

New species and records of *Microphorella* Becker (Diptera: Empidoidea, Dolichopodidae) from the Mediterranean region

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New species and records of *Microphorella* Becker (Diptera: Empidoidea, Dolichopodidae) from the Mediterranean region. - Two new species of *Microphorella* Becker, *M. ulrichi* sp. n. from Morocco and Tunisia, and *M. merzi* sp. n. from Cyprus, Malta and Turkey are described. Two additional species from Turkey and Israel are not described because of inadequate material. *M. curtipes* (Becker) is newly recorded from Sardinia, and the genus is newly recorded from North Africa, Sardinia, Malta, Turkey, Cyprus and Israel.

Key-words: Diptera - Dolichopodidae - Parathalassiinae - *Microphorella* - new species - new records - Mediterranean region.

INTRODUCTION

Microphorella Becker is a little known genus of basal Dolichopodidae which, together with *Parathalassius* Mik, *Amphithalassius* Ulrich, *Plesiothalassius* Ulrich and *Thalassophorus* Saigusa, has tentatively been placed in a subfamily - Parathalassiinae Chvála 1981 - tentatively only, because the subfamily may be a paraphyletic assemblage. Originally, the then known genera were included in the former Empididae. They were subsequently transferred to the Microphoridae when the Empididae was divided into four distinct families by Chvála (1981-1988). However, phylogenetic evidence is very strong that the Parathalassinae are more closely related to the Dolichopodidae s. auct. than to the Microphorinae, forming a monophylum with the former, not the latter (Ulrich, 1990, 1991 and in litt.; Cumming & Sinclair, 2000).

The genus, as currently defined, is known from 5 Nearctic (Melander, 1928), 1 Australian (Colless, 1963) and 3 Palaearctic (Chvála, 1988) species. More species, both extant and fossil, doubtlessly occur. Shamshev & Grootaert (2002) recently erected a new genus, *Chimerothalassius*, for a new species of the *Microphorella* group from New Zealand.

Likewise, two fossil species of *Microphorella*-like flies have recently been described from Baltic amber by Cumming & Brooks (2002) who erected a new genus, *Electrophorella*, for them.

Species of *Microphorella* are minute flies with inconspicuous habits, and are thus easily overlooked. Consequently, they are not commonly found in collections.

They have been collected by sweeping on sandy beaches, gravel and sand in river beds, and on moist rocks in streams. The small flies are very difficult to spot while resting on sand, and will only be caught if deliberate, slow, sweeping movements are employed, with the mouth of the net held very close to the ground.

The three Palaearctic species have been reviewed by Chvála (1988) who also figured male and female genitalia. They include *M. praecox* (Loew, 1864) from central and northern Europe, *M. beckeri* (Strobl, 1910) from Austria and northern Yugoslavia, and *M. curtipes* (Becker, 1910) from northern Italy and Corsica. The Palaearctic species known so far are therefore exclusively distributed in Europe from the Mediterranean in the south, north to the arctic circle (Chvála 1988, Fig. 1). Only one species, *M. curtipes*, is known from the Mediterranean (Corsica). Since that time, the genus has received scant attention. No new species have been described, and no new records have been added from the Mediterranean. It is therefore of interest to describe two new mediterranean species, and to record the genus for the first time from the coast of North Africa (Tunisia and Morocco), the mediterranean islands of Sardinia, Malta and Cyprus, and the mediterranean coasts of Turkey and Israel. A further two new species from Turkey and Israel are not described because of lack of adequate material.

MATERIAL AND METHODS

The material available for this study was collected in large part by the author. Valuable material was also contributed by Dr Bernhard Merz (Geneva), Dr Martin Ebejer (Cardiff) and Dr John Deeming (Cardiff).

Dissected specimens on which the drawings are based are stored in glycerine microvials mounted on pins in the author's collection. Slide mounts of wings, antennae, and legs were prepared in Berlese fluid, as described by Disney (1983). Drawings were made with the aid of a x250 stereomicroscope and drawing tube. For some figures (Figs 2-3, 6-8, 11, 17, 21) a compound microscope with built in ocular grid was employed. Drawings of complex structures made from slide mounts studied in transmitted light (eg. Fig. 7) fail to make a clear distinction between internal and external structures, and cannot show how the various parts are interconnected.

The following abbreviations are used in the figures 1-21:

Ae	aedeagus	Mt	metatarsus
C	cercus	OH	opisthypandrium
d	digitiform process	PST	pigmented spinulated tubercle
fo	foramen from segment 8	s5-s7	abdominal sternites 5-7
HA	hypandrium	t5-t8	abdominal tergites 5-8
ht8,		T	tibia
ht10	abdominal hemitergites 8 and 10	TC	tibial comb
LPL	left periandrial lamella	vp8	ventral plate of segment 8

Labels of types are cited verbatim. The text of each separate label is enclosed in quotation marks, whilst individual lines on each label are separated by slashes.

The depositories of all specimens are indicated by the following abbreviations or initials in brackets at the end of each citation under 'material examined':

MHNG	Muséum d'histoire naturelle, Genève, Switzerland
MJEB	Private collection of M. J. Ebejer, Cardiff, Wales
NMGW	National Museum and Galleries of Wales, Cardiff
PGR	Private collection of P. Gatt, Rabat, Malta
ZFMK	Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany

The terminology used in this account follows Chvála (1988) and Ulrich (1974, 1991) except for the parts of the antennae which is after Stuckenberg (1999).

TAXONOMIC TREATMENT

Microphorella ulrichi sp. n.

Figs 1-11

MATERIAL EXAMINED (31 ♂♂, 16 ♀♀)

Holotype male: "MOROCCO: Tangier, / Ksar Sghir, Oued Araml, / Beach & Dunes, / 13.IV.2001, P. Gatt", "HOLOTYPUS / *Microphorella / ulrichi* sp. n. / det. P. Gatt 2003" (ZFMK). The holotype is preserved in alcohol and is in good condition.

Paratypes: 12 ♂♂, 9 ♀♀, same data as holotype (ZFMK, PGR); 1 ♀, "TUNISIA: Ain Draham / Al Furnan, 900m / *Quercus*, 13.V.1995 / P. Gatt" (ZFMK); 1 ♂, "TUNISIA / J. C. Deeming / NMW.Z / 1995:026", "Atlas Mts., / Ain Draham, / Al Furnan, / 12v.1995" (NMGW); 1 ♀, "TUNISIA: Jendouba / Fernana, *Pinus*, / 14.V.1995, P. Gatt" (ZFMK); 1 ♂, "TUNISIA, Tabarka / Ain Sobah, dunes / eucalyptus, pine, bog / 15.V.1995 M. J. Ebejer" (MJEB); 13 ♂♂, 3 ♀♀, "TUNISIA: Tabarka / Tamra, *Quercus*, / Stream, meadows, / 19.III.2001; P. Gatt" (ZFMK, MHNG, PGR).

Other material: 1 ♂, same data as holotype (PGR); 1 ♂, 2 ♀♀, Tunisia, Ain Draham, Al Furnan, 900m, *Quercus*, 13.V.1995, P. Gatt (PGR); 1 ♂, Tunisia, Tabarka, Tamra, *Quercus*, stream, meadows, 19.III.2001, P. Gatt (PGR).

ETYMOLOGY

This species is dedicated to Dr Hans Ulrich in recognition of his expertise on the Parathalassiinae, and in gratitude for his assistance throughout the preparation of this paper.

DIAGNOSIS

Small, greyish dusted, sexually dimorphic species with strongly infuscated wings, 'pigmented spinulated tubercles' (see below) on fore and hind metatarsi, dilated fore tarsi (male) and a digitiform process at base of hind femur (male).

DESCRIPTION

Male

Head. Higher and wider than deep, grey dusted; eyes widely separated on frons, all facets equally small, covered with short, white, hairs, longer towards ventral pole of eye; occiput only narrowly projecting beyond posterior margin of eye, concave above neck, convex below, greyish-brown dusted, with some metallic reflections; jowls narrow; face long and narrow, narrowest in middle and widening both above and below,

silvery grey dusted, narrower than frons above antennae; clypeus grey. Chaetotaxy: cephalic bristles blackish; anterior pair of ocellar bristles strong, diverging, almost as strong as one pair of fronto-orbitals; posterior pair of ocellar bristles minute; 3 pairs of strong vertical bristles, the inner converging, the outer 2 diverging, all almost as strong as anterior ocellars; an additional, very short bristle present between the two lateral pairs; postocular cilia long, dark, and strictly uniserial above neck, becoming paler, longer and irregularly multiserial below. Antennae (Fig. 1) placed well above middle of head in profile; scape (segment 1) small, bare and orange brown in colour; pedicel (segment 2) globular, with greyish micropubescence, and subapical collarette of longer, whitish hairs; postpedicel (segment 3) dark brown, roughly symmetrical in profile, tear-drop shaped, covered with both micropubescence and with long, whitish hairs; postpedicel ending in very long, uniarticulate stylus (arista) clothed with microscopic pubescence; proboscis short, narrow, directed forwards, dark brown and lustrous; palps one-segmented, yellow, broadly triangular in profile, each bearing a sensory pit and one long, white, subapical bristle in addition to some shorter hairs.

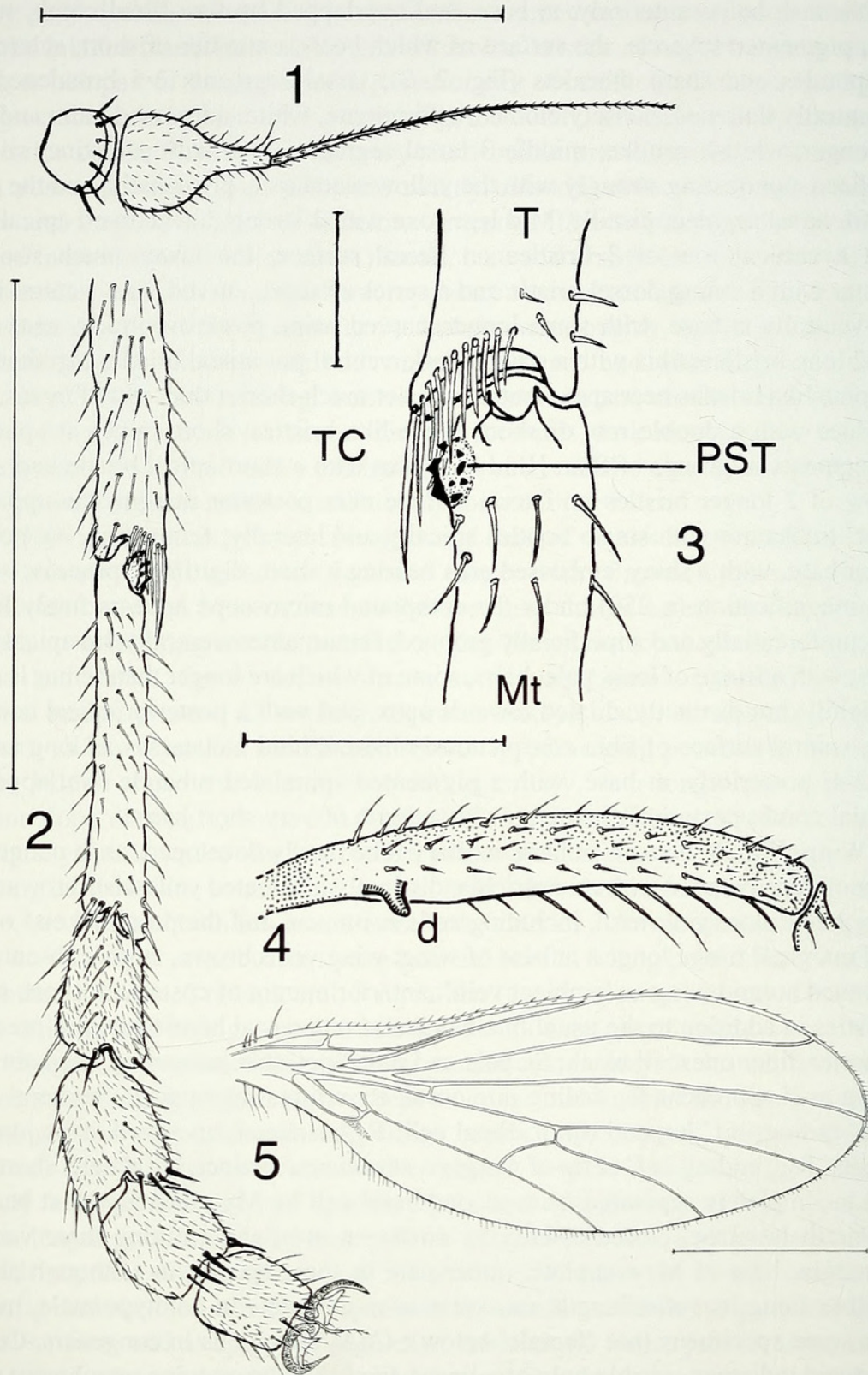
Thorax. Black in ground colour; dorsal surface of mesoscutum arched: anterior slope behind neck vertical; posterior slope with flattened prescutellar area. Mesoscutum: viewed from in front and above, grey dusted anteriorly and posteriorly, central part subshining and clothed with golden brown micropubescence; viewed from behind and above, dusted before suture, subshining behind. Complete prothoracic precoxal bridge present. Chaetotaxy: thoracic bristles black; acrostichals very short, piliform, widely separated and biserial anteriorly, converging posteriorly, disappearing shortly behind transverse suture, preceded anteriorly by a longer pair arising from anterior slope of mesoscutum; dorsocentrals 2+3, uniserial, long, bristle-like, more or less equally strong, except for prescutellar pair, which is longer, wider apart, and almost as strong as scutellars; some short, accessory bristles, the size of acrostichals, inserted before, between and both inside and outside the anterior 2 dorsocentrals; humeral callus with two very short setae but no strong humeral bristle; 1 long posthumeral inserted far from humeral callus, 2 notopleural, 3 supra-alar (the anterior very weak), 1 postalar and 1 pair of long, converging, scutellar bristles. Pleura bare, grey dusted.

Legs. Long and slender, yellow in ground colour, greyish dusted, finely bristled with short, generally whitish hairs except on coxae and trochanters; fore coxae mostly yellow, grey dusted; mid and hind coxae brown, more heavily dusted; trochanters yellowish brown, hind trochanters the darkest; femora infuscated dorsally, more strongly bristled dorsally and apically; fore and mid femora equally strong; hind femora longer, more bristled; tibiae yellow, covered with blackish hairs; tarsi yellow, but fifth segment of fore tarsus, and fourth and fifth segments of mid and hind tarsi distinctly darkened; all tarsi, but especially the middle, with short, spine-like setae on ventral surface, and at apices of segments; tarsal claws large, pulvilli large and ventrally haired, empodium setiform, forked, haired. Fore leg: coxa sparsely covered with short pale hairs anteriorly, longer near apex; trochanter with a short dorsal apical bristle; femur with a posteroventral row of bristly hairs, longer towards the apex; ventrally, at base, with a group of curved hairs; tibia (Fig. 2, 3) with an apical, anterior comb of close set spinules. Tarsus (Fig. 2) modified: metatarsus long and slender, as long as following 3 segments together, yellow in ground colour, sparsely clothed with

short, blackish hairs; anteriorly, at base, and overlapped by fore-tibial comb, with a minute, pigmented tubercle, the surface of which bears a number of short, sclerotised blunt spinules and sharp thornlets (Fig. 2, 3); tarsal segments 2-5 broadened and dorsoventrally flattened, densely clothed with minute, white, adpressed hairs and with some longer, whitish setulae; middle 3 tarsal segments thus with a distinct silvery-white sheen, contrasting strongly with the yellow metatarsus proximally, and the darkened fifth tarsal segment distally. Mid leg: coxa with 1 strong downcurved apical bristle and a vertical row of 3 bristles on lateral surface, the lower much stronger; trochanter with a strong dorsal bristle and a series of short, curved, fine, ventral hairs; femur, ventrally at base, with some longer, curved hairs; posteroventrally, near apex, with 1-2 long bristles; tibia with a strong, dark, ventral pre-apical bristle, together with a few spine like bristles near apex; metatarsus not much shorter than rest of tarsus, ventral surface with a double row of short, spine-like bristles; short spines at apices of tarsal segments in groups of four. Hind leg: coxa with a short apical bristle and a vertical row of 2 longer bristles on lateral surface near posterior margin, the upper the stronger; trochanter with single bristles apically and laterally; femur (Fig. 4), posteriorly near base, with a shiny, embossed area bearing a short, digitiform process, which, at high magnification ($\times 250$) under the compound microscope appears finely haired and circumferentially and superficially grooved; femur, anteroventrally, on apical three quarters, with a fringe of long, pale, hairs, some of which are longer than femur is deep; tibia slightly, but distinctly, dilated towards apex, and with a posterior apical comb of setulae; ventral surface of tibia conspicuously haired; hind metatarsus as long as segments 2-4; posteriorly, at base, with a pigmented spinulated tubercle overlapped by hind tibial comb; posteriorly, at apex, with a comb of very short hairs.

Wing (Fig. 5). Narrow at base, axillary lobe hardly developed, as in congeners; wing membrane covered with microtrichia, distinctly infuscated yellowish-brown; base of wing paler, more yellowish, including cells *c*, *bm*, *cu*, and the proximal end of cell *r*₁; hind marginal fringe longest at base of wing; wing veins brown, stigma absent; costa continued around wing as 'ambient vein'; anterior margin of costa with short, spine-like bristles in addition to the usual fine hairs; a strong costal bristle present, preceded by 3 shorter, finer ones, all black; *Sc* pale and indistinct, first narrowing, then abruptly widening as it approaches *R*₁, fading into costa; *Rs* originating opposite humeral cross vein; *R*₁ ending in *C* beyond tip of discal cell; *R*₂₊₃ sinuous, upcurved at its junction with costa; *R*₄₊₅ ending in *C* at tip of wing; crossvein *r-m* distinct; basal cells short, discal cell incompletely separated from second basal cell by *M*₃₊₄ interrupted at base, as in all *Parathalassiinae*, closed distally by crossvein *m-m* and emitting three veins to wing margin; base of *M*₂ complete, rather pale in some specimens, although always discernible along its entire length; crossvein *m-m* complete in holotype male, incomplete in some specimens (see 'female' below); *CuA*₂ curved, as in congeners, *CuA*₂ + *A*₁ short and indistinct, visible only as a linear, faint shadow on wing membrane; squamae yellowish brown with darker margins, fringe of marginal hairs long and brownish; halteres yellow.

Abdomen. Cylindrical, black in ground colour, less densely grey dusted than thorax, subshining in some lights; tergites sparsely clothed with short, whitish hairs which lengthen towards lateral margins; tergites 1-4, and sternites 1-3 simple, sym-



FIGS 1-5

Microphorella ulrichi sp. n.: 1, ♂, antenna, lateral view; 2, ♂, right fore leg: tarsus and apex of tibia, dorsal view; 3, ♂, left fore leg: apex of tibia and base of metatarsus, dorsal view; 4, ♂, right hind leg: femur and base of tibia, posterior view; 5, wing. Scales: 0.5 mm except for Fig. 3 (0.07 mm) and Fig. 5 (1.0 mm). Abbreviations explained in the text.

metrical, sternites reduced; postabdomen beginning with sternite 4, rotated and latero-flexed to the right, as in congeners; tergites 5 and 6 narrowed and excavated on the right hand side, accomodating hypopygium; tergite 7 normal, tergite 8 vestigial; sternite 4 broad, short, depigmented medially and indented at its hind margin. Sternite 5 (Fig. 6) short, brown and lustrous, modified, with a median, robust, keel-shaped process which is bifid in profile and projecting ventrad; sternite 6 (Fig. 6) broad and angular, more heavily pigmented in middle third; sternite 7 large, quadrangular in side view, dusted except for a polished, roughly triangular area on posterior half; sternite 8 large, clothed with long, white hairs. Hypopygium (Fig 7) of very intricate structure, large, globose, lying on right side of abdomen as in congeners, reaching up to tergite 4; cerci soft, bifid, densely setulose. Opisthyandrium, aedeagus, and associated structures as in Figure 8; opisthyandrium conspicuously ridged along posterior surface; aedeagus with bevel-edged, pointed tip.

Length. Body 1.6 mm, wing 2.5 mm

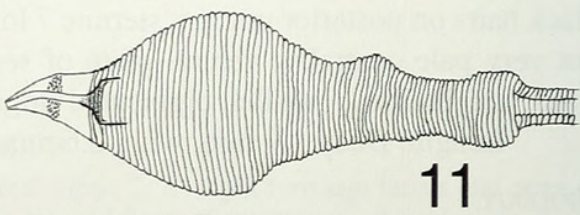
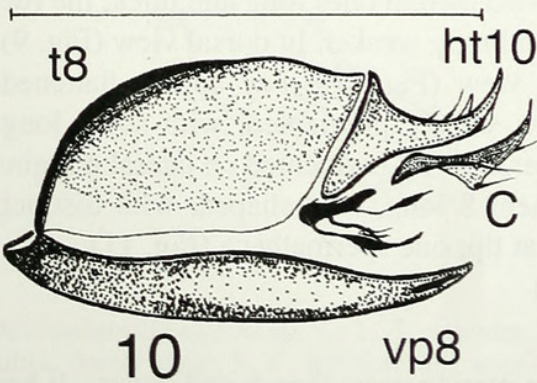
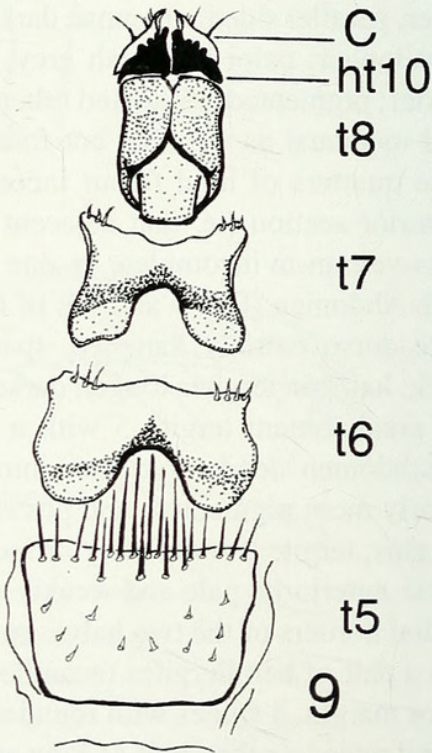
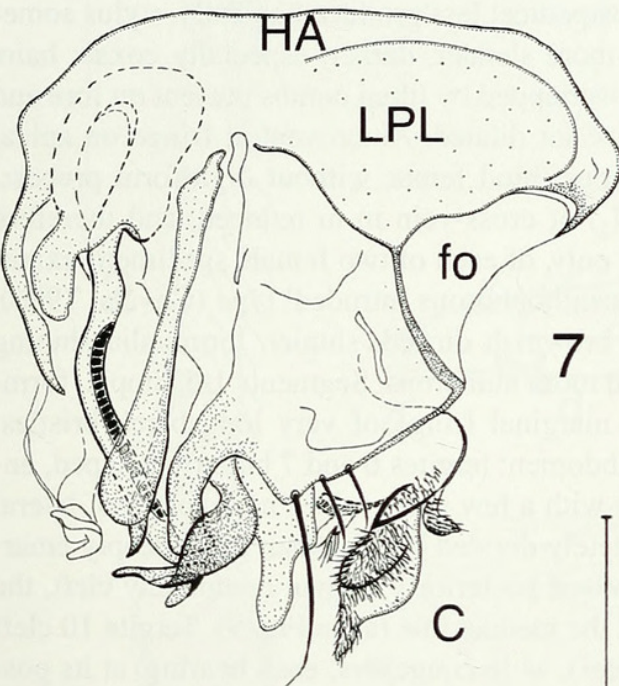
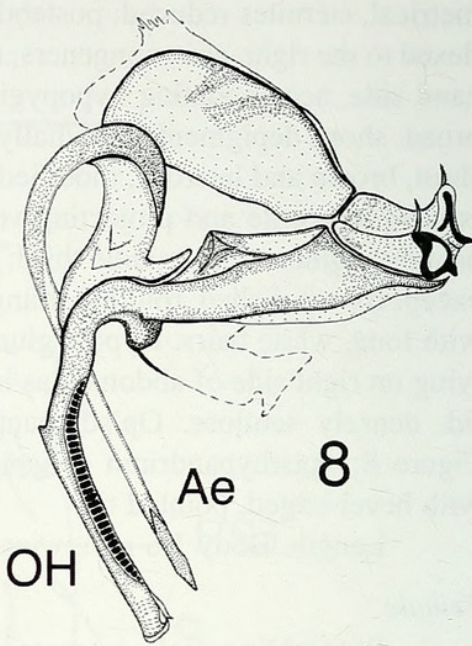
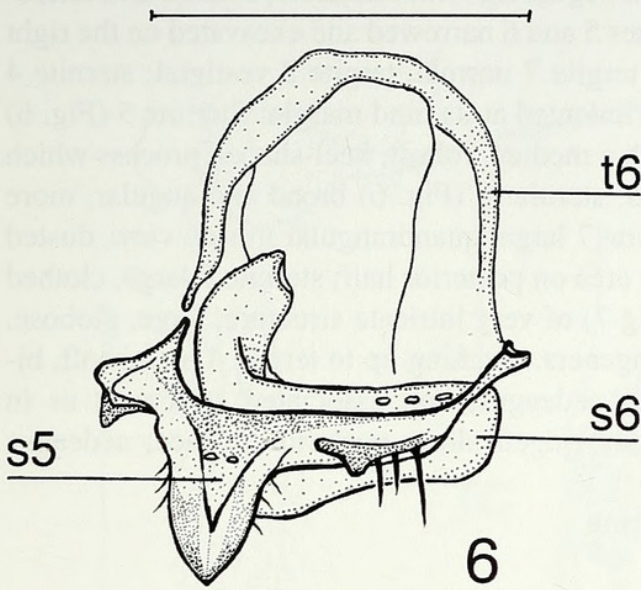
Female

Resembling male in many respects. Body and wings generally longer; face wider, parallel sided; antennae darker, postpedicel less produced apically, stylus somewhat longer; palpi brownish grey; legs more slender, darker, especially coxae; hairs shorter; pigmented spinulated tubercles overlapped by tibial combs present on fore and hind metatarsi as in male, but fore tarsus not dilated. Anteroventral fringe on apical three quarters of hind femur inconspicuous; hind femur without digitiform process. Posterior section (ie. that adjacent to M_3) of cross-vein m-m reduced, and therefore cross-vein m-m incomplete, in one wing only, of each of two female specimens examined. Abdomen (Fig. 9 and 10) of the 'acanthophorous intruded' type (Chvála, 1986), more dorsoventrally flattened, sparsely brownish dusted, shinier, terminalia shining black; hairs on tergites longer, darker, and more numerous. Segments 1-5 simple, forming preabdomen; tergite 5 with a hind marginal fringe of very long black bristles; postabdomen slender, retracted into preabdomen; tergites 6 and 7 butterfly shaped, anteriorly more pigmented, and posteriorly with a few short spines near apices of lateral margins; tergite 8 completely or incompletely divided by a median cleft, deeply emarginate anteriorly, pale and weakly sclerotised posteriorly - when completely cleft, the medial borders of the two halves meet in the median line (as in Fig. 9). Tergite 10 cleft into a pair of hemitergites (acanthophorites), as in congeners, each bearing, at its posterior margin, 4 spines with rounded ends; the two medial ones long and thick, the two lateral ones less than half as long and correspondingly weaker. In dorsal view (Fig. 9), the 4 spines look like blunt pegs. In lateral view (Fig. 10) they appear flattened, pointed, and curved dorsad. Sternite 6 narrow, evenly pigmented, with some long, black hairs on posterior margin; sternite 7 longer, heavily pigmented on lateral margins but very pale centrally; ventral plate of segment 8 long, boat shaped, with distinct, short, longitudinal, parallel, pigmented ridges at tip; one spermatheca (Fig. 11).

Length. Body 1.9 mm, wing 2.6 mm

BIOLOGY

This species has been collected from the marine coast (beach and dunes). It has also been swept from a wet meadow, a pine forest and an oak forest at altitude (900m)



and is therefore clearly not exclusively coastal in habitat. The spines of the female's hemitergites 10 are shaped like curved gutters, suitable for digging into sand and similar soft substrates.

DISTRIBUTION

Hitherto known from the mediterranean coast of North Africa (Tunisia and Morocco).

REMARKS

This species can easily be distinguished from its Palaearctic congeners by the characters given under 'diagnosis'. Other characters of taxonomic importance include: the black thoracic bristles; the short biserial acrostichals; the bristle-like, uniserial dorsocentrals; the two strong supra-alar bristles; and the conspicuous anteroventral fringe of long hairs on the male hind femur.

Pigmented spinulated tubercles have not hitherto been observed in any species of *Microphorella*. They are absent in the two Palaearctic species I have examined (*M. praecox* and *M. curtipes*). The modified fore tarsi and hind femora in the male of this species are also unique. Melander (1928) described dilated hind, but not fore, tarsi in the males of some Nearctic species of the genus.

Combs of spinules on fore and hind tibiae and on hind metatarsi may be more common in members of this, and related, genera, than has hitherto been appreciated. Melander (1928) and Chvála (1988) make no mention of this character in any of the species that they treat. Colless (1963), however, describes it in *M. iota* from Australia and Ulrich (1991) records it also in the parathalassiine genera *Plesiothalassius* and *Amphithalassius* from South Africa. Combs are present in the two Palaearctic species of *Microphorella* I have examined (*M. praecox* and *M. curtipes*).

Reduction of the base of vein M_2 is not rare as an individual aberration in species of *Microphorella*, both recent and fossil in Baltic amber (Ulrich, 2002). The base of M_2 though always complete, is pale in several specimens of this species. It is speculated that loss of melanization, and perhaps sclerotization, may precede reduction of this section (Ulrich, in. litt.). The development of cross-vein m-m is also subject to individual variation in this species.

Microphorella merzi sp. n.

Figs 12-21

MATERIAL EXAMINED (21 ♂♂, 12 ♀♀)

Holotype male: "CYPRUS: Akamas Peninsula / Lara Beach, 34.58N/32.19E / 28.IV.2002, P. Gatt". "HOLOTYPUS / *Microphorella merzi* sp. n. / det. P. Gatt 2003" (ZFMK). The holotype is preserved in alcohol and is in good condition.

FIGS 6-11

Microphorella ulrichi sp. n.: 6, ♂, sternite 5 and segment 6 detached from remaining parts of abdomen and membranes omitted, anterior view; 7, ♂, hypopygium, left lateral view; 8, ♂, opisthyandrium, aedeagus and associated structures, left lateral view; 9, ♀, abdomen, macerated and stretched, membranes omitted, dorsal view; 10, ♀, terminalia, left lateral view; 11, ♀, spermatheca. Scales: 0.5 mm except for Fig. 11 (0.05mm). Abbreviations explained in the text.

Paratypes: Cyprus: 6 ♂♂, 2 ♀♀, same data as holotype (ZFMK); 1 ♂, 3 ♀♀, "CYPRUS / Akamas peninsula / Lara beach / 28.IV.2002 St. 28", "34.58N/32.19E / dunes, meadow / leg. Merz, Deeming / Ebejer & Gatt St. 28" (ZFMK, MHNG, PGR); 9 ♂♂, 2 ♀♀, "CYPRUS: beach, / 6 km E of Zygi, / 34°44'44"N, 32°44'55"E / 24.IV.2002, P. Gatt" (ZFMK, MHNG, PGR); 2 ♂♂, 1 ♀, "CYPRUS 0m / Lemasos / Pegasus beach hotel / 1.V.2002 St.38", "34.42N/33.06E / beach / leg. Merz, Deeming / Ebejer & Gatt St. 38" (ZFMK, MHNG); 1 ♀, "CYPRUS 0m / 10 km W Pissouri / , Petra tou Romiou / , 23.IV.2002 St. 4", "34.41N/32.35E / beach / leg. Merz, Deeming / Ebejer & Gatt St. 4" (MHNG); 1 ♀, "MALTA 0m / Ghajn Tuffieha Bay / 35.56N/14.21E / 1.V.2001 B. Merz" (PGR); 1 ♂, "TK Antalya Prov. / Phaselis / 10km S Kemer / 27.IV.2000 0m / leg. Merz & Senay" (MHNG).

Other material: 1 ♀, data as holotype (PGR); 2 ♂♂, 1 ♀ Cyprus, beach, 6 km E of Zygi, 34°44'44"N, 32°44'55"E, 24.IV.2002, P. Gatt (PGR).

ETYMOLOGY

This species is dedicated to Dr Bernhard Merz who collected and generously made available valuable material for this study.

DIAGNOSIS

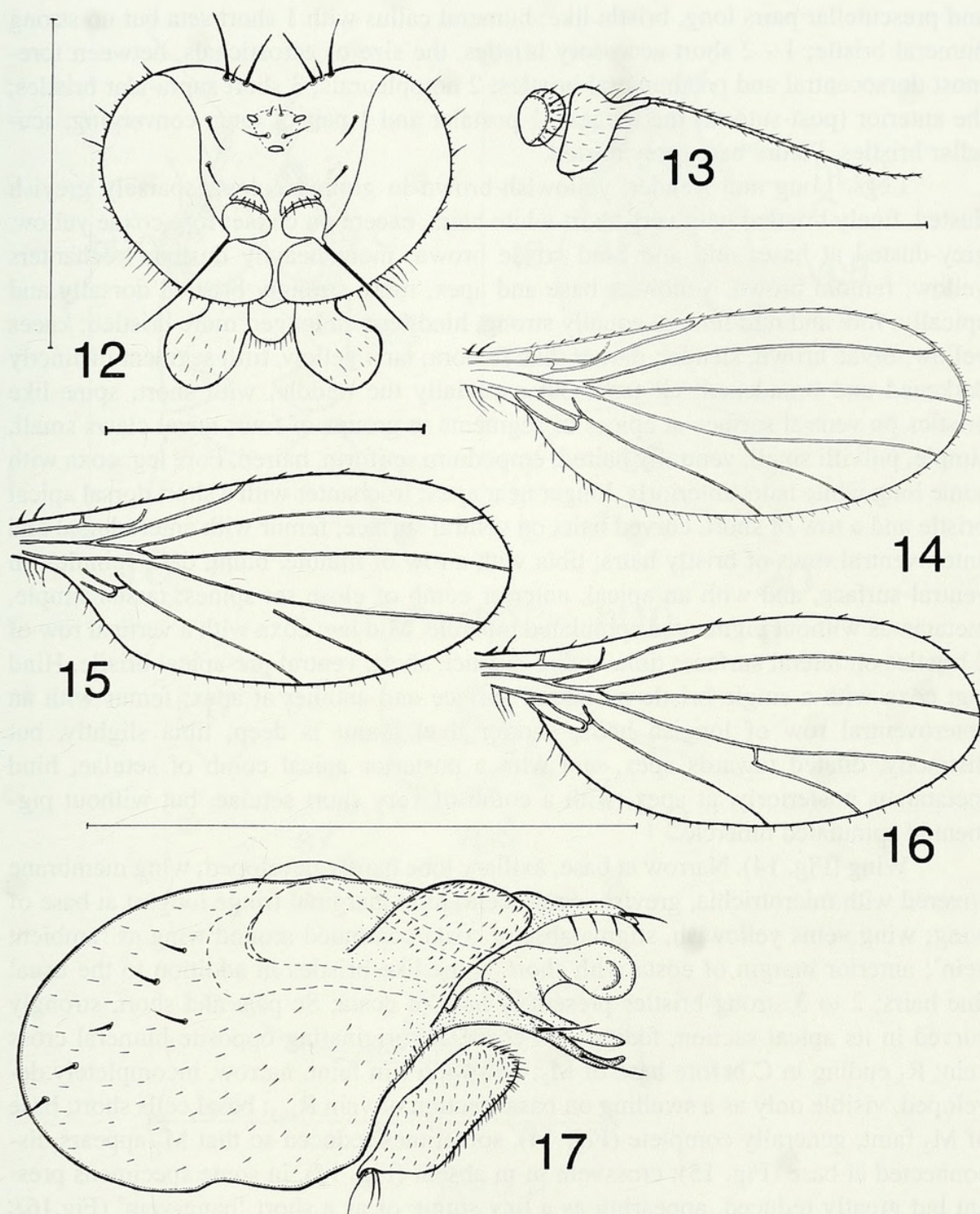
Very small, greyish dusted species with greyish wings; sexually dimorphic, males with enormously dilated palpi and with a row of minute, blunt, ventral spinules on fore tibiae.

DESCRIPTION

Male

Head (Fig. 12). Very broad, about 1.5 times as broad as high, silvery grey dusted; eyes widely separated on frons, all facets equally small, covered with very short, white, hairs; occiput concave above neck, convex below, greyish dusted, subshining, projecting well beyond posterior margin of eye; jowls very narrow, linear; face very short and narrow, eyes almost touching below antennae, widening towards clypeus, much narrower than frons above antennae; clypeus grey. Chaetotaxy: cephalic bristles blackish; 2 pairs of strong fronto-orbitals; ocellar tubercle distinct; anterior pair of ocellar bristles shorter than fronto-orbitals, diverging; posterior ocellar bristles short; 3 pairs of vertical bristles, the inner strong, converging, the outer strong, diverging, the middle short; post-ocular cilia pale, short, sparse and uniserial above neck, becoming denser and irregularly multiserial below. Antennae (Fig. 13) inserted at about middle of head in profile; scape yellow, small, concealed; pedicel yellowish brown, sparsely grey dusted, large, globular, with subapical collarette of hairs; postpedicel dark brown in ground colour, strikingly asymmetrical, onion-shaped, sparsely covered with grey micropubescence and some longish white hairs; postpedicel ending in very long, uniaarticulate stylus clothed with microscopic pubescence; proboscis yellowish brown, very short, directed downwards and forwards; palps (Fig. 12) one segmented, very large, spatulate and concave on lateral surface; yellow in ground colour and densely covered with minute glistening white hairs, in addition to some sparse longer setulae; palps without sensory pit or subapical bristle.

Thorax. Black in ground colour; mesoscutum rather long and narrow, dorsal surface not much arched, posteriorly with well defined, prescutellar depression commencing behind suture; mesoscutum covered with greyish micropubescence, more brownish dusted around prescutellar depression and on scutellar apex; complete



FIGS. 12-17

Microphorella merzi sp. n.: 12, ♂, head, anterior view; 13, ♂, antenna, lateral view; 14, wing; 15-16, paratypes, wings, variations in venation; 17, ♂, hypopygium, right lateral view. Scales: 0.5 mm except for Figs 14-16 (1.0 mm) Abbreviations explained in the text.

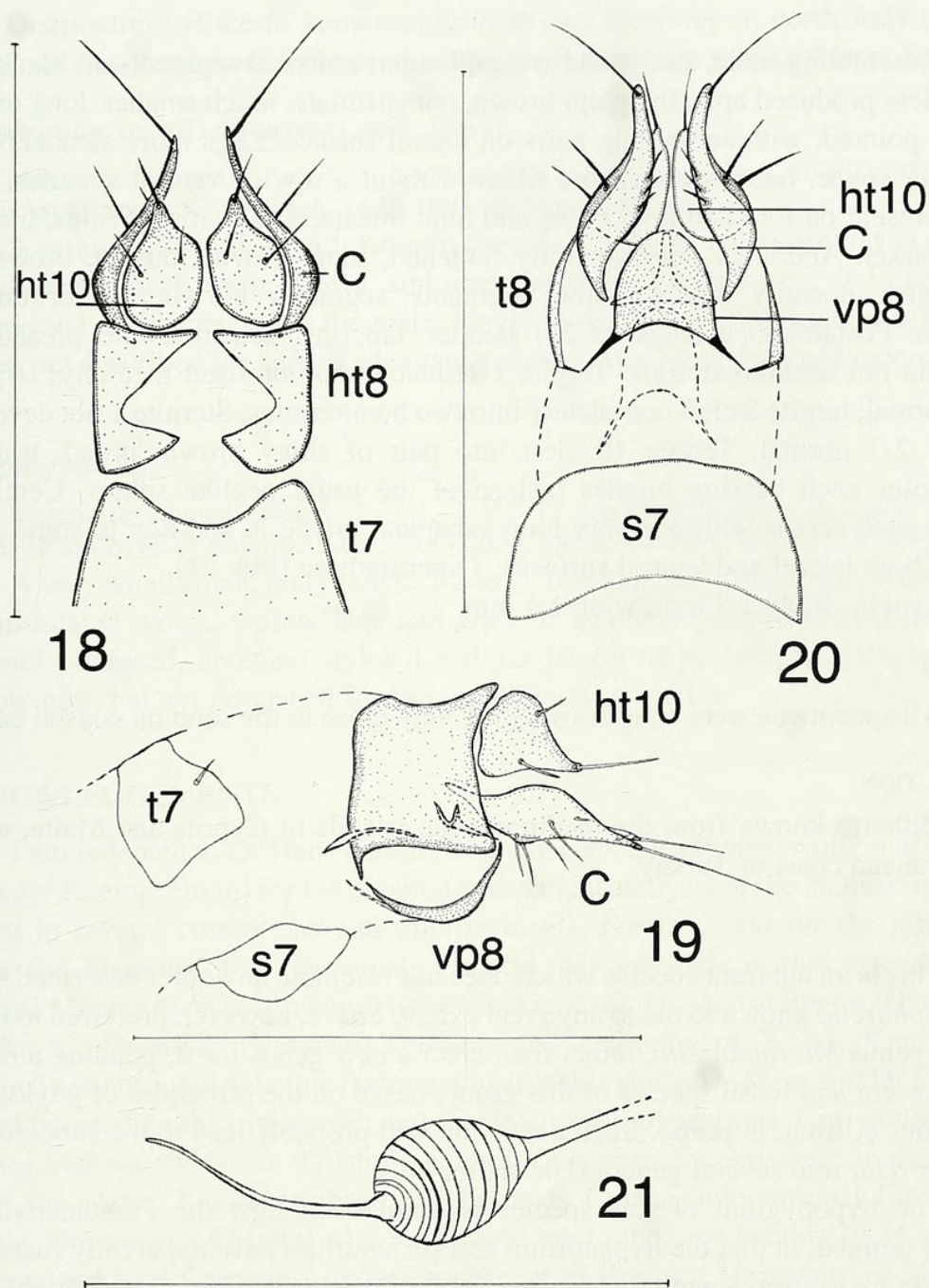
prothoracic precoxal bridge present. Chaetotaxy: large thoracic bristles black, short bristles pale; 3 pairs of acrostichals, very short, biserial, disappearing at transverse suture, preceded anteriorly by a stronger, darker, pair arising from anterior slope of mesoscutum; dorsocentrals 2 + 6, uniserial, short, longer than acrostichals, presutural

and prescutellar pairs long, bristle like; humeral callus with 1 short seta but no strong humeral bristle; 1 - 2 short accessory bristles, the size of acrostichals, between foremost dorsocentral and posthumeral bristles; 2 notopleurals; 3 short supra-alar bristles, the anterior (post-sutural) the longest; 1 postalar and 1 pair of long, converging, scutellar bristles. Pleura bare, grey dusted.

Legs. Long and slender, yellowish-brown in ground colour, sparsely greyish dusted, finely bristled with very short white hairs, except on coxae; fore coxae yellow, grey-dusted at base; mid and hind coxae brown, more heavily dusted; trochanters yellow; femora brown, yellow at base and apex, more strongly bristled dorsally and apically; fore and mid femora equally strong, hind femora longer, more bristled; knees yellow; tibiae brown, slender, darker than femora; tarsi yellow, fifth segment distinctly darkened and broadened; all tarsi, but especially the middle, with short, spine-like bristles on ventral surface at apices of segments in groups of four; tarsal claws small, simple, pulvilli small, ventrally haired, empodium setiform, haired. Fore leg: coxa with some long white hairs anteriorly, longer near apex; trochanter with a short dorsal apical bristle and a row of short, curved hairs on ventral surface; femur with anterodorsal and anteroventral rows of bristly hairs; tibia with a row of minute, blunt, dark spinules on ventral surface, and with an apical, anterior comb of close set spines; tarsus simple, metatarsus without pigmented spinulated tubercle. Mid leg: coxa with a vertical row of 2 bristles on lateral surface; tibia with a distinct, short, ventral pre-apical bristle. Hind leg: coxa with a single bristle on lateral surface and another at apex; femur with an anteroventral row of longish hairs, shorter than femur is deep; tibia slightly, but distinctly, dilated towards apex, and with a posterior apical comb of setulae; hind metatarsus posteriorly, at apex, with a comb of very short setulae, but without pigmented spinulated tubercle.

Wing (Fig. 14). Narrow at base, axillary lobe hardly developed; wing membrane covered with microtrichia, greyish, opalescent; hind marginal fringe longest at base of wing; wing veins yellowish, stigma absent; costa continued around wing as 'ambient vein'; anterior margin of costa with short, spine-like bristles in addition to the usual fine hairs; 2 to 3 strong bristles present at base of costa; Sc pale and short, strongly curved in its apical section, fading into costa; Rs originating opposite humeral cross vein; R_1 ending in C before base of M_2 ; crossvein r-m faint, narrow, incompletely developed, visible only as a swelling on basal section of vein R_{4+5} ; basal cells short; base of M_2 faint, generally complete (Fig. 14), sometimes reduced so that M_2 appears disconnected at base (Fig. 15); crossvein m-m absent (Fig. 14), in some specimens present but greatly reduced, appearing as a tiny stump or as a short 'hang-vein' (Fig. 16); discal cell open by virtue of absence of crossvein m-m; M_{3+4} interrupted at base, as in all Parathalassinae; CuA_2 curved, as in congeners, $CuA_2 + A_1$ absent. Squamae small, pale; fringe of marginal setulae short, pale; halteres greyish.

Abdomen. Cylindrical, black in ground colour, more shining than thorax, grey and brown dusted; segments 1-4 simple, forming preabdomen; postabdomen rotated and lateroflexed to the right, as in congeners; tergites sparsely clothed with short, whitish hairs, longer towards lateral margins; tergites 1-4 symmetrical; tergite 1 narrow, desclerotised medially; tergites 5 and 6 with right lateral margin sharply infolded; tergite 7 small, tergite 8 vestigial; sternite 1 membranous, very narrowly scler-



FIGS 18-21

Microphorella merzi sp. n.: 18-20: ♀, postabdomen, macerated and stretched: 18, dorsal view, membranes omitted; 19, left lateral view; 20, ventral view; 21, ♀, spermatheca. Scales: 0.5 mm except for Fig. 20 (0.25 mm). Abbreviations explained in the text.

rotised only at posterior and lateral margins; sternites 2-4 narrow, symmetrical; sternite 5 not developed as a sclerite; sternites 6 and 7 narrow, sternite 8 small, moderately convex and covered with some short, pale hairs. Hypopygium (Fig 17) large, globose, lying on right side of abdomen and reaching up to tergite 4; hypandrium and perianthrium fused without any suture to form a genital capsule.

Length. Body 1.1 mm, wing 1.25 mm.

Female

Resembling male. Body, and wings, longer; antennal segments all black, postpedicel less produced apically; palpi brown, not spatulate, much smaller, long oval and apically pointed, with some long hairs on lateral surface. Legs more slender, darker, especially coxae, hairs shorter; fore tibiae without a row of ventral spinules; tibial combs present on fore and hind tibiae and hind metatarsi as in male. Wings, including veins, darker. Abdomen dorsoventrally flattened, more greyish dusted, brownish in some lights, dorsally with 6 visible segments; segments 1-5 simple, forming preabdomen. Postabdomen (Figs 18-20) slender, tapering, retracted into preabdomen; terminalia not acanthoporous. Tergite 1 reduced, desclerotised medially; tergites 6 and 7 normal; tergite 8 cleft completely into two hemitergites. Sternite 1 not developed, sternites 2-7 normal. Tergite 10 cleft into pair of shiny brown, broad, triangular hemitergites each bearing bristles instead of the usual peglike spines. Cerci long, sinuous; each cercus with one very long subapical bristle in addition to some shorter setae on both lateral and ventral surfaces; 1 spermatheca (Fig. 21).

Length. Body 1.3 mm, wing 1.4 mm.

BIOLOGY

All specimens were caught sweeping very close to the sand on coastal beaches.

DISTRIBUTION

Hitherto known from the mediterranean islands of Cyprus and Malta, and the mediterranean coast of Turkey.

REMARKS

This is an aberrant species which does not resemble any other described species of *Microphorella* known to me to any great extent. I have, however, preferred to include it in the genus *Microphorella*, rather than erect a new genus for it, pending a revision of both recent and fossil species of this group, based on the principles of phylogenetic systematics (Ulrich, in prep.). Such a revision will probably lead to the subdivision of *Microphorella* into several genera (Ulrich, in. litt.).

The hypopygium of this species is unique amongst the Parathalassinae as currently defined, in that the hypandrium and periandrium have apparently fused without any suture to form a genital capsule as in the Dolichopodidae s. str. (Ulrich, 1974). This may be a synapomorphy with the Dolichopodidae s. str., and, if confirmed, will be important for a reconstruction of the group's phylogeny, and a justification for erecting a new genus for this species (Ulrich, in. litt.).

Cross vein m-m is entirely absent, or at least greatly reduced, in this species. In those specimens where it is absent, the condition is the same as in the type of the Lower Cretaceous *Avenaphora* recently described by Grimaldi & Cumming (1999).

OTHER RECORDS

Microphorella curtipes (Becker, 1910)

Material examined: Italy: Sardinia, 4 ♀♀, Dorgali reg. 350 m, Rio Flumineddu, Gola di Gorropu, sweeping over moist sand near stream, 40.11N/9.29E, 15.VI.2002, B. Merz. (MHNG).

Distribution: Hitherto known only from two localities in north Italy (Rapallo and Vallombrosa) and from Corsica, this species is now also recorded from Sardinia.

Microphorella sp. aff. *praecox* (Loew, 1864)

Material examined: Israel: 1 ♂, Bor Mashash, inland sand-dunes, 16.III.1995, B Merz; 1 ♀, Tel Aviv Country Club, beach, 14.III.1995, B. Merz (MHNG).

A small (male body length 1.6mm) grey dusted species, very similar to *praecox*, but with postpedicel much shorter, and antennal stylus much longer and bristle like, about as long as postpedicel in the male, longer in the female. The species is probably new, but not described for lack of adequate material. The genus is newly recorded from Israel.

Microphorella sp.

Material examined: Turkey: 2 ♂♂, 2 ♀♀ (1 headless), Antalya Province, Kursunlu Selalesi, 15 km NNE of Antalya, 150m, 29.IV.2000, forest, waterfall, B. Merz (MHNG).

A very small (male body length 1.2mm), black, lightly brownish dusted species with infuscated wings, yellow legs and apex of antennal postpedicel conspicuously hairy and produced, antennal stylus 1.5 times length of postpedicel. The species is probably new, but not described for lack of adequate material.

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REFERENCES

- CHVÁLA, M. 1981. Classification and phylogeny of Empididae, with a presumed origin of Dolichopodidae (Diptera). *Entomologica scandinavica*, Supplement 15: 225-236.
- CHVÁLA, M. 1983. The Empidoidea (Diptera) of Fennoscandia and Denmark II. *Fauna entomologica scandinavica* 12: 281 pp. *Scandinavian Science Press, Copenhagen*.
- CHVÁLA, M. 1986. Revision of Palaearctic Microphoridae (Diptera) 1. *Microphor* Macq. *Acta Entomologica Bohemoslovaca* 83: 432-454.
- CHVÁLA, M. 1987. Revision of Palaearctic Microphoridae (Diptera) 2. *Schistostoma* Beck. *Acta Entomologica Bohemoslovaca* 84: 133-155.
- CHVÁLA, M. 1988. Revision of Palaearctic Microphoridae (Diptera) 3. Parathalassiinae (*Parathalassius* Mik and *Microphorella* Becker). *Acta Entomologica Bohemoslovaca* 85: 352-372.
- COLLESS, D. H. 1963. An Australian species of *Microphorella* (Diptera: Empididae), with notes on the phylogenetic significance of the genus. *Proceedings of the Linnean Society of New South Wales* 88: 320-323.
- CUMMING, J. M. & BROOKS, S. E. 2002. *Electrophorella*, a new genus of parathalassiine flies from Baltic amber, with a cladistic analysis of the Microphorinae + Dolichopodidae lineage (Diptera: Empidoidea). *Studia Dipterologica* 9: 41-54.
- CUMMING, J. M. & SINCLAIR, B. J. 2000. A new phylogenetic classification of the Empidoidea (Diptera: Eremoneura). *XXI International Congress of Entomology, Foz do Iguassu, Brazil*, Abstract Vol. II: 924 [3660].
- DISNEY, R. H. L. 1983. Scuttle Flies. Diptera, Phoridae (except *Megaselia*). *Handbooks for the Identification of British Insects* 10 (6): 1-81; *London*.
- GRIMALDI, D. & CUMMING, J. 1999. Brachyceran Diptera in Cretaceous ambers and Mesozoic diversification of the Eremoneura. *Bulletin of the American Museum of Natural History* 239: 124pp.
- MELANDER, A. L. 1928 (1927). Diptera, Fam. Empididae. Fasc. 185. In: WYTSMAN, P. (ed.). *Genera insectorum*, 434 pp., 8 pls.; *Bruxelles*.
- SHAMSHEV, I. V. & GROOTAERT, P. 2002. A new genus of Microphorinae (Diptera Empidoidea) from New Zealand. *Belgian Journal of Entomology* 4: 129-144.
- STUCKENBERG, B. R. 1999. Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. *Studia dipterologica* 6 (1): 33-48.
- ULRICH, H. 1974. Das Hypopygium der Dolichopodiden (Diptera): Homologie und Grundplanmerkmale. *Bonner Zoologische Monographien* 5: 60 pp.
- ULRICH, H. 1990. Evidence for the phylogenetic position of Parathalassiinae (Empidoidea) based on thoracic morphology. *Second International Congress of Dipterology, Bratislava*, Abstract Volume: p. 245.
- ULRICH, H. 1991. Two new genera of parathalassiine-like flies from South Africa (Diptera, Empidoidea). *Bonner zoologische Beiträge* 42 (2): 187-216.
- ULRICH, H. 2002. Referee's comment on the paper of Cumming and Brooks. *Studia Dipterologica* 9 (1): 55.



Gatt, Paul. 2003. "New species and records of *Microphorella* Becker (Diptera: Empidoidea, Dolichopodidae) from the Mediterranean region." *Revue suisse de zoologie* 110, 669–684. <https://doi.org/10.5962/bhl.part.80205>.

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