Manual of Palaearctic Diptera 3, 1998

3.28. Family MILICHIIDAE

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Small to very small, usually dark flies (body 1 to 6 mm long); setae or setulae on lunule; 1–4 pairs of medioclinate lower fronto-orbitals, 2–3 pairs of upper fronto-orbitals; several interfrontal pairs (disarranged in several cases); costal vein broken just proximally to conjointment with radial vein R_1 and broken or very much tapering distally to humeral vein; wing with anal cell (cu*p*) closed; female cerci not fused.

Adult. Head: Frons (postfrons) mostly with sclerotized interfrontal stripes, facial plate (praefrons) flat or with antennal foveae but latter seldom deep (*Leptometopa*); no high and sharp facial carina. Lunule with bristles or setulae. Antenna usually short and decumbent, male first flagellomere enlarged in some species (e.g., in *Phyllomyza*, Fig. 5). Proboscis usually elongate, in several genera labellae very long (Fig. 10).

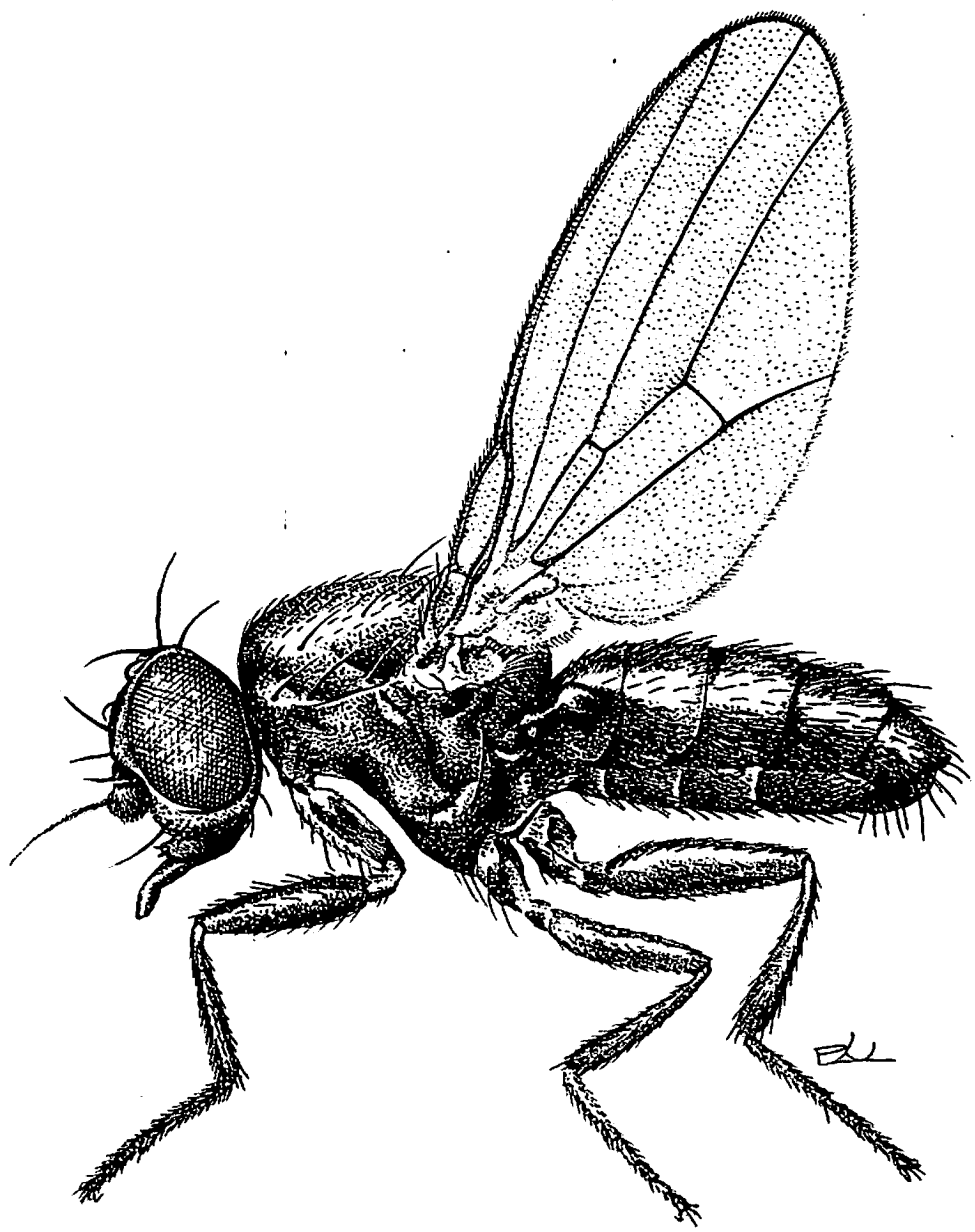
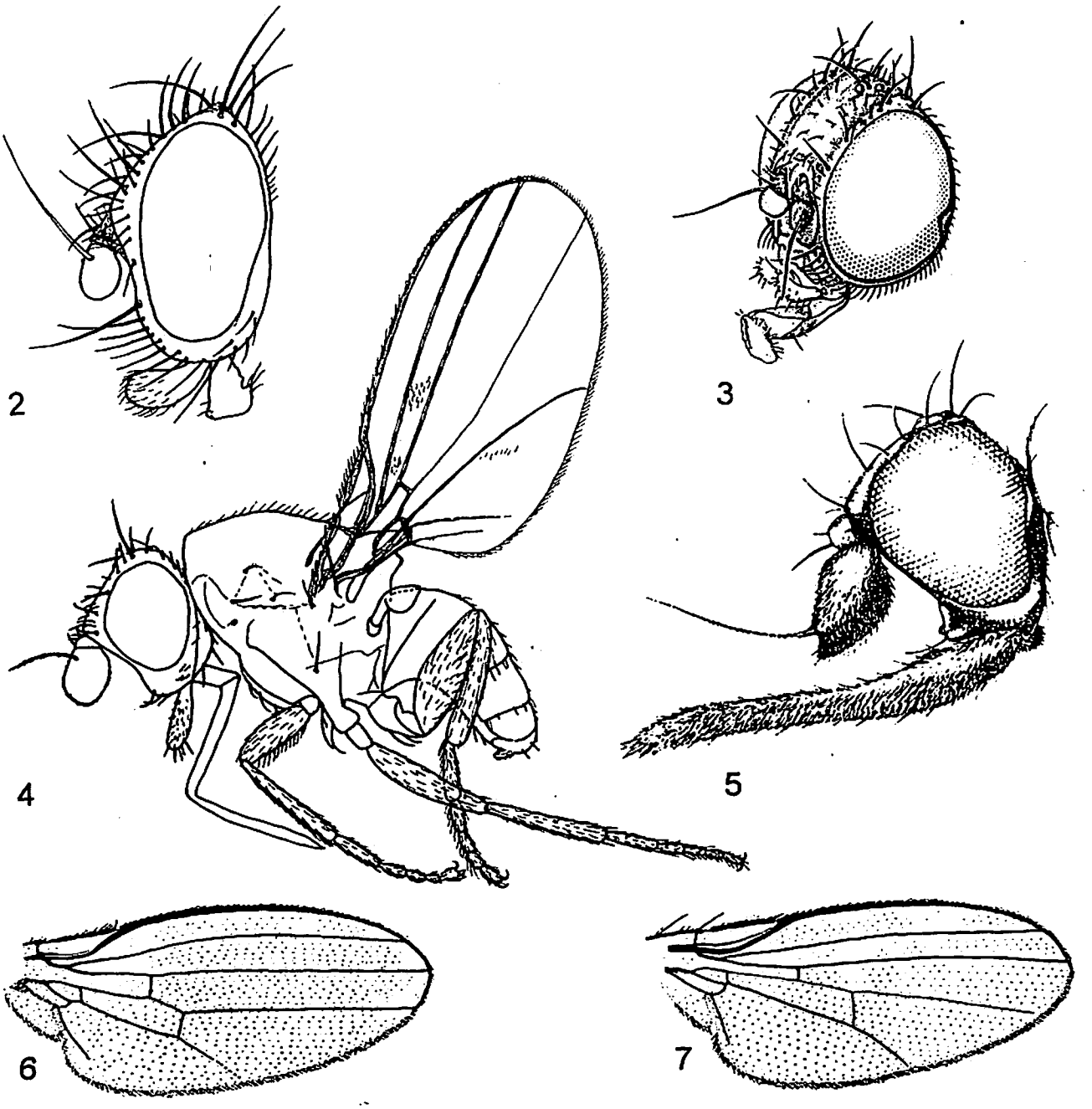


Fig. 28.1. *Desmometopa sordida* (Fallén), male.

Frontal chaetotaxy (other than above): 1 pair each of strong *vte, vti* and *oc,* one pair of postocellars (postverticals) of various inclinations. Postoculars usually strong with one inner and outer occipital pairs each. Vibrissae mostly strong, but missing in *Paramyia, Aldrichiomyza*, etc., vibrissal angle strong in Madizinae but rounded and not angulate in Milichiinae; peristomial and genal bristles various in length. Palps generally short in Madizinae, more conspicuous (elongate) in Milichiinae, and very large in males of some species of *Phyllomyza* and *Desmometopa*.

Thorax: Thoracic chaetotaxy: 1–(2) *h* (postpronotal), 2 *np*, 0–1 *posth*, (0)-1 *prst*, 1–3 *sa*, 2 *pa*; 0–1+2–4 *dc*, 0–1 *prsc*, 2 *sc*; proepisternal bristle present, proepimeral absent; 1–4 katepisternal bristle pairs (Milichiinae: mostly 2–3, Madizinae: mostly 1 pair); anepisternum (mesopleuron) setose in numerous species (Madizinae).



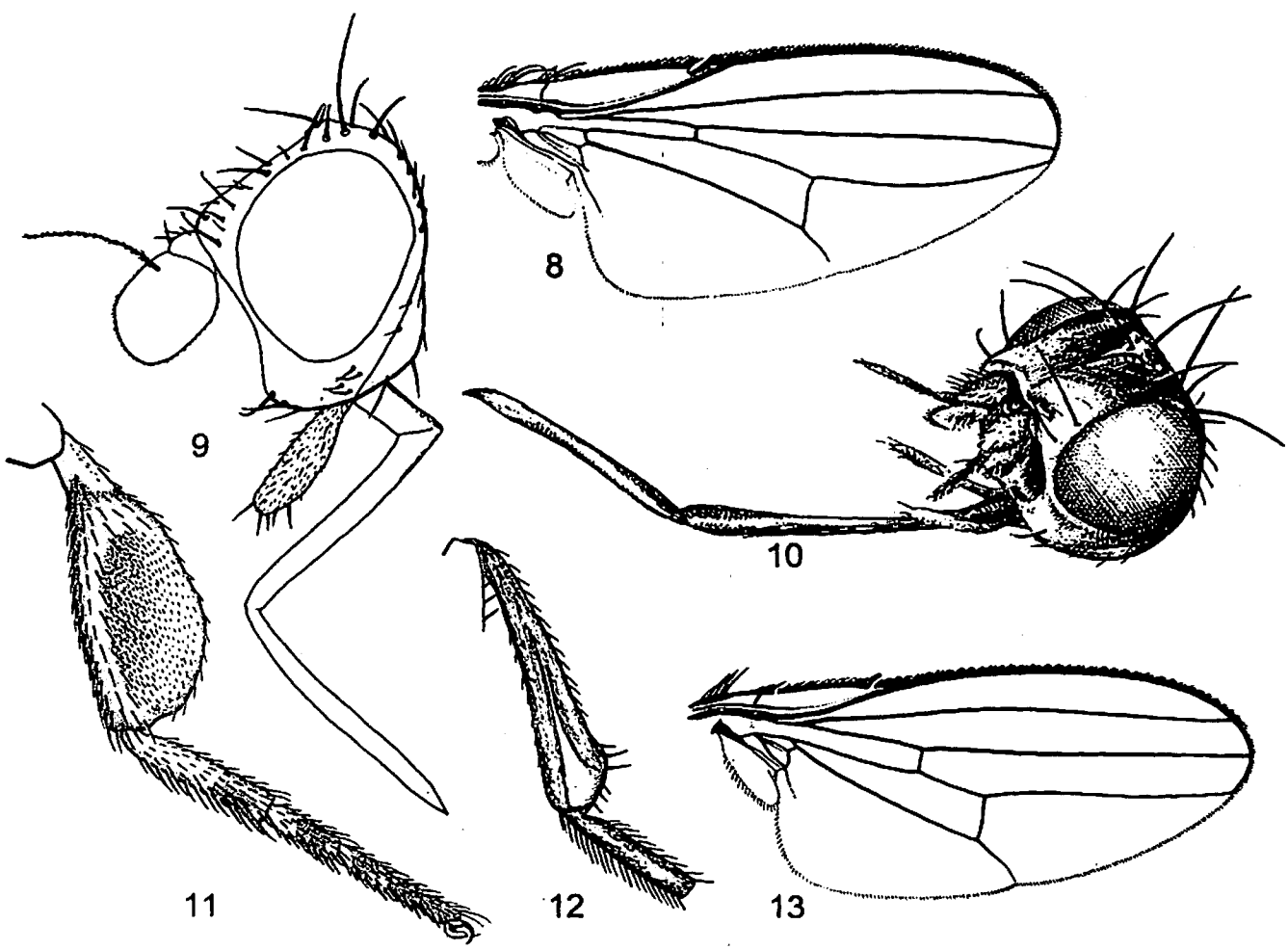
Figs 28.2–7. 2–3: heads: 2: *Milichia speciosa* Meigen; 3: *Milichiella lacteipennis* Perris. 4: *Paramyia hungarica* L. Papp, male habitus. 5: *Phyllomyza longipalpis* Schmitz, male head. 6–7: wings: 6: *Neophyllomyza acyglossa* Villeneuve; 7: *Aldrichiomyza* sp. (3 after Sabrosky 1987, 4 after Papp 1993, 5–7 after Papp 1978).

Legs usually simple, tibiae without dorsal preapicals. Male hind tibia is modified (swollen, flattened) in a number of species (Figs 11–12).

Wings (Figs 6–8, 13) clear without a pattern. Costa with humeral and subcostal breaks. Subcostal vein complete but very thin; in the species of Milichiinae subcostal break with a deep notch below a costal lappet (Fig. 8); costal vein continued to the end of M_1 (extending only to R_{4+5} in *Paramyia*, *Aldrichiomyza* and *Xenophyllomyza* (Fig. 4); vein R_{2+3} rather long, ending near apex of wing; anal cell always present, basal cell, i.e., bM-Cu usually present; anal vein A_2 well-developed or replaced by a long vein-fold.

Abdomen normal or even slender in Madizinae, flattened and broadened in Milichiinae; preabdominal tergites silvery pruinose in a large portion of Milichiinae species (particularly in males). Seven pairs of spiracles in both sexes, or 7th absent in males, preabdominal (1–5) spiracles usually in membrane or in the margin of tergites.

Male terminalia (Figs 14–19) symmetric (? secondarily). A male pre-epandrial complex includes tergite 6, syntergosternite 7–8 with 6th and 7th pairs of spiracles; epandrium small, male cerci usually elongate or enlarged (Fig. 17), surstyli usually simple, movable, aedeagus (phallus) not coiled with small basiphallus and partly membraneous distiphallus. Hypandrium large, hypandrial arms connected directly to sternite 10 (decasternum, "subanal plate", Fig. 17) well dorsally to surstyli, gonopods fused to the hypandrial complex, parameres indistinct. Aedeagal apodeme usually short or at least not conspicuous. A well-sclerotized ejaculatory apodeme of various shape present (Figs 14, 17–18).

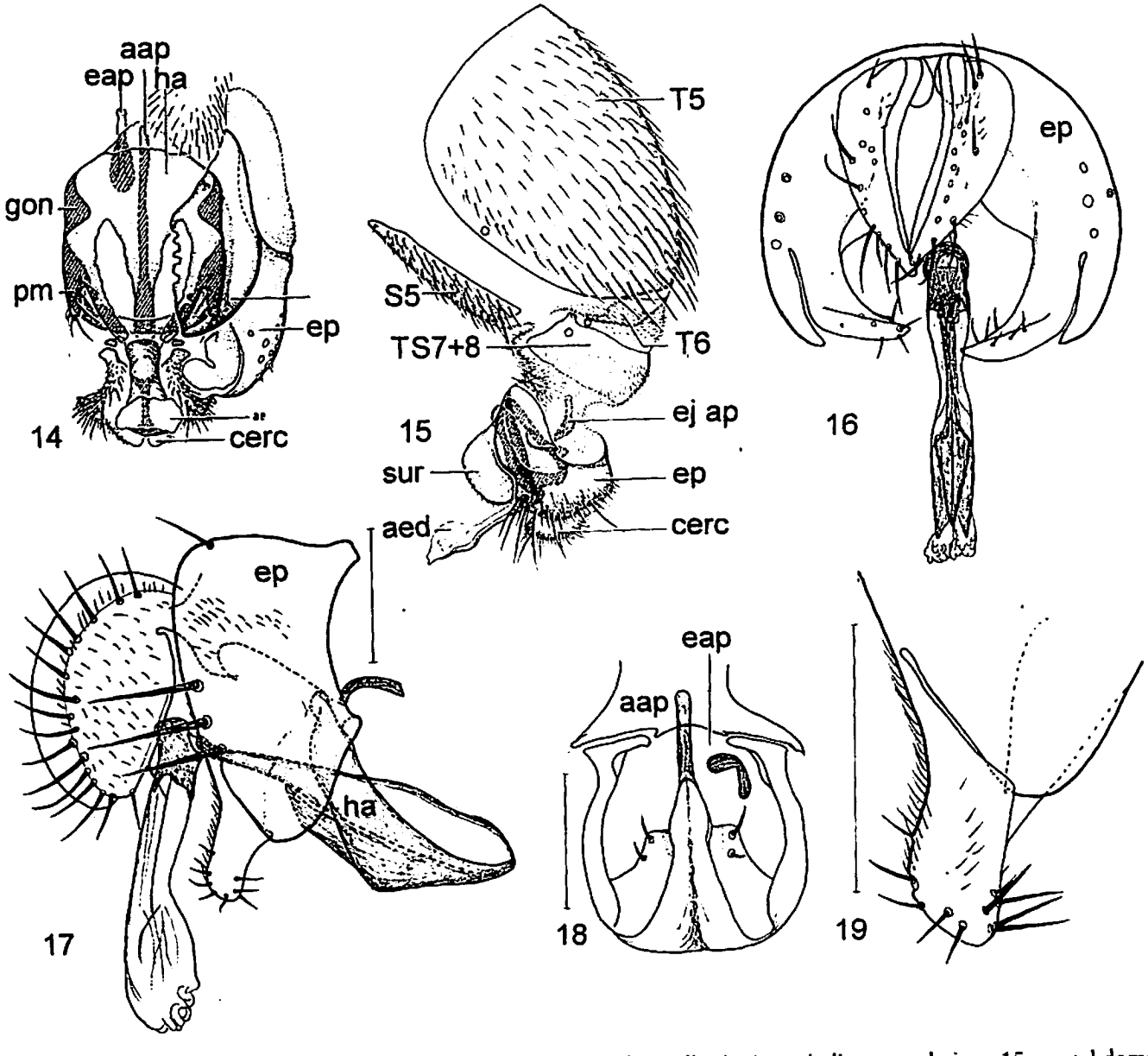


Figs 28.8–13. 8: *Milichiella lacteipennis* Perris, wing. 9–10: heads: 9: *Paramyia hungarica* L. Papp, male; 10: *Aldrichiomyza* sp. 11–12: male hind tibia, lateral view: 11: *Leptometopa latipes* (Meigen); 12: *Desmometopa discipalpis* L. Papp. 13: *Madiza glabra* Fallén, wing (8, 11, 13 after Sabrosky 1987, 10 after Papp 1978, 12 after Papp 1993).

Females with well-sclerotized though retractile abdominal segments 7–9. Female cerci free, not fused. Spermathecae maybe desclerotized ("absent"), two weakly sclerotized slender spermathecae in e.g., *Leptometopa*.

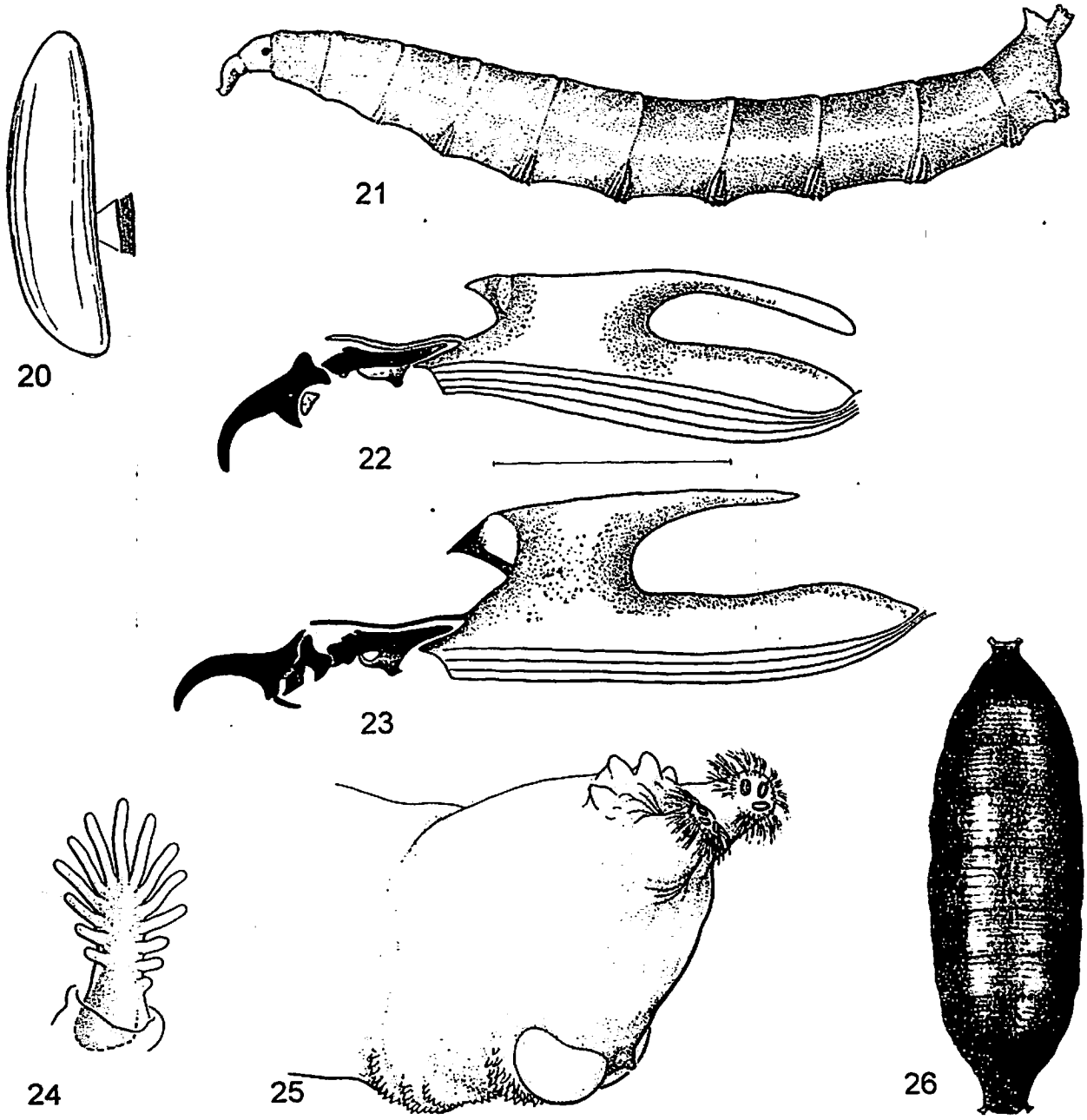
Egg (of *Madiza glabra*, Fig. 20). White, rather long, more cylindrical than ovoid, 0.55–0.59 mm long, 0.15–0.16 mm wide, with very shallow longitudinal ridges and extremely fine microsculpture. Sturtevant (1926) observed four long slender filaments anteriorly on the egg of *Desmometopa m-nigrum*; no such filaments seen on those of *M. glabra*. *Madiza glabra* lays c. 80 eggs in a batch; we do not know whether long lived specimens lay more than one batch (probably yes). Very little known on the eggs of other species but probably also the others are medium-sized. No larvipary is known in this family.

Larvae. Third instar larvae (Fig. 21) 4 to 6.2 mm long, 0.4 to 0.8 mm wide (see Table 49.2 of

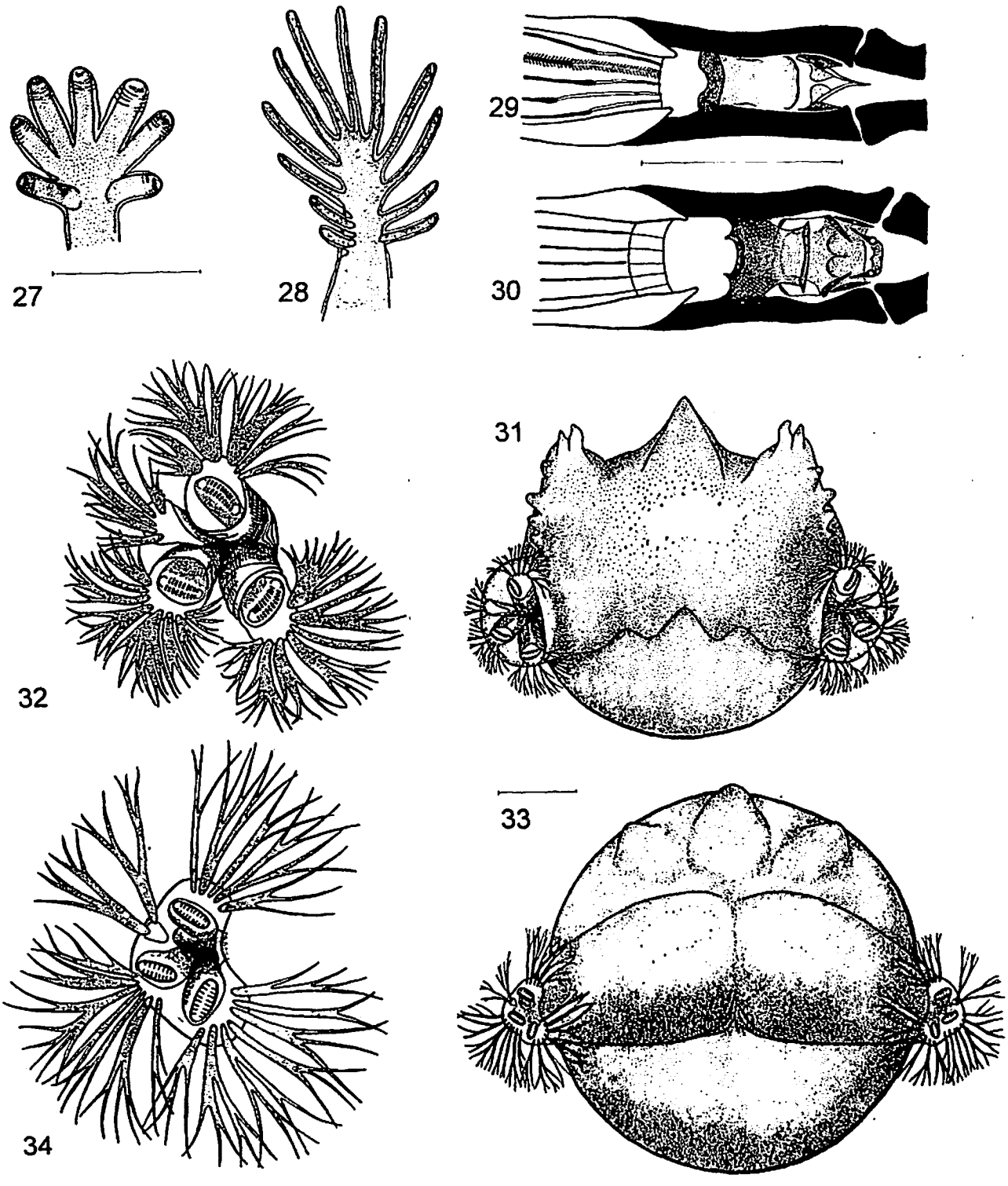


Figs 28.14–19. Male genitalia of Milichiidae. 14–15: *Madiza glabra* Fallén: 14: genitalia, ventral view, 15: postabdomen, lateral view. 16–19: *Desmometopa discipalpis* L. Papp: 16: caudal view, 17: lateral view, 18: hypandrial complex, ventral view, 19: surstylus, broadest extension (abbreviations: aap: aedeagal apodeme, aed: aedeagus, cerc: cercus, eap, ej ap: ejaculatory apodeme, ep: epandrium, gon: gonopod, ha: hypandrium, pm: paramere, sur: surstylus, S: sternite, T: tergite, TS: syntergosternite) (14–15 after Sabrosky 1987, 16–19 after Papp 1993).

Ferrar 1987). The larvae are slightly or strongly S-shaped with distinct transverse tubercles on posterior border of abdominal segments 1 to 7 in both the subfamilies (cf. Hennig 1956; Moser and Neff 1971 and Ferrar 1987). These tubercles characterized by anterior and posterior double rows of spinules. Cephalopharyngeal skeleton (Figs 22–23, 29–30) basically same as in other cyclorrhaphans, with curved mouth hooks, dental sclerites, long parastomal bars (rods) and hypostomal (intermediate) sclerites and with longitudinal ridges on ventral cornua. In *Pholeomyia* (new world genus, see Moser and Neff 1971) and *Desmometopa* (Hennig's "? *Leptometopa latipes*" regarded as a *Desmometopa* sp.) there is an "intercalary" sclerite between mouthhooks



Figs 28.20–26. Developmental stages of Milichiidae. 20: *Madiza glabra* (Fallén), egg, lateral view. 21–22: *Leptometopa coquilletti* Hendel, third instar larva: 21: lateral view, 22: cephalopharyngeal skeleton, lateral view. 23: *Desmometopa* sp. ("? *Leptometopa latipes* Meig."), cephalopharyngeal skeleton, lateral view. 24–25: *Desmometopa m-nigrum* (Zetterstedt), third instar larva: 24: anterior spiracle, 25: caudal end with posterior spiracles. 26: *Phyllomyza securicornis* Fallén, puparium (21–23 after Hennig 1956, 24–25 after Sabrosky 1987, 26 after Hennig 1937).



Figs 28.27–34. Details of third instar larvae of Milichiidae. 27–28: anterior spiracles: 27: *Leptometopa coquilletti* Hendel; 28: *Desmometopa* sp. ("? *Leptometopa latipes* Meig."). 29–30: hypostomal part of cephalopharyngeal skeleton (ventral): 29: *Leptometopa coquilletti* Hendel; 30: *Desmometopa* sp. ("? *Leptometopa latipes* Meig."). 31–32: *Leptometopa coquilletti* Hendel: 31: posterior end, caudal view, 32: posterior spiracle in high magnification. 33–34: *Desmometopa* sp. ("? *Leptometopa latipes* Meig."): 33: posterior end, caudal view, 34: posterior spiracle in high magnification (scale bars: 0.05 mm for 27–28, 29–30, 0.1 mm for 31, 33) (after Hennig 1956).

and hypostomal sclerite. Hypostomal (intermediate) sclerite mostly of an intricate shape (Figs 29–30). Pharyngeal sclerite (incl. cornua) pale, contrasting the more anterior sclerites. Dorsal cornua essentially smaller than ventrals (Fig. 23). Ventral cornua without a dorsal apodeme. Anterior spiracles (Figs 24, 27–28) with spherical or digitiform lobes ("papillae") numbering 5 to 13, rosette-shaped in *Milichiella* and *Leptometopa coquilletti* (and in some other non-Palaearctic genera), with an elongate axis bearing long digitiform lobes in *Desmometopa* and *Milichia*. Last segment with (*Leptometopa*, or more widely: ? Madizinae) or without (*Pholeomyia*, or ? Milichiinae) widely separated protuberant processes dorsally, where posterior spiracles borne. Posterior spiracles mostly lacking a peritreme (Fig. 25) but each consisting of three projections (Figs 32, 34; Ferrar 1987), each projection with a straight or slightly curved slit and with hair-like interspiracular processes (at least so distally) or with numerous branching long hairs in 3(4) groups (Figs 31–34).

The morphology of the milichiid larvae is little known and the proportion of the genera with known larvae is low. This is why no key for the larvae is given below.

Puparium. 2.75 to 4.2 mm long, 0.75 to 1.4 mm wide (Ferrar 1987). Yellowish brown to dark reddish-brown (Ferrar 1987), elongate barrel-shaped tapering at both ends (Fig. 26). No puparial horns, posterior spiracles slightly elevated on puparia (on protuberant processes). Larval anterior spiracle distinct on *Desmometopa*, *Milichiella* and *Milichia* but obscure in *Leptometopa* (Ferrar 1987).

Biology and behaviour. Most of the species of this family are saprophagous, but life-habits in their concrete form are very diverse. The larvae are coprophagous or saprophagous in the widest sense. An excellent summary of the biology and the larval media is given by Ferrar (1987). His table (49.1.) of the recorded breeding habits includes rotting animal matter, rotting plant matter, dung, wood debris, tree wounds, dry debris incl. seeds, ants' nests and birds' nests, thus breeding media include kitchen refuse and amorphous plant detritus. Milichiid adults have been reared from various kinds of dung (droppings, manure heaps and stables; e.g., *Desmometopa m-nigrum*, *D. sordida* and *Leptometopa latipes* were several times reared so in Hungary, see Papp 1978) Some species have been found in ants' nests, they maybe scavengers but the concrete situations are not always clear (cf. Ferrar 1987). *Phyllomyza longipalpis* (Schmitz) was reared from a nest of *Vespa crabro crabro* in Hungary. The life-habits of the *Desmometopa* species of the World were reviewed by Sabrosky (1983). Of the Palaearctic species, *D. m-nigrum*, *D. singaporensis*, *D. varipalpis* were reared from manure, dung; *D. singaporensis*, *D. sordida* and *D. varipalpis* from plant material, etc. Adults of some species are commensalists of predatory insects, some other species are sucking flower nectar; e.g., adults of *Desmometopa microps* Lamb, 1914, an "Oriental" species were collected in high number on flowers of eryngo (*Eryngium*) in Hungary. For special habits of some species (sucking from the prey of robber flies, associations with spiders, etc., see Ferrar (1987).

Classification and distribution. This family is regarded as closely related to the large family Chloropidae (Griffiths 1972), and a good number of synapomorphies in male genitalia corroborates this view. Sabrosky (1987) did not give details of their phylogeny as a family, McAlpine (1989) placed them in the superfamily Carnoidea with Australimyzidae, Braulidae, Carnidae, Tethinidae, Canacidae, Risidae, Cryptochetidae and Chloropidae. Their close relationship with Risidae can be excluded.

The genus *Xenophyllomyza* Ozerov, 1992 is probably a junior subjective synonym of *Paramyia*, however, a detailed study is necessary to corroborate this proposal. Also, some consider *Eccoptomma freyi* Becker as a species of *Milichiella* only.

Papp (1984) listed 50 species of nine genera in the Palaearctic, a genus *Xenophyllomyza* Ozerov and a low number of species (e.g., Papp

1993 with description of a *Paramyia*) were described since that time. Thus eleven genera are included in the key below.

One extinct genus, *Pseudodesmometopa* Hennig, 1971 (with *P. succineum* Hennig, 1971), as well as two fossil species of *Phyllomyza*, *Ph. jaegeri* Hennig, 1967 from Baltic amber (Eocene/Oligocene) and *Ph. hurdi* Sabrosky, 1963 from Mexican amber (Oligocene/Miocene) are known (Evenhuis 1994).

There are no species of economic importance in this family.

KEY TO GENERA
Adults

1. Wing with conscpicuous broad anal lobe: margin of anal area parallel to the dM-Cu crossvein. Subcostal notch remarkable with subcostal section of C ending in an acute lappet (Fig. 8). 1 pair of posthumeral setae. Vibrissal angle not evident, vibrissa well above lower margin of eye seen in profile. Head in profile rounded below. No anepisternal or anepimeral setae in the Palaearctic species MILICHIINAE 2

– Wing without conspicuous broadened anal lobe: margin of anal area and the dM-Cu crossvein convergent. Subcostal notch never well-developed, no acute lappet at the end of subcostal section of C (Figs 6–7, 13). No posthumeral setae. Vibrissal angle 90° or less, with vibrissa below lower margin of eye seen in profile, or no ture vibrissa. Head in profile quadrate or subquadrate. Some anepisternal or anepimeral setae in some genera MADIZINAE 4

2. Posterior margin of eye normal (Fig. 2). 4 to 5 pairs of dorsocentral and 1 pair of strong and 2 or more pairs of weaker supra-alar setae present. Frons broad. Posterior margin of male first tergite straight Milichia Meigen
   11 spp. in the Palaearctic region, mostly in the southern areas (Mediterraneum, etc.).

– Posterior margin of eye notched or stripe-like excision (Fig. 3). At most 3 pairs of dorsocentral setae and only 1 pair of strong supra-alar setae present. Frons narrow. Posterior margin of male first tergite not straight 3

3. Posterior margin of eye with stripe-like excision Eccoptomma Becker
   Only 1 sp. in the Canary Is (*E. freyi* Becker).

– Posterior margin of eye notched (Fig. 3) Milichiella Giglio-Tos
   A widespread genus; at least 4 spp. in the Palaearctic; Hennig 1937.

4. Costal vein extending to M_1 (Figs 6, 13) 5

– Costal vein extending only to R_{4+5} (Figs 4, 7). Proboscis always very long (Figs 4, 9–10). No true vibrissae (Fig. 10) 9

5. Three pairs of lateroclinate orbitals. Male first flagellomere and male palpus usually enlarged (Fig. 5). Head much longer at the height of antennal base than at the level of vibrissae. Proboscis short, labella short and fleshy Phyllomyza Fallén
   14–15 spp. in the Palaearctic region, which need revision.

– Only 2 pairs of lateroclinate orbitals. Male first flagellomere and male palpus not enlarged. Head usually as long at the height of antennal base as at the level of vibrissae. Proboscis and labella various 6

6. Frons with 2 rows of interfrontal setae, which are borne on distinct grey interfrontal stripes; these with ocellar triangle and fronto-orbital plates form an M-shaped area. Prescutellar setae always well-developed. No anepisternal or anepimeral setae **Desmometopa** Loew
   7 spp. in the Palaearctic; Sabrosky 1983 (synopsis of the World species), Papp 1993.

– Interfrontal setae usually in 1 row (or absent), no interfrontal stripes in colour different from the rest of frons. Prescutellar setae mostly reduced 7

7. Anepisternum covered with short setulae, or, 1 or 2 anepimeral setae present. A distinct facial carina (down to the middle of face) separates deep antennal foveae, lower margin of face protruding. Knob of halteres always pale. Male hind tibia broadened in some species (Fig. 11, but cf. Fig. 12) **Leptometopa** Becker
   3 spp. in the Palaearctic.

– No anepisternal or anepimeral setae. Facial carina indistinct. Male hind tibia always normal 8

8. Cell dm short, crossvein dM-Cu 2 or 3 times as far from wing margin as from crossvein R-M (Fig. 6). Body dull or subshining **Neophyllomyza** Melander
   2 spp. in the Palaearctic.

– Cell dm longer, crossvein dM-Cu only a little farther from wing margin than from crossvein R-M (Fig. 13). Body shining black **Madiza** Fallén
   4 spp. in the Palaearctic; Papp 1993.

9. Crossvein dM-Cu present (Fig. 7). Arista thickened (Fig. 10), particularly so for its base, with dense long black hairs. Two pairs of katepisternals. Anterior upper fronto-orbital seta proclinate (Fig. 10) **Aldrichiomyza** Hendel
   An Oriental genus; 2 spp. in the south-eastern Palaearctic; Hennig 1937.

– Crossvein dM-Cu absent (Fig. 4). Arista normal and short haired (pubescent). One or 2 pairs of katepisternals 10

10. Only 1 pair of katepisternals (Fig. 4). Anterior upper fronto-orbital seta lateroclinate (Fig. 9) **Paramyia** Williston
    1 sp. in the Palaearctic; *P. hungarica* L. Papp, 1993.

– 2 pairs of katepisternals. Anterior upper fronto-orbital seta proclinate **Xenophyllomyza** Ozerov
  Type-species (and only known species): *X. deserticola* Ozerov, 1992.

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