

A REVISION OF THE NEW WORLD SPECIES OF *MINILIMOSINA* ROHÁČEK (DIPTERA: SPHAEROCERIDAE)

S.A. MARSHALL

Department of Environmental Biology, University of Guelph,
Guelph, Ontario N1G 2W1

Abstract

Proc. Ent. Soc. Ont 116:1-60 (1985)

The genus *Minilimosina* is revised for the New World, with the description of a new subgenus, *Amputella* and the following 21 new species: *intercepta*, *vixa*, *bipara*, *archboldi*, *contrasta*, *masoni*, *ternaria*, *digitata*, *bistylus*, *priapismus*, *erecta*, *curvistylus*, *sclerophallus*, *zeda*, *baculum*, *longisternum*, *intermedia*, *lepida*, *tuberculum*, *pulpa*, and *accinta*. The following new synonymies are established: *M. dissimilicosta* (Spuler) for *M. hackmani* (Roháček); *M. niveipennis* (Malloch) for *Limosina varicosta* Malloch and *Limosina mollis* Richards; *M. vitripennis* (Zetterstedt) for *Leptocera albifrons* (Spuler). *Minilimosina parvula* (Stenhammar), *M. trogeri* Roháček, *M. gemella* Roháček, *M. fungicola* (Haliday), *M. albinervis* (Duda), and *M. vitripennis* (Zetterstedt) are recorded from the Nearctic region for the first time. A key is provided to New World species and the phylogeny of the entire genus is discussed.

Introduction

The genus *Minilimosina* was erected by Roháček (1983) to include 22 Palearctic species and is equivalent (in part) to the *Limosina fungicola* group of Richards (1930). Roháček (1983) divided *Minilimosina* into three subgenera: *Minilimosina* Roháček, *Allolimosina* Roháček and *Svarciella* Roháček. All three subgenera are recorded here for North America in addition to a distinctive fourth subgenus, *Amputella*, new subgenus.

The subgenus *Minilimosina* includes 15 species in the New World, five of which are also found in Europe. The subgenus *Allolimosina* includes only two New World species, one of which is also found in Europe. There are nine New World species in *Svarciella*, only two of which are known from Europe. *Amputella* is a primarily Neotropical subgenus. One of the six *Amputella* species described here has a range extending north into Canada, but no species occurs outside the New World.

Little is known about the biology of most *Minilimosina* species, even though some species are common. *M. parva* (Malloch) is among the most common fungivorous Diptera in North America, and *M. fungicola* (Haliday) is a common, synanthropic species. Several species are phytosaprophagous and tend to be collected rarely. Most specimens considered in this study were collected by use of dung or carrion traps.

Minilimosina species can be separated from other Limosiniinae by the combination of a mid tibia which lacks a mid-ventral bristle, a long telescoping female abdomen, and the simple wing venation, in which the costa extends beyond the tip of R_{2+4} . Similar taxa are the genus *Xenolimosina* Roháček, in which the hind tibia has a long dorsal bristle, and the species *Aptilotus spatulatus* Marshall. *A. spatulatus* is clearly part of the *Aptilotus pulex* group on the basis of the male abdomen, but the female retains a primitive, *Minilimosina*-like habitus (Marshall 1983). As suggested by this sort of similarity between genera, the diagnostic features for *Minilimosina* are plesiomorphic for the subfamily Limosiniinae. There are no outstanding synapomorphic characters for the genus as a whole, however there is no positive evidence that the group is not monophyletic. Unless such evidence is found in the form of synapomorphies between part of *Minilimosina* and another genus, the genus *Minilimosina* should be retained as a convenient grouping of generally similar insects. Each of the subgenera are more clearly defined on the basis of synapomorphic characters.

Materials and Methods

Many of the specimens on which this paper is based were collected in baited pitfall traps set by Dr. A. F. Newton of the Museum of Comparative Zoology, Cambridge, Dr. S. B. Peck of Carleton University, Ottawa, or by the author. These specimens were stored in alcohol, later dried using a critical-point drier, and then mounted. Specimens were also borrowed from the following institutions: Biosystematics Research Institute, Ottawa, Canada (BRI); American Museum of Natural History (AMNH); University of California at Berkeley (BERK); California Academy of Sciences, San Francisco (CAS); Field Museum of Natural History, Chicago (FLD); Florida State Collection of Arthropods, Gainesville (FSC); Museum of Comparative Zoology, Cambridge (MCZ); Frost Entomological Museum, Pennsylvania State University (PSU); National Museum of Natural History, Washington (USNM); Naturhistorisches Museum Wien, Austria (NMW); and the University Zoological Museum, Helsinki, Finland (ZMH). Unless otherwise noted, specimens are retained in the University of Guelph Collection or, in the case of long paratype series, distributed to other museums with large sphaerocerid collections such as the Silesian Museum, Opava, Czechoslovakia (JRO).

In order to examine male and female terminalia, the abdomens of many specimens were removed and macerated in hot 10% KOH. Abdominal preparations were examined in glycerin or glycerin gel, then stored in plastic microvials pinned under the specimen.

Minilimosina Roháček 1983:27

Type Species *Limosina fungicola* Haliday 1836

Generic diagnosis. Length 0.9-2.1 mm. Colour brown to shining black. Interfrontal bristles small, equal or subequal, in 2-5 pairs. Eye 1-3 times as high as gena, anterior genal bristle short to medium length. Katepisternum with a large dorsal bristle and a small anterodorsal setula. Mid tibia of both sexes with only weak ventral setulae at middle, males sometimes with a row of distal ventral spinules; apicoventral bristle well developed. Mid tibia with a dorsal bristle in distal 1/4, an anterodorsal bristle in proximal 1/3, and smaller anterodorsal and posterodorsal bristles just above distal 1/4 (referred to as distal antero-dorsal and distal posterodorsal bristles) (Figs. 1-5). Acrostichal bristles in 4-8 rows, dorsocentral bristles in 1 or 2 pairs, the anterior pair short. Wings always well developed, costa extended beyond apex of R_{4+5} (except in *contrasta* n.sp.), outer angle of cell dm usually weakly appendiculate. Sternite 5 of male usually with a comb-like structure posteromedially. Sternite 6 simple or with posterior lobes. Epandrium with uniformly short bristles. Cercus weakly developed, with at least 1 long bristle. Surstylus and internal genitalia variable; distiphallus simple in structure. Female postabdomen long and retractile; tergite 8 long, often divided into 2 or 3 pigmented areas; sternite 8 often reduced; hypoproct large and well developed; cercus very long, with long sinuate hairs.

KEY TO THE NEARCTIC AND NEOTROPICAL SUBGENERA
AND SPECIES OF *MINILIMOSINA* ROHÁČEK

- 1. Upper of 2 costagial bristles long, usually subequal in length to posterior dorsocentral bristle. (Costagial bristles often broken on pinned specimens.) Sternite 5 of male concave and deflexed posteromedially, deflexed part often long and projected posteriorly through concavity (Figs. 43-47). Left paramere well developed, right paramere vestigial. Distiphallus reduced to a small, sclerotized lobe; epiphallus well developed (Fig. 112). Sternite 8 of female reduced, often split into small pieces
..... *Amputella* new subgenus 2
- Costagial bristles subequal in length. Sternite 5 of male usually with a posteromedial comb or short deflexed process, never with a concave margin. Parameres equally developed. Distiphallus usually largely membranous; epiphallus absent. Sternite 8 of female consisting of a single sclerite 7

2. Second costal sector 0.7-0.8 times as long as third. Tergite 8 of female complete, at most slightly depigmented medially (Fig. 160) 3
- Second costal sector subequal to third. Tergite 8 of female apparently split medially or with a window-like area posteriorly (Fig. 154) 4
3. Surstylus with 3 (rarely 4) stout bristles forming a compact comb (Fig. 113). Sternite 8 of female reduced to 2 small sclerites (Fig. 162) *ternaria* n.sp. North America.
- Surstylus with stout bristles spread out along posterior margin (Fig. 110). Sternite 8 of female forming a single, ring-shaped sclerite (Fig. 153) *digitata* n.sp. Mexico.
4. Posteromedial lobe of male sternite 5 very large, over half as long as sternite (Fig. 43). Division between anterior and posterior lobes of surstylus shallow (Fig. 98). Tergite 8 of female darkly pigmented medially; sternite 8 made up of a central and 2 lateral sclerites *priapismus* n.sp. Mexico.
- Posteromedial lobe of male sternite 5 shorter (Figs. 45, 47). Division between anterior and posterior lobes of surstylus deep (Figs. 101, 104, 107). Tergite 8 of female depigmented medially; sternite 8 made up of 4 pieces or reduced to a single piece 5
5. Tergite 8 of female with a posterior, desclerotized, window-like area (Fig. 154). Sternite 8 of female simple, pale (Fig. 156). Apex of posterior process of male sternite 5 bent ventrally (Fig. 45) *erecta* n.sp. Mexico.
- Tergite 8 of female dark, shining; with a straight medial suture line dividing it into 2 halves (Fig. 148). Sternite 8 of female divided into 4 dark pieces (Fig. 147). Process male of sternite 5 straight (Fig. 47). 6
6. Anterolateral process of surstylus long, whip-like, curving posteriorly (Fig. 108). Lateral pieces of female sternite 8 elongate, much longer than central piece (Fig. 150) *curvistylus* n.sp. Panama.
- Anterolateral process of surstylus short, projected ventrally (Fig. 104). Lateral pieces of female sternite 8 short (Fig. 147) *bistylus* n.sp. Mexico, Panama.
7. Two pairs of dorsocentral bristles. Body often shining black subgenus *Svarciella* Roháček 24
- One pair of dorsocentral bristles. Body never shining black 8
8. Cell dm very short, anterior outer corner obtuse-angled and posterior outer corner acute-angled. Second costal sector no more than 0.7 times as long as third (Fig. 203). Surstylus without posteroventral spur. Hypandrium short subgenus *Allolimosina* Roháček 9
- Cell dm longer, with anterior outer angle acute-angled to rectangular, or rarely slightly obtuse-angled; posterior outer corner never acute-angled. Second costal sector usually over 0.7 times as long as third. Surstylus with a posteroventral spur. Hypandrium long subgenus *Minilimosina* Roháček 10
9. Sternite 5 of male with 2 comb-plates in front of posteromedial region (Fig. 25). Surstylus long, dark, and almost bare (Figs. 79, 187). Tergites 6 of 7 of female greatly reduced *M. (Allolimosina) rotundipennis* (Malloch) Florida, Arizona, Puerto Rico, Brazil.
- Sternite 5 of male with a single posteromedial comb row. Surstylus pale, broad, many-lobed, and setose. Tergites 6 and 7 of female simply sclerotized

- *M. (Allolimosina) albinervis* (Duda)
 Eastern North America.
10. Apical scutellar bristles 0.5-1.4X length of scutellum 11
 — Apical scutellar bristles over 1.5X length of scutellum 14
11. Apical scutellar bristles slightly longer than scutellum. Sternite 5 of male with the solid, dark apex of posteromedial comb longer than length or width of its base which is evenly curved with scale-like bristles (Fig. 21) *intermedia* n.sp.
 Quebec.
 — Apical scutellar bristles shorter than or equal to scutellar length. Dark apical part of male sternite 5, if present, shorter 12
12. Second costal sector at least 0.8x length of third. Sternite 5 of male with a blunt, hairy posteromedial lobe (Fig. 18). Hypoproct entirely setulose (Fig. 132) *fungicola* (Haliday)
 Holarctic.
 — Second costal sector usually less than 0.8x length of third. Posteromedial comb of male sternite 5 with a solid apical process (Figs. 19-21). Hypoproct usually with a bare anterior lobe (Fig. 135) 13
13. Middle of katepisternum with a shining spot. Basal part of posteromedial comb on male sternite 5 with a bare central area (Fig. 20). Spermathecae short, cup-shaped (Fig. 116) *longisternum* n.sp.
 Mexico.
 — Middle of katepisternum polliose, only anterior corner of katepisternum shining. Basal part of posteromedial comb covered with scale-like bristles. Spermathecae wrinkled-cylindrical (Fig. 134) *gemella* Roháček
 Holarctic.
14. Outer half of R_{4+5} strongly curved towards costa (Fig. 201). Paramere strongly setose (Fig. 50). Anterior margin of hypoproct deeply concave *sclerophallus* n.sp.
 Venezuela, Ecuador.
 — R_{4+5} more gently curved up to costa. Paramere with at most a few minute setulae. Anterior margin of hypoproct straight or lobate 15
15. Greatest eye height at least twice as high as gena 16
 — Greatest eye height less than 1.8x genal height 19
16. Mid tibia with distal anterodorsal and posterodorsal bristles small, subequal, much smaller than distal dorsal. Posteromedial comb of male sternite 5 made up of 2 short rows of flat bristles, the outer row strongly convex (Fig. 12). Female sternite 8 Y-shaped, with 3 lobes (Fig. 123) *parva* (Malloch)
 Widespread in North America.
 — Mid tibia with distal posterodorsal bristle larger than distal anterodorsal bristle. Posteromedial comb concave or with a single dark lobe. Female sternite 8 not Y-shaped 17
17. Sternite 5 of male with posteromedial comb bearing a solid, pointed lobe (Fig. 16). Female sternite 8 much larger than hypoproct, deeply concave on anterior margin (Fig. 120) *nasuta* (Spuler)
 Western North America.
 — Sternite 5 of male with a concave or split posteromedial comb. Female sternite 8 usually smaller and lobate rather than concave anteriorly 18
18. Frons with 2 inclinate inner orbital setulae between interfrontal and orbital bristles. Posteromedial comb of male sternite 5 deeply concave, apparently divided into 2 tufts of flat setae (Fig. 11). Sternite 8 of female trilobate anteriorly (Fig. 141)

- *zedæ* n.sp.
Alberta.
- Frons bare between orbits and interfrontal strips. Posteromedial comb gently concave (Fig. 9). Sternite 8 of female T-shaped *parvula* (Stenhammar)
Holarctic.
19. Sternite 5 of male with a long, pointed posteromedial process which is longer than the bristled row at its base (Fig. 15). Surstylus with a subquadrate anteroventral lobe (Fig. 68) *trogeri* Roháček Ontario, Quebec, Wyoming, Austria, Finland.
- Sternite 5 of male never with a long, pointed posteromedial process. Anterior part of surstylus rounded, pointed, or club-shaped 20
20. Sternite 5 of male with a posteromedial lobe ending in a serrate-tipped plate resembling a butterfly scale (Fig. 17). Parameres bifid at apex (Fig. 75) *lepida* n.sp.
Saskatchewan, Ontario.
- Sternite 5 never with a solid posteromedial plate. Parameres simple or curved at apex 21
21. Surstylus with a large anteroventral club (Fig. 58). Posteromedial lobe of male sternite 5 with a small, dark process distally (Fig. 13) *baculum* n.sp.
Ontario, British Columbia, Finland.
- Surstylus never with a large ventral club. Posteromedial lobe of sternite 5 with uniformly small setulae 22
22. Sternite 5 of male with 6 large bristles projected over posteromedial lobe (Fig. 10). Parameres short, thick (Fig. 78) *accinta* n.sp.
Utah.
- Sternite 5 never with large bristles projected over posteromedial lobe. Parameres long and slender 23
23. Apex of posteromedial lobe on male sternite 5 sinuate (Fig. 14). Length about 1.0 mm *pulpa* n.sp.
Wyoming.
- Apex of posteromedial lobe on male sternite 5 straight (Fig. 23). Length closer to 1.5 mm *tuberculum* n.sp.
Wyoming.
24. Sternite 8 of female reduced, narrow, no wider than hypoproct (Fig. 165). Sternite 5 of male with a simple posteromedial, setulose lobe (Fig. 40) *bipara* n.sp.
Panama, Venezuela.
- Sternite 8 of female larger than hypoproct. Sternite 5 of male concave or with a comb of stout bristles 25
25. All abdominal tergites heavily sclerotized, dark. Distiphallus narrow, simple. Each spermatheca cylindrical, with an apical invagination 26
- Tergites 1-5 pale, contrasting with the darkly, sclerotized terminalia. Distiphallus usually large, mostly membranous, with a long ventral flagellum (Fig. 93). Each spermatheca of known females short, usually with an apical evagination (Fig. 185) 28
26. Mid tibia of male with only simple setulae along ventral surface. Sternite 5 of male with a very large convex bulge in front of posteromedial comb (Figs. 38, 39). Surstylus large, cup-shaped, without stout bristles (Fig. 38). Sternite 8 of female longer than wide, bare except for area surrounding a posterior concavity (Fig. 174)
..... *dissimilicosta* Spuler
Europe, western North America.
- Mid tibia of male with a double row of ventral spines. Sternite 5 of male flat, with a posteromedial comb of stout, flat bristles (Fig. 30). Surstylus with 3 stout bristles on

- posterior lobe (Fig. 31). Hypoproct wider than long, mostly setulose (Fig. 171) 27
27. Antennae and anterior part of frons yellowish brown or orange. Epimeron with large shining spots. Surstylus with a small external lobe (Fig. 31) *intercepta* n.sp. Eastern North America.
- Antennae and frons brown. Epimeron with very small shining spots. Surstylus with a large external lobe (Fig. 35) *vixa* n.sp. Northeastern North America.
28. Antennae orange or yellow-brown. Second costal sector less than or equal to half as long as third 29
- Antennae brown. Second costal sector 0.7-0.8x as long as third 31
29. Antennae, gena, lower frons and face orange or yellow-brown. Second costal sector 0.4 times as long as third (Fig. 206). Hind tibia with a dorsal, preapical tibial bristle. First 2 tarsomeres of hind leg subequal in length and width *masoni* n.sp. Mexico.
- Antennae sharply contrasting in colour with the dark frons, gena and face. Second costal sector 0.5 times as long as third. Hind tibia with only small dorsal setulae. Second tarsomere of hind leg longer and thinner than first tarsomere 30
30. Scutum and scutellum strongly convex. Sternite 5 of male with a simple posterior margin. Spermathecal ducts very long (Fig. 179) *niveipennis* (Malloch) Costa Rica.
- Scutum and scutellum flat. Sternite 5 with a dark, deflexed posteromedial lobe (Fig. 28). Spermathecal ducts short (Fig. 176) *contrastata* n.sp. Ontario, Quebec, Maryland.
31. Frons, ocellar triangle, lunule, face, facial cavity and gena silvery white to silvery blue dusted, only the frontal triangle bare and shining. Tergites 3-5 greatly reduced, sclerotization indistinct. Deflexed posteromedial process of male sternite 5 broadly Y-shaped (Fig. 29) *vitripennis* (Zetterstedt) Holarctic.
- Head without silvery white areas, frontal triangle lightly pollinose, middle of interfrontal area bare. Tergites 3-5 pale but distinctly sclerotized. Deflexed posteromedial process of sternite 5 with a large comb of flat bristles and 2 lateral apically setose lobes (Fig. 26) *archboldi* n.sp. Florida.

Descriptions (or diagnoses of taxa recently described by Roháček) follow in alphabetical order within each subgenus. The subgenera are dealt with the following order: *Minilimosina*, *Allolimosina*, *Svarciella*, and *Amputella*.

***Subgenus Minilimosina* Roháček 1983:37**
Type Species *Limosina fungicola* Haliday 1836

Subgeneric diagnosis. Small, 1.0-1.9 mm; usually dull in colour. Orbits, ocellar triangle and interfrontal strips silvery to pollinose; middle of interfrontal plate shining brown to silvery black, intervening areas forming a dull, black M-shape. Postocellar bristle minute or absent; face protrudent between antennae (Fig. 189), strongly concave and carinate below. Mid femur with 2-5 long ventral bristles near base, mid tibia of male with at least some weak spinules forming a distal ventral row. Costa always extended clearly beyond tip of R_{4+5} , cell dm rounded or obtuse angled and indistinctly or not appendiculate at outer posterior corner. Dorsocentral bristles in a single prescutellar pair or anterior pair difficult to distinguish from acrostichal setulae. Sternite 5 of male with a narrow posteromedial lobe covered with comb-like bristles. Basiphallus and distiphallus simple; distiphallus with

sclerotized dorsal and ventral processes and relatively little exposed membrane. Tergites 6 and 7 of female often reduced, sternite 8 often greatly reduced.

***Minilimosina (Minilimosina) accinta* new species**

Figs. 10, 76, 77, 78, 191

Description, male (female unknown). Length 1.1 mm. Interfrontal plate broad, slightly tapering, bordered by 3 equal interfrontal bristles, subequal in width and height. Eye 1.3 times as high as gena. Mid tibia with a row of very weak distal bristles and an apical bristle ventrally. Distal posterodorsal bristle of mid tibia twice as long as adjacent anterodorsal bristle, half as long as distal dorsal bristle. Scutum with 4-5 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in 1 prescutellar pair 0.7 times as long as scutellum. Prescutellar acrostichal bristles in a single pair, 3 times as long as acrostichal setulae. Scutellum 0.7 times as long as wide, apical bristles as long as scutellar width. Mesopleuron pollinose except shining anterior part of episternum. Halter uniformly light brown. Wing with costagial bristles subequal, small; second costal sector slightly greater than half as long as third; veins uniformly light in colour (Fig. 191).

Abdomen. Syntergite 1+2 1.5 times as long as tergite 3. Sternite 5 with 6 long bristles posteromedially, projecting over a lobe bearing rows of small scale-like setae (Fig. 10). Surstylus with a long, lobate are anteriorly, a stout posterior bristle and several smaller bristles (Figs. 76, 77). Paramere broad, blunt; distiphallus broad, distally bilobed (Fig. 78).

Types. *Holotype* (♂, BRI): U.S.A. **Utah.** Duchesne Co., Uinta Mts., Rocky Sea Pass, 11200', 30.vii-12.viii.1979, carrion, rocky tundra, S.&J. Peck. *Paratype:* **Utah.** Duchesne Co., Mirror Creek, 10300', 30.vii-12.viii.1979, meadow, malaise trap, S.&J. Peck (1 ♂).

Etymology. The specific name is from the Latin for "well armed", and refers to the armature of sternite 5.

Comments. Although known from only 2 specimens, the strong constriction of the anterior surstyler lobe and the conspicuous chaetotaxy of the male sternite 5 make this an easily identifiable species. Its probable closest relative is another rare, western species, *M. pulpa*. Both species are known only from high alpine sites, and were collected on carrion. Their closest relative is the European species *M. tenera*, known only from a peat bog in Czechoslovakia.

***Minilimosina (Minilimosina) baculum* new species**

Figs. 13, 58, 59, 192

Description, male (female unknown). Length 1.5 mm. Interfrontal plate broad, width at top almost equal to height; slightly tapered, bordered by 4 long, almost cruciate interfrontal bristles. Eye 1.5 times as high as gena. Mid tibia of male ventrally with a distal row of weak spinules and an apical bristle. Distal anterodorsal bristle slightly shorter than posterodorsal bristle, much shorter than distal dorsal bristle. Scutum with 4-5 rows of long acrostichal setulae between dorsocentral lines, dorsocentral bristles in a single prescutellar pair subequal in length to scutellum. Prescutellar acrostichal bristles in a single pair slightly longer than acrostichal setulae. Scutellum twice as wide as long, apical bristles as long as scutellar width. Halter dark brown with lighter stem. Wing with costagial bristles subequal, short; second costal sector 0.7 times as long as third (Fig. 192).

Abdomen. Syntergite 1+2 1.8 times as long as tergite 3. Sternite 5 of male with posteromedial lobe bearing rows of small, scale-like bristles and a small posterior spur-like process (Fig. 13). Surstylus with a distinctive anteroventral clubbed lobe (Figs. 58, 59). Parameres curved anteriorly at tip.

Types. *Holotype* (♂, BRI) and 2 *paratypes*: CANADA. **Ontario.** Ottawa, viii.1980., in lawn clippings, A.Telka. *Other paratypes:* **British Columbia.** Telegraph Creek, 2.vii.1960, 1100', in *Carex* and *Equisetum* beside lake, R.Pilfrey (1 ♂, BRI). **Finland.** Kilpisjarvi, R.Frey, "742" (1 ♂, ZMH).

Biology. This northern, Holarctic species is probably phytosaprophagous. Most of the type series was collected in piles of decaying grass.

Comments. *M. baculum* is a distinctive species that does not appear to be closely related to any other known species. Dr. J. Roháček was kind enough to send me the specimen from Finland, which he recognized as a new species I had described in an early manuscript version of this paper.

Etymology. The specific epithet is from the Latin for "club", and refers to the club-like anterior lobe of the surstylus.

***Minilimosina (Minilimosina) fungicola* (Haliday)**

Figs. 18, 130, 131, 132, 133, 195

Limosina fungicola Haliday, 1836:330.

Minilimosia (Minilimosina) fungicola: Roháček, 1983:39, synonymy and description.

Diagnosis. Length 1.2-1.5 mm. Eye 1.8 times as high as gena. Posterior scutellar bristles subequal in length to scutellum. Distal anterodorsal bristle of mid tibia much larger than adjacent posterodorsal. Second costal sector subequal to third (ratio 0.8-1.0) (Fig. 195).

Male abdomen. Sternite 5 with medial spinose patch covered with hairs, not showing distinct bristles (Fig. 18). Surstylus with only setulae ventrally but with the usual stout posterventral bristle.

Female abdomen. Tergites 6 and 7 of female completely sclerotized, tergite 8 with tripartate pigmentation (Fig. 130). Sternite 8 long, rectangular, and weakly sclerotized; hypoproct subquadrate, setulose on entire surface (Fig. 132). Each spermatheca round-oval, surface reticulate, oval swelling of duct very small (Fig. 131).

Material examined. CANADA. **British Columbia:** Woodbury Creek, near Ainsworth, 5.viii.1980, dung vacuum, S.A. Marshall (1 ♀); Vancouver, U.B.C. campus, conifer duff, dung, 23&28.vii.1980, S.A. Marshall (4 ♂, 2 ♀). **New Brunswick:** St. Andrews, 15.viii.1979, dead seagull, S.A. Marshall (5 ♂, 1 ♀). **Ontario:** Lanark, 11.viii.1979, dead fish, S.A. Marshall (1 ♀); Iron Bridge, 5.viii.1981, S.A. Marshall (1 ♂); Thunder Bay, 24.v.1980, M. Kaulbars (1 ♀); Honey Harbour, 25.iv.1959, J.G. Chillcott (1 ♂, BRI). **Quebec:** Gt. Whale R., 18.viii.1949, "host *Agaricus*", J.R. Vockeroth (2 ♀, BRI). **Northwest Territories:** Reindeer Depot, Mackenzie Delta, 16.viii.1948, J.R. Vockeroth (2 ♀, BRI). U.S.A. **Colorado:** Roatte Co., 5miNE Clark Hinman Cpgrd., 7600', 23-25.vi.1972, dung trap (1 ♂). **Michigan:** Gogebic Co., Crooked Lake Bog, 11.viii.1977, Berlese sample, mammal dung, H.S. Dybas (1 ♂, 3 ♀, FLD). **North Carolina:** Gt. Smoky Mt. Nat. Pk., Clingman's Dome, 6300', on bear dung, 3.vi.1952, J.R. Vockeroth (1 ♀, BRI). **Washington:** 23.2miS South Bend, 9.x.1968, Malaise trap, D.D. Munroe (1 ♀, BRI); Sequim Bay, 3.ix.1934, A.L. Melander (1 ♂, USNM). This species is also known throughout Europe (Roháček 1983).

Biology. This species is common and synanthropic throughout at least the northern Holarctic Region, and has been collected from a wide variety of substrates. In spite of the specific name, it is rarely associated with fungi. Roháček (1983) suggested that *M. fungicola* is primarily phytosaprophagous.

***Minilimosina (Minilimosina) gemella* Roháček**

Figs. 19, 133, 134, 135, 196

Minilimosina (Minilimosina) gemella Roháček, 1983:40, male only.

Diagnosis. Length 1.0-1.3 mm. Eye 2.5 times as high as gena. Scutellum twice as wide as long, marginal bristles short, apical scutellar bristles less than or equal to scutellar length. Distal anterodorsal bristle of mid tibia much longer than adjacent posterodorsal bristle. Wing with second costal sector 0.7-0.9 times as long as third (Fig. 196). Sternite 5 of male with posteromedial lobe basally covered with small, bifurcate scale-like setae, with a solid projection distally (Fig. 19). Surstylus with a stout posterior bristle and 1 or 2 smaller robust blunt bristles ventrally.

Description, new female. Tergites 6 and 7 small but complete and sclerotized dorsally, with tripartate pigmentation (Fig. 133). Epiproct setulose on posterior half, with 2 bristles. Sternite 8 large, lightly pigmented anteriorly; hypoproct with a bare anterior lobe (Fig. 135). Each spermatheca longer than wide, duct with 2 swellings (Fig. 134).

Material examined. CANADA. **New Brunswick:** St. Andrews, 11-15.viii.1978, pitfall traps, S.A. Marshall (5 ♂). **Ontario:** Algonquin Park, S. of Shirley Lake, 26.v-16.vi.1984, mushroom traps in deciduous forest, K. Pendreigh (2 ♂, 2 ♀); Algonquin Park, S. of Shirley Lake, 18-26.v.1984, moose dung baited traps in deciduous forest, K. Pendreigh (2 ♂, 6 ♀); Lanark, 1.ix.1979, mushroom, S.A. Marshall (1 ♂). **Quebec:** Lac Roddick, 23.iv.1984, L. Masner (1 ♂). **Saskatchewan:** Cypress Hills, 26.v.1955, J.R. Vockeroth (1 ♂, BRI). U.S.A. **Michigan:** Gogebic Co., Crooked L. Bog, 11&15.viii.1977, Berlese-mammal dung, H.S. Dybas, and 23.vi.1978, Berlese-Otter dung and root-mat substrate, J. Wagner (11 ♂, 5 ♀, FLD). **West Virginia:** Pendleton Co., Spruce Knob, 4600', 27.vi-9.vii, carrion trap among conifers, A. Newton (2 ♂, MCZ). Otherwise this species is known only from the two type males, collected in Austria.

Biology. The type material (2 ♂, JRO) was collected using a photoeclector in a manured alpine meadow in Austria, suggesting an association with dung-enriched substrates and boreal-alpine habitats. This association is substantiated by the longest series cited above, which was taken from dung-enriched vegetation in a bog.

Comments. Of the several species with a similar male sternite 5, *M. gemella* is most closely related to *M. fungicola* and *M. longisternum*, both of which also have very short scutellar bristles.

Minilimosina (Minilimosina) intermedia new species

Figs. 21, 65, 66, 67, 136, 137, 138, 197

Description. Length 1.3-1.5 mm. Interfrontal plate bordered by 4 small, equal interfrontal bristles, width at top 0.8 times height. Eye 2.0 times as high as gena. Mid tibia of male ventrally with a distal row of about 7 short spinules and a distinct apical bristle. Distal anterodorsal bristle of mid tibia slightly shorter than distal posterodorsal bristle. Scutum with 4-6 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in a single prescutellar pair 0.5 times as long as scutellum. Prescutellar acrostichal bristles in a single minute pair, no longer than other acrostichal setulae. Scutellum 0.7 times as long as wide, apical scutellar bristles 1.1 times as long as scutellum. Mesopleuron pollinose except for shining anterior part of episternum. Halter uniformly light brown. Wing with costagial bristles small, upper 0.7 times as long as lower; second costal sector 0.8-1.0 times as long as third (Fig. 197).

Abdomen. Syntergite 1+2 1.4 times as long as tergite 3.

Male abdomen. Sternite 5 with a long posteromedial lobe bearing overlapping rows of scale-like bristles and a long, solid pointed process posteromedially (Fig. 21). Surstylus with a blunt, ventrally setulose anterior lobe, a single stout posteroventral bristle, and 2 small, blunt posteroventral bristles (Figs. 65, 66). Parameres narrow, slightly curved apically. Distiphallus simple, mostly sclerotized (Fig. 67).

Female abdomen. Tergites 6-8 complete but lightly pigmented medially; epiproct setulose on posterior quarter only (Fig. 136). Sternite 8 elongate, quadrate and darkly sclerotized on posterior half; medial bristles forming a transverse row (Fig. 138). Hypoproct entirely setulose, with an even anterior margin. Each spermatheca somewhat peanut-shaped, with a reticulate surface and short ducts (Fig. 137).

Types. *Holotype* (♂, BRI): CANADA. **Quebec:** Mt. Albert, Gaspé Prov. Pk., 5.vi-24.vii.1980, Dondale and Redner. *Paratypes:* **Quebec:** CampLeRelais, Laurentide Pk., 3000', 29.viii.1956, H.S. Dybas (4 ♂, 1 ♀, FLD, GUELPH) **Nova Scotia:** Cape Breton Highland Nt. Pk., North Mt., 400m, 5.viii.1983, "PG766864", fen pan trap, J. Vockeroth (1 ♂, BRI).

Comments. *M. intermedia* is closely related to *M. gemella* and *M. longisternum*, each of

which also have short scutellar bristles and a solid, dark, posteromedial lobe on the male fifth abdominal sternite.

Etymology. Prior to the discovery of *M. intermedia*, the species of this genus could be neatly separated into those with apical scutellar bristles no longer than the scutellum (*gemella*, *fungicola*, *longisternum*) and those with very long scutellar bristles (all other species). The name *intermedia* was chosen to reflect the intermediate length of the apical scutellar bristles in this new species.

***Minilimosina (Minilimosina) lepida* new species**

Figs. 17, 74, 75

Description. Length 1.2-1.3 mm. Interfrontal plate subequal in height and width, slightly tapered; bordered by 4 equal interfrontal bristles. Eye 1.7 times as high as gena. Mid tibia of male ventrally with distal row of weak spinules and a strong apicoventral bristle. Distal anterodorsal and posterodorsal bristles of mid tibia small, subequal. Scutum with 4-5 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in a single prescutellar pair half as long as scutellum. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Scutellum half as long as wide, apical scutellar bristles longer than scutellar width. Mesopleuron pollinose except for anterodorsal corner of katepisternum. Halter brown with lighter stem. Wing with costagial bristles short; second costal sector dark and slightly shorter than third, other veins light brown; distance between crossvein dm-cu and crossvein r-m 5 times as long as dm-cu, cell dm faintly appendiculate.

Abdomen. Syntergite 1+2 1.4 times as long as tergite 3.

Male Abdomen. Posteromedial lobe of sternite 5 basally with rows of short, scale-like setae, with a crenulate-tipped solid projection posteriorly (Fig. 17). Surstylus (Fig. 74) with a stout posteroventral bristle, paramere bifurcate apically (Fig. 75). Distiphallus broad, short.

Female Abdomen. Tergites 6 and 7 sclerotized laterally but membranous dorsally as in *M. nasuta* (Fig. 118), tergite 8 with tripartate pigmentation. Epiproct bare except for 2 small bristles. Sternite 8 large and darkly sclerotized, similar to *M. nasuta* (Fig. 120) except with a large, rounded lobe in anterior concave part of sclerite. Hypoproct setulose on posterior 1/3, anterior portion bare, much darker than posterior part; anterior margin with a deep median cleft. Spermathecae spherical, similar to *M. nasuta* (Fig. 119).

Types. *Holotype* (♂, BRI): CANADA. Saskatchewan: Cypress Hills, 15-17. vii.1980, wet spruce, intercept trap, R.A. Anderson. *Paratypes*: Ontario: Algonquin Park, S. of Shirley Lake, pitfall traps baited with moose dung, deciduous forest, 18-26.v.1984, K. Pendreigh (2 ♂, 1 ♀).

Comments. In spite of the distinctive and autapomorphic sternite 5, *M. lepida* can be seen to be closely related to *M. nasuta*. The very similar anteriorly narrowed surstyli, bifid parameres, split female tergites, and huge female sternite 8 are shared characters supporting this relationship. The Ontario paratypes differ from the holotype (Fig. 17) in having a greater number of crenulations on the posteromedial lobe of male sternite 5.

Etymology. The specific epithet *lepida* is from the Latin for "pleasant", but also refers to the close similarity between the posteromedial lobe of the fifth sternite and a lepidopteran scale.

***Minilimosina (Minilimosina) longisternum* new species**

Figs. 20, 62, 63, 64, 115, 116, 117, 194

Description. Length 1.5-1.7 mm. Interfrontal plate bordered by 4 small, subequal interfrontal bristles, width at top 0.7 times height. Eye 1.5 times as high as gena. Mid tibia of male ventrally with a distal row of short spinules and a distinct apical bristle. Distal anterodorsal bristle of mid tibia equal in length to distal posterodorsal bristle. Scutum with

6-7 rows of acrostichal setulae between dorsocentral lines. Dorsocentral bristles in 2 pairs; anterior pair indistinct, twice as large as acrostichal setulae; prescutellar pair 0.5 times as long as scutellum. Prescutellar acrostichal setulae in a single pair twice as long as acrostichal setulae. Scutellum 0.8 times as wide as long, apical scutellar bristles shorter than scutellum. Mesopleuron pollinose except shining anterior part of episternum and separate large shining area below katepisternal bristle. Halter dark brown with yellow stem. Wing with costagial bristles small, upper twice as long as upper. Second costal sector 0.8 times as long as third (Fig. 194).

Abdomen. Syntergite 1+2 1.6 times as long as tergite 3.

Male abdomen. Sternite 5 with a long posteromedial lobe, central basal part of lobe bare, basal part of lobe otherwise bearing scale-like setae, distal part of lobe forming a long, darkly sclerotized process (Fig. 20). Surstylus with a very narrow anterior lobe, a single strong ventral bristle posteriorly, and 2 short blunt ventral bristles (Figs. 62, 63). Parameres weakly clubbed at apex, with 3 small anterior setulae (Fig. 64). Distiphallus simple, largely sclerotized with a narrow distal dorsal process (Fig. 64).

Female abdomen. Tergites 6 and 7 entire but shortened medially, tergite 8 much longer, with tripartate pigmentation (Fig. 115). Epiproct longer than cerci, bare except for the usual 2 bristles. Sternite 8 very elongate, with sinuate lateral margins and trilobed anterior margin (Fig. 117). Hypoproct entirely setulose. Each spermatheca small, dark, subspherical, flattened and invaginated apically, duct short (Fig. 116).

Types. *Holotype* (♂, MCZ) and 11 *paratypes* (10 ♂, 1 ♀, BRI, GUELPH): MEXICO. **Oaxaca:** 1.4miE jct. Mex.175 and Yuvila Rd., 9300' 9-19.viii.1973, mesic oak forest. A. Newton. *Other paratypes:* MEXICO. **Oaxaca:** 3.3miE jct. Mex.175 and Yuvila Rd., 8100', 9-19.viii.1973, oak-pine, dung. A. Newton (2 ♂, MCZ).

Etymology. The Latin name *longisternum* refers to the very long sternite 8 of the female.

Minilimosina (Minilimosina) nasuta (Spuler) new combination

Figs. 16, 71, 72, 73, 118, 119, 120, 198

Leptocera (Scotophilella) nasuta Spuler, 1925:84.

Description. Length 1.2-1.5 mm. Interfrontal plate bordered by 4 equal interfrontal bristles, width at top 0.7 times height. Eye 1.6 times as high as gena. Mid tibia of male ventrally with a distal row of 7 short spinules and a distinct apical bristle. Distal anterodorsal bristle of mid tibia shorter than long distal posterodorsal and longer distal dorsal bristle. Scutum with 4-6 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in 1 prescutellar pair subequal in length to scutellum. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Scutellum 0.7 times as long as wide, apical scutellar bristles twice as long as scutellum. Mesopleuron pollinose except for shining anterior part of episternum. Halter uniformly light brown. Wing with costagial bristles small, upper 0.7 times as long as lower. Second costal sector 0.7-0.8 times as long as third (Fig. 198).

Abdomen. Syntergite 1+2 2.0 times as long as tergite 3.

Male abdomen. Sternite 5 with a long posteromedial lobe with rows of scale-like setae on basal half and a solid, pointed process distally (Fig. 16). Surstylus with a long anterior lobe and a broader posterior lobe bearing the usual small spur (Figs. 71, 72). Parameres broad, apically bifid (Fig. 73). Distiphallus narrow, simple.

Female abdomen. Tergites 6 and 7 sclerotized laterally but membranous dorsally; tergite 8 with tripartate pigmentation (Fig. 118). Epiproct small bare except for 2 central bristles. Sternite 8 large and darkly sclerotized, deeply emarginate anteriorly, larger than hypoproct (Fig. 120). Hypoproct largely setulose, with a bare anteromedial lobe. Each spermatheca spherical, with several small papillae at base, stem with a single short swelling (Fig. 119).

Types. *Holotype* (♂, no abdomen): U.S.A. **Washington:** Pullman, May 19, 1912, A.L.

Melander (USNM). *Paratype* (♀, dissected): **Washington:** Almota (no collector or date, A.L. Melander collection, USNM). All other paratype material not conspecific with holotype, see *M. parva*.

Other material examined: CANADA. **British Columbia:** Terrace, 3.vii.1960, swept off carcass, J.G. Chillcott (1 ♂, BRI). U.S.A. **Arizona:** Apache Co., Alpine, Luna Lake, 7900', 9-14.vii.1979, alpine meadows, S.&J. Peck (31 ♂, 5 ♀, BRI, GUELPH); Coconino Co., Flagstaff, 7100', 18-25.vii.1979, pond-pine-meadow, S.&J. Peck (1 ♀); 10miNW Flagstaff, San Francisco Mtns, 9500', 18-24.vii.1979, spruce-fir-aspen, meadow malaise, S.&J. Peck (3 ♂, 1 ♀); Oak Creek Canyon, 5900', 17-25.vii.1979, riparian woods, S.&J. Peck (8 ♂, 4 ♀); Cochise Co., Huachuca Mts., 6000', Miller Canyon, ix.1970, dung trap in oak woodland, A.F. Newton (1 ♂, MCZ). **New Mexico:** Catron Co., 5miW Luna, 7400', 9-14.vii.1979, pond-pine-meadows, San Francisco River, S.&J. Peck (10 ♂, 5 ♀); Lincoln Co., Gallinas Pk. 8600', 10miW Corona, 17-22.viii.1975, carrion trap in bog w. pond, fir, pine, S. Peck (1 ♀); Socorro Co., 20miW Socorro, Water Canyon, 7000', 2.vi-7.1979, mixed mesic forest, S.&J. Peck (2 ♂, 1 ♀); Sandoral Co., Rabbit Mtn., 25.v.1959, W.W. Wirth (1 ♂, USNM).

Biology. Although most of the specimens examined lacked habitat information, two of the records suggest an association with carrion. This western species has been collected over a wide range of elevations throughout the summer months, but has been most frequently collected at higher elevations in the southwest.

***Minilimosina (Minilimosina) parva* (Malloch) new combination**

Figs. 12, 51, 52, 53, 121, 122, 123, 199

Limosina parva Malloch, 1913:371.

Leptocera (Scotophilella) parva: Spuler, 1925b:82.

Description. Length 1.1-1.3 mm. Interfrontal plate narrow and tapered, width at top 0.7 times height; bordered by 3-4 small equal interfrontal bristles. Eye 3.0 times as high as gena. Mid tibia of male with a distal row of several small ventral spinules and a weak apicoventral bristle. Mid tibia of both sexes with a strong distal dorsal bristle, a slightly shorter distal posterodorsal bristle and a much shorter distal anterodorsal bristle. Acrostichal setulae in 6-7 rows between dorsocentral lines, prescutellar acrostichal bristles 2-3 times as long as others. Scutellum twice as wide as long, apical bristles twice as long as scutellum. Mesopleuron entirely pollinose. Halter uniformly light brown. Wing with costagial bristles small, subequal. Second costal sector 0.5-0.8 times as long as third (Fig. 199).

Abdomen. Syntergite 1+2 1.7 times as long as tergite 3.

Male abdomen. Sternite 5 with 2 rows of flat spines posteromedially, forming a lobe which is widest distally and convex at apex (Fig. 12). Surstylus with stout posterior and ventral spurs (Figs. 52, 53). Paramere thin, slightly curved at apex. Distiphallus simple, scoop-shaped, mostly sclerotized (Fig. 51).

Female abdomen. Tergites 6 and 7 entire; tergite 8 with tripartate pigmentation, pigmentation of dorsal part irregular. Epiproct bare except for 2 small bristles, anterior margin incised (Fig. 21). Sternite 8 Y-shaped, with some bristles but general surface bare (Fig. 123). Hypoproct subquadrate, entire surface setulose. Each spermatheca subspherical, apical invagination shallow (Fig. 122).

Type. *Holotype* (♂, USNM): "Nat. Mus. on windows Ap. 1912 Malloch"

Other material examined. CANADA. **British Columbia:** 10miW Hope, wet forest, 8-28.vii.1908, S.A. Marshall (1 ♀); **Manitoba:** Erickson, 1-5.viii.1983, Pengelly and Barber, mushroom traps (2 ♂, 3 ♀). **New Brunswick:** Kouchibouguac N.P., 23.v.1977, Hanley and Cooper, code 5113Q (1 ♂, BRI); St. Andrews, vii & viii.1978, S.A. Marshall (7 ♂, 8 ♀). **Nova Scotia:** Cape Breton Highlands Nt. Pk., North Mt., 400m, 29.vii.1983, fen and for., D. Bright (4 ♀); Antigonish Co., 1kmN Antigonish, 2.vii-5.viii.1984, L. MacMillan, flight intercept trap (3 ♂, 4 ♀, BRI). **Ontario:** Alfred, Alfred Bog, 25.ix.1983, sifted from moss under fungi and moose dung, S. Peck (1 ♂); Algonquin Park, S. of Shirley Lake, 26.v-21.vii.1984, mushroom traps in deciduous forest, K. Pendreigh (7 ♂, 10 ♀); Algonquin Park, S. of Shirley Lake, 18-26.v.1984, moose dung baited traps in deciduous

forest, K. Pendreigh (4 ♂); Guelph, 10.vi-8.vii.1983, mushroom bait, B. Brown (11 ♂, 7 ♀); Guelph, 19.vii.1983, vacuumed from mushroom, B. Brown (1 ♂); Guelph, 9-11.vi.1984 (1 ♀), 9-12.vii.1984 (1 ♀), 12-14.vii.1984 (2 ♂, 1 ♀), 1.viii.1984 (2 ♂, 1 ♀), 7-12.ix.1984 (1 ♂), mushroom traps in coniferous forest, B. Brown & S. Marshall; Guelph, 21-24.vii.1984, mushroom trap in field (1 ♂); Guelph, 17-27.v.1984 (1 ♀), 25-30.vii.1984 (2 ♀), 1.viii.1984 (1 ♂, 1 ♀), 5.viii.1984 (1 ♂, 4 ♀), 26.ix-3.x.1984 (1 ♀), mushroom traps in deciduous forest, B. Brown and S. Marshall. Constance Bay, 26.viii.1980, on mushroom, S.A. Marshall (1 ♀); Lanark, 1.ix.1979, decaying mushrooms, S.A. Marshall (5 ♂, 4 ♀); Lanark, 12.viii.1979, bear feces, emerged 20.viii, S.A. Marshall (1 ♀); Deux Rivieres, 2-3.ix.1979, mixed forest, carrion, S.B. Peck (1 ♂); Iron Bridge, 5.viii.1981, on fungus, S.A. Marshall (3 ♂); Heckston, 24.vi-21.vii.1984, M. Kaulbars, flight intercept trap (1 ♂, 1 ♀); Thunder Bay, 13.vii.1980, M. Kaulbars (3 ♂, 1 ♀); Bells Corners, 4.vi.1952, swept from bare rock, J.F. McAlpine (1 ♀, BRI); Port Severn, 18.vi.1959, Black Spruce bog, J.G. Chillcott (1 ♂, BRI); Normandale, 30.v.1956, J.R. Vockeroth (1 ♀, BRI); Ottawa, 10.vii.1956, J.R. Vockeroth (1 ♀, BRI); Mer Bleue, 25.vi.1964, J.R. Vockeroth (1 ♀, BRI); Chaffey's Locks, Queen's University Biological Stn., mushroom in forest, S.A. Marshall (1 ♂); Strathroy, v.1953 (1 ♂, BRI); Chalk River, 14.ix.1984, vacuumed from fungi, S. Marshall (4 ♂). **Quebec:** Gatineau Park, Blue Sea Lake, 10.ix.1978, assoc. with mushroom, R. Sexton (3 ♀, BRI); Gatineau Park, 8.iv.1981, car net, Masner and Goulet (3 ♂, BRI); Old Chelsea, 10.x.1961, 21.vi.1959, 9.x.1955, 13.viii.1958, 1.x.1963, 30.viii.1961, J.R. Vockeroth (4 ♂, 5 ♀, BRI); Beechgrove, 29.vi.1962, J.R. Vockeroth (1 ♀, BRI); Camp LeRais, Laurentian Pk., 3000', 29.viii.1956, berl. ex. rabbit hutch debris, H.S. Dybas (1 ♂, FLD); Great Whale River, 18.viii.1949, Host. *Agaricus*, J.R. Vockeroth (1 ♂, BRI). **U.S.A. Alaska:** Matanuska, 28.iv.1944, rotary trap, J.C. Chamberlain (1 ♂, USNM). **Arizona:** Flagstaff, Oak Ck. Canyon, 5900', 17-25.vii.1979, S.B. Peck (1 ♀). **Arkansas:** Garland Co. 1.2miN Crystal Springs, Hwy.270, 6-8.iii.1977, Woodruff and Wiley, pig dung traps (1 ♂). **District of Columbia:** Washington, "9238 on cabbage" (1 ♂, USNM). **Georgia:** Dade Co., Cloudland Canyon St. Pk., 16-23.v.1972, Rhododendrom thicket dung trap, S.B. Peck (2 ♂, 1 ♀); Rabun Co., Chatahoochee St. For., 5-25.vi.1984, mushroom trap, S.A. Marshall (30 ♂, 10 ♀); Telfair Co., Little Ocmulgee St. Pk., 6-25.vi.1984, on mushroom and in mushroom trap, S.A. Marshall (2 ♂); Wilkinson Co., Big Sandy Creek, 8miS Irwinton on US441, 5-25.vi.1984, intercept trap in mixed forest, S.A. Marshall (16 ♂, 17 ♀). **Illinois:** Champaign Co., Mahomet Hart Woods, 20-26.v.1979, oak woods intercept, S.B. Peck (♂); Knox Co., Green Oaks, 22.ix.1980, sublitter under decaying mushrooms, H.S. Dybas (2 ♀, FLD). **Indiana:** Burns Hbr., 7-10.vi.1983, sand-oak mushroom traps, S.A. Marshall (3 ♂, 2 ♀); Gary, 7-10.vi.1983, sand-oak mushroom traps, S.A. Marshall (1 ♂, 2 ♀). **Kentucky:** Laurel Co., 15miW London, 4-30.vi.1984, intercept trap in oak forest, S. Marshall (5 ♀); Whitley Co., Cumberland Falls State Pk., 29-30.vi.1984, mushroom trap, S.A. Marshall (10); Daniel Boone Nat. For., 4-30.vi.1984, *Rhododendron* thicket, flight intercept trap, S. Marshall (7 ♂, 6 ♀); Rowan Co., 24kmSW Moorehead Cave, 14.v-20.viii.1983, *Fagus* for. flight intercept trap, S. Peck (1 ♀). **Louisiana:** Alexandria, 11miSW, 21.iii.1960, J.G. Chillcott (1 ♀, BRI), Grant Parish, 18kmN Alexandria, 19.v-17.viii.1983, forest intercept trap, S.B. Peck (1 ♂, 2 ♀). **Maryland:** Plummers Id., 25.vii.1914, ex fungus, R.C. Shannon (1 ♀, USNM); Montgomery Co., Bethesda, 5.v.1969, G. Steyskal (1 ♂, USNM). **Massachusetts:** Middlesex Co., Bedford, mixed for., vi.1969, carrion, A.F. Newton (1 ♂, 2 ♀). **Michigan:** Gogebic Co., Crooked L. Bog, 9.viii.1977, Leg. J. Wagner (1 ♂, 4 ♀, FLD). **Mississippi:** Scott Co., Beinvill Nat. For., 10-14.iv.1972, dung, A.F. Newton (1 ♂). **Missouri:** Pontotoc Co., 17.v-19.vii.1983, oak forest intercept trap, S. Peck (1 ♂, 1 ♀). **New Hampshire:** Mt. Washington, Lakes of the Clouds, 5000', 9.viii.1954, W. Mason (1 ♂, BRI). **New Jersey:** Burlington Co., 4miWNW Mt. Misery, 17-24.vii, dung, A.F. Newton (1 ♂). **New York:** Lake Placid, 30.viii.1979, mushroom, S.A. Marshall (1 ♂); Cairo, 1.vii.1980, S.A. Marshall (2 ♂); Rochester, 5.viii.1983, vacuumed from dead *Pleurotus*, S.A. Marshall (2 ♂); Speculator, 5.viii.1983, vacuumed from mushroom, S.A. Marshall (1 ♂). **North Carolina:** Sampson Co., Falcon., 28.ix-4.x.1983, pig dung, R. Woodruff; Jackson Co., Blue Ridge Pkwy., Grassy Ridge Mine Overlook and Bear Paw Gap, 5-25.vi.1984, 42000-5250', mushroom traps, S.A. Marshall (17 ♂, 6 ♀); Haywood Gap and Bear Paw Gap, intercept traps, 5-27.vi.1984, S.A. Marshall (4 ♂, 5 ♀); Cullowhee, 2200', 6-12.vi.1984, pan under malaise trap, S.A. Marshall (9 ♂, 10 ♀); Swain Co., NE Mt. Collins, 5900', 17-22.v, carrion, A.F. Newton (1 ♂); Chapel Hill, 31.vii.1980, snail carrion, K. Kneidel. **Pennsylvania:** Center Co., State College, 22.iv.1982, soil trap, A. Norrbom (4 ♂, 6 ♀, PSU); State College, 15.v.1982, housefly medium, A. Norrbom (1 ♂, 2 ♀, PSU); Pine Grove Mills, 11.iv.1972, D.D. Wilder, (1 ♀, CAS). **Tennessee:** Cumberland Co., 2miE Ozone, mixed hardwood forest, 17.vi-14.vii, A.F. Newton (14 ♂, 5 ♀); Sevier Co., 2.5miN Gatlinburg, 5-28.vi.1984, rotting mushroom trap, S.A. Marshall (5 ♂, 5 ♀). **Texas:** San Jacinto Co., 5kmS Coldspring, 2.v-16.viii.1983, forest intercept trap, S.&J. Peck (2 ♀). **Washington:** Mt. Rainier, Ohanapecosh, 11.viii.1940, A.L. Melander (1 ♂, USNM). **Virginia:** Bath Co., 9.6kmN Clifton Forge, 13.v-21.viii.1983, *Tsuga-Fagus* forest, flight intercept trap, S. Peck (2 ♂, 1 ♀); Smyth Co., 6mi. Marion on Va.16, 2800', mixed hdwd., 17.vi-14.vii.1972, dung, A.F. Newton (1 ♀). **West Virginia:** Fayette Co., Clifftop, Babcock St. Pk., 14.v-21.viii.1983, flight intercept trap, S. Peck (1 ♂, 2 ♀); Pendleton Co., Spruce Knob, 4600',

conifers, carrion, 27.vii-9.viii, A.F. Newton (6 ♂, 2 ♀); Randolph Co., Bickle Knob, 6.5miE Elkins, 4000', mixed decid. for., 27.vii-9.viii.1969, A.F. Newton (1 ♂, 1 ♀, dung trap; 1 ♂, carrion trap).

Biology. Although this common species has been collected in a wide range of habitats and has been reared from bear feces and snail carrion, it is primarily fungivorous. *M. parva* is one of the most common flies associated with decaying mushrooms in southern Ontario and has been found on mushrooms in Manitoba, Quebec, Illinois, Indiana, Maryland and New York.

Comments. *Limosina meszarosi*, *Limosina parafungicola*, and *Limosina similissima*, all described by Papp (1974) from central Asia, appear to be closely related to *M. parva*, however the descriptions are very superficial. He mentioned sternite 8 of the female of only one of these species, *parafungicola*, and described it as inverse Y-shaped. This suggests that *M. parafungicola* is very closely related to, and perhaps a junior synonym of, *M. parva*. *M. parva* is closely related to *M. parvula*, a Holarctic species which is easily distinguished by its concave male sternite 5 and T-shaped female sternite 8. These 2 species are often sympatric in North America. *M. tubercula*, known only from Wyoming, also appears to be related to *M. parva*.

Minilimosina (Minilimosina) parvula (Stenhammar)

Figs. 7, 9, 200

Limosina parvula Stenhammar, 1854:422

Minilimosina (Minilimosina) parvula: Roháček, 1983:42, synonymy and description.

Diagnosis. Length 1.1-1.3 mm. Scutellum twice as wide as long, apical marginal bristles twice as long as scutellum (Fig. 7). Distal posterodorsal bristle of mid tibia subequal to distal anterodorsal. Wing with second costal sector 0.8-0.9 times as long as third (Fig. 200).

Male abdomen. Posteromedial comb of male sternite 5 made up of blunt spines, posterior margin of comb concave (Fig. 9). Outer lobe of surstylus large, densely haired along ventral margin, internal lobe small. Parameres thin, curved at apex.

Female abdomen: Tergites 6 and 7 complete but weakly sclerotized dorsally, broad and dark laterally. Tergite 8 with tripartate pigmentation. Epiproct setulose in posterior 2/3 and with 2 dorsal bristles. Cercus with preapical dorsal bristle shorter and much thicker than apical bristle. Sternite 8 forming a T-shaped sclerite, the head of the T (posterior) complete. Hypoproct large, entire surface setulose. Each spermatheca spherical.

Material examined. CANADA. **Alberta:** Edmonton, iv.5.1924, Owen Bryant (1 ♂, CAS). **Manitoba:** Fort Churchill, 20.vi.1952, ecological data f-2-15, J.G. Chillcott (1 ♂, BRI). **New Brunswick:** St. Andrews, 25.vii.1978, pitfall traps, S.A. Marshall (4 ♂). **Nova Scotia:** Antigonish, 2.vii-5.viii.1984, flight intercept trap, L. MacMillan (2 ♂, BRI); Lockeport, 4.vii.1958, J.R. Vockeroth (1 ♂, BRI); Cape Breton Highland Nt. Pk., Paquets L. Rd., 260m, 7.vii.1983, pan trap (2 ♂, 4 ♀). **Ontario:** Algonquin Pk., 14-21.vii.1984, deciduous forest mushroom traps, K. Pendreigh (1 ♂); Algonquin Park, deciduous forest moose dung traps, 18-26.v.1984, K. Pendreigh (3 ♂); Deux Rivieres, 2-30.ix.1979, carrion in mixed forest, S.&J. Peck (1 ♂); Lanark, 1.ix.1979, mushroom, S.A. Marshall (1 ♀); Mer Bleue, Ottawa, 21.viii.1968, O. Peck (1 ♂, BRI). **Quebec:** Old Chelsea, 21.vi.1959, Summit King Mtn., J.R. Vockeroth (5 ♀, BRI); Old Chelsea, 10.x.1961, J.R. Vockeroth (1 ♂, BRI); Mt. Albert, Gaspé Park, vi-vii.1980, C. Dondale (1 ♂). U.S.A. **Alaska:** Matanuska, 27.v.1942 and 10.v.1944, J.C. Chamberlin, Rotary trap (1 ♂, 1 ♀, USNM). **Massachusetts:** Middlesex Co., Bedford, carrion in pines, 7.vii.1969, A.F. Newton (2 ♂, MCZ). **New York:** Lake Placid, 30.viii.1979, dung, S.A. Marshall (1 ♂); Piseco Lake, wet area mushroom trap, 1-5.vii.1983, S.A. Marshall (3 ♂, 1 ♀); Speculator, Snowy Mtn. Trail, mushroom bait, 1-4.viii.1983, S.A. Marshall (1 ♂). **Michigan:** Gogebic Co., Crooked Lake Bog, 15.viii.1977, J. Wagner (3 ♂, 4 ♀, FLD). **New Hampshire:** Passaconaway, Lily Pond, 2050', 4-6.vii, dung, A. Newton (1 ♂, MCZ). **North Carolina:** Jackson Co., Cullowhee, Cane Creek Rd., 5-25.vi.1984, dung trap along creek, S.A. Marshall (1 ♂). **Oregon:** Grant Co., 5000', E. Prairie City, Dixie Pass, Blue Mtn., 1.vi.1957, Berlese garbage and forest subliter (1 ♂, FLD). **Pennsylvania:** Center Co., State College, 6.v.1982, soil trap, A. Norrbom, (2 ♀, PSU). **Tennessee:** Sevier Co., Greenbriar Cove, Ramsey Cascade Trail, 2700', 3100', 17-23.v.1972, carrion, A.F. Newton (20 ♂, 15 ♀); Henderson Co., Natchez Trace St. Pk.,

1000', 18.vi-13.vii.1972, dung, A.F. Newton (1 ♂). **Virginia:** Smyth Co., Marion, 2800', 14.vi.1972, carrion in mixed hardwood, A.F. Newton (2 ♂). **West Virginia:** Pendleton Co., Spruce Knob, 4600', carrion in conifers, 27.vii-9.viii, A.F. Newton (4 ♂, 2 ♀); Randolph Co., Bickle Knob, 6.5miE Elkins, 4000', 27.vii-9.viii, carrion, A. Newton (3 ♂, 5 ♀). Also known from throughout Europe.

Biology. Although occasionally found on mushrooms or dung, Nearctic collection records suggest that this is primarily a necrophagous species. Roháček (1983) stated that it is most commonly collected on decaying fungi in Europe, however extensive collecting of fungi- vorous sphaerocerids in eastern North America has failed to yield a significant number of *M. parvula*. Where it is found on fungi, it is almost always outnumbered by the closely related *M. parva*.

Minilimosina (Minilimosina) pulpa new species

Figs. 14, 56, 57

Description, male (female unknown). Length 1.0 mm. Interfrontal plate tapered, bordered by 3-4 equal interfrontal bristles, width at top 2/3 of height. Eye 1.4 times as high as gena. Mid tibia of male ventrally with a distal row of 7 short spinules and a long apical bristle; distal posterodorsal bristle subequal to distal anterodorsal bristle. Scutum with acrostichal setulae in 4-5 rows between dorsocentral areas, dorsocentral bristles in 1 prescutellar pair 0.5 times as long as scutellum. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Scutellum 0.7 times as long as wide, marginal bristles long, apical pair 3 times as long as scutellum. Mesopleuron pollinose except anterior part of episternum. Halter uniformly light brown. Wing with costagial bristles subequal, small; second costal sector 0.7 times as long as third, cell dm narrow, not appendiculate, crossvein dm-cu 0.2 times as long as distance between dm-cu and r-m; veins uniformly light brown.

Male abdomen. Sternite 5 with a darkly pigmented, bare patch immediately anterior to the posteromedial comb; comb sinuate (Fig. 14). Outer lobe of surstylus sharply pointed anteriorly and with a thin, bifurcate process laterally. Inner portion of surstylus with a subquadrate process anteriorly (Figs. 56, 57). Paramere short, thick, truncate at apex. Distiphallus smoothly concave dorsally.

Type. *Holotype* (♂, BRI): U.S.A. WYOMING: Sublette Co., 7miN Pinedale, 16-24.viii.1979, pine meadow, 9000', malaise-carrion, S.&J. Peck.

Comments. The remarkable trilobed anterior part of the surstylus makes this a distinctive species, but the formation of sternite 5 suggests a close relationship to another rare western species, *M. accinta*.

Etymology. The specific name *accinta* is from the Latin for flesh, and refers to the type habitat.

Minilimosina (Minilimosina) sclerophallus new species

Figs. 3, 4, 22, 48, 49, 50, 124, 125, 126, 201

Description. Length 1.7-1.9 mm. Interfrontal plate broad and slightly tapered, width at top equal to height, bordered by 3 small, equal interfrontal bristles. Eye 3.0 times as high as gena. Mid tibia of male with a distal row of short ventral bristles and a short apical ventral bristle; mid tibia of female with a long apical ventral bristle only (Fig. 4); mid tibia of both sexes with a long distal dorsal bristle and weaker, subequal distal anterodorsal and distal posterodorsal bristles (Fig. 3). Scutum with 6-8 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in 2 pairs but anterior pair barely larger than acrostichal setulae, prescutellar pair subequal to scutellar length. Prescutellar acrostichal bristles in a single pair 2-3 times as large as acrostichal setulae. Scutellum 0.7 times as long as wide, apical bristles twice as long as scutellum. Mesopleuron pollinose except for 2 separate shining areas on anterior part of episternum, shining area on anepisternum very large. Halter dark brown, stem yellow. Wing with small, subequal costagial bristles. Second costal sector 0.7-0.8 times as long as third (Fig. 201). Cell dm broad, outer angle obtuse.

Abdomen. Syntergite 1+2 equal in length to tergite 3.

Male abdomen. Sternite 5 with a posermidial process bearing 12-14 long flat bristles (Fig. 22). Surstylus simple, with a broad anterior lobe and a much smaller posterior one; ventral surface with several long bristles and posterior surface with shorter bristles (Figs. 48, 49). Paramere with a dense patch of anterior bristles distally (Fig. 50). Distiphallus massive, forming a completely sclerotized hood-like structure (Fig. 50).

Female abdomen. Tergite 8 complete but lightly pigmented medially. Epiproct small, bare except for 2 bristles (Fig. 124). Sternite 8 elongate, with posterior part tri-lobed (Fig. 126). Hypoproct entirely setulose, deeply emarginate anteriorly. Each spermatheca wrinkled-funnel shaped, with a small apical invagination (Fig. 125).

Types. *Holotype* (♂, BRI) and 16 *paratypes* (5 ♂, 11 ♀, BRI, GUELPH): VENEZUELA. Tachira, 4.5kmNE San Cristobal, 9000', 20-22.v.1974, dung trap, S. Peck. *Other paratypes*: ECUADOR. **Pichincha**: 9300', 35kmE Tandapi, 24-29.vi.1975, S. Peck, Bamboo (3 ♂, 14 ♀): Napo, 27kmNW Baeza, 2-6.iii.1976, 2700m, dung trap, S. Peck (1 ♂, 13 ♀). COLUMBIA. **Santander**: Above Pamplona, 9000', 9-13.v.1984, dung trap, S. Peck (1 ♀); 30kmS Chinacota, 8000', 10-14.v.1974, dung trap, S. Peck (2 ♀).

Comments. *M. sclerophallus* is the most anomalous member of the subgenus *Minilimosina*. The single comb row of male sternite 5 is similar to that of *Allolimosina* species, but no other feature suggests an affinity to *Allolimosina*, and the massive distiphallus is in marked contrast to the reduced distiphallus characteristic of that subgenus. The surstylus of *M. sclerophallus* is of the general form of *Minilimosina* but is unique in this subgenus in lacking a posteroventral bristle. Another striking autapomorphy of this species its setose paramere.

Etymology. The name *sclerophallus* is descriptive of the unusual, large, sclerotized distiphallus.

Minilimosina (Minilimosina) trogeri Roháček

Figs. 15, 68, 69, 70, 127, 128, 129, 193

Minilimosina, (Minilimosina) trogeri Roháček, 1983:41.

Diagnosis. Length 1.0-1.3 mm. Eye 1.5 times as high as gena. Mid tibia of male ventrally with a distal row of 6-8 weak spinules and a distinct apicoventral bristle. Distal anterodorsal and posterodorsal bristles of mid tibia subequal. Scutellum 0.6 times as long as wide, apical bristle over twice as long as scutellum. Mesopleuron pollinose except shining anterior part of episternum. Halter uniformly light brown. Wing with lower costagial bristle twice as long as upper, half as long as dorsocentral bristle. Second costal sector 0.5-0.8 times as long as third (Fig. 193).

Male abdomen. Sternite 5 with 2 rows of short bristles posteromedially, behind which a solid, dark, long lobe projects (Fig. 15). Surstylus setulose on anterior surfaces (Figs. 68, 69). Parameres thin, simple (Fig. 70).

Female abdomen. Tergites 6 and 7 lightly pigmented dorsally, each appearing as 2 separate lateral sclerites; tergite 8 with tripartate pigmentation (Fig. 127). Sternite 8 largely membranous, rectangular in posterior sclerotized area, pattern of pigmentation giving sclerite an apparent irregular outline (Fig. 129). Hypoproct bare on anterior half, lobate anteromedially. Each spermatheca irregular in shape, roughly short-cylindrical (Fig. 128).

Material examined. CANADA. **Ontario**: Ottawa, grass piles, vii.1979, A. Telka (3 ♂, 1 ♀); Ottawa, 19.iv.1959, J.G. Chillcott (1 ♂, BRI); Ottawa, 16.viii.1952, J.R. Vockeroth (1 ♂, BRI); Bells Corners, 21.ix.1951, on toadstool, J.F. McAlpine (5 ♀, BRI); Mer Bleue, 27.v-3.vi.1982, L. Dumouchel, intercept trap (1 ♂, BRI); Stouffville, 5-13.v.1983, B.V. Brown, Malaise-pan (1 ♂). **Quebec**: King Mountain, near Old Chelsea, 1.ix.1980, K. Barber (1 ♀). U.S.A. **Massachusetts**: Middlesex Co., Medford, Pine forest, 11-17.viii, carrion trap, A. Newton (1 ♂, MCZ). **Wyoming**: Wind River Mountains, 20miNE Pinedale, nr. Nelson Lake, 10400-11000', carrion, tundra, 15-25.viii.1979, S. Peck (1 ♂).

Biology. Some of the type specimens were collected using a photoeclector in a manured alpine meadow, and Roháček (1983) suggests that this is a boreal-alpine species. All type specimens were either from the central high alps of Austria or from Finland. The Holarctic distribution reported here, with the Nearctic records primarily alpine or northern, fits well with Roháček's suggestion. The longest series of *M. trogeri* have been collected on decaying vegetation and on fungi. The series collected from fungi is an isolated record, and is not repeated in the hundreds of fungus-baited trap samples examined by the author. Phytosaprophagous communities are less well studied, and probably include *M. trogeri* as well as other rarely collected *Minilimosina* species.

Comments. *M. trogeri* is closely related to *M. nasuta* and *M. lepida*. *M. nasuta* bears the greatest superficial similarity because of its long scutellar bristles and similar male sternite 5, but the narrow surstylus and very distinctive female sternite 8 of *M. nasuta* make these species easy to separate. Slight differences can be noted between the Nearctic material illustrated here and the Palearctic material illustrated by Roháček (1983), for example the pigmentation of female sternite 8. These small differences are interpreted as intraspecific variation.

***Minilimosina, (Minilimosina) tuberculum* new species**

Figs. 23, 60, 61

Description, male (female unknown). Length 1.5 mm. Interfrontal plate 0.7 times as wide as high, slightly tapered, bordered by 3 pairs of long, almost cruciate interfrontal bristles. Face more strongly tuberculate between antennae than in congeners; lower half of face smoothly concave. Eye slightly higher than gena. Mid tibia of male with ventral setulae of distal half slightly enlarged, only apicoventral bristle distinct. Distal dorsal bristle of mid tibia large, reaching tip of tibia; distal anterodorsal and posterodorsal bristles very small. Scutum with 5-6 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in 1 prescutellar pair 0.7 times as long as scutellum. Prescutellar acrostichal bristles in 1 pair slightly longer than other acrostichal setulae. Scutellum 0.7 times as long as wide, apical scutellar bristles as long as scutellar width. Mesopleuron entirely pollinose. Halter dark brown with pale knob. Wing with costagial bristles small and subequal; second costal sector subequal in length to third. Costa surpassing R_{4+5} by length of dm-cu, dm-cu half as long as distance from dm-cu to r-m.

Male abdomen. (Preabdominal sternites of type destroyed) Sternite 5 with a subquadrate lobe bearing 3 rows of short flat setae (Fig. 23). Surstylus broad, with several posterior and medial short bristles (Figs. 60, 61). Paramere narrow, with a small pointed anteroventral process at apex.

Type. *Holotype* (♂, BRI, abdomen severely damaged): U.S.A. **Wyoming:** Uinta Co., 8miSE Evanston, 10.vii-11.vii.1979, sage-grass-riparian, 7100', carrion, S.&J. Peck.

Comments. Although I was hesitant to name this species on the basis of a single, damaged specimen, there are enough distinctive features to ensure its separation from any other known species. The small eyes, relatively long interfrontal bristles, and strongly tuberculate face give it a distinctive habitus, and the rows of posteromedial lamellae on sternite 5 are clearly diagnostic. The most similar species is *M. parva*, from which it can be distinguished by the above features and very different wing venation.

Etymology. Although the presence of a strongly projecting upper face is characteristic of the entire subgenus, the upper face is especially swollen and tubercle-like in this species, thus giving rise to the specific name *tuberculum*.

***Minilimosina (Minilimosina) zeda* new species**

Figs. 11, 54, 55, 139, 140, 141, 202

Description. Length 1.5-1.6mm. Interfrontal plate bordered by 4 interfrontal bristles, upper 3 barely cruciate; width 0.5 times height. Three inner orbital bristles, uppermost

bristle largest, present between orbital and interfrontal bristles (inner orbitals are not found elsewhere in the genus). Eye 2.0 times as high as gena. Mid tibia of male ventrally with a row of about 10 short, stout bristles on distal half or more; apical ventral bristle short but distinct. Distal anterodorsal bristle of mid tibia 0.6 times as long as distal posterodorsal bristle. Scutum with 6-8 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in a single, prescutellar pair 0.7 times as long as scutellum. Prescutellar acrostichal setulae in a single pair slightly longer than other acrostichal setulae. Scutellum 0.9 times as wide as long, apical scutellar bristles twice as long as scutellum. Mesopleuron pollinose except for a small area along anterior margin of episternum (the entire type series is light brown, probably teneral, making it difficult to ascertain with certainty the extent of pollinosity). Halter uniformly light brown. Wing with costagial bristles short, equal. Second costal sector 0.9 times as long as third (Fig. 202).

Abdomen. Syntergite 1+2 2.7 times as long as tergite 3.

Male abdomen. Sternite 5 setose, posteromedial area with a distally concave group of rows of short, dark bristles; rows of bristles strong laterally and very weak medially (Fig. 11). Surstylus with a broad, setulose anterior lobe and a single large posteroventral bristle (Figs. 54, 55). Paramere weakly clubbed and truncate apically. Distiphallus angulate, pointed distally.

Female abdomen. Tergites 6 and 7 complete, simple; tergite 8 large, with tripartate pigmentation. Epiproct large, bare except for the usual 2 bristles (Fig. 139). Sternite 8 deeply tri-lobed anteriorly, flat posteriorly (Fig. 141). Hypoproct entirely setulose. Each spermatheca wrinkled-oval, ducts short (Fig. 140).

Types. *Holotype* (♂, BRI), and 5 *paratypes* (3 ♂, 2 ♀, JRO, GUELPH): CANADA. **Alberta:** Hinton, 12.viii.1980, on an old, dried up mammal carcass, S.A. Marshall. Other *paratypes*: **Alaska:** Alaska Hwy, 12 mi N Tok, carrion trap, 14-20.vii.1985, S.A. Marshall (1 ♂, 1 ♀, BRI); Sawmill Creek, White Spruce bog, 18 miS Delta Jctn., carrion FIT, 15.vii.1985, S.A. Marshall (1 ♂, GUELPH).

Comments. The very unusual head chaetotaxy gives this species a superficial similarity to *Halidayina* species, and the distinctive male sternite 5 reinforces the impression that this is an unusual *Minilimosina*. Other features, the typical surstyli in particular, provide ample evidence that *zeda* does belong in the subgenus *Minilimosina*.

Etymology. Since this species has resided in my collection since 1980 as "unplaced species Z", the coined word *zeda* was chosen as a permanent, easily remembered specific epithet.

Subgenus *Allolimosina* Roháček, 1983:43

Type Species *Limosina* (*Scotophilella*) *albinervis* Duda, 1918

Subgeneric diagnosis. Size small, 0.9-1.2 mm. Colour brown, mostly pollinose. Postocellar bristles present. Face protruding between antennae, strongly concave and carinate below. Dorsocentral bristles in a single, prescutellar pair. Mid tibia of male ventrally with only minute setulae or a row of distal spinules; mid femur with 1-3 stout basal bristles. Costa distinctly overpassing R_{4+5} , second costal sector less than 0.7 times length of third; discal cell very short, with anterior outer corner always obtuse-angled, posterior outer corner acute angled. Sternite 5 of male with a posteromedial comb of blunt spines. Sternite 8 of female reduced or weakened. Distiphallus simple and sclerotized.

Minilimosina (*Allolimosina*) *albinervis* (Duda)

Figs. 24, 82, 83, 84, 142, 143, 144

Limosina (*Scotophilella*) *albinervis* Duda, 1918: 131.

Minilimosina albinervis: Roháček, 1983:44, synonymy and description.

Diagnosis. Length 1.1-1.2 mm. Mid tibia of male with a long apicoventral bristle and no other ventral bristles; distal posterodorsal bristle and distal anterodorsal bristles short, subequal. Scutum with 5 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in 1 prescutellar pair 0.8 times as long as scutellum. Apical scutellar bristles 1.6

times as long as scutellum. Wing with second costal sector 0.5-0.6 times as long as third, veins others than costa very light, membrane milky-white.

Male abdomen. Sternite 5 with a single posteromedial row of about 20 flat bristles (Fig. 24). Surstylus large, flat, setulose on medial and ventral surfaces; posterior lobe with a single, unbranched lobe with an apical bristle which is branched in some specimens (Figs. 82, 83). Paramere broad (Fig. 84).

Female abdomen. Tergite 8 complete but depigmented medially. Epiproct emarginate anteriorly, bare except for the usual 2 bristles (Fig. 142). Sternite 8 reduced to a minute setulose patch immediately behind sternite 7; hypoproct small, bare, anteriorly emarginate (Fig. 144). Spermatheca short-cylindrical, with a deep apical invagination (Fig. 143).

Material examined. CANADA: **Ontario:** Marmora, 3.vi.1952, J.R. Vockeroth (1 ♀, BRI). U.S.A. **District of Columbia:** Washington, 7.xi.1912, R.C. Shannon (1 ♀, ANSP). **Illinois:** Cook Co., Homewood, 11.x.1952, Berlese of decaying vegetation, H.S. Dybas (1 ♂, FLD). **Minnesota:** Ramsey Co., Luth. Sem. Grounds, 29.v.1965, on dead Grackle, B. Cutler (2 ♂, 1 ♀, PSU). **Virginia:** Fairfax Co., Dead Run, ex debris in wild bee hive, 14.xi.1914, issued 30.i.1915, R.C. Shannon (1 ♂, USNM).

This species is also known from Spain, England, Germany, Czechoslovakia, Hungary, Israel, and Afghanistan.

Biology. Roháček (1983) recorded this as a rare species, most often associated with decaying vegetation. Some of the above records, especially the rearing record from bee hive debris, further suggest that this is a phytosaprophagous species; however, three of the specimens examined were collected on a dead bird.

Comments. Slight differences can be noted between the Nearctic specimens illustrated here and the Palaearctic material illustrated by Roháček (1983), especially in the details of the posteroventral surstyler process. I feel that these differences represent intraspecific variation, and that the Nearctic populations should not be considered a distinct species. The Holarctic species *M. albinervis* is most distinctive for its complex surstylus, short second costal sector, and reduced, tab-like female sternite 8. Its closest relatives are the Palaearctic *M. alloneura* and *M. secundaria*.

Minilimosina (Allolimosina) rotundipennis (Malloch)

Figs. 25, 79, 80, 81, 187, 203

Limosina rotundipennis Malloch, 1913:370.

Limosina curvitaris Duda, 1925:167, New Synonymy.

Description. Length 0.9-1.2 mm. Interfrontal plate narrow, width at top 0.7 times height, tapering to 0.5 times height below; bordered by 4 equal interfrontal bristles. Lunule rounded, face projecting knob-like between antennae, concave below. Eye 2.1 times as high as gena. Mid tibia of male ventrally with a distal row of 5-6 weak short spines and a stout anteroventral bristle, femur with 3 stout bristles basally. Distal posterodorsal bristle of mid tibia slightly shorter than distal anterodorsal and much shorter than distal dorsal. Scutum with 4-5 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristle in 1 prescutellar pair subequal to length of scutellum. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Scutellum 1.5 times as broad as long, apical scutellar bristles 1.7 times scutellar length. Halter uniformly light brown. Wing with 2 equal costagial bristles, second costal sector less than half as long as third (Fig. 203).

Abdomen. Syntergite 1+2 1.5 times as long as tergite 3, tergites 3-5 wide and fully sclerotized.

Male abdomen. Synsternite 1+2 dark, deeply emarginate posteriorly (Fig. 25). Sternite 3 convex and membranous at middle. Sternite 5 with posterolateral corners heavily sclerotized, posteromedial comb split into oblique angled combs (Fig. 25). Surstylus with a long, thin outer lobe (Figs. 79, 80, 187). Distiphallus minute (Fig. 81).

Female abdomen. Tergite 6 greatly reduced, distinctly sclerotized only at setal bases.

Tergite 7 divided into 2 small lateral sclerites with anteromedial lobes. Tergite 8 divided into 2 sclerites, almost contiguous anteromedially. Epiproct greatly reduced, membranous. Sternites 6 and 7 small and very lightly pigmented, sternite 8 lightly pigmented but larger than the darker, setulose hypoproct. Each spermatheca subspherical, apical invagination small, stem with a single bulbous swelling.

Types. *Holotype* (♀, USNM): PUERTO RICO. Culebral, Feb, 1899, Aug. Busck (specimen also bears a label "perparva Williston").

Type of *Limosina curvitaris* Duda: BRAZIL. Blumenau, Loth.Hetschke (1 ♂, NMW, labelled and described by Duda as ♀).

Other material examined. U.S.A. (5 ♂, BRI): **Arizona:** Pima. Co., Santa Catalina Mountains, Mt. Lemmon Highway, 4900', dung, ix.1970, A.Newton (4 ♂, BRI); Cochise Co., Huachuca Mts., 6000', Miller Canyon, dung, oak woodland, ix.1970, A.Newton (1 ♂); Portal, Southwestern Research Stn., Chiricahua Mts., 18-23.viii.1984, mushroom trap, B.V. Brown (2 ♀); Stewart Campground, 16-19.viii.1984, dung trap, B.V.Brown (1 ♀); Santa Cruz Co., 8miWNW Nogales, Walker Canyon, 3900', oak woodland, ix.1970, dung, A.Newton (1 ♂, 4 ♀); Patagonia Lk. St. Pk., 9-11.viii.1984, flight intercept trap, B.V.Brown (1 ♀). **Florida.** Hendry Co., LaBelle, Capt. Hendry Rd., iv.1971, pine, hardwood near river, human dung, A.Newton (1 ♂); Volusia Co., Tomoka St. Pk., 20.4i.1984, S. Marshall (1 ♂); Sarasota Co., Myakka River St. Pk., 21.v.1982, pig dung trap, R.E. Woodruff (5 ♂, 1 ♀, FSC); Orange Co., E. Orlando, 2-3.vii.1982, pig dung trap, R.E. Woodruff (1 ♀).

Comments. The abdominal characters of this species are highly modified, and it is difficult to compare them to any other group within *Minilimosina*. The long, dark surstyli, the small, anterolaterally deflexed parameres, the incomplete subanal plate, and the minute, membranous distiphallus are unique. *M. rotundipennis* is included in the subgenus *Allolimosina* because it keys there on the basis of wing venation and resembles other *Allolimosina* species in a few superficial features such as the presence of postocellar bristles. There is no convincing evidence for a close phylogenetic relationship between *M. rotundipennis* and other *Allolimosina* species.

Subgenus *Svarciella* Roháček 1983:30

Type Species *Limosina (Scotophilella) splendens* Duda, 1982

Subgeneric diagnosis. Size 0.9-1.9, body at least partly shining black. Postocellar bristle absent. Face weakly concave, usually weakly or not at all projecting between antennae (Fig. 188). Dorsocentral bristles in 2 pairs, anterior pair small; acrostichal bristles in 4-6 rows. Mid tibia of male with only minute setulae ventrally or with a row of spinules on distal 2/3. Mid femur with only a single basal ventral bristle or with long ventral hairs over most of its length. Costa usually weakly surpassing tip of R_{4+5} , cell dm obtuse angled and sometimes appendiculate on outer posterior corner. Sternite 5 of male variable, usually with a large posteromedial comb or process. Sternite 8 of female large, not reduced. Distiphallus sometimes with a long ventral flagellum (*vitripennis* group).

Comments. The subgenus *Svarciella* contains two distinctive species groups. *M. albifrons*, *M. contrasta*, *M. niveipennis*, *M. archboldi*, *M. vitripennis* and probably *M. masoni* (known only from females) form an apparently monophyletic group of species sharing several unique characters, such as a very unusual long flagellum on the distiphallus. *M. dissimilicosta*, *M. vixa*, *M. intercepta* and the related European *M. splendens*, *M. ismayi*, and *M. v-atrum* form a distinctive, but probably paraphyletic, group sharing such characters as the very uniform and distinctive type of male fifth sternite (Figs. 30, 34) and a slender distiphallus quite different from the found in the *vitripennis* group. The one remaining species of *Svarciella*, *M. bipara*, does not fit well into either group.

Most of the features listed in the subgeneric diagnosis are probably plesiomorphic, and the apparent transformation series from the type of male sternite 5 found in *v-atrum* to that found in *vitripennis* is the strongest evidence for the monophyly of *Svarciella*. *M. dissimilicosta*, *M. splendens*, and *M. archboldi* provide the intermediate states required to support the suggestion that the phenotypically dissimilar species groups of *Svarciella* make up a single monophyletic group.

Minilimosina (Svarciella) archboldi new species

Figs. 26, 89, 90

Description. (Male only). Length 1.5 mm. Colour brown, pollinose. Orbits, ocellar triangle and narrow interfrontal strips pollinose, middle of interfrontal plate shining brown, intervening areas forming a black M-shape. Interfrontal plate broad and slightly tapered, width at top equal to height, bordered by 4 short, equal interfrontal bristles. Eye 4.0 times as high as gena. Mid tibia with a very short apicoventral bristle and no other ventral bristles; distal anterodorsal bristle longer than distal posterodorsal bristle. Scutum with 5-6 rows of acrostichal setulae between dorsocentral lines, dorsocentral bristles in 2 pairs, anterior pair twice as long as acrostichal setulae, posterior pair as long as scutellum. Prescutellar acrostichal bristles in a single pair twice as long as other acrostichal setulae. Scutellum flat, 0.9 times as long as wide, apical bristles twice as long as scutellum. Mesopleuron pollinose except for shining, bare anterior half of katepisternum, anteroventral corner of anepisternum, and middle of anepimeron. Halter very dark brown, stem yellow. Costagial bristles much shorter than dorsocentrals. Second costal sector 0.75 times as long as third. Cell dm broad, outer angle obtuse.

Abdomen. Syntergite 1+2 2.5 times as long as tergite 3, tergites 1-5 lightly pigmented but fully sclerotized.

Male abdomen. Sternite 5 with a posteromedial comb of 12 dark, blunt bristles flanked by a setose tubercle on each side; a shelf-like 4-bristled projection anterior to posteromedial comb (Fig. 26). Surstylus broad with a small, digitate, setose, anterior lobe and a larger posteromedial lobe bearing a long, stout bristle (Figs. 89, 90). Distiphallus with a long dorsal flagellum (Fig. 89). Parameres thin, apically curved.

Female. Unknown.

Types. *Holotype* (♂, BRI): **Florida:** Archbold Biological Station, Highlands Co., 23.iv.1967, B.V. Peterson. *Paratype:* **Florida:** De Land Co., nr. Barberville, Hwy.40, 18-20.vi.1984, mushroom baited pitfall trap, S.Marshall (1 ♂).

Biology. Beyond the fact that one of two known specimens was collected in a mushroom trap, nothing is known of the biology of this species.

Comments. *M. archboldi* is clearly related to the *vitripennis* species group, as evinced by the strongly deflexed posteromedial portion of sternite 5, the whip-like ventral portion of the distiphallus, and the *vitripennis*-like surstyli. It also shows some significant similarities to the *Svarciella v-atrum* species group, such as the membranous lobes to each side of the posteromedial comb of male sternite 5, detail of the posteromedial comb, and the plesiomorphic retention of well developed preabdominal tergites. *M. archboldi* is thus treated as a plesiomorphic member of the *vitripennis*-group, and forms a sort of operational "missing link" uniting the *vitripennis* and *v-atrum* groups into *Svarciella*.

Minilimosina (Svarciella) bipara new species

Figs. 40, 94, 95, 96, 163, 164, 165, 209

Description. Length 1.5-1.7 mm. Colour brown, pollinose. Middle part of interfrontal plate, interfrontal strips and orbits silvery, lower frons reddish, upper part of interfrontal plate and areas flanking ocellar triangle shining black, frons otherwise dull black. Interfrontal plate narrow, almost parallel-sided, twice as high as wide, bordered by 4 very fine equal interfrontal bristles. Lunule projecting as a carinate knob between antennae, face concave-carinate below. Eye 3.5 times as high as gena. Mid tibia of male ventrally with a distal row of 9 spinules and a long apicoventral bristle. Anterodorsal bristle in distal 1/4 of mid tibia shorter than distal posterodorsal bristle; distal dorsal bristle slightly displaced anteriorly; and additional small dorsal bristle present between distal anterodorsal and posterodorsal bristles. Scutum with 4-6 rows of acrostichal setulae between dorsocentral lines; dorsocentral bristles in 2 pairs, anterior pair 3 times as long as acrostichal setulae, posterior pair subequal to scutellar length. Prescutellar acrostichal bristles in a single pair

twice as long as acrostichal setulae. Scutellum flat, 0.7 times as long as wide, apical bristles twice scutellar length. Mesopleuron pollinose except central and anterior parts of katapisternum; anepisternum bulging out in type specimen. Halter uniformly dark brown. Wing with upper costagial bristle 2.5 times as long as lower costagial. Second costal sector 0.75 times as long as third, all veins pale in colour (Fig. 209).

Abdomen. Syntergite 1+2 1.8 times as long as tergite 3, other tergites lighter in pigmentation than syntergite 1+2 but fully sclerotized.

Male abdomen. Sternite 5 with a setulose posteromedial swelling (Fig. 40), sternite 6 simple. Surstylus flat, almost triangular with an elongate anteroventral point and a blunt posteroventral angle with a short bristle (Figs. 94, 95). Paramere S-shaped, strongly curved near apex (Fig. 96). Distiphallus very narrow, sclerotized, rod-like (Fig. 96).

Female abdomen. Tergite 8 long, complete but weakly pigmented medially; epiproct small, bare except for 2 bristles (Fig. 163). Sternite 8 broadest posteriorly, bare except for 8 small bristles; hypoproct setulose except for anterolateral lobes (Fig. 165). Each spermathecae spherical, with deep apical invagination (Fig. 164).

Types. *Holotype* (♂, BRI) and 9 *paratypes* (4♂, 5♀, BRI, GUELPH): PANAMA. **Chiriqui:** 2kmE Cerro Punta, 2200m., 1-4.vi.1977, forest carrion trap, S.B. Peck. *Other paratypes:* MEXICO. **Oaxaca:** 5miE jct. Hwy.175 & Yuvila Rd., 7600', 9-19.viii.1973, oak-pine dung, A.Newton (1♂, MCZ); Oaxaca, 15.5miS Ixtlan de Juarez, 7600', 10-18.viii.1973, oak woods, dung, A.Newton (1♀, MCZ); **Hidalgo:** 3.2miN Tlanchinol, 5100', 6-11.vii.1973, cloud forest dung, A.Newton (1♀, MCZ). PANAMA. **Chiriqui:** 2200m., 2kmE Cerro Punta, 28.v-8.vi.1977, oak, dung, S.Peck (3♂, 3♀). VENEZUELA. **Tachira:** 45kmNE SanCristobal, 9000', 20-22.v.1974, dung trap, S.Peck (1♂); Tachira. 38kmNE SanCristobal, 7000', 18-20.vi.1974, carrion, S.Peck (1♂, 1♀).

Biology. Beyond the fact that the type material was taken in both dung and carrion traps over a wide range of elevations, nothing is known of the biology of this species.

Comments. *M. bipara* does not fit well with either of the main species groups of *Svarciella*, and in fact bears a greater general similarity to species of *Amputella* than to any other group. As it lacks the defining characters of *Amputella* (reduction of right paramere and female sternite 8) but exhibits the diagnostic characters of *Svarciella* (2 pairs of dorsocentral bristles, relatively large female sternite 8), *M. bipara* is included in the latter subgenus.

Etymology. The name chosen reflects the fact that, unlike similar and sympatric species in the subgenus *Amputella*, this species has 2 complete parameres. The name *bipara* is a coined word formed from the Latin *bi* plus the first part of the word 'paramere'.

Minilimosina (Svarciella) contrasta new species

Figs. 28, 91, 92, 93, 175, 176, 177

Description. Length 1.0-1.2 mm. Colour shining dark brown except yellow-orange antennae. Interfrontal plate small, bordered by 2 minute interfrontal bristles; frons pollinose except for a large, wider than long, rounded, shining frontal triangle; face shining and weakly carinate. Eye 3 times as high as gena. Mid tibia with only an apical bristle ventrally; distal anterodorsal bristle and distal posterodorsal bristle minute. Acrostichal setulae sparse, in 4 rows between dorsocentral lines. Dorsocentral bristles in 2 pairs, anterior pair short, prescutellar pair 0.7 times as long as scutellum. Prescutellar acrostichal setulae in a single pair equal in length to other acrostichal setulae. Scutellum flat, 0.6 times as long as wide, apical scutellar bristles as long as scutellar width. Halter dark brown with yellow stem. Wing with costagial bristles small and subequal; veins yellow, second costal sector half as long as third; crossvein dm-cu 1/3 as long as distance between dm-cu and r-m; costa ending at or just beyond tip of R_{4+5} .

Abdomen. Syntergite 1+2 2.0 times as long as tergite 3, lightly pigmented but distinctly sclerotized. Tergites 3-5 very lightly pigmented, sclerotization indistinct, preabdomen appearing largely membranous.

Male abdomen. Sternite 5 with a small, dark, deflexed T-shaped posteromedial process; apex of process with a row of 5 bristles and sometimes concave (Fig. 28). Surstylus broad, with several stout posteroventral bristles and a large inner basal lobe bearing a strong bristle (Figs. 91, 92). Parameres thin, somewhat S-shaped. Distiphallus similar to *M. vitripennis*, but ventral flagellum weaker (Fig. 93).

Female abdomen. Tergite 8 longitudinally divided into a dorsal and 2 lateral dark areas. Epiproct large, setulose on posterior half, with 2 long bristles. Sternite 8 large, as broad as long, lightly pigmented anteriorly (Fig. 175); hypoproct setulose except along anterior margin (Fig. 177). Each spermatheca spherical, with a large apical evagination which is longer than spermathecal body, duct short, sclerotized part very short (Fig. 176).

Types. *Holotype* (♂, BRI): CANADA. **Ontario:** Ottawa, 18.ix.1956, on ground under prostrate *Picea*, J.R. Vockeroth. *Paratypes:* CANADA. **Ontario:** Mer Bleue Bog, Ottawa, 19.vii.1963, J.R. Vockeroth (1 ♂, BRI). **Quebec:** Old Chelsea, Summit King Mtn., 1150', 25.vi.1962, J.R. Vockeroth (1 ♀, BRI). U.S.A. **Florida:** Marion Co., Zay Prairie, Ocala Nat.For., 14-18.vi.1984, human dung, S.A. Marshall (1 ♂). **Maryland:** Plummer's I. 19.iv.1903, E.A. Schwarz (1 ♀, USNM), **Virginia:** Prince William Co., 8 air kmNW Haymarket, 25.vi.1966, P.H. Arnaud, Jr. (1 ♂, 5 ♀, CAS).

Comments. *M. contrasta* has previously been misidentified as *M. varicosta* (itself a junior synonym of *M. niveipennis*), from which it differs in having a flat scutellum, a deflexed process on male sternite 5, and different male and female genitalia. *M. contrasta* forms part of a complex of species including the Holarctic *M. vitripennis*, the Nearctic *M. archboldi*, the Neotropical *M. niveipennis*, and the Neotropical *M. masoni*. *M. furcalisterna*, (Deeming, 1969) from Nepal also appears to belong to this complex, and resembles *M. contrasta* in having yellow or orange antennae.

Etymology. The specific name is a coined word referring to the contrast in colour between the head and antennae.

Minilimosina (Svarciella) dissimilicosta (Spuler) new combination

Figs. 38, 39, 172, 173, 174, 204

Leptocera Scotophilella dissimilicosta Spuler, 1925:148.

Limosina hackmani Roháček, 1977:115, New Synonymy

Minilimosina (Svarciella) hackmani, Roháček, 1983: 34, male only

Description. Length 1.6-1.9 mm. Colour shining black. Frons pollinose except for large, longer than wide, shining frontal triangle surrounding the pollinose ocellar triangle. Interfrontal plate 0.8 times as wide as high, 0.3 times as wide as frons. Face concave, subshining, lunule yellowish brown, small and almost flat. Eye 3.0 times as high as gena, gena dull black. Mid tibia in both sexes with only an apical bristle ventrally; distal anterodorsal larger than distal posterodorsal bristle. Acrostichal setulae long, in 5 or 6 rows between anterior dorsocentral bristles. Dorsocentral bristles in 2 pairs, anterior pair twice as long as acrostichal setulae; prescutellar dorsocentral bristles slightly shorter than scutellum; prescutellar acrostichals in a single pair twice as long as other acrostichals. Scutellum flat, 0.8 times as long as wide, apical scutellar bristles twice as long as scutellum. Mesopleuron almost completely pollinose or katapisternum with a small anterodorsal bare area. Halter black, with contrasting yellow stem. Second costal sector dark, 0.9 times as long as third, other veins pale. Costa slightly surpassing tip of R_{4+5} ; cell dm with outer corner acute, weakly appendiculate.

Abdomen. Syntergite 1+2 1.9 times as long as tergite 3, all abdominal sclerites dark.

Male abdomen. Sternite 5 with a large convex bulge preceeding a posteromedial comb of flat setae (Figs. 38, 39). Surstylus very large, almost spoon-shaped (Fig. 38). Parameres simple, blunt-tipped. Distiphallus simple, with thin dorsal and ventral processes.

Female abdomen. Tergite 8 longitudinally divided into a dorsal and 2 lateral dark

areas. Epiproct elongate, bare except for 2 bristles (Fig. 172). Sternite 8 large, slightly longer than wide, setulose on posterior half, notched posteromedially, darkly pigmented on anterior half. Hypoproct setulose on posterior third, bare and tri-lobed anteriorly (Fig. 174). Each spermathecae large, peanut-shaped, duct very short with no exposed sclerotized part (Fig. 173).

Types. *Holotype*: (♀ , USNM): U.S.A. **Washington**: Olga, 17.v.10, Melander Collection. *Paratypes*: **Washington**: Dewatto, 15.viii.1910 (1 ♂ , dissected, USNM); Mt. Constitution, 17.v.1910 (1 ♀ , dissected, USNM); Ilwaco, 25.v.1917, Melander (1 ♂ , USNM).

Other Material Examined. CANADA. **Alberta**: Elk Island Nat. Pk., Trail 6, 13.v.1982, sifting moose dung, R.A. Anderson (1 ♂); Coleman, 24-26.vii.1980, S.A. Marshall (2 ♀). **British Columbia**: King Salmon L., 3.viii.1960, 1750', W.W. Moss (1 ♀ , BRI); Hot Springs, 5miS Lakelse, 8.vii.1960, C.H. Mann (1 ♂ , BRI); Summit Lake, mi392 Alaska Hwy., 7,8,16.vii.1959, 4500-4700', R.E. Leech (1 ♂ , 2 ♀ , BRI). U.S.A. **Alaska**: Iditarod, 12.vi.1918, Alice Twitchell (1 ♂ , USNM); Matanuska, 5.15.1944, rotary trap, J.C. Chamberlin (2 ♂ , 5 ♀ , USNM). **Colorado**: Rio Grande Co., 10,000', Beaver Creek, 21.vi.1972, W.W. Wirth, Malaise Trap (1 ♂ , USNM). **New Mexico**: Socorro Co., S. Baldy Pk., 10,400', 20miW Socorro, 28.vi-7.vii.1979, alpine meadow, S.&J. Peck (1 ♂); Taos Co., 1.7miSE Tres Ritos, 8500', 3-5.vii.1972, dung, A.F. Newton (1 ♂ , MCZ). **Utah**: Little Brush Creek, 25miW Vernal, 8.vii.1961, 8000', J.G. Chillcott (2 ♂ , BRI). Also known from Finland (holotype of *hackmani* Roháček).

Biology. Of all the known specimens of this species, including the one from Finland, the only specimen with biological information was collected from moose dung in Elk Island National Park, Alberta.

Comments. *M. dissimilicosta* is a highly distinctive species due to the conically highly bulging male sternite 5 and the very large surstyli. The posteromedial comb of sternite 5, often deflexed and obscured by the conical bulge, is similar to that found in *M. vixa* and *M. intercepta* but also shows important similarity to that found in *M. archboldi* and the related European *M. splendens*.

Minilimosina (Svarciella) intercepta new species

Figs. 30, 31, 32, 33, 166, 167, 168, 188, 205

Description. Length 1.6-1.8 mm. Colour black except antenna, stem of halter, trochanters, and tips of tibia and femur, which are orange or yellowish brown. Frons pollinose except for large, longer than wide, shining frontal triangle surrounding the pollinose ocellar triangle (Fig. 188). Interfrontal plate as wide as high, bordered by 3 or 4 interfrontal bristles. Lunule subquadrate, weakly projecting between antennae, face weakly concave, carinate, subshining. Antennae bright orange in contrast to black face and frons. Eye 3.5 times as high as gena, gena lightly pollinose except bare, shining spot below eye. Mid tibia of male curved, with a double row of distinct ventral spinules and an anteroventral bristle. Acrostichal setulae in 6-8 rows between the small anterior dorsocentral bristles; dorsocentral bristles in 2 pairs, anterior pair small, prescutellar pair subequal to length of scutellum; prescutellar acrostichals in a single pair slightly longer than other acrostichals. Scutellum flat, 0.7 times as long as wide, apical scutellar bristles slightly longer than scutellar width. Mesopleuron with 2 large bare, shining areas on anterior half, the lower spot twice as large as the upper. Halter black with orange stem. Second costal sector dark, 0.7-0.8 times as long as third; other veins lighter in colour; costa slightly surpassing R_{4+5} ; outer angle of cell dm not appendiculate (Fig. 205).

Abdomen. Syntergite 1+2 1.5 times as long as tergite 3. All abdominal sclerites large, dark, heavily sclerotized and weakly punctate.

Male abdomen. Sternite 5 with a long posteromedial comb of short stout bristles, comb flanked by longer bristles on each side (Fig. 30); sternite 6 with 2 small, dark lobes at middle (Fig. 33). Surstylus bilobed, inner lobe longer, with 3 large spurs (Figs. 31). Parameres weakly bent anteriorly at tip (Fig. 32). Distiphallus slender, simple, mostly sclerotized (Fig. 32).

Female abdomen. Tergite 8 with tripartate pigmentation, epiproct broad, bare except for 2 bristles (Fig. 166). Sternite 8 shield-shaped, almost entirely setulose (Fig. 168). Hypoproct large, entirely setulose. Cercus long, with long bristles. Each spermatheca cylindrical with a reticulate surface (Fig. 167).

Types. *Holotype* (♂, BRI) and 13 *paratypes* (8 ♂, 5 ♀, GUELPH, JRO): U.S.A. **Illinois:** Champaign Co., Mahomet Hardwoods, 20-26.v.1979, Peck, Malaise intercept trap in oak woods. *Other paratypes* (BRI, GUELPH): **CANADA. Ontario:** Foxmead, 25.v.1959, dense maple woodland, J.G. Chillcott, (1 ♀, BRI); Heckston, 20kmSE Kemptville, 15.v-24.vi.1984, fight intercept trap, M. Kaulbars (1 ♀); Pt. Pelee N.P. Leamington, 14.vi.1984, K.N. Barber (1 ♂). U.S.A. **Arkansas:** Scott Co. 7miE Y City, Jct.Hwy270&Rt.71 on 270, 6-8.iii.1977, pig dung trap, Woodruff & Wiley (1 ♀, FSC). Montgomery Co., 5.4miE IdaHwy270, 6-8.iii.1977, pig dung trap, Woodruff & Wiley (1 ♀, FSC). **Georgia:** Chatahoochee St. For., US441 N of Turnerville, 5-25.vi.1984, mushroom trap, S.A. Marshall (1 ♂); Rabun Co., Pine Mtn., 1400', 4.v.1957, J.R. Vöckeroth (1 ♂); Wilkinson Co., Big Sandy Ck., 8miS Irwinton, US441, 5-25.vi.1984, intercept trap near dung, S.A. Marshall (1 ♂). **Illinois:** Savanna, Miss. Palisades Pk., 13-17.v.1979, oak woods intercept trap, Peck (1 ♂, 2 ♀). **Kentucky:** Rowan Co., 24kmSW Borehead Cave, 14-20.vii.1983, *Fagus* forest intercept trap, Peck (1 ♀). **Louisiana:** 3miS Oak Grove, 31.iii.1960, J.G. Chillcott (2 ♂). **North Carolina:** Jackson Co., Cullowhee, 5-28.vi.1984, intercept trap and 6-17.vi, pan trap, S.A. Marshall (2 ♂, 2 ♀). **Oklahoma:** Latimer Co., 5miW Red Oak, 9.iii.1977, pig dung trap, K. Stephen (1 ♀, FSC). **Tennessee:** Sevier Co., 2900', Greenbrier Cove, Ramsey Cascade Cove Forest, 18.v-23.v.1972, carrion trap, A. Newton (2 ♂, MCZ); 2.5miN Gatlinburg, 5-28.vi.1984, riparian, rotting mushroom trap, S.A. Marshall (1 ♀). **Texas:** San Jacinto Co., 5kmS Coldspring, Double Lk. Camp, 22.v-16.viii.1983, forest flight intercept trap, Peck (2 ♂, 1 ♀). **Virginia:** Shenandoa Co., 16km Strasburg, 12.v-22.viii.1983, flight intercept trap in forest, Peck (2 ♂).

Biology. The majority of the known specimens were collected in hardwood forests using intercept traps, although 4 specimens were collected on dung, and one on carrion. The related European *M. ismayi* Roháček is known only from the holotype, collected in Spain and with no associated biological information.

Comments. *M. intercepta* is very similar to the European *M. ismayi* Roháček, both of which have light antennae contrasting with a dark body, and both of which have very similar male genitalia. Unfortunately, the female of *M. ismayi* is not known. Dr. Roháček, describer of *M. ismayi*, was kind enough to compare specimens of *M. intercepta* with the holotype of *M. ismayi*. He agreed that *ismayi* and *intercepta* are different species. Although they are extremely similar, in *M. intercepta* the projections of sternite 6 are smaller and more widely separated, the posteromedial comb of sternite 5 is longer, and there are small differences in the surstylus. In addition to these differences, *M. intercepta* has a shining spot below the eye which is lacking or indistinct in *M. ismayi*, and has a much larger mesopleural shining area. The Nearctic species most closely related to *M. intercepta* is *M. vixa*.

Etymology. The specific name refers to the type of trap in which most of the type series was collected.

Minilimosina (Svarciella) masoni new species

Figs. 181, 182, 183, 206

Description. (Female only). Length 0.9 mm. Colour shining black except tarsomeres, tips of tibiae, lower frons, face antennae, and anterior part of gena which are contrasting orange. Interfrontal plate small, twice as high as wide, bordered by 4 very small interfrontal bristles. Frons pollinose except for a large, equilateral, shining frontal triangle; ocellar triangle in a square pollinose patch. Face carinate between antennae, concave and weakly carinate below. Eye 4.0 times as high as gena. Mid tibia with only an apical bristle ventrally,

dorsally with an anterodorsal bristle just above middle, a posterodorsal bristle just below middle, and a posterodorsal bristle just before apex in addition to the usual proximal anterodorsal, distal anterodorsal and dorsal bristles shown in Fig. 1. Hind tibia with a long, thin, preapical dorsal bristle (absent in all congeners); first 2 tarsomeres of hind leg subequal in length and width (tarsomere 2 longer and thinner in congeners). Acrostichal setulae long, sparse, in 4 rows between dorsocentral areas. Dorsocentral bristles in 2 pairs, anterior pair barely longer than acrostichal setulae, prescutellar pair subequal to scutellar length. Prescutellar acrostichal setulae in a single pair, slightly longer than acrostichal setulae. Scutellum strongly convex, 0.5 times as long as wide, apical scutellar bristles as long as scutellum. Halter shining black with yellow stem. Wing with upper costagial bristle 1.5 times as long as lower costagial; second costal sector very short, 0.4 times as long as third sector, R_{4+5} diverging from R_{2+3} at a large angle (Fig. 206).

Abdomen. Syntergite 1+2 2.0 times as wide, 2.0 times as long, and much darker than tergite 3; tergites 3, 4 and 5 greatly reduced, almost membranous; tergite 7 darkly pigmented (Fig. 181); tergite 8 darkly pigmented, setulose along posterior margin only; epiproct bare except for 2 bristles. Sternites 1-6 lightly pigmented, sternite 7 normal; sternite 8 large, setulose; hypoproct entirely setulose (Fig. 183). Each spermatheca spherical, with a shallow, lateral depression; sclerotized part of duct short (Fig. 182).

Types. *Holotype* (♀, BRI) and 7 *paratypes* (7 ♀, BRI): MEXICO. **Sinaloa:** 20miE Concordia, 3000', 4.viii.1964, W.R.M. Mason.

Comments. *M. masoni* differs markedly from other *Minilimosina* species in the colouration of the face and frons, the rich mid tibial chaetotaxy, the sharply up-turned R_{2+3} , and the preapical dorsal bristle of the hind tibia. The sharply up-turned R_{2+3} is similar to that found in (and diagnostic for) the distantly related genus *Pterogramma*, and the dorsal hind tibial bristle is a diagnostic character of the closely related genus *Xenolimosina*. Since there is good evidence that *M. masoni* is a derived member of the *M. vitripennis* species complex, these characters appear to have developed independently in this species. Characters suggesting the placement of *M. masoni* in the *vitripennis* group include the greatly reduced sclerites of abdominal segments 3-5, the large sternite 8, the large, sparse acrostichals, head chaetotaxy, and general habitus. Within the *vitripennis* group, the very short second costal sector and convex scutellum are considered derived characters. It is predicted that when the male is discovered, it will have a large, membranous distiphallus with a long dorsal flagellum similar to that found in *M. niveipennis*.

Etymology. This species is named after the collector of the type series, Dr. W.R.M. Mason of the Biosystematics Research Institute, Canada Agriculture, Ottawa.

***Minilimosina (Svarciella) niveipennis* (Malloch) new combination**

Figs. 27, 85, 86, 178, 179, 180

Limosina niveipennis Malloch, 1913:370.

Limosina varicosta Malloch, 1914:14, New synonymy.

Limosina mollis Richards, 1963:243, New synonymy.

Description. Length 0.9-1.1 mm. Colour black except contrasting orange antennae, yellow tarsomeres, and brown tibiae. Orbits and ocellar triangle pollinose; interfrontal plate shining brown; relatively narrow strip between interfrontal plate and orbits black. Interfrontal plate broad and slightly tapered, width at top equal to height, bordered by 3 very fine, equal interfrontal bristles. Lunule small, flat and shining, face shining except pollinose carina. Eye 2.5 times genal height. Mid tibia of both sexes with a short apicoventral bristle and no other ventral bristles; distal anterodorsal bristle long, distal posterodorsal bristle minute or absent. Scutum and scutellum strongly convex, shining; with 4 rows of acrostichal setulae between anterior dorsocentral bristles. Dorsocentral bristles in 2 pairs, both short, twice as long as acrostichal setulae. Prescutellar acrostichal setulae in a single, small pair. Scutellum strongly convex, short, 2.1 times as wide as long, apical bristles 1.4

times as long as scutellum. Mesopleuron pollinose on posterior half, episternum shining. Halter light brown. Costagial bristles short; second costal sector half as long as third, costa only slightly surpassing R_{4+5} . Cell dm narrow, outer angle obtuse. Veins brown, second costal sector thickened and dark.

Abdomen. Syntergite 1+2 sclerotized; tergites 3-5 greatly reduced and difficult to distinguish from membrane.

Male abdomen. Sternite 5 simple, without posteromedial ornamentation. Surstylus broad, with strongly setose posterodorsal and posteroventral angles and a posteromedial lobe bearing a strong bristle (Figs. 85, 86). Distiphallus with a long, split dorsal flagellum and a lateral cluster of spines in membrane near base (Fig. 85). Parameres thin, simple.

Female abdomen. Tergite 8 darkly pigmented laterally, very lightly pigmented medially (Fig. 178). Epiproct small, entirely setulose, with 2 long bristles. Sternite 8 large, broader than long; lightly pigmented, especially anteriorly. Hypoproct large, setulose over entire surface (Fig. 180). Each spermatheca almost spherical, with a large apical invagination; duct very long, including sclerotized part (Fig. 179).

Types. *Holotype* (♂, USNM): "Porto Rico, Mayaguez, Jan. 1899". A. Busck. USNM #14953. **Type series of *L. varicosta*** (all ANSP): COSTA RICA: Alajuela, 15.ix.1909, 3100', sweepings, P.P. Calvert (holotype ♂ and 7 paratypes, 1 ♂ and 1 ♀ dissected); Bonnefil Farm, Rio Surubres, 20.x.1909, 800', sweepings, P.P. Calvert; Peralta Stn., 10.viii.1909, 3100', sweepings, P.P. Calvert; La Carpintera, Cartago, 4.xii.1909, sweepings, P.P. Calvert; Cartago, 27.x.09, 800', sweepings, P.P. Calvert. **Type series of *L. mollis*** (holotype ♂, 5 ♂ and 28 ♀ paratypes, CAS): HONDURAS. Bras Lagoon, 25.iv.1947, C.W. Cook.

Other material examined. COSTA RICA: San Mateo, Higuito, Pablo Schild Coll. (1 ♀, USNM). JAMAICA: "Bath St Thos" Sta. 433 (1 ♀, USNM); Battersea, ii.1910, R. Thaxter (1 ♂, 1 ♀, labelled *L. varicosta* det. Spuler, USNM).

Comments. This neotropical species is closely related to *M. vitripennis*, *M. archboldia* and *M. contrasta*. Nearctic records of this species have been based on misidentifications of *M. contrasta*.

Minilimosina (Svarciella) vitripennis (Zetterstedt)

Figs. 8, 29, 87, 88, 184, 185, 186, 208

Limosina vitripennis Zetterstedt, 1847:2505

Leptocera (Scotophilella) albifrons Spuler, 1925b:147, New synonymy.

Minilimosina (Svarciella) vitripennis: Roháček 1983:31, description and synonymy.

Diagnosis. Length 1.2-1.4 mm. Colour shining brown except whitish pollinose gena and face. Frons pollinose except large, wider than long, shining frontal triangle surrounding pollinose ocellar triangle. Interfrontal plate small, 1/4 as wide as frons, bordered by 2-3 almost cruciate interfrontal bristles. Face pollinose, weakly concave-carinate; lunule small and weakly projecting between antennae. Eye 3.0 times as high as gena, gena pollinose, often whitish. Mid tibia of both sexes with only an apical bristle ventrally; distal posterodorsal bristle minute. Acrostichal setulae sparse, 4 rows between anterior dorsocentral bristles (Fig. 8). Dorsocentral bristles in 2 pairs, anterior pair twice as long as acrostichal setulae; prescutellar dorsocentral bristles equal in length to scutellum; prescutellar acrostichal bristles no larger than other acrostichal setulae. Scutellum flat, 0.8 times as long as wide, apical scutellar bristles equal in length to scutellum. Mesopleuron pollinose except shining anterodorsal half of katepisternum. Halter uniformly light brown. Wing with costagial bristles small, subequal; second costal sector glossy black, 0.8 times as long as third; other veins lighter in colour. Cell dm with posterior outer corner weakly appendiculate (Fig. 208).

Abdomen. Syntergite 1+2 2.5 times as long as tergite 3; tergites 1-5, especially 3-5, pale-pigmented, reduced.

Male abdomen. Sternite 5 with a dark Y-shaped process posteromedially (Fig. 29)

which is often deflexed giving sternite 5 a misleading similarity to that of *M. ternaria* (Fig. 42). Surstylus broad, with several posteroventral bristles, and a posteromedial lobe bearing a strong bristle (Figs. 87, 88). Parameres thin, simple. Distiphallus with a long, split ventral flagellum (Fig. 87).

Female abdomen. Tergite 8 longitudinally divided into a dorsal and 2 lateral dark areas. Epiproct large, setulose on posterior half, with 2 long bristles (Fig. 184). Sternite 8 large, broader than long, lightly pigmented anteriorly (Fig. 186). Hypoproct setulose over entire surface. Each spermatheca flattened basally, with a large apical evagination which is shorter than spermathecal body; duct short, sclerotized part relatively long (Fig. 185).

Type. *Holotype* of *Scotophilella albifrons* Spuler: **Idaho:** Kendrick, 7.vi.1917, A.L. Melander (♂, USNM).

Other Material examined: CANADA. **Alberta:** Lethbridge, 5.vii.1956, O. Peck (1 ♂, BRI); 28.v.1929, J.H. Pepper (1 ♂, BRI); McMurray, 30.v.1953, G.E. Ball (1 ♀, BRI). **British Columbia:** Aiyansh, Nass R., 500', 25.vi.1960, J.G. Chillcott (1 ♀, 2 ♂, BRI); Hatzic, 30.vii.1953, W.R.M. Mason (1 ♂, BRI); Terrace, 3.vii.1960, swept from carcass, J.G. Chillcott (3 ♂, 1 ♀, BRI), 1.vi.1960, W.R. Mason (1 ♂, BRI). **Manitoba:** Churchill 13.vii.1952, J.G. Chillcott (1 ♂, 1 ♀, BRI); Ninette, 15.vii.1958, J.G. Chillcott, *Betula glandulosa*-*Populus balsamifera* Associes (2 ♂, 1 ♀, BRI); Treesbank, "vii-20-15" (1 ♂, USNM). **New Brunswick:** Kouchibouguac N.Pk., 19.v.1977, code5087Q, W.P. Hanley (1 ♀, BRI). **Newfoundland:** Hebron, 19.vii.1954, J.F. McAlpine (2 ♂, BRI). **North West Territories:** Aklavik, 8.vi.1931, Bryant (1 ♀); Chesterfield, 6.vii.1950, J.R. Vockeroth (2 ♂, BRI); Reindeer Depot, Mackenzie Delta, 29.vi.1948, J.R. Vockeroth. **Nova Scotia:** West end Sable Is., 5, 11, 13.vii.1967, D.M. Wood (8 ♂, 1 ♀, BRI). **Ontario:** Ancaster, 1.iv.1967, J.E.H. Martin (1 ♀, BRI); Arkell, 20.vi.1956, D.H. Pengelly (1 ♀); Constance Bay, 1.x.1953, J.F. McAlpine (2 ♂, BRI); Guelph, 14-16.vii. K.N. Barber, pan trap (1 ♀), 14.v.1978, J.M. Cumming, pan trap (1 ♀); Marmora, 1.ix.1952, C. Boyle (1 ♂, BRI); Midland, 30.vii.1956, J.G. Chillcott (1 ♂, BRI); Norval, 16.v.1980, on carrion, S.A. Marshall (4 ♂, 2 ♀); Ottawa, 22.iv.1957, on ground among *Carex* roots, J.R. Vockeroth (2 ♀, BRI), 24.iv.1957, C.D. Miller (1 ♀, BRI), 15.v.1963, H. Rutz (2 ♀, BRI), 5.v.1952, J.G. Chillcott (1 ♂, BRI), 26.vii.1951, J.F. McAlpine (1 ♂, BRI), 26.vii.1955, J.G. Chillcott (1 ♂, BRI); Merbleue, 12.x.1960, J.R. Vockeroth (1 ♂, BRI); Penetang, 2.v.1959, J.G. Chillcott, (1 ♂, BRI); Port Severn, 18.v.1959, black spruce bog, J.G. Chillcott (1 ♂, BRI). **Quebec:** Indian House Lake, 29.vii.1954, W.R. Richards (1 ♂, BRI); Lac Roddick, 23.iv.1984, L. Masner (1 ♀, BRI). **Yukon:** La Force, 3300', 7.vii.1960, J.E.H. Martin (1 ♂, BRI); Rampart House, 5.vi.1951, J.E.H. Martin (1 ♂, BRI); Ross River, 3000', 21.vi.1960, J.E.H. Martin (1 ♀, BRI). U.S.A. **Alaska:** Anchorage, 27.vi.1951, R.S. Bigelow (1 ♀, USNM); Matanuska, 15.v.1944, rotary trap, J.C. Chamberlin (1 ♂, 1 ♀, USNM). **Arizona:** Flagstaff, Oak Ck. Cany. 5900', 17-25.vii.1979, S.&J. Peck (1 ♂); **Colorado:** Nederland, 8300', 5.vii.1961, J.G. Chillcott, (1 ♀, BRI); Nederland, Caribou, 10,000', 10.vi.1961, C. Mann (1 ♀, BRI); Boulder, 10.vi.1961, C.H. Mann (1 ♂, BRI). **California:** Siskiyou Co., McBride Springs, 5200', 10-14.vi.1974, J. Doyen (1 ♂, BERK); Yosemite Valley, 22.v.1908, E.T. Cresson (1 ♂, paratype of *albifrons* Spuler, ANSP). **Idaho:** Franklin Co., Cub River Canyon, 26.vi.1971, G.F. Knowlton, (1 ♂, USNM). **New Hampshire:** Mt. Washington, Lakes of the Clouds, 5000', 9.viii.1954, W. Mason, (1 ♂, BRI). **North Carolina:** Franklin, 2000', 8.v.1957, J.R. Vockeroth (1 ♀, BRI). **Oregon:** Tumalo State Pk., 5.iv.1970, Oman (1 ♀, USNM). **Pennsylvania:** Center Co., Pine Grove Mills, 24.v.1981, P.A. Adler, sticky trap over slab cabin run (1 ♂, 1 ♀, PSU). **Utah:** Summit Co., Bear R.Cp., Wasatch For., 30.vii-11.viii.1979, malaise, streamside, 8400', (1 ♀). **Washington:** Mt. Vernon, 5.vii.1925, A.L. Melander (1 ♀, USNM); Seattle, 28.vi.1917, H.G. Dyar (1 ♂, 1 ♀, USNM).

This species is also known from Europe, Afghanistan, and Mongolia (Roháček, 1983).

Biology. As indicated by the above data, this species is commonly collected in northern North America, and appears to be the most frequently encountered sphaerocerid at very high latitudes. Roháček (1983) pointed out a similar distributional pattern in Europe, where it is common in the north and primarily restricted to high elevations in South Europe. A most unusual feature of the North American collection records is the relative frequency with which *M. vitripennis* has been taken by general collectors, and the conspicuous absence of this species from baited pitfall trap samples. This suggests that, in contrast to other sphaerocerid species, *M. vitripennis* frequents exposed situations. It seems to be collected most often in wet areas and has been swept off carrion, collected in mammal runs, and collected among decaying vegetation.

Comments. This species is closely related to *M. contrasta*, *M. archboldi*, *M. niveipennis*, and *M. masoni*, as evinced by the many synapomorphies of male and female terminalia, the reduced preabdominal sclerites, wing venation, and other external characters. Previous North American authors, including Marshall (1982), have treated this species under the name *albifrons* Spuler, now considered as a junior synonym.

***Minilimosina (Svarciella) vixa* new species**

Figs. 34, 35, 36, 37, 169, 170, 171, 207

Description. Length 1.5-1.9 mm. Colour black except stem of halter, tarsomeres and tips of tibiae and femora, which are orange or yellowish brown. Frons black, shining except for silvery pollinose orbits and narrow interfrontal strips and brown pruinose ocellar triangle. Interfrontal plate 0.8 times as wide as high, bordered by 3-4 small, subequal interfrontal bristles. Lunule small, flat; face weakly concave, distinctly carinate. Eye 3.0 times as high as gena. Mid tibia of male ventrally with a distal double row of short, stout bristles and a weak apical bristle. Distal anterodorsal bristle of mid tibia slightly longer than the weak distal posterodorsal bristle. Scutum with 6 rows of acrostichal setulae between dorsocentral areas, dorsocentral bristles in 2 pairs, anterior pair 0.5 times as long as posterior pair. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Scutellum flat, 0.7 times as long as wide, apical bristles 1.3 times scutellar length. Mesopleuron pollinose except anterior part of katepisternum, anterior part of anepisternum, and an isolated shining area on mid dorsal part of katepisternum. Halter shining black with a yellow stem. Wing with costagial bristles equal, second costal sector 0.7 times as long as third, dark black; other veins yellow to brown (Fig. 207).

Abdomen. Syntengite 1+2 1.7 times as long as tergite 3. All abdominal sclerites large, heavily sclerotized, weakly punctate.

Male abdomen. Sternite 5 with a posteromedial comb of flat bristles flanked by long bristles on each side (Fig. 34). Sternite 6 with 2 dark posteromedial processes sometimes visible behind sternite 5 (Fig. 37). Surstylus with a narrow posterior lobe bearing 3 large, stout spurs (Fig. 35). Paramere narrow, with 2 or 3 anterior setulae. Distiphallus narrow, with a short ventral piece and a longer dorsal piece (Fig. 36).

Female abdomen. Tergite 8 short, with tripartate pigmentation. Epiproct large, bare except for two bristles (Fig. 169). Sternite 8 subquadrate, setulose. Hypoproct entirely setulose (Fig. 171). Each spermatheca cylindrical, surface strongly tuberculate, apex with a deep invagination (Fig. 170).

Types. *Holotype* (♂, BRI): CANADA. Nova Scotia: Cape Breton Highland N.Pk., North Mt., 400m, 10.viii.1983 "PG766864", Fen pan trap, J. Martin. *Paratypes*: CANADA. New Brunswick: Kouchibouguac N.Pk., 19,20,22,24.v and 17,24,30.vi.1977, B. Cooper, G.A. Calderwood, J.R. Vockeroth (5 ♂, 4 ♀, BRI, codes 5117u, 5085o, 51110, 5314j, 5097a, 5453s, 5366j, 5043y). Nova Scotia: Cape Breton Highland N.Pk., North Mt., 400m, vii.1983, "pg766864", bog pan trap, J. Vockeroth (1 ♀, BRI), North Mt., 400m, 24.viii.1983, "pg766864", fen pan trap, M. Sharkey (1 ♂, BRI), Mackenzie Mt., 300m., 29.viii.1983, "pg64851" *Picea-Betula* MalaiseTp. (2 ♀, BRI), South Harbour, 12.vii.1983, "pg929935" mixed forest Malaise trap, J.R. Vockeroth (1 ♀, BRI); Mount Uniacke, 5.viii.1958, J.R. Vockeroth (1 ♂, BRI). Ontario: Algonquin Park, S. of Shirley Lake, deciduous forest, moose dung trap, 18-26.v.1984, K. Pendreigh (2 ♂); Algonquin Park, Pen Lake, 29-31.v.1984, forest intercept trap, B.V. Brown (1 ♂, 4 ♀). U.S.A. Maine: Penob Co., 2miSW Orono, 28.v.1982, Malaise trap, D.S. Chandler (1 ♀, UNH).

Biology. *M. vixa* seems to be associated with wet deciduous forests or boggy areas of the northeast. Nothing further is known of its biology. The closely related *M. v-atrum* is a rare species of bogs and wet forests in north central Europe.

Comments. This species is close to *M. v-atrum* (Villeneuve) and was treated provisionally under that name by Marshall (1982). Since then, Dr. Roháček has compared North American and European specimens and has pointed out that the Nearctic material differs in having a smaller anal fissure and possessing ornamentation of sternite 6 (a doubled projection) not found in *M. v-atrum*, and that the North American populations therefore should be considered as a different species. In addition to these features, *M. vixa* differs from *M. v-atrum* in having strongly tuberculate spermathecae, larger shining spots on the mesopleuron, and equivocal differences in some trivial indices such as relative eye height. *M. v-atrum* and *M. vixa* are very closely related to *M. ismayi* (Palearctic) and *M. intercepta* (Nearctic), both of which differ in having yellow or orange antennae.

Etymology. The name *vixa* is a coined word (noun in apposition), reminiscent of the Latin adverb *vix* meaning 'hardly, scarcely or with difficulty', and reflects the difficulty of deciding whether or not this species should indeed be considered separate from *v-atrum*.

Amputella new subgenus

Type Species *Minilimosina (Amputella) ternaria* new species

Subgeneric description. Length 1.0-2.1 mm, usually dull brown in colour. Postocellar bristles minute or absent, face narrowly tuberculate to carinate between antennae, concave-carinate below. Mid tibia of male with at least some weak spinules forming a distal ventral row; mid femur with a corresponding basal ventral row of bristles (Fig. 6). Upper costagial bristle long, subequal in length to basal scutellar bristle. Costa always extending clearly beyond tip of R_{4+5} , cell dm obtuse angled and usually weakly appendiculate on posterior outer corner. Dorsocentral bristles in 2 pairs, anterior pair small and often hard to distinguish from acrostichal setulae, prescutellar pair *ca.* as long as scutellum. Sternite 5 of male concave posteromedially (Figs. 41-47), never with a posteromedial comb, but deflexed posteromedial part often with a median lobe or process (Figs. 43-47). Surstylus with one or more anterior lobes and a large posterior lobe bearing 3 or 4 stout bristles. Basiphallus elongate, with an epiphallus (Fig. 100). Ejaculatory apodeme well developed. Left paramere large, often sinuate. Right paramere atrophied to an inconspicuous, terminally membranous lobe. Distiphallus simple, greatly reduced, more or less cylindrical. Female sternite 8 greatly reduced, often made up of 2 or more small plates. Hypoproct large, deeply concave anteriorly, setulose posteriorly. Female tergite 8 and often tergite 7 split or depigmented medially. Epiproct long, bare at least on anterior half. Each spermatheca short, with a deep, usually lateral, invagination.

Etymology. The name *Amputella* is descriptive of the most striking autapomorphy of the subgenus, which is the presence of one normal paramere and a greatly shortened one.

Discussion. This subgenus is characterized by a number of outstanding apomorphic characters. The atrophied right paramere and reduced, tubular distiphallus, for example, are unique in the Limosininae. Other characters, such as the long epiphallus and long costagial bristle, as apomorphic within the framework of *Minilimosina* and related genera but occur as homoplasies elsewhere in the Limosininae. *Amputella* shares some characters with *Svarciella*, such as having two dorsocentrals, reduced postocellars and a low number of acrostichals. The dorsocentral and postocellar characters are plesiomorphic, being found in closely related genera, and acrostichal number is a very weak character on which to base any suggestion of relationship. Similarities between the sexual characters of *Amputella* and *Svarciella* are difficult to interpret. The possession of 3 surstylar bristles could be interpreted as synapomorphic with the *v-atrum* group of *Svarciella*, and the deflexed sternite 5 could be interpreted as synapomorphic with the *viripennis* group. The shape of the spermathecae and the reduction of female sternite 8, on the other hand, suggest an affinity to *Allolimosina*. For these reasons, *Amputella* is placed on Fig. 216 as a highly autapomorphic group of uncertain affinity.

Minilimosina (Amputella) bistylus new species

Figs. 5, 6, 46, 47, 103, 104, 105, 145, 146, 147, 210

Description. Length 1.4-1.8 mm. Interfrontal plate narrow and tapered, width at top 0.7 times height, bordered by 3-4 short, subequal, interfrontal bristles. Frontal triangle shining brown and extended almost to frontal suture (similar to Fig. 188), orbits and thin interfrontal strips brown, rest of frons dull black. Eye 2.7-3.0 times as high as gena. Mid tibia with distal anterodorsal bristle shorter than distal posterodorsal bristle; distal dorsal bristle displaced anteriorly, almost in line with small, distal anterodorsal (Fig. 5). Scutum with 4-5 rows of long acrostichal setulae between anterior dorsocentral bristles, prescutellar dorsocentral bristles subequal to scutellar length. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Scutellum 2/3 as long as wide, marginal bristles long, apical marginals twice as long as scutellum. Mesopleuron pollinose except shining anterodorsal corner of katapisternum. Halter uniformly light brown. Second costal sector 0.9-1.0 times as long as third (Fig. 210).

Male abdomen. Sternite 5 concave, darkly pigmented and long-setose posteromedially (Fig. 47). Posteromedial deflexed part of sternite 5 projecting posteriorly as a blade-like structure originating on a black, quadrate base (Figs. 46, 47). Surstylus with a curved, anterior lobe, apex serrate and with a thin, sinuate bristle; posterior lobe broad, with 3 short, stout bristles; anteromedial, membranous lobe also present but difficult to see in cleared material (Figs. 104, 105). Paramere narrow, constricted near apex. Basiphallus with a long epiphallus. Distiphallus short, simple, sclerotized (Fig. 103).

Female Abdomen. Tergites 6 and 7 complete but tergite 7 lightly pigmented medially; tergite 8 large, darkly pigmented. Epiproct setulose on posterior 1/4 (Fig. 145). Sternite 8 reduced to 4 sclerites; lateral ones short, posterior one setose. Hypoproct setulose, with 2 dark, bare anterior lobes (Fig. 147). Each spermatheca spherical, with a lateral, spherical invagination (Fig. 146).

Types. *Holotype* (♂, MCZ) and 12 *paratypes* (3 ♂, 9 ♀, MCZ): MEXICO. **Hidalgo:** 3.2 & 3.5miN Tlanchinol, 5100', 6-11.vii.1973, cloud forest, dung, A. Newton. *Other Paratypes:* MEXICO. **Chiapas:** Lagunas de Montebello Parque Nacional, Aqua Tinta, 4900', 21-24.viii.1971, oak-pine, human dung, A. Newton (2 ♀). **Hidalgo:** 2.5miN Tlanchinol, 5200', 6-11.vii.1973, cloud forest, dung, A. Newton (6 ♀). **Oaxaca:** 12miS Valle Nacional, 3200', 23-31.vii.1971, tropical montane forest, carrion (shrimp), A. Newton (6 ♂, 1 ♀). **Puebla:** 4.5miE Teziutlan, 5000', 10-14.vii.1971, cloud forest, human dung, A. Newton (4 ♀). **Veracruz:** 10miSW Teocelo, 4400', 1-16.vii.1971, oak, wet, human dung, A. Newton (2 ♀). PANAMA. **Chiriqui:** 15kmNW Hartman Finca, 1200m, 20-31.v.1977, carrion trap, S. Peck (1 ♀); 27kmW Cerro Punta, 1260m, 2.vi.1977, S. Peck (25 ♂, 21 ♀); 15kmNW Volcan Hartmann Finca, 1500m, 20-31.v.1977, carrion, S. Peck (6 ♂, 2 ♀); 27kmW Cerro Punta, 1700m, 5.v.1977, carrion, S. Peck (75 ♂, 40 ♀, BRI, GUELPH); 2kmW Cerro Punta, Baldwin Forest, 1750m, 30.v-2.vi.1977, carrion and dung traps, S. Peck (9 ♂, 15 ♀, from carrion; 9 ♂, 14 ♀ from dung).

Biology. As detailed above, this species has been taken in large numbers in dung and carrion traps in Panama and Mexico. Unlike related *Amputella* species, which are known from higher elevations, *M. bistylus* is associated with cloud forest or tropical montane forest.

Comments. *M. bistylus* is very closely related to *M. priapismus*, *M. erecta*, and *M. curvistylus*. It is most closely related to the latter species, from which it differs most obviously in having a relatively short anterior surstyler lobe and in having sternite 8 of the female with short lateral pieces.

Etymology. The name *bistylus* refers to the deeply cleft surstylus which, in lateral view, appears to be divided into anterior and posterior pieces.

***Minilimosina (Amputella) curvistylus* new species**

Figs. 106, 107, 108, 148, 149, 150, 211

Description. Length 1.7-1.9 mm. Interfrontal plate strongly tapered, width at top subequal to height, bordered by 4 short, subequal interfrontal bristles. Frontal triangle silvery-brown and extended to frontal suture, orbits and thin interfrontal strips also brown, rest of frons dull black and forming an M-shape. Eye 2.5-3.0 times as high as gena. Distal anterodorsal and distal posterodorsal bristles of mid tibia large, posterodorsal bristle longer than anterodorsal, slightly shorter than distal dorsal bristle. Scutum with 6 rows of acrostichal setulae between anterior dorsocentral bristles; anterior dorsocentral bristles *ca.* 3 times as long as acrostichal setulae; posterior dorsocentrals slightly longer than scutellum. Prescutellar acrostichal bristles in a single pair twice as long as other acrostichals. Scutellum 0.8 times as long as wide, marginal bristles long, apical marginals 2.2 times as long as scutellum. Mesopleuron pollinose except for shining areas anterodorsally on katepisternum and anteriorly on anepisternum. Halter uniformly brown. Second costal sector equal in length to third (Fig. 211).

Male abdomen. Sternite 5 concave, darkly pigmented and long-setose posteromedially; deflexed part projecting posteriorly as a blade-like structure originating on a small, black, quadrate base. Surstylus very distinctive; posterior lobe large, with 3 large, closely placed bristles; anterior lobe long, thin, curving posteriorly, with long apical bristles; medial surfaces setose; anteromedial lobe also present, but largely membranous and difficult to see (Figs. 107, 108). Paramere simple, almost straight. Basiphallus with a long epiphallus, distiphallus small, simple, sclerotized, convex dorsally (Fig. 106).

Female abdomen. Tergites 6 and 7 complete but lightly pigmented medially; epiproct setulose in posterior 1/4 (Fig. 148). Sternite 8 divided into 2 long lateral pieces, a short dark anterior piece, and a small setulose posterior piece (Fig. 150); hypoproct setulose on posterior half, anterior half consisting of 2 broad lobes. Each spermatheca spherical, duct of medium length, inserted almost at right angles to deep apical invagination (Fig. 149).

Types. *Holotype* (♂, BRI) and 4 *paratypes* (3 ♂, 1 ♀, BRI): PANAMA. **Chiriqui:** 4.5kmE Cerro Punta, 2500m, 23-28.v.1977, carrion trap, S. Peck. *Other paratypes:* PANAMA. **Chiriqui:** 2kmE Cerro Punta, 2200m., 1-4.vi.1977, forest carrion trap, S. Peck (9 ♂, 7 ♀).

Biology. All known specimens were collected in Panama, using carrion traps set at 2200-2500m.

Comments. Despite the strongly modified surstylus, this species is clearly related to *M. priapismus*, *M. erecta*, and *M. bistylus*. Both *M. bistylus* and *M. curvistylus* have female sternite 8 divided into 4 parts, although the lateral parts are strikingly long in *M. curvistylus*.

Etymology. The name *curvistylus* refers to the long, thin, and curved anterolateral process of the surstylus (Fig. 108).

***Minilimosina (Amputella) digitata* new species**

Figs. 41, 109, 110, 111, 151, 152, 153, 212

Description. Length 1.6 mm. Interfrontal plate, narrow interfrontal strips and orbits silvery brown, intervening areas dull black; lower frons red. Interfrontal plate narrow and tapered, width at top 0.75 times height; bordered by 4 short, subequal interfrontal bristles. Eye 2.4 times as high as gena. Mid tibia with distal anterodorsal bristle slightly shorter than distal posterodorsal; long distal dorsal bristle displace anteriorly; an additional small dorsal bristle present between distal anterodorsal and posterodorsal. Scutum with 4-5 rows of long acrostichal setulae between dorsocentral areas, anterior dorsocentral areas damaged on type material but posterior dorsocentral bristles present, *ca.* 0.7 times as long as scutellum. Prescutellar acrostichal bristles in a single pair 2-3 times as long as other

acrostichal setulae. Scutellum 0.7 times as long as wide, apical marginal bristles 2.0 times as long as scutellum. Mesopleuron pollinose except shining anterodorsal part of katepisternum and anterior part of anepimeron. Halter brown, stem yellow. Second costal sector 0.7 times as long as third.

Male abdomen. Sternite 5 with concave posteromedial area flanked by 2 tubercles (Fig. 41), deflexed area membranous. Surstylus elongate, with 4 stout bristles evenly spaced along posteroventral margin (Figs. 110, 111). Left paramere long, curved, swollen preapically and apically narrowed to a finger-like projection (Fig. 109). Basiphallus elongate-triangular, distiphallus small, cylindrical (Fig. 109).

Female abdomen. Tergites 6 and 7 complete but tergite 7 lightly pigmented medially; tergite 8 large, darkly pigmented. Epiproct subequal in length and width to cerci together, setulose and darkened on posterior 1/4, swollen laterally (Fig. 151). Sternite 8 ring-like, desclerotized centrally (Fig. 153). Hypoproct slightly larger than sternite 8, anteriorly with 2 bare, lateral lobes; posteriorly setulose (Fig. 153). Each spermatheca wrinkled, expanded apically, with a deep apical invagination, sclerotized parts of ducts short (Fig. 152).

Types. *Holotype* (♂, MCZ) and 1 *paratype* (♀, BRI): MEXICO. **Veracruz:** 4miN Huatusco, 4100', 11-16.vii.1971, cloud forest, dung, A. Newton. *Other Paratypes:* MEXICO. **Oaxaca:** 3.3miEjct. Yuvilla Rd. & Mex.175, 9-19.viii.1973, Oak, pine, dung, A. Newton (1 ♂, BRI).

Biology. The short type series was taken on dung.

Comments. Several synapomorphies suggest that *M. digitata* is the sister species to *M. ternaria*. The surstylus, with a small inner lobe and broad outer lobe bearing 3-4 large bristles, and the paramere with a finger-like apex, are the two most striking synapomorphies shared by these species.

Etymology. The name *digitata* refers to the long, digit-like bristles of the outer surstyler lobe.

Minilimosina(Amputella) erecta new species

Figs. 44, 45, 100, 101, 102, 154, 155, 156, 213

Description. Length 1.5-2.1 mm. Interfrontal plate, interfrontal strips, and orbits dull brown, intervening areas black; interfrontal plate narrow and tapered, width at top 0.75 times height, bordered by 3-4 small interfrontal bristles, pair below top pair largest. Eye 2.5 times as high as gena. Mid tibia of male ventrally with a distal row of 8-9 short spinules and a long apical ventral bristle. Anterodorsal bristle in distal 1/4 of mid tibia much shorter than distal posterodorsal bristle; an additional small bristle present above distal dorsal bristle. Scutum with 4-6 rows of long acrostichal setulae between dorsocentral areas; dorsocentral bristles in 2 pairs, anterior pair barely longer than acrostichal setulae, posterior pair subequal to scutellar length. Prescutellar acrostichal bristles in a single pair 2-3 times as long as acrostichal setulae. Scutellum 2/3 as long as wide, marginal bristles long, apical marginals twice as long as scutellum. Mesopleuron pollinose, except shining anterodorsal part of katepisternum and contiguous anterior part of anepisternum. Halter brown, stem yellow. Second costal sector 0.9-1.0 times length of third (Fig. 213).

Male abdomen. Sternite 5 concave posteromedially, with several long, thin bristles but no other adornment (Fig. 45); deflexed part projecting posteroventrally as a beak-like structure (Fig. 44). Surstylus with 3 stout bristles on posterior surface; anterior lobe small, with a cluster of ventral bristles; membranous anteromedial lobe also present but difficult to see, weakly tuberculate (Figs. 101, 102). Left paramere long, curved, swollen preapically and apically narrowed to a finger-like projection; basiphallus elongate, with epiphallus; distiphallus simple, sclerotized (Fig. 100).

Female abdomen. Tergites 6 and 7 complete but lightly pigmented medially; tergite 8 with a triangular, lightly pigmented area posteromedially (Fig. 154). Sternite 8 greatly reduced, broadest and setulose posteriorly; hypoproct setulose, with narrow, bare, antero-

lateral processes (Fig. 156). Each spermatheca cup-shaped, duct short and inserted at right angles to deep invagination (Fig. 155).

Types. *Holotype* (♂, MCZ) and 20 *paratypes* (13 ♂, 7 ♀, MCZ): MEXICO. **Oaxaca:** 1.7miW jct. Mex. 175 and Yuvilla Rd, 9400', 9-19.viii.1973, mesic oak, carrion (fish) trap, A. Newton. *Other paratypes:* MEXICO. **Morelos:** 7miW Tres Cumbres, 9600', 29.viii-4.ix.1971, oak, pine, fir, dung, A. Newton (1 ♂, 1 ♀). **Oaxaca:** 29.7miS Valle Nacional, 6800', cloud forest, carrion, 11-17.viii.1973, A. Newton (6 ♂, 5 ♀, BRI); 35miS Valle Nacional, 8000', 10-12.viii.1970, Oak, dense thicket, human dung, A. Newton (1 ♂, 4 ♀); 25miN Ixtlan, 9100', 23-29.vii.1971, oak, pine, dung, A. Newton (6 ♂, 11 ♀); 10miN Ixtlan de Juarez, 10-16.viii.1973, oak, pine carrion (fish) trap, A. Newton (11 ♂, 3 ♀); 1.4miW jct. Mex 175 & Yuvila Rd., 9-19.viii.1973, 9300', mesic oak for., dung, A. Newton (12 ♂, 9 ♀); 2miW jct. Mex. 175 & Yuvilla Rd., 9500', 8-19.viii.1973, oak, pine, dung, A. Newton (1 ♂, 4 ♀).

Biology. This species is known only from dung and carrion baited traps set at high elevations in southern Mexico.

Comments. *M. erecta* is closely related to *M. curvistylus*, *M. priapismus*, and *M. bistylus*. The median lobe of male sternite 6, which is a synapomorphy shared by these 4 species, is bent apically in *M. erecta* unlike the other 3 species. *M. erecta* is also alone in this species group in having a simple female sternite 8.

Etymology. This species was named *erecta* because, when examining the male abdomen in ventral view, the apex of the posteromedial process of sternite 5 stands erect and above the plane of the rest of the sternite.

Minilimosina (Amputella) priapismus new species

Figs. 43, 97, 98, 99, 157, 158, 159, 214

Description. Length 2.0 mm. Interfrontal plate, narrow interfrontal strips, and orbits dull brown, intervening areas dull black; lower frons reddish. Interfrontal plate narrow and tapered, width at top 0.7 times height, bordered by 2-3 interfrontal bristles, upper two almost cruciate. Eye 3.0 times as high as gena. Mid tibia of male ventrally with a distal row of 5-6 short spinules and a long apical ventral bristle. Anterodorsal bristle in distal 1/4 of mid tibia shorter than distal posterodorsal bristle; an additional small bristle present above large distal dorsal bristle. Scutum with 4-6 rows of long acrostichal setulae between dorsocentral areas, dorsocentral bristles in 2 pairs, anterior pair small, posterior pair longer than scutellum. Prescutellar acrostichal bristles in a single pair, twice as long as acrostichal setulae. Scutellum 0.8 times as long as wide, apical marginal bristles 2.5 times as long as scutellum. Mesopleuron pollinose except shining anterodorsal part of katapisternum and anterior part of anepisternum. Halter brown, stem yellow. Second costal sector 0.8 times as long as third. Discal cell broad, outer angle obtuse (Fig. 214).

Male abdomen. Sternite 5 with posteromedial area dark, concave, flanked by setose areas; deflexed part projecting as a large, dark, sinuate lobe flanked by 2 basal, setose lobes (Fig. 43). Surstylus broad, large posteroventral bristles clustered in a group of 3 on posterior margin; anterior lobe barely separated from posterior lobe, with a tuft of bristles ventrally; a membranous anteromedial lobe also present but difficult to see on cleared specimens (Figs. 98, 99). Left paramere long, curved, swollen preapically and apically narrowed. Basiphallus long, curved, with epiphallus; distiphallus thin, simple, weakly serrate dorsally (Fig. 97).

Female abdomen. Tergites 6 and 7 complete but tergite 7 lightly pigmented medially; tergite 8 large, darkly pigmented, setulose on posterior half; epiproct setulose on posterior 3/4 (Fig. 157). Sternite 8 complex, with a dark anterior piece and small lateral pieces (Fig. 159); hypoproct setulose, with 2 bare, anterior arms. Each spermatheca bent-cylindrical, with reticulate surface and small apical invagination (Fig. 158).

Types. *Holotype* (♂, MCZ) and 3 *paratypes* (2 ♀, MCZ, 1 GUELPH): MEXICO. **Chiapas:** 10miSE San Cristobal de las Casas, 8000', 30.vii.-1.ix.1973, fungus trap, A. Newton.

Biology. The type series was taken in a fungus baited trap, suggesting that this species might be fungivorous.

Comments. *M. priapismus* belongs to the species group including *M. (Amputella) bistylus*, *M. erecta*, and *M. curvistylus*.

Etymology. The name *priapismus* refers to the large dark process of the male sternite 5.

***Minilimosina (Amputella) ternaria* new species**

Figs. 42, 112, 113, 114, 190, 215

Description. Length 1.0-1.8 mm. Interfrontal plate narrow and tapered, width at top 0.7 times height, bordered by 3-4 small subequal interfrontal bristles. Eye 2.0-2.5 times as high as gena. Mid tibia with distal anterodorsal bristle shorter than distal posterodorsal. Scutum with 4-5 rows of long acrostichal setulae between anterior dorsocentral bristles; anterior dorsocentral bristles barely larger than acrostichal setulae, prescutellar dorsocentral bristles subequal in length to scutellum. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Scutellum 0.7 times as long as wide, marginal bristles long, apical marginals twice as long as scutellum. Mesopleuron pollinose except shining anterodorsal part of katepisternum and contiguous anterior part of anepisternum. Halter uniformly light brown. Second costal sector 0.6-0.8 times as long as third (Fig. 215).

Male abdomen. Sternite 5 concave posteromedially, with several long, thin bristles but no other adornment (Fig. 42); deflexed part simple, membranous. Surstylus with a broad posteromedial lobe bearing 3 dark spurs (Figs. 113, 114, 190). Left paramere long, curved, narrowed abruptly to a finger-like tip (Fig. 112). Basiphallus with a relatively short, blunt epiphallus; distiphallus a short, simple lobe (Fig. 112).

Female abdomen. Tergites 6 and 7 complete; tergite 8 divided into 2 lateral sclerites. Epiproct oval, subequal in length and width to cerci together, setulose on posterior 1/3, with 2 bristles (Fig. 160). Sternite 8 greatly reduced, sclerotized only at setal bases; hypoproct large, with 2 anterolateral lobes, setulose on posterior 1/2 (Fig. 162). Each spermatheca with rugose surface, invagination very large (Fig. 161).

Types. *Holotype* (♂, BRI) and 21 *paratypes* (14 ♂, 7 ♀, BRI, GUELPH): U.S.A. **Arizona:** Coconino Co., Flagstaff, Oak Creek Canyon, 5900', 17-25.vii.1979, riparian woods, S.&J. Peck. *Other paratypes:* CANADA. **Manitoba:** Erickson, 1-5.viii.1983, mushroom pitfalls, D.H. Pengelly and K.N. Barber (1 ♂, 1 ♀). **Ontario:** Heckston, 20kmSE Kemptville, 15-24.vi.1984, intercept trap, M. Kaulbars (1 ♂). **Quebec:** Old Chelsea, summit King Mountain, 1150', 24.vi.1964 and 1.ix.1963, J.R. Vockeroth, (2 ♂, BRI). U.S.A. **Arizona:** Apache Co., 25miW Springerville, Green's Peak, 10100', 10-13.vii.1979, forest-meadow malaise trap, S.&J. Peck (1 ♂, 1 ♀); Apache Co., Alpine, Luna Lake, 9-14.vii.1979, pine-meadows, 7900', S.&J. Peck (6 ♂, 2 ♀); Cochise Co., Chiricahua Mts., Rustler Park, 8250', ix.1970, dung trap, A. Newton (5 ♂, 1 ♀); Huachuca Mts., 6000', Miller Canyon, dung trap, ix.1970, oak woodland, A. Newton (2 ♂); Chiricahua Mts., E. Tunkey Ck., 6500', 15-21.vii.1978, dung traps, O. Kukal (5 ♂, 3 ♀); Coconino Co., 20miN Flagstaff, Bonito Park, 5-8.viii.1984, 7000', mushroom trap, Ponderosa Pine-meadow, B.V. Brown (2 ♂); Navajo Co., 15miS Holbrook, 14-16.vii.1975, 5300', grassland carrion, S.&J. Peck (1 ♂); Pima Co., Santa Catalina Mts., Mt. Lemmon, 9000', A. Newton (1 ♀); Santa Cruz Co., Santa Rita Mts., Madera Canyon, 5500', stream-dung trap, ix.1972, A. Newton (1 ♂). **Arkansas:** Wash Co., 3miS Devil's Den State Park, 28-31.v.1979, oak, hickory, S.&J. Peck (2 ♂). **Florida:** Marion Co., Ocala Nat. For., Rd.65, 1.5miW St. Rd. 19, 15-16.iii.1984, dung trap, R. Woodruff (1 ♂, FSC). **Massachusetts:** Middlesex. Co., Medford, pine forest, carrion, A. Newton (1 ♂). **New Mexico:** Lincoln Co., 10miW Corona, 8600', 17-22.viii.1975, carrion, S.&J. Peck (4 ♂, 7 ♀); 7miW

Angus, 7700', 6-8.vii.1972, dung trap, A. Newton (6 ♂, 3 ♀); Catron Co., 5miW Luna, 7400', 9-14.vii.1979, San Francisco River, pond, pine, meadows, S.&J. Peck (4 ♂, 2 ♀); Socorro Co., 20miW Socorro, Water Canyon, 7000', 28.vi-7.vii.1979, mixed mesic forest, S.&J. Peck (2 ♂). **North Carolina:** Jackson Co., Cullowhee, 5-28.v.1984, intercept trap, S.A. Marshall (1 ♂). **Texas:** Brewster Co., Big Bend National Park, 30.vii-4.viii.1975, S. Peck (3 ♂, 8 ♀, BRI). **MEXICO. Oaxaca:** 5miE jct. Yuvilla Rd. & Mex. 175, 7600', 9-19.viii.1973, dung, pine-oak, A. Newton (9 ♂, 12 ♀); 3.3miE jct. Yuvilla Rd. & Mex. 175, 8100', 9-19.viii.1973, pine-oak, dung, A.F. Newton (1 ♂, 3 ♀).

Biology. Most of the collection records of this species are from dung at high elevations.

Etymology. The specific name is from the Latin for "consisting of 3", referring to the triple comb of large spurs on the surstylus.

Comments. *M. ternaria* appears to be common, probably coprophagous, species at high elevations in Mexico and southwestern U.S.A. The existence of a few specimens collected in the northeast presents a puzzle. The fact that *M. ternaria* is the northernmost representative of an otherwise strictly Neotropical subgenus makes this apparent disjunction all the more anomalous. Only further collecting will show if this is a real disjunction, or a case of a common southern species being rare in the north, but present continuously from Mexico to Quebec.

Phylogeny

Figure 216 is a summary of the perceived phylogenetic relationships within *Minilimosina*, and of the putative synapomorphies proposed as evidence for these relationships. The confidence with which characters are accepted as synapomorphic varies widely with the complexity of the characters and the pattern of their occurrence or non-occurrence elsewhere in the Sphaeroceridae. For example, some characters are unique in the family and are treated as strong evidence for unique common ancestry. Characters of this type are coded (+++) on Fig. 216. The development of a long ventral flagellum on the distiphallus, reduction of tergites 3-5, and the loss of a single paramere are examples of such heavily weighted characters. Other characters seen as strong evidence for common ancestry, but more open to misinterpretation than (+++) characters, are coded (++). These are characters which occur elsewhere in the Limosininae or Copromyzinae and therefore of equivocal polarity or homology at the level used. In the absence of a clear sister group to *Minilimosina*, all possible sister groups (the rest of the Limosininae) plus the Copromyzinae (probable sister group to the Limosininae) were considered in out-group analysis. Characters uniform in the Copromyzinae, such as the retractile female abdomen, were considered plesiomorphic and therefore are ignored, even though rare in the Limosininae. Characters not found in the Copromyzinae and rare in the Limosininae were usually considered apomorphic and coded (++). Characters which occur or could occur commonly within the outgroups, such as ratios or minor chaetotaxy differences, are especially subject to non-homology within the groups considered, and determination of the polarity of these characters is subject to great uncertainty. Such characters are coded (+). Autapomorphies are not listed for terminal taxa unless they are losses of a previously considered apomorphy, in which case they are coded (-) and given the same number as the apomorphy. Although this paper has dealt primarily with New World species, Roháček (1983) has provided enough information on European species for their inclusion on Fig. 216. These are indicated by an (E).

Discussion

The picture that emerges from this analysis is one of a heterogeneous genus of questionable monophyly, made up of 3 or 4 distinct clades. One of these clades, subgenus *Amputella*, is strictly New World, primarily Neotropical. It is a distinctive and highly autapomorphic group sharing no unequivocal synapomorphy with other *Minilimosina*.

Another distinctive clade, the subgenus *Svarciella*, is similarly included in *Minilimosina* primarily on the basis of weak characters but is itself divided into distinctive subgroups. Each subgroup of *Svarciella* includes Nearctic and Palaearctic species, and the *vitripennis* group includes Holarctic and Neotropical species. The subgenera *Allolimosina* and *Minilimosina* together form the largest defensible monophyletic group in the genus. *Allolimosina* includes 2 Palaearctic, 1 Holarctic, and one New World species, but the New World species is of questionable affinity. The large subgenus *Minilimosina* also includes a Neotropical species of questionable affinity, but the rest of the subgenus consists of Nearctic, Holarctic, and Palaearctic species. Each of the well-defined subgroups of *Minilimosina* includes both Nearctic and either Holarctic or Palaearctic species.

Several important problems remain to be solved in this genus. As more of the New World genera of Limosininae are studied and become available for comparison, it will be necessary to reconsider the affinities of the subgenera *Svarciella* and *Amputella*. Cladistic analysis will eventually refute or support the inclusion of these taxa in *Minilimosina*. Another problem area is the question of eastern Palaearctic affinities. Almost nothing is known of eastern Palaearctic *Minilimosina*, a gap in our knowledge which prevents full understanding of *Minilimosina* phylogeny and zoogeography. Similarly, almost nothing is known of the biology of *Minilimosina* or most other Limosininae. It is hoped that this and similar basic taxonomic works will stimulate study of the diverse saprophagous communities dominated by Limosininae.

Acknowledgements

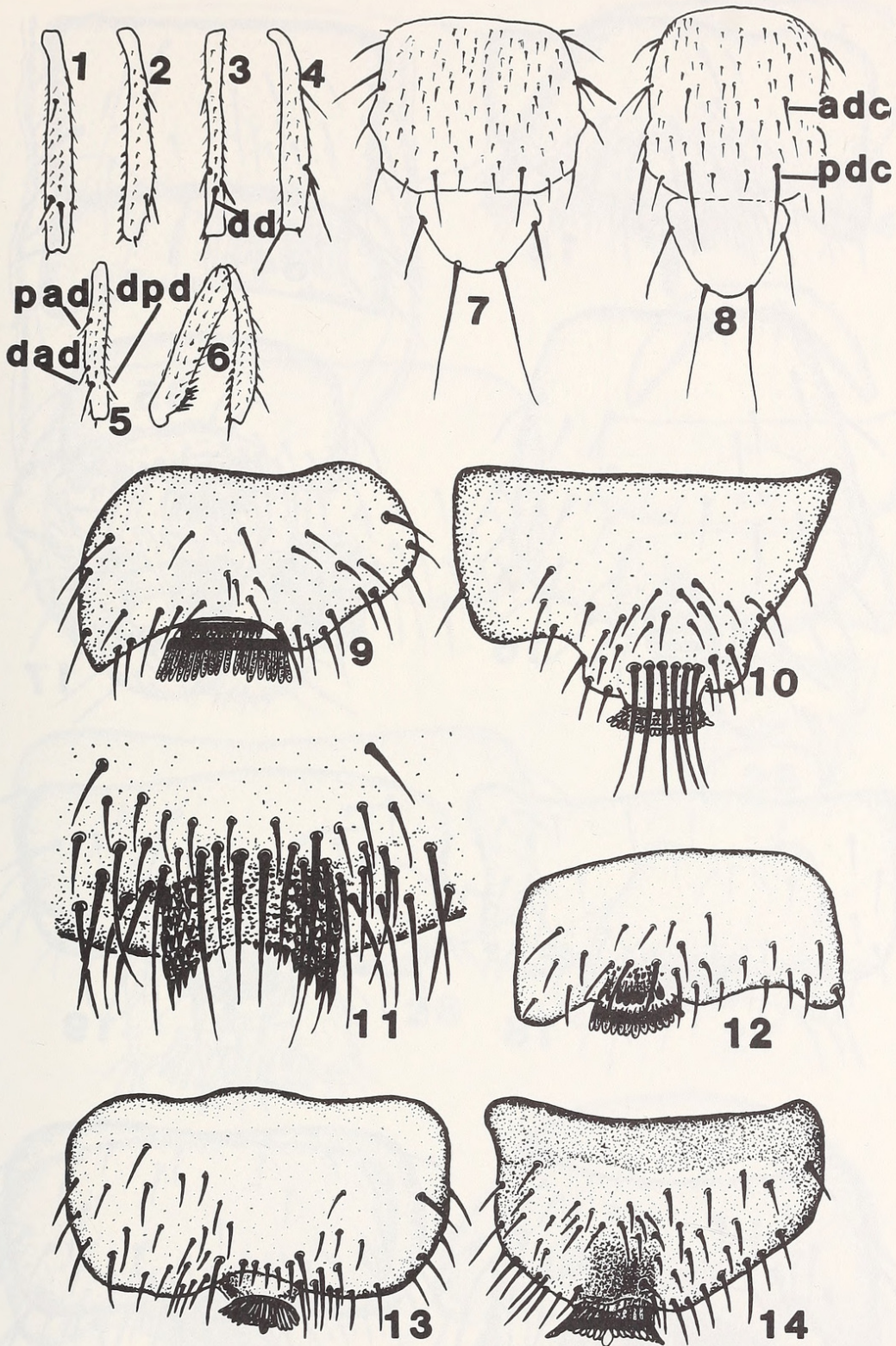
The curators of the museums listed earlier are thanked for their kindness in shipping materials, and Drs. Peck and Newton are thanked for access to their valuable pitfall trap samples. Dr. J. Roháček has been a constant source of information and advice, and he is gratefully acknowledged. Paul Forde inked the final copies of most of the drawings, and D.J. Hamilton helped lay out and photograph the plates. J. Heraty and K. Barber reviewed the manuscript. This research was funded by the National Sciences and Engineering Council of Canada.

References

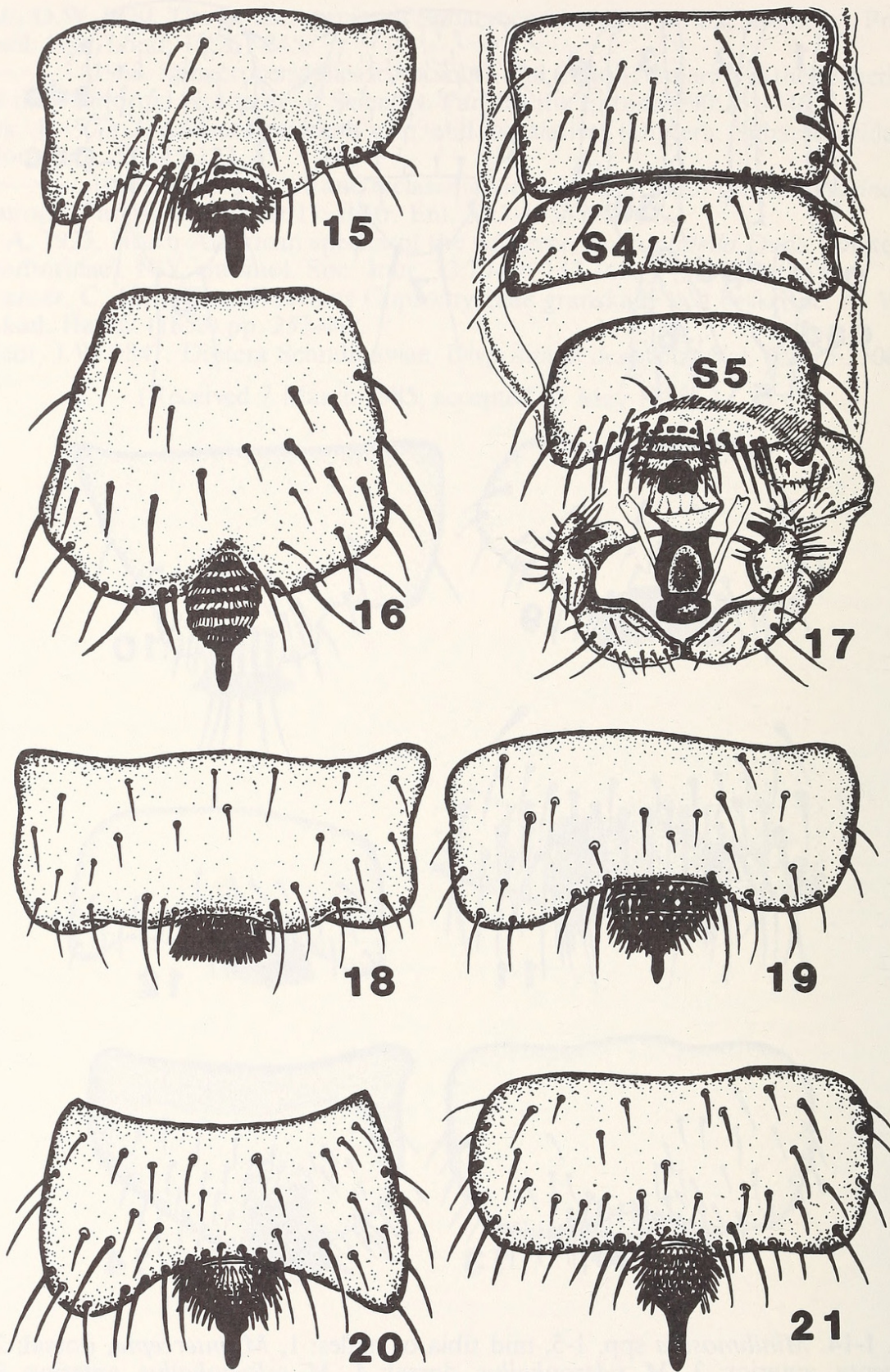
- Deeming, J.C. 1969. Diptera from Nepal. Sphaeroceridae. Bull. br. Mus. (nat. Hist.), Ent., 23:53-74.
- Duda, O. 1918. Revision der europäischen Arten der Gattung *Limosina* Macquart. Abh. zool.-bot. Ges. Wien 10:1-240.
- . 1925. Die aussereuropäischen Arten der Gattung *Leptocera* Olivier-*Limosina* Macquart (Dipteren) mit Berücksichtigung der europäischen Arten. Arch. Naturg. (A) 90:5-125.
- . 1928. Bemerkungen zur Systematik und Ökologie einiger europäischer Limosinen und Beschreibung von *Scotophilella spendens* n.sp. (Dipt.). Konowia 7:162-174.
- Haliday, A.H. 1836. British species of the dipterous tribe Sphaeroceridae. Entomologist's Mag. 3:315-336.
- Malloch, J.R. 1913. Descriptions of new species of American flies of the family Borboridae. Proc. U.S. natl Mus. 44:361-372.
- . 1914. Costa Rican Diptera collected by Philip P. Calvert, Ph.D., 1909-10. Trans. Amer. entomol. Soc. 40:1-36.
- Marshall, S.A. 1982. A review of the Nearctic Limosininae (Diptera, Sphaeroceridae), with revisions of selected genera. PhD thesis, University of Guelph.
- . 1983. A revision of the genus *Aptilotus* Mik in North America (Diptera, Sphaeroceridae). Can. J. Zool. 61:1910-1924.
- Papp, L. 1974. New species and records of Sphaeroceridae from Central Asia (Diptera). Ann. Hist.-nat. Mus. Nat. Hung. 66:251-268.

- Richards, O.W. 1930. The British species of Sphaeroceridae (Borboridae, Diptera). Proc. zool. Soc. Lond. 18:261-345.
- . 1963. Sphaerocerid flies from South and Central America in the collection of the California Academy of Sciences. Pan-Pacific Entomol 90:231-246.
- Roháček, J. 1977. *Limosina hackmani* n.sp. and its relatives (Diptera, Sphaeroceridae). Notul. ent. 57:115-123.
- . 1983. A monograph and reclassification of the previous genus *Limosina* of Europe. Part 1: Beitr. Part 11. Beitr. Ent. 33:3-195 (1983).
- Spuler, A. 1925. North American species of the subgenus *Scotophilella* Duda (Diptera. Borboridae). N.Y. entomol. Soc. Jour. 33:70-84, 147-162.
- Stenhammar, C. 1854. Skandinaviens Copromyzinae granskade och beskrifne. K. Ver. Akad. Handl. (1853) pp. 257-442.
- Zetterstedt, J.W. 1847. Diptera Scandinaviae. Disposita et descripta. Vol. 6:2475-2506.

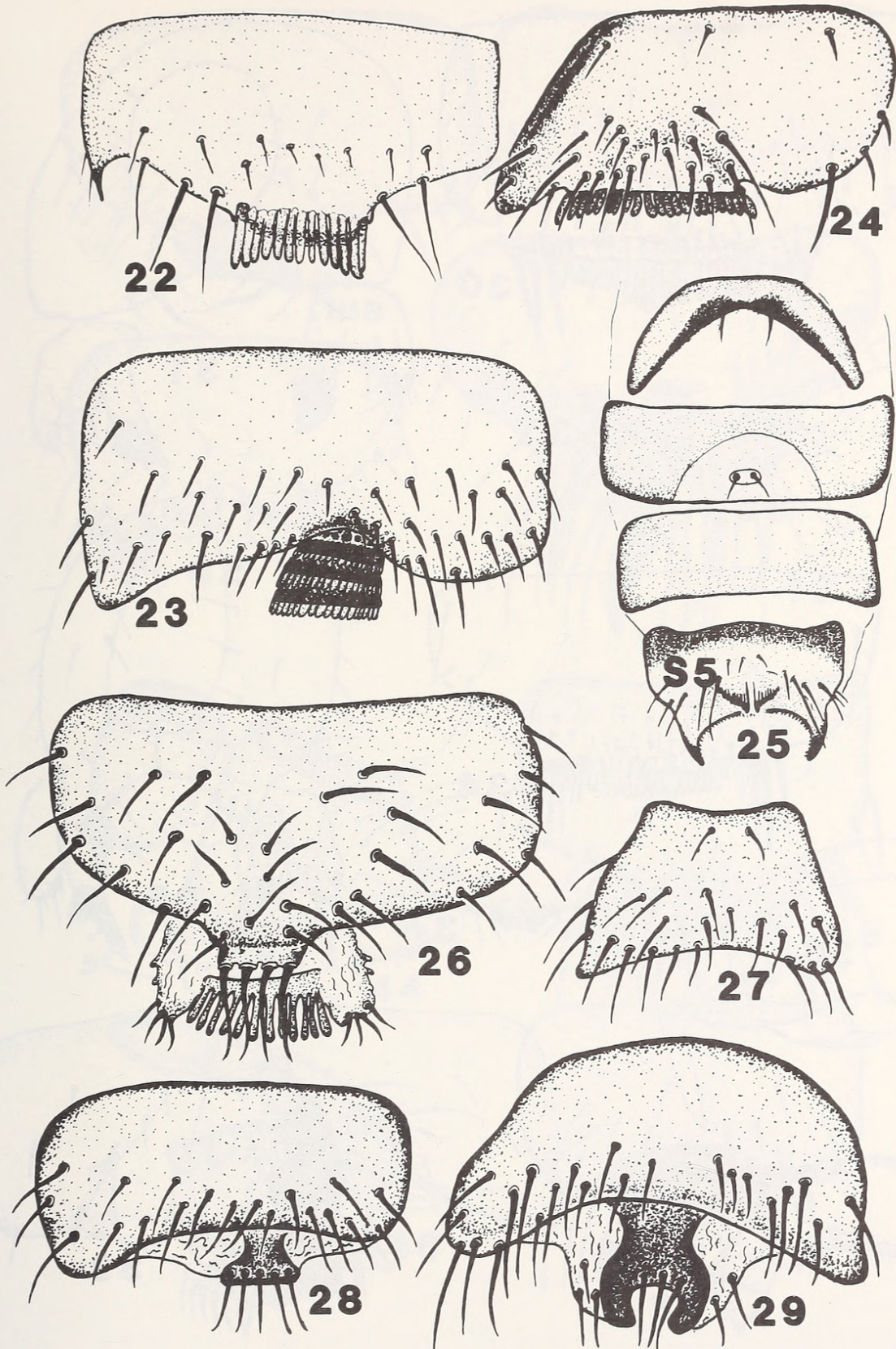
(Received 7 March 1985; accepted 25 May 1985)



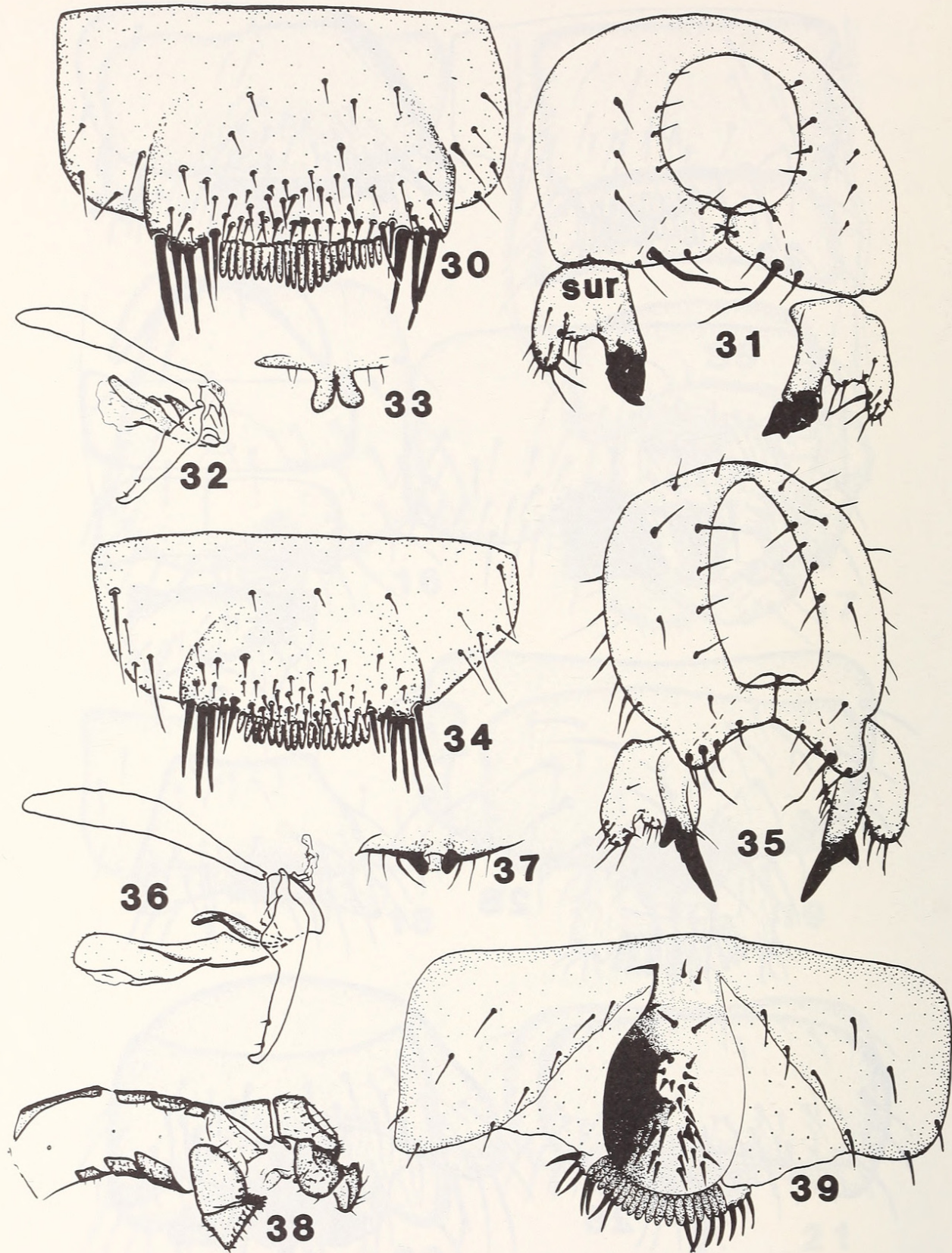
FIGS. 1-14. *Minilimosina* spp. 1-5, mid tibia of males: 1, *M. intercepta*, dorsal; 2, *M. intercepta*, anterior; 3, *M. sclerophallus*, dorsal; 4, *M. sclerophallus*, anterior; 5, *M. bistylus*, dorsal. 6, *M. bistylus*, anterior, mid femur and tibia of male. 7, *M. parvula*, mesonotum. 8, *M. vitripennis*, mesonotum. 9-14, *Minilimosina* (*Minilimosina*) spp. male sternite 5: 9, *M. parvula*; 10, *M. accinta*; 11, *M. zeda*; 12, *M. parva*; 13, *M. baculum*; 14, *M. pulpa*. Abbreviations: pad - proximal anterodorsal; dad - distal anterodorsal; dpd - distal posterodorsal; dd - distal dorsal; adc - anterior dorsocentral; pdc - posterior dorsocentral.



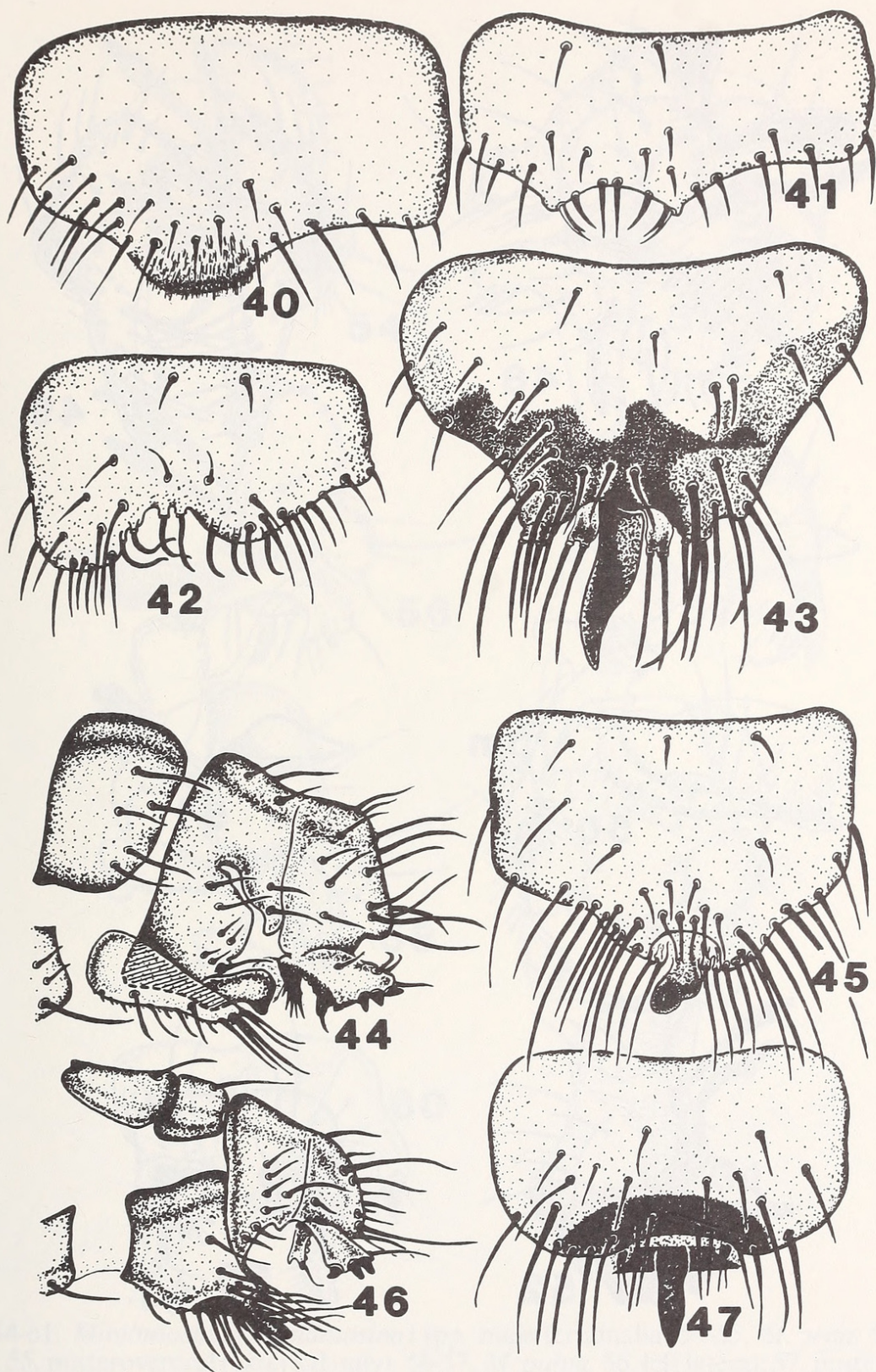
FIGS.15-21. *Minilimosina* (*Minilimosina*) spp. male sternite 5 (17 includes terminalia and sternites 3 & 4). 15, *M. trogeri*; 16, *M. nasuta*; 17, *M. lepida*; 18, *M. fungicola*; 19, *M. gemella*; 20, *M. longisternum*; 21, *M. intermedia*. Abbreviations: S4 - sternite 4; S5 - sternite 5.



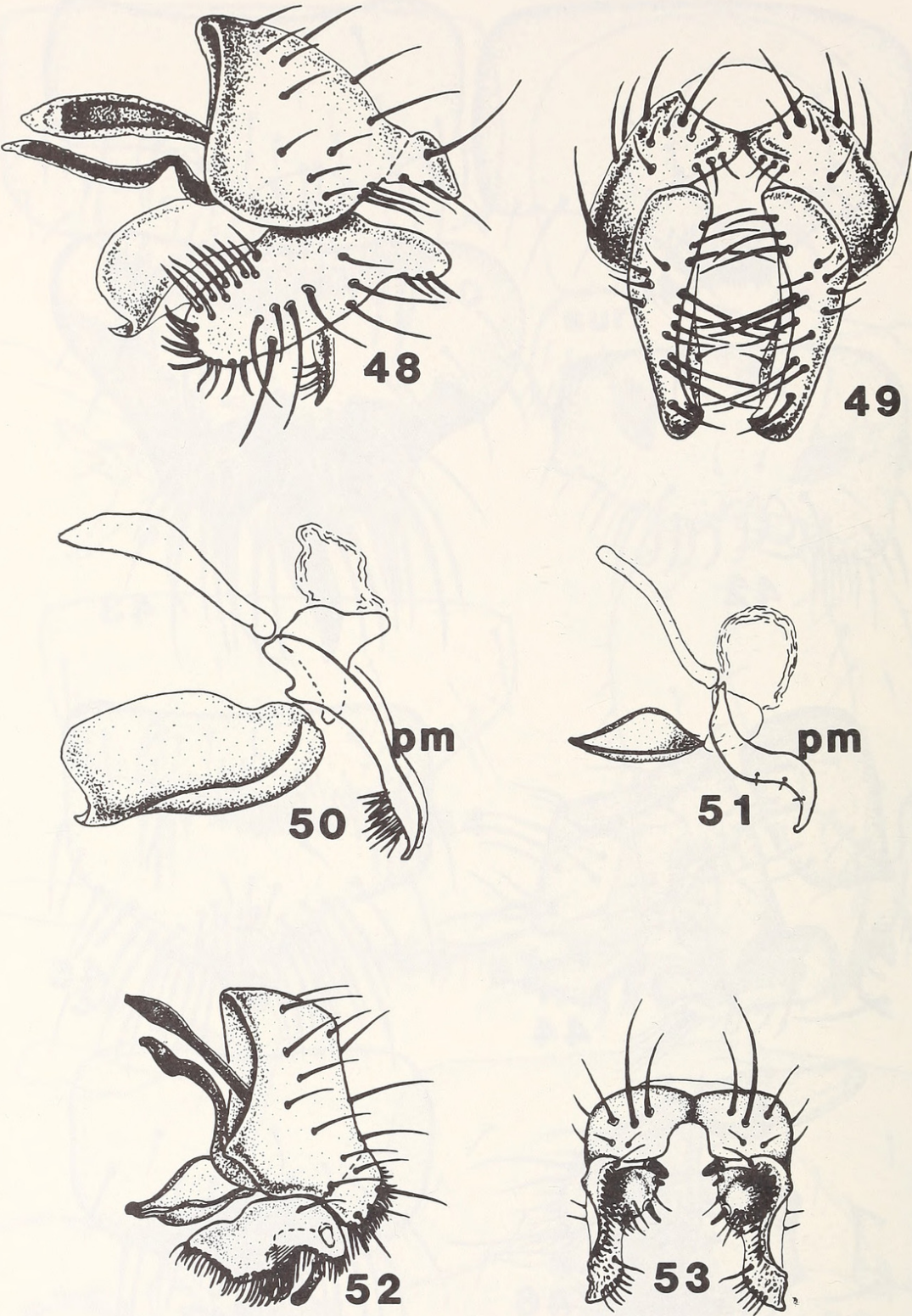
FIGS. 22-29. *Minilimosina* spp. male sternite 5 (25 is sternites 1-5). 22, *M. sclerophallus*; 23, *M. tuberculum*; 24, *M. neoalbinervis*; 25, *M. rotundipennis*; 26, *M. archboldi*; 27, *M. niveipennis*; 28, *M. contrasta*; 29, *M. vitripennis*. Abbreviations: S5 - sternite 5.



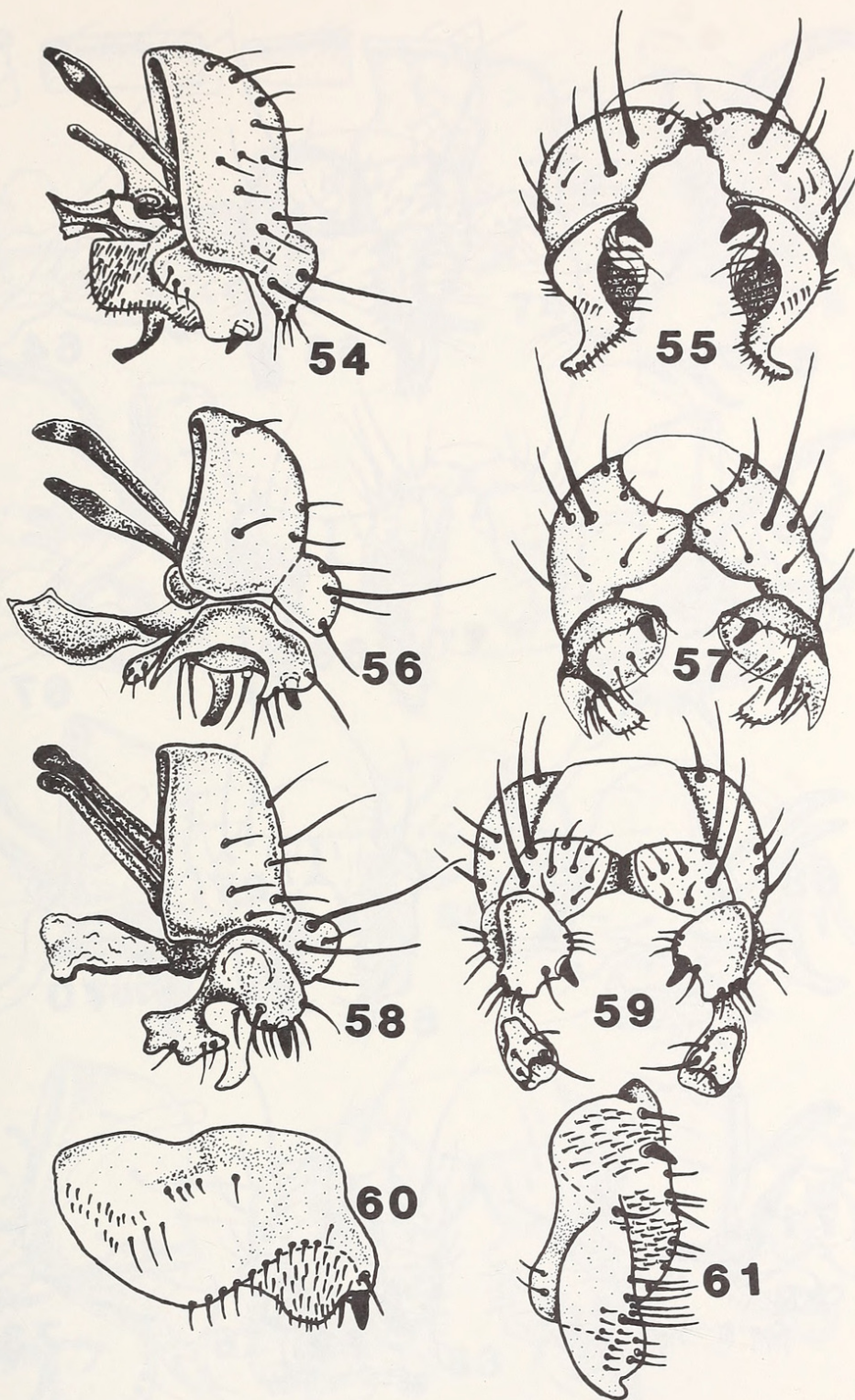
FIGS. 30-39. *Minilimosina* (*Svarciella*) spp. males. 30-33, *M. intercepta*: 30, sternite 5; 31, terminalia, posterior; 32, aedeagal complex, left lateral; 33, posteromedial margin of sternite 6. 34-37, *M. vixa*: 34, sternite 5; 35, terminalia, posterior; 36, aedeagal complex, left lateral; 37, posteromedial margin of sternite 6. 38-39, *M. dissimilicosta*: 38, abdomen, left lateral; 39, sternite 5.



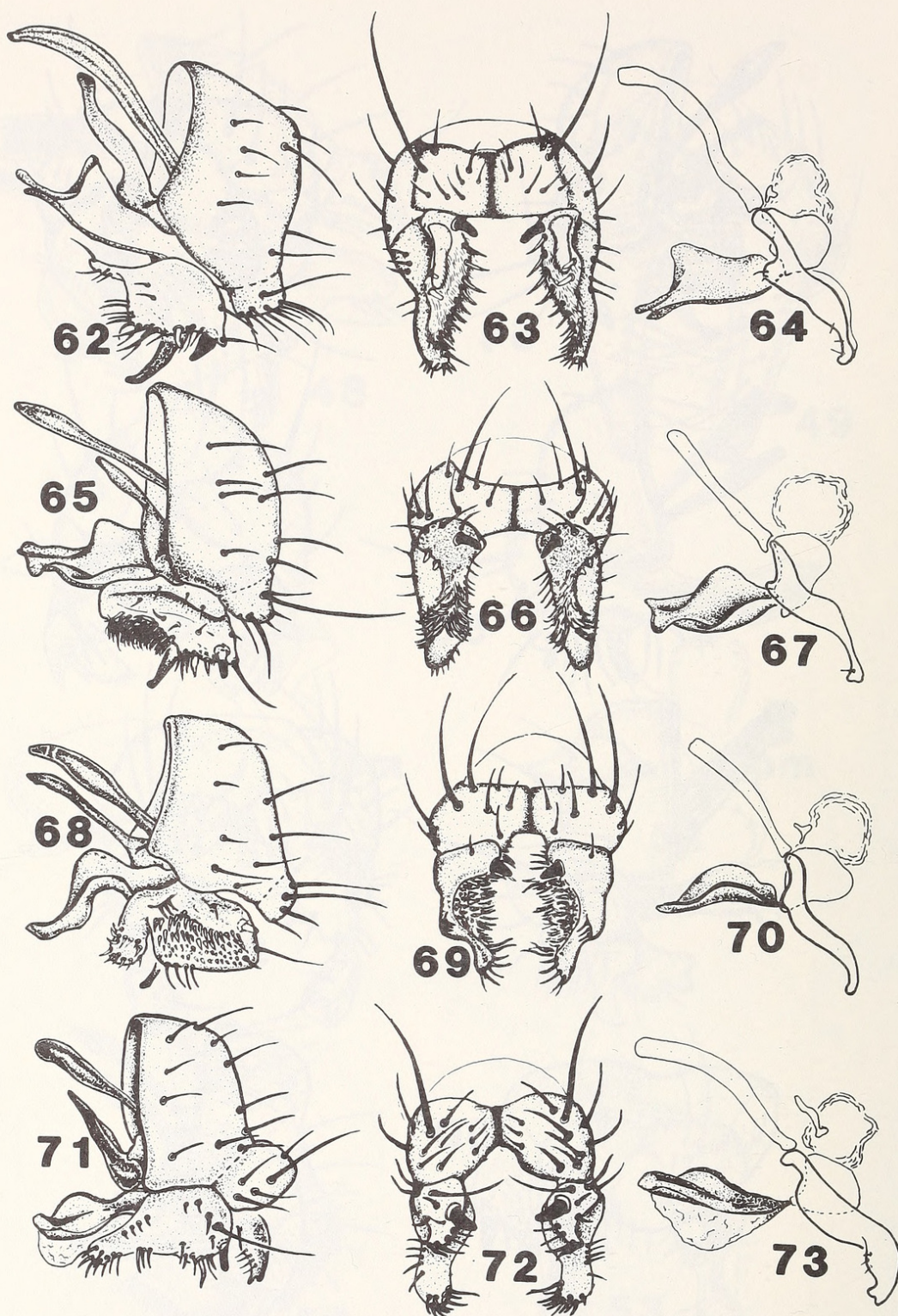
FIGS. 40-47. *Minilimosina* spp. males. 40, *M. bipara*, sternite 5; 41, *M. digitata*, sternite 5; 42, *M. ternaria*, sternite 5; 43, *M. priapismus*, sternites 5 and 6; 44, *M. erecta*, left lateral view to show terminalia and sternites 5 and 6; 45, *M. erecta*, sternites 5 and 6; 46, *M. bistylus*, left lateral view to show terminalia and sternites 5 and 6; 47, *M. bistylus*, sternites 5 and 6.



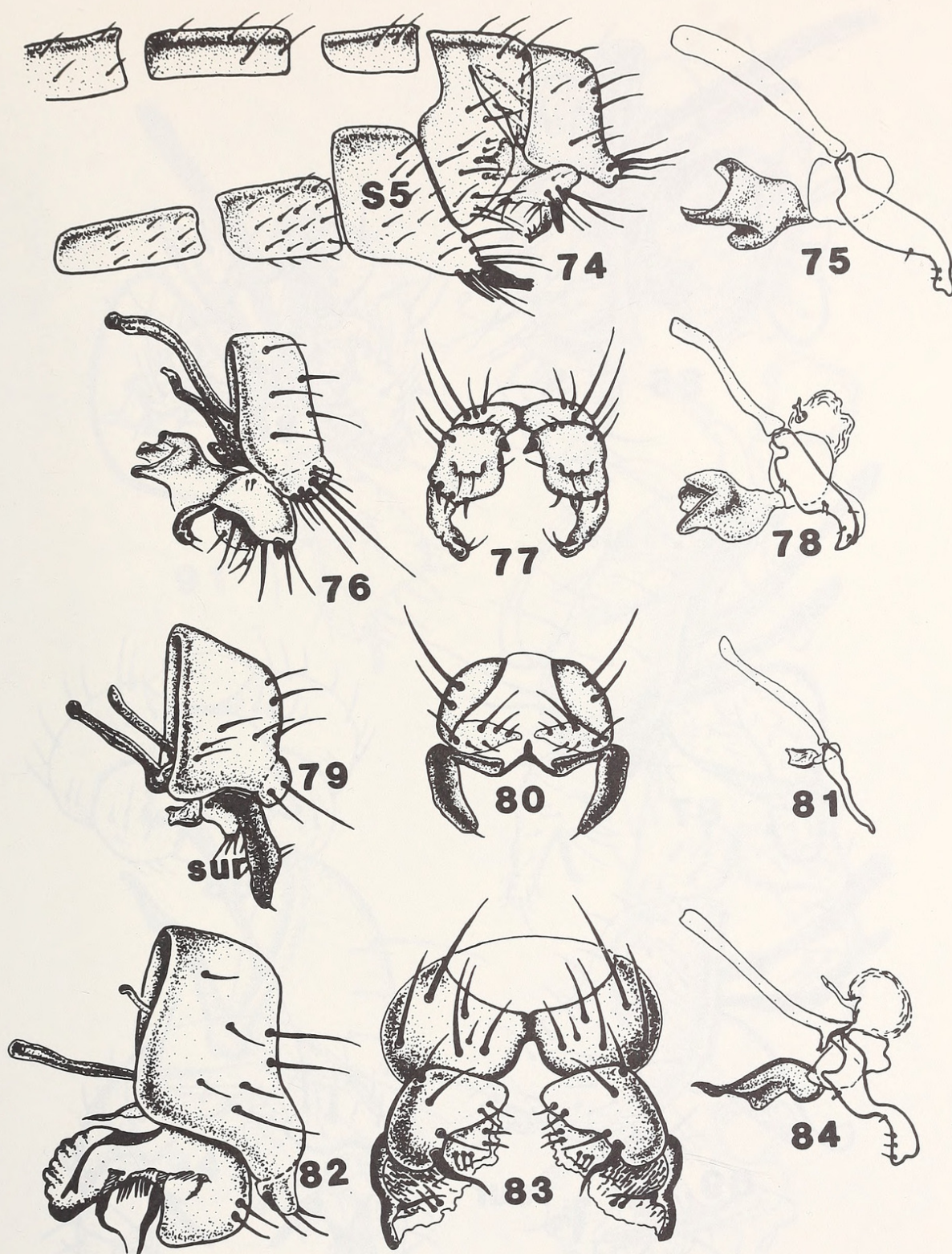
FIGS. 48-53. *Minilimosina* (*Minilimosina*) spp. male terminalia. 48-50, *M. sclerophallus*: 48, left lateral; 49, posteroventral; 50, aedeagal complex (left lateral). 51-53, *M. parva*: 51, aedeagal complex (left lateral) 1; 52, left lateral; 53, posteroventral. Abbreviations: pm - paramere.



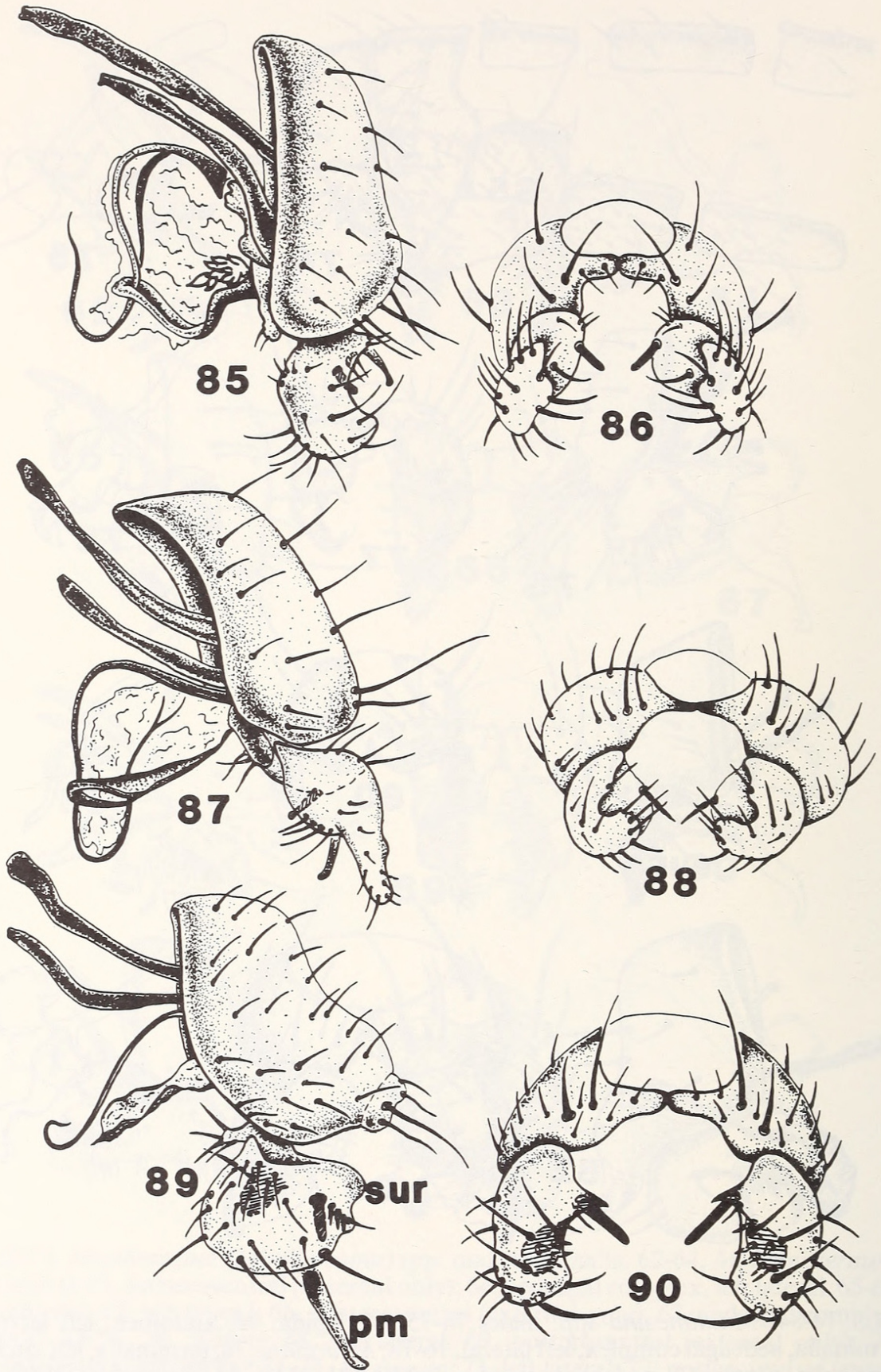
FIGS. 54-61. *Minilimosina* (*Minilimosina*) spp. male terminalia. 54-55, *M. zeda*: 54, left lateral; 55, posteroventral (external only). 56-57, *M. pulpa*. 56, left lateral; 57, posteroventral (external only). 58-59, *M. baculum*: 58, left lateral; 59, posteroventral (external only). 60-61, *M. tuberculum*, surstylus: 60, left lateral; 61, ventral.



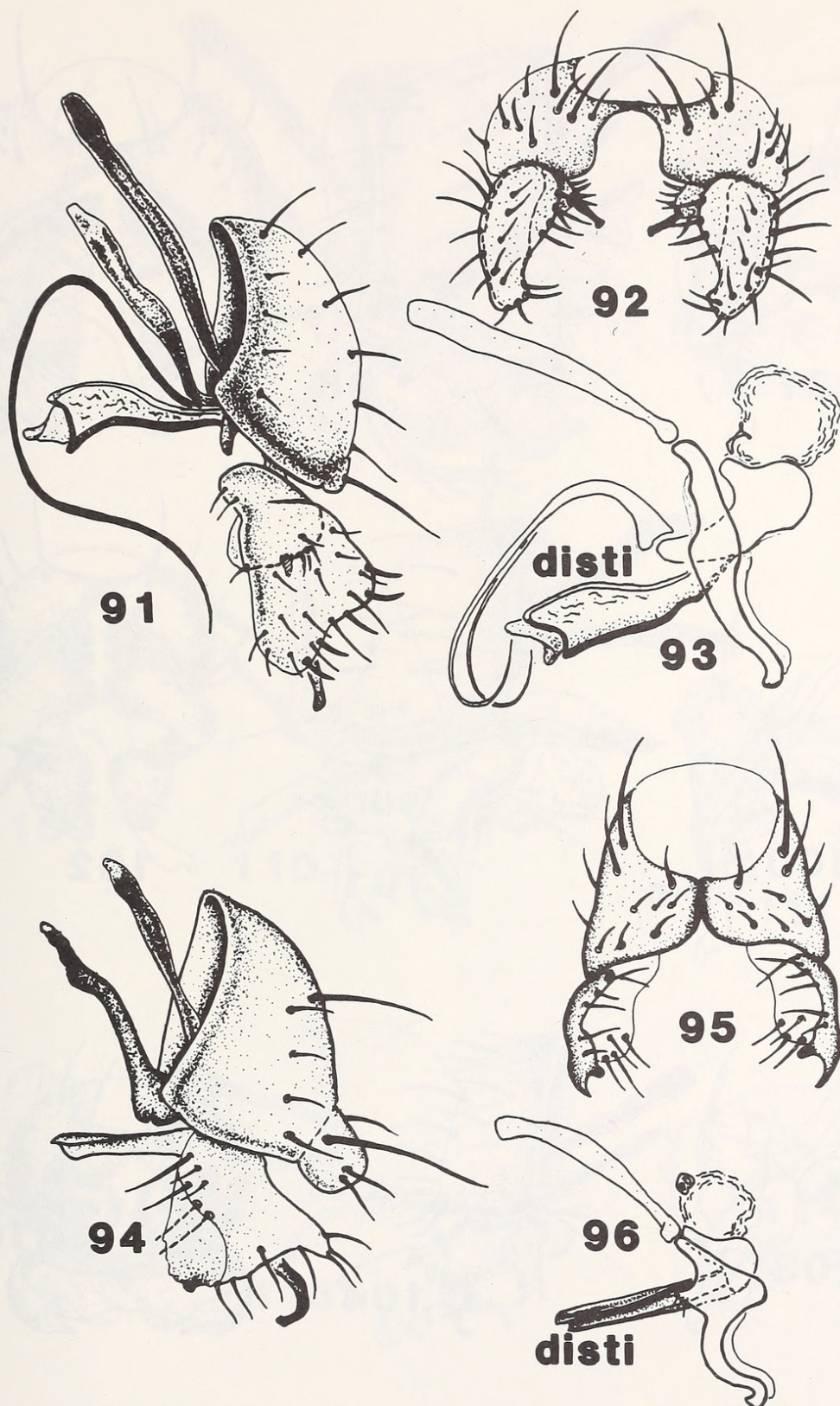
FIGS. 62-73. *Minilimosina* (*Minilimosina*) spp. male terminalia. 62-64, *M. longisternum*: 62, left lateral; 63, posteroventral (external only); 64, aedeagal complex, left lateral. 65-67, *M. intermedia*: 65, left lateral; 66, posteroventral (external only); 67, aedeagal complex, left lateral. 68-70, *M. trogeri*: 68, left lateral. 69, posteroventral (external only); 70, aedeagal complex, left lateral; 71-73, *M. nasuta*: 71, left lateral; 72, posteroventral (external only); 73, aedeagal complex, left lateral.



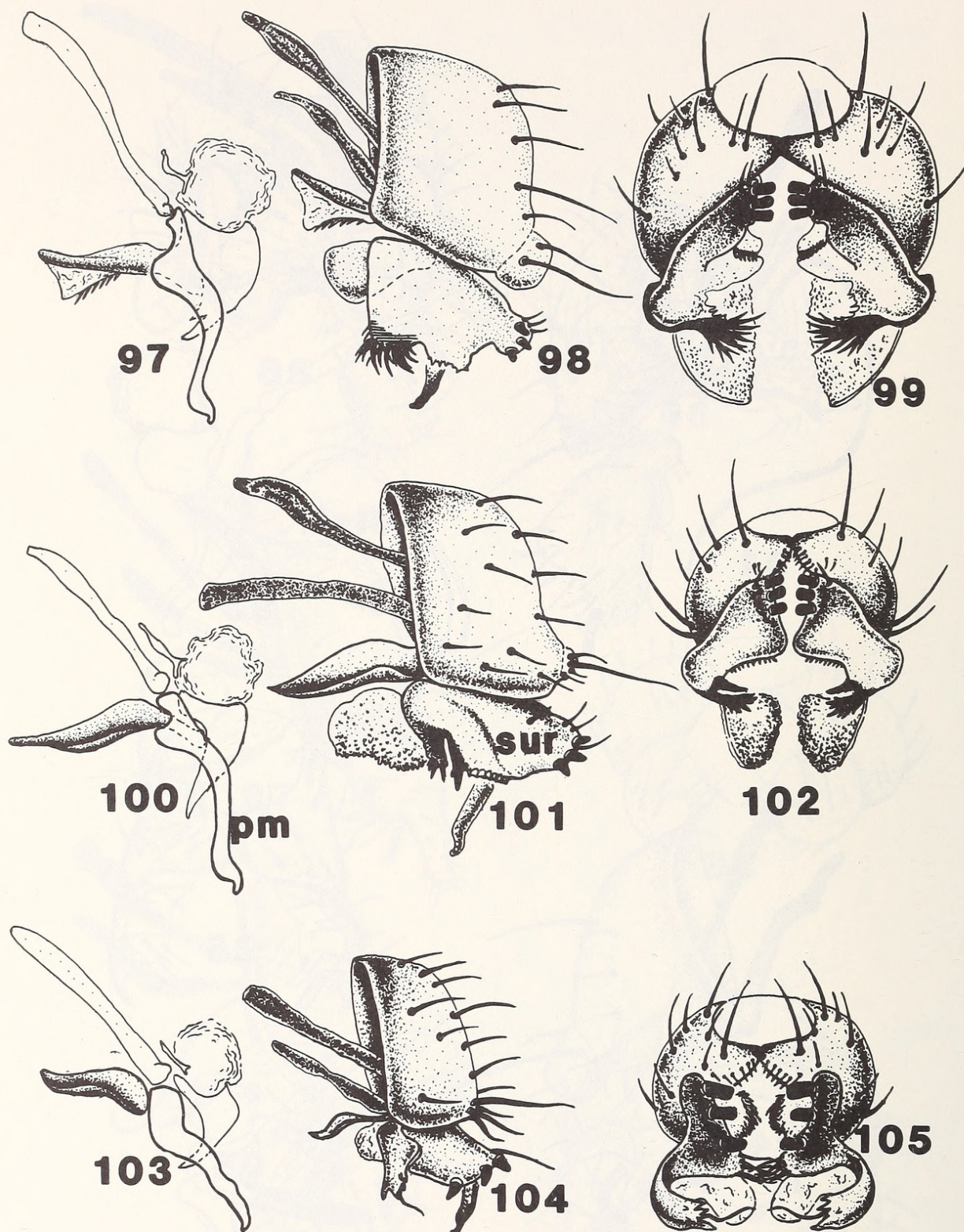
FIGS. 74-84. *Minilimosina* spp. males 74-75, *M. lepida*: 74, abdomen, left lateral; 75, terminalia, aedeagal complex, left lateral. 76-78, *M. accinta*: 76, terminalia, left lateral; 77, terminalia, ventral; 78, aedeagal complex, left lateral. 79-81, *M. rotundipennis*: 79, terminalia, left lateral; 80, terminalia, posteroventral (external only); 81, aedeagal complex, left lateral. 82-84, *M. albinervis*: 82, terminalia, left lateral; 83, terminalia, posteroventral (external only); 84, aedeagal complex, left lateral. Abbreviations: S5 - sternite 5; sur - surstylus.



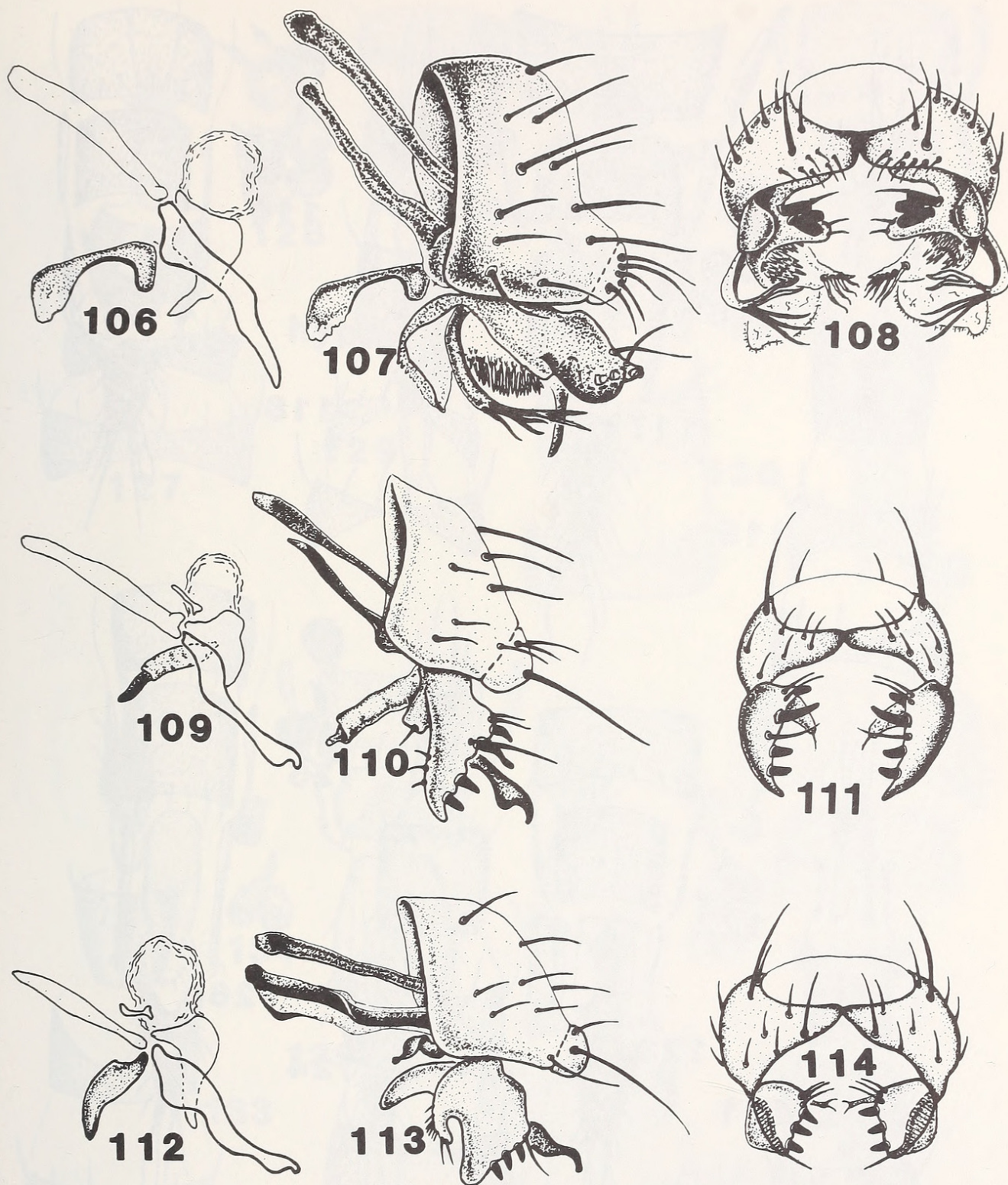
FIGS. 85-90. *Minilimosina* (*Svarciella*) *vitripennis* species group male terminalia. 85-86, *M. niveipennis*: 85, left lateral; 86, posteroventral (external only). 87-88, *M. vitripennis*: 87, left lateral; 88, posteroventral (external only). 89-90, *M. archboldi*: 89, left lateral; 90, posteroventral (external only). Abbreviations: sur - surstylus; pm - paramere.



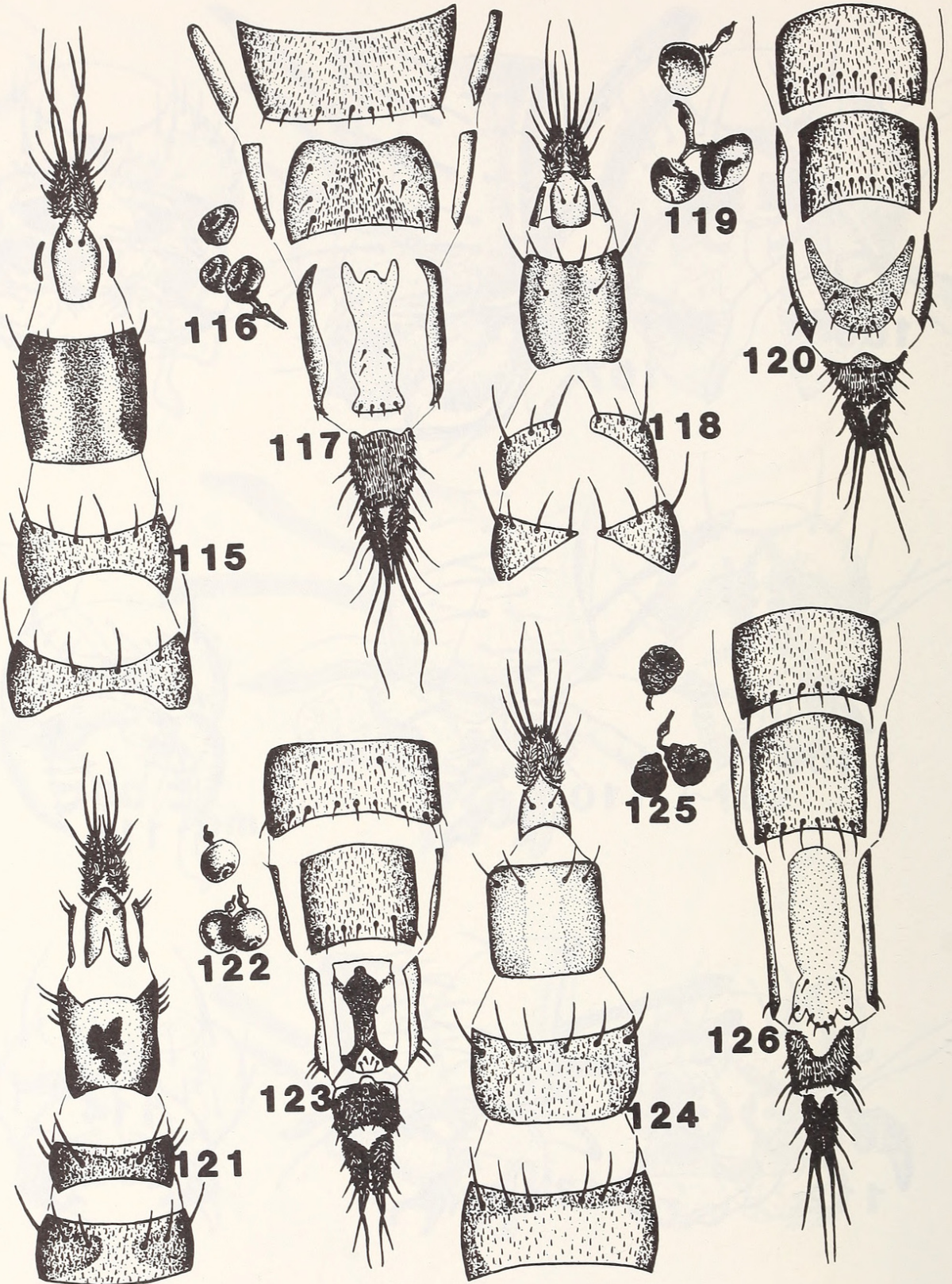
FIGS. 91-96. *Minilimosina* (*Svarciella*) spp. male terminalia. 91-93, *M. contrasta*: 91, left lateral; 92, posteroventral (external only); 93, aedeagal complex, left lateral. 94-96, *M. bipara*: 94, lateral; 95, posteroventral (external only); 96, aedeagal complex, left lateral. Abbreviations: disti - distiphallus.



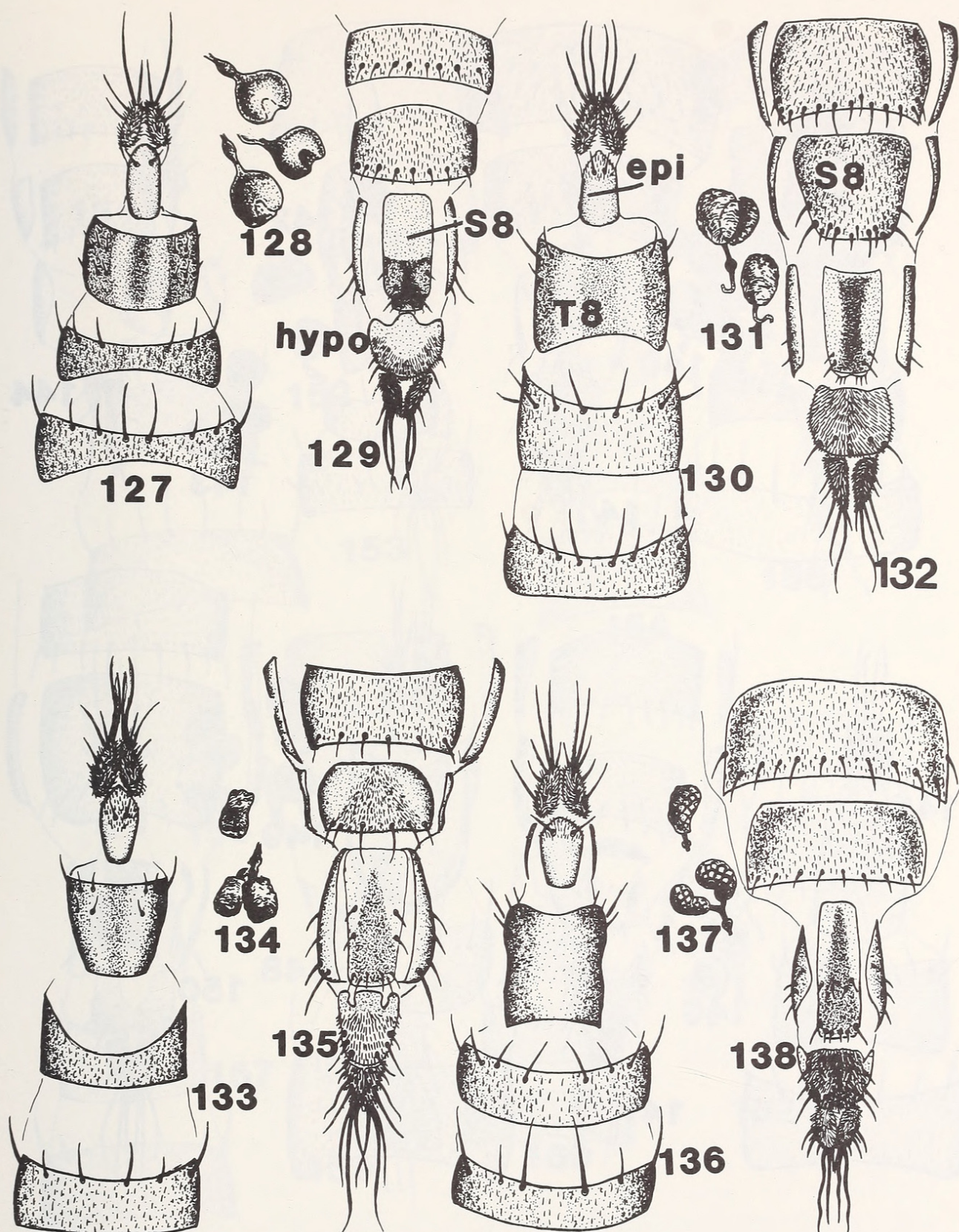
FIGS. 97-105. *Minilimosina* (*Amputella*) spp. male terminalia. 97-99, *M. priapismus*: 97, aedeagal complex, left lateral; 98, left lateral; 99, posteroventral (external only). 100-102, *M. erecta*: 100, aedeagal complex, left lateral; 101, left lateral; 102, posteroventral (external only). 103-105, *M. bistylus*: 103, aedeagal complex, left lateral; 104, left lateral; 105, posteroventral (external only). Abbreviations: sur - surstylus.



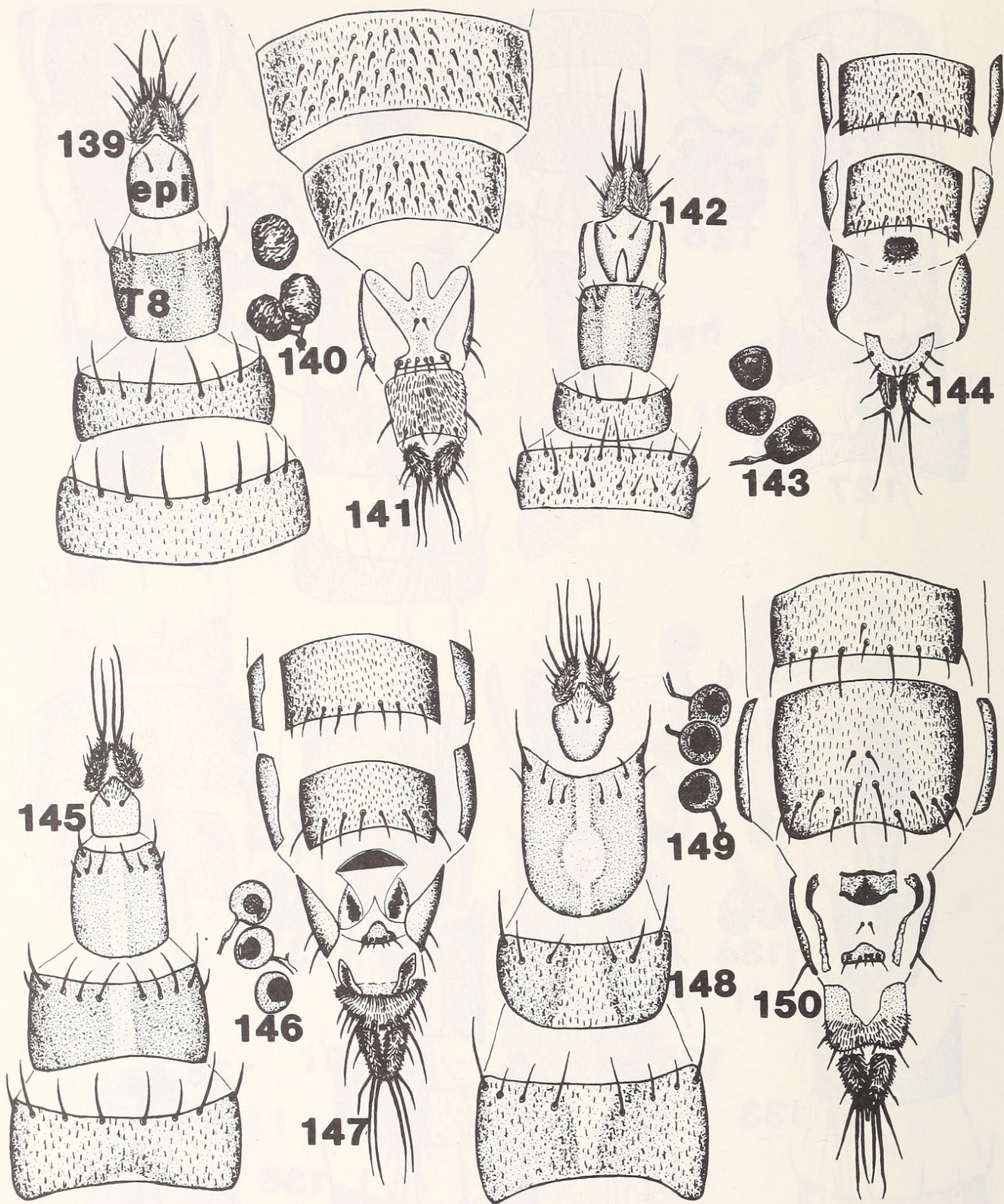
FIGS. 106-114. *Minilimosina* (*Amputella*) spp. male terminalia. 106-108, *M. curvistylus*: 106, aedeagal complex, left lateral; 107, left lateral; 108, posteroventral (external only). 109-111, *M. digitata*: 109, aedeagal complex, left lateral; 110, left lateral; 111, posteroventral (external only). 112-114, *M. ternaria*: 112, aedeagal complex, left lateral; 113, left lateral; 114, posteroventral (external only).



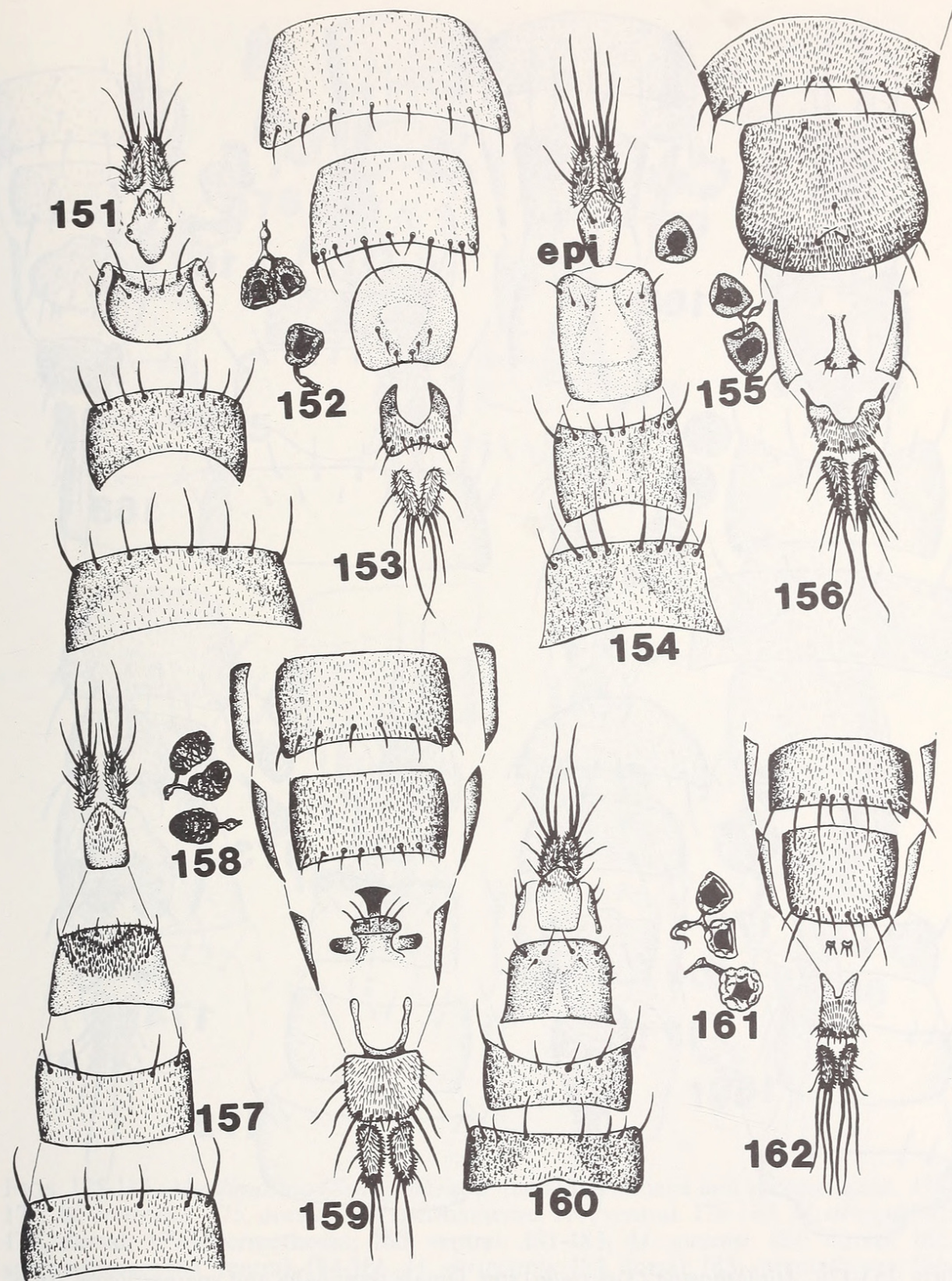
FIGS. 115-126. *Minilimosina* (*Minilimosina*) spp. female terminalia and spermathecae. 115-117, *M. longisternum*: 115, dorsal; 116, spermathecae; 117, ventral. 118-120, *M. nasuta*: 118, dorsal; 119, spermathecae; 120, ventral. 121-123, *M. parva*: 121, dorsal; 122, spermathecae; 123, ventral. 124-126, *M. sclerophallus*: 124, dorsal; 125, spermathecae; 126, ventral.



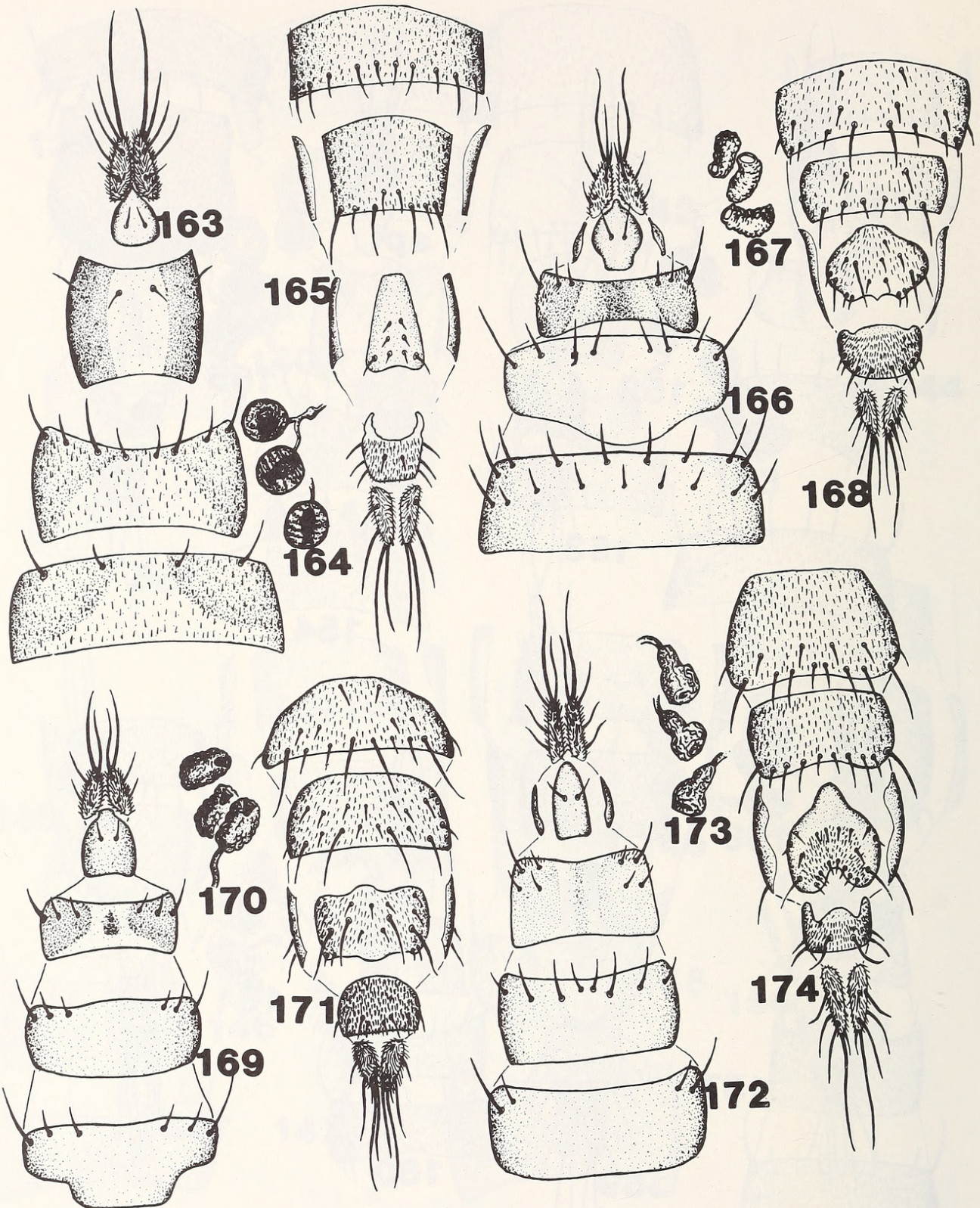
FIGS. 127-138. *Minilimosina* (*Minilimosina*) spp. female terminalia and spermathecae. 127-129, *M. trogeri*: 127, dorsal; 128, spermathecae; 129, ventral. 130-132, *M. fungicola*: 130, dorsal; 131, spermathecae; 132, ventral. 133-135, *M. gemella*: 133, dorsal; 134, spermathecae; 135, ventral. 136-138, *M. intermedia*: 136, dorsal; 137, spermathecae; 138, ventral. Abbreviations: S8 - sternite 8; hypo - hypoproct; epi - epiproct; T8 - tergite 8.



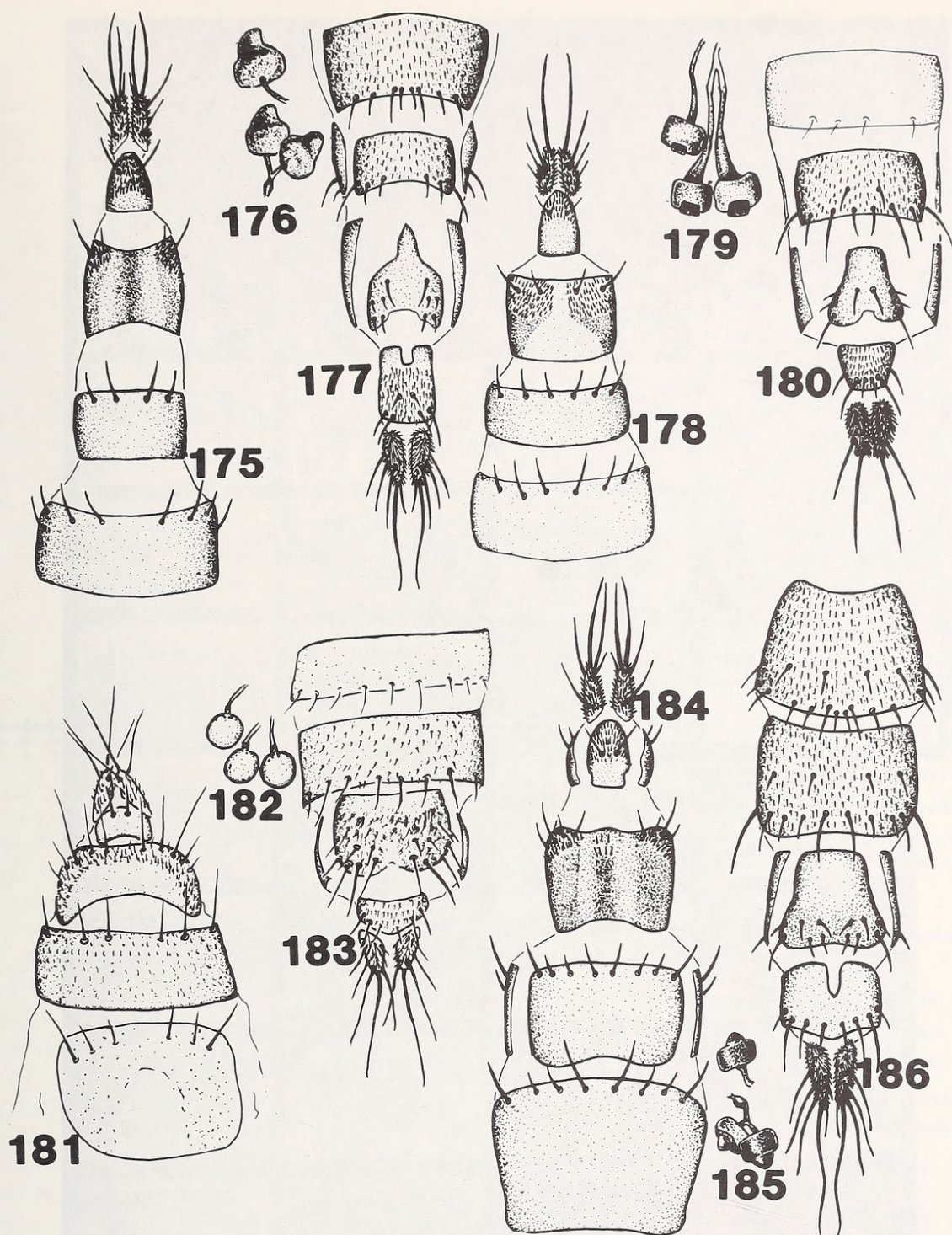
FIGS. 139-150. *Minilimosina* spp. female terminalia and spermathecae. 139-141, *M. zeda*: 139, dorsal; 140, spermathecae; 141, ventral. 142-144, *M. albinervis*: 142, dorsal; 143, spermathecae; 144, ventral. 145-147, *M. bistylus*: 145, dorsal; 146, spermathecae; 147, ventral. 148-150, *M. curvistylus*: 148, dorsal; 149, spermathecae; 150, ventral. Abbreviations: epi - epiproct; T8 - tergite 8.



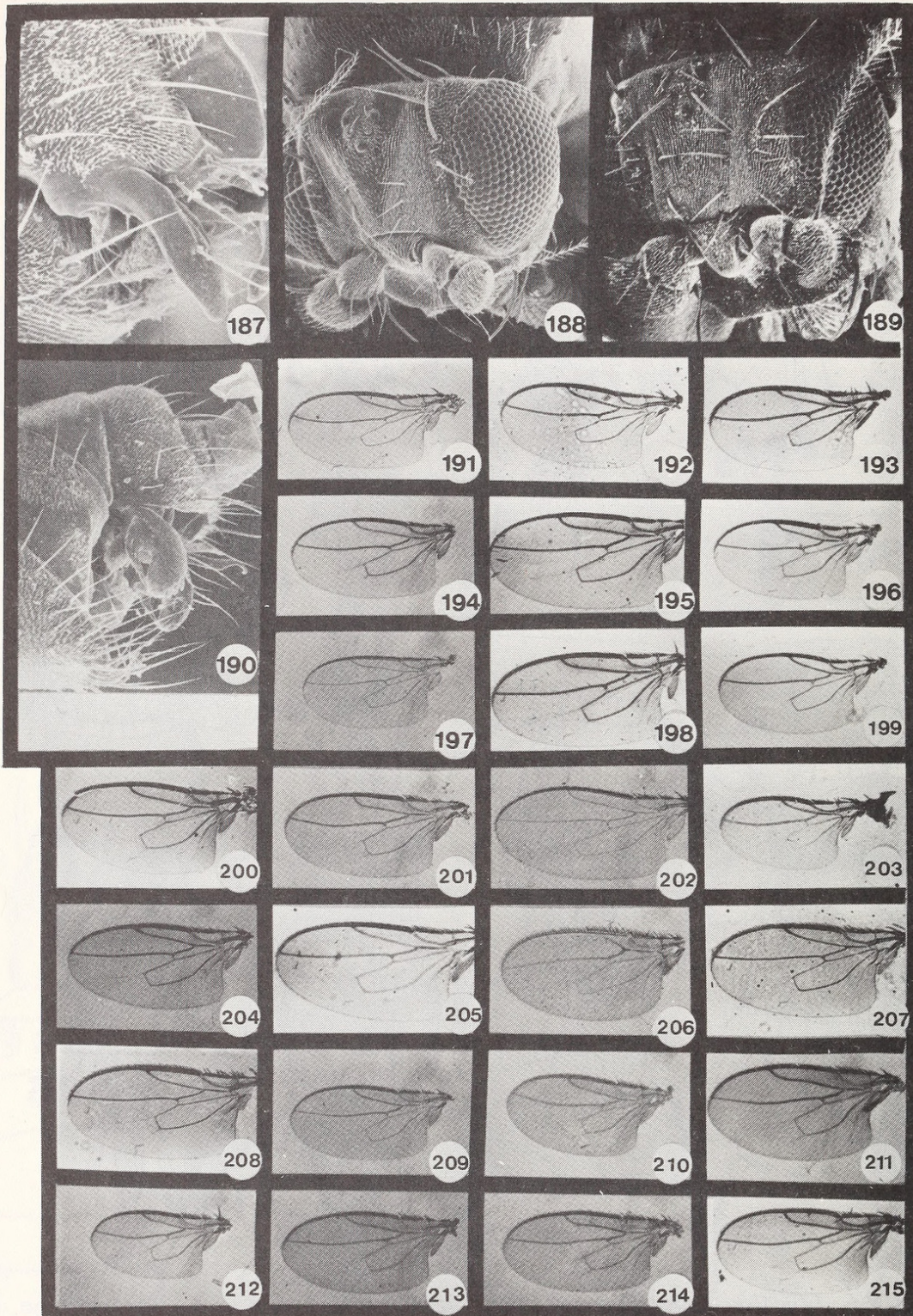
FIGS. 151-153. *Minilimosina* (*Amputella*) spp. female terminalia and spermathecae. 151-153, *M. digitata*: 151, dorsal; 152, spermathecae; 153, ventral. 154-156, *M. erecta*: 154, dorsal; 155, spermathecae; 156, ventral. 157-159, *M. priapismus*: 157, dorsal; 158, spermathecae; 159, ventral. 160-162, *M. ternaria*: 160, dorsal; 161, spermathecae; 162, ventral. Abbreviations: epi - epiproct.



FIGS. 163-174, *Minilimosina* (*Svarciella*) spp. female terminalia and spermathecae. 163-165, *M. bipara*: 163, dorsal; 164, spermathecae; 165, ventral. 166-168, *M. intercepta*: 166, dorsal; 167, spermathecae; 168, ventral. 169-171, *M. vixa*: 169, dorsal; 170, spermathecae; 171, ventral. 172-173, *M. dissimilicosta*: 172, dorsal; 173, spermathecae; 174, ventral.



FIGS. 175-186. *Minilimosina* (*Svarciella*) spp. female terminalia and spermathecae. 175-177, *M. contrasta*: 175, dorsal; 176, spermathecae; 177, ventral. 178-180, *M. niveipennis*: 178, dorsal; 179, spermathecae; 180, ventral. 181-183, *M. masoni*: 181, dorsal; 182, spermathecae; 183, ventral. 184-186, *M. vitripennis*: 184, dorsal; 185, spermathecae; 186, ventral.



FIGS. 187-215. 187, *M. rotundipennis*, male terminalia, posterolateral. 188, *M. intercepta*, head, anterodorsal. 189, *M. nasuta*, head, dorsolateral. 190, *M. ternaria*, male terminalia, left lateral. 191-215, left wings of *Minilimosina* species: 191, *M. accinta*; 192, *M. baculum*; 193, *M. trogeri*; 194, *M. longisternum*; 195, *M. fungicola*; 196, *M. gemella*; 197, *M. intermedia*; 198, *M. nasuta*; 199, *M. parva*; 200, *M. parvula*; 201, *M. sclerophallus*; 202, *M. zeda*; 203, *M. rotundipennis*; 204, *M. dissimilicosta*; 205, *M. intercepta*; 205, *M. masoni*; 207, *M. vixa*; 208, *M. vitripennis*; 209, *M. bipara*; 210, *M. bistylus*; 211, *M. curvistylus*; 212, *M. digitata*; 213, *M. erecta*; 214, *M. priapismus*; 215, *M. ternaria*.

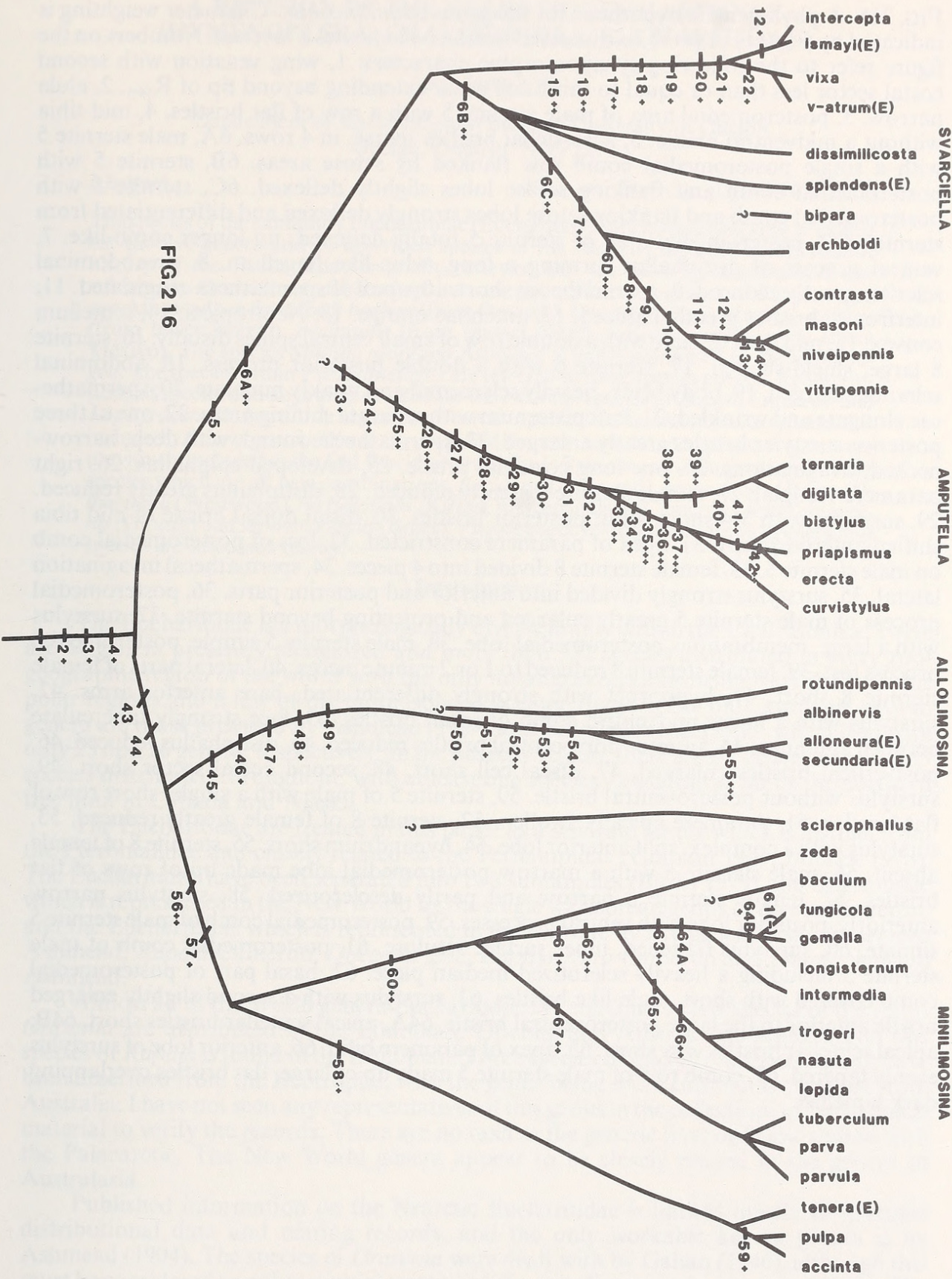


FIG. 216. A phylogenetic hypothesis for the genus *Minilimosina*. Character weighting is indicated by (+), (++) or (+++), as discussed in text; (-) indicates a reversal. Numbers on the figure refer to the following synapomorphic characters: 1, wing venation with second costal sector less than or equal to third and costa extending beyond tip of R_{4+5} . 2, alula narrow. 3, posteromedial area of male sternite 5 with a row of flat bristles. 4, mid tibia without a midventral bristle. 5, acrostichal bristles sparse, in 4 rows. 6A, male sternite 5 with a single posteromedial comb row flanked by setose areas. 6B, sternite 5 with posteromedial comb and flanking setose lobes slightly deflexed. 6C, sternite 5 with posteromedial comb and flanking setose lobes strongly deflexed and differentiated from sternite. 6D, posteromedial area of sternite 5 totally deflexed, no longer comb-like. 7, ventral process of distiphallus forming a long, whip-like flagellum. 8, preabdominal sclerites greatly reduced. 9, spermathecae short. 10, apex of spermatheca evaginated. 11, interfrontal bristles greatly reduced. 12, antennae orange. 13, Neotropical. 14, scutellum convex. 15, mid tibia of male with a double row of small ventral spines distally. 16, sternite 8 large, shield-shaped. 17, sternite 6 with a double posterior process. 18, abdominal sclerites enlarged. 19, body black, heavily sclerotized and weakly punctate. 20, spermathecae elongate and wrinkled. 21, katapisternum with separate shining areas. 22, one of three posterior surstylar bristles greatly enlarged. 23, spermathecae round, with deep, narrow-necked invaginations. 24, one long costagial bristle. 25, developed epiphallus. 26, right paramere vestigial. 27, female sternite 8 greatly reduced. 28, distiphallus greatly reduced. 29, surstylus with 3-4 short, stout posterior bristles. 30, distal dorsal bristle of mid tibia shifted anterodorsally. 31, apex of paramere constricted. 32, loss of posteromedial comb on male sternite 5. 33, female sternite 8 divided into 4 pieces. 34, spermathecal invagination lateral. 35, surstylus strongly divided into anterior and posterior parts. 36, posteromedial process of male sternite 5 greatly enlarged and projecting beyond sternite. 37, surstylus with a large, membranous posteromedial lobe. 38, male sternite 5 simple, posteromedial process lost. 39, female sternite 8 reduced to 1 or 2 minute pieces. 40, lateral parts of female sternite 8 short. 41, hypoproct with strongly differentiated, bare anterior arms. 42, surstylus with a linear midventral comb of small bristles. 43, face strongly tuberculate between antennae. 44, anterior dorsocentral bristles reduced. 45, distiphallus reduced. 46, postvertical bristles enlarged. 47, discal cell short. 48, second costal sector short. 49, surstylus without posteroventral bristle. 50, sternite 5 of male with a single, short row of flat bristles. 51, paramere apically swollen. 52, sternite 8 of female greatly reduced. 53, surstylus with a complex, split anterior lobe. 54, hypandrium short. 55, sternite 8 of female absent. 56, male sternite 5 with a narrow posteromedial lobe made up of rows of flat bristles. 57, female sternite 8 narrow and partly desclerotized. 58, surstylus narrow anteriorly, posterior lobe with ventral processes. 59, posteromedial comb of male sternite 5 sinuate. 60, surstylus flattened, inner surface setulose. 61, posteromedial comb of male sternite 5 including a heavily sclerotized median piece. 62, basal part of posteromedial comb covered with short, scale-like bristles. 63, surstylus with a second slightly enlarged bristle anterior to the large posteroventral bristle. 64A, apical scutellar bristles short. 64B, apical scutellar bristles very short. 65, apex of paramere bifid. 66, anterior lobe of surstylus evenly tapered. 67, comb row of male sternite 5 made up of large, flat bristles overlapping dark lamellae.



Marshall, Stephen A. 1985. "A revision of the New World species of *Minilimosina* Rohacek (Diptera: Sphaeroceridae)." *Proceedings of the Entomological Society of Ontario* 116, 1–60.

View This Item Online: <https://www.biodiversitylibrary.org/item/139960>

Permalink: <https://www.biodiversitylibrary.org/partpdf/117956>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In Copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.