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Female terminalia of lower Brachycera — II

(Diptera)

With 39 text figures

Introduction

This paper describes and illustrates the female terminalia of Stratiomyidae, Pantophthalmidae, and the genus *Heterostomus* (probably Coenomyiidae) and deals with a total of 39 species belonging to 26 genera.

The Stratiomyidae contain numerous genera of which a small portion is now examined with respect to the female terminalia. The classification of Stratiomyidae may partially be artificial, that is, the subfamily Clitellariinae and Pachygasterinae may be heterogeneous, but it is still difficult to stop a gap at the present state of our knowledge.

The chapter on techniques and terminology in our previous report (part 1; NAGATOMI & IWATA 1976) is applicable to this part 2. In the text, not a few misinterpretations or hasty generalizations might be unavoidable. In the illustrations, *A*: posterior part of abdomen, dorsal view; *B*: sternum 8 and genital furca, ventral view; *C*: cercus; *C1—2*: segments 1—2 of cercus; *T7—10*: terga 7—10.

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Additions to the key to families (a)

1 A pair of cerci distant from each other; tergum 10 conspicuously protruded posteriorly or if not so cercus 1-segmented, tergum 10 present, and intersegmental membrane between terga 7—8 long . . . . . 1′

— A pair of cerci adjacent to each other or if not so some of the following characters present: cercus 2-segmented, tergum 10 absent or intersegmental membrane between terga 7—8 hardly visible or short 2

1′(1) Distance between cerci wider and tergum 10 generally broader . . Stratiomyidae

— Distance between cerci closer and tergum 10 except basal part narrower or evanescent; tergum 8 and sternum 8 greatly long . . . . . Pantophthalmidae

5 (4) Terga 7 and 8 wider than long (it may not be so in *Atherimorpha* of Rhagionidae where tergum 10 is undivided) 6

— Terga 7 and 8 much longer than wide, or about as long as wide in *Heterostomus* where tergum 10 is divided into a pair (Xylophagidae s. lat.) 7

9 (7) Tergum 10 more developed and sternum 8 less elongate than in Exeretoneuridae (Coenomyiidae) . . . . . 9′

— Tergum 10 less developed (or possibly absent) and sternum 8 more elongate than in Coenomyiidae . . . . . Exeretoneuridae

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9′(9) Terga 7—8 and sternum 7 about as long as wide, and sternum 8 about as long as and narrower than tergum 8; tergum 10 shorter and distinctly divided into a pair . . . . . Heterostominae (*Heterostomus*)
— Terga 7—8 and sternum 7 distinctly longer than wide, and sternum 8 larger than tergum 8; tergum 10 especially its lateral margin longer . . . . . Coenomyiinae

Family Stratiomyidae (Figs. 1—36)

Characters of family. The female terminalia of Stratiomyidae are very diverse in shape: abdominal segments 6—8, 7—8, or sometimes 4—8 form an ovipositor which is often indistinct (i.e. they are not much narrower than preceding segment); intersegmental membrane between terga 7—8 long or short; cercus sometimes 1-segmented (usually 2); tergum 9 sometimes divided into a pair; terga 7—8 and sterna 7—8 longer than wide, as long as wide, or wider than long.

Stratiomyidae are characterized as follows: a pair of cerci are far distant from each other; tergum 10 is always present and conspicuously protruded posteriorly, although in some Pachygasterinae (e.g. *Abrosiomyia* (which belongs to *Pachygaster* s. lat.)) it is not protruded posteriorly.

The female terminalia of Stratiomyidae are most similar to those of Pantophthalmidae but in the latter distance between cerci appears to be closer, tergum 10 except basal part may be narrower or evanescent, and tergum 8 and sternum 8 are greatly long.

Some Pachygasterinae (e.g. *Abrosiomyia* in which tergum 10 is not protruded posteriorly) are similar to Vermileonidae and some Rhagionidae (i.e. *Ptiolina*, *Spania*, and *Spaniopsis*) in which a pair of cerci are well separated from each other. But in the latter some of the following characters are recognized: cercus 2-segmented, tergum 10 absent, or intersegmental membrane between terga 7—8 hardly visible or short.

Key to generic groups of Stratiomyidae (b)

1 Abdominal segments 1—7 (or 1—8) plainly visible; in Beridinae (at least the genera *Actina*, *Allognosta*, *Beris*, and *Chorisops*) and some Chiromyzinae (e.g. *Inopus*), ovipositor indistinct, i.e. terminal segments not abruptly narrower than preceding segment, while in other Chiromyzinae (at least some *Chiromyza*) ovipositor composed of segments 4—8 2
— Segments 6—8 (or 7—8) concealed beneath segment 5 (or 6) and not visible in principle; ovipositor composed of segments 6—8 (or 7—8) 3

2(1) Sterna 7—8 and often terga 7—8 longer than wide . . . . . *Chiromyza* and *Inopus* (Chiromyzinae)
— Terga 7—8 and sterna 7—8 much wider than long . . . . . *Actina*, *Allognosta*, *Beris*, and *Chorisops* (Beridinae)

3(2) Cercus 1-segmented 4
— Cercus 2-segmented 6

4(3) Terga 7—8 wider than long; cercus very large or larger; tergum 10 conspicuously protruded posteriorly 5
— Terga 7—8 longer than wide or not wider than long; cercus small; in *Abrosiomyia* tergum 10 not protruded posteriorly . *Abrosiomyia* and *Wallacea* (Pachygasterinae)

5(4) Tergum 8 not protruded latero-posteriorly; cercus larger . . . . . *Oxycera* (Clitellariinae) and *Rhaphiocerina* (Prosopochrysinae)
— Tergum 8 protruded latero-posteriorly; cercus smaller . . *Brachycara* (Clitellariinae)

6(3) In cercus difference in size between segments 1 and 2 not so conspicuous . . . 7
— In cercus segment 1 becoming very wide and segment 2 much narrower and shorter than segment 1; terga 7—8 wider than long . . . . . *Stratiomys*, *Odontomyia*, and *Orthogoniocera* (Stratiomyinae)

7(6) Tergum 9 not protruded postero-outwardly 8
— Tergum 9 is peculiar, i.e. lateral part is more strongly chitinous and protruded postero-outwardly . . . . . *Kolomania* (= *Ouchimyia*) (Pachygasterinae)

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8(7) Sternum 8 not longer than tergum 8 + tergum 9 except for *Hermetia* in which tergum 9 divided into a pair; tergum 9 often divided 9
— Sternum 8 distinctly longer than tergum 8 + tergum 9; tergum 9 undivided and comparatively small . . . . . *Craspedometopon* and *Evaza* (Pachygasterinae)
9(8) Sternum 8 longer than tergum 8 + tergum 9; tergum 9 divided into a pair which are nearly connected with each other . . . . . *Hermetia* (Hermetinae)
— Sternum 8 shorter than or at most nearly as long as tergum 8 + tergum 9 . . . . . *Cephalochrysa, Chrysochroma, Microchrysa, Sargus,* and *Ptecticus* (Sarginae)

Subfamily Chiromyzinae (Figs. 1–2)

Characters of subfamily. Ovipositor indistinct or composed of segments 4–8 (in either event abdominal segments 1–8 plainly visible); intersegmental membrane between terga 7–8 long; sterna 7–8 and often terga 7–8 longer than wide.

The female terminalia of Chiromyzinae are similar to those of Sarginae. But segment 2 of cercus may not be as elongate as in the genera of Sarginae discussed in this paper.

Characters of genus and species. Two genera and 2 species have been examined. Genus *Chiromyza* WIEDEMANN, 1820 (Fig. 1): At least in *papuae*, tergum 9 appears to be divided into a pair (but connected with each other), tergum 8 and sternum 8 much longer than wide, and tergum 7 and sternum 7 also distinctly longer than wide, terga 7–8 and sterna 7–8 with many transverse furrows, and sternum 8 wider somewhat anteriorly and with posterior margin rounded and having a small concavity at middle.

Specimen dissected: *C. papuae* NAGATOMI & YUKAWA, 1969: 1 ♀, Lake Iviva (Sirunki), 2800–2900 m, NE New Guinea, 15. vi. 1963, J. SEDLACEK.

Genus *Inopus* WALKER, 1850 (Fig. 2): At least in *rubriceps*, tergum 9 appears to be not divided into a pair, sterna 7–8 longer than wide but terga 7–8 wider than long, and sternum 8 wider somewhat anteriorly and with posterior margin rounded.

Specimen dissected: *I. rubriceps* (MACQUART, 1847): 1 ♀, Sydney, 11–13. iii. 1909, HELME Collection.

Subfamily Beridinae (Figs. 3–15)

Characters of subfamily. In the genera *Actina, Allognosta, Beris,* and *Chorisops* each of terga 6–8 not so conspicuously narrower than preceding tergum, each of terga 7–8 and sterna 7–8 wider than long, tergum 9 and intersegmental membrane between terga 7–8 shorter. In tergum 8 posterior margin straight or more or less concave, and in sternum 8 posterior margin convex but anterior margin concave or more or less so.

Characters of genus and species. No striking differences are found among 4 genera examined, but they may be distinguished from one another as shown in the key (c).

Genus *Actina* MEIGEN, 1804 (Figs. 3–4): In cercus each segment elongate and segment 2 distinctly shorter than segment 1; posterior margin of sternum 8 not concave at either side of mid-apical part. No definite differences are found among 2 species of *Actina* and 1 species of *Chorisops* examined, although the shape of genital furca, length of each segment of cercus, and length of sternum 8 may vary with the species.

Specimens dissected: *A. flavofemorata* PLESKE, 1930 (= *A. japonica* (JAMES, 1941)) (Fig. 3): 1 ♀, Kanmuridake, Satsuma, 11. iv. 1962, A. NAGATOMI; 1 ♀, Kagoshima City, Satsuma, 14. iv. 1968, A. TANAKA. *A. jezoensis* (MATSUMURA, 1916) (Fig. 4): 1 ♀, Kagoshima City, 27. iii. 1954, NAGATOMI; 1 ♀, Kagoshima City, 7. iv. 1968, TANAKA.

Genus *Allognosta* OSTEN SACKEN, 1883 (Figs. 5–8): Segment 1 of cercus wider than in the genera *Actina, Beris,* and *Chorisops* and not or not so elongate; posterior margin of sternum 8 concave at either side of mid-apical part. No definite differences are found among 4 species examined, although the shape of genital furca may vary with the species.

Specimens dissected: *A. flavimaculata* NAGATOMI & TANAKA, 1969 (Fig. 5): 2 ♀♀, Aizankei, Hokkaido, 7. vii. 1964, A. NAGATOMI. *A. flavofemoralis* PLESKE, 1926 (Fig. 6): 2 ♀♀, Kagoshima City, Satsuma, 12. iv. 1963, K. KUSIGEMATI. *A. japonica* FREY, 1960 (Fig. 7): 1 ♀, Kagoshima City, Satsuma, 14. iv. 1968, A. TANAKA; 1 ♀, Onobaru, Mt. Takakuma, Osumi, 28. iv. 1968, TANAKA. *A. vagans* (LOEW, 1873) (= *A. sapporensis* MATSUMURA, 1916) (Fig. 8): 1 ♀, Kagoshima City, Satsuma, i. vi. 1961, NAGATOMI; 1 ♀, Kagoshima City, 21. v. 1962, NAGATOMI.

Genus *Beris* LATREILLE, 1802 (Figs. 9–14): Each segment of cercus elongate and segment 2 roughly as long as or longer than segment 1; posterior margin of sternum 8 often concave at either side of mid-apical part. *Beris* may be distinguished from *Actina* and

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Chorisops in which segment 2 of cercus is distinctly shorter than segment 1. Six species of *Beris* are examined and may be distinguished from one another as shown in the key (d).

Specimens dissected: *B. angustifacies* NAGATOMI & TANAKA, 1972 (Fig. 9): 1 ♀, Ashoro, Hokkaido, 27. vii. 1962, T. SAIGUSA; 1 ♀, Towadako, Aomori Pref., 26. viii. 1966, K. KUSIGEMATI. *B. crassitarsis* NAGATOMI & TANAKA, 1972 (Fig. 10): 1 ♀, Toya, Hokkaido, 9. vii. 1967, KUSIGEMATI; 1 ♀, Yari-daira, Hida, 17. vii. 1969, NAGATOMI. *B. fuscipes* MEIGEN, 1820 (Fig. 11): 1 ♀, Shin-hotaka, Hida, 14. vii. 1969, NAGATOMI; 1 ♀, Yari-daira, Hida, 17. vii. 1969, NAGATOMI. *B. hirotsui* OUCHI, 1943 (Fig. 12): 1 ♀, Kurinodake, Satsuma, 25—26. v. 1966, KUSIGEMATI; 1 ♀, Kurinodake, 23. v. 1969, KUSIGEMATI. *B. strobli* DUŠEK & ROZKOŠNÝ, 1968 (= *B. latifacies* NAGATOMI & TANAKA, 1972) (Fig. 13): 1 ♀, Senjodake, Kai, 4. vii. 1963, NAGATOMI; 1 ♀, Sharidake, Hokkaido, 10. vii. 1964, NAGATOMI. *B. nebulosus* NAGATOMI TANAKA, 1972 (Fig. 14): 1 ♀, Tokugotoge, Nagano Pref., 12. vii. 1963, NAGATOMI; 1 ♀, Tokugotoge, 12. vii. 1963, SAIGUSA.

Genus *Chorisops* ROND ANI, 1856 (Fig. 15): No definite differences are found between *Chorisops* and *Actina*.

Specimens dissected: *C. maculiala* NAGATOMI, 1964: 1 ♀, Kurume, Fukuoka Pref., 11. vi. 1966, K. KUSIGEMATI; 1 ♀, near Narai, Nagano Pref., 26. vii. 1969, A. NAGATOMI.

Key to 4 genera of Beridinae (c)

1 In cercus segment 1 elongate and segment 2 in *Beris* longer; posterior margin of sternum 8 not concave at either side of mid-apical part in *Actina* and *Chorisops* and often so in *Beris* 2
— In cercus segment 1 not or not so elongate and segment 2 shorter than in *Beris*; posterior margin of sternum 8 concave at either side of mid-apical part . . *Allognosta*
2 In cercus segment 2 roughly as long as or longer than segment 1; posterior margin of sternum 8 often concave at either side of mid-apical part . . . . . *Beris*
— In cercus segment 2 distinctly shorter than segment 1; posterior margin of sternum 8 not concave at either side of mid-apical part . . . . . *Actina* and *Chorisops*

Key to 5 species of *Beris* (d)

1 Posterior margin of sternum 8 concave at either side of mid-apical part; in cercus segment 2 may be shorter than segment 1 2
— Posterior margin of sternum 8 not concave at either side of mid-apical part; in cercus segment 2 may be as long as or longer than segment 1; genital furca at middle with a large hole . . . . . *angustifacies* and *strobli*
2(1) Posterior margin of tergum 8 straight or nearly so; in sternum 8 concavity at side of mid-apical part more gentle 3
— Posterior margin of tergum 8 distinctly concave at middle; in sternum 8 concavity at side of mid-apical part deeper . . . . . *fuscipes*
3(2) In sternum 8 anterior part not so narrow 4
— In sternum 8 anterior part narrow in contrast with widest part . . . . . *nebulosus*
4(3) Tergum 8 protruded laterally; apical margin (toward base of abdomen) of genital furca concave . . . . . *hirotsui*
— Tergum 8 not protruded laterally; apical margin of genital furca straight . . . . . *crassitarsis*

Subfamily Stratiomyinae (Figs. 16—18)

Characters of subfamily. Ovipositor composed of segments 6—8; intersegmental membrane between terga 7—8 well developed or sometimes comparatively short; terga 7—8 wider than long. Cercus 2-segmented and segment 2 much shorter and narrower than segment 1. Posterior margin of tergum 8 nearly straight or concave and that of sternum 8 nearly straight or convex.

Characters of genus and species. Three genera and 3 species are examined and they may be distinguished from one another as shown in the key (e).

Genus *Stratiomys* GEOFFROY, 1762 (Fig. 16): At least in *japonica*, segment 1 of cercus about as long as wide, sternum 8 wider than long, sternum 7 about as long as wide and narrower anteriorly, and intersegmental membrane between terga 7—8 may be comparatively short.

Specimens dissected: *S. japonica* VAN DER WULP, 1885: 1 ♀, Hakozaki, Fukuoda City, 10. vi. 1952, T. SHIROZU; 1 ♀, Taniyama, Kagoshima City, 6. vi. 1963, A. NAGATOMI.

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Genus *Odontomyia* MEIGEN, 1803 (Fig. 17): At least in *garatas*, segment 1 of cercus longer than wide, sternum 8 not much wider than long but sternum 7 wider than long, and roughly as wide as tergum 7, sternum 10 appears to be divided into a pair (this may be so in *Stratiomys japonica*), and intersegmental membrane between terga 7—8 well developed.

Specimen dissected: *O. garatas* WALKER, 1849: 1 ♀, Sasayama, Tamba, 4. vii. 1951, A. NAGATOMI.

Genus *Orthogoniocera* LINDNER, 1951 (Fig. 18): At least in *hirayamae*, segment 1 of cercus roughly as long as wide, sternum 8 wider than long and with posterior margin not so convex, sternum 7 somewhat wider than long but much narrower than tergum 7, and intersegmental membrane between terga 7—8 well developed.

Specimen dissected: *O. hirayamae* (MATSUMURA, 1916): 1 ♀, Omogokei, Ehime Pref., 1. vi. 1969, T. EDASHIGE.

Key to 3 genera of Stratiomyinae (e)

1 Sternum 7 not narrower anteriorly 2
— Sternum 7 narrower anteriorly . . . . . *Stratiomys* (at least in *japonica*)
2 Sternum 8 distinctly wider than long; sternum 7 much narrower than tergum 7 . . . . . *Orthogoniocera* (at least in *hirayamae*)
— Sternum 8 not much wider than long; sternum 7 not much narrower than tergum 7 . . . . . *Odontomyia* (at least in *garatas*)

Subfamily Prosopochrysinae (= Myxosarginae) (Fig. 19)

Characters of subfamily. At least in *Rhaphiocerina* ovipositor composed of segments 6—8, cercus 1-segmented and large, intersegmental membrane between terga 7—8 comparatively short, and terga 7—8 wider than long.

The female terminalia of *Rhaphiocerina* are similar to those of *Brachycara* and *Oxycera* both of which are traditionally relegated to Clitellariinae.

Characters of genus. Genus *Rhaphiocerina* LINDNER, 1936 (Fig. 19): Cercus large, and egg-shaped (from a dorsal view); sternum 8 appears to be not much wider than long; tergum 7 wider than tergum 8. In Fig. 19 sternum 8 and genital furca are different in shape between A and B, and it is uncertain which figure is correct or more typical. The female terminalia of *Rhaphiocerina* are very similar to those of *Oxycera* but in the latter tergum 7 narrower than tergum 8, and genital furca especially its basal part different in shape.

Specimens dissected: *R. hakiensis* (MATSUMURA, 1916): 4 ♀♀, Miyanoura, 17—19. vii. 1972, K. KUSIGEMATI.

Subfamily Clitellariinae (Figs. 20—21)

Characters of subfamily. Ovipositor composed of segments 6—8; cercus is 1-segmented in *Brachycara* and *Oxycera* but is probably 2-segmented in *Clitellaria* MEIGEN, 1803 (whose female terminalia are not yet studied); intersegmental membrane between terga 7—8 well developed, and terga 7—8 wider than long at least in *Brachycara yukawai* and *Oxycera kusigematii*.

Characters of genus and species. Two genera and 2 species have been examined. Genus *Brachycara* THOMSON, 1869 (Fig. 20): Cercus 1-segmented, elongate and smaller; tergum 8 protruded latero-posteriorly and wider than long; sternum 8 or possibly its more chitinous part divided into two, (a) smaller anterior- and (b) larger posterior one, and (b) with posterior margin convex; tergum 7 wider than long; sternum 7 is wider posteriorly and with posterior margin concave, and appears to be roughly Y-shaped.

Specimen dissected: *B. yukawai* NAGATOMI, 1977: 1 ♀, Nijinomatsubara, Karatsu, Saga Pref., 25. v. 1975, A. NAGATOMI.

Genus *Oxycera* MEIGEN, 1803 (Fig. 21): Cercus 1-segmented, large, and egg-shaped (from a dorsal view); terga 7—8 and sterna 7—8 wider than long; tergum 7 narrower than tergum 8; sternum 8 nearly semicircular and with posterior margin rounded. The female terminalia of *Oxycera* are very similar to those of *Rhaphiocerina* but in the latter tergum 7 wider than tergum 8, and genital furca especially its basal part different in shape.

Specimen dissected: *O. kusigematii* NAGATOMI, 1977: 1 ♀, Jozankei, Hokkaido, 2. viii. 1965, K. KUSIGEMATI.

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Subfamily Pachygasterinae (Figs. 22—26)

Characters of subfamily. The female terminalia of Pachygasterinae are diverse in shape and are difficult to be defined by the common characters. Five genera are examined and are divided into the following 3 groups: (1) *Abrosiomyia* (which belongs to *Pachygaster* s. lat.) and *Wallacea*, (2) *Craspedometopon* and *Evaza*, and (3) *Kolomania* (= *Ouchimyia*). (1) is very peculiar by having cercus 1-segmented, and tergum 10 in *Abrosiomyia* not protruded posteriorly. (2) and (3) are similar to the genera of Hermetinae and Sarginae but may be characterized as shown in the key to generic groups (couplets 7 and 8).

Characters of genus and species. Five genera in question are distinguished from one another as shown in the key (f).

Genus *Abrosiomyia* KERTÉSZ, 1914 (Fig. 22): Abdominal segments 6—8 form an ovipositor, are much narrower than segment 5, and are weak in development of chitin; intersegmental membrane between terga 7—8 comparatively short; cercus 1-segmented, tergum 10 not protruded posteriorly. At least in *bella*, cercus much longer than wide, tergum 10 rectangular but its posterior margin with a pair of peaks at inner sides of cerci, sternum 10 appears to be transverse at posterior margin and to be long protruded anterolaterally, tergum 9 small and triangular or semicircular in shape, tergum 8 and sternum 8 longer than wide and with posterior margin rounded, tergum 7 wider than long, and sternum 7 narrower than tergum 7.

Specimens dissected: *A. bella* NAGATOMI, 1975: 1 ♀, Sasayama, Tamba, 14. vi. 1954, A. NAGATOMI; 1 ♀, Sasayama, 13. vi. 1956, NAGATOMI.

Genus *Craspedometopon* KERTÉSZ, 1909 (Fig. 23): Abdominal segments 6—8 form an ovipositor, are much narrower than segment 5, and are weak in chitinization; intersegmental membrane between terga 7—8 comparatively long; terga 7—8 and sterna 7—8 distinctly longer than wide; tergum 8 and sternum 8 with numerous transverse furrows. Cercus 2-segmented and each segment much longer than wide; posterior margins of terga 8—9 concave or rather so and that of sternum 8 rounded; sternum 8 distinctly longer than tergum 8 + tergum 9. *Craspedometopon* (at least in *frontale*) may be distinguished from *Evaza* (at least in *japonica*) by having tergum 9 longer and narrower.

Specimens dissected: *C. frontale* KERTÉSZ, 1909: 1 ♀, Mt. Osuzu, Hyuga, 21. v. 1966, K. KUSIGEMATI; 1 ♀, Kurinodake, Satsuma, 25—26. v. 1966, KUSIGEMATI.

Genus *Evaza* WALKER, 1857 (Fig. 24): *Evaza* (at least in *japonica*) is similar to *Craspedometopon* (at least in *frontale*) but may be distinguished from the latter by having tergum 9 wider and shorter. Apex of sternum 8 may be somewhat pointed.

Specimen dissected: *E. japonica* LINDNER, 1938: 1 ♀, Mt. Nyugasa, Nagano Pref., 19. vii. 1963, A. NAGATOMI.

Genus *Kolomania* PLESKE, 1924 (= *Ouchimyia* NAGATOMI & MIYATAKE, 1965) (Fig. 25): Abdominal segments 6—8 form an ovipositor, are much narrower than segment 5, and are weak in chitinization; intersegmental membrane between terga 7—8 comparatively short; sternum 8 with many transverse furrows. Cercus 2-segmented and each segment elongate; tergum 9 with a pair of more strongly chitinous lateral parts which are large, elongate and directed postero-outwardly; two pairs of elongate sclerites are present (a) at apex of strongly chitinous lateral part of tergum 9 and (b) near base of genital furca and sclerites at (b) are densely covered with short hairs but it remained unknown whether or not these sclerites belong to tergum 9; sternum 8 longer than wide and with posterior margin rounded; terga 7—8 and sternum 7 roughly as long as wide, and with posterior margins nearly straight.

Specimens dissected: *K. nipponensis* (OUCHI, 1940): 1 ♀, Kagoshima City, Satsuma, 29. iv. 1961, A. NAGATOMI; 1 ♀, Kagoshima City, Satsuma, 20. iv. 1966, K. KUSIGEMATI.

Genus *Wallacea* DOLESCHALL, 1858 (Fig. 26): Abdominal segments 6—8 form an ovipositor, are much narrower than segment 5, and are weak in development of chitin; intersegmental membrane between terga 7—8 very long; middle portions of tergum 8 and sternum 8 with many transverse furrows; cercus 1-segmented and small, and posterior margin of tergum 10 with a pair of deep concavities; tergum 9 small. At least in *tsudai*, terga 9—10 subequal in size and transversely elongate, tergum 8 with apical margin transverse, and sternum 8 wider and longer than tergum 8.

Specimens dissected: *W. tsudai* (OUCHI, 1940): 3 ♀♀, Sata, Osumi, 27—29. iv. 1962, A. NAGATOMI.

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Key to 5 genera of Pachygasterinae (f)

1 Cercus 1-segmented; mid-apical part of tergum 10 in *Abrosiomyia* not protruded 2
— Cercus 2-segmented; tergum 10 conspicuously protruded posteriorly 3
2(1) Abdominal segments 6—8 shorter, i.e. terga 7—8 and sterna 7—8 not or not much longer than wide and intersegmental membrane between terga 7—8 short . . . . . *Abrosiomyia* (at least in *bella*)
— Abdominal segments 6—8 very long, i.e. terga 7—8 and sterna 7—8 much longer than wide and intersegmental membrane between terga 7—8 very long . . . . . *Wallacea* (at least in *tsudai*)
3(1) Sternum 8 distinctly longer than tergum 8 + tergum 9; tergum 9 without lateral part more chitinous; tergum 8 longer than wide; intersegmental membrane between terga 7 and 8 longer 4
— Sternum 8 shorter than tergum 8 + tergum 9; tergum 9 with lateral part more chitinous and protruded postero-outwardly; tergum 8 not longer than wide; intersegmental membrane between terga 7 and 8 shorter . . . . . *Kolomania* (= *Ouchimyia*) (at least in *nipponensis*)
4(3) Tergum 9 narrower and longer . . . *Craspedometopon* (at least in *frontale*)
— Tergum 9 wider and shorter . . . . . *Evaza* (at least in *japonica*)

Subfamily Hermetinae (Fig. 27)

Characters of subfamily. It may be difficult to separate Hermetinae from Sarginae but *Hermetia* is distinguished from the 5 genera of Sarginae discussed in this paper as shown in the key to generic groups (couplet 9).

Characters of genus and species. Genus *Hermetia* LATREILLE, 1804 (Fig. 27): Ovipositor composed of segments 6—8; intersegmental membrane between terga 7—8 long; tergum 8 and sternum 8 (except posterior portions) and tergum 7 and sternum 7 with many transverse furrows; terga 7—8 and sterna 7—8 much longer than wide. Cercus 2-segmented, elongate, and at least in *illucens* segment 2 shorter than segment 1; tergum 10 with a long antero-lateral process and sternum 10 band-like and V-shaped; tergum 9 divided into a pair which are nearly contiguous with each other; posterior margin of tergum 8 concave; sternum 8 longer than tergum 8 + tergum 9 and with posterior portion rather pointed.

Specimens dissected: *H. illucens* (LINNAEUS, 1758): 1 ♀, Senpirotaki, near Mt. Shibi, Satsuma, 14. viii. 1965, K. HASHIMOTO; 1 ♀, Nase, Amami Oshima, 4. v. 1966, K. KUSIGEMATI.

Subfamily Sarginae (Figs. 28—36)

Characters of subfamily. Ovipositor composed of segments 6—8 or 7—8; intersegmental membrane between terga 7—8 is well developed but it is shorter in *Ptecticus*; terga 7—8 and sterna 7—8 longer than wide or not wider than long but sometimes tergum 7 or terga 7—8 wider than long. Cercus 2-segmented and each segment elongate.

Characters of genus and species. Five genera examined may be distinguished from one another as shown in the key (g).

Genus *Cephalochrysa* KERTÉSZ, 1912 (Fig. 28): Ovipositor composed of segments 6—8; intersegmental membrane between terga 7—8 long; tergum 8 and sternum 8 (except posterior parts) with many transverse furrows; terga 7—8 and sterna 7—8 longer than wide. Tergum 10 protruded antero-outwardly; posterior margins of tergum 8 and sternum 8 rounded; tergum 8 shorter than sternum 8 whose posterior less than half becomes convex laterally and wider than anterior more than half.

Specimen dissected: *C. stenogaster* JAMES, 1939: 1 ♀, Inunakiyama, Fukuoka Pref., 18. vi. 1967, H. SHIMA.

Genus *Chrysochroma* WILLISTON, 1896 (Fig. 29): No definite difference is found between this genus and *Sargus*.

Specimens dissected: *C. niphonensis* (BIGOT, 1879): 1 ♀, Kurume, Fukuoka Pref., 31. x. 1959, S. NAKAO; 2 ♀♀, Kagoshima City, Satsuma, 28. x. and 2. xi. 1961, A. NAGATOMI.

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Genus *Microchrysa* LOEW, 1855 (Figs. 30—32): Ovipositor composed of segments 6—8; intersegmental membrane between terga 7—8 comparatively long; tergum 8 and sternum 8 may have transverse furrows; tergum 7 wider than long. Tergum 10 long protruded antero-laterally; tergum 9 divided into a pair which are well separated; tergum 8 shorter than sternum 8, and with posterior margin nearly straight; sternum 8 not much wider than long and with posterior margin rounded; sternum 7 much narrower than tergum 7 and with lateral margin concave. Three species of this genus have been examined, but it is undetermined whether or not the differences shown in Figs. 30—32 are significant, i.e. (1) tergum 10 protruded latero-posteriorly in *flaviventris* but not so in *japonica* and *nigrimacula*, (2) tergum 8 longer than wide in *nigrimacula* but wider than long in *flaviventris* and *japonica*, and (3) tergum 7 and sterna 7—8 vary in shape with the species. The structure of genital furca is probably useful in separating the species. Its apical (toward base of abdomen) part is the widest among the 3 species in *flaviventris* and bluntly pointed in *nigrimacula*.

Specimens dissected: *M. flaviventris* (WIEDEMANN, 1824) (Fig. 30): 1 ♀, Sasayama, Tamba, 24. vii. 1954, A. NAGATOMI; 1 ♀, Sasayama, 13. vi. 1956, NAGATOMI; 2 ♀♀, Takara-jima, Tokara Islands, 14. vii. 1964, A. TANAKA; 1 ♀, Takara-jima, 13. vii. 1964, H. SHIMA. *M. japonica* NAGATOMI, 1975 (Fig. 31): 1 ♀, Nopporo, Hokkaido, 7. vii. 1964, K. KUSIGEMATI; 1 ♀, Masike, Hokkaido, 24. vii. 1964, KUSIGEMATI. *M. nigrimacula* NAGATOMI, 1975 (Fig. 32): 1 ♀, Nishinakama, Amami Oshima, emerged on 20—21. viii. 1970, H. MAKIHARA; 1 ♀, Ashikebu, Amami Oshima, emerged on 21—24. viii. 1970, MAKIHARA.

Genus *Ptecticus* LOEW, 1855 (Figs. 33—35): Ovipositor composed of segments 7—8 or possibly 6—8 (tergum 6 not much narrower than tergum 5). Intersegmental membrane between terga 7 and 8 short. In cercus, segment 2 shorter or not longer than segment 1. Tergum 9 is divided into a pair or its lateral part is more chitinous and a pair of sclerites are well separated from each other. Tergum 8 and sternum 8 roughly as long as wide but tergum 7 wider than long. Posterior margin of tergum 8 nearly straight or concave but that of sternum 8 convex or rounded; sternum 7 wider posteriorly. Three species are examined and are distinguished from one another as shown in the key (h) and the characters and the data on the specimens dissected in each species are given below.

Ptecticus aurifer (WALKER, 1854) (Fig. 33): Tergum 10 protruded antero-laterally. Sternum 10 roughly semicircular. Unless tergum 9 is not divided into a pair, its lateral parts are more chitinous but the distance between them is comparatively short. In tergum 8 posterior about half more chitinous. Sternum 7 not much narrower than tergum 7.

Specimen dissected: 1 ♀, Senjodake, Nagano Pref., 5. vii. 1963, A. NAGATOMI.

Ptecticus matsumurae LINDNER, 1936 (Fig. 34): Sternum 10 appears to be band-like and U-shaped. Tergum 9 appears to be divided into a pair which are much longer than wide and are widely separated from each other. Sternum 8 may be divided into two more chitinous sclerites, (a) larger posterior one and (b) smaller anterior one, and mid-posterior part of (a) is rounded. Sternum 7 much narrower than tergum 7.

Specimens dissected: 1 ♀, Rausu, Hokkaido, 21. vii. 1961, J. YUKAWA; 1 ♀, Sasayama, Tamba, 18. vii. 1951, A. NAGATOMI; 1 ♀, Tokushima City, 30. viii. 1968, A. MORI; 1 ♀, Gokanosho, Higo, 21. vii. 1966, NAGATOMI.

Ptecticus tenebrifer (WALKER, 1849) (Fig. 35): Antero-lateral parts of tergum 10 shortly protruded. Sternum 10 triangular or semicircular. Unless tergum 9 is not divided into a pair, its more chitinous lateral parts are wider than long and widely separated from each other. Posterior part of tergum 8 and that of sternum 7 strongly chitinous and much wider than long. A transversely elongate sclerite may be present just before sternum 7.

Specimens dissected: 3 ♀♀, Sapporo, Hokkaido, 27. viii. 1965, K. KUSIGEMATI; 1 ♀, Sapporo, Hokkaido, 12. viii. 1967, KUSIGEMATI; 1 ♀, Kagoshima City, Satsuma, 6. v. 1966, A. TANAKA.

Genus *Sargus* FABRICIUS, 1798 (Fig. 36): Ovipositor composed of segments 6—8 or possibly 7—8; intersegmental membrane between terga 7—8 comparatively long; tergum 8 and sternum 8 (except posterior parts) with many transverse furrows; terga 7—8 and sterna 7—8 longer than wide. In cercus, segment 2 distinctly shorter than segment 1; antero-lateral parts and antero-mid part of tergum 10 protruded; tergum 9 divided into a pair which appear to be widely separated from each other; tergum 8 with posterior margin nearly straight and shorter than sternum 8; sternum 8 with posterior margin convex.

Specimens dissected: *S. metallinus* FABRICIUS, 1805: 1 ♀, Sasayama, Tamba, 13. x. 1950, KUNIO IWATA; 1 ♀, Sapporo, Hokkaido, 12. viii. 1967, K. KUSIGEMATI; 1 ♀, Kurinodake, Satsuma, 25—26. v. 1966. KUSIGEMATI; 1 ♀, Anbo, Yakushima, 30. v. 1969, KUSIGEMATI.

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Key to 5 genera of Sarginae (g)

1 Intersegmental membrane between terga 7 and 8 longer 2
— Intersegmental membrane between terga 7 and 8 shorter; tergum 7 much wider than long and than tergum 8 . . . . . *Ptecticus* (at least in *aurifer*, *matsumurae*, and *tenebrifer*)
2(1) Terga 7 and 8, and sternum 8 longer than wide 3
— Tergum 7 and sternum 8 not longer than wide; tergum 8 wider than long or not much longer than wide . . . . . *Microchrysa* (at least in *flaviventris*, *japonica*, and *nigrimacula*)
3(2) Tergum 7 much longer than wide; posterior margin of tergum 8 convex; tergum 9 appears to be not divided into a pair . . . . *Cephalochrysa* (at least in *stenogaster*)
— Tergum 7 not much longer than wide; posterior margin of tergum 8 straight or rather concave; tergum 9 divided into a pair . . . . . *Chrysochroma* and *Sargus*

Key to 3 species of *Ptecticus* (h)

1 A pair of tergum 9 (or its strongly chitinous lateral parts) longer than wide; tergum 8 and sternum 7 not so strongly chitinous 2
— A pair of tergum 9 (or its strongly chitinous lateral parts) wider than long; posterior part of tergum 8 and that of sternum 7 strongly chitinous and much wider than long . . . . . *tenebrifer*
2 Sternum 7 larger and not much narrower than tergum 7; sternum 10 roughly semicircular; a pair of tergum 9 (or its more chitinous lateral parts) not much longer than wide and more narrowly separated from each other . . . . . *aurifer*
— Sternum 7 smaller and much narrower than tergum 7; sternum 10 band-like and U-shaped; a pair of tergum 9 much longer than wide and widely separated from each other . . . . . *matsumurae*

Family Pantophthalmidae (Figs. 37—38)

Characters of family. Ovipositor composed of segments 5—8; intersegmental membrane between terga 7—8 long; terga 6—8 and sterna 6—8 with numerous transverse furrows; tergum 8 and sternum 8 greatly long; cercus 2-segmented, with each segment longer than wide but not much elongate, and a pair of cerci well separated; in tergum 9 lateral parts more chitinous and elongate and a membrane present between them; posterior margin of tergum 8 rounded and that of sternum 8 bluntly pointed; tergum 8 somewhat shorter and narrower than sternum 8; tergum 7 and sternum 7 long.

Both in Pantophthalmidae and Stratiomyidae, (1) a pair of cerci are distant from each other and (2) tergum 10 is conspicuously protruded posteriorly, but in Pantophthalmidae distance between cerci appears to be closer, tergum 10 except basal part appears to be narrower or evanescent, and tergum 8 and sternum 8 are greatly long.

Characters of genus and species. No striking differences are found between (1) *Pantophthalmus bellardii* and (2) *Rhaphiorhynchus* sp. (= possibly *planiventris*). In (1) mid-posterior part of sternum 8 is concave but in (2) it may not be so.

Specimens dissected: Genus *Pantophthalmus* THUNBERG, 1819 (Fig. 37): *P. bellardii* (BIGOT, 1862) (det. by L. L. PECHUMAN): 1 ♀, no data. Genus *Rhaphiorhynchus* WIEDEMANN, 1821 (Fig. 38): *R.* sp. (= possibly *planiventris* WIEDEMANN, 1821) (det. by L. L. PECHUMAN): 1 ♀, Salipo, Peru (P. PAPRZVCKI leg.).

Genus *Heterostomus* BIGOT, 1857 (probably Coenomyiidae) (Fig. 39)

Characters of genus. Ovipositor composed of segments 7—8; intersegmental membrane between terga 7—8 short; terga 7—8 and sternum 7 roughly as long as wide. Cercus 2-segmented, with each segment elongate, and with segment 1 much wider than segment 2; tergum 10 divided into a pair which are rectangular and short; tergum 9 comparatively long; tergum 8 circular; sternum 8 longer than wide, about as long as tergum 8, with posterior margin rounded, and with lateral margin concave near middle.

Heterostomus differs from the genera of Coenomyiidae (e.g. *Coenomyia*, *Dialysis*, and *Odontosabula*) by having ovipositor composed of segments 7—8, tergum 10 divided into a pair and shorter, intersegmental membrane between terga 7—8 short, terga 7—8 and sternum 7 about as long as wide, and sternum 8 about as long as and narrower than tergum 8.

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Heterostomus is very similar to *Ptiolina* of Rhagionidae but is distinguished from the latter by having ovipositor composed of segments 7—8, tergum 10 divided into a pair, sternum 10 undivided, tergum 8 about as long as and wider than sternum 8, sternum 8 longer than wide, and tergum 8 about as long as wide.

Specimen dissected: *H. curvipalpis* BIGOT, 1857 (det. by L. L. PECHUMAN): 1 ♀, E. P. REED Collection.

Discussion

The female terminalia of Stratiomyidae are diverse in shape but are easily separated in general from those of other families. The characterizations of the subfamilies of Stratiomyidae are sometimes difficult by the female terminalia only. The Clitellariinae and Pachygasterinae may not be monophyletic, although the Chiromyzinae, Beridinae, Stratiomyinae, Sarginae, etc. seem to be homogeneous or almost so.

The genera *Oxycera* and *Brachycara* are probably very different in structure of female terminalia from *Clitellaria* (we have seen an undetermined species of *Nigritomyia*, which is a close relative of *Clitellaria*, and have found that its cercus is 2-segmented). The female terminalia of *Oxycera* are very similar to those of *Rhaphiocerina* belonging to Prosopochrysinae (= Myxosarginae). The genera *Oxycera* and *Rhaphiocerina* may belong to the same natural unit. The position of *Brachycara* requires further examination.

In Pachygasterinae the genera *Abrosiomyia* (belonging to *Pachygaster* s. lat.) and *Wallacea* are very different in structure of female terminalia from *Kolomania* (= *Ouchimyia*), *Craspedometopon*, and *Evaza*. The reexaminations of the latter 3 genera are much needed in order to decide their subfamily status.

The female terminalia of Stratiomyidae may be more similar to those of Pantophthalmidae rather than to those of Solvidae (= Xylomyidae). But several characters other than the female terminalia may indicate that the Stratiomyidae are most closely related to Solvidae. It may be more appropriate, however, that the group of *Solva* et al. is not a subfamily of Stratiomyidae but an independent family.

From a total of 61 genera of the lower Brachycera examined, only the genus *Austroleptis* (probably belonging to Rhagionidae) has the sternum 9 in addition to the genital furca (see NAGATOMI and IWATA 1976: 46).

The tergum 10 is absent or very small in the following genera: *Solva*, *Rachicerus*, *Xylophagus*, *Exeretoneura*, *Pelecorhynchus*, *Glutops*, *Pseudoerinna*, *Spania*, *Spaniopsis*, *Lampromyia*, *Vermileo*, and *Austroleptis* (see NAGATOMI and IWATA, 1976). All of these genera seem to be primitive.

Summary

The female terminalia of Stratiomyidae, Pantophthalmidae, and the genus *Heterostomus* (probably Coenomyiidae) are described and illustrated. Twenty-six genera and 39 species are treated in this paper. Thus a total of 12 families, 61 genera, and 89 species belonging to the lower Brachycera are included in our previous reports (NAGATOMI & IWATA 1976, and IWATA & NAGATOMI 1976) and the present paper, although many genera of Stratiomyidae still remain unstudied with respect to the female terminalia.

Zusammenfassung

Die weiblichen Terminalien von Stratiomyidae, Pantophthalmidae und der Gattung *Heterostomus* (wahrscheinlich Coenomyiidae) werden beschrieben und abgebildet. Dieser Artikel behandelt 26 Gattungen und 39 Arten. Damit werden zusammen mit jenen aus NAGATOMI & IWATA 1976 und IWATA & NAGATOMI 1976 insgesamt 12 Familien, 61 Gattungen und 89 Arten niederer Brachyceren erfaßt, obwohl viele Stratiomyidae-Gattungen hinsichtlich der weiblichen Terminalien noch nicht untersucht sind.

Резюме

Описана задняя часть брюшка самок Stratiomyidae, Pantophthalmidae и рода *Heterostomus* (вероятно Coenomyiidae) и изображена рисунками. В работе приводятся 26 родов и 39 видов, так что совместно с более ранними публикациями (NAGATOMI & IWATA 1976 и IWATA & NAGATOMI 1976) всего были зарегистрированы 12 семейств, 61 род и 89 видов низких Brachycera. Однако много родов Stratiomyidae остаются еще неизученными относительно задней части брюшка самок.

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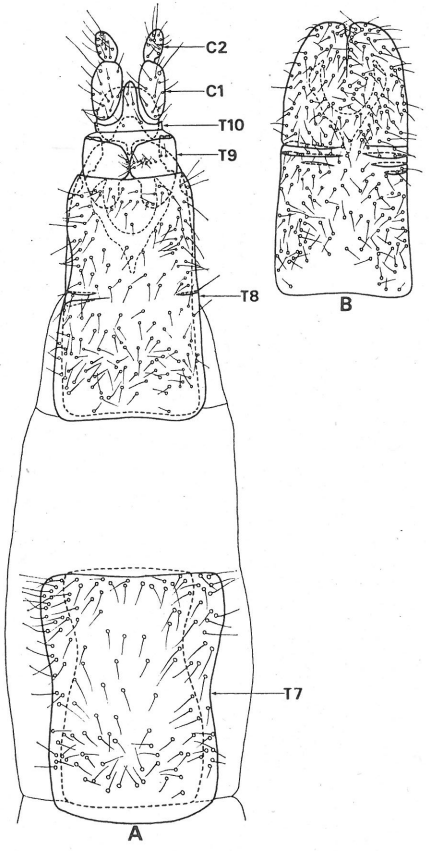

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Fig. 1. *Chiromyza papuae* NAGATOMI & YUKAWA, 1969

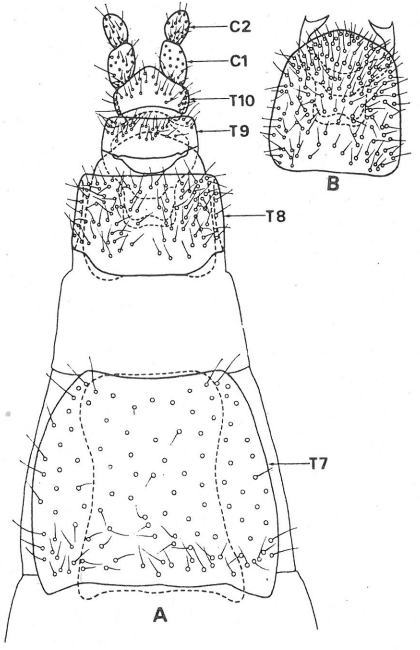

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Fig. 2. *Inopus rubriceps* (MACQUART, 1847)

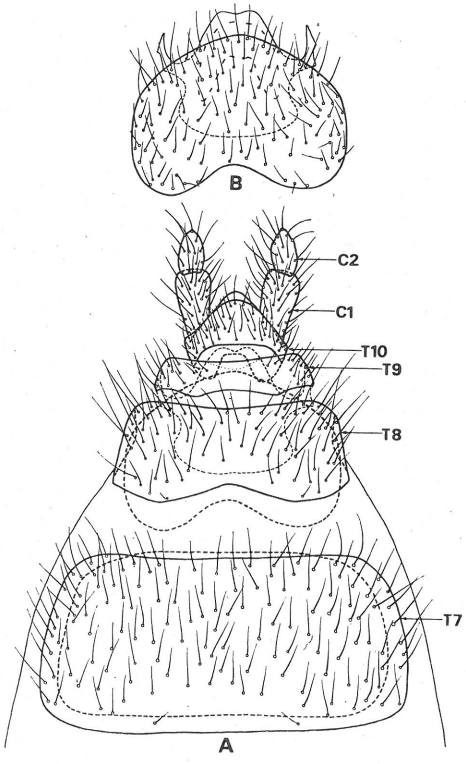

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Fig. 3. *Actina flavofemorata* PLESKE, 1930 (= *A. japonica* (JAMES, 1941))

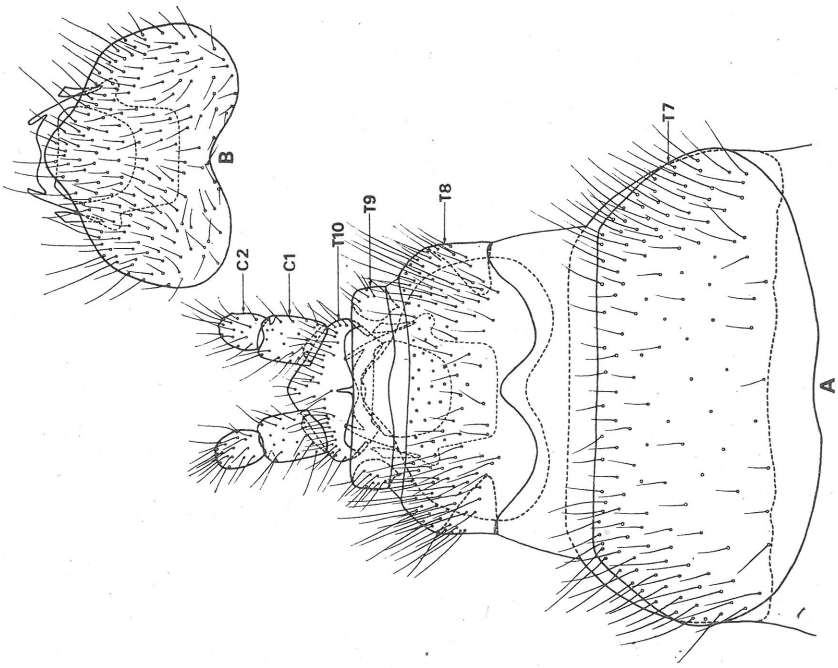

Fig. 5. *Allognosta flavimaculata* NAGATOMI & TANAKA, 1969

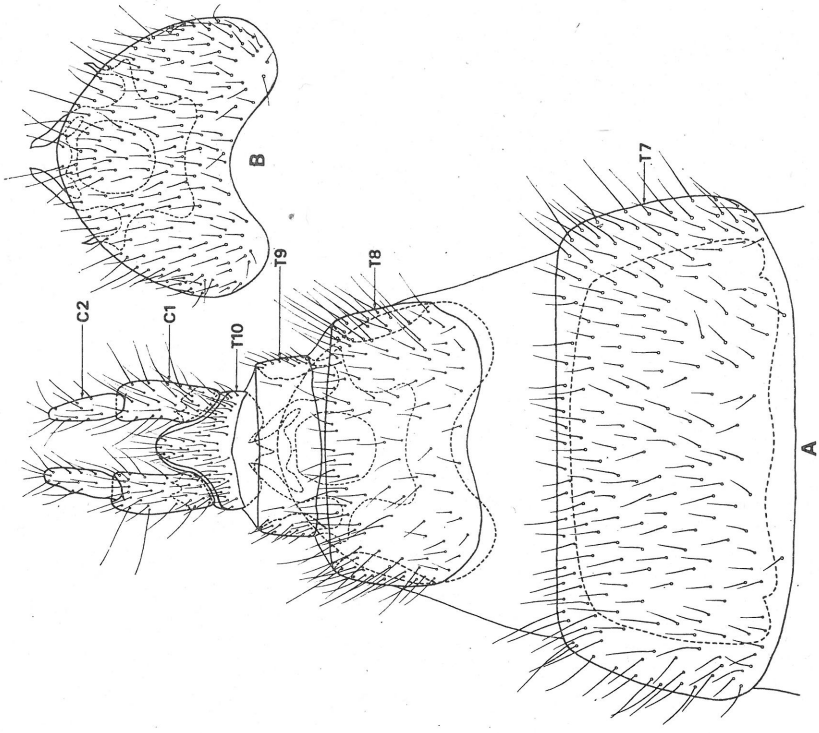

Fig. 4. *Actina jezoensis* (MATSUMURA, 1916)

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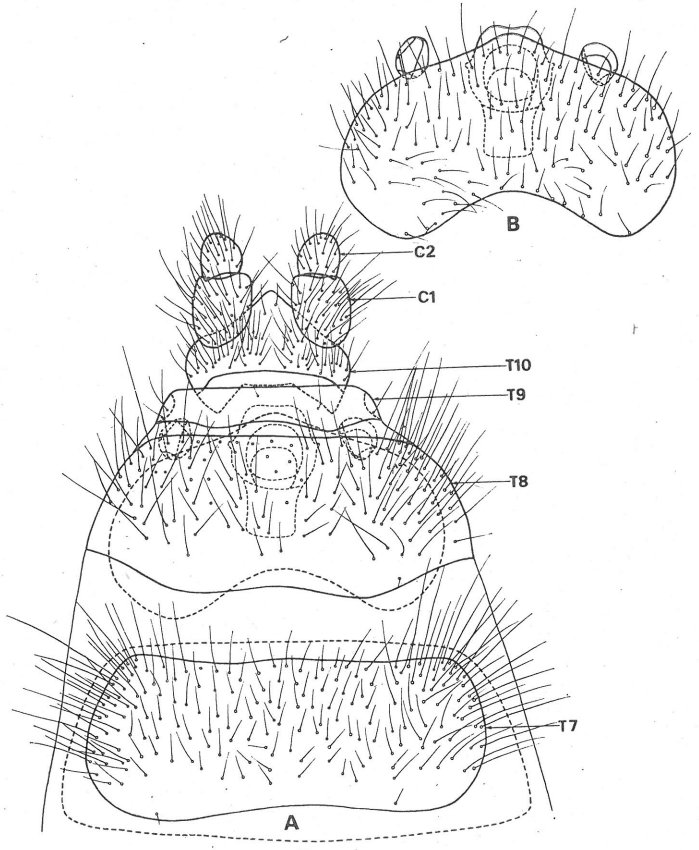

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Fig. 6. *Allognosta flavofemoralis* PLESKE, 1926

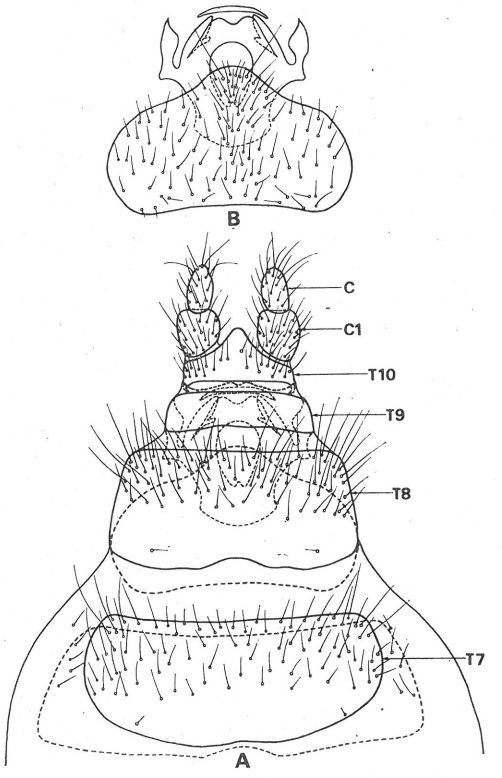

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Fig. 7. *Allognosta japonica* FREY, 1960

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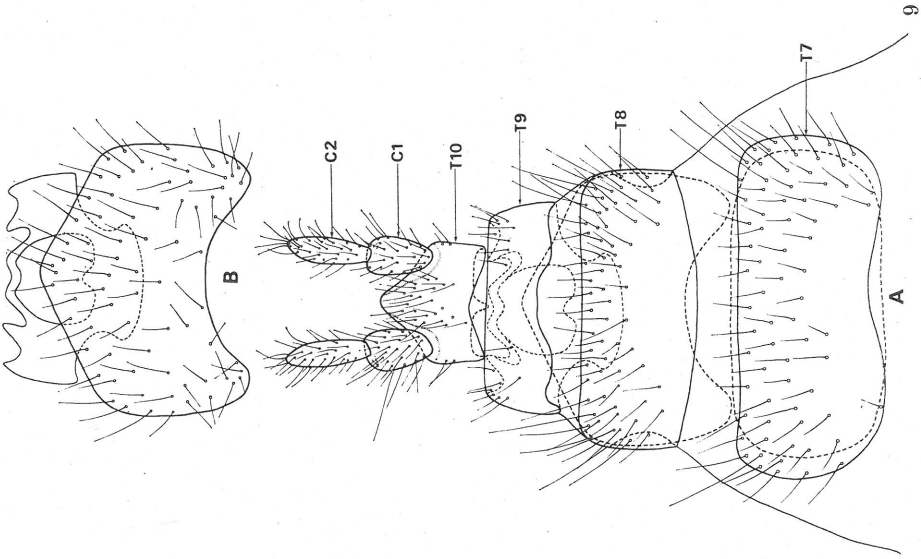

Fig. 9. *Beris angustifacies* NAGATOMI & TANAKA, 1972

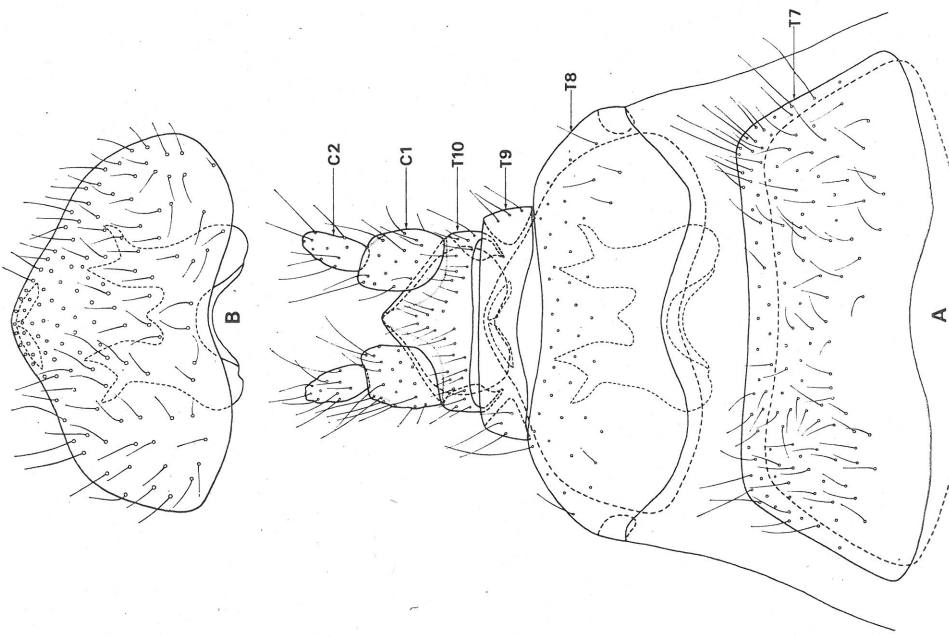

Fig. 8. *Allognosta vagans* (LOEW, 1873) (= *A. sapporensis* MATSUMURA, 1916)

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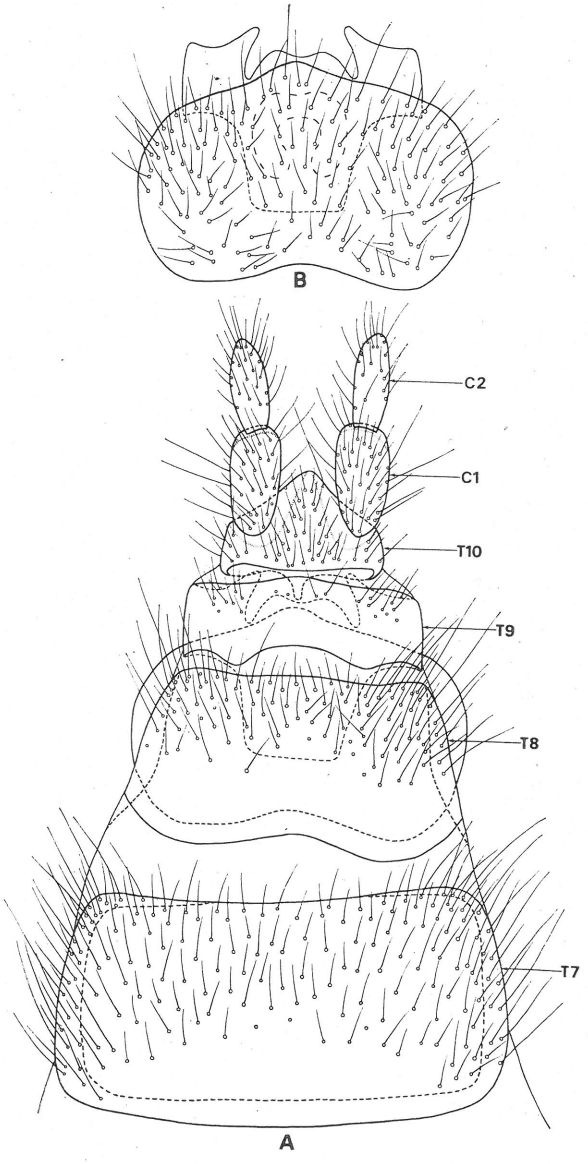

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Fig. 10. *Beris crassitarsis* NAGATOMI & TANAKA, 1972

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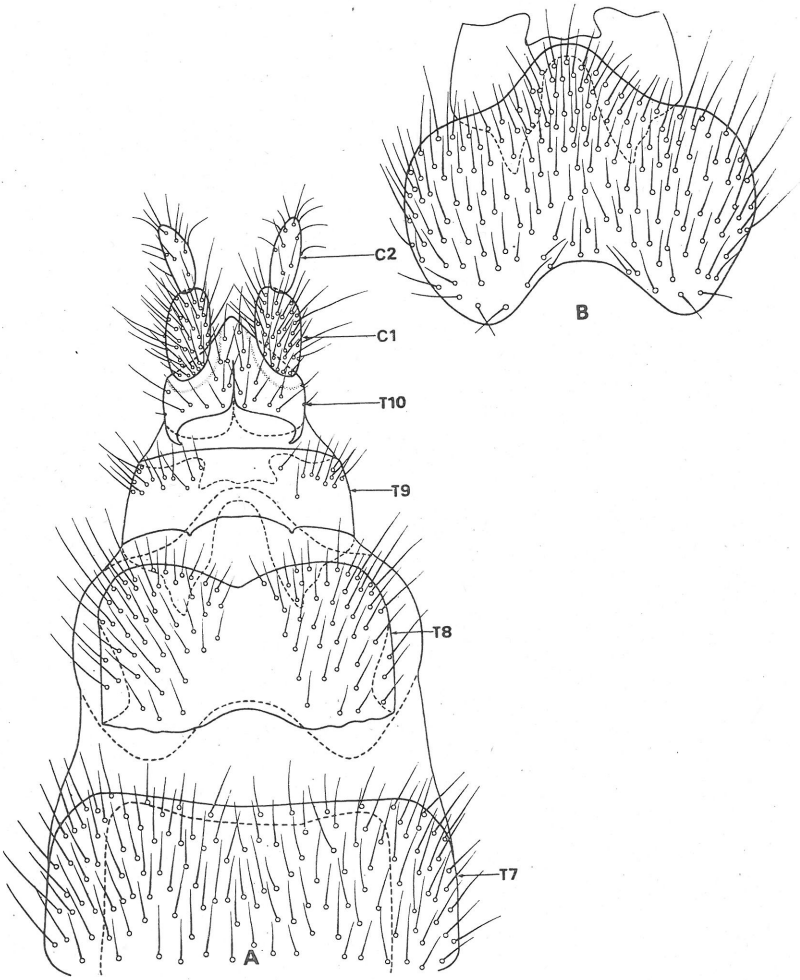

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Fig. 11. *Beris fuscipes* MEIGEN, 1820

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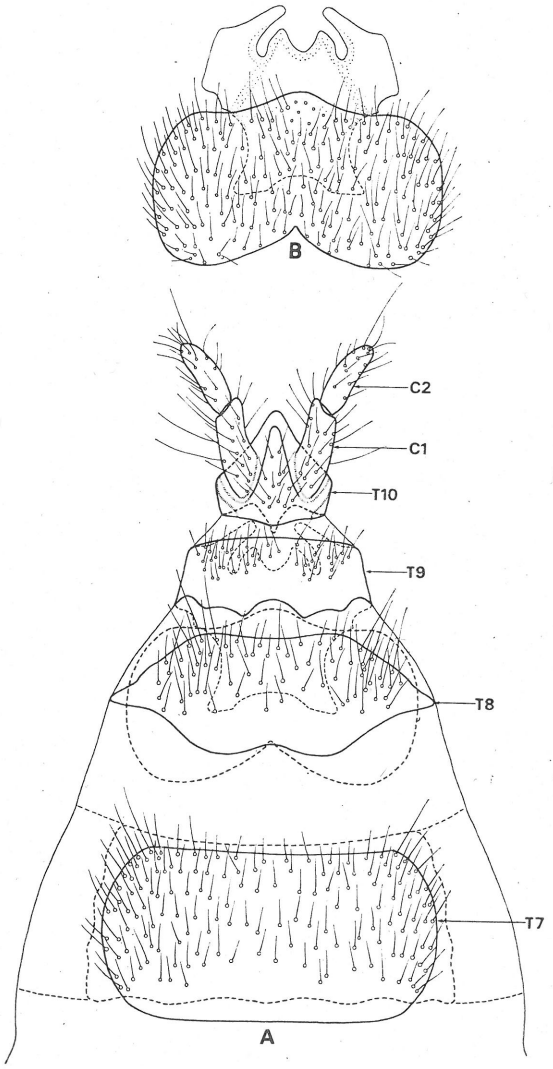

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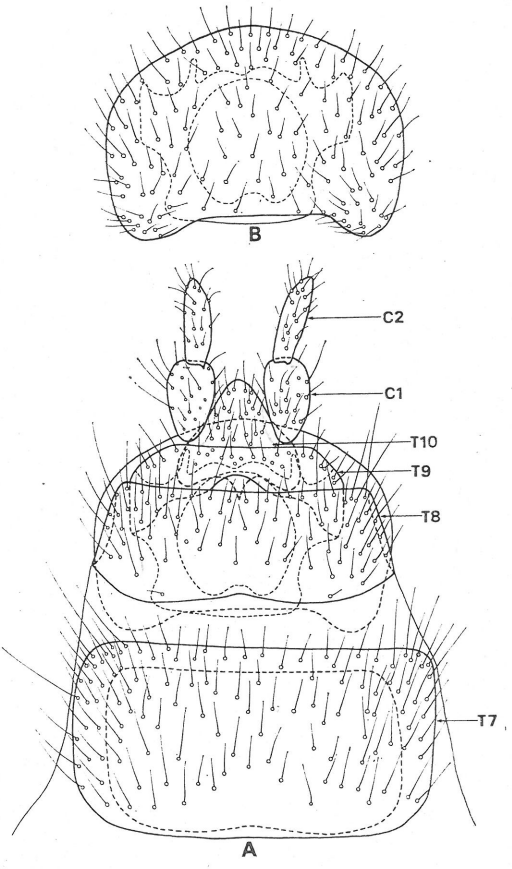

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Fig. 12. *Beris hirotsui* OUCHI, 1943
Fig. 13. *Beris strobli* DUŠEK & ROZKOŠNÝ, 1968 (= *B. latifacies* NAGATOMI & TANAKA, 1972)

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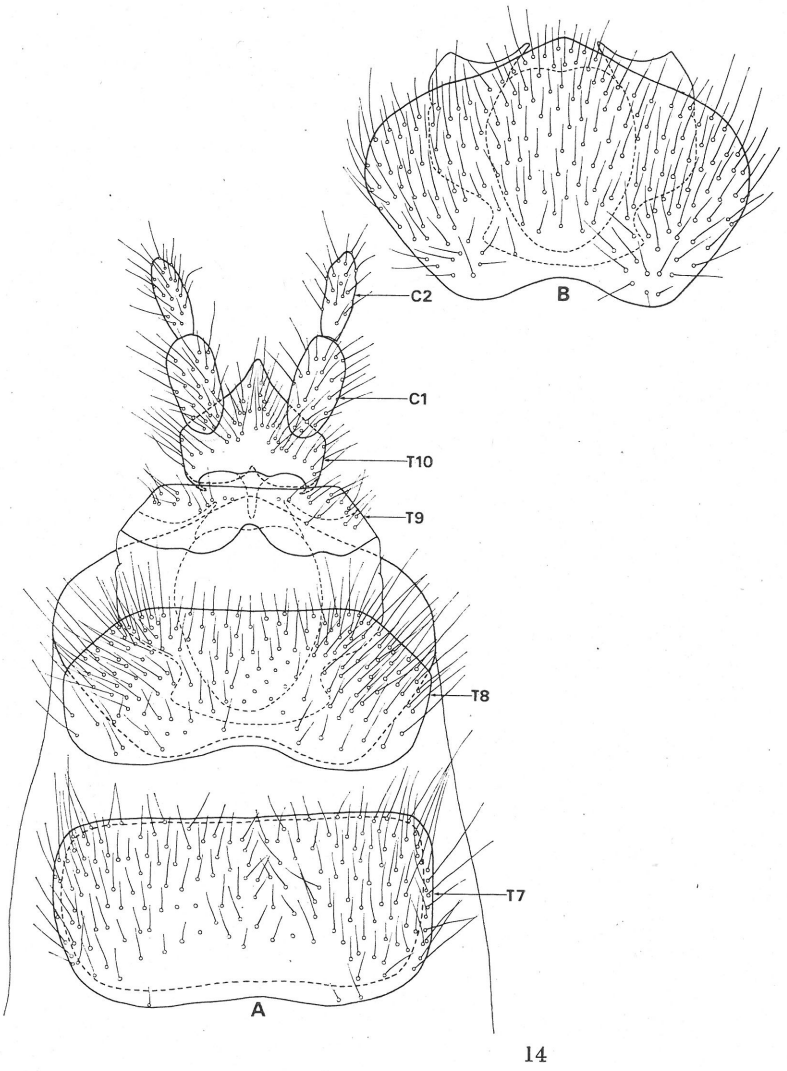

Fig. 14. *Beris nebulosus* NAGATOMI & TANAKA, 1972

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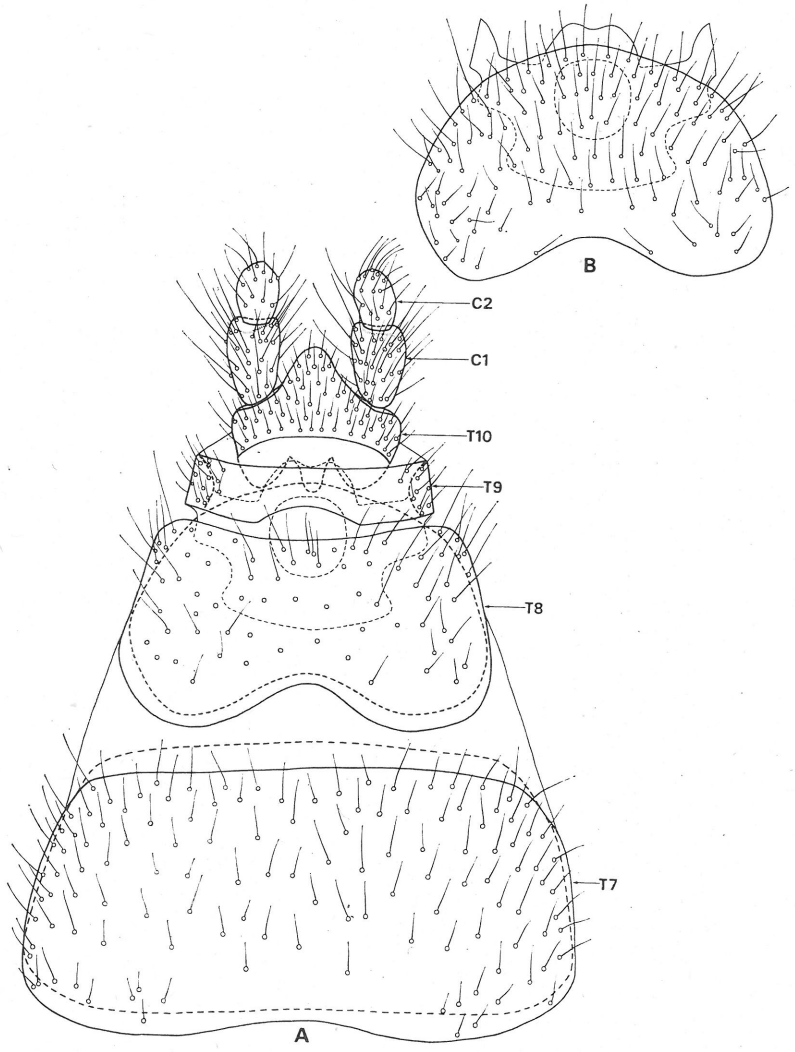

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Fig. 15. *Chorisops maculiala* NAGATOMI, 1964

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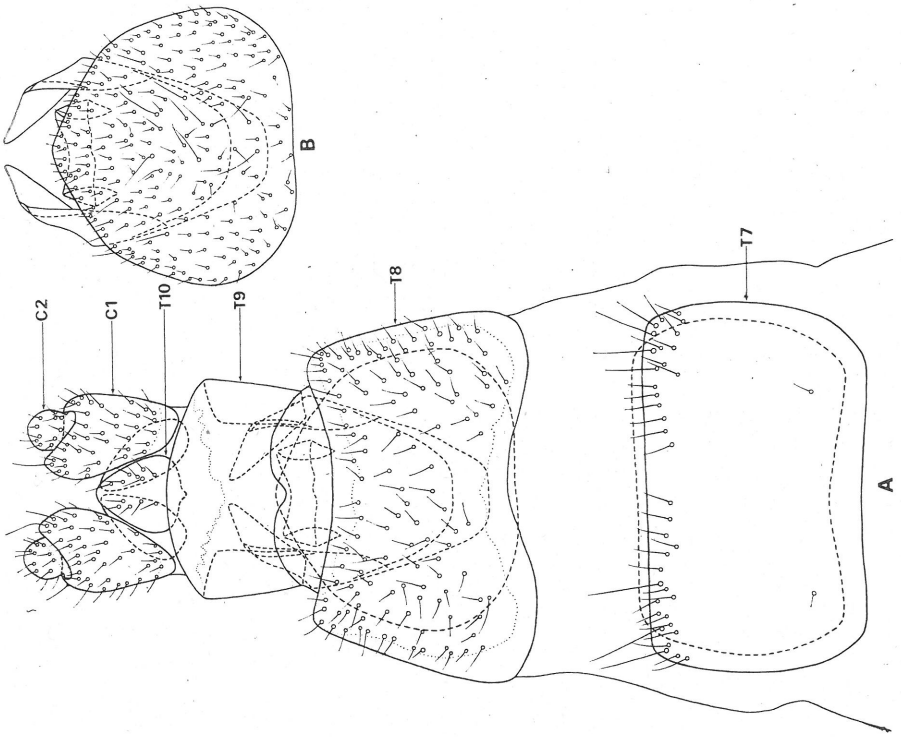

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Fig. 17. *Odontomyia garatas* WALKER, 1849

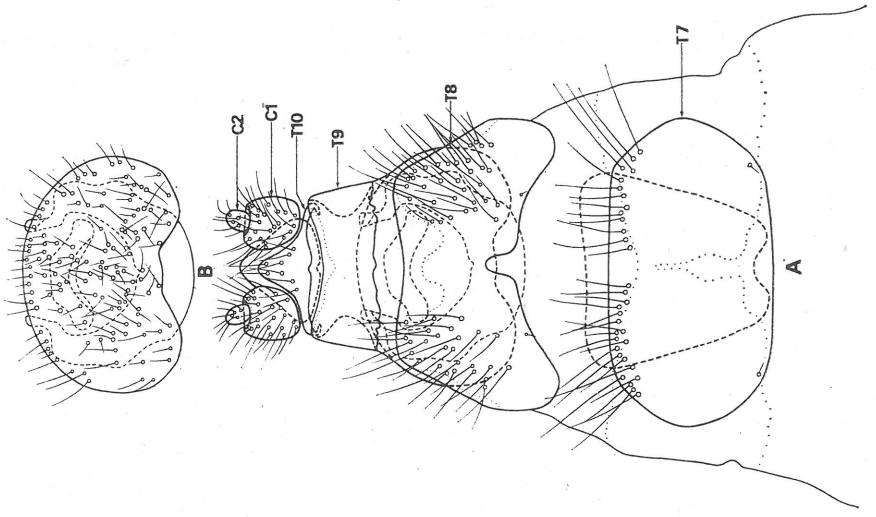

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Fig. 16. *Stratiomys japonica* VAN DER WULP, 1885

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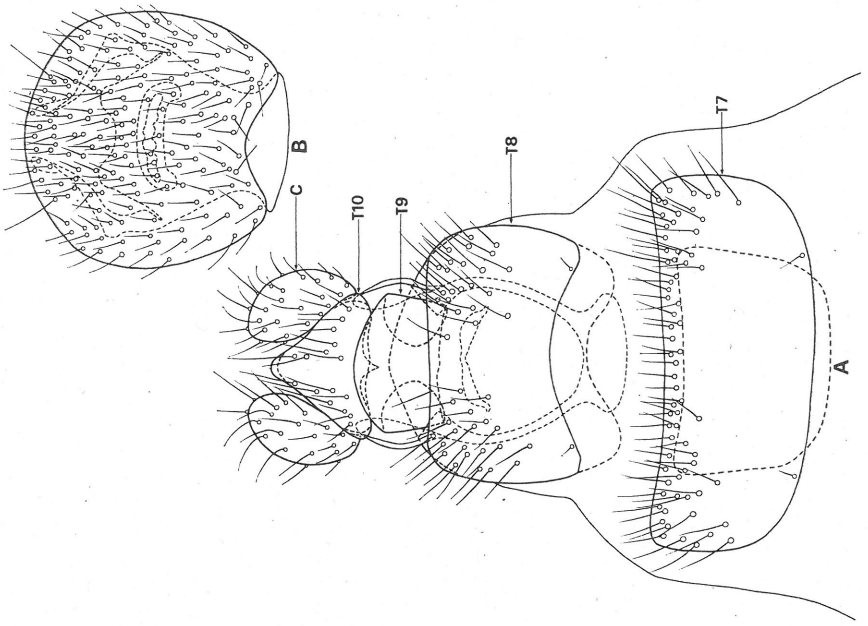

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Fig. 19. *Rhaphiocerina hakiensis* (MATSUMURA, 1916)

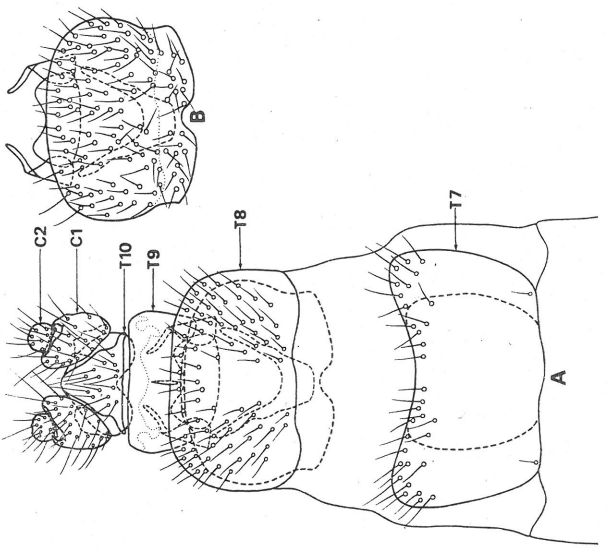

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Fig. 18. *Orthogoniocera hirayamae* (MATSUMURA, 1916)

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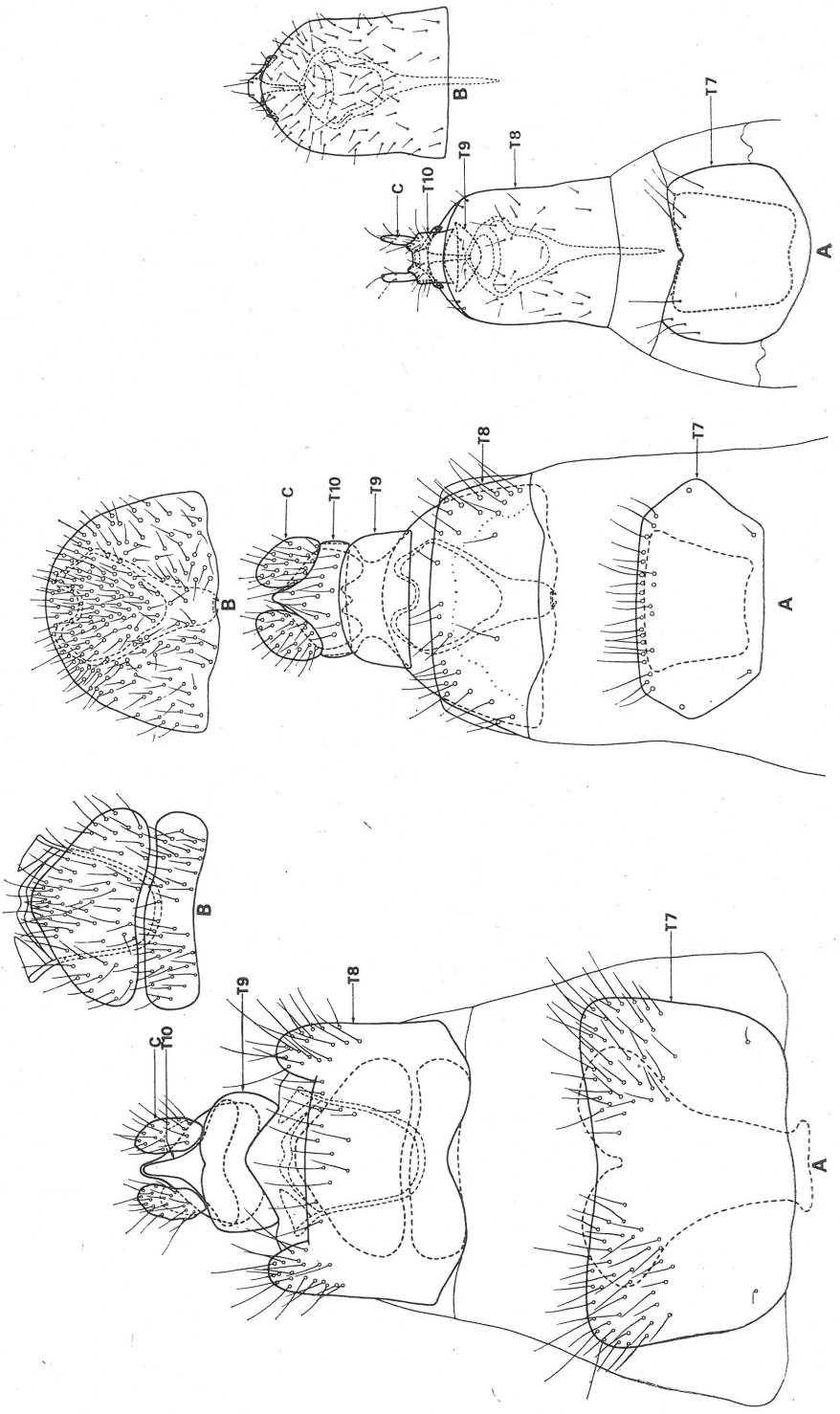

Fig. 20. *Brachycera yukawai* NAGATOMI, 1977

Fig. 21. *Oxycera kusigematii* NAGATOMI, 1977

Fig. 22. *Abrosiomyia bella* NAGATOMI, 1975

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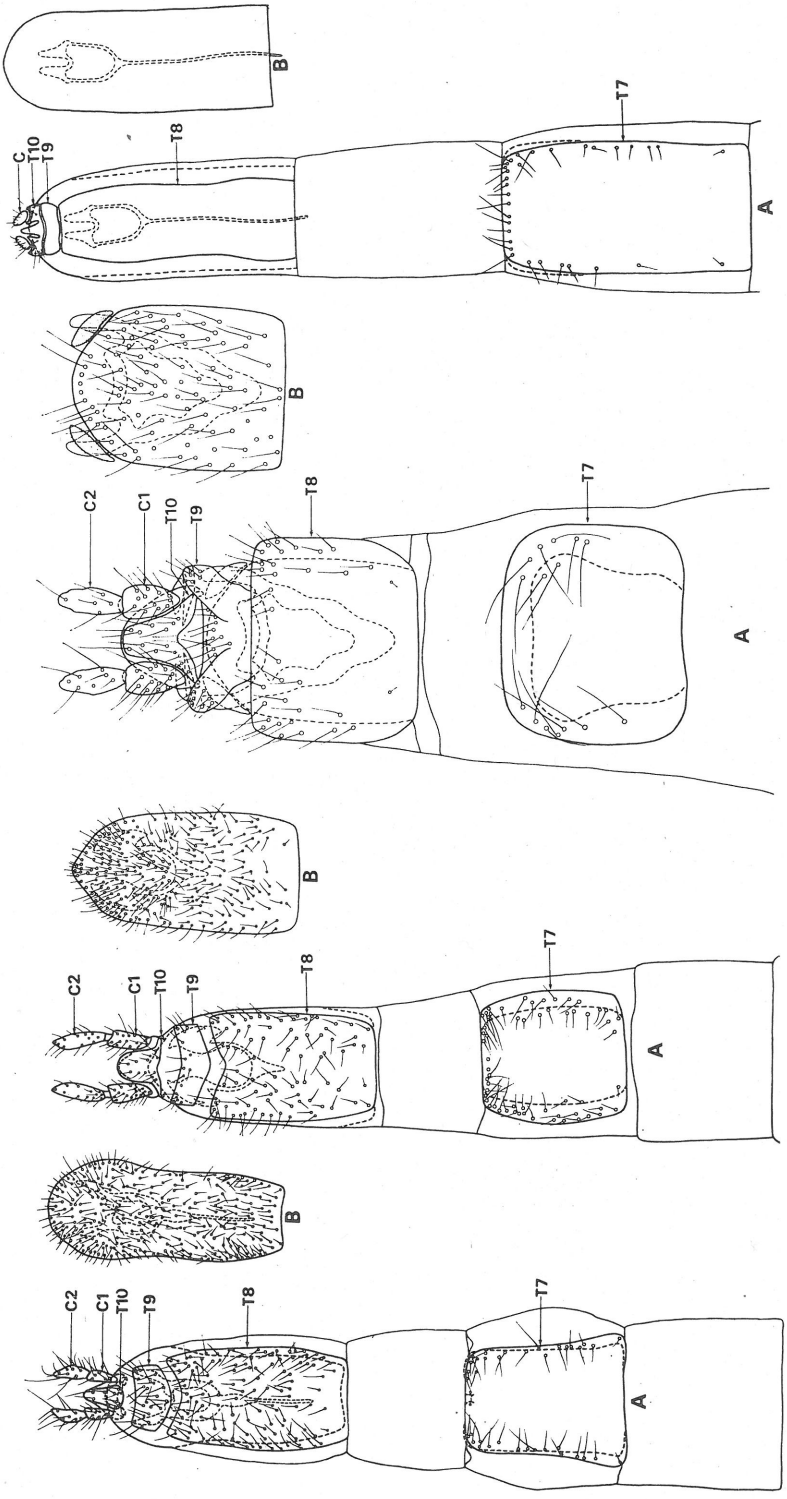

Fig. 23. *Craspedometopon frontale* KERTÉSZ, 1909
Fig. 26. *Wallacea tsudai* (OUCHI, 1940)

Fig. 24. *Evaza japonica* LINDNER, 1938

Fig. 25. *Kolomania* (= *Ouchimyia*) *nipponensis* (OUCHI, 1940)

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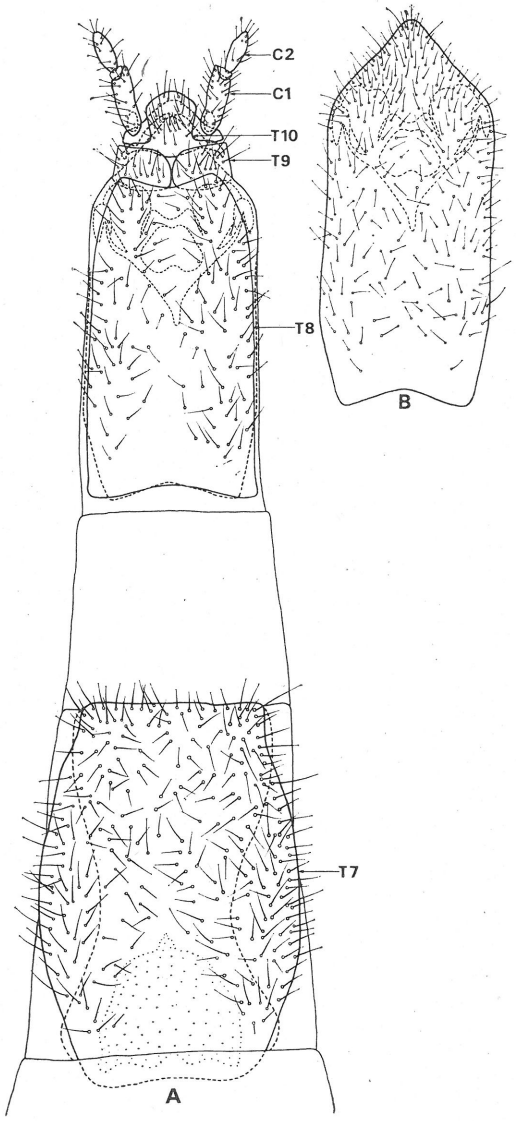

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Fig. 27. *Hermetia illucens* (LINNAEUS, 1758)

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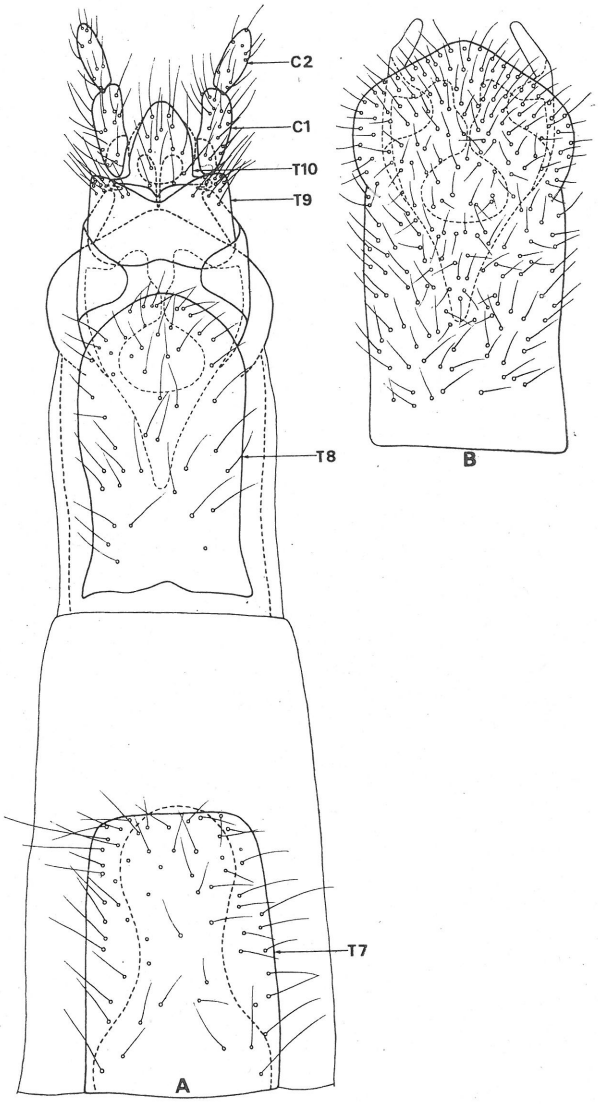

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Fig. 28. *Cephalochrysa stenogaster* JAMES, 1939

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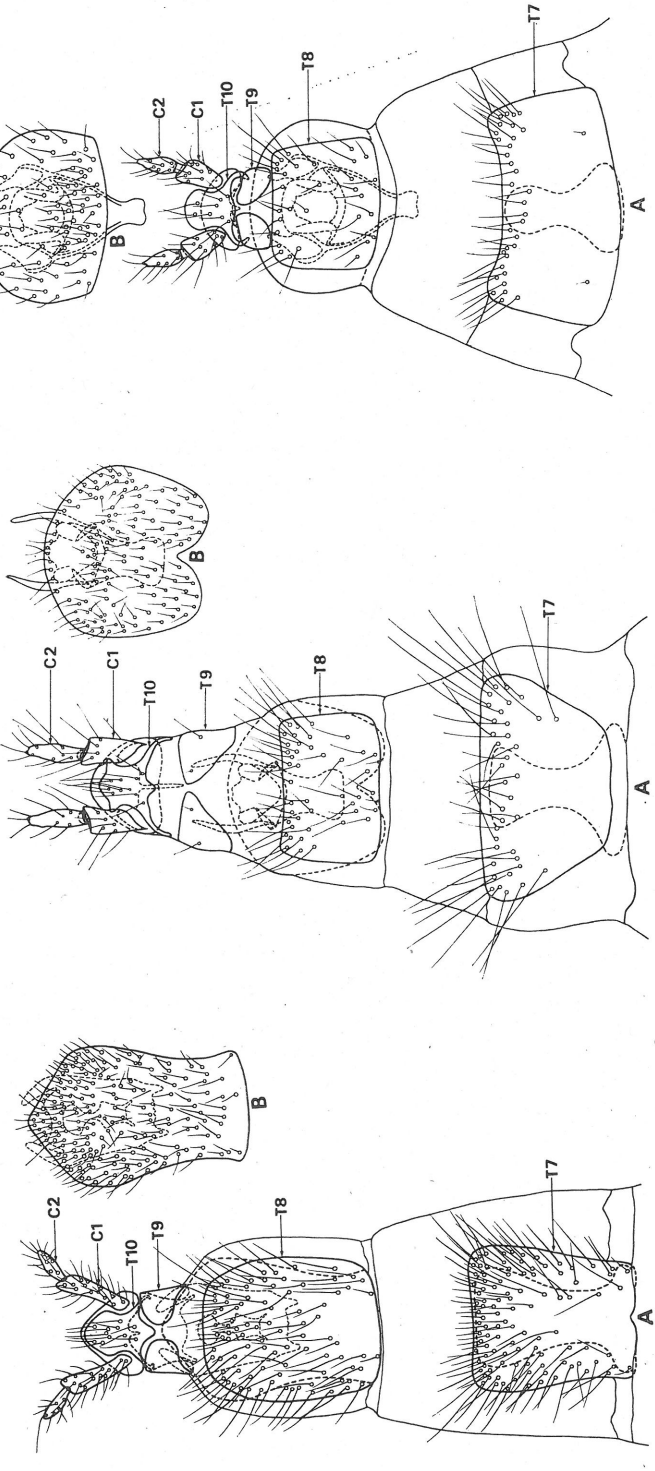

Fig. 29. *Chrysochroma niphonensis* (BIGOT, 1879)

Fig. 30. *Microchrysa flaviventris* (WIEDEMANN, 1824)

Fig. 31. *Microchrysa japonica* NAGATOMI, 1975

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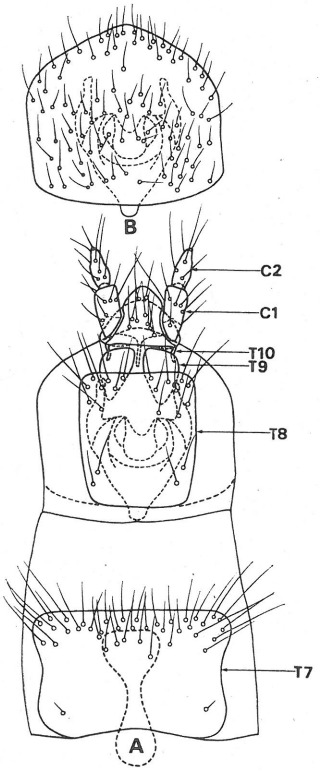

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Fig. 32. *Microchrysa nigrimacula* NAGATOMI, 1975

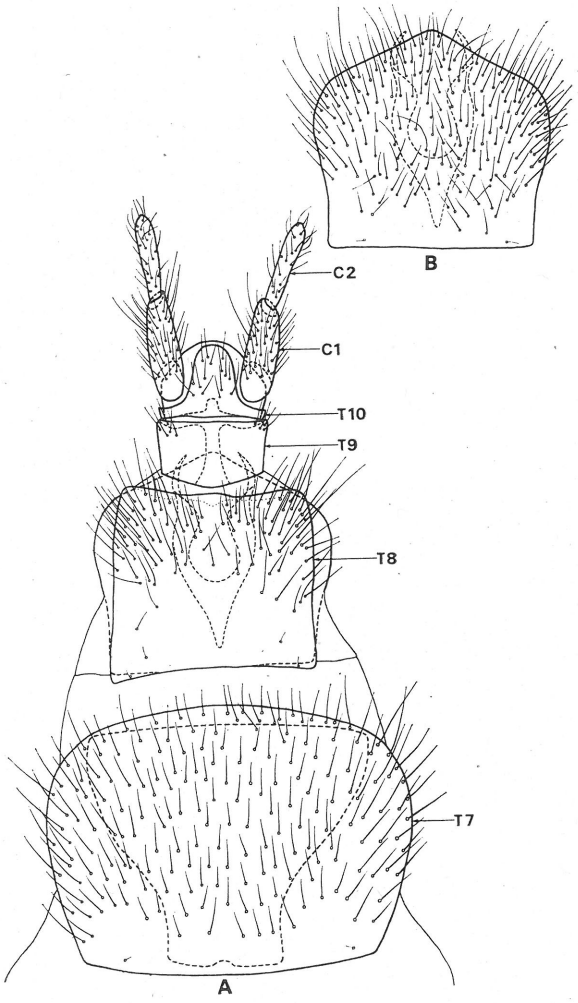

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Fig. 33. *Ptecticus aurifer* (WALKER, 1854)

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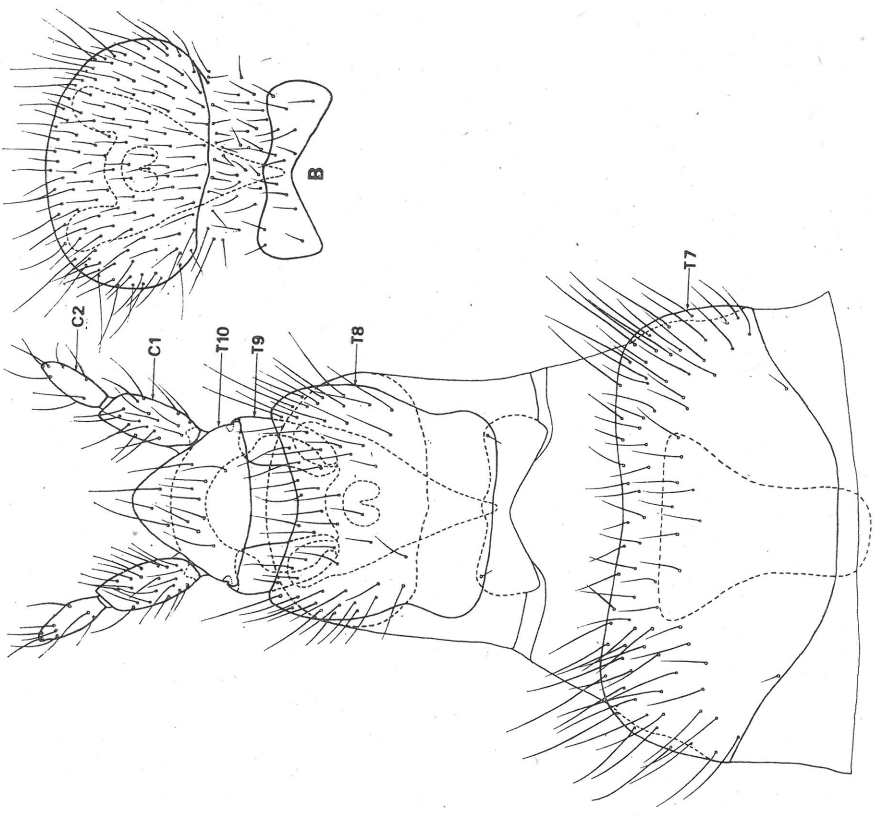

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Fig. 34. *Ptecticus matsumurae* LINDNER, 1936

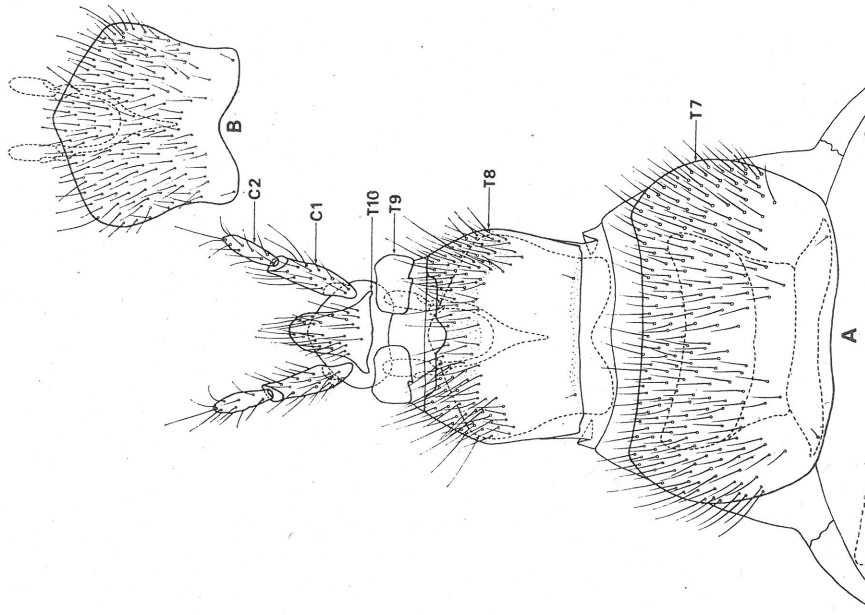

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Fig. 35. *Ptecticus tenebrifer* (WALKER, 1849)

DOI: 10.21248/contrib.entomol.28.2.263-293

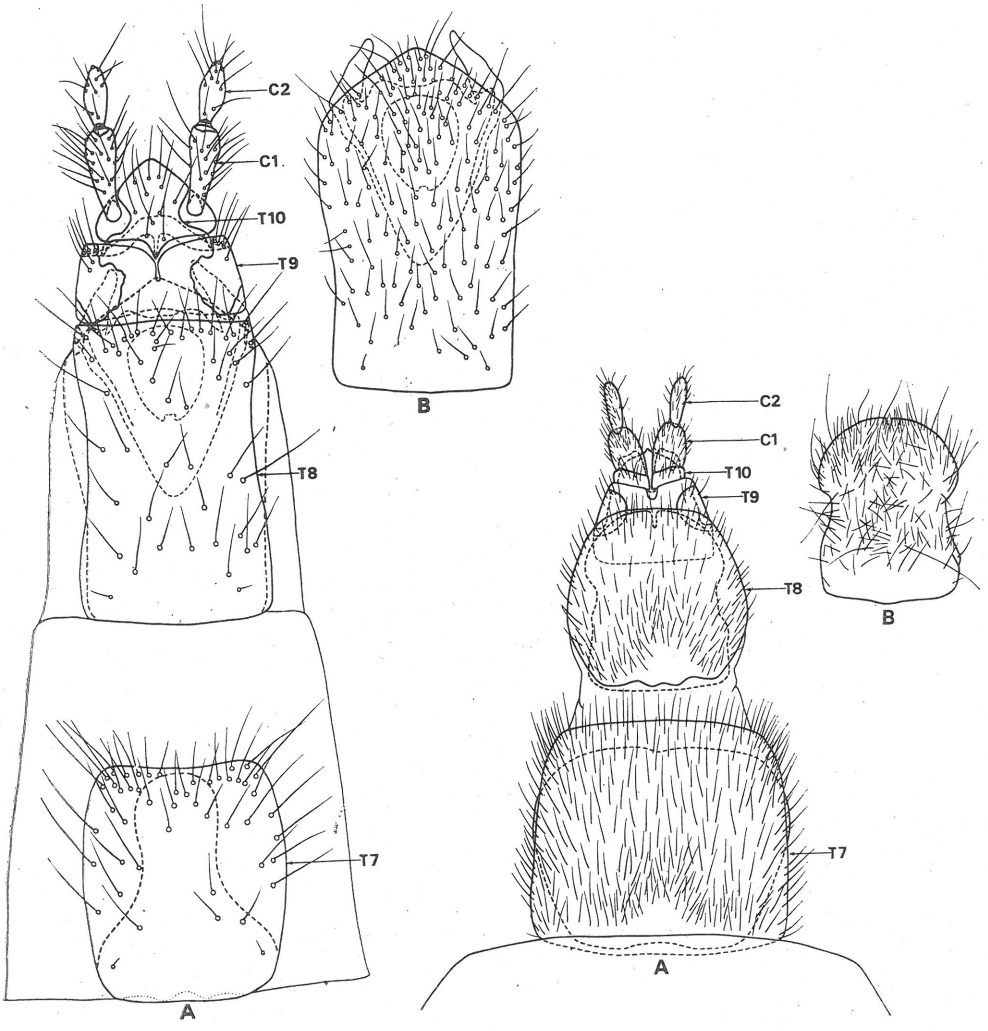

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Fig. 36. *Sargus metallinus* FABRICIUS, 1805
Fig. 39. *Heterostomus curvipalpis* BIGOT, 1857 (probably Coenomyiidae)

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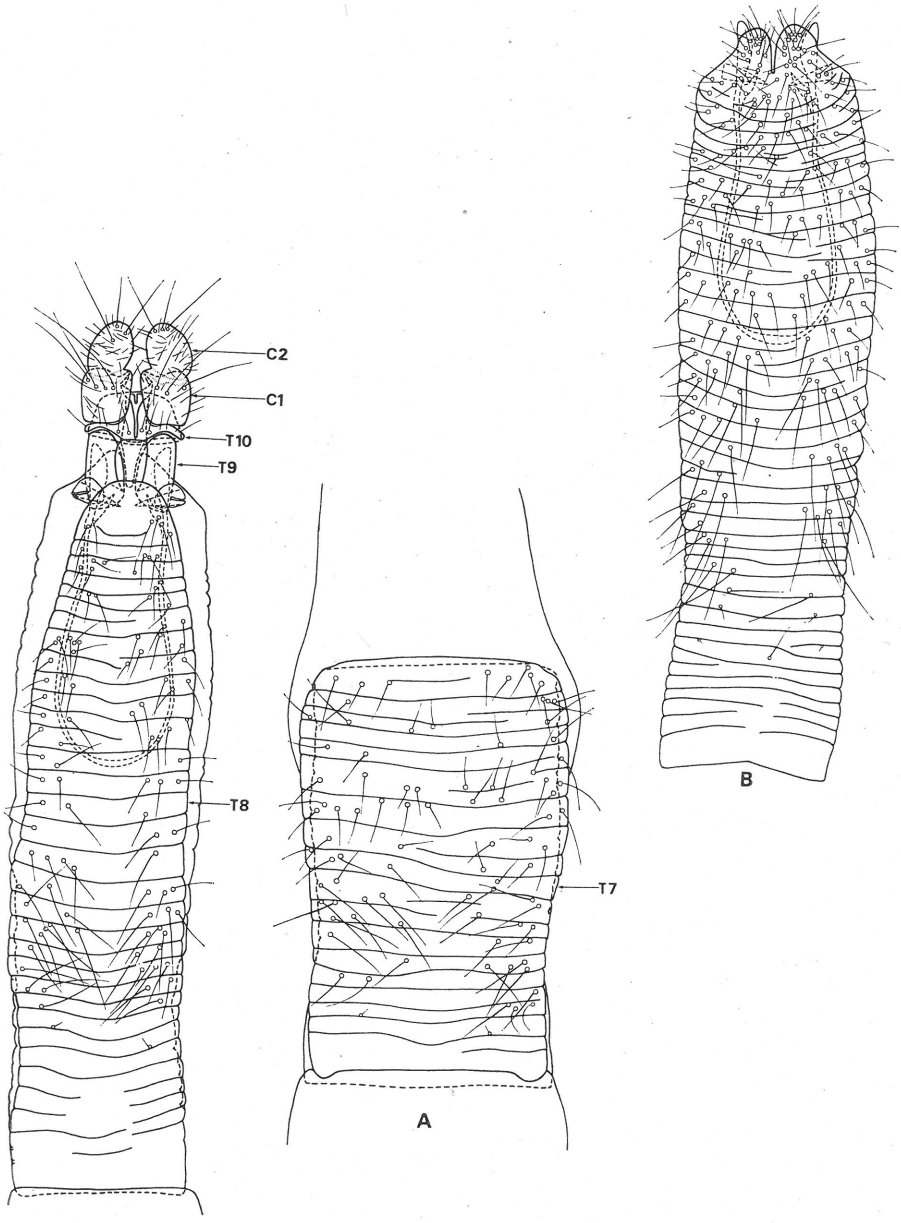

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Fig. 37. *Pantophthalmus bellardii* (BIGOT, 1862) (Pantophthalmidae)

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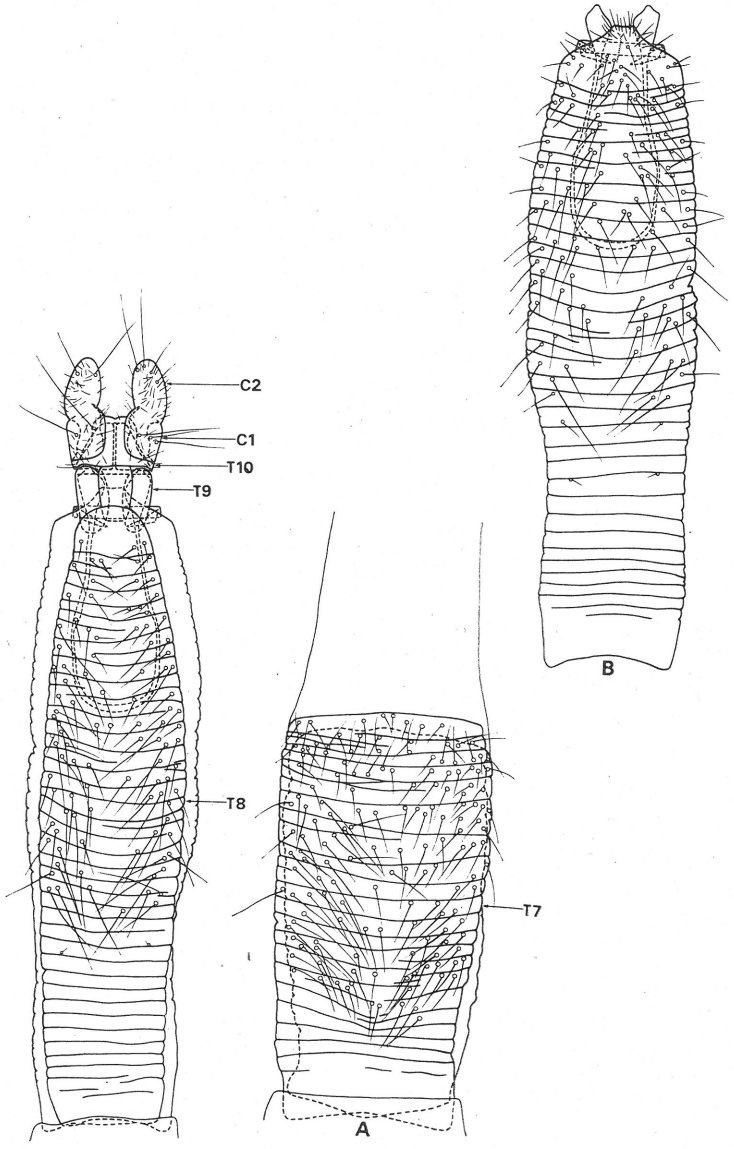

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Fig. 38. *Rhaphiorhynchus* sp. (= possibly *planiventris* WIEDEMANN, 1821) (Pantophthalmidae)

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