, somewhat longer than the antennæ, its first joint short. The first antennal joint is bare, the second has small bristles at the apical margin, the third is distinctly hairy, and the arista short-hairy. Epistoma somewhat broad, and broadest in the female; the clypeus is short, it is indistinctly separated from the epistoma by a small notch or tubercle at each side; it is somewhat arched, with the lower margin a little angular and forming a nose-like protruding point in the middle; it does not reach the lower margin of the eyes. The proboscis is thick, somewhat protruding; it and the oral aperture a little larger in the female than in the male. The maxillary palpi are very large, squamiform, and likewise larger in the female than in the male. Thorax rectangular, somewhat high, and a little arched above; pro- and metathorax small, the former with a transverse row of very small bristles. No acrostichal bristles; there are six dorsocentral bristles, the first generally a little smaller than the other, further a humeral bristle and some small hairs, a posthumeral, only one notopleural, a præsutural, but small, three supraalar, and a postalar bristle. The disc has only few small hairs on the front part, but some of them a little strong. Propleura have some hairs and about two bristles. Scutellum with two long marginal bristles, and a smaller hair or bristle on each side. Abdomen depressed, and narrow towards the end; in the male there are five visible dorsal segments of about the same length; also the small sixth segment is generally seen; on the ventral side there are, I think, four normal segments; the seventh segment is small and quite hidden. Hypopygium small, bent in under abdomen, the base of it with the eighth segment is seen at the apex of abdomen. I have not been able to examine the hypopygium more closely, but there are some ventral lobes or inner lamellæ, and a pair of somewhat linear outer lamellæ with long hairs; they seem to be united in the basal part. In the female there are five visible abdominal segments. Dot-like impressions at the side margins are present on the second, third and fourth segments, at all events in the female. The abdominal segments have small and indistinct hindmarginal bristles only at the sides, they are longer on the first segment. Legs simple, somewhat slender, hind metatarsus about of the length of the second joint, without bristles. The posterior coxæ have each a bristle; the posterior femora have a preapical bristle at some distance from the apex; front tibiæ with some dorsal bristles; middle tibiæ with three antero-dorsal and three postero-dorsal bristles, and with two or three ventral bristles; besides the

posterior tibiæ have apical or preapical bristles. There are two claws, two pulvilli, and a somewhat long, linear empodium with bristles below, and thus somewhat comb-shaped. Wings somewhat long; the mediastinal vein terminating in the subcostal vein; discal vein slightly and evenly curved, and a little converging towards the cubital vein; posterior cross-vein about in the middle of the wing; anal vein not specially short. Axillary lobe well developed. The discal vein has a convexity in the middle of its last part. Squamulæ with a small angular lobe, bearing a very short fringe, and with the inner part short-haired¹.

The developmental stages are not known.

The species of *Thinophilus* occur on salt marshes and at the shore.

Of the genus 11 species are known from the palæarctic region; one occurs in Denmark.

1. *T. ruficornis* Hal.

1838. Hal. Ann. Nat. Hist. II, 184 (*Medeterus*). — 1862. Schin. F. A. I, 228. — 1903. Kat. paläarkt. Dipt. II, 352. — *Rhaphium maculicorne* Zett. 1843. Dipt. Scand. II, 474, 15, et 1849. VIII, 3062, 15. — *Thinophilus maculicornis* Zett. ibid. 1849. VIII, 3103, 2.

Male. Vertex and frons dark æneous or bluish, a little brownish pruinose. Epistoma broad, brown or yellowish brown. Palpi ferruginous. Occiput brownish above, grey downwards; postocular bristles black

Fig. 130. Antenna of *T. ruficornis* ♂, from the inside. $\times 120$.
From a dried object.

above, the hairs below white or yellowish. Antennæ reddish or brownish red, the second and third joint darker brown above and at the apex. Thorax greenish blue or æneous to coppery, dark olive brown pruinose,

¹ Girschner says (Ill. Zeitschr. für Entom. 1897, 558) about *Thinophilus*: "Das fächertragende Plättchen spitz"; in *ruficornis*, the only species I have examined, I find it small, but not pointed. Girschner says nothing about the very short fringe, which is so short that Zetterstedt says of the squamulæ "an detritæ".

often so densely as to hide the ground colour, with two faint, narrow, dark brown stripes in the middle. Pleura slightly æneous, grey or brown pruinose; propleura with some pale hairs, among which two bristles. Abdomen green, æneous or more coppery, grey pruinose at the sides, especially on the hind corners of the segments; it is clothed with short, black hairs; at the sides there are small and slightly distinct hindmarginal bristles, long only on the first segment. Venter grey. The outer lamellæ of the hypopygium reddish, with long hairs. Legs yellow or brownish yellow, posterior coxæ grey with the apex yellowish; tibiæ more or less brownish, especially towards the apex, and here often blackish to a smaller or greater extent; tarsi black, sometimes the base a little paler. The legs have short, blackish hairs; posterior coxæ each with a black bristle; femora mainly short-haired, posterior femora with a preapical bristle; front tibiæ with some dorsal bristles, middle tibiæ with about three antero-dorsal, three postero-dorsal and two or three ventral bristles; hind tibiæ with some dorsal bristles in two rows, and some small ventral bristles. Wings somewhat blackish tinged; veins black, the last part of the discal vein with a slight curve. Squamulæ yellow, with a very short, pale fringe. Halteres yellow.

Female. Epistoma broader than in the male, æneous or coppery as it is more thinly pruinose. Wings more brown. For the rest similar to the male.

Length 3—4 mm.

T. ruficornis is very rare in Denmark, I have only taken five specimens on Fæno on 20th 1907; they were taken on a salt marsh at a little lagoon with brackish water; Mr. Th. Becker took it on Bornholm.

Geographical distribution:— Europe down into Spain; towards the north to middle Sweden.

35. **Schoenophilus** Mik.

This genus, which was created by Mik in 1878, agrees in all essential respects with the preceding; the chief differences are: The third antennal joint is quite round, the arista is inserted near the middle of the front margin and thus subapical or almost apical. There are only four dorsocentral bristles (according to Mik, my specimens do not show it with certainty); no præsutural bristle, and only two supraalar; there are only very few and small hairs on the front part of the disc. Scutellum with two marginal bristles.

I have kept the genus here, though I am not sure that this is correct; it is one of Mik's numerous genera, which were not all valid. The character from the scutellar bristles is a slight one; in *T. ruficornis* the outer bristles are small, and moreover varying in size, sometimes very small. The difference in the thoracic bristles is also questionable, and when all species of *Thinophilus* are examined (my generic description is chiefly based on *ruficornis*) I doubt whether the characters will hold good.

Of the genus only one species is known, also occurring in Denmark.

1. *S. versutus* Walk.

1851. Walk. Ins. Brit. I, 192, 3 (*Thinophilus*). — 1855. Zett. Dipt. Scand. XII, 4641, 3 (*Thinophilus*). — 1903. Kat. paläarkt. Dipt. II, 352. — 1909. Strobl, Verhandl. zool. bot. Gesell. Wien, LIX, 188. — *Pseudacropsilus maculipennis* Strobl, 1899. Wien. ent. Zeitg. XVIII, 123, 79.

Male. Vertex and frons brown. Epistoma broad, brown. Palpi brownish. Occiput slightly greenish, grey pruinose; postocular bristles black above, yellowish below. Antennæ blackish, a little yellowish at the base and below; arista practically apical. Thorax greyish brown, dull. Pleura slightly greenish or æneous, grey pruinose; propleura with some pale hairs among which a pair of bristles. Abdomen very slightly greenish or æneous, grey pruinose; it is thinly clothed with short, black hairs, and has small hindmarginal bristles at the sides, longer on the first segment. Venter grey. Legs with the coxæ grey, femora blackish, a little greyish pruinose; the apex of the femora, the tibiæ and tarsi yellowish brown or reddish brown, the tarsi darker at the apex. The legs have short, blackish hairs; posterior coxæ each with a black bristle; the femora have a little longish, distantly placed hairs below, and at the apex a pair of bristly hairs below on each side; posterior femora with a preapical bristle; the front tibiæ are short ciliated below, without bristles above; middle tibiæ with about two antero-dorsal and two postero-dorsal bristles, but no ventral bristles, and hind tibiæ with some few bristles on the dorsal and antero-dorsal sides. Wings somewhat grey or brownish tinged; veins black; the discal vein straight, parallel with the cubital vein; the posterior cross-vein is slightly blackish seamed, and on the middle of the last part of the discal vein is a faint blackish spot. Squamulæ dirtily whitish, with a very short, pale fringe. Halteres yellow or a little brownish.

Female. Epistoma broader than in the male, greyish brown; for the rest quite similar to the male.

Length 2 to fully 2 mm.

S. versutus is very rare in Denmark, only two specimens, a male and a female, have been taken in Jutland, one at Horsens, the other at Frederikshavn, in July 1881 and 1883 (H. J. Hansen).

Geographical distribution:— Europe down into Spain, and further in North Africa (Becker, as *Pseudacropsilus maculipennis*); towards the north to southern Sweden.

Addenda et Corrigenda.

Part. III.

Page 7 Line 12 for "*Microphorus*" read "*Trichina* 189".

- 49 — 13 and 14, page 51 line 14 and page 323 line 30: The locality Allerup recorded here is not near Esbjerg but in Vendsyssel.
- 87 — 36 for "*decora*" read "*stercorea*"
- 108 — 29 for "... 5" read "... 4"
- 162 — On the figure a dividing line has unfortunately been drawn on the last joint, so that the tarsus has six joints; when the line is removed the relative length of the joints is otherwise correct.
- 230 — 14 for "anal vein" read "lower branch of the postical vein"

Part. IV.

Page 15 Line 8, page 17 line 27 and page 23 line 3 for "*Tinophilus*" read "*Thinophilus*"

- 19 — 40, page 21 line 34 and page 22 line 29 for "*Teuchophorus*" read "*Teuchophilus*"
- 21 — 32 for "*Tinophilinae*" read "*Thinophilinae*"
- 28 — 16 for "middle metatarsi" read "middle tarsi"
- 70 — 21 for "*D. stratus*" read "*D. atratus*"
- 86 — 8 for "joint" read "point"
- 96 — To the explanation under the figure add "♂"
- 99 — 11 for "IV, 45, 28." read "IV, 88, 28."
- 156 — 27 for "front tibiæ with two ventral rows." read "front tibiæ with more and longer bristles ventrally, and middle tibiæ with two ventral rows."
- 161 — 10 for "Verral" read "Verrall"
- 165 — 37 for "it" read "the epistoma"
- 189 — 33 for "hind femora" read "posterior femora"
- 202 — 19 for "Zett." read "Zell."
- 223 — 32 after "two notopleural," add "a præsutural,"
- 300 — 1 the ¹ refers to the foot-note on the foregoing page.

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Synonyms are given in italics. References to Genera and Species which are not Danish have the page in italics.

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