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Manual of Neotropical Diptera. Mydidae[1]

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For general information and classification of the family, see Wilcox & Papavero (1971). Becher (1882) studied the mouthparts, Zaitlan & Larson (1984) the head and Jahn (1930) the internal anatomy. Some species are mimics of Hymenoptera, especially Pompilidae (Rothschild, 1910; Zikan, 1942; Cooper, 1981; Meyer, McKenzie & Zalom, 1984; Nelson, 1986).

Adults (at least the males) feed upon flowers (Williams (1995) also found females of *Mydas clavatus* (Drury, 1773) feeding on flowers). Alcock (1989) described the mating system of *Mydas ventralis* Gertaecker, 1868 and Gibson (1965) the oviposition of *Mydas clavatus* (Drury, 1773).

As far as known, the larvae feed upon coleopterous larvae. The oldest record may be found in Westwood (1841: 50, 51): he said that William Sharp MacLeay found *Ceriomydas tricolor* (Wiedemann, 1830) as "parasitic" on larvae of a "giant Prionidae" (Cerambycidae, Prioninae) [?maybe *Stenodontes chevrolati* Gahan, 1890], in Cuba. Walsh (1864), in Illinois, reared *Mydas tibialis* Wiedemann, 1828 from fibrous debris found in a hollow sycamore which contained coleopterous larvae. Berg (1899) mentioned that *Messiasia testaceiventris* (Macquart, 1850) was always found associated with nests of *Acromyrmex hystrix* (Latreille, 1802) and *Acromyrmex lundii* (Guérin-Méneville, 1838), so probably this species always preys upon coleopterous larvae found in the nests of *Acromyrmex*, as those of *Gauromydas* do in nests of *Atta* ants. The most informative papers on mydid biology are those of Zikan (1942, 1944). He spent several years observing the biology of a few species of mydids (especially *Gauromydas heros* (Perty, 1833), in the National Park of Itatiaia, State of Rio de Janeiro, Brazil. According to him, adult males commonly feed upon the nectar of flowers, especially *Acacia paniculata* Willdenow and *Mimosa adherens* Martius, and other Leguminosae and Compositae. Females apparently rely solely on the fatty substances accumulated in their abdomen for subistence. Zikan never observed females feeding on flowers. Male adults were found by him in the vicinity of the large nests of "saúva" ants (Hymenoptera, Formicidae, genus *Atta*), either flying around the nest or sitting on nearbly bushes and herbs. As a rule, only one male was to be seen in the neighbourhood of an ants' nest. If another male approached, an aerial battle ensued, such as happens between male hummingbirds when one invades the territory of the other. The attacks between the two mydid males are followed by brief respites, during which the two contenders keep flying, one facing the other. The attacks are then renewed, ending with the "defeat" of one of them, who leaves the field. Males seem to be attracted to areas with "saúva" nests by the sight of the large, bare, denuded earth mounds, in some cases several meters across, accumulated by the worker ants; this seems to be

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corroborated by the fact that they are also attracted to similar areas resulting from other natural causes or even to man-made mounds. Near these sites mating takes place; sometimes the males make mistakes and try to copulate with females of another species, with other males, or with the large black pompilids, which they seem to mimic (cf. Fig. 2). If the mating couple is disturbed, the female flies away very rapidly, carrying along the hanging male, until an eventual separation. The females oviposit in the inerior of the ants' nest. Zikán frequently found females with the body partially covered with earth, indicating that they were laying eggs in the loose soil of the nets's entrance. The larvae live in the "garbage pans" ["panelas de lixo"] of the *Atta* nests, where the workers accumulate the garbage from the nest and the exhausted plant medium on which the fungus *Rhozites gongylophora* Moeller is maintained by the ants. These residues of decaying plants attract several Coleoptera, especially some Melolonthidae (Dynastinae) of the genus *Coelosis* (*Coelosis bicornis* (Leske, 1779), *Coelosis biloba* (Linnaeus, 1767) and *Coelosis inermis* (Sternberg, 1908)), whose larvae feed upon the debris, a fact discovered and published by Eidmann in 1937 (confirmed also by Pardo-Locarno, Morón & Gaigl, 2006, who also give a good figure of the larva of *Coelosis biloba*). Although he reported no actual observation, Zikan believed that the mydid larvae prey upon those dynastine larvae. The mature larva (Fig. 1A) abandons the "garbage pans" and digs up the soil to a depth of 10-20 cm below the surface, where it constructs a pupation chamber. The pupal chamber or cell is always situated above the "garbage pan", sometimes quite far from it. There the pupa remains until the day of emergence of the imago. Then, with the help of its strong spines (Figs. 1B-C), the pupa makes its way to the surface, where it remains half-buried until the hottest hours of the day, when the imago finally emerges. The adult walks for some distance and climbs to a low bush or herb, where it dries its wings. The females can copulate a few moments later. Not all " saúva" nests harbour mydid larvae. The larvae are usually found in large nests with many "garbage pans". Zikan found up to 16 exuviae (of two different species of mydids) in a next of *Atta sexdens rubropilosa*. Autuori (1952, 1971) also published on the mydids associated with *Atta*. Genung (1959) found larvae of *Mydas maculiventris* Westwood, 1825 preying upon white grubs. Specimens of *Messiasia pertenuis* (Johnson, 1926), at the University of Arizona (Tucson), were reared from larvae and pupae collected at the Santa Rita Range Reserve, Arizona, from nests of the banner-tailed kangaroo rat *Dipodomys spectabilis* Merriam (Rodentia, Heteromyidae) (cf. Wilcox & Papavero, 1975: 8), and were probably preying upon larvae of scavenger beetles living in the rats' den.

Rogers & Mattoni (1993) summarized what is known about the biology of *Raphiomidas*. Hogue (1967) described the pupa of *Rhaphiomidas terminatus* Cazier, 1941 and Steinberg, Dorsett, Shah, Jones & Burk, 1998 the pupa of *Rhaphiomydas acton* Coquillett, 1891.

Key to the genera

1. Scutum and scutellum with marginal bristles. Male terminalia (cf. Yeates & Irwin, 1996: 275, figs. 44-45) comparately large, epandrium divided medianly into two thick sclerites; hypandrium absent or entirely fused to bases of gonocoxites; gonocoxites fused in midline, with narrow, posteriorly directed extentions. Spiracle scar present on female sternite 8. Proboscis elongate (length: 5.3-14.4 mm). Antennae short, flagellum of one segment of various shapes. Palpus one-segmented, palpal pit absent. Propresternum a single sclerite, pear-shaped; proprecoxal bridges present. C circumambient; r-m crossvein perpendicular to M, positioned closer to apex of discal cell than base; veins M1, M2 and R5 curving forward to join the wing margin before the wing apex; discal and m3 cells present; M3 and CuA1 united before wing margin, CuA1 + A1 fused just before margin. Abdomen elongate, cigar-shaped, tapering towards apex. Ejaculatory apodeme small, cylindrical. Female terminalia with a row of stout spines on the acanthophorites (cf. Yeates & Irwin, 1996: 280, fig. 63); acanthophorites fused to tergite 9 dorsally; tergite 9 with a median, dorsal bridge. Three poorly sclerotized, relatively small spermathecae. Length, 19-35 mm. U. S. A. (California, Arizona, New Mexico, Nevada), Mexico (Baja California Norte, Baja California Sur, Sonora). Subfamily RHAPHIOMYDINAE Williston, 1893 …….. *Rhaphiomydas* Osten Sacken, 1877

   Scutum and scutellum devoid of bristles. Epandrium lobes never thick. Spiracle scar absent on female sternite 8. Other combinations of characters ……..…… 2

2 (1) C ends in R_1, veins M_1 and M_2 present; M_1 short, almost horizontal, ending in R_5; M_2 fused with M1 for a short distance and then curved towards anterior part of wing, ending in R_5 before the wing apex; vein M3 + CuA1 present; r-m crossvein occurring approximately midway along the discal cell at 90° to the longitudinal veins it joins (Fig. 196). Second flagellomere of antennae absent (Figs. 197-198, 201-202); separate antennal insertion; lateral ocelli situated on either side of the ocellar tubercle (cf. fig. 5 of Yeates & Irwin, 1996; Fig. 197). A single occipital foramen. Mouthparts very small (Figs. 198, 201-202). Antepronotum short. Propresternum composed of two separate, rounded sclerites. Scutellum relatively large, extending posteriorly to the anterior margin of the

abdomen (Fig. 199). First tarsomere of hind leg about 5 times as long as wide (Fig. 200). First abdominal sternite small but present as a separate narrow band just behind the hind coxae. Bullae* absent on the posterolateral margins of tergite 2. Hypandrium present and separated from gonocoxites, with a deep median notch (Fig. 204). Aedeagus as in Figures 205-206. Female genitalia with a row of stout spines on acanthophorites (*cf.* Yeates & Irwin, 1996: 280, figs. 61-62; Fig. 207), these pressed to tergite 9 dorsally; tergite 9 with a dorsal, median ridge. Furca narrow and elongate, with a posterior ventral scoop. Spermathecae as in Figure 208 (Chile). Subfamily MEGASCELINAE Cazier, 1941 ..... *Megascelus* Phlippi, 1865

C either circumambient or ending in R5 or ending in M1. M1 and M2 both present, but never as above, or completely fused; M3 + CuA1 present or absent; r-m crossvein close to the apex of the discal cell and at an acute angle to the adjoining proximal region of M. Second flagellomere of antennae present. Antennal insertions very close together, so close that the borders of the articulations are confluent (cf. Fig. 3 of Yeates & Irwin, 1996). Ocellar tubercle takes the form of an elongate side. A dorsal and a ventral occipital foramen. Mouthparts large. Antepronotum elongate, contributing to the general lengthening of the cervical region. Propresternum pear-shaped. First tarsomere of hind legs about 5 times as long as wide, or shorter. Sternites of the first two abdominal tergites either fused or the sternite of segment 1 has been lost. Bullae* present on the posterolateral margins of tergite 2 in both sexes (Figs. 47-60). Hypandrium either present, but fused with the anterior ventral margin of the gonocoxites, or absent or perhaps completely fused with the gonocoxites. Female genitalia variable. Furca not as above; if narrow and elongate (*Apiophora*), then without a posterior ventral scoop ……...…….……...…….. 3

3 (2). First tarsomere of hind leg usually 5 times as long as wide …..... 4

First tarsomere of hind leg never 5 times as long as wide ….....……. 6

4 (3). C ends beyond apex of M2; veins M1 and M2 separate, M1 ends in R1 and M2 ends in C, above the wing apex; R4 fused to R5 apically; M3 + CuA1 absent, i. e., cell m3 not petiolate (Fig. 3). Proboscis from very short (shorter than length of subcranial cavity) to very elongate (Fig. 4). Scape 3 times as long as pedicel (Figs. 5, 11, 25). Katatergite convex, bare of hairs. Hind femur not clavate (Fig. 6) and hind tibia cylindrical. Anatergite long and densely pilose. Abdominal bulla as in Fig. 52. Male terminalia as in Figs. 65-68 (see also Artigas & Palma, 1979: figs. 108-125, 138-139, 140-145). Female genitalia with spines on acanthophorites (Fig. 69). Female spermathecae (Figs. 69-70) reduced only to central capsule; genital furca as in Figs. 69-70 (see also Artigas & Palma, 1979: figs. 75-80). Length, 11-19 mm. (Chile, Argentina). Subfamily DIOCHLISTINAE Bequaert, 1963 ..... *Mitrodetus* Gerstaecker, 1868

Veins M1 and M2 completely fused, i. e., only one vein enters C between the apex of wing and apex of R1. Scape at most two times as long as pedicel. Other combinations of characters. Subfamily ECTYPHINAE Wilcox & Papavero, 1971 5

5 (4). Prementum subequal in length to subcranial cavity, labella short and slightly wider than mentum. Cell r4 usually closed and short petiolate. Hind tibia with slender apical spur and several bristles; spur small in females of some species. Bulla as in Fig. 53. Male terminalia as in Figs. 71-73. Female genitalia with spines on acanthophorites (Fig. 74). Female spermathecae and furca as in Figs. 74-75. Length, 18-25 mm. (U. S. A., Mexico) .... *Opomydas* Curran, 1934

Prementum about one-half length of subcranial cavity, labella attached to prementum near its midpoint and subequal in length to subcranial cavity (Fig. 10). Cell m4 usually broadly open. Hind tibia with apical spur and a bristle at base. Hypandrium fused only basally to gonocoxites, gonostyli absent (Figs. 76-78). Female genitalia with spines on acanthophorites (Fig. 79). Female spermathecae and furca as in Figs. 79-81. Length, 22-29 mm (U. S. A., Mexico) .... *Heteromydas* Hardy, 1944

6 (3). Cell r4 open, usually very widely open 7

Cell r4 closed, or closed and petiolate …..... 11

7 (6). Hind tibia cylindrical (Fig. 211). (Northeastern Brazil, Chile). (Subfamily RHOPALIINAE Papavero & Wilcox, 1974) ... 8

Hind tibia with ventral keel (carinate). (Southern Brazil, Chile, Argentina). (Subfamily APIOPHORINAE Papavero & Wilcox, 1974) …..... 9

8 (7). Vein CuA1 + M3 present, i. e., cell m3 closed and petiolate. Labella almost half length of subcranial cavity. Bulla as in Fig. 51. Male terminalia as in Artigas & Palma (1979: figs. 99-104, 146-149). Female spermathecae as in Figs. 82-84 (see Artigas & Palma, 1979: fig. 82). Length, 11-17 mm. (Chile) ..... *Midacritus* Séguy, 1939

Vein CuA1 + M3 absent, i. e., cell m3 open (Fig. 212). Prementum short and attached to middle of labella, which is slightly shorter than length of subcranial cavity. Bulla as in Fig. 60. Male terminalia as in Figs. 85-87. Female genitalia with spines on acanthophorites (Fig. 88). Female spermathecae as in Figs. 88-89. Length, 10-14 mm.

(Northeastern Brazil) ……..……..... *Pseudorhopalia* Wilcox & Papavero, 1971 [Fig. 201-204]

9 (7). Katepimeron pilose (Fig. 214). Antennal flagellomere of a vivid reddish-orange color (Fig. 213). Abdomen beautifully shining blue, deeply punctate (Fig. 215). Alula with fringe of squamose hairs (Fig. 216). Bulla as in Fig. 56. Female tergite 10 with hairs. Female spermathecae as in Artigas & Palma (1979: figs. 81, 83). Male terminalia as in Figs. 90-92 and Artigas & Palma (1979). Length, 18-23 mm. (Chile: Coquimbo to Talca) .... *Paramydas* Carrera & d'Andretta, 1948

Katepimeron bare. Female tergite 10 with spines on the acanthophorites. Other combinations of characters 10

10 (9). Anal lobe of wing less than ½ as broad as long and alula with fringe of short, fine hairs (Fig. 217). Hind femur of male 4-4.5, of female 4.5-5 times as long as broad. Bulla as in Fig. 47. Male terminalia as in Figs. 93-95 and as in Artigas & Palma (1979: figs. 93-98, 134-137). Female spermathecae as in Artigas & Palma (1979: figs. 84-86). Length, 14-19 mm. (Chile: between provinces of O'Higgins and Malleco) …..... *Apiophora* Philippi, 1865 [Figs. 209-210]

Anal lobe of wing about as broad as long. Alula with dense fringe of squamose hairs. Hind femur of male 6, of female 7 times as long as broad. Bulla as in Fig. 49. Male terminalia as in Figs. 96-98. Length, 21-28 mm. (Brazil: Santa Catarina) …..... *Eumydas* Wilcox & Papavero, 1971

11 (6). Hind tibia cylindrical. (Americas). Subfamily MYDINAE Latreille, 1809 …..... 12

Hind tibia with ventral keel (carinate). Subfamily LEPTOMYDINAE Papavero & Wilcox, 1974) 23

12 (11). Prementum about one half length of subcranial cavity, labella attached to prementum near its midpoint and subequal in length to subcranial cavity. Anterior margin of subcranial cavity situated at about two-fifths distance from lower eye margin to base of antennae …..... 13

Prementum subequal in length to subcranial cavity, labella attached to prementum near its apical one-half, and extending out at about a 90º angle (Fig. 8). Anterior margin of subcranial cavity level with lower eye margin 14

13 (12). Antenna short, first flagellomere widened apically and subequal in length to scape and pedicel together; second flagellomere as long as the three preceding segments (Fig. 18). Vein M3 + CuA1 absent. Bulla as in Fig. 48. Male terminalia as in Figs. 99-101. Female genitalia only with hairs (Figs. 102-103). Female spermathecae and furca as in Figs. 102-103. Length, 20-27 mm. (Guiano-Brazilian subregion) Tribe DOLICHOGASTRINI Papavero & Wilcox, 1974 ……..... *Dolichogaster* Macquart, 1848

First flagellomere of antenna slender and at least twice as long as scape and pedicel together; second flagellomere shorter than three preceding segments (Figs. 21-23). Vein M3 + CuA1 present. Bulla as in Fig. 50. Male terminalia as in Figs. 104-133. Female genitalia without spines. Female spermathecae as in Figs. 134-135. Length, 15-29 mm. (U. S. A.: Arizona, to Argentina: Buenos Aires). Tribe MESIIASIINI Papavero & Wilcox, 1974 ..... *Messiasia* d'Andretta, 1951

14 (12). Facial gibbosity about as broad as high. Female tergite 9 narrower apically than basally. Male terminalia with simple, or bifid and falciform, gonostyli. Length, 15-60 mm. (North and South Americas). Tribe MYDINI Latreille, 1809 …..... 15

Facial gibbosity about one and one-half times as broad as high (Fig. 7). Bulla as in Fig. 57. Female tergite 9 wider apically than basally, fluted (Figs. 64, 139). Male terminalia as in Figs. 136-138, with bifid gonostyli. Female spermathecae and furca as in Figs. 139-141. Length, around 21 mm. (U. S. A., Mexico). Tribe PHYLLOMYDINI Papavero & Wilcox, 1974 ....…….....*Phyllomydas* Bigot, 1880

15 (14). Hind tibia with ventral keel underdeveloped, visible only on the basal half (or less) of the tibia; apical spur on hind tibia underdeveloped, always shorter than width of first tarsomere (still shorter, almost absent, in female). Epandrium trapezoidal. Female spermathecae and furca as in Figs. 150-151. Length, 20-40 mm. (Neotropical, except Chile). Subtribe PROTOMYDINA Wilcox, Papavero & Pimentel, 1989 ..... *Protomydas* Wilcox, Papavero & Pimentel, 1989

Hind tibia with well-developed, very evident ventral keel, all along its length; apical spur of hind tibia well-developed in both sexes (longer in males), always longer than width of first tarsomere (up to two times as long as width of first tarsomere). Epandium trapezoidal, subtrapezoidal, or triangular 16

16 (15). Mesonotum without a definite pollinose pattern of stripes or spots (Americas). Subtribe MYDINA Latreille, 1809 ... 17

Mesonotum with a very evident pattern of pollinose stripes or spots. (Neotropical, except Chile). Subtribe STRATIOMYDINA Wilcox, Papavero & Pimentel, 1989 …..... 21

17 (16). First tarsomere of hind leg long, at least subequal in length to tarsomeres 2-3 and always longer than tarsomere 5 18

First tarsomere of hind leg not very long, subequal in length to tarsomere 2 and always shorter than tarsomere 5 …..... 19

18 (17). Second flagellomere of antenna about six times as long as wide or more. Female spermathecae and furca as in Figs. 152-154. (Neotropical, except Chile) …..... *Gauromydas* Wilcox, Papavero & Pimentel, 1989

Second flagellomere about four times as long as wide or less (five times in *Mydas boonei* Curran) (Figs. 26, 27, 28). Female spermathecae as in Figs. 155-156. Mexico, extending into Nearctic region) ..... *Mydas* Fabricius, 1794

19 (17). No strong, differentiated bristles on legs. Fore tibia with a dense patch of black and orange red hairs. Alula broad, with a long, dense fringe of squamose hairs. Abdomen entirely cupreous-red, as wide as thorax. Male terminallia as in Figs. 157-159. Female spermathecae as in Figs. 161-162. Length, 29-32 mm. (Surinam, Brazil: Pará) .... *Mapinguari* Papavero & Wilcox, 1974

Tibia with well-developed bristles. Other combinations of characters …..... 20

20 (19). Alula narrow, with a short, sparse fringe of hairs. Abdomen slender, narrower than thorax, mostly black, sometimes constricted in the middle. Male terminalia as in Figs. 163-168. Female spermathecae as in Figs. 169-170. Length, 20-27 mm. (Neotropical, except Chile) …..... *Ceriomydas* Williston, 1898

Alula broad, with dense fringe of squamose hairs (Fig. 178). Abdomen strongly petiolate, wasp-like, uniformly red (Fig. 175, 177). Bulla as in Fig. 176. Hind femur with 15 black tuberculate spines in two more or less irregular rows on venter (Fig. 174). Length, 29 mm. (Brazil: Pará) …..... *Utinga* Wilcox, Papavero & Pimentel, 1989

21 (16). First tarsomere of hind leg long, subequal in length to tarsomeres 2-3 and longer than tarsomere 5..... 22

First tarsomere of hind leg very short, subequal in length to tarsomere 2 and shorter than tarsomere 5. Katepimeron pilose (*Baliomydas cubanus* (Curran)) or bare. Male terminalia as in Figs. 179-181. (West Indies) ..... …..... *Baliomydas* Wilcox, Papavero & Pimentel, 1989

22 (21). Targites 2-5 with the usual sparse, short, recumbent pilosity, directed backwards. Epandrium subtrapezoidal or triangular. Katepimeron bare (sparsely pilose in *Stratiomydas colimas* Wilcox, Papavero & Pimentel). Bulla as in Fig. 54. (Tropical lowland forests of Mexico and Central America, Peru) ..... *Stratiomydas* Wilcox, Papavero & Pimentel, 1989

Tergites 2-5 with long, dense, recumbent hairs, directed outwards. Epandrial halves triangular. Katepimeron pilose. (Guiano-Brazilian subregion) …..... *Chrysomydas* Wilcox, Papavero & Pimentel, 1989

23 (11). Katatergite bare. Vein CuA1 + M3 present (Fig. 182). Labella attached to prementum at its midpoint and slightly shorter than subcranial cavity. Hind femur about 10 times as long as broad, venter with hairs and 2-3 subapical spines. Bulla as in Fig. 58. Male terminalia as in Figs. 183-185. Female tergite 10 with apical hairs. Length, 12-18 mm. (Peru) …..... *Plyomydas* Wilcox & Papavero, 1971

Katatergite pilose, hairs short and inconspicuous in some females. Vein CuA1 + M3 absent. Proboscis obsolete to functional, varying from one half to three times length of subcranial cavity, labella attached to apex of prementum (Figs. 12, 13, 15, 16). Female tergite 10 with spines on acanthophorites (Figs. 61-62) 24

24 (23). Second flagellomere of antenna longer than first flagellomere. Bulla as in Fig. 55. Male terminalia as in Figs. 186-188, gonostyle split apically, with two prongs, the inner one acute and not quite as long as the outer one. Female spermathecae with only two capsules (Figs. 189-190). Length, 12-23 mm. (Canada: British Columbia, to Panama) ... …..... *Nemomydas* Curran, 1934

Second flagellomere of antenna shorter than or subequal to length of first flagellomere. Bulla as in Fig. 59. Male terminalia as in Figs. 191-193, gonostyle with only one apical prong. Female spermathecae with 3 capsules (Figs. 194-195). Habitus as in Fitzgerald & Kondratieff, 1995: 33, fig. 24. Length, 9-20 mm. (U. S. A., Mexico) .... *Pseudonomoneura* Bequaert, 1961

***** The bullae consist of ridges and grooves (figs. 12 and 13 of Yeates & Irwin, 1996), consistent with an evaporation surface. The bullae probably function in the release of the pheromone product of an endocrine gland. The floor of each groove appears to be invaginated, and all secretions may communicate with the surface of the integument through the grooves (Yeates & Irwin, 1996: 268).

The accompanying illustrations were extracted from Artigas (1973), Papavero & Wilcox (1974), Wilcox & Papavero (1971, 1975), Wilcox, Papavero & Pimentel (1989) and Zikan (1942, 1944).

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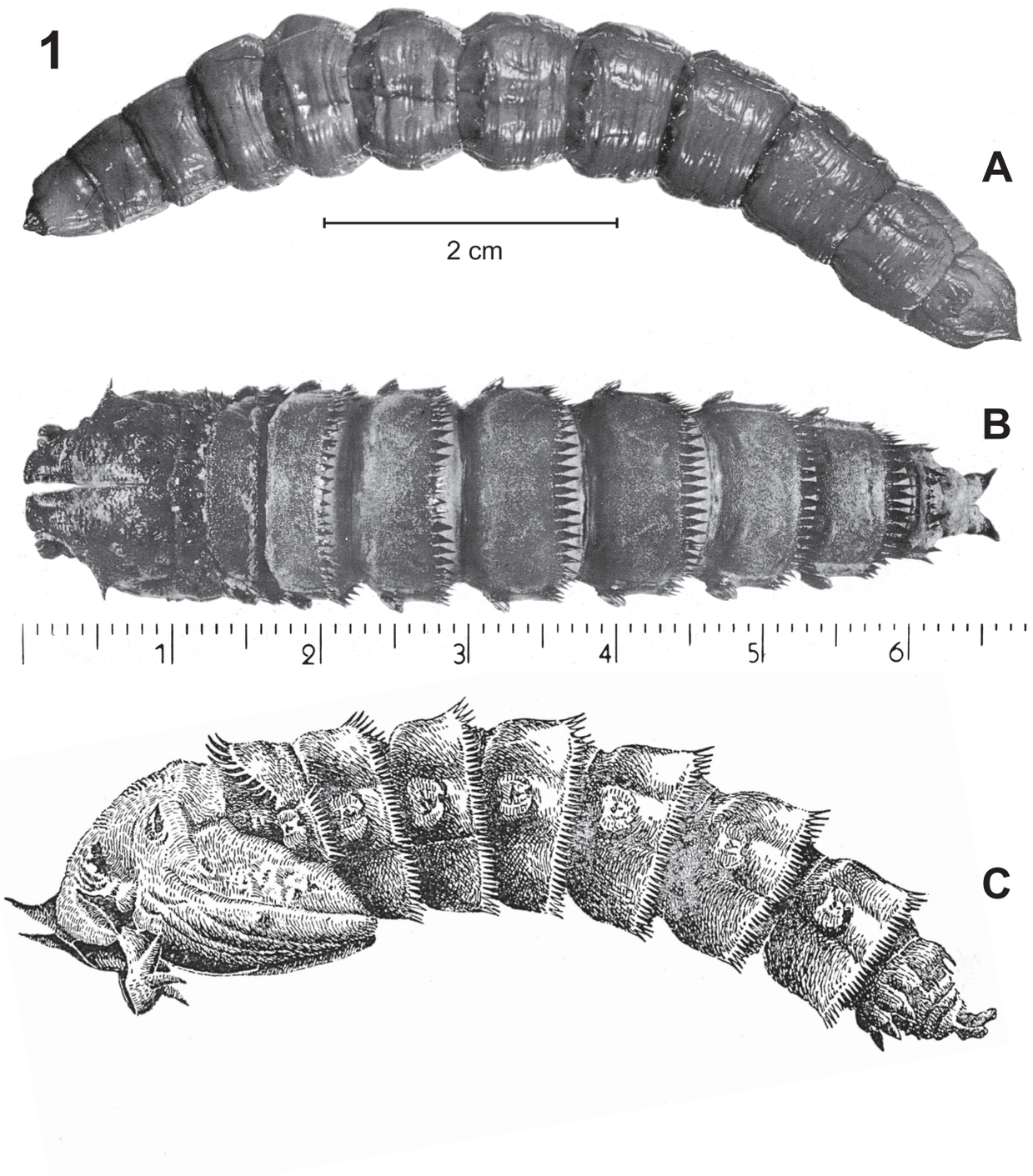


Fig. 1A-B. *Gauromydas heros* (Perty, 1833). A. Larva. B. Pupal skin, dorsal view. C. Pupa, lateral view.

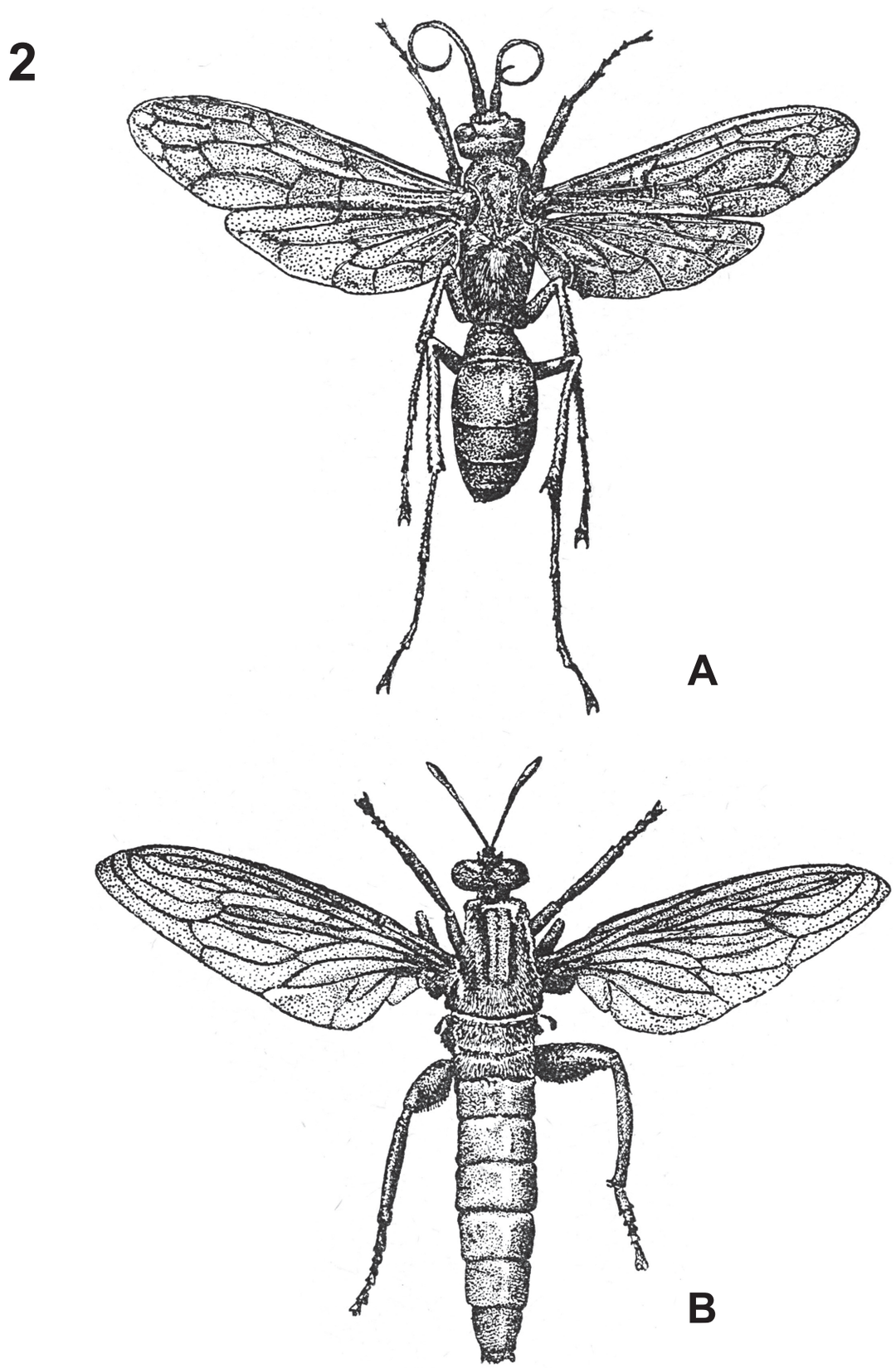
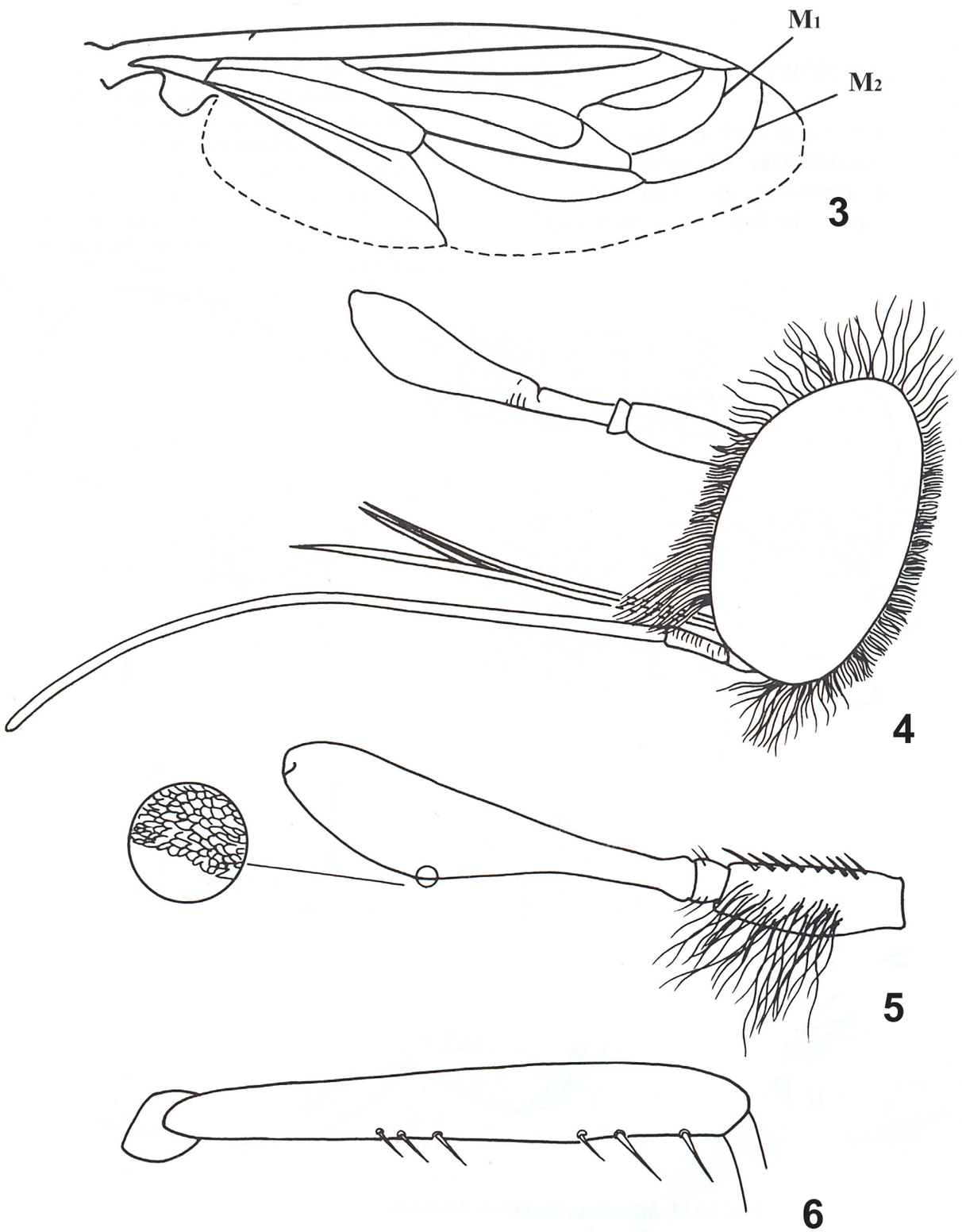
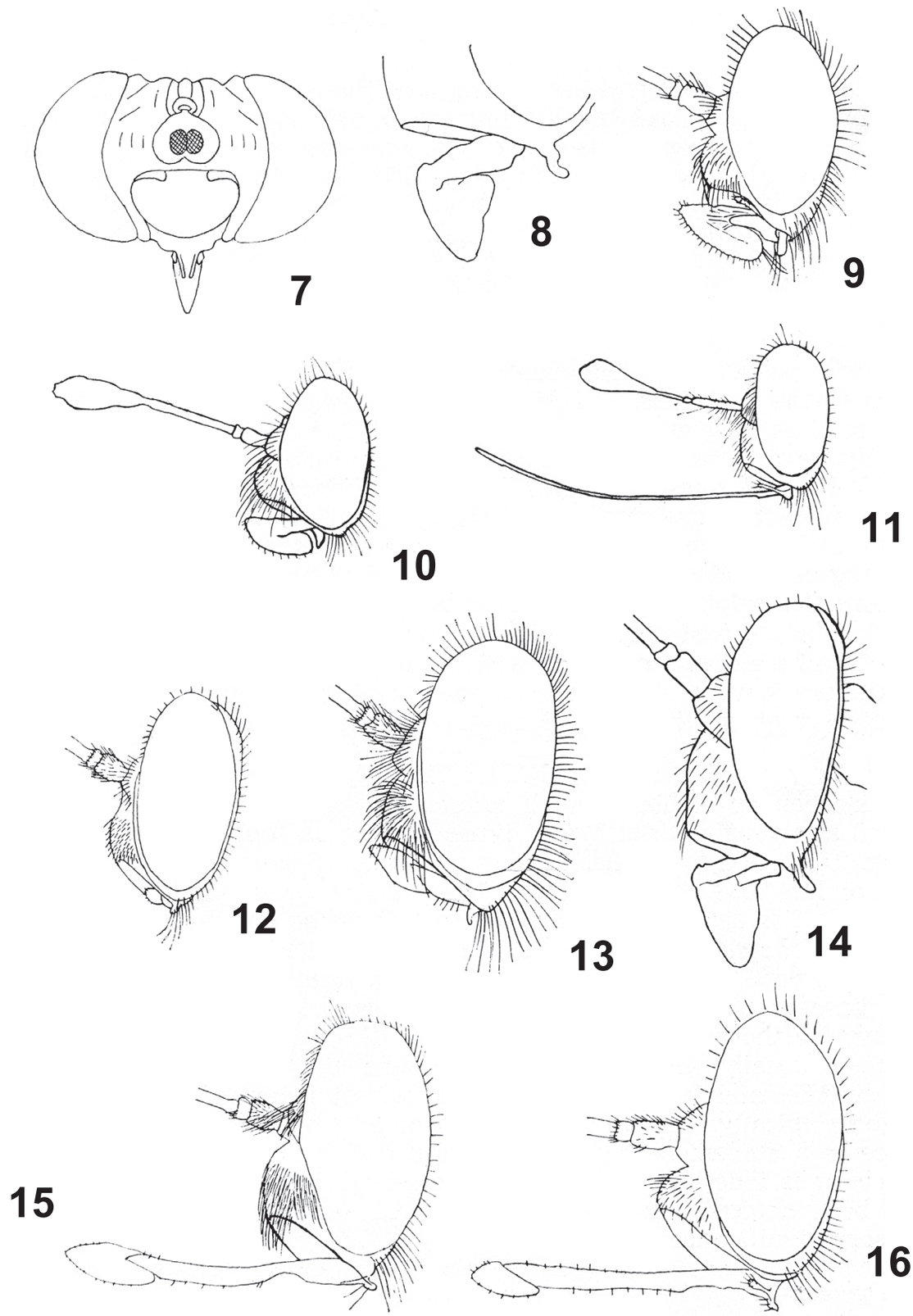


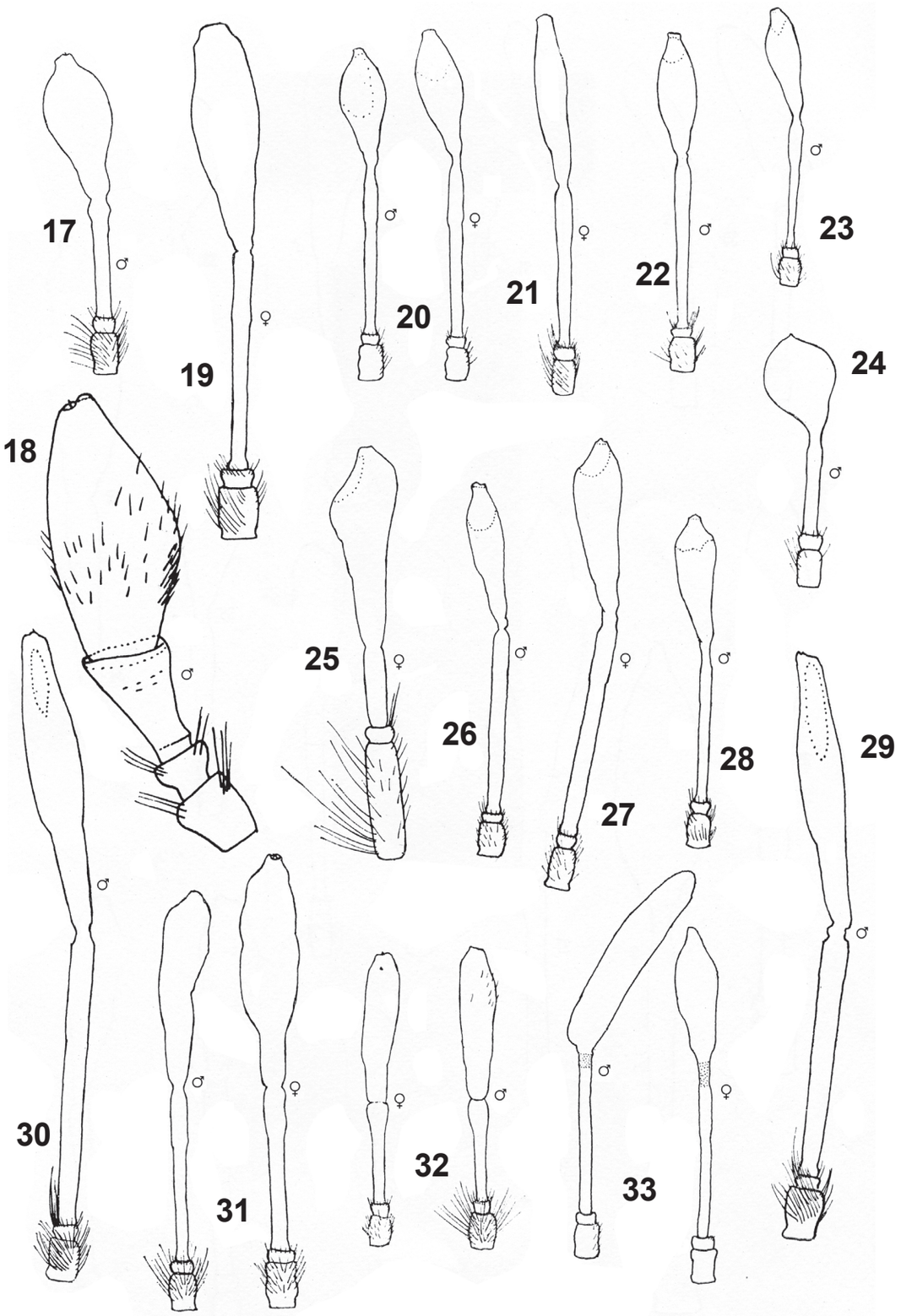
Figure 2. Pompilidae (Hymenoptera) (A) and its mimic *Gauromydas heros* (Perty, 1833) (B).



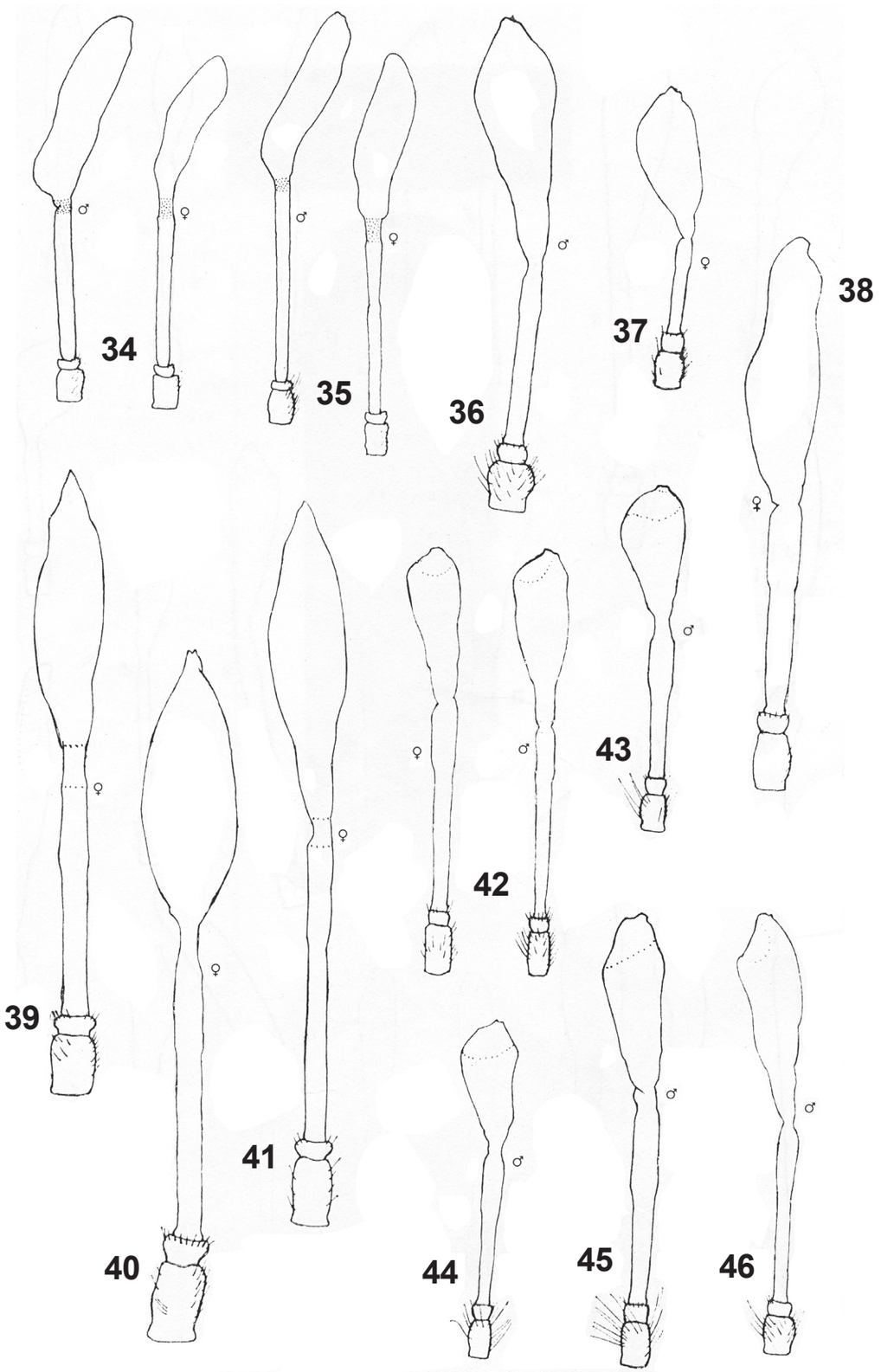
Figs. 3-6. *Mitrodetus sp.*: 3, wing; 4, head, lateral view; 5, antenna; 6. hind femur.



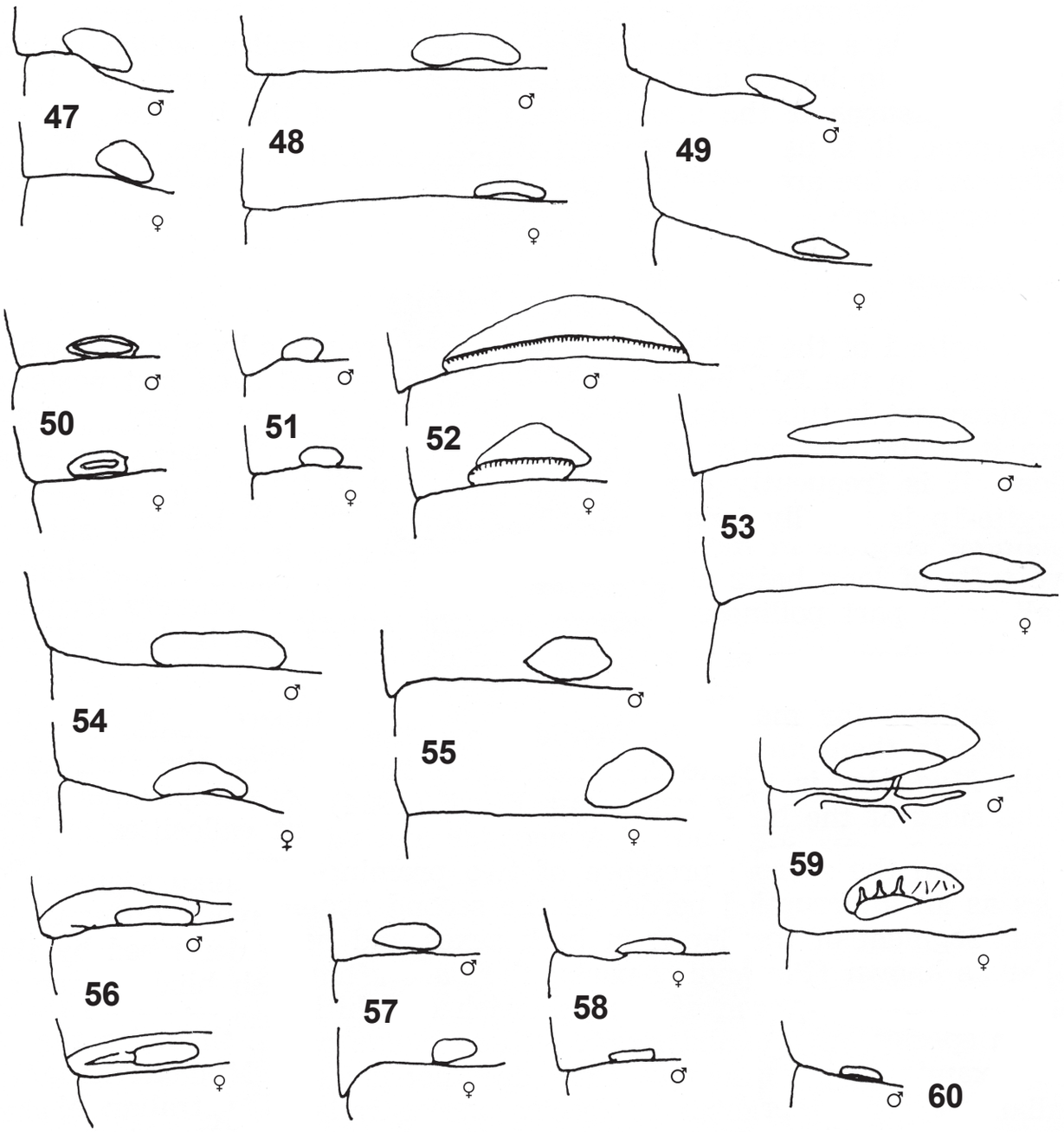
Figs. 7-8. *Phyllomydas bruesii* Johnson, 1926, head in frontal view (7) and detail of proboscis in lateral view (8). Figs. 9-16, head, lateral view: 9, *Apiophora rubrocincta* (Blanchard, 1852); 10, *Heteromydas bicolor* Hardy, 1844; 11, *Mitrodetus sp.*; 12, *Nemomydas melanopogon* Steyskal, 1956; 13, *Nemomydas pantherinus* (Gerstaecker, 1868); 14, *Mydas clavatus* (Drury, 1773); 15, *Nemomydas lamia* (Séguy, 1928); 16, *Pseudonomoneura californica* (Cole, 1970).



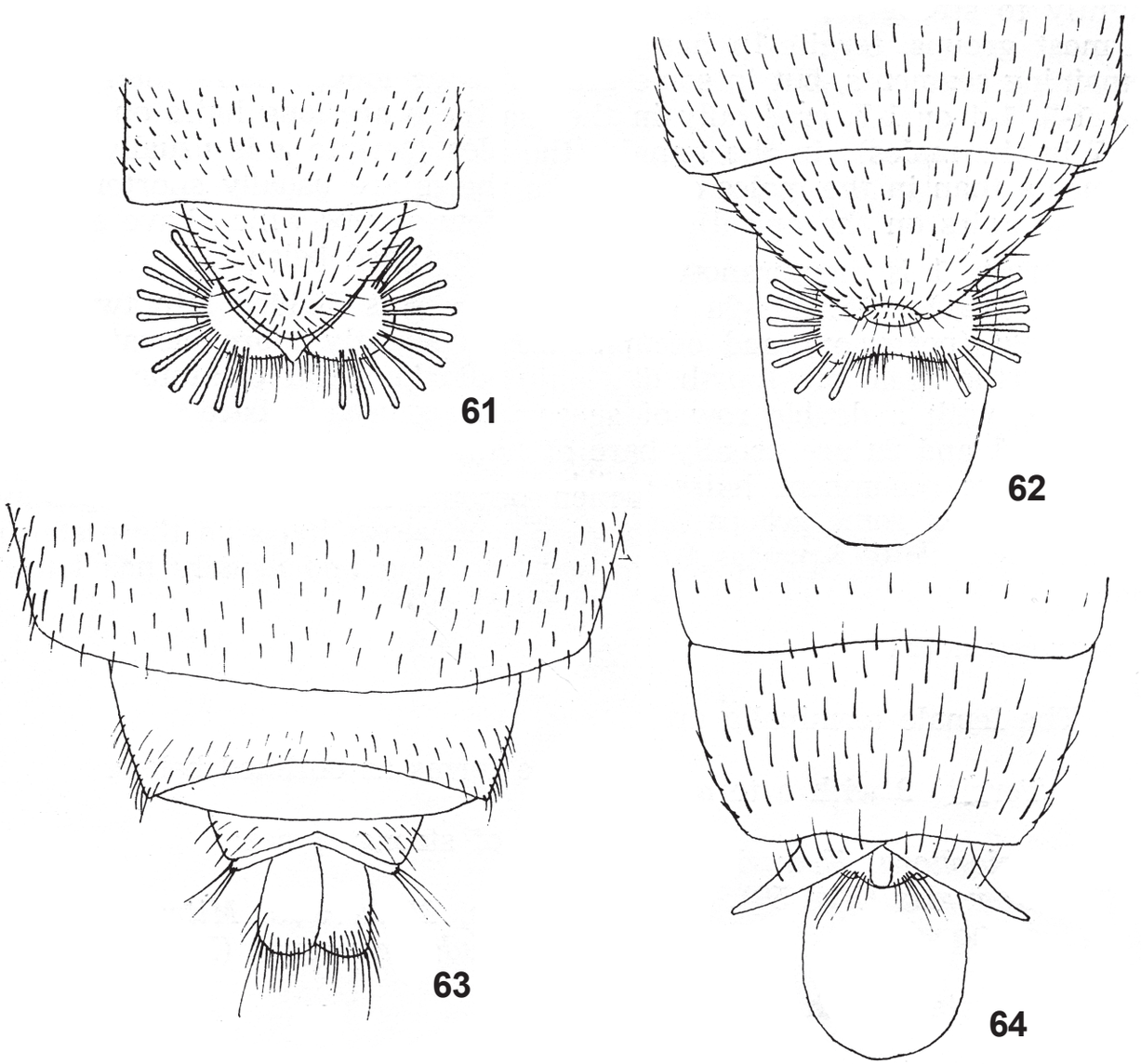
Figs. 17-33. Antennae: 17, *Apiophora paulseni* Philippi, 1863; 18, *Dolichogaster brevicornis* (Wiedemann, 1821); 19, *Eumydas corupas* Wilcox & Papavero, 1971; 20, *Heteromydas bicolor* Hardy, 1944; 21, *Messiasia decor* (Osten Sacken, 1886); 22, *Messiasia mocoronga* Wilcox & Papavero, 1975; 23, *Messiasia pertenuis* (Johnson, 1926); 24, *Midacritus stuardoanus* Séguy, 1929; 25, *Mitrodetus dentitarsis* (Macquart, 1850); 26, *Mydas clavatus* (Drury, 1773); 27, *Mydas xanthopterus* Loew, 1866; 28, *Mydas luteipennis* Loew, 1866; 29-30, *Protomydas rubidapex* (Wiedemann, 1830); 31, *Nemomydas pantherinus* (Gerstaecker, 1868). 32, *Nemomydas melanopogon* Steyskal, 1956; 33, *Opomydas athama* (Séguy, 1928).



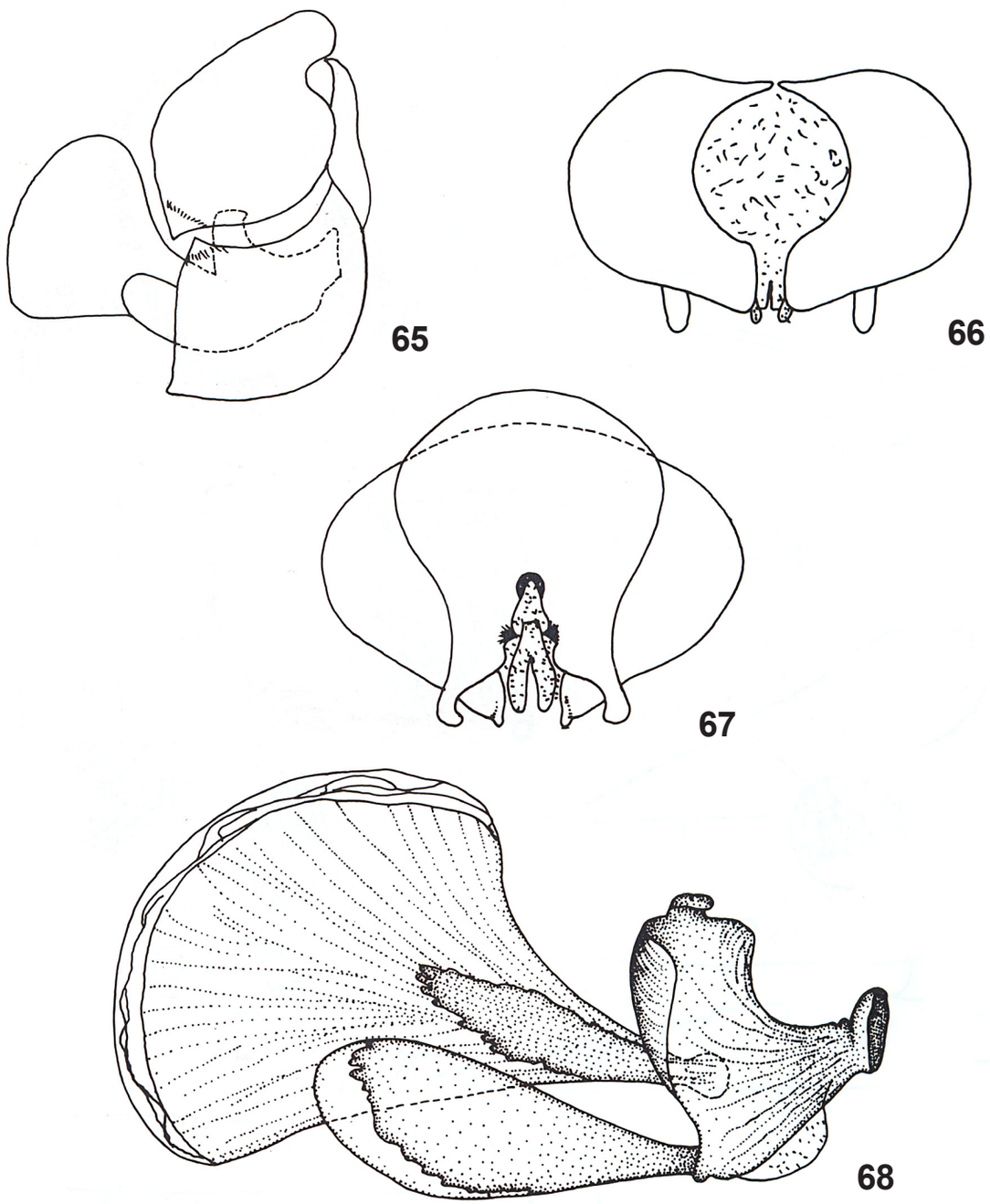
Figs. 34-46. Antennae: 34, *Opomydas limbatus* (Williston, 1886); 35, *Opomydas townsendi* (Williston, 1898); 36, *Paramydas igniticornis* (Bigot, 1857); 37, *Plyomydas peruviensis* Wilcox & Papavero, 1974; 38, *Phyllomydas scitulus* Williston, 1886); 39, *Phyllomydas phyllocerus* Bigot, 1880; 40, *Phyllomydas bruesii* Johnson, 1926; 41, *Phyllomydas currani* Hardy, 1943; 42, *Pseudonomoneura californica* (Hardy, 1950); 43, *Pseudonomoneura tinkhami* (Hardy, 1950); 44, *Pseudonomoneura micheneri* (James, 1938); 45, *Pseudonomoneura hirta* (Coquillett, 1904); 46, *Nemomydas lamia* (Séguy, 1928).



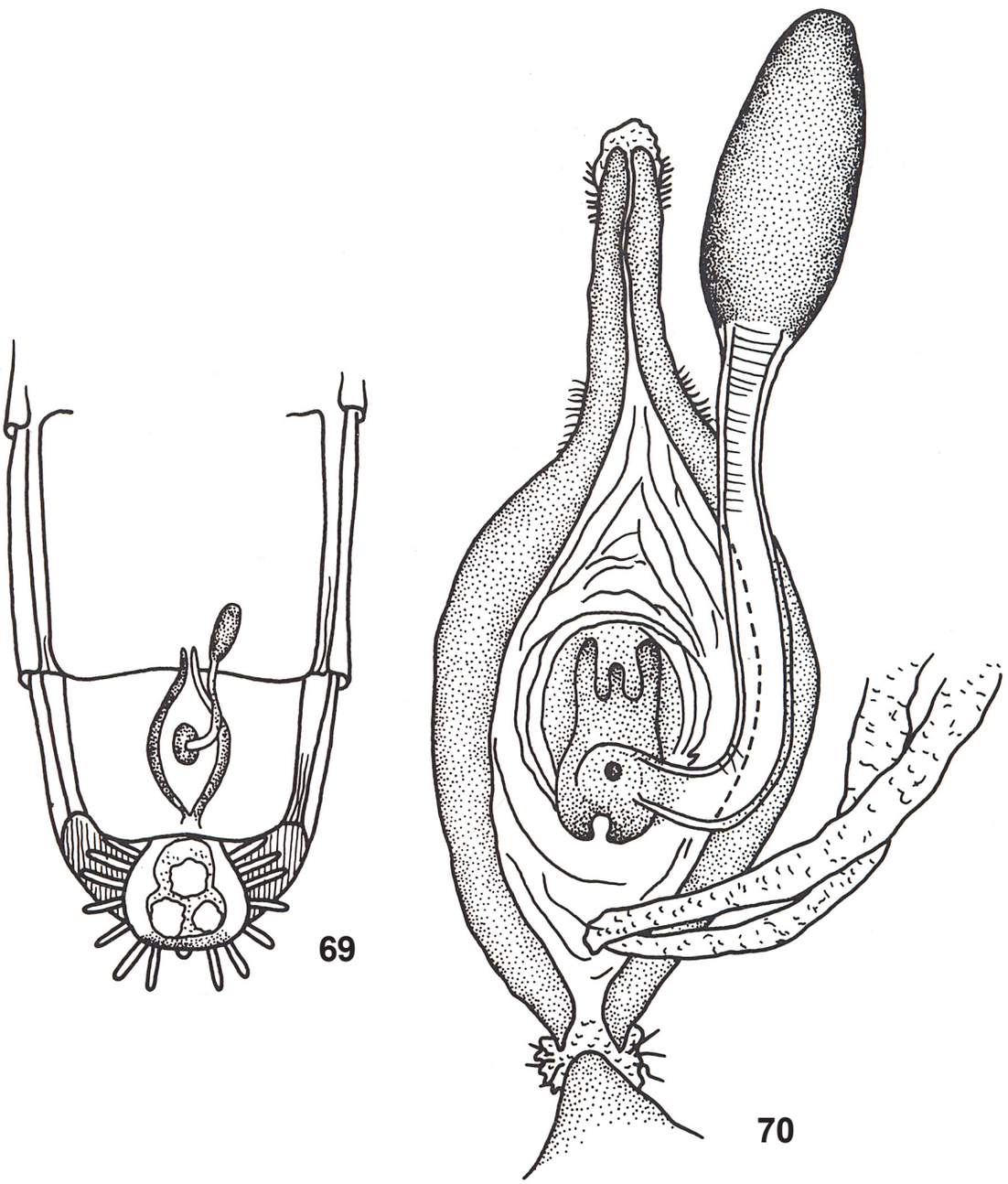
Figs. 47-60. Abdominal bullae: 47, *Apiophora paulseni* Philippi, 1865; 48, *Dolichogaster brevicornis* (Wiedemann, 1821), 49, *Eumydas corupas* Wilcox & Papavero, 1974; 50, *Messiasia pertenuis* (Johnson, 1933); 51, *Midacritus stuardoanus* Séguy, 1939; 52, *Mitrodetus dentitarsis* (Macquart, 1850); 53, *Opomydas athama* (Séguy, 1928); 54, *Stratiomydas lividus* (Curran, 1953); 55, *Nemomydas venosus* (Loew, 1866); 56, *Paramydas igniticornis* (Bigot, 1857); 57, *Phyllomydas scitulus* (Williston, 1886); 58, *Plyomydas peruviensis* Wilcox & Papavero, 1974; 59, *Pseudonomoneura hirta* (Coquillett, 1904); 60, *Pseudorhopalia mirandai* (d'Andretta & Carrera, 1951).



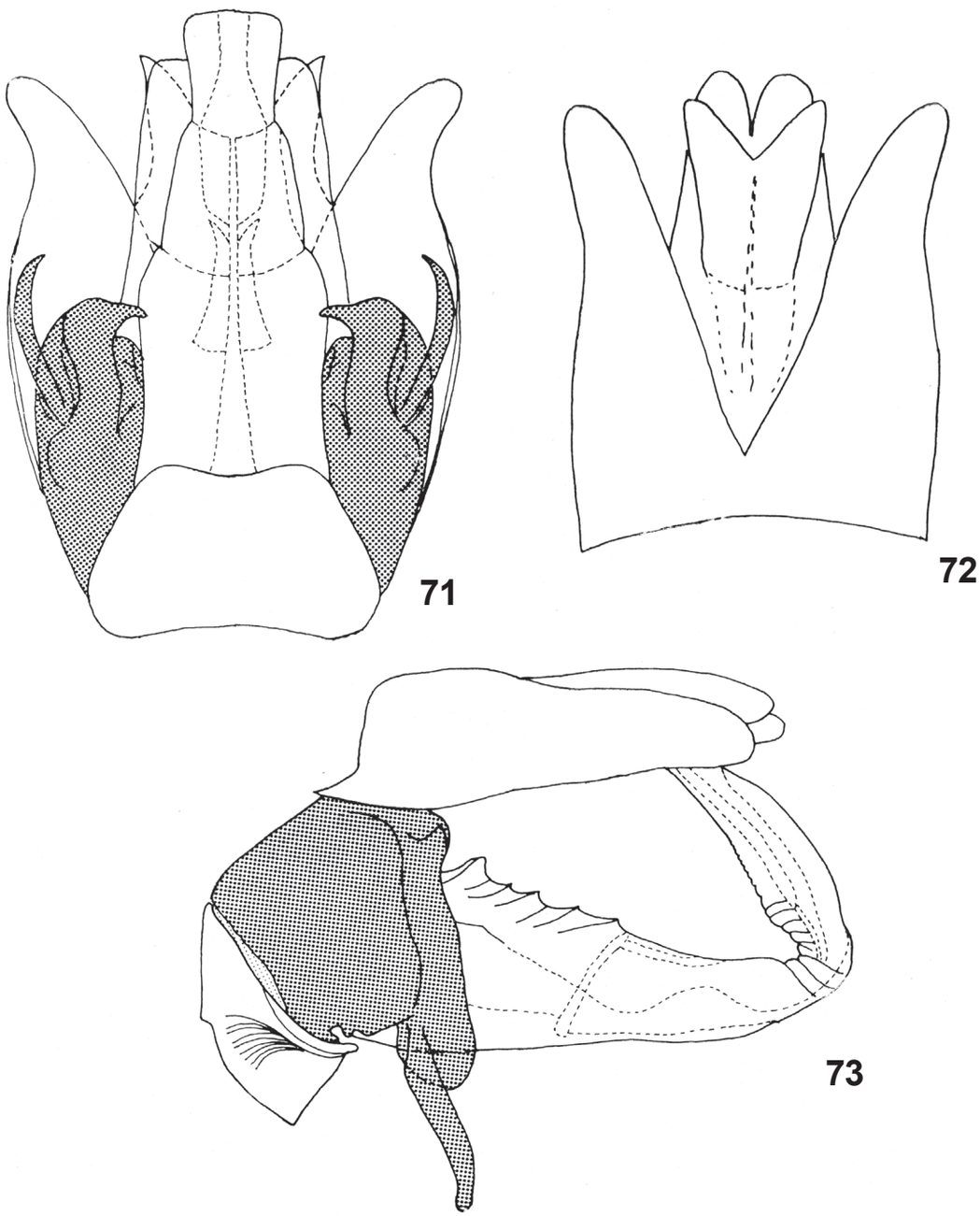
Figs. 61-64. Female terminalia: 61, *Pseudonomoneura californica* (Hardy, 1950); 62, *Nemomydas sp.*; 63, *Messiasia pertenuis* (Johnson, 1926); 64, *Phyllomydas bruesii* Johnson, 1926.



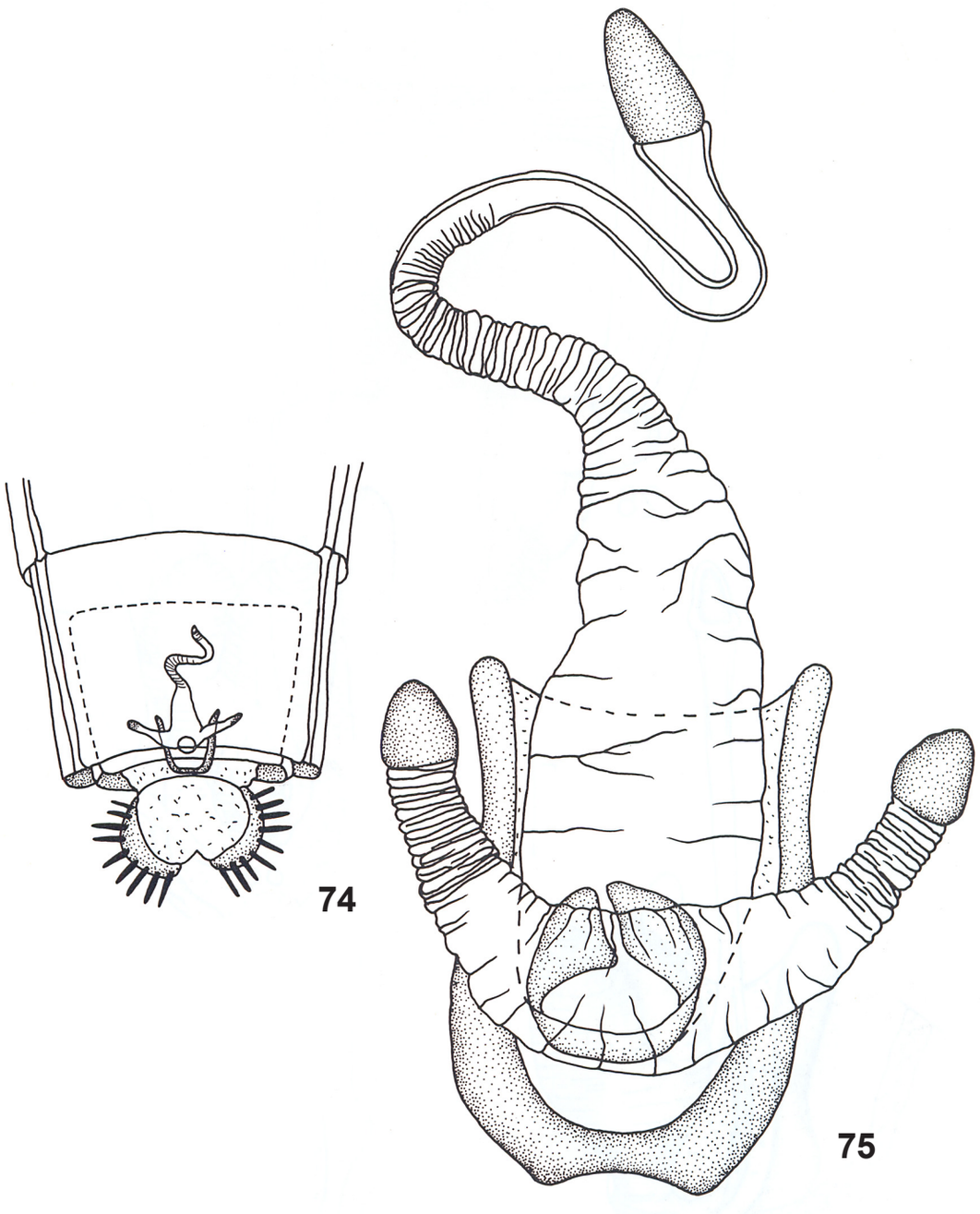
Figs. 65-68. *Mitrodetus dentitarsis* (Macquart, 1850), male terminalia: 65, lateral view; 66, dorsal view; 67, ventral view; 68, aedeagus in lateral view.



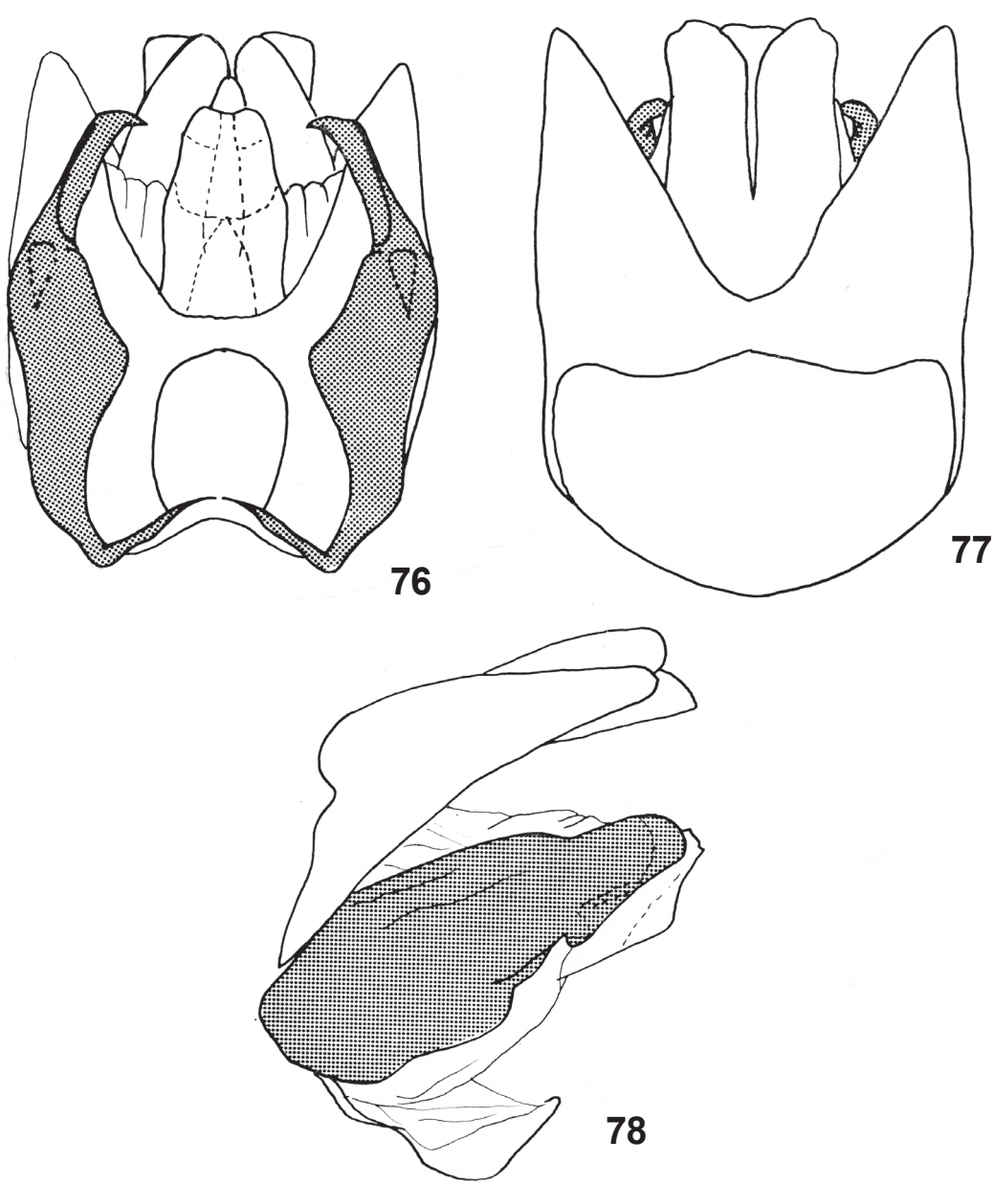
Figs. 69-70. *Mitrodetus dentitarsis* (Macquart, 1850): 69, tip of abdomen, showing position of spermathecae and furca; 70, spermatheca and furca.



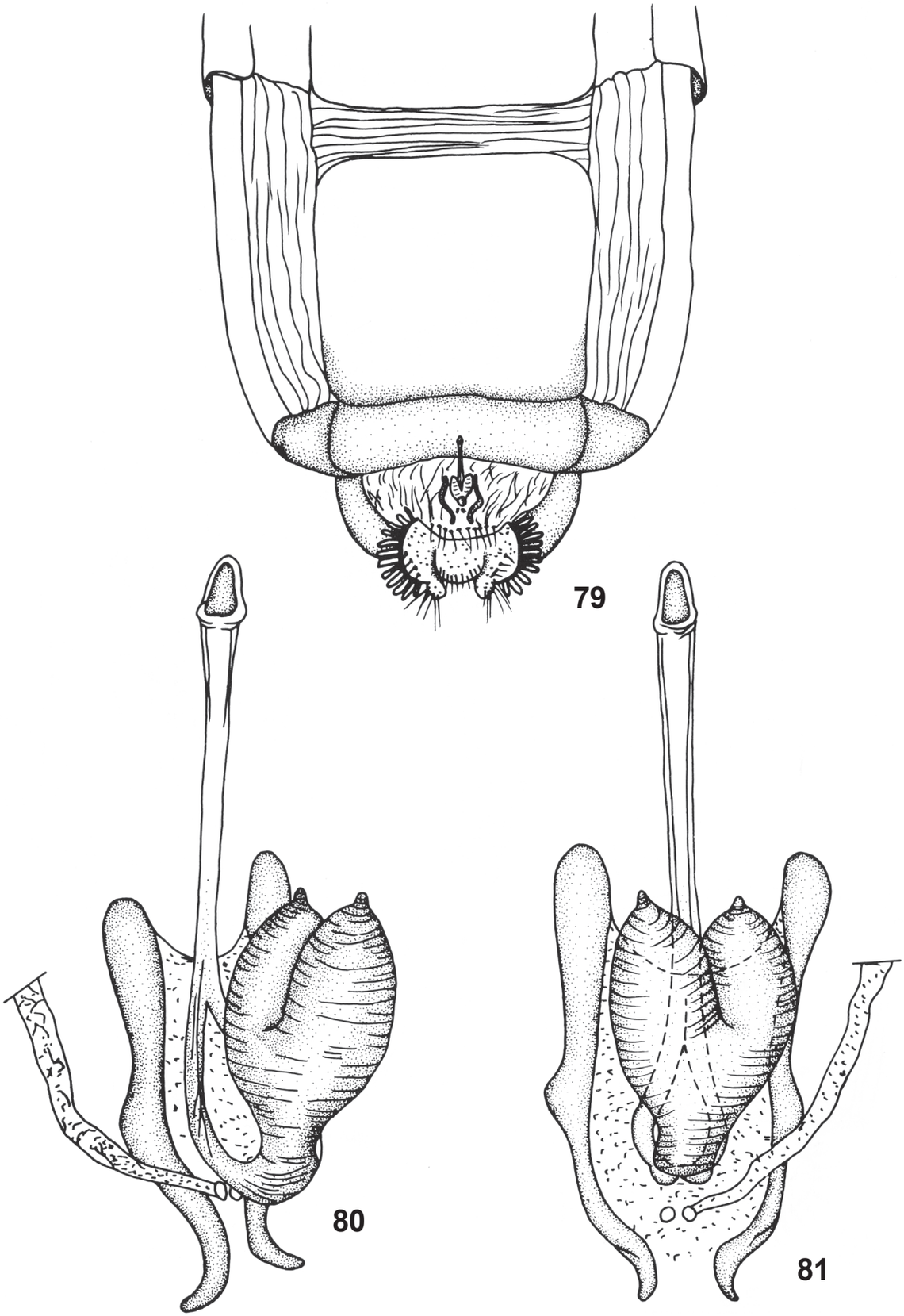
Figs. 71-73. *Opomydas limbatus* (Williston, 1886), male terminalia in ventral (71), dorsal (72) and lateral (73) views.



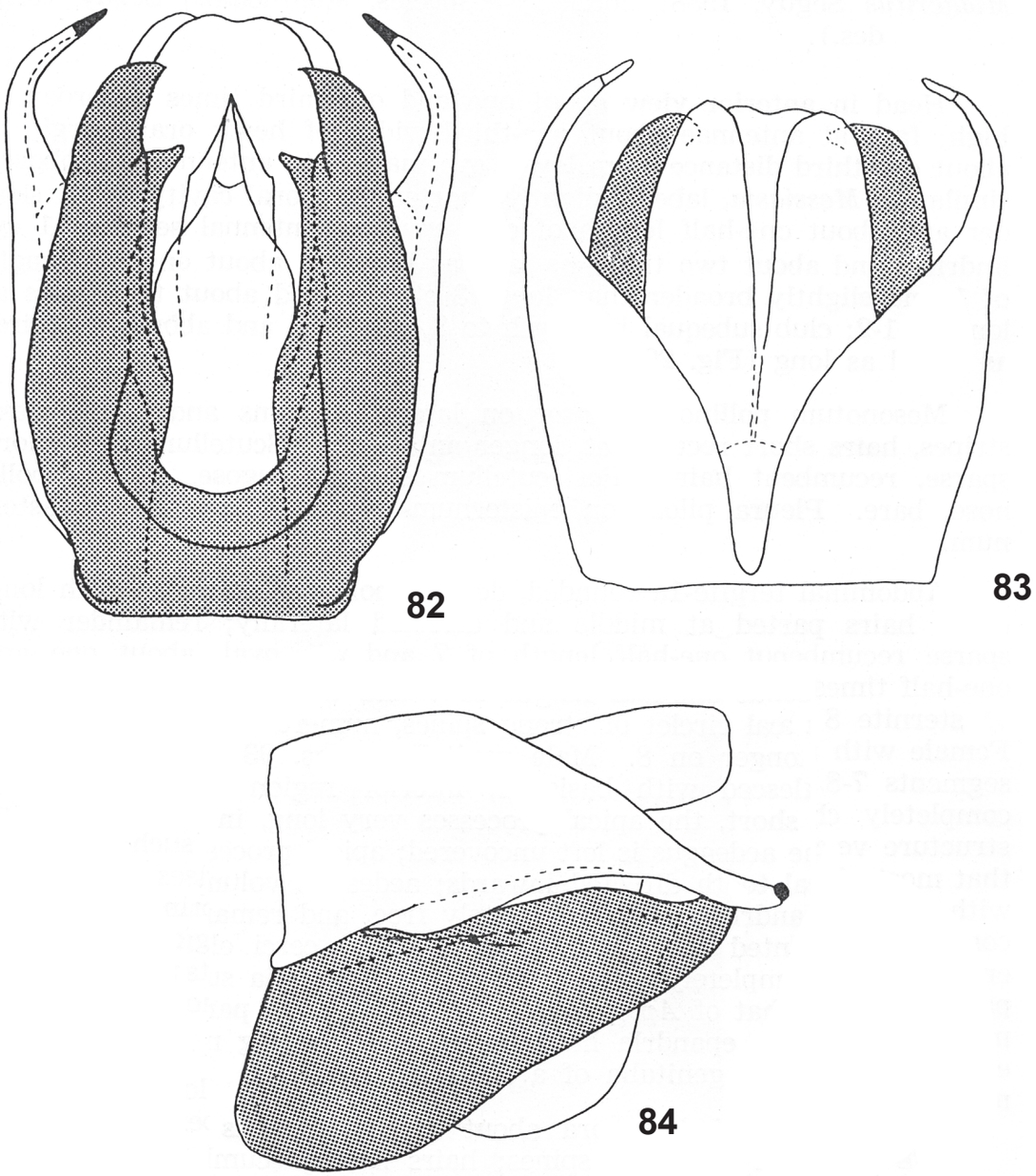
Figs. 74-75. *Opomydas limbatus* (Williston, 1886): 74, tip of abdomen showing position of spermathecae and furca; 75, spermathecae and furca.



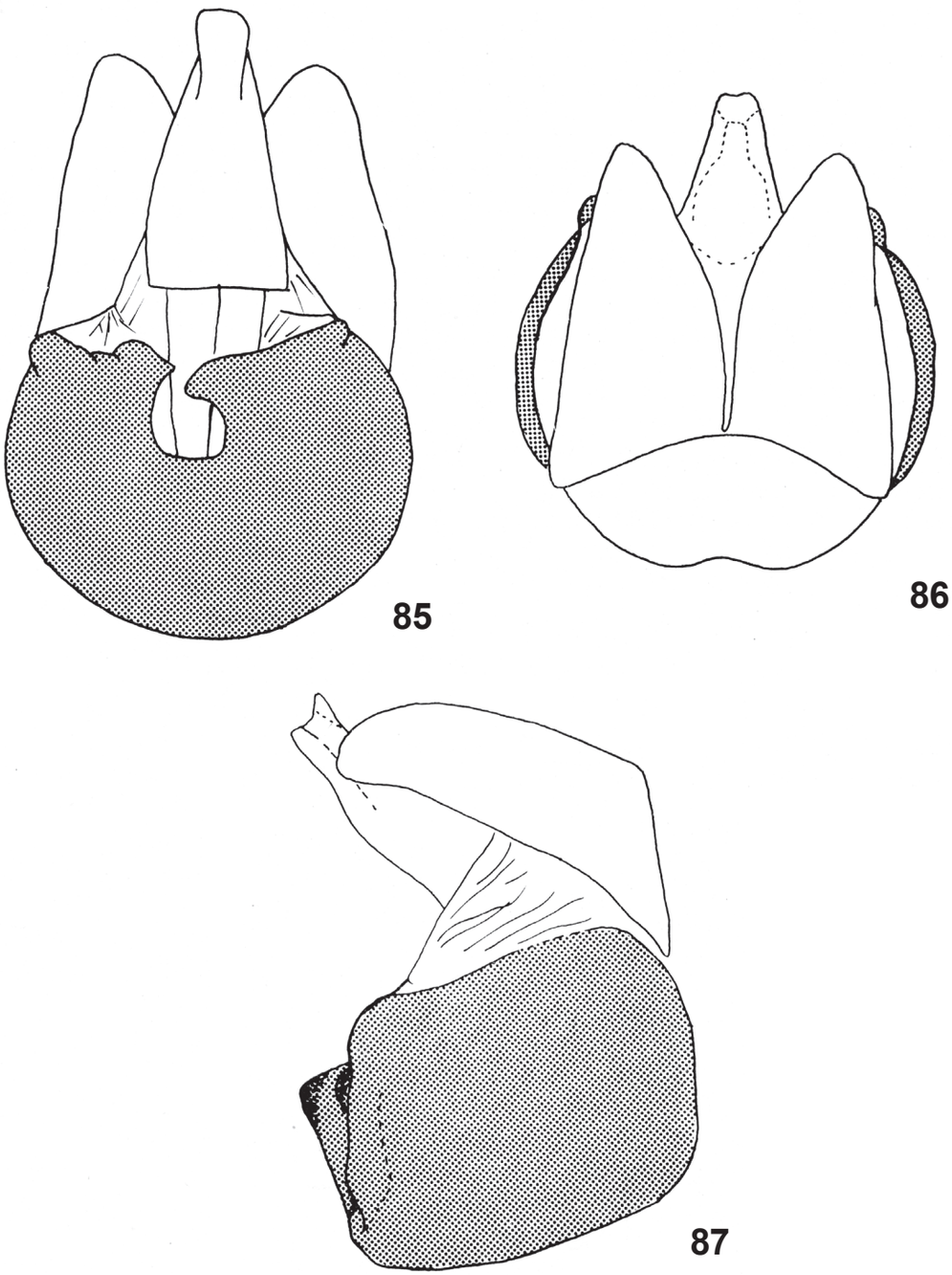
Figs. 76-78. *Heteromydas bicolor* Hardy, 1944, male terminalia in ventral (76), dorsal (77) and lateral (78) views.



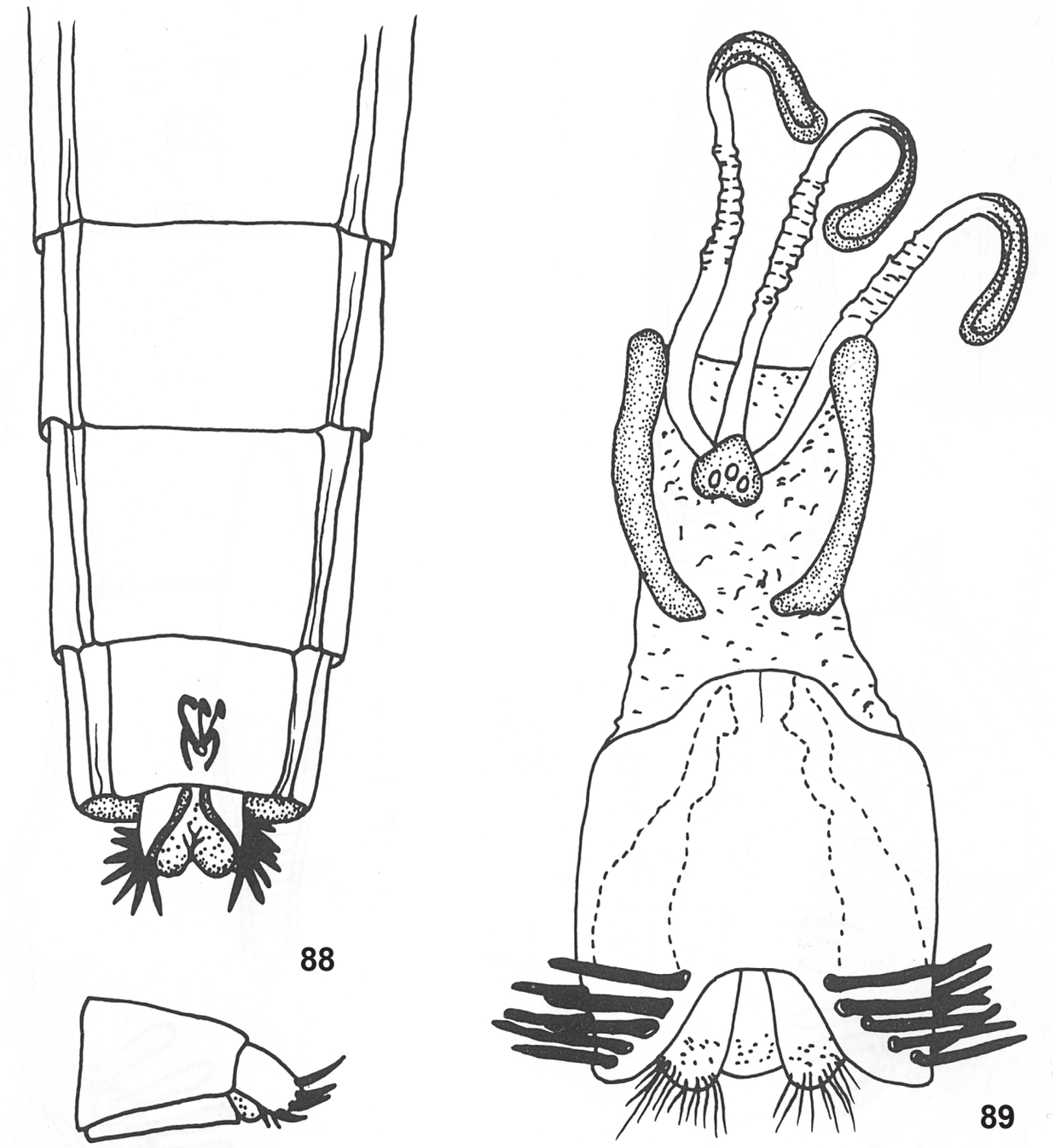
Figs. 79-81. *Heteromydas bicolor* Hardy, 1944: 79, tip of abdomen showing situation of spermathecae and furca; 80-81, spermathecae and furca in different view.



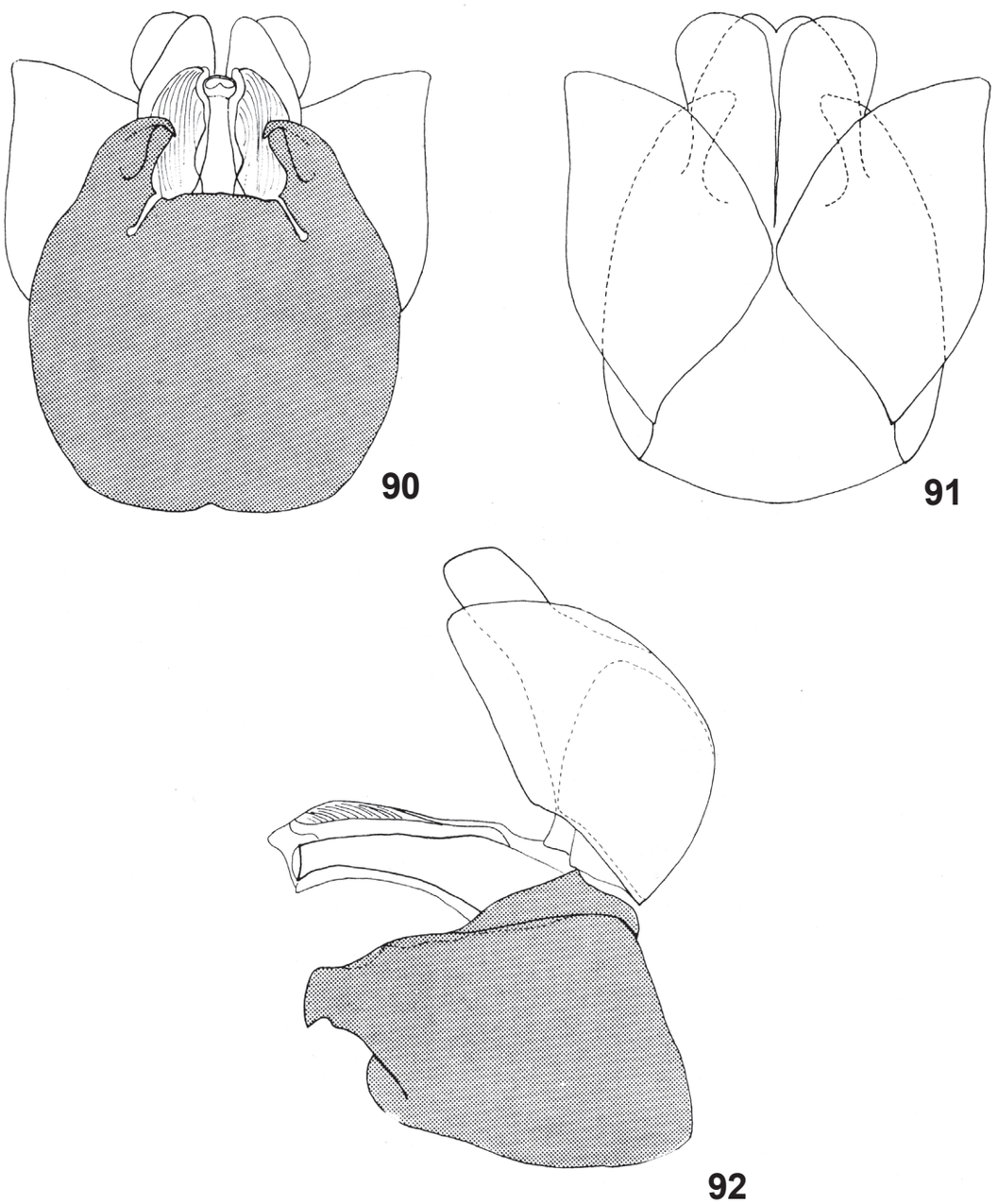
Figs. 82-84. *Midacritus stuardoanus* Séguy, 1939, male terminalia in ventral (82), dorsal (83) and lateral (84) views.



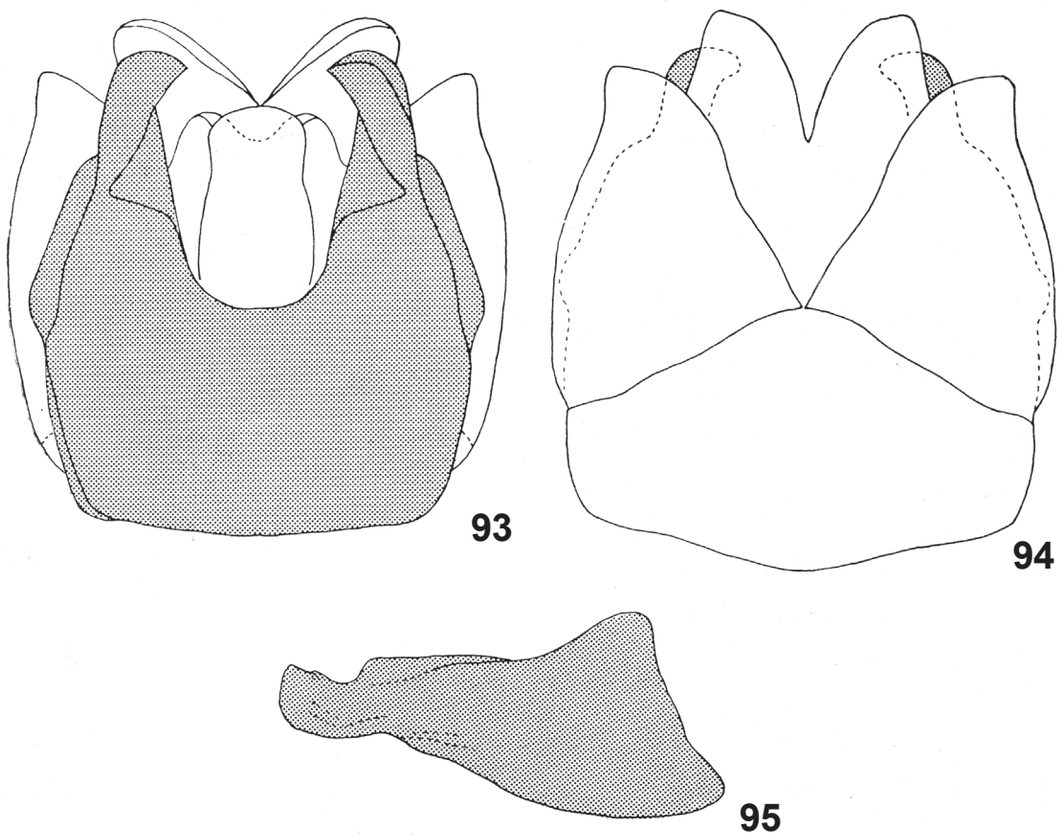
Figs. 85-87. *Pseudorhopalia mirandai* (d'Andretta & Carrera, 1951), male terminalia in ventral (85), dorsal (86) and lateral (87) views.



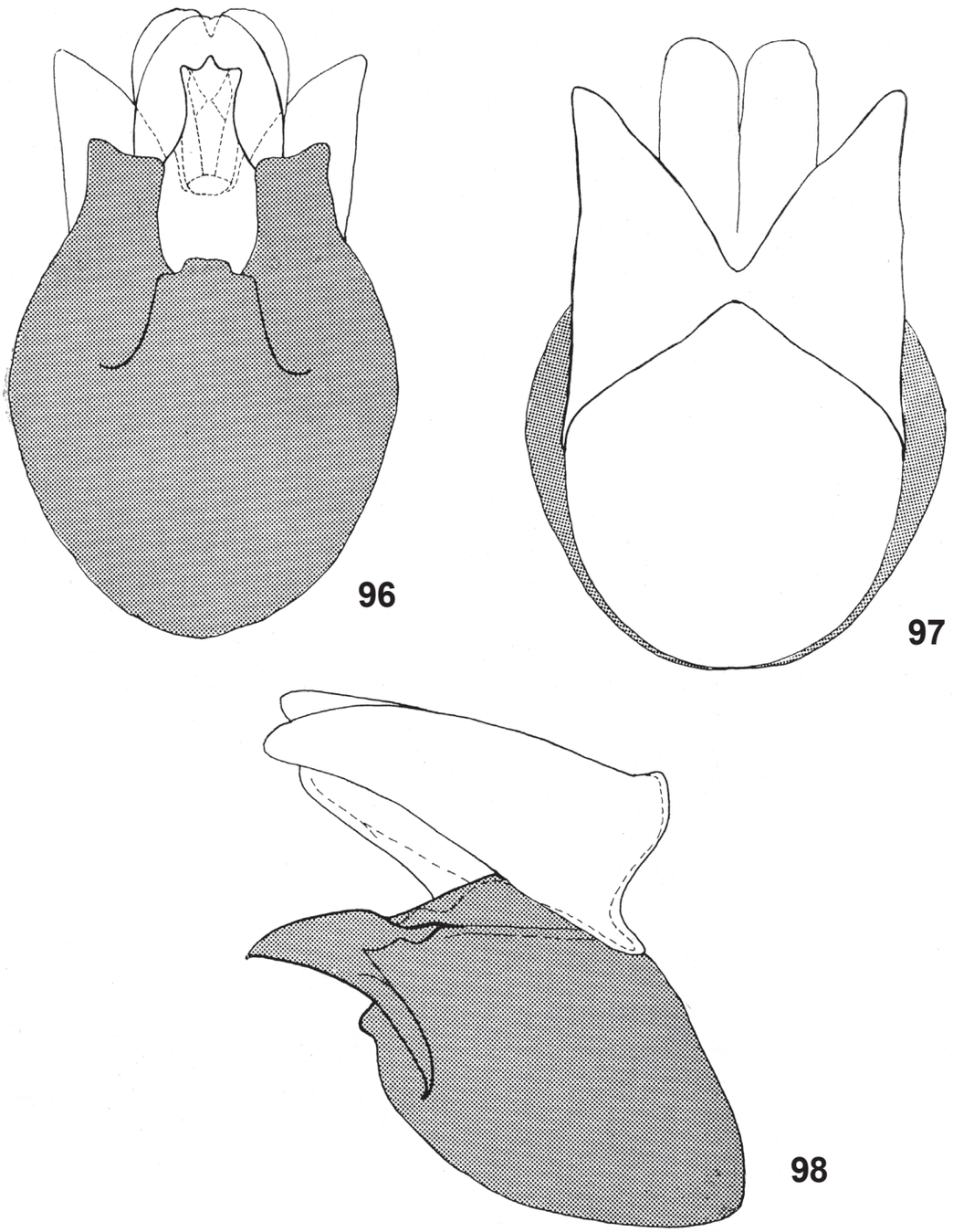
Figs. 88, 88A, 89. *Pseudorhopalia mirandai* (d'Andretta & Carrera, 1951). 88. Situation of spermathecae and furca in the abdomen (tip of abdomen in lateral view in detail). 89. Spermathecae and furca.



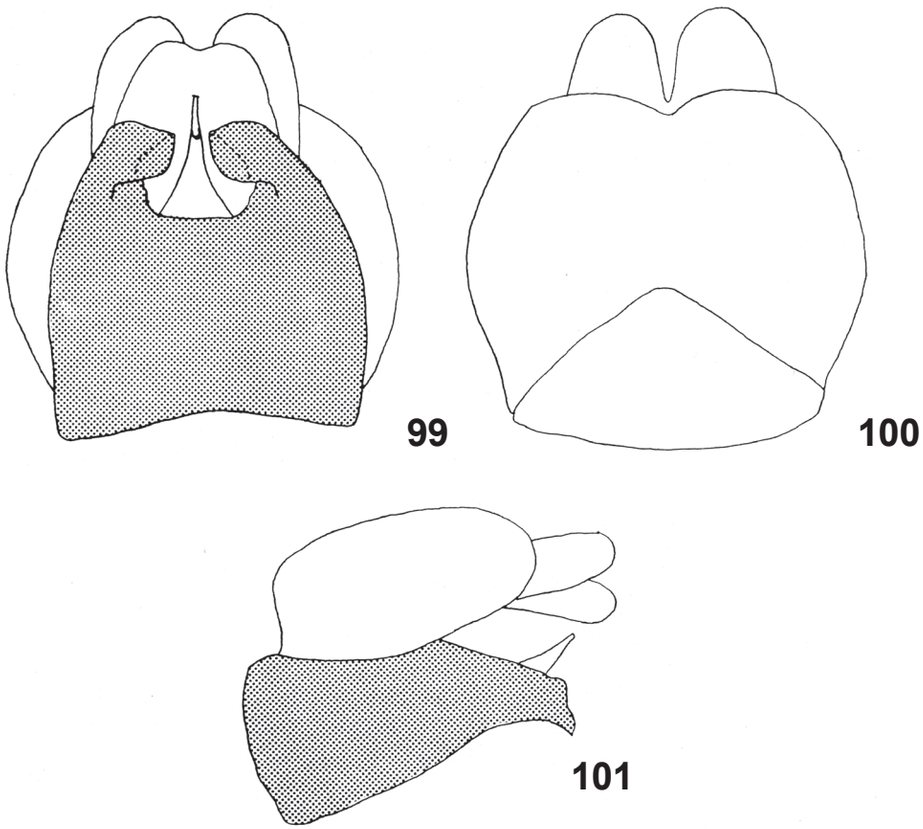
Figs. 90-92. *Paramydas igniticornis* (Bigot, 1857), male terminalia in ventral (90), dorsal (91) and lateral (92) views.



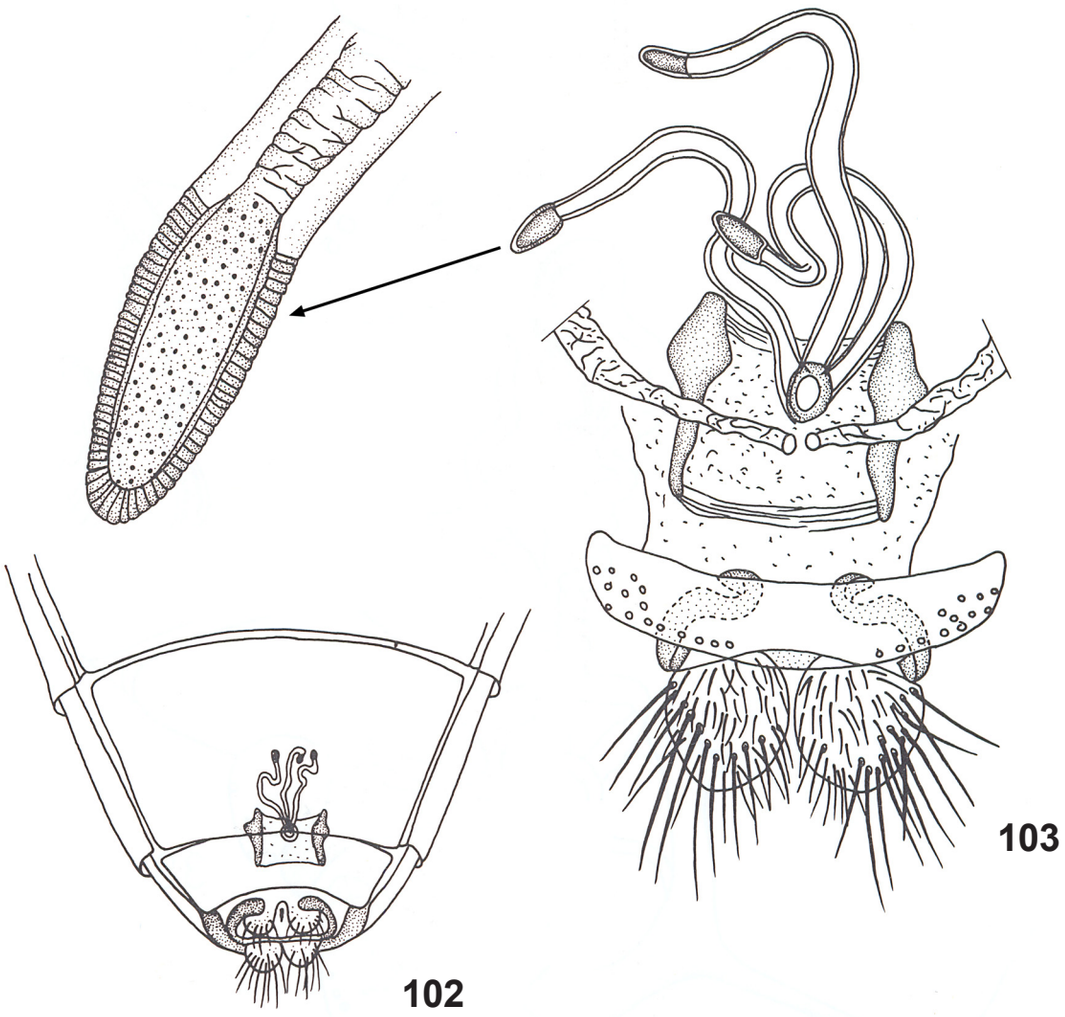
Figs. 93-95. *Apiophora paulseni* Philippi, 1865, male terminalia in ventral (93) and dorsal (94) views; 95, fused hypandrium and gonopods, lateral view.



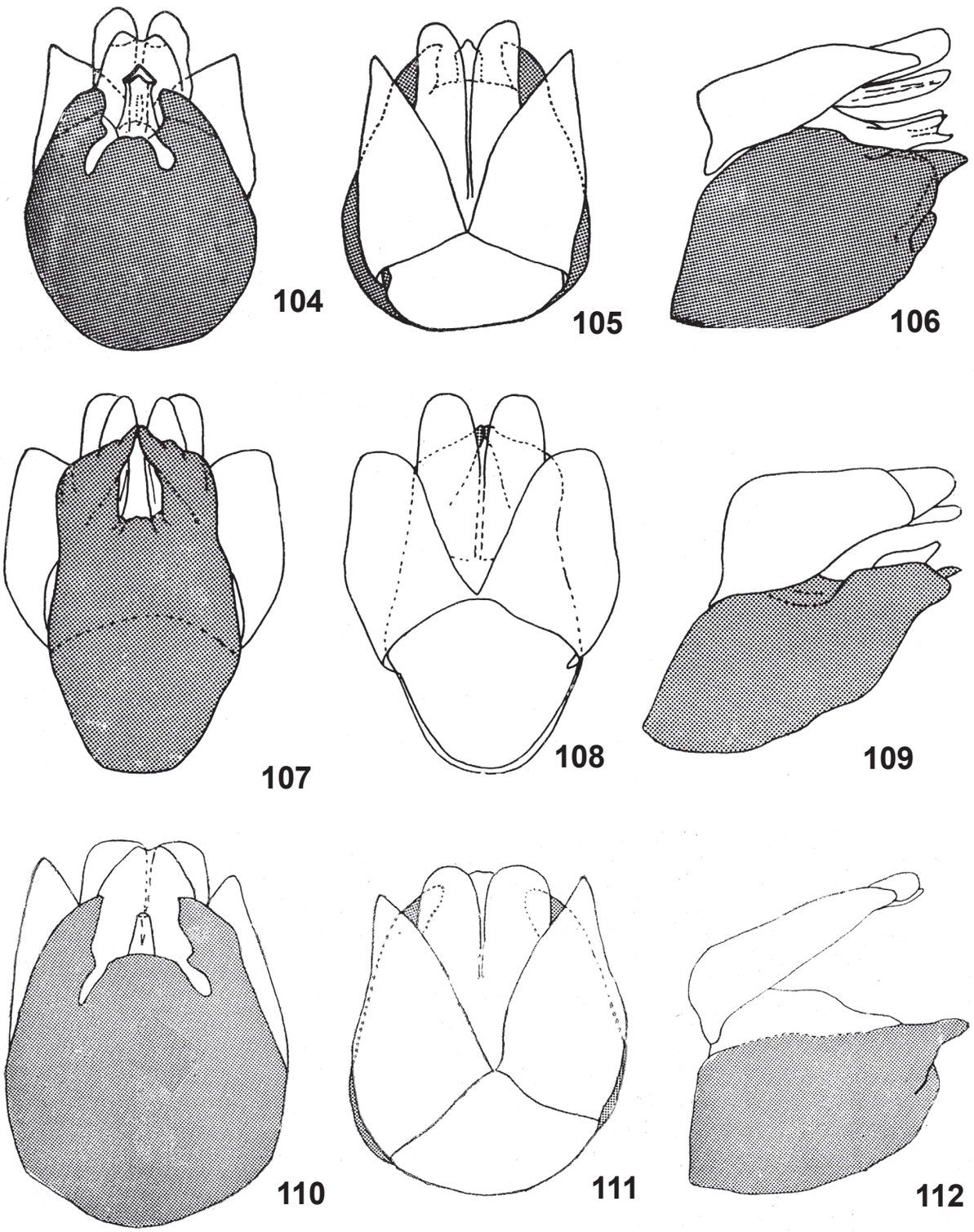
Figs. 96-98. *Eumydas corupas* Wilcox & Papavero, 1974, male terminalia in ventral (96), dorsal (97) and lateral (98) views.



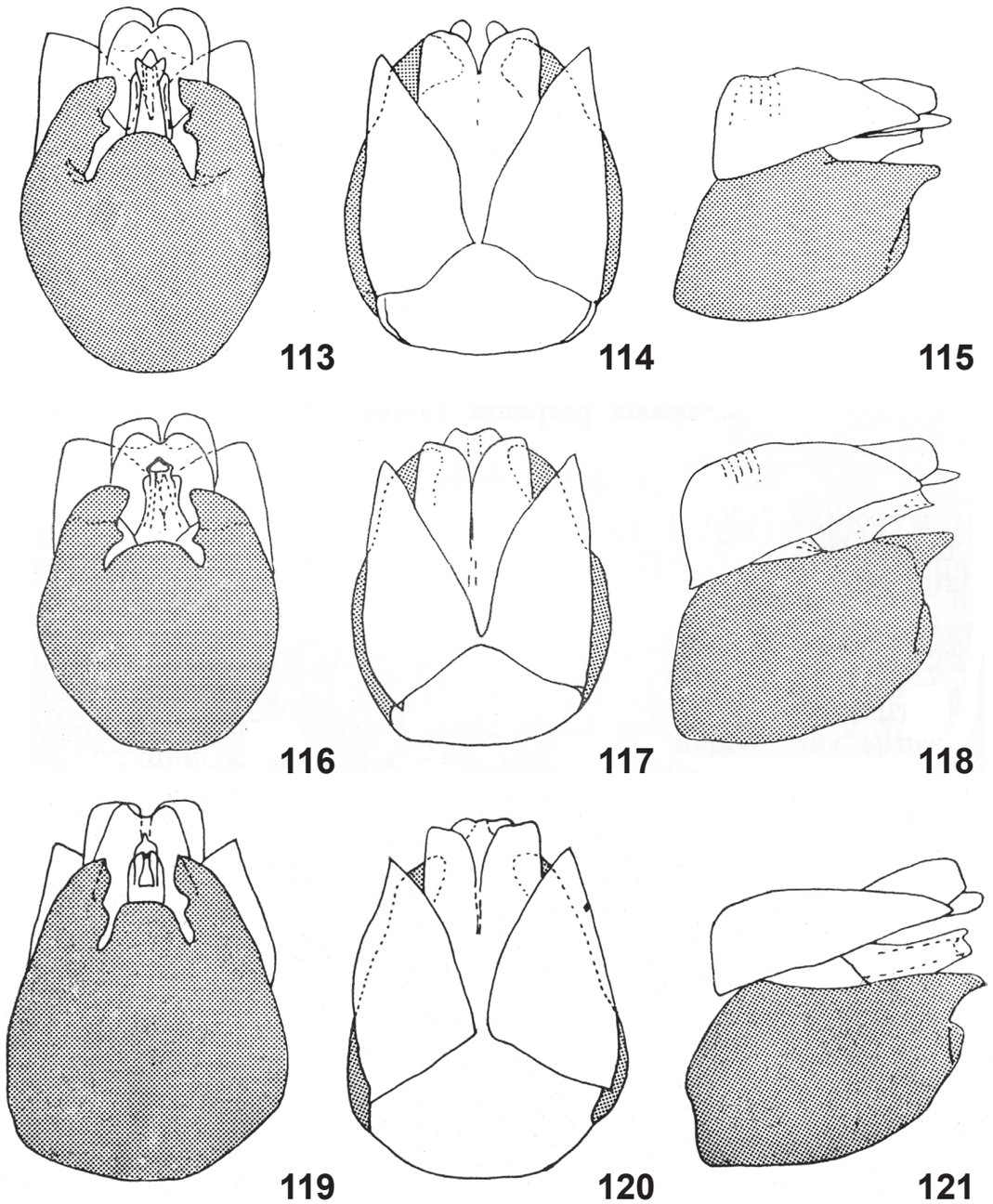
Figs. 99-101. *Dolichogaster brevicornis* (Wiedemann, 1821), male terminalia in ventral (99), dorsal (100) and lateral (101) views.



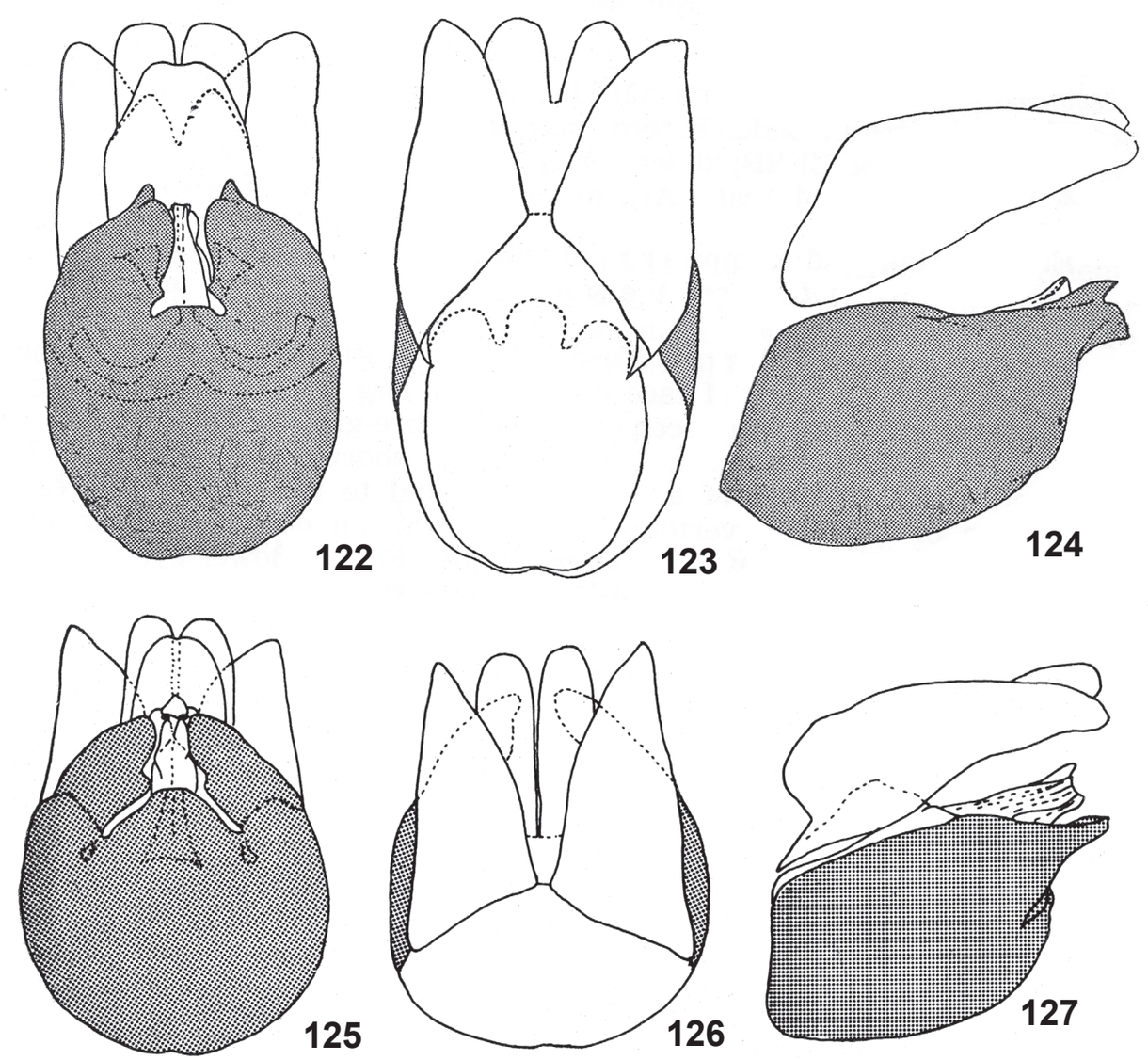
Figs. 102-103. *Dolichogaster brevicornis* (Wiedemann, 1821): 102, tip of abdomen showing situation of spermathecae and furca; 103, spermathecae and furca (tergite 9 flattened in the preparation).



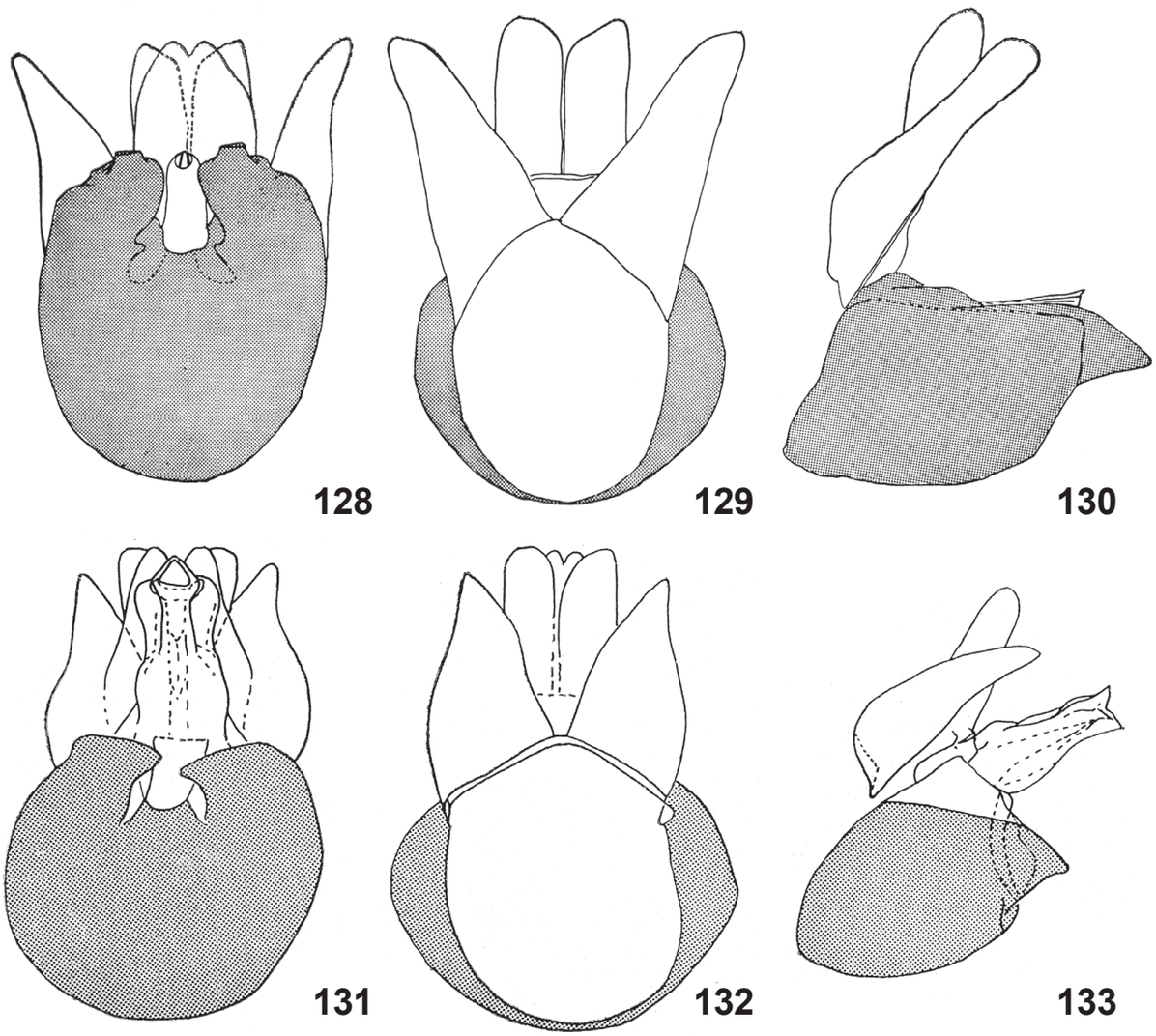
Figs. 104-112. Mydidae, male terminalia. 104-106. *Messiasia californica* (Cole, 1970). 107-109. *Messiasia décor* (Oestren Sacken, 1886). 110-112. *Messiasia lanei* d'Andretta, 1951. (dorsal view, 104, 107, 110; ventral view, 105, 108, 111; lateral view, 106, 109, 112).



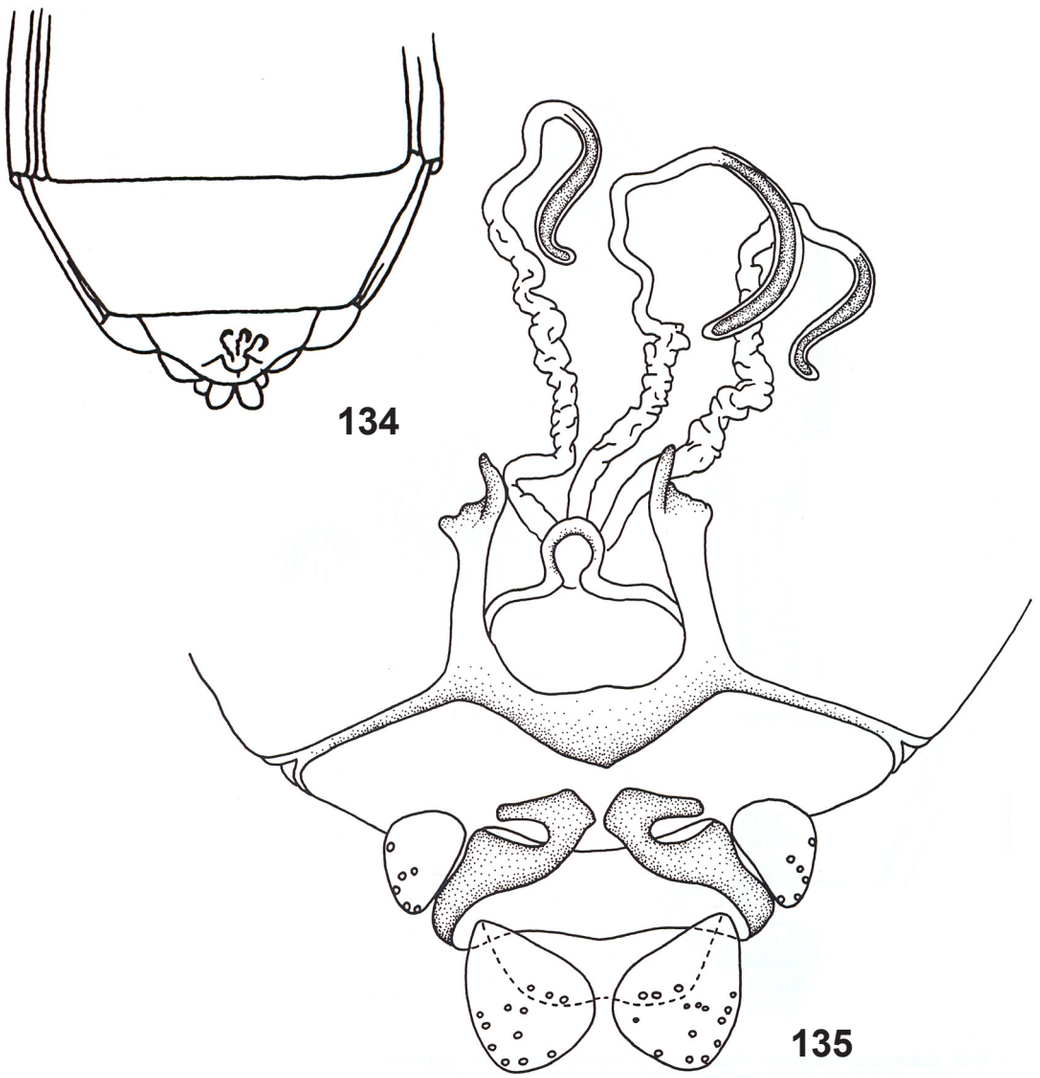
Figs. 113-121. Mydidae, male terminalia. 113-115. *Messiasia painteri* Wilcox & Papavero, 1975. 116-118. *Messiasia perpolita* (Johnson, 1933). 119-121. *Messiasia pertenuis* (Johnson, 1926). (dorsal view, 113, 116, 119; ventral view, 114, 117, 120; lateral view, 115, 118, 121).



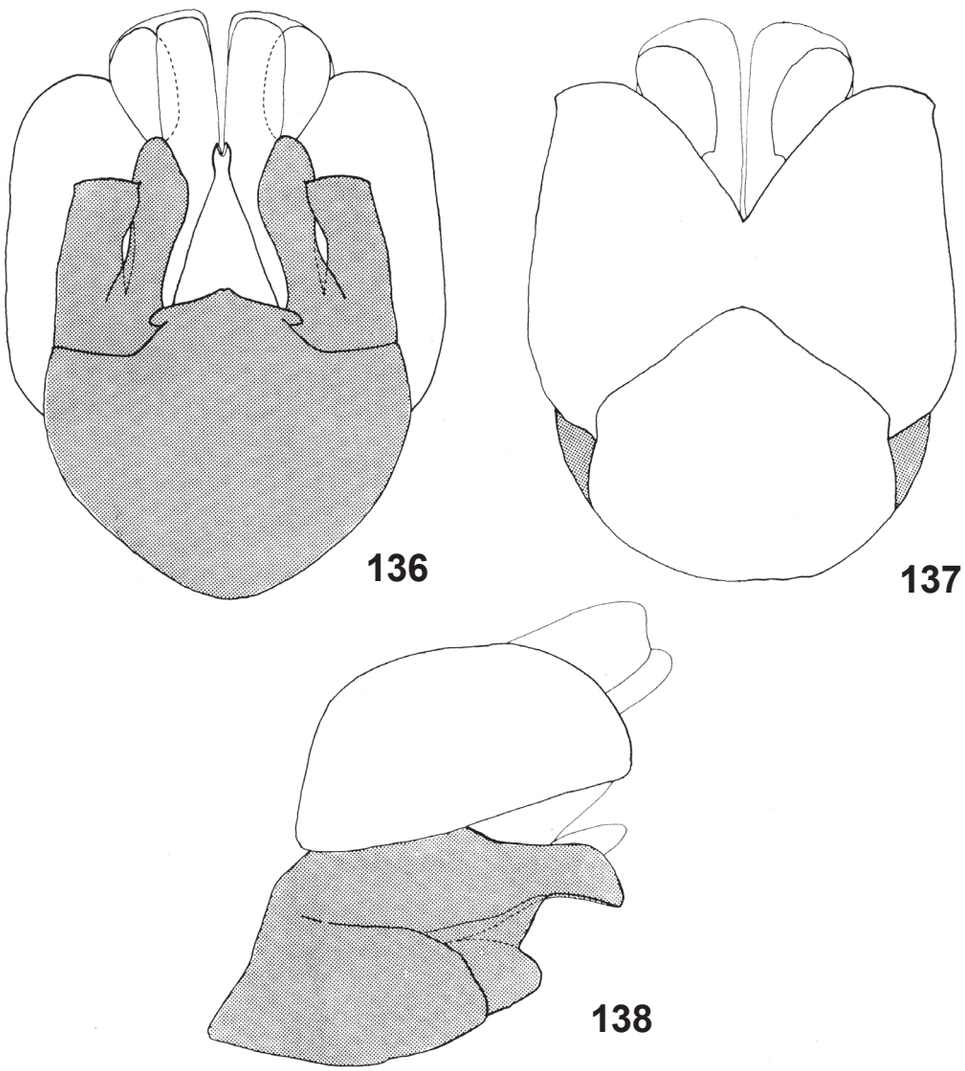
Figs. 122-127. Mydidae, male terminalia. 122-124. *Messiasia testaceiventris* (Macquart, 1850). 125-127. *Messiasia virgata* (Wiedemann, 1830). (dorsal view, 122, 125; ventral view, 123, 126; lateral view, 124, 127).



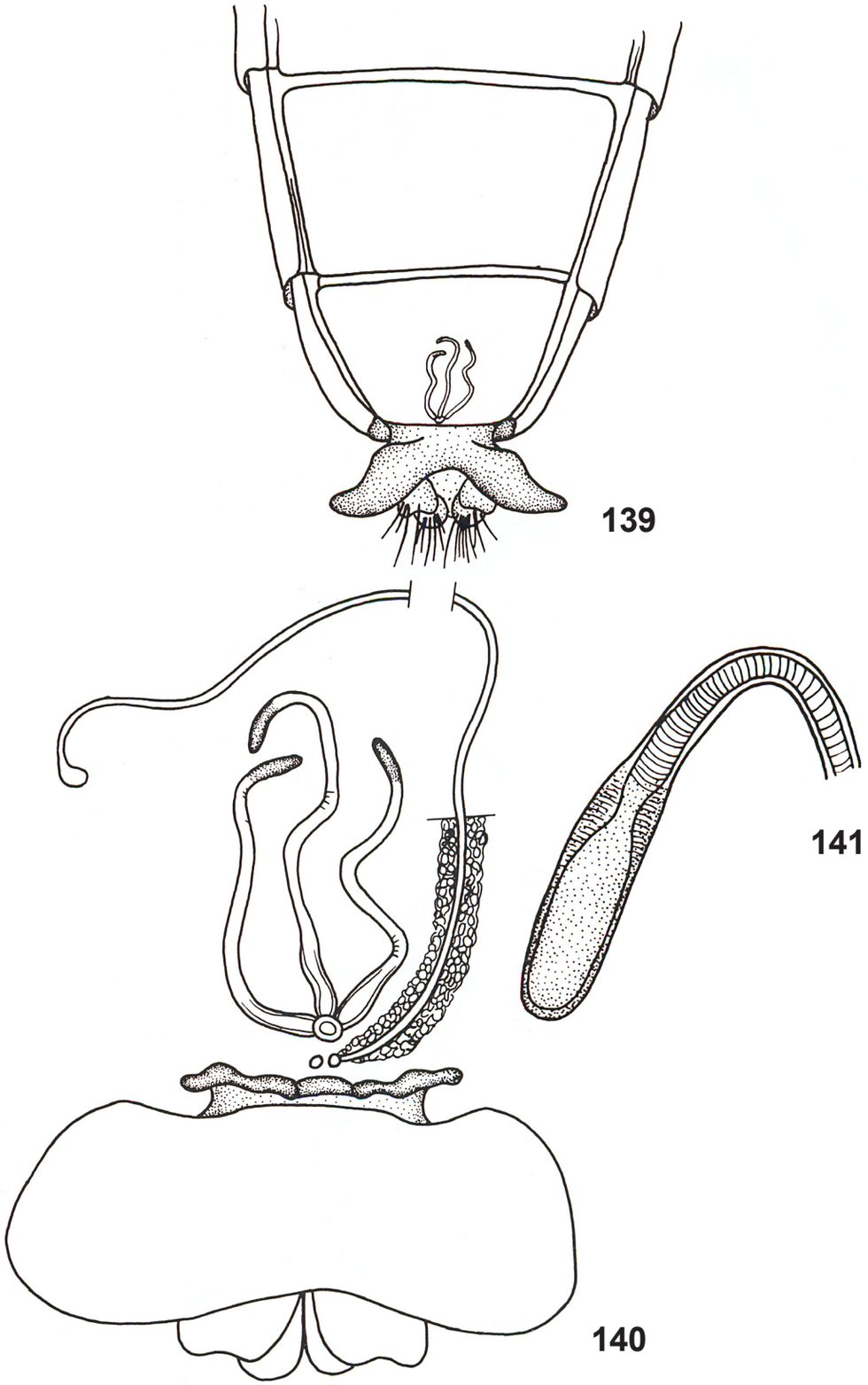
Figs. 128-133. Mydidae, male terminalia. 128-130. *Messiasia yacochuya* Wilcox & Papavero, 1975. 131-133. *Messiasia zikani* d'Andretta, 1951. (dorsal view, 128, 131; ventral view, 129, 132; lateral view, 130, 133).



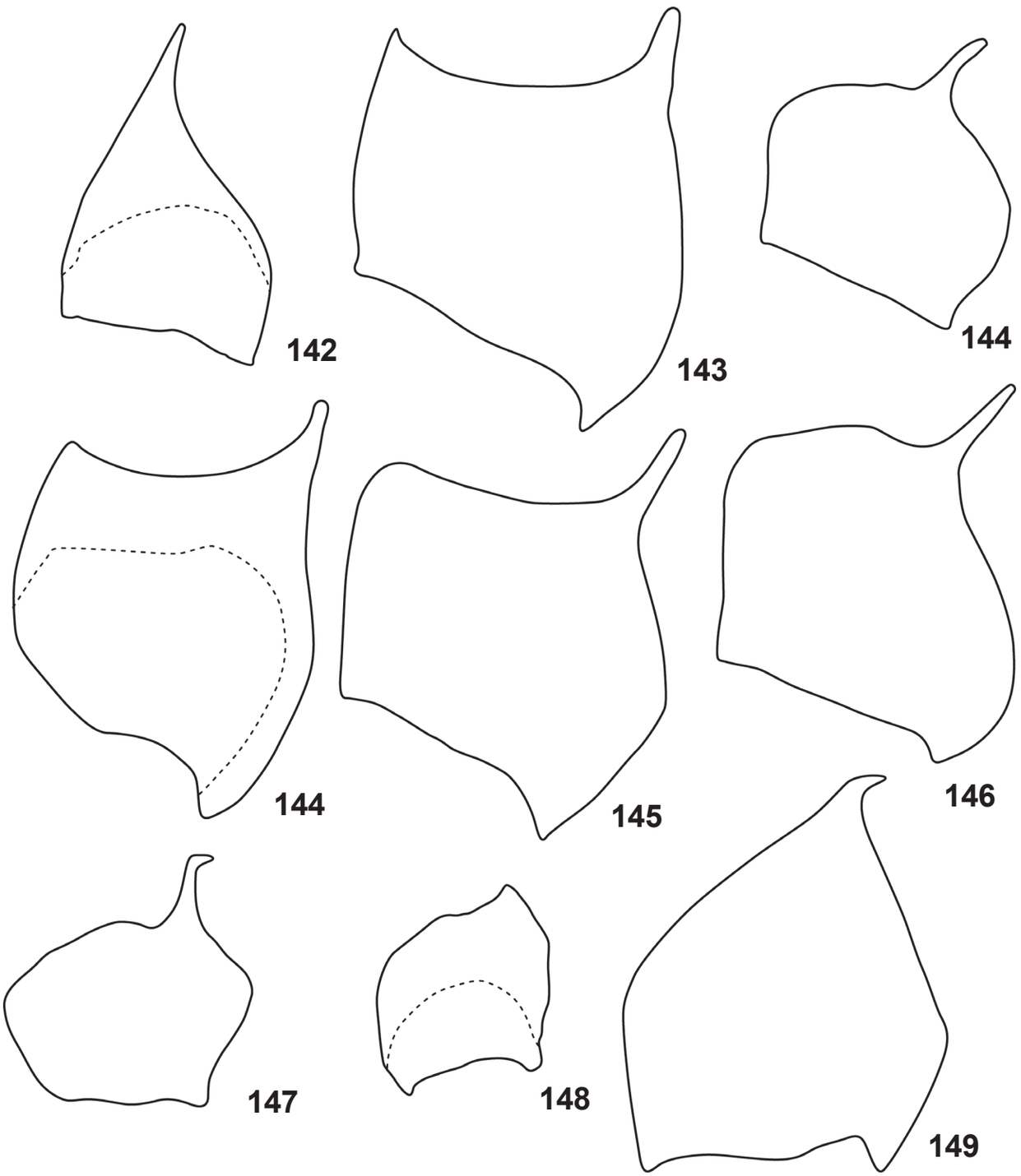
Figs. 134-135. *Messiasia dalcyana* d'Andretta, 1951: 134, tip of abdomen showing situation of spermathecae and furca; 135, spermathecae and furca.



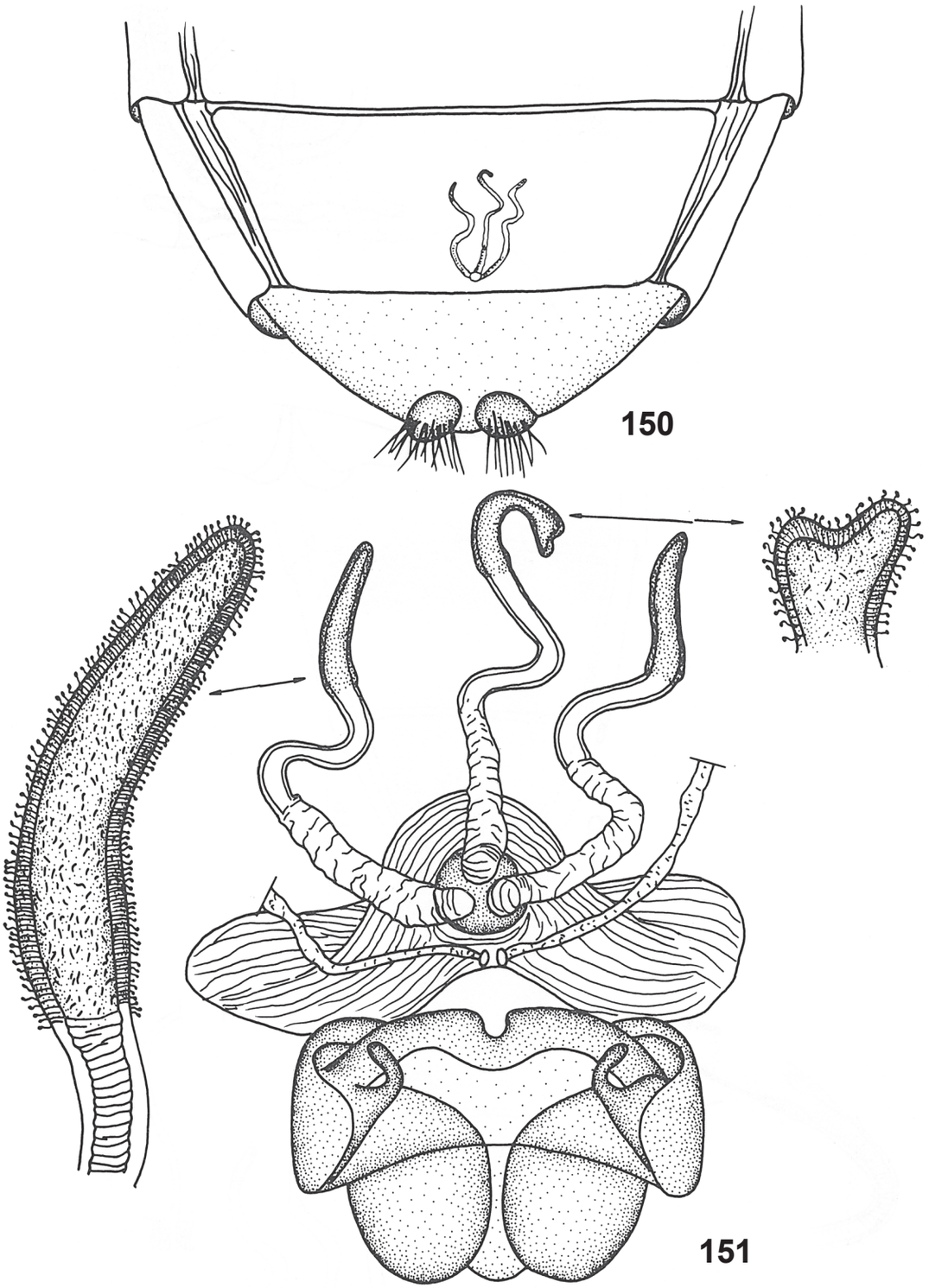
Figs. 136-138. *Phyllomydas bruesii* Johnson, 1926: male terminalia in ventral (136), dorsal (137) and lateral (138) views.



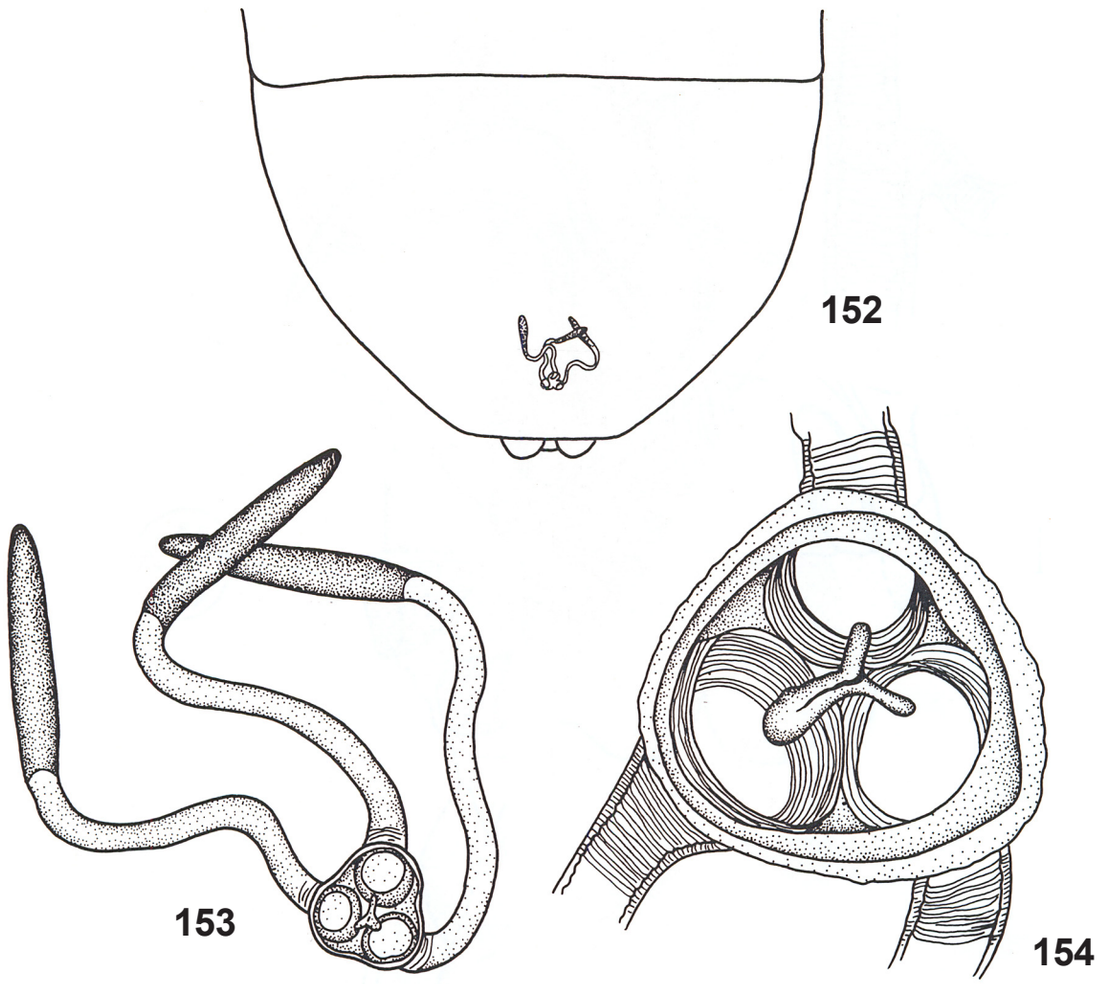
Figs. 139-141. *Phyllomydas bruesii* Johnson, 1926: 139, tip of abdomen showing situation of spermathecae; 140, spermathecae and furca; 141, spermathecae.



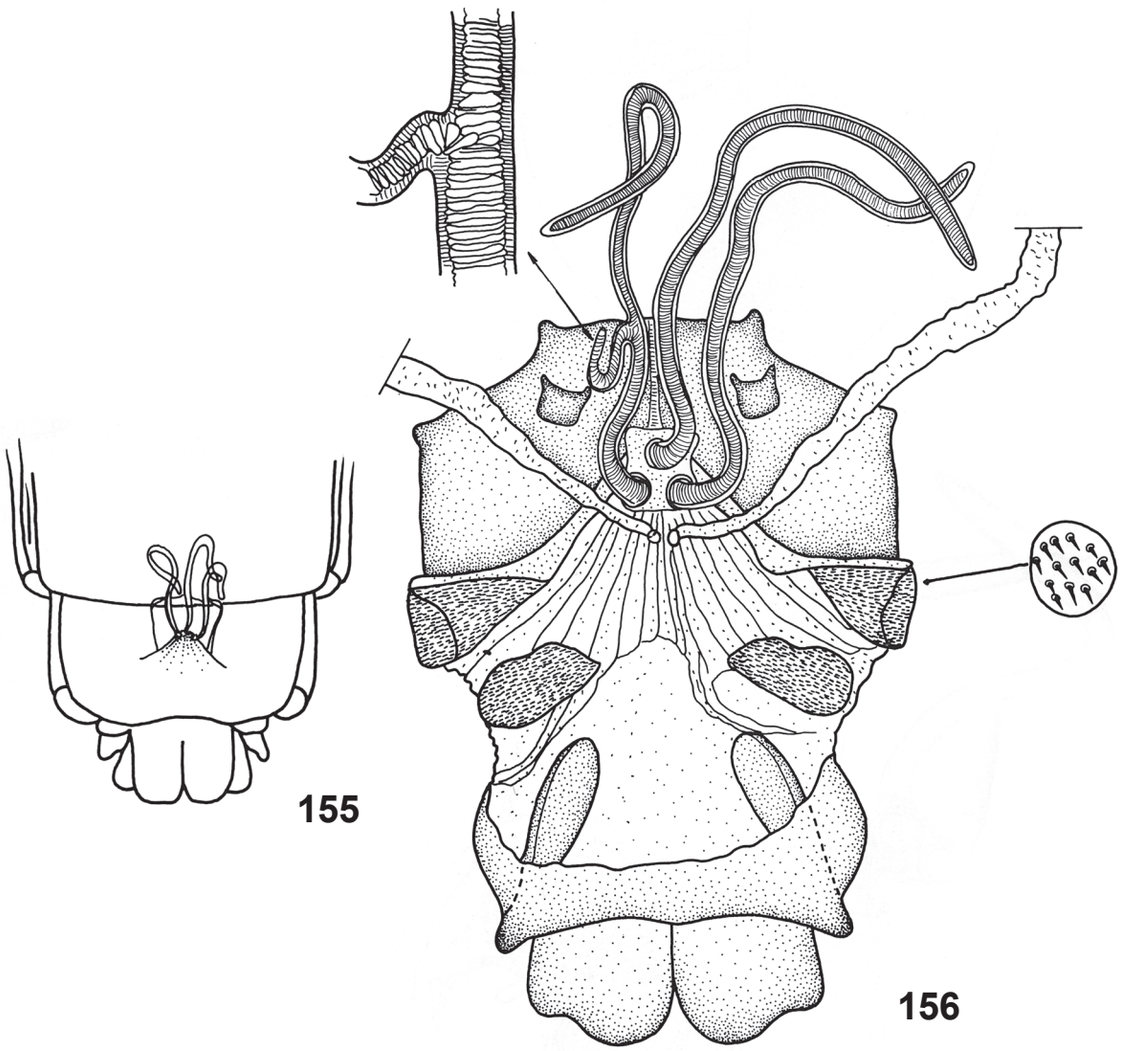
Figs. 142-149. Epandrial halves of: 142, *Gauromydas apicalis* (Wiedemann, 1830); 143, *Protomydas caerulescens* (Olivier, 1811); 144, *Mydas clavatus* (Drury, 1773); 145, *Protomydas rubidapex* (Wiedemann, 1830); 146, *Gauromydas heros* (Perty, 1833); 147, *Baliomydas gracilis* (Macquart, 1834); 148, *Stratiomydas rufiventris* (Macquart, 1850); 149, *Gauromydas mystaceus* (Wiedemann, 1830).



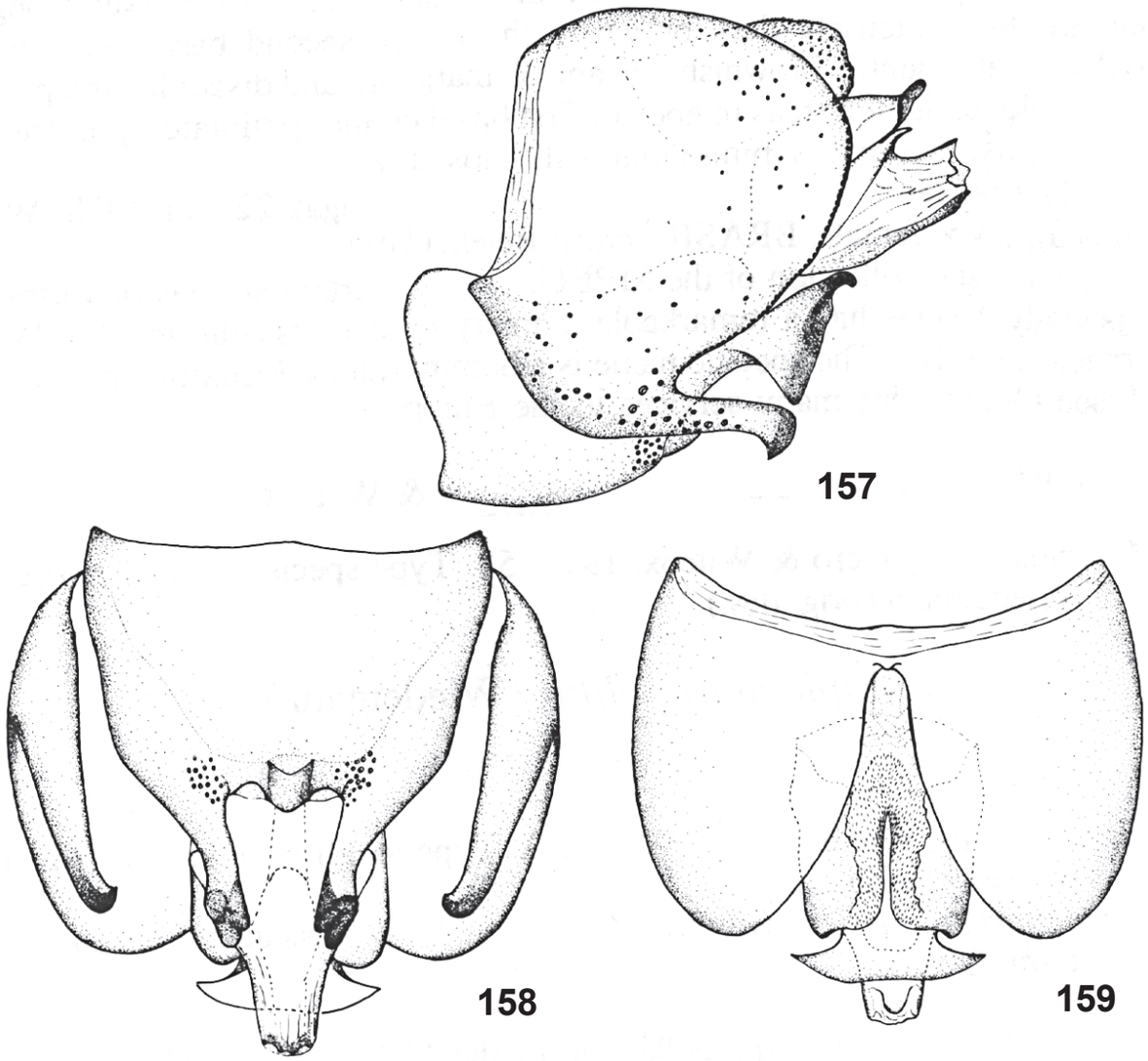
Figs. 150-151. *Protomydas coerulescens* (Olivier, 1811): 150, tip of abdomen showing position of spermathecae; 151, spermathecae (with details and central capsule with teratological growth) and furca.



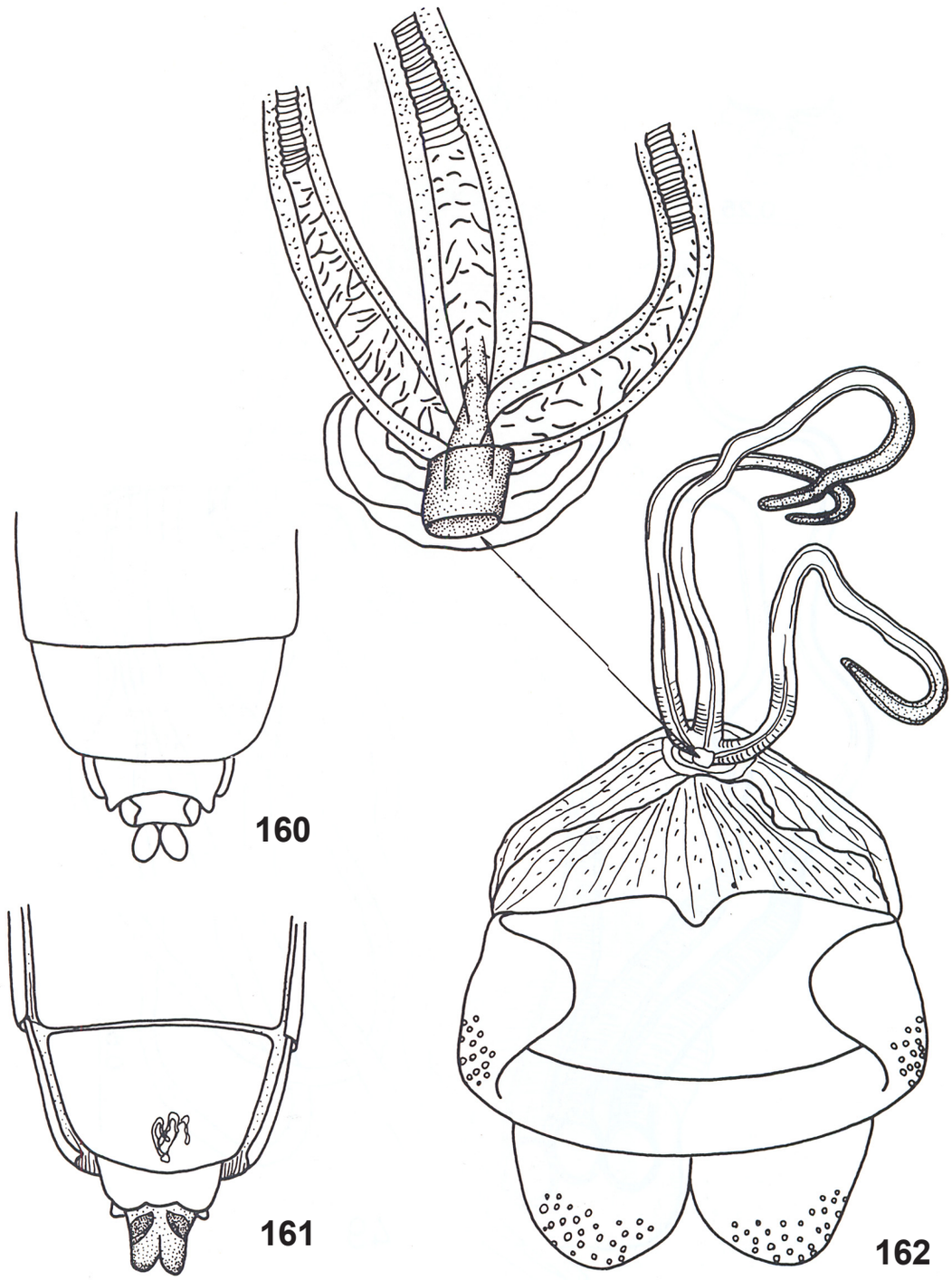
Figs. 152-154. *Gauromydas heros* (Perty, 1833): 152, tip of abdomen showing position of spermathecae; 153, spermathecae; 154, detail of confluence of the three ducts of the spermathecae.



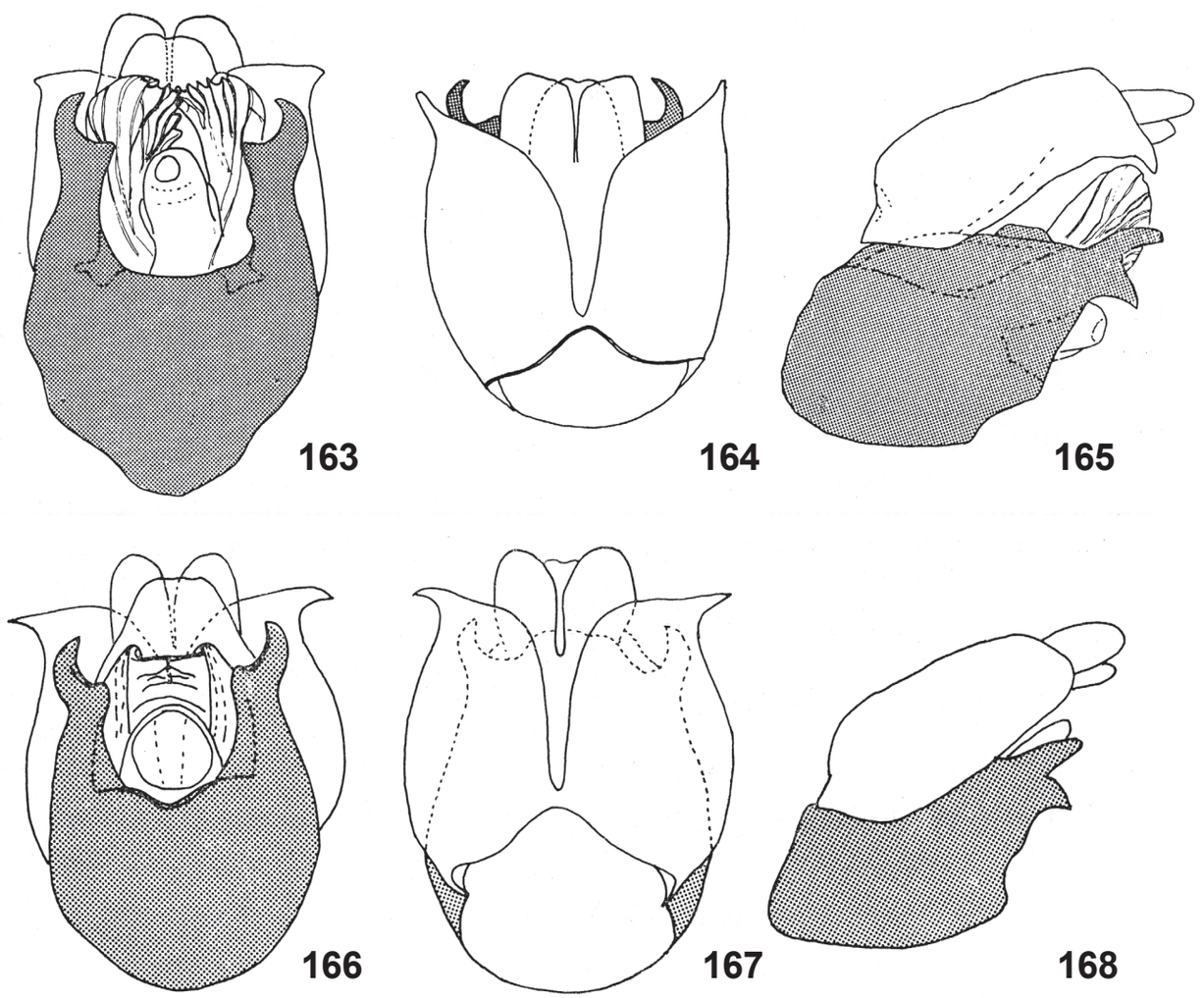
Figs. 155-156. *Mydas clavatus* (Drury, 1773): 155, tip of abdomen showing position of spermathecae; 156, spermathecae and detail of teratological growth of duct.



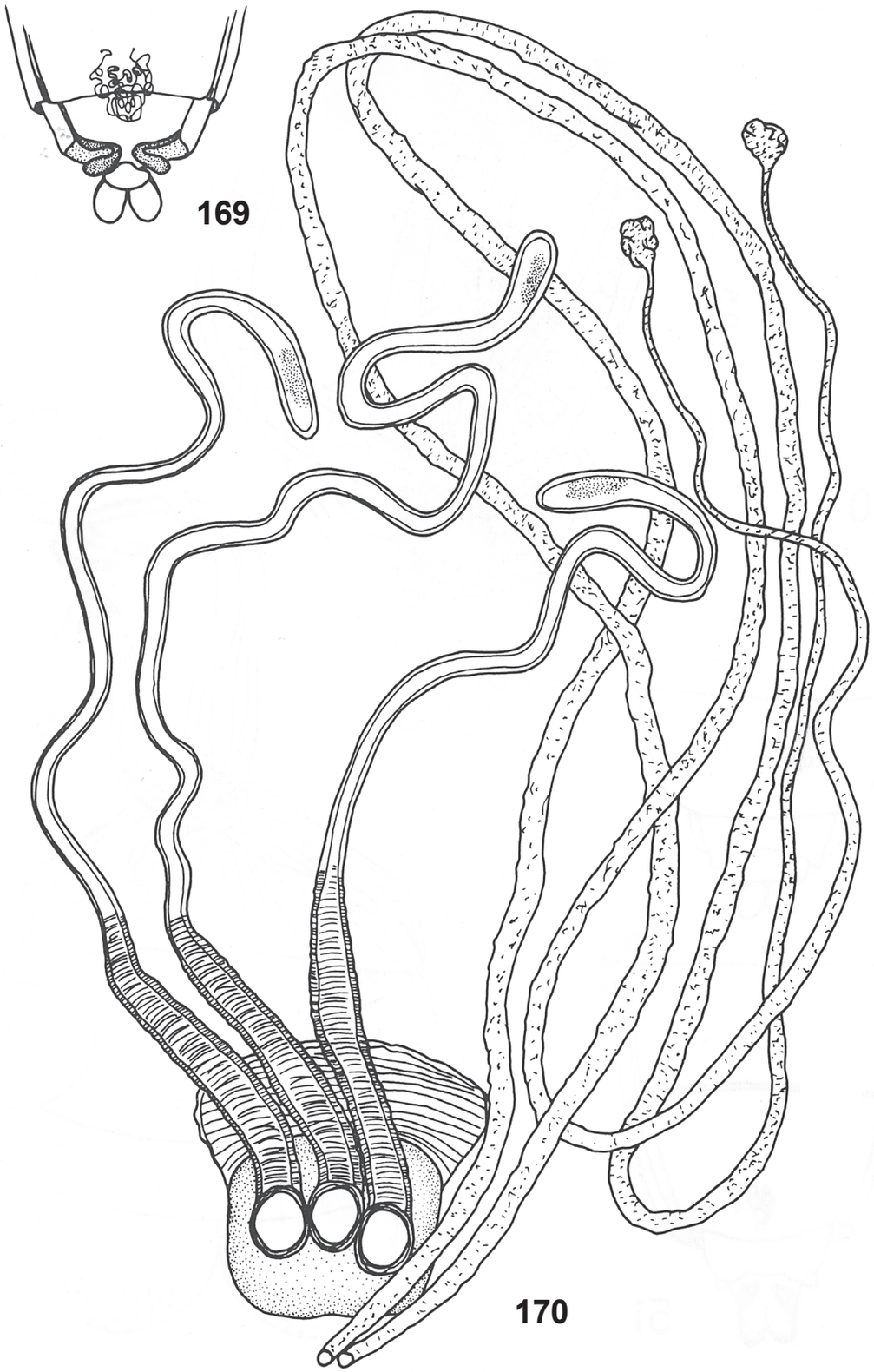
Figs. 157-159. *Mapinguari politus* (Wiedemann, 1828), male terminalia in lateral (157), ventral (158) and dorsal (159) views.



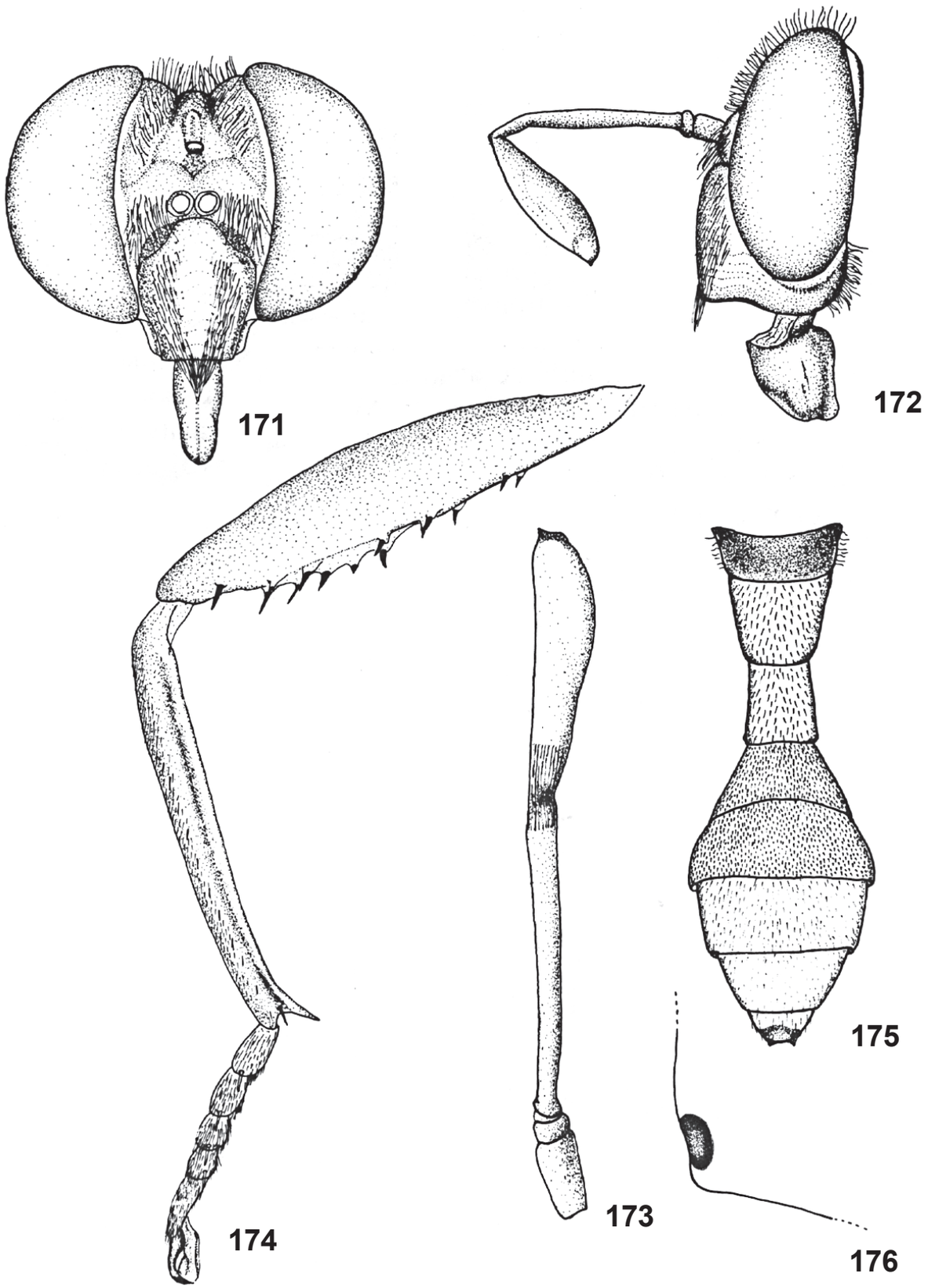
Figs. 160-162. *Mapinguari politus* (Wiedemann, 1828): 160, dorsal view of abdomen's apex; 161, ventral view of abdomen's apex, showing situation of spermathecae; 162, spermathecae and detail of confluence of the three ducts of the spermathecae.



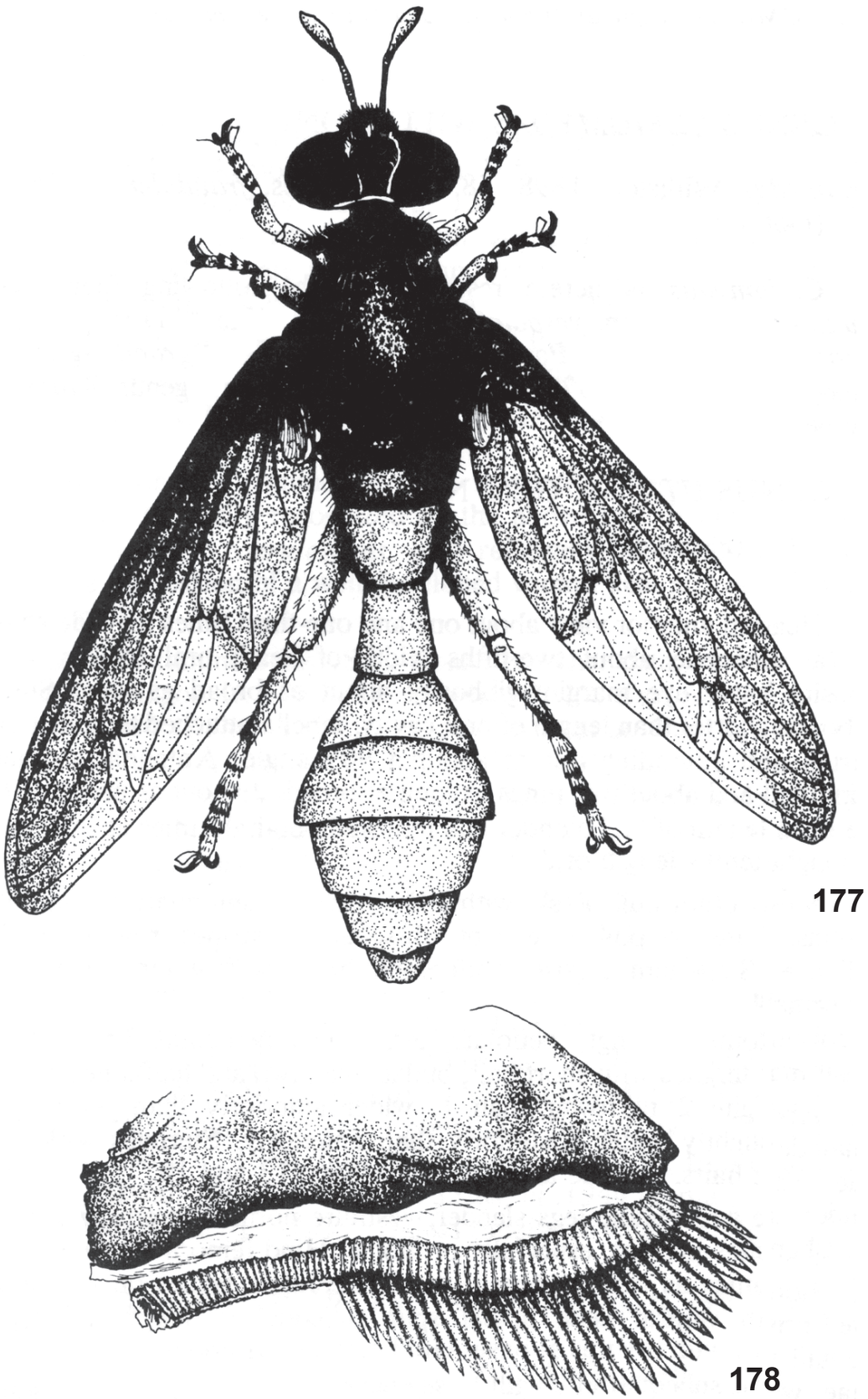
Figs. 128-133. Mydidae, male terminalia. 163-165. *Ceriomydas crassipes* (Westwood, 1841). 166-168. *Ceriomydas vespoides* Papavero & Wilcox, 1974. (dorsal view, 163, 166; ventral view, 164, 167; lateral view, 165, 168).



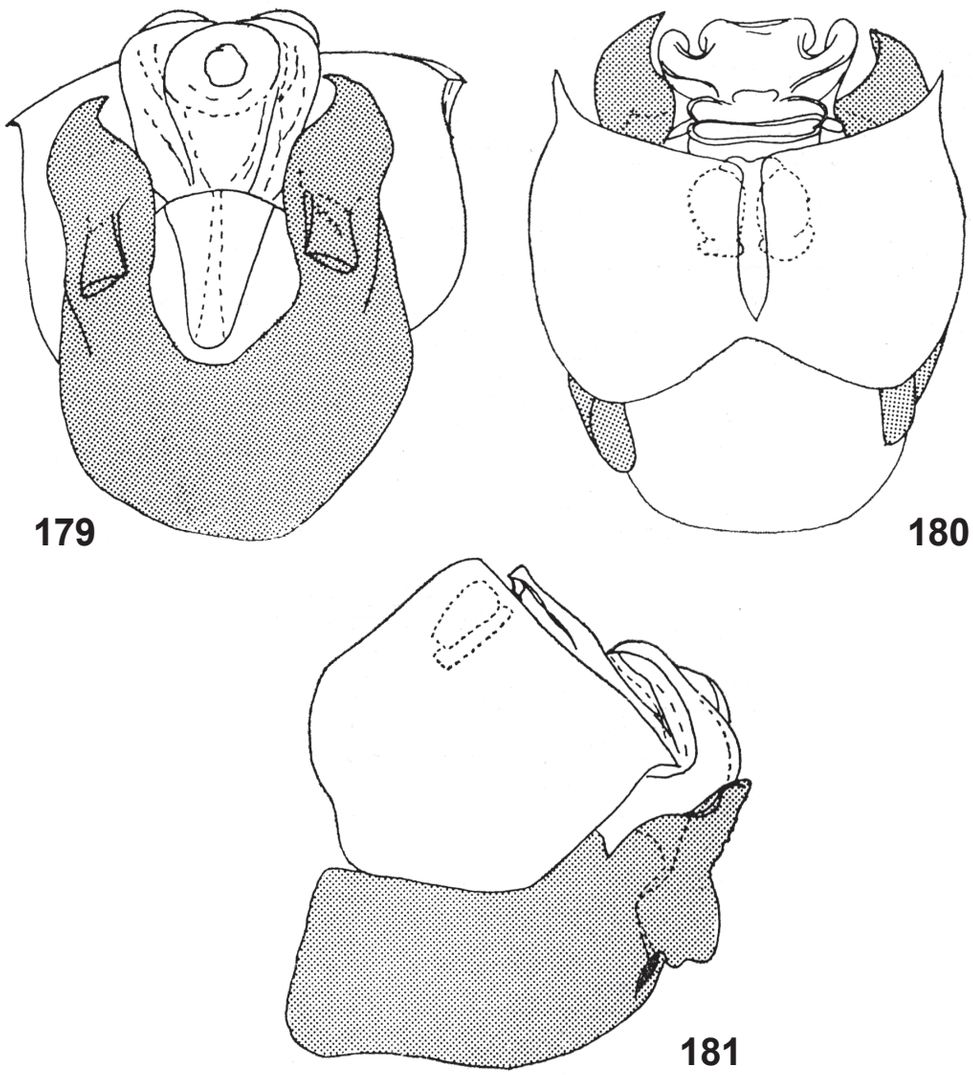
Figs. 169-170. *Ceriomydas crassipes* (Westwood, 1841): 169, tip of abdomen showing situation of spermathecae; 170, spermathecae [notice the extreme development of accessory glands].



Figs. 171-176. *Utinga francai* Wilcox, Papavero & Pimentel, 1989: 171-172, head in frontal (171) and lateral (172) views; 173, antenna; 174, hind leg; 175, abdomen; 176, abdominal bulla.



Figs. 177-178. *Utinga francai* Wilcox, Papavero & Pimentel, 1989: 174, habitus; 175, squama.



Figs. 179-181. *Baliomydas gracilis* (Macquart, 1834), male terminalia in ventral (176), dorsal (177) and lateral (178) views.

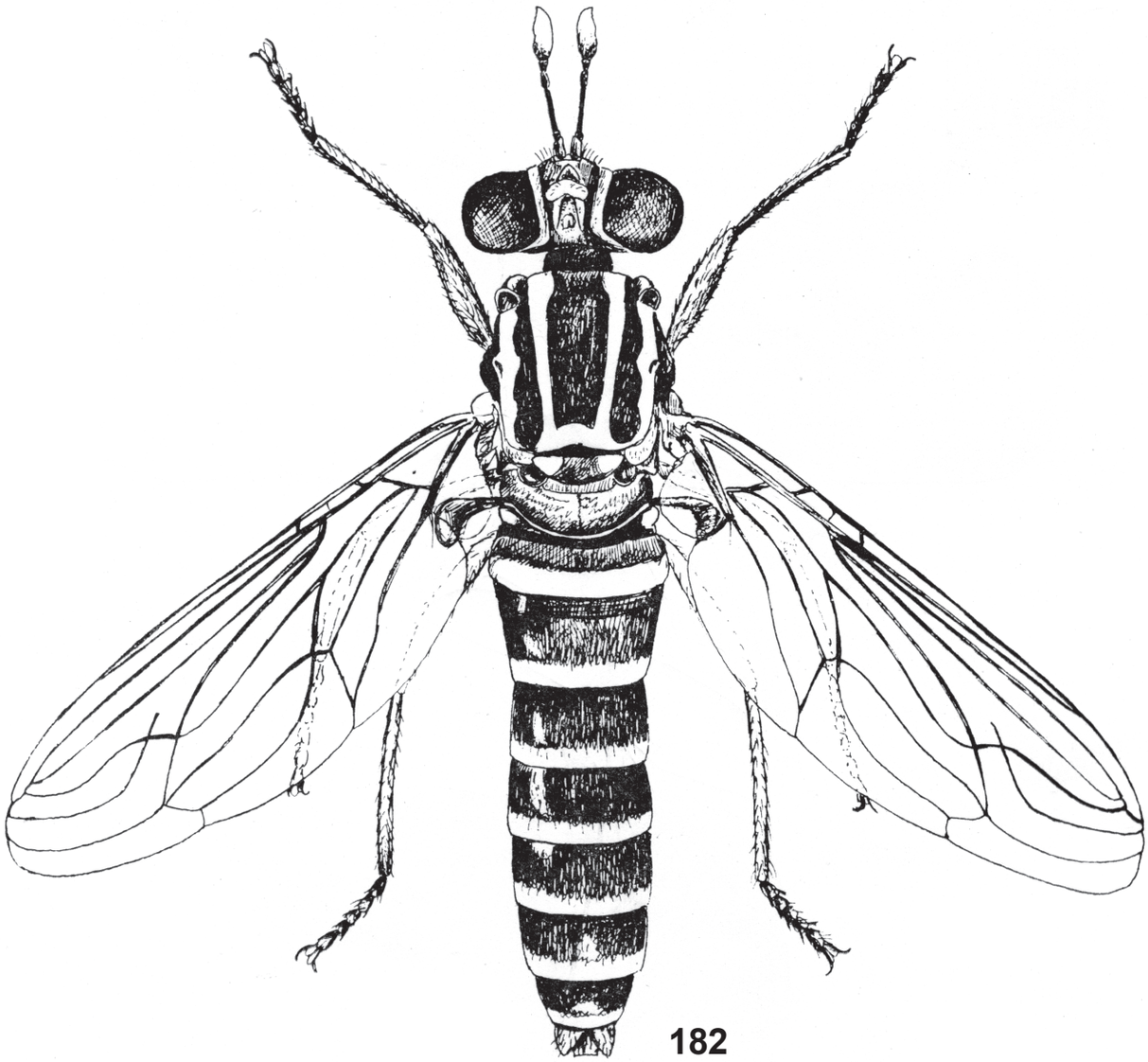
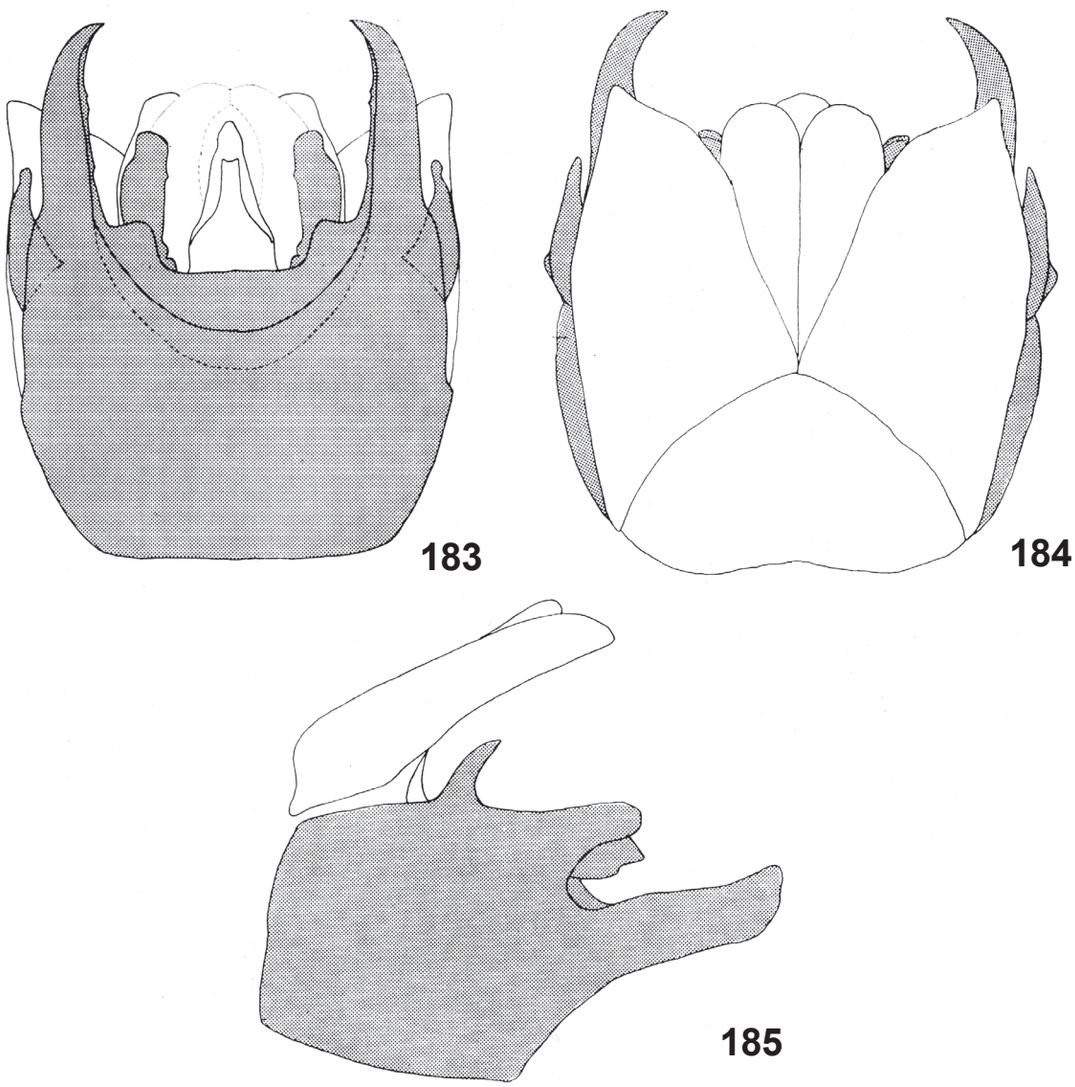
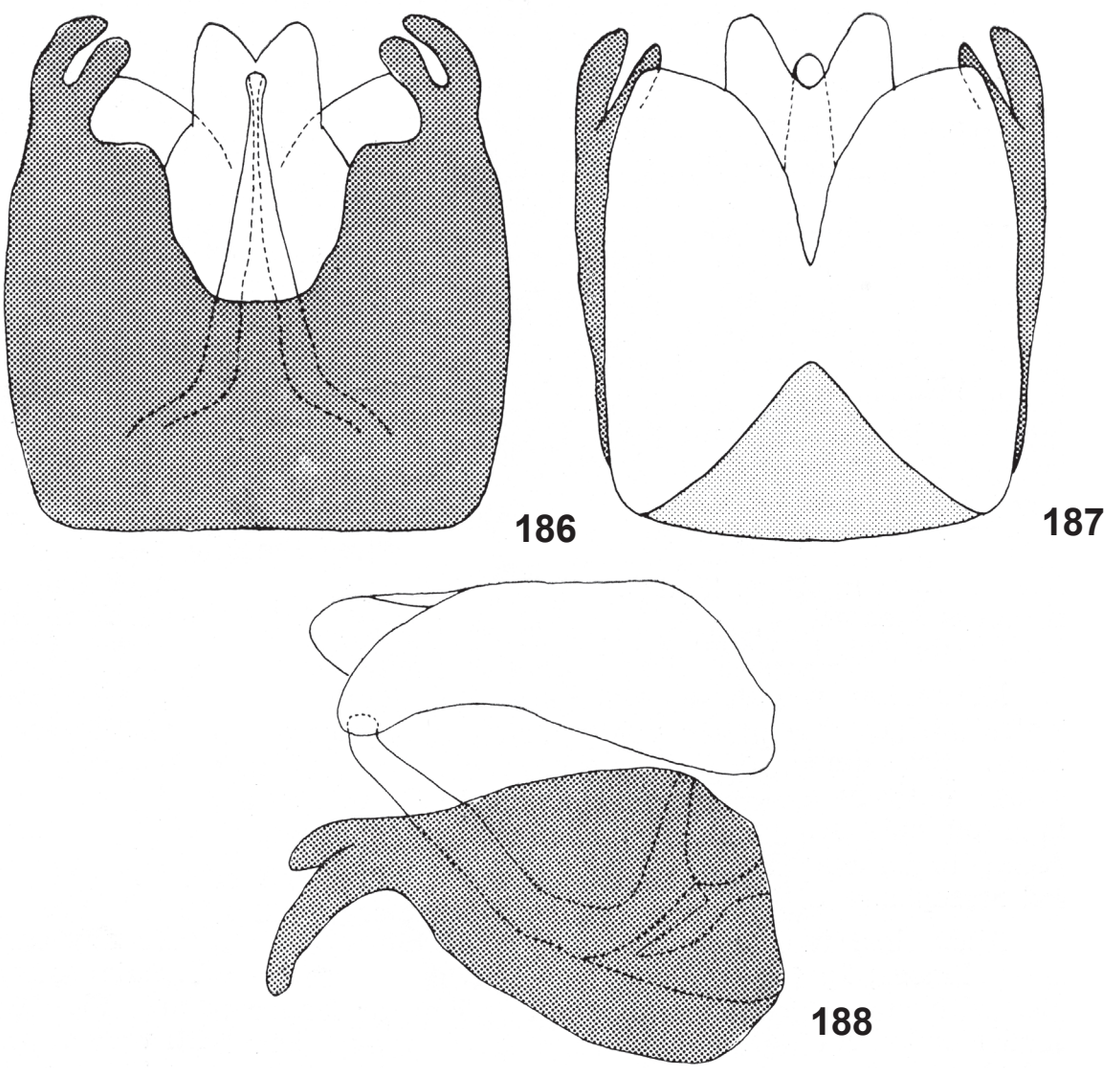


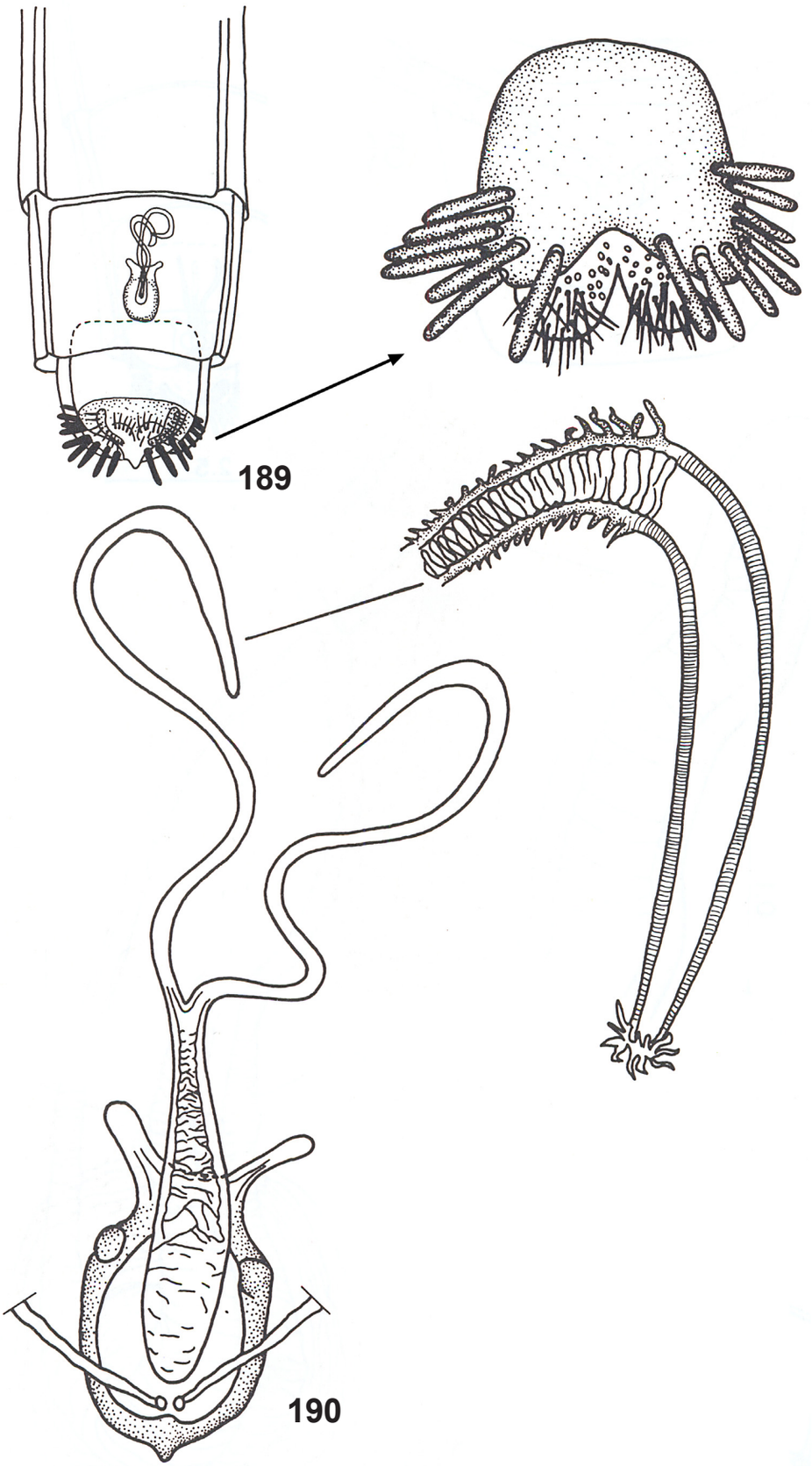
Fig. 182. *Plyomydas peruviensis* Wilcox & Papavero, 1971, habitus.



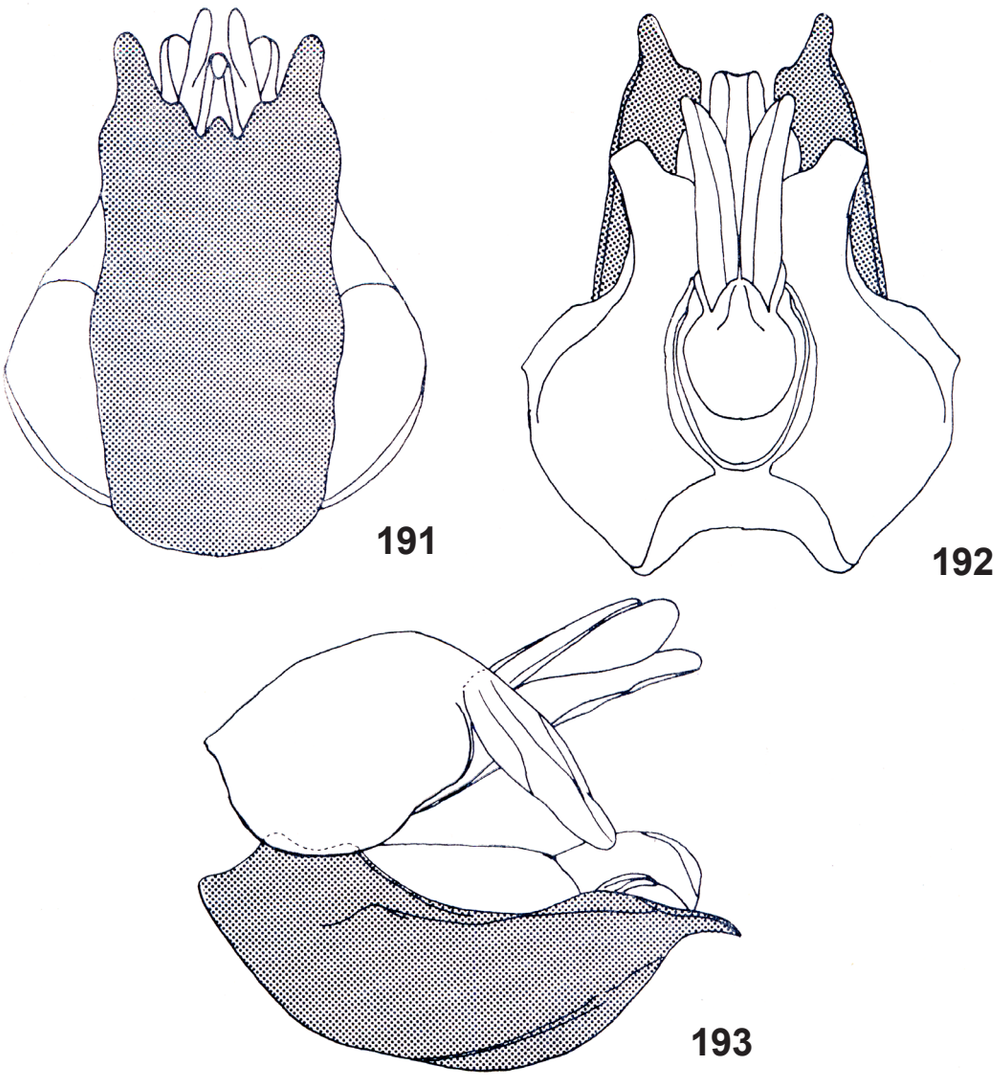
Figs. 183-185. *Plyomydas peruviensis* Wilcox & Papavero. 1971, male terminalia in ventral (183), dorsal (184) and lateral (185) views.



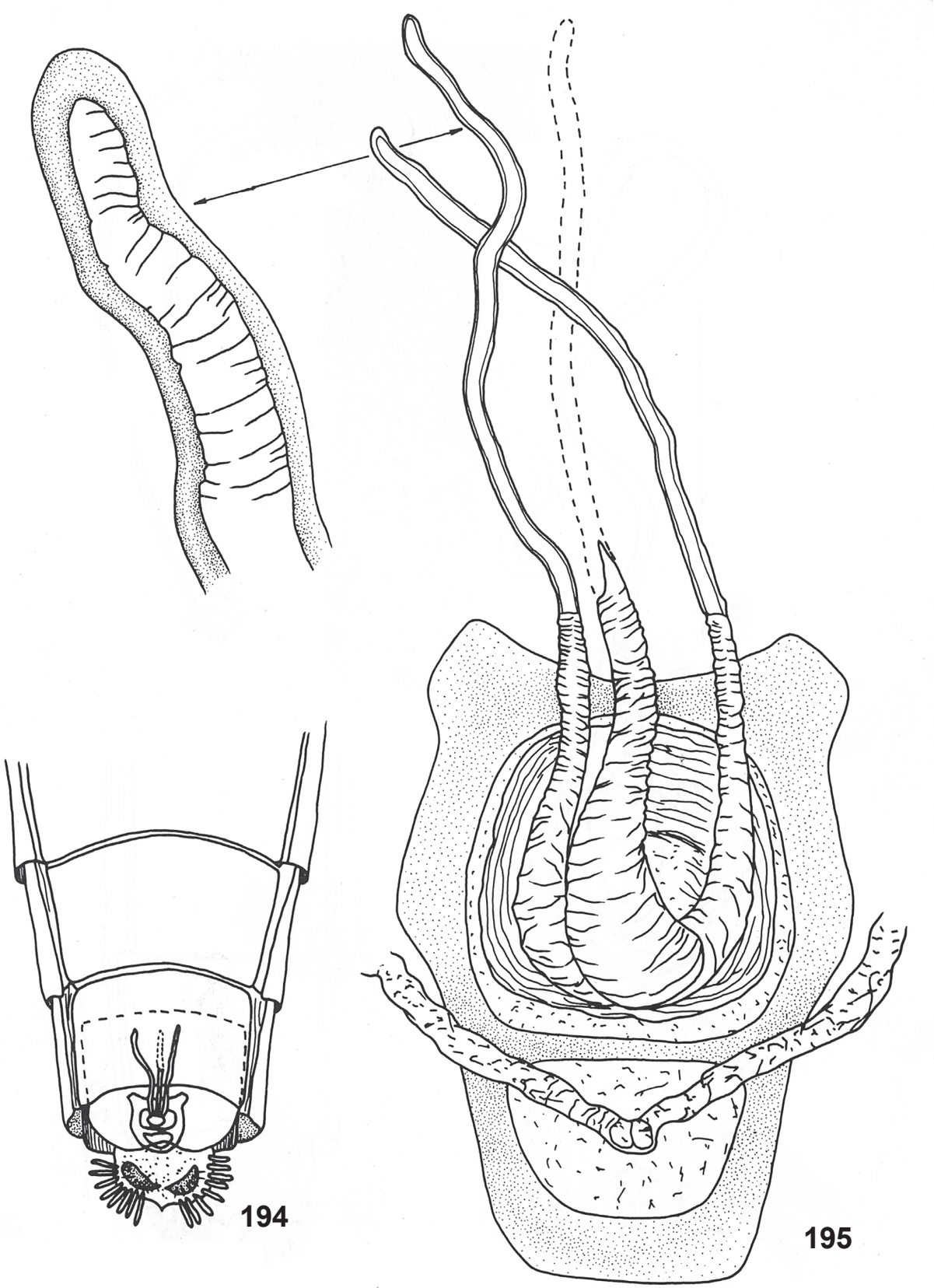
Figs. 186-188. *Nemomydas pantherinus* (Gerstaecker, 1868), male terminalia in ventral (186), dorsal (187) and lateral (188) views.



Figs. 189-190. *Nemomydas pantherinus* (Gerstaecker, 1868): 189, tip of abdomen showing position of spermathecae; 190, spermathecae and furca.



Figs. 191-193. *Pseudonomoneura hirta* (Coquillett, 1904), male terminalia in ventral (191), dorsal (192) and lateral (193) views.



Figs. 194-195. *Pseudonomoneura hirta* (Coquillett, 1904): 194, tip of abdomen showing situation of spermathecae; 195, spermathecae.

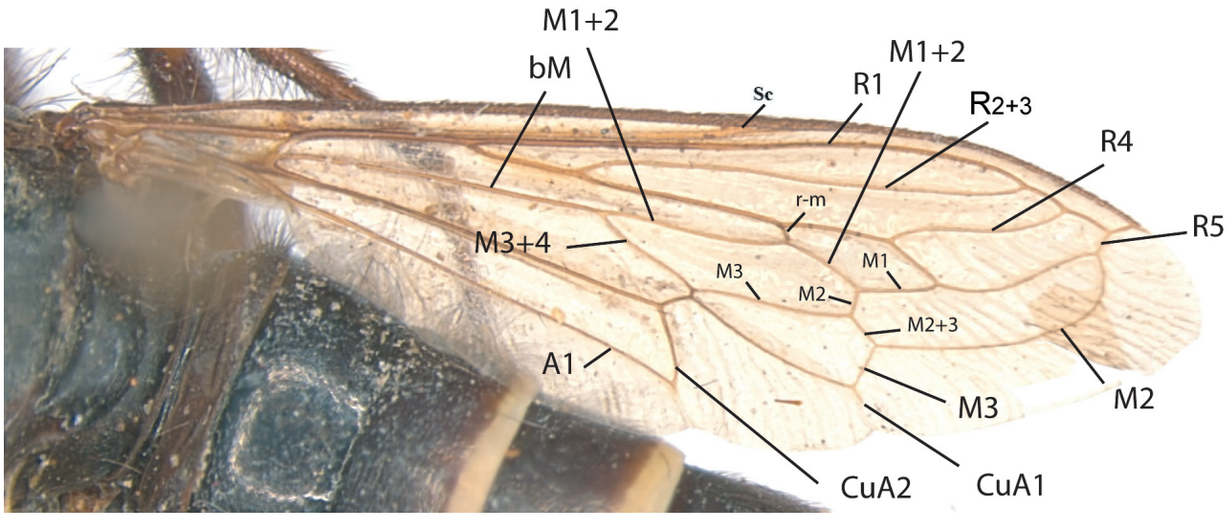


Figure 196. *Megascelus nigrovillosus* Artigas, 1970, wing.

Figure 197. *Megascelus nigrovillosus* Artigas, 1970: head, dorsal view.

Figure 198. *Megascelus nigrovillosus* Artigas, 1970: head, lateral view.

Figure 199. *Megascelus nigrovillosus* Artigas, 1970: head and thorax, dorsal view.

Figure 200. *Megascelus nigrovillosus* Artigas, 1970: hind tarsus.

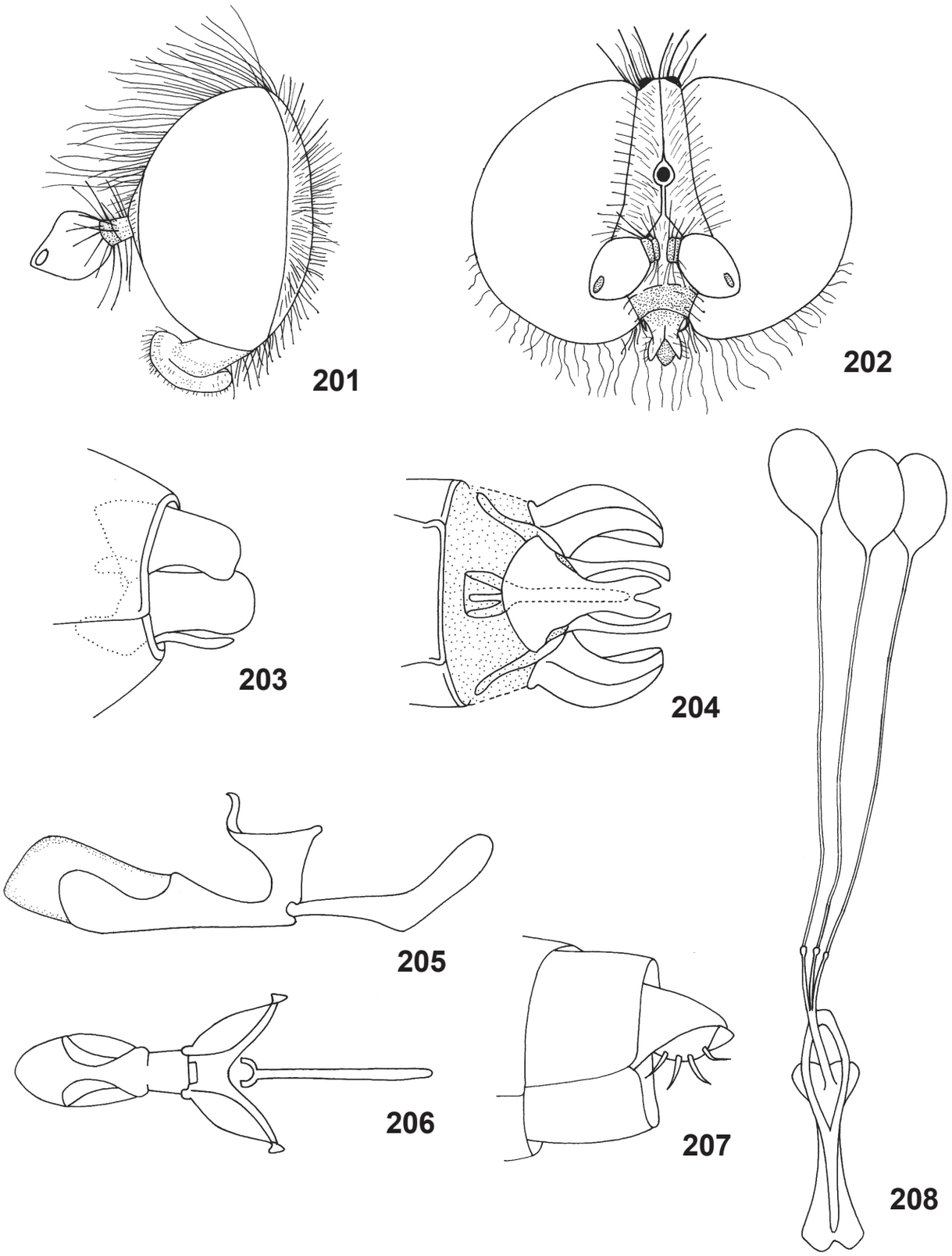


Figure1 201-208. *Megascelus albovillosus* Artigas, 1973. 201-202. Head, lateral and frontal views. 203-204. Male terminalia, lateral and ventral views. 205-206. Aedeagus, lateral and dorsal views. 207. Apex of female abdomen. 208. Spermathecae.

Figure 209. *Pseudorhopalia mirandai* (d'Andretta & Carrera, 1951), habitus.

Figure 210. *Pseudorhopalia mirandai* (d'Andretta & Carrera, 1951), head in ventral view.

Figure 211. *Pseudorhopalia mirandai* (d'Andretta & Carrera, 1951), hind tibia and tarsus.

Figure 212. *Pseudorhopalia mirandai* (d'Andretta & Carrera, 1951), wing.

Figure 213. *Paramydas igniticornis* (Bigot, 1857), head, lateral view.

Figure 214. *Paramydas igniticornis* (Bigot, 1857), pleura, showing pilose katepimeron.

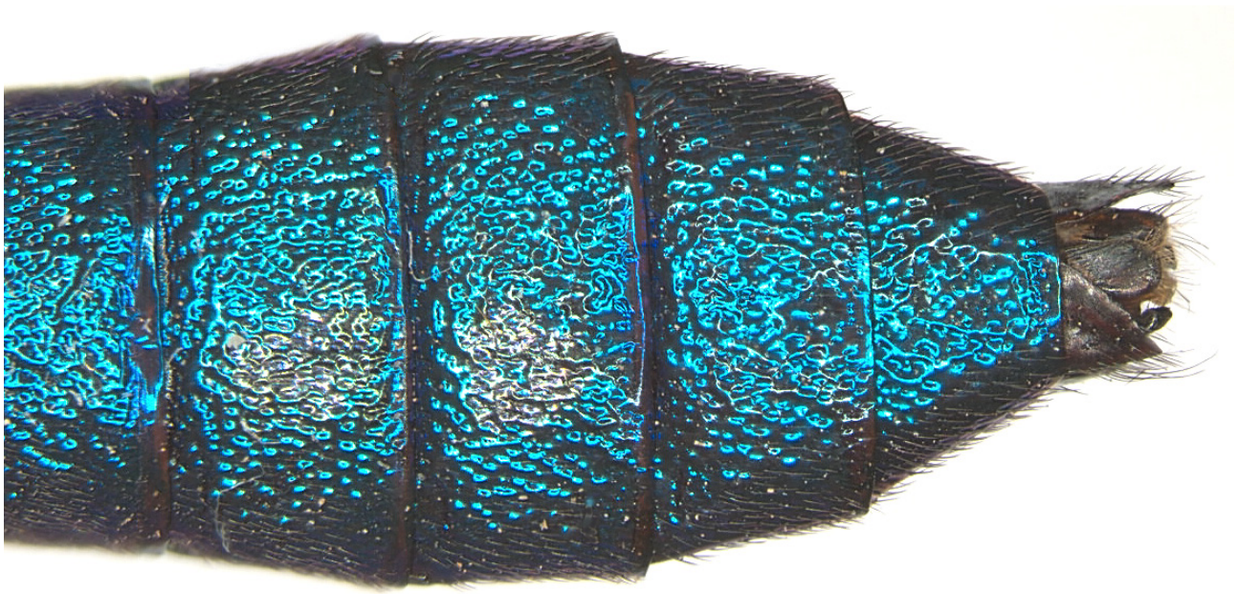


Figure 214. *Paramydas igniticornis* (Bigot, 1857), abdomen, dorsal view.

Figure 215. *Paramydas igniticornis* (Bigot, 1857), alula.

Figure 216. *Apiophora quadricincta* Artigas & Palma, 1979, base of wing.

Figure 217. *Apiophora quadricincta* Artigas & Palma, 1979, habitus.