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Female Terminalia of *Axymyia* and *Hesperinus* (Diptera, Axymyiidae and Bibionidae)

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Synopsis This paper describes and illustrates the female terminalia of *Axymyia japonica* and *Hesperinus brevifrons* and discusses the systematic positions of these two genera. It seems to be better to keep *Axymyia* in Axymyiidae (not in Pachyneuridae) and *Hesperinus* in Bibionidae (rather than to Hesperinidae).

IWATA and NAGATOMI (1979) described and illustrated the female terminalia of 4 genera (*Bibio*, *Dilophus*, *Penthetria* and *Plecia*) and 7 species of Bibionidae. In this paper, the female terminalia of 1 species of *Hesperinus* as well as an *Axymyia* will be described.

In the illustrations, C1-C2: Segments 1-2 of cercus, dorsal view; T7-T9: Terga 7-9, dorsal view; S8-S10: Sterna 8-10 and genital furca, ventral view.

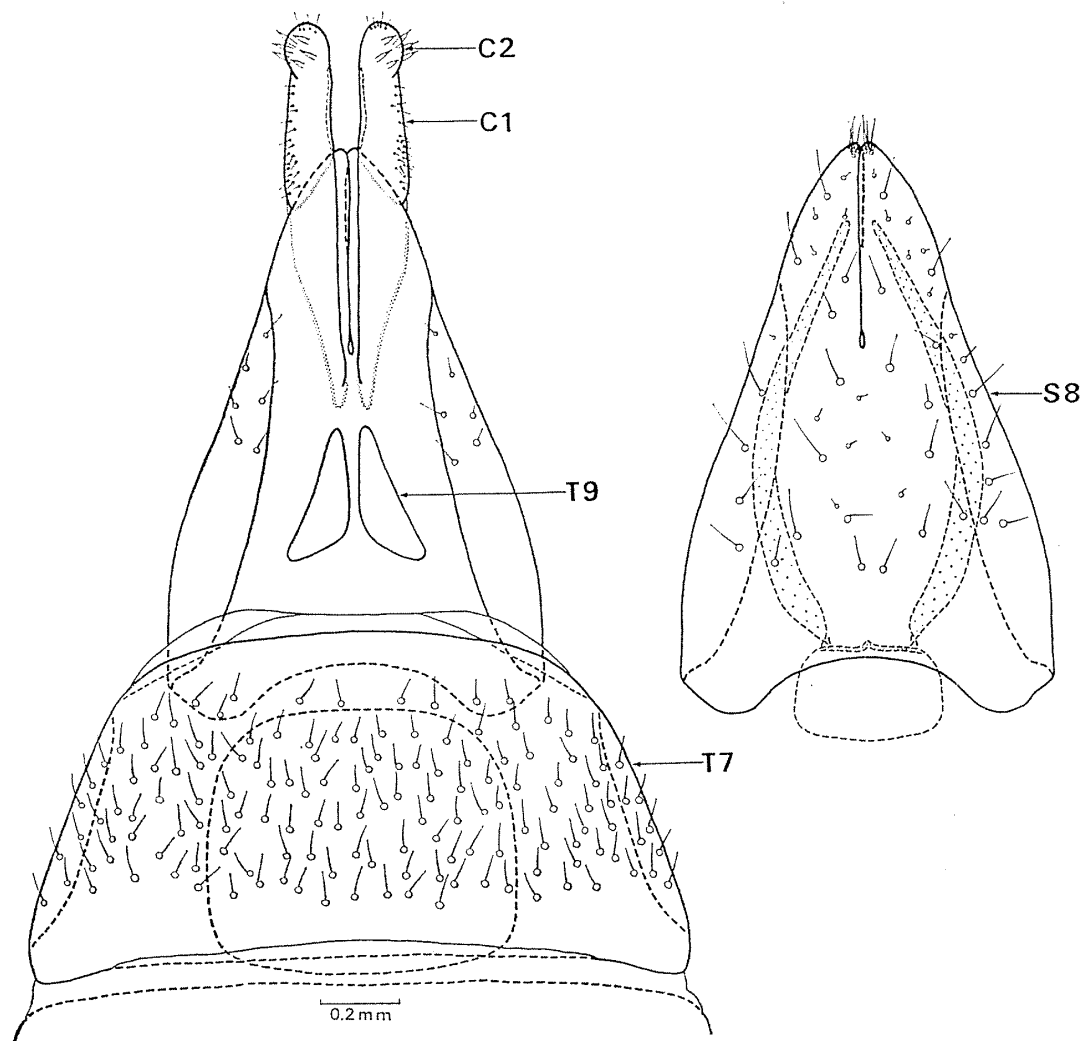
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Family A x y m y i i d a e

(Fig. 1)

Characters of family. Only segment 8 (or at most segments 7-8) forms an ovipositor; intersegmental membrane between segments 7-8 absent or hardly visible; cercus 2-segmented (if apical part is differentiated from the rest); tergum 10, sternum 10, and tergum 8 absent; it appears that tergum 9 is divided into a pair of sclerites which are elongate and much smaller than sternum 8 (the sclerites of tergum 9 are weak and may easily be overlooked unless carefully examined); sternum 8 longer than wide, tapering apically, narrower but longer than tergum 7, and with lateral margin folded dorsally; tergum 7 wider than long and wider anteriorly.

It should be noted that a pair of sclerites indicated as tergum 9 in Fig. 1 may

Fig. 1. *Axymyia japonica* ISHIDA

possibly be tergum 8 and if so, tergum 9 is entirely absent.

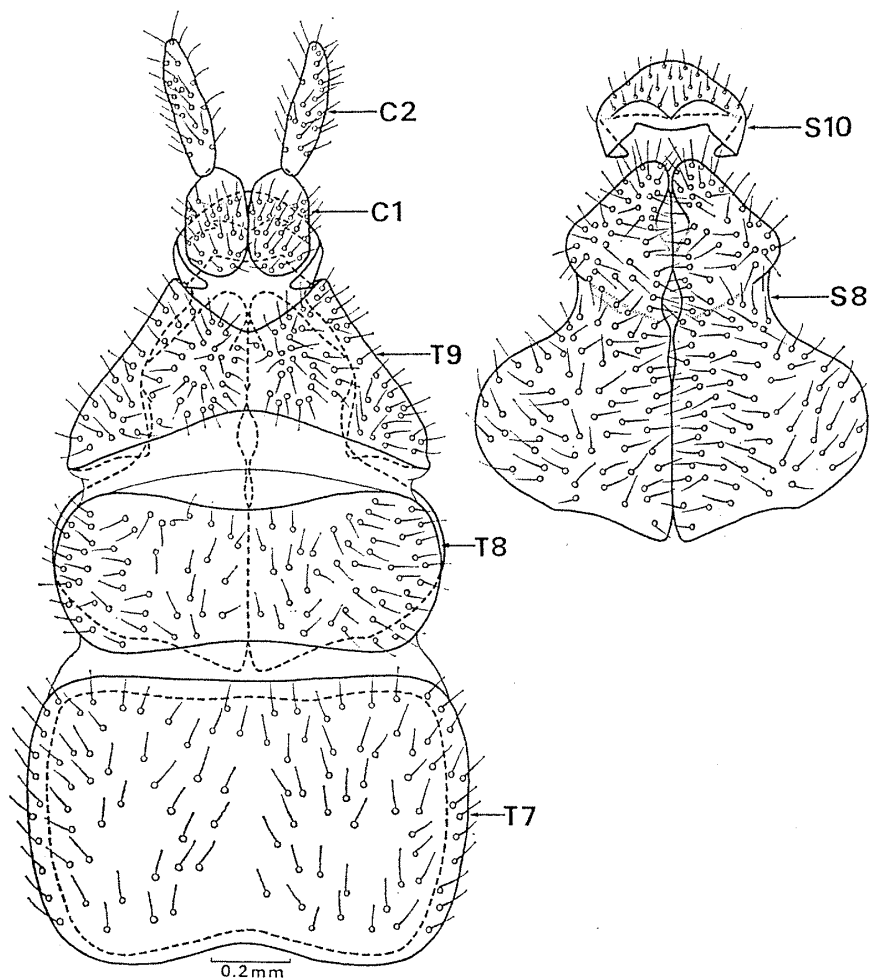
Characters of genus and species: Genus *Axymyia* MCATEE, 1921: in *japonica*, segment 1 of cercus elongate and segment 2 rounded and with some bristles more stout than in segment 1, sternum 8 with a deep break at mid posterior part, and sternum 7 wider than long and much narrower than tergum 7.

Specimen dissected. *A. japonica* ISHIDA, 1953: 1 ♀, Japan (no other data).

Family Bibionidae

(Fig. 2)

Characters of family. The female terminalia of *Hesperinus* fit the description of the family Bibionidae based on *Bibio*, *Dilophus*, *Penthetria* and *Plecia* by IWATA and NAGATOMI (1979), although the sternum 8 is about as wide as long. It should

Fig. 2. *Hesperinus brevifrons* WALKER

be noted that the genital furca (or genital fork) is present in *Bibio*, *Dilophus*, *Penthetria* and *Plecia* but is not found in *Hesperinus*.

Characters of genus and species: Genus *Hesperinus* WALKER, 1848: *Hesperinus* may be characterized among Bibionidae by having genital furca absent; sternum 8 about as wide as long, more or less gourd-shaped and with posterior part smaller than the anterior, and divided by a median line (which may be desclerotized) and with apical parts forming a pair of lobes (whose margins are narrowly folded [although this is not indicated in Fig. 2]).

Hesperinus is similar to *Penthetria* in the cercus 2-segmented but may be distinguished from the latter by having tergum 9 not smaller than tergum 8 (besides the sternum 8 different) and is also similar to *Plecia* in the shape of tergum 9 but is easily separated from the latter by having cercus 2-segmented (besides the sternum 8 different).

In *brevifrons*, each segment of cercus elongate and segment 2 narrower than but longer than segment 1, sternum 10 wider than long and with wide concavity at

anterior margin, tergum 10 absent, tergum 9 comparatively long, wider anteriorly, and with posterior margin concave, terga 7-9 and sternum 8 about as wide as one another and sternum 7 not larger but not much smaller than tergum 7.

Specimens dissected. *H. brevifrons* WALKER, 1848: 1 ♀, Science Lodge, 9500 feet, Nederland, Colorado, 5. vii. 1961, W. R. M. MASON; 1 ♀, Alaska Hwy, 4500 feet, MacDonald R, British Columbia, 20. vii. 1959, R. E. LEECH.

Discussion

HARDY and TAKAHASHI (1960: 386) wrote concerning *Hesperinus*, "Many authorities have treated this [= *Hesperinus*] under a separate family, Hesperinidae, but we see no justification for removing this genus from the Bibionidae." We support this view from the characters of the female terminals.

Axymyia was often put in Bibionidae (including *Hesperinus* and *Penthetria*) but must be removed from this family even on the basis of the female terminalia alone. *Axymyia* was also placed in Pachyneuridae of the Bibionoidea (see STONE *et al.* (1965)) or of the Bibionomorpha including Pachyneuriformia, Anisopodiformia, etc. (see HENNIG (1973)).

Unfortunately no chance is taken now to study the female terminalia of *Pachyneura* and no comment is able to be made in this respect. However, it may be right to erect the family Axymyiidae as pointed out by the workers below, on the basis of the larval characters.

MAMAEV and KRIVOSHEYNA (1966) wrote, "Study of the morphology and ecology of axymyiid larvae thus shows the group to be rather separate from other Diptera. To keep this family in the superfamily Bibionoidea is no longer acceptable in the light of new data. The family Axymyiidae is a very isolated branch in the evolution of Diptera and from this point of view merits ranking as an independent superfamily, Axymyoidea."

ALEXANDER and ALEXANDER (in DELFINADO & HARDY (1973)) wrote, "The eastern Nearctic genus *Axymyia* MCATEE was placed in this family [= Pachyneuridae] by EDWARDS (1928 a) but very probably does not belong here and needs further study. The remarkable larva of *Axymyia* has been discussed by KROGSTAD (1959)."

TESKEY (1976) described and illustrated the larva of *Axymyia furcata* MCATEE and put it in Axymyiidae.

References

- DELFINADO, M. D. & D. E. HARDY, 1973. *A catalog of the Diptera of the Oriental region*. Vol. 1. Suborder Nematocera. 618 pp. Honolulu.
- HARDY, D. E. & M. TAKAHASHI, 1960. Revision of the Japanese Bibionidae (Diptera, Nematocera). *Pacif. Ins.*, **2**: 383-449.
- HENNIG, W., 1973. Diptera (Zweiflügler). In *Handbuch der Zoologie*, **4** (2), 2/31: 1-337.
- ISHIDA, H., 1953. A new Pachyneuridae from Japan (Diptera). *Sci. Rep. Saikyo Univ. Agric.*, **5**: 117-118.

- IWATA, K. & A. NAGATOMI, 1979. The female terminalia of Bibionidae (Diptera). *Kontyû, Tokyo* 47: 505-510.
- MAMAEV, B. M. & N. P. KRIVOSHEYNA, 1966. New data on the taxonomy and biology of the family Axymyiidae (Diptera). *Ent. Rev.* 45: 93-99 (= *Entom. Obozr.*, 45: 168-180).
- STONE, A. *et al.*, 1965. *A catalog of the Diptera of America north of Mexico*. 1696 pp. Washington, D. C.
- TESKEY, H. J., 1976. Diptera larvae associated with trees in North America. *Mem. ent. Soc. Canada*, No. 100. 53 pp.

新 著 紹 介

Pacific Insects Monograph 37. 194 pp. 1981. Department of Entomology, Bishop Museum, Honolulu, Hawaii, U.S.A.

このモノグラフには、オーストラリア La Trobe 大学 I.W.B. THORNTON 教授による南太平洋の3島嶼群と南米チリのチャタテムシ相に関する次の4篇の論文が収められている: Psocoptera of the Fiji Islands (1~105 頁); Psocoptera of the Tongan Archipelago (106~135 頁); Psocoptera from Central and Southern Chile (136~178 頁); Psocoptera from Robinson Crusoe Island, Juan Fernandez Archipelago (179~191 頁). なお、後の2篇は著者の後輩にあたる同大学の T.R. New 博士との共著である. 従来この地域のチャタテムシ相に関する研究はほとんど行われていないので、今回報告された16科32篇156種中、新種は69種に及び、挿図は約92頁分と半分近くを占めている. 著者らは数年来、オーストラリア、ニューギニア、ビスマルク諸島、ソロモン諸島などの近隣諸地域の採集調査に従事しており、本書も南太平洋地域をチャタテムシ相に関する一連の仕事の一部を成すもので、専門分野の研究者にとっては看過し得ない. 比較的短期間に続々と精力的な研究が行われているが、能率を高めるために、描図を他人にまかせるのも一方法であることは、本書からもうかがえる. 新種の記載、各種の記述、調査地域の気候・植生・地史の概略の紹介の他に、これと関連した各地域のチャタテムシの分布についても考察されている. ただし、とくにチリとロビンソンクルーソー島に関しては、今後の資料の充実の望まれることは著者ら自身によっても指摘されている. 価格 \$22.50. 申込は Bishop Museum Press, P.O. Box 19000-A, Honolulu, Hawaii 96819, U.S.A.

(堤 千里)