

NOTES ON THE GENUS *APISTOMYIA* [DIPTERA] AND DESCRIPTION
OF A NEW SPECIES.

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(Communicated by I. M. Mackerras.)

(Fourteen Text-figures.)

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The genus *Apistomyia* is one of the best characterized among the Paltostominae, especially on account of the peculiar shape of the simple radial sector which is curved upwards in its distal part in such a way as to reach the costa very near the tip of R_1 , on account of its glassy wings with a dark apical spot in the females of most species, and the typical coloration of the abdomen with silvery-grey transverse bands either complete or interrupted.

Five species, including the one hereafter described, are now known to belong to this genus, the distribution of which is a fairly wide one from the Mediterranean region, through the north of India to Malaya and to the east coast of Australia.

The first species to be described, *A. elegans* Bigot, was discovered in Corsica, and in spite of Bezzi's prediction that it would be found also in Sardinia and on the Italian peninsula, Cyprus is so far the only other locality from which it has been recorded.

Why this species has not been able to maintain itself on the mainland of Europe is a puzzle; the more so that it seems to be able to hold its own in Corsica where other species of Blepharoceridae exist in the same mountain streams, apparently living in association with it. The larva of *A. elegans* remained unknown for nearly sixty years and it is only quite recently that Edwards (1928) made it known; he mentions capturing it in the river Porto at its junction with the Aitone, at which spot he also found larvae of *Liponeura decipiens* and *L. bischoffi*, although he does not specially mention finding these three species in association. It must be noted also that species of *Apistomyia* are found in India and in New South Wales in association with other species of Blepharoceridae. The fact that *A. elegans* is absent from the mountain ranges of Europe cannot therefore be explained by the competition between species.

Apistomyia larvae seem to prefer spots where a large amount of water is falling directly on to them, such as the foot of a fall, as was observed for *A. elegans* by Edwards, by myself for *A. tonnoiri* and by Dr. Mackerras for the species hereafter described. Similar habitats abound in the mountain ranges of Europe, therefore this larval preference does not explain the absence of *A. elegans* from the European mainland.

The second species to be made known, *A. indica* Brunn. from Kashmir, is one of the many species which apparently exist in the Himalayan region. In a fine collection of Blepharocerid larvae from India, kindly submitted to me for study by Dr. S. L. Hora, and on which a report is being published elsewhere, I found five larval forms which I consider may belong to as many species, unless they be races of the same species, but even in that case the abundance of these larvae and their universal distribution throughout the Himalayan ranges indicate that the centre of origin of this genus may well have been in Northern India.

In his splendid study of the Blepharoceridae Bezzi (1912) described a third species, *A. collini*, from Queensland; but in spite of a detailed description, this species is not well known, as only one female specimen has ever been found.

Dr. Tillyard (1922) discovered and described the fourth species, *A. tonnoiri*, from the Blue Mountains in New South Wales, and the larva and pupa, which were found at the same time, were described by me (1923) a little later, this being the first time that the early stages of this genus were made known; all those of other species found since then are as strikingly characteristic of the genus as are the imagines.

In view of the presence of *Apistomyia* in India and in Australia, the recent discovery of that genus in Java does not come as a surprise. This species, on account of the complete anal vein, shows closer affinity with the northern species *A. elegans* and *A. indica* than with the Australian *A. collini* and *A. tonnoiri*.

The facts, that these last two species are somewhat more specialized and that this genus is absent from Tasmania, tend to show that *Apistomyia* is a comparatively recent immigrant from the north into Australia. In spite of extensive search for Blepharoceridae in New Zealand, this genus has never been found there yet and it is not likely to occur; its absence from that country is rather surprising, as the three endemic genera occurring there, *Neocurupira**, *Paracurupira* and *Peritheates*, are all closely related to *Apistomyia*, but are more generalized. They are not found in Australia, yet the Blepharocerid fauna of New Zealand must have come from the north as no primitive genus related to *Edwardsina*, which is evidently of southern origin and so well represented in Tasmania, is to be found in that country.

All the known species of *Apistomyia* can be differentiated in the adult stage by means of the following table:

- | | |
|---|-------------------------------|
| 1. Anal vein complete, reaching the wing margin; female with a distinct dark spot at apex of wing | 2 |
| Anal vein incomplete; no definite dark markings on the wings in either sex | 4 |
| 2. Thorax with two distinct narrow whitish vittae on the disc of the mesonotum or else with three wide black vittae on greyish-white background, or else coloration mostly orange in the female; larger species | 3 |
| Thorax without submedian narrow pale vittae; coloration blackish in female; smaller species | <i>A. mackerrasi</i> , n. sp. |
| 3. Second antennal segment flat and dilated in female | <i>A. trilineata</i> Brunn. |
| Second antennal segment normal; coloration of female often mostly orange | <i>A. elegans</i> Big. |

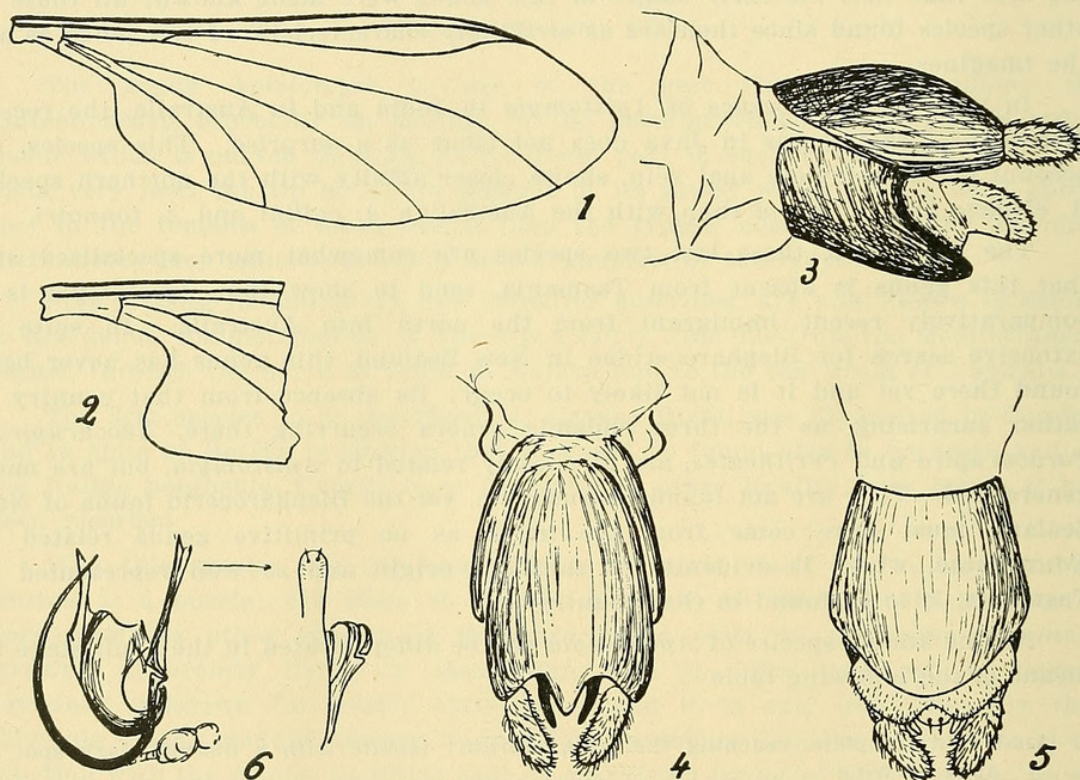
* It is not at all certain that the Australian species *N. nicholsoni* which Tillyard refers to *Neocurupira* is congeneric with the genotype *N. hudsoni* Lamb from New Zealand.

4. Wing clear; transverse basal whitish bands of abdominal tergites interrupted *A. tonnoiri* Till.
 Wing infuscated; abdominal pale bands complete *A. collini* Bezzi

As can be seen from this key, there are not many morphological features which can be used for differentiating the species.

The eye structure, as already noted by Bischoff (1928), differs in the sexes, in that the region of large facets is more developed than the one of small facets in the male, whereas it is the reverse in the female; this proportion may vary to some extent for each species, and so does the length of the proboscis as compared with the height of the head capsule.

The relative length of the antennal segments is also peculiar to each species, especially in the three or four basal segments. Usually there is no dimorphism in the structure of the antennae, but in the Indian species the pedicel of the female



Text-figures 1-6.

1.—Wing venation of male of *Apistomyia mackerrasi*. 2.—Anal lobe of female of *A. mackerrasi*? 3.—Hypopygium of *A. mackerrasi* from the side. 4.—The same from above. 5.—The same from below. 6.—Aedeagus removed from hypopygium and seen from the side.

is flat and dilated, whereas it is subnormal in the male; this observation has been made on imagines dissected out of some pupae of the Hora collection; the male of *A. indica* is so far unknown, so that no observation could be made on that point in this species.

The wing shape is very constant within the genus and there is apparently no sexual dimorphism of that organ, except perhaps in *A. mackerrasi*, as the female

which I refer to that species has a distinctly produced anal lobe (Text-fig. 2) which is not found in the male or in any other species. Such a produced anal lobe is a feature of some species of *Edwardsina*, *Philorus* and *Hapalothrix*, but this character is not sexually dimorphic in these genera.

The base of Rs is not always absent, as shown in the figures given by different authors, including Bischoff, for *A. elegans*. According to Bezzi, it is present in *A. collini* and I have ascertained its presence in *A. tonnoiri* and *A. mackerrasi*, whereas in *A. indica* there is a close contact between R_1 and the curve formed by r-m and Rs. This basal segment of Rs is rather difficult to detect on account of its smallness, so that it may easily have been overlooked in *A. elegans*.

The male genitalia of the various species of *Apistomyia* differ but little, as is often the case in the family. I have made a detailed study of the hypopygium of *A. mackerrasi* and its various aspects are depicted in Text-figures 3 to 6; the same organ of *A. tonnoiri* has also been dissected and found to be very little different from the one here figured even in the intimate structure of the aedeagus. To my knowledge the hypopygium of *A. elegans* has been figured only by Bischoff (1928, p. 261), so that the genitalia of the three species whose males are known show that the best, although rather precarious, character of differentiation, is to be found in the relative length of the forceps (styles) as compared with that of the fused coxites. In *A. tonnoiri* the styles are as long as the coxites, in *A. mackerrasi* one-third and in *A. elegans* two-thirds (according to Bischoff's drawing) as long.

In the first two species the parameres are much longer and stronger than the three filaments of the penis which can be easily overlooked on account of their small size.

APISTOMYIA MACKERRASI, n. sp.

♂. Head and its appendages blackish, face greyish; upper portion of large facets more brightly red than the lower. Thorax silvery-grey, except on the disc of the mesonotum and the whole of the scutellum which are velvety-black. Abdomen velvety-black, with the first tergite completely grey and an anterior silvery-grey triangle on the sides of the following tergites; on the basal segments these markings are more extensive and not so distinctly triangular. Hypopygium velvety-black above, brownish below. Halteres with orange stem and brownish-black knob. Legs brown, the base of the anterior femora paler. Wing completely hyaline.

Head: Eyes hairy, region of large facets distinctly larger than the one of small facets, especially when seen from the side; ocellar triangle little produced. Antennae short, ten-segmented, the first shorter than the second which is a little longer than broad, the third longer than broad, but the following one shorter than broad, the last ovoid and somewhat longer than broad. Proboscis one and a half times as long as the head, the labella shorter than the basal part of the proboscis.

Tibial spur formula, 0.0.2; fore and mid femora subequal, fore tibiae and tarsi distinctly longer than the mid pair; hind legs very much elongate, their femora, tibiae and tarsi subequal to each other.

The relative lengths of the different segments of the legs are as follows:

Legs.	I.	II.	III.
Femora	15	17	49
Tibiae	22	19	49
Tarsi: 1	17	10	20
2	5	5	12
3	4	2	10
4	3	2	7
5	3	3	5

All the claws finely denticulated (4-5 teeth).

Wing venation as depicted in Text-figure 1, quite normal for an *Apistomyia*; base of Rs distinct.

Hypopygium as depicted in Text-figures 3-6.

Length of body, 3.5 mm.; wing, 4 mm.; hind legs, 11 mm.

Type from Mt. Malabar, near radio station, Java, 4,400 feet, 26th May, 1929, I. M. Mackerras. Collected on leaves of small bush along a path, 20 yards from the stream in which some larvae were subsequently discovered. Paratype: One male with crumpled wings and swollen abdomen, evidently immature, but apparently identical with type; it was collected in the same situation as the type but two hundred yards at least further up the valley. Allotype: The female here described is doubtfully referred to the same species on account of the different wing shape; the only specimen of that sex was captured in the same locality as the males, but at a good distance from them.

Coloration similar to that of the male, that is, velvety-black with silvery-grey markings, but these are more extensive in this sex. Frons with orbital grey margin; face grey; antennae more greyish than in the male. Coloration of thorax as in the male, the pale humeral markings more extensive. Abdomen velvety-black, first tergite completely silvery-grey, the following ones with a narrow transverse basal greyish band, sometimes very narrowly interrupted in the middle. Terminal lamellae brown. Wing with a small apical infuscation; the anal lobe also somewhat infuscated on the margin.

Head: Frons very wide, but as the eyes are crumpled the proportion cannot be made out; the region of large facets about one-fourth the height of the head, the facets not much larger than those of the lower region. Antennae as in male, the second segment proportionately a little larger. Proboscis three times as long as the height of the head; palpi as usual, very small and apparently one-segmented. The proportion of the different segments of the legs as follows:

Legs.	I.	II.	III.
Femora	20	20	55
Tibiae	25	22	55
Tarsi: 1	12	10	27
2	5	5	14
3	4	4	10
4	3	3	8
5	4	4	7

All the claws finely denticulated.

Wings as in male, but the anal lobe much more produced as depicted in Text-figure 2.

Length of body, 5.5 mm.; wing, 5.5; hind legs, 12 mm.

Larvae and Pupae.

The material collected by Dr. Mackerras in the stream along which the three imagines described above were captured, consists of about fifty larvae and thirty pupae which evidently do not all belong to the same species and perhaps not to the same genus.

This material is composed as follows:

A. Typical *Apistomyia* larvae, the majority in the fourth instar, a few in the third.

B. Numerous *Apistomyia* pupae with internal lamellae of the breathing organ pointed.

C. A few similar pupae but with the internal lamellae of the breathing organ blunt or truncate.

D. A number of larvae in the fourth and third instars with some characters of *Apistomyia*, yet with the end of the body shaped more as in *Liponeura* or *Blepharocera*.

Larva A. Text-figure 7.

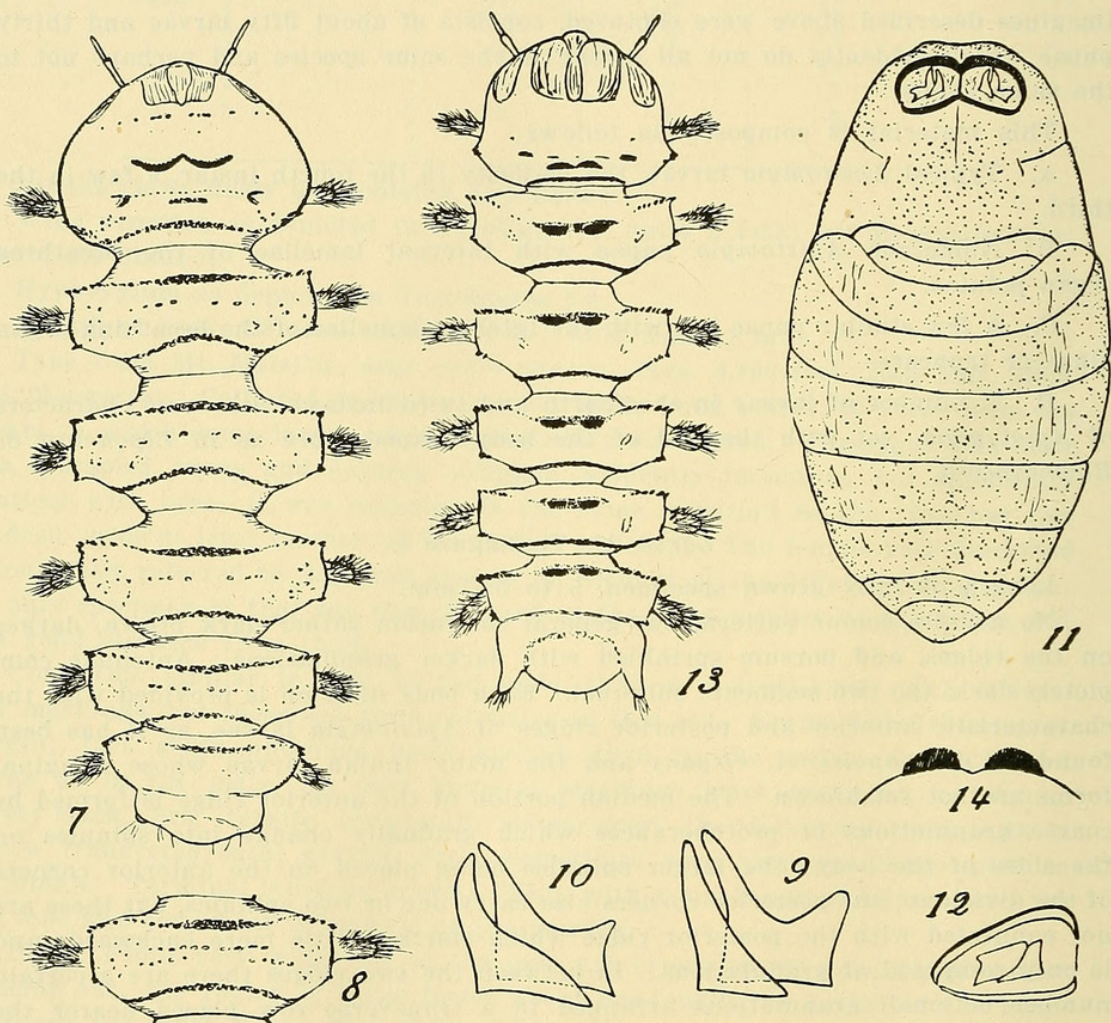
Length of fully grown specimen, 5 to 5.5 mm.

No definite colour pattern, but general coloration rather dark brown, darker on the ridges, and dorsum sprinkled with darker granulations. Antennae completely dark, the two segments subequal. Each body division is provided with the characteristic anterior and posterior ridges of *Apistomyia* larvae, as it has been found in *A. tonnoiri*, *A. elegans* and the many Indian larvae whose imaginal forms are not yet known. The median portion of the anterior ridge is formed by coarse granulations or protuberances which gradually change into spinules on the sides of the body; the larger spinules being placed on the anterior corners of the divisions; the posterior corners also carry one or two spinules, but these are not connected with the posterior ridge which starts a little more backwards and is only composed of granulations. In between the two ridges there are a certain number of small granulations arranged in a transverse row placed nearer the anterior ridge; this line is composed of six to eight granulations and is sometimes interrupted in the middle, on the sides of the divisions the granulations are smaller and scattered without any apparent order. Some specimens exhibit a second row of these small granulations behind the one just mentioned (Text-fig. 8). This row is more widely interrupted in the middle and somewhat oblique and curved. I thought at first that these specimens might belong to a different species because the pupal breathing organ dissected out of two of them seemed to differ slightly from those of the first type in the shape of the internal lamellae (compare Text-figs. 9 and 10), but this difference is not very great and, besides, there are intermediate types having from one to eight or more granulations placed behind the first row.

The lateral appendages carry long hairs dorsally and apically as well as smaller spinulous bristles which are not always very distinct. The last body

division is provided with two pairs of appendages; those placed on the sides of the penultimate segment are very small as is the rule in *Apistomyia* and are not readily visible from above.

The gill tufts are composed of five filaments, one turned backwards and the others forwards; the most internal one of the latter is in appearance two-segmented, but it is not doubled as in the Indian species of this genus.



Text-figures 7-14.

7.—Larva A. 8.—A median division of a specimen of larva A with two rows of granulations. 9 and 10.—Two types of pupal internal lamellae extracted from larva A. 11.—Pupa B. 12.—Breathing organ of pupa C. 13.—Larva D. 14.—Dorsal brushes of larva D seen in profile.

In the few larvae in the third instar, the gill tufts are composed, as usual, of only three filaments, two turned forwards and one backwards; for the rest these larvae are similar, also in the antennal structure, to the fully grown ones with the exception of the very small lateral appendages of the penultimate segment which are completely visible from above; there are no small granulations between the two main ridges of the divisions.

Length, about 3 mm.

Several fully-grown specimens of this type of larva are in the prepupal stage and the shape of the lamellae of the breathing organ of the pupa could be ascertained by dissection as shown in Text-figure 9; this shape corresponds well to that of the majority of the pupae contained in the material.

Pupa B.

This pupa, depicted in Text-figure 11, which should replace a detailed description, does not differ from any of those known in the genus *Apistomyia* except for the shape of the internal lamellae of the breathing organs. The coarse grain of the integument is present on the whole dorsum except on the base of the wing sheaths. A male fly dissected out of one of these pupae corresponds well in the structure of the hypopygium to *A. mackerrasi*, as far as could be ascertained in spite of its immaturity; there is therefore little doubt that larva A and pupa B belong to that species.

Pupa C.

Among the pupae above described are four others which differ from them in the shape of the internal lamellae of the breathing organ, which are both broader, the upper one being besides devoid of emargination (Text-fig. 12). The sheath of the mouth parts is also different from that of pupa B in which some of the parts are more elongate; this cannot be a sexual character, since two of the imagines extracted from similar pupae belonged to opposite sexes, as could be seen by the eye structure. Except for the venation which is clearly that of an *Apistomyia*, the imagines were not sufficiently developed to be certain that they differ in any way from *A. mackerrasi*, although it is most probable that they belong to another species.

Larva D. Text-figure 13.

Length of fully grown specimen, 5 mm.

No definite colour pattern, but general coloration rather dark, the transverse ridges darker. Antennae completely black, two-segmented, the segments subequal. The body divisions are shaped as in *Apistomyia* larvae, that is, with an anterior collar, a median part between the two ridges and a small tapering part behind the posterior ridge. The anterior ridge is not straight from one anterior corner to the other, but in its middle it bends backwards to the spot where it carries the two very peculiar tufts of bristles. These tufts or brushes are placed on a dilatation of the anterior ridge which is there darker than elsewhere; they are separated by a little gap where the dark coloration of that part of the ridge can best be seen. These brushes are formed by a row of cylindrical or tubular bristles slightly curved at the tip (Text-fig. 14). The spinules on the sides of the body are also rather cylindrical, not tapering to a point as in most *Apistomyia* larvae. The couple of brushes are present on the cephalic division, but there they are smaller and are touching each other.

The shape of the last body division is very characteristic and not at all like any known larva of *Apistomyia*, but much more similar to a *Blepharocera* larva on account of the lateral processes of the penultimate segment, which are completely visible from above, pointing backwards and being rather elongate; there is a distinct suture between the last two segments.

The gill filaments are as in *Apistomyia*; they number five; three are pointing forwards and two backwards.

Of the fourteen larvae of this type contained in the material, twelve are in the last instar, but none of these is in the prepupal stage; the two others are in the third instar; these are similar to the fully-grown larva, but the gill tufts are as usual composed of three filaments only, two pointing forwards and one backwards. The dorsal brushes are present in one of these specimens but not in the other which, however, does not seem to differ otherwise in the slightest; its anterior ridge is shaped as if the brushes were present, but even when looking at the specimen in profile there is no trace whatsoever of the brushes to be found. It seems that these dorsal processes could be either present or absent in this species, as is the case for the dorsal spines of the Indian genus *Horiaia*.

As no larva showed the breathing organ of the pupa below the skin, it is impossible to say if pupa C, which differs from the others only in the shape of the internal lamellae, belongs to these larvae; it is not quite impossible, but not at all likely, because this pupa is typically that of an *Apistomyia*, whereas larva D, chiefly on account of the conformation of the end of the body, does not seem to belong to that genus.

The relationship of this larva with *Apistomyia* is evidently very marked; and much more so than in the three New Zealand genera *Neocurupira*, *Peritheates* and *Paracurupira*, the larvae of which are devoid of anterior and posterior ridges found in all *Apistomyia* larvae and in this larva D.

The presence of the dorsal brushes cannot be considered as a generic character, as similar ornamentation may be present or absent in species of a given genus, as in *Liponeura* or *Curupira*, for instance.

In conclusion, I wish to thank Dr. Mackerras for the opportunity he has given me of studying this interesting material; I hope that this paper will stimulate collectors in Malaya in searching more assiduously for Blepharoceridae and thus help to solve the questions of the generic status of larva D and of the correct attribution of the female here described as that of *A. mackerrasi*.

References.

- BEZZI, M., 1912.—Blepharoceridi Italiani, etc. *Bull. Soc. Ent. Ital.*, xliv, 1912, 67.
BISCHOFF, W., 1928.—Die Oekologie der Palearctischen Blepharoceridae. *Ergeb. Fort. Zool.*, 7, 1928, 257.
EDWARDS, F. W., 1928.—The Nematocerous Diptera of Corsica. *Diptera*, Vol. iv, 1928, 177.
TILLYARD, R. J., 1922.—Australian Blepharoceridae. Part i. *Aust. Zool.*, ii, 1922, 169.
TONNOIR, A. L., 1923.—Australian Blepharoceridae. Part ii. *Aust. Zool.*, iii, 1923, 55.
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1930. "Notes on the genus *Apistomyia* (Diptera) and description of a new species." *Proceedings of the Linnean Society of New South Wales* 55, 136–144.

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