



A revision of the Asian and European species in the subgenus *Amiota* Loew (Diptera, Drosophilidae) and the establishment of species-groups based on phylogenetic analysis

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A total of 53 *Amiota* (s. str.) species (75% of the world total) from Asia and Europe, including 10 new species, *kamui*, *kimurai* and *planata* from Japan, and *aristata*, *cuii*, *macai*, *magniflava*, *nuerhachii*, *spinata* and *watabei* from China, are reviewed with designation of two new synonymies and phylogenetic analysis. Based upon the result of cladistic analysis with 31 adult male morphological characters, the following conclusions are deduced: (1) The subgenus *Amiota* is monophyletic, so far as the Asian and European forms are concerned. (2) Seven monophyletic groups are recognized within this subgenus. Two of them correspond to known species-groups, the *apodemata* and *sinuata* groups, and the remaining five are established as new species-groups, the *nagatai*, *basdeni*, *taurusata*, *alboguttata* and *rufescens* groups. A key to all the studied species from Asia and Europe is provided.

KEYWORDS: Diptera, Drosophilidae, *Amiota* (s. str.), phylogeny, taxonomy, new species-group, new species, new synonymy, Asia, Europe.

Introduction

The subgenus *Amiota* Loew, 1862 contains mostly small, black flies which are often attracted to the eyes of human and animals. Presently, a total of 61 species have been reported from the world (Wheeler, 1981, 1986; Gupta and Panigrahy, 1987; Bock, 1989; Sidorenko, 1989; Tsacas, 1990; Toda and Peng, 1992; Máca and Lin, 1993; Beuk and Máca, 1995; Toda *et al.*, 1996; Chassagnard *et al.*, 1997; Chen and Toda, 1998a, 1998b): 32 spp. from East Asia, 10 spp. each from South-East Asia and Europe, nine spp. from North and Central America, three spp. from Africa, and two spp. from Australia. Thus, this subgenus is mainly distributed in temperate regions of the northern hemisphere, centring especially in East Asia. This paper adds 10 more new species to its world fauna from Japan and China, and confirms two new synonymies.

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As to the phylogenetic position of the subgenus *Amiota*, only a few studies have been attempted so far. Okada (1971) performed phenetic analyses by different clustering methods, examining 25 adult morphological characters for 28 species of the genus *Amiota* (including the subgenera *Amiota*, *Apsiphortica* Okada, 1971 and *Phortica* Schiner, 1862), but could not obtain consistent results about the relationships among these subgenera. Grimaldi (1990) included a single representative from each of three subgenera, *Amiota*, *Phortica* and *Sinophthalmus* Coquillett, 1904, of the genus *Amiota* in his very extensive cladistic analysis, which covered almost the entire family Drosophilidae. He concluded that these three subgenera formed a clade with the genus *Apenthecia* Tsacas, 1983. No attempts had been made to subdivide the subgenus *Amiota* into species-groups until Chen and Toda (1998a, 1998b) established the *apodemata* and the *sinuata* groups, respectively, within this subgenus.

This study deals with 53 *Amiota* (s. str.) species, including 10 new ones, from Asia and Europe. This constitutes 75% of the subgenus. We employ a cladistic analysis with morphological characters to (1) define species-groups and (2) determine the phylogenetic relationships among species in the subgenus *Amiota*.

Materials and methods

Observation. The studied specimens were either preserved in 70% ethanol or dried and pinned. External morphology was observed under a stereoscopic microscope and metric characters were measured with an ocular micrometer. To observe the detailed structure of the head, the male legs, and the male and female terminalia, respective organs were detached from the body, cleared by warming in a 10% KOH solution around 100°C for several minutes, and observed in a droplet of glycerol under a compound light microscope. The dry, pinned specimens were softened by warming in 70% ethanol for several minutes before dissection. Drawings were made with an ocular, mesh micrometer and section paper.

Terminology and indices. We followed McAlpine (1981) for morphological terminology and Zhang and Toda (1992) for the definitions of measurements and indices, with some new indices (indicated with *): arb=dorsal branches/ventral branches of arista, avd*=longest ventral branch/longest dorsal branch of arista in length, adf*=longest dorsal branch of arista/width of first flagellomere, flw*=length/width of first flagellomere, FW/HW=frontal width/head width, ch/o=maximum width of gena/maximum diameter of eye, prorb=proclinate orbital/posterior reclinate orbital in length, rcorb=anterior reclinate orbital/posterior reclinate orbital in length, vb=subvibrissal/vibrissa in length, dcl=anterior dorsocentral/posterior dorsocentral in length, presctl=prescutellar/posterior dorsocentral in length, sctl=basal scutellar/apical scutellar in length, sterno=anterior katepisternal/posterior katepisternal in length, orbito=distance between proclinate and posterior reclinate orbitals/distance between inner vertical and posterior reclinate orbital, dcp=length distance between ipsilateral dorsocentrals/cross distance between anterior dorsocentrals, sctlp=distance between ipsilateral scutellars/cross distance between apical scutellars, C=second costal section between subcostal break and R_{2+3} /third costal section between R_{2+3} and R_{4+5} , 4c=third costal section between R_{2+3} and R_{4+5}/M_1 between *r-m* and *dm-cu*, 4v= M_1 between *dm-cu* and wing margin/ M_1 between *r-m* and *dm-cu*, 5x= CuA_1 between *dm-cu* and wing margin/*dm-cu* between M_1 and CuA_1 , ac=third costal section between R_{2+3} and R_{4+5} /distance between distal ends of R_{4+5} and M_1 , M= CuA_1 between *dm-cu* and wing margin/ M_1 between *r-m* and

dm-cu, $C3F$ = length of heavy setation in third costal section / (length of heavy setation in third costal section + length of light setation in third costal section).

Species studied. For the cladistic analysis, we selected a total of 56 species (see Appendix), including 53 *Amiota* (s. str.) species as ingroup and the following three outgroup species: *Apenthecia* (*Parapenthecia*) *foliolata* Toda and Peng, 1992, *Amiota* (*Phortica*) *variegata* (Fallén, 1823) and *Amiota* (*Apsiphortica*) *lini* Okada, 1971.

Characters. Examining thoroughly from the head to the terminalia, we extracted a total of 31 characters of male adult morphology for the analysis. The characters were coded *a posteriori* so that all characters of the hypothetical ancestor at the root of the resulting cladogram have character state 0. All characters were treated as 'unordered'.

1. Postocellar setae present (0); absent (1).
2. A few anterior sensilla of medial cibarial trichoid, not differentiated from others (0); short, somewhat peg-like (1; figure 1A).
3. Face greyish brown (0); milky white on lower half (1).
4. Clypeus white medially, black laterally (0); entirely dark brown to black (1).
5. Prescutellar setae present (0); absent (1).
6. Postpronotal lobe yellowish white (0); distinctly milky white on upper part (1).
7. Anepimeron not white (0); distinctly milky white on upper part (1).
8. Ventral surface of costal vein between R_{2+3} and R_{4+5} with more than 18 minute, peg-like spinules (0); without such spinules (1); with 14 or 15 distinct ones (2).
9. Hind femur without a row of special setae on posteroventral surface (0); with a row of long setae basally to medially (1; figure 2B).
10. Hind femur with neither extension nor flap basoventrally (0); slightly extended (1); with small, lobe-like flap (2; figure 2D).
11. Hind tibia not extended apicodorsally (0); slightly extended (1); much extended like flap (2; figure 2D).
12. Hind tibia without a row of long setae ventrally (0); with such setae (1; figure 2B).
13. Hind first tarsomere not expanded dorsally (0); expanded (1; figure 2D).
14. Hind second tarsomere slender, twice as long as wide (0); broadened, shorter than 1.5 times of width (1); much broadened, shorter than wide (2; figure 2C).
15. Fourth tergite not protruded laterally (0); protruded more than others (1; figure 1B).
16. Fifth tergite not broadened (0); broadened (1; see Chen and Toda, 1998a, figure 1E).
17. Fifth tergite without dark coloured strips laterally (0); with such strips (1; see Chen and Toda, 1998a, figure 1E).
18. Fifth sternite quadrate, not notched posteromedially (0); more or less triangularly notched there (1; figure 1C–E).
19. Lateral margin of sixth tergite only slightly narrower than dorsomedian part (0); tapering, but reaching ventral margin of fifth tergite (1); pointed apically, not reaching ventral margin of fifth tergite (2; see Chen and Toda, 1998a, figure 1E).
20. Epandrium not constricted mid-dorsally (0); constricted more deeply than

one-half of width (1; figures 4A, 5A, 7A, 8A, 15A); entirely separated into two lateral lobes (2; figures 10–14A). Máca (1980) regarded the character states 1 and 2 as diagnostic for the subgenus *Amiota*, describing ‘... perianthrium (after conception of Griffiths, 1972) not or only narrowly connected in dorsal midline; sometimes the connection is indicated by a suture, as is common in many other Steganinae’. However, we found the character state 0, the completely connected epandrium, in some *Amiota* (s. str.) species.

21. Prensistae on surstylus small, wedge-shaped (0); short, pointed apically (1); long, apically blunt (2; figures 4B, 5B, 7B, 8B, 10B, 11B, 12A, 13B, 15B); long, pointed apically (3; figure 14B); absent (4).
22. Surstylus without any aristate processes on mesal surface (0); with one to five such processes (1; figures 7B, 8B). Okada (1968) referred to the latter character state in the description of *Amiota (Amiota) alboguttata*, forma *clavata* as follows: Clasper ... medially with a row of strong setae, which are inserted on a dark common lobe or ‘crown’.
23. Anterior portion of hypandrium more or less broadened (0, figures 5C, 7C, 8C, 14C, 15C); entirely thin (1; figures 10C, 11C, 12B, 13C); narrowly separated (2; figure 4C); broadly separated (3).
24. Plate connecting anterior part of hypandrium with ventromedian part of paramere absent (0); present (1; see Chen and Toda, 1998b, figures 2–6C).
25. Paramere with only ordinary sensilla (0); with very minute sensilla apically in addition to ordinary ones (1). Chen and Toda (1998b) termed the additional minute sensilla as pits, since only their sockets were seen under a light microscope. This time we confirmed the presence of microsensilla by a scanning electron microscope.
26. Parameres separated from each other (0; figures 7D, 8D, 10E, 11D, 12C, 13D, 14D); fused only basally (1; figures 4D, 5D, 15D); fused basomedially (2; see Chen and Toda, 1998b, figures 1–6B).
27. Aedeagus single (0; figure 4D); separated into a pair of unbifurcated processes as long as paramere (1; figures 7D, E, 8D, E); separated into a pair of unbifurcated processes shorter than paramere (2; figures 5D, 10E, 11D, 12C, 13D); separated into a pair of bifurcated processes (3; figure 14D, E); indistinguishably fused to parameres or lost (4; figure 15D, E).
28. Aedeagus and apodeme separated (0; figures 5D, E, 7D, E, 8D, E, 10E, 11D, 12C, 13D, 14D, E, 15D, E); fused (1; figure 4D).
29. Aedeagal apodeme rod-like or laterally flattened (0); broad, dorsoventrally flattened (1; figures 4C, 5D, 7D, 8D, 10E, 11D, 13–15D).
30. Aedeagal apodeme nearly straight (0; figure 4D); slightly curved (1; see Chen and Toda, 1998b, figures 2–6C); strongly curved (2; figures 5E, 7E, 8E, 10F, 11E, 13–15E).
31. Vertical process of gonopod single lobe or rod (0; figures 4C, 5C, 10C, 11C, 12B, 13C, 14C); with two sclerotized, basally fused M-shaped processes (1; figures 7C, 8C); separated into two processes (2; figure 15C).

Cladistic analysis. The original data matrix, 56 species \times 31 characters, is given in the Appendix. However, the following two species, *Amiota (Amiota) filipes* Máca, 1980 and *Amiota (Amiota) spinata* sp. nov., were excluded from the analysis, because a number of characters could not be confirmed due to some damage of the specimens studied.

Data analysis was performed by the Phylogenetic Analysis Using Parsimony (PAUP 3.1.1; Swofford, 1993) program. PAUP was run on a Macintosh Quadra 840Av. Data analysis included two main steps: (1) Determination of the maximum parsimony tree was made by a heuristic search method, in which the addition sequence was set as random and the tree-bisection-reconnection (TBR) branch-swapping was performed. The most parsimonious trees were obtained after 100 replicates of such a search. The strict consensus tree was constructed and rooted such that the outgroup species formed a basal polytomy with the ingroup. According to the resulting tree, the character optimization was performed by DELTRAN (delayed transformation) and ACCTRAN (accelerated transformation). (2) Support for each clade on the consensus tree was assessed by bootstrap analysis with 100 replicates. Each bootstrap replicate was analysed by a heuristic search method with 'simple' addition sequence and the TBR procedure.

Type depositories. The examined specimens are deposited in the following institutions: Czech Agency for Nature Conservation, Ceske Budejovice, Czech Republic (CANC); Department of Biology, Shenyang Teachers' College, Shenyang, China (DBSC); Entomological Institute, Hokkaido University, Sapporo, Japan (EHU); Museum Zoologicum Bogoriense, Bogor, Indonesia (MZB); Department of Biology, Northeast Normal University, Changchun, China (NENU); Department of Zoology, National Science Museum, Tokyo, Japan (NSMT). The type specimens deposited by Dr H. Takada in Sapporo University were transferred to EHU.

Description

Characters commonly seen in all species examined are first described as subgeneric characters and are not referred to in the subsequent description of each species.

Subgenus *Amiota* Loew

Amiota Loew, 1862: 229. Type-species: *Amiota leucostoma* Loew, 1862.

Amiota (s. str.): Wheeler, 1952: 166.

Diagnosis. Face, postpronotal lobe and wing base each with distinctly milky white spot; clypeus unicolourous, dark brown to black; aedeagal apodeme broad, drosoventrally flattened; a few anterior sensilla of medial cibarials short, somewhat peg-like (figure 1A).

Description. Eyes dark reddish brown. Anterior reclinate orbital slightly shorter than other orbitals. Frons slightly pollinose, with a few minute, interfrontal setulae. Pedicel and first flagellomere almost greyish yellow; arista plumose, without terminal fork. Palpus larger in female than in male, greyish yellow, with several stout setae on lateral margin. Vibrissa prominent; other orals small. Postgena brownish black. Occiput glossy, brownish black.

Thorax slightly glossy, usually brownish black to black, except a small number of species having yellow thorax. One postpronotal seta. Acrostichal setulae in about 12 irregular rows. Prescutellar setae usually present (absent in the *sinuata* species-group). Scutellum usually unicolourous. Basal scutellar setae divergent; apicals cruciate.

Wing hyaline. Veins greyish yellow; crossveins clear. Basal medial-cubital crossvein present. Costal vein with spinules variable in size and number on ventral surface between R_{2+3} and R_{4+5} . C_1 setae two, less differentiated. R_{2+3} slightly curved to costa at tip; R_{4+5} distally convergent to M_1 . Halteres white.

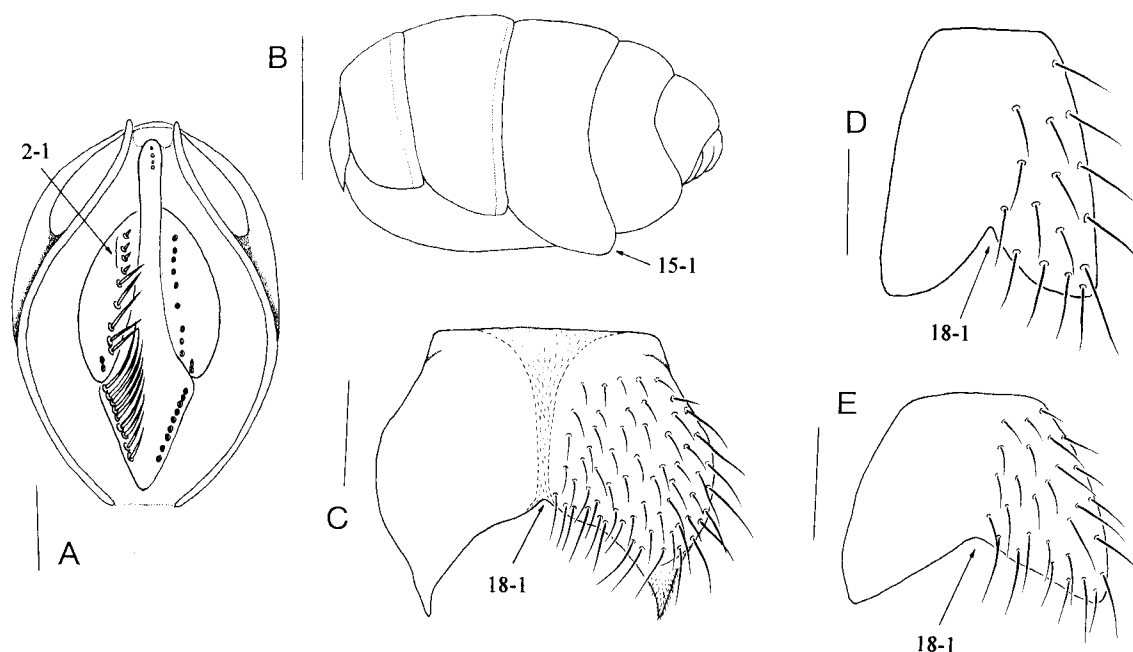


FIG. 1. (A) Cibarium (dorsal view, scale-line=0.1 mm) of *Amiota (Amiota) albilabris* (Roth) ♂ from Hokkaido, Japan. (B) Abdomen (lateral view, scale-line=0.5 mm) of *Amiota (Amiota) taurusata* Takada, Beppu and Toda ♂ from Hokkaido, Japan. (C–E) Fifth sternite (ventral view, scale-line=0.1 mm) of (C) *Amiota (Amiota) collini* Beuk and Máca ♂ from Duchcov-louny, Czech Republic; (D) *Amiota (Amiota) furcata* Okada ♂ from Hokkaido, Japan and (E) *Amiota (Amiota) subfurcata* Okada ♂ from Hokkaido, Japan.

Legs usually yellow, but dark brown in a few exceptions. Apical seta present on mid tibia; preapical dorsal setae present on all tibiae. Fore femur with two to three irregular, posterior rows of setae. Mid tarsus with one or two (usually one) rows of minute cuneiform setulae ventrally; hind tarsus with one row of such setulae. Fore and hind first tarsomeres each usually slightly shorter than remaining tarsomeres combined; mid first tarsomere as long as remainings combined; second tarsomere usually about twice as long as wide.

Abdominal tergites glossy, usually brown to brownish black, except in a small number of species having yellow to brownish yellow tergites; first and second medially paler. Sternites pale greyish yellow; first small, lacking pubescence; second to sixth (♂) or seventh (♀) pubescent and setigerous.

Male terminalia: Epandrium with a number of setae near posterior to ventral margins; apodeme less developed. Surstylus with a row of prensisetae on distal margin and several setae apically. Tenth sternite laterally fused to surstyli and with a pair of lobe-like processes, contiguous dorsally to cerci and ventrally to gonopod. Cercus separated from epandrium, entirely pubescent and setigerous. Membrane between epandrium and cercus pubescent. Hypandrium usually narrow and arcuate. Gonopods almost fused to each other, forming posteromedian plate, anteriorly forming vertical process, posterolaterally contiguous to posterior ends of hypandrium and anteroventral corners of epandrium. Parameres usually basally contiguous to arms of aedeagal apodeme. Aedeagus usually present and sclerotized; outer membrane less developed; apodeme with a pair of arms.

Female terminalia: Seventh tergite usually separated mid-dorsally into lateral lobes. Eighth sternite (oviscapt) not bilobed. Pregenital lamella usually sclerotized,

partly bilobed, present posteriorly to eighth sternite. Spermatheca dark brown, usually with numerous, minute, apically round, mould-like processes over outer surface; duct not introverted into capsule.

Remarks. As pointed out by Máca (1980), the structures of proper aedeagus in this subgenus are difficult to homologize with those of other drosophilids, but the sclerotized aedeagal rod seems to be homologous to the aedeagal 'medial rod' (Máca, 1980) or 'median rod' (Toda and Peng, 1990) seen in *Phortica*, of which the aedeagus is composed of outer membranous tube, sclerotized median rod, and sometimes basal and lateral processes (Máca, 1977; Toda and Peng, 1990). In the subgenus *Amiota*, however, such an outer membrane is seen only at the basal part of aedeagus in a few species or vestigial in most species. We here apply the term of aedeagus to the sclerotized rod articulated with the tips of arms of aedeagal apodeme according to the traditional usage of the same term by other authors (Okada, 1956; Máca, 1980). As for the parameres, which are a pair of processes usually articulated with the aedeagal base throughout the Diptera, the terminology has been confused (see McAlpine, 1981 for review). Drosophilid taxonomists have traditionally called it the anterior paramere, but Grimaldi (1987) used the term paraphysis. Here, as elsewhere (Zhang and Toda, 1992), we adopt the term paramere (McAlpine, 1981) to conform to standard terminology among other dipterists and to emphasize the homology of the structure throughout the Diptera. In some *Amiota* (s. str.) species, the paramere has been misjudged as the aedeagus, since these two organs are often fused to each other, sometimes indistinguishably. However, the presence of sensilla, though lost in a few species, is a good character to identify the paramere. There has, furthermore, been confusion for all the endopterygote orders in the interpretation and naming of processes on the posterior margin of sternite IX, i.e. hypandrium (McAlpine, 1981). In drosophilid taxonomy, too, no consistent term or interpretation has been established for this organ, although it has been conventionally called the posterior paramere. We here call them the gonopods after McAlpine (1981). In most *Amiota* (s. str.) species, those are fused to each other, forming a median plate bridging the caudal ends of the hypandrium and anteriorly with a vertical process that is certainly homologous to the 'dorsal mantle' (Okada, 1977), the 'spoon-shaped lobe' (Máca, 1980) or the 'vertical lobe' (Toda and Peng, 1990) developed in the subgenus *Phortica*.

Classification of species-groups. Chen and Toda (1998a, 1998b) established two species-groups, the *apodemata* and the *sinuate* groups, respectively, within the subgenus *Amiota*. In addition, we establish here five more species-groups, the *nagatai*, the *basdeni*, the *taurusata*, the *alboguttata* and the *rufescens* groups, based on the monophyly resulting from the cladistic analysis (see below). The aut- and/or synapomorphies for each of the seven species-groups are also given as the diagnosis.

***The apodemata* species-group**

Amiota (Amiota) apodemata species-group, Chen and Toda, 1998a: 271.

Diagnosis. Fifth tergite with dark-coloured strips laterally; sixth tergite very small, pointed laterally and not reaching ventral margin of fifth tergite; aedeagus basally fused to apodeme.

Included species: *apodemata* Gupta and Panigrahy, 1987; *parvipyga* Chen and Toda, 1998; *yangonensis* Chen and Toda, 1998; *planata* sp. nov.

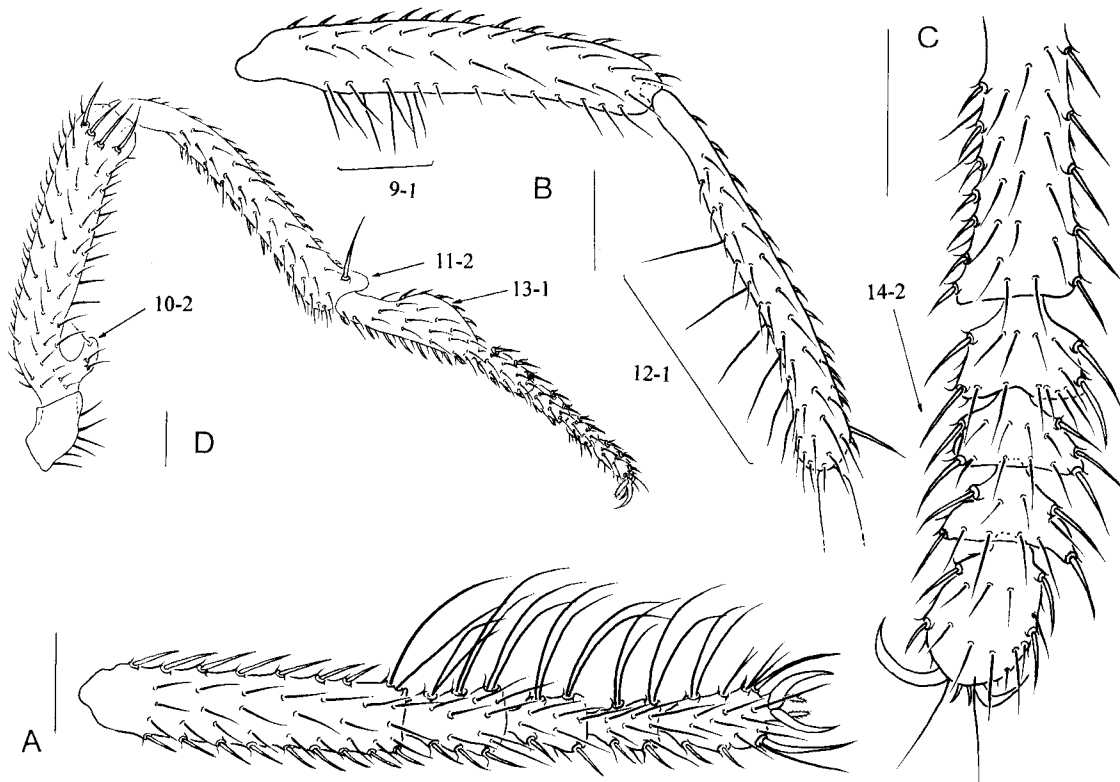


FIG. 2. (A) Hind tarsus (dorsal view) of *Amiota (Amiota) flagellata* Okada ♂ from Hokkaido, Japan. (B) Femur and tibia (anterior view) and (C) second to fifth tarsomeres (dorsal view) of hind leg of *Amiota (Amiota) delta* Takada, Beppu and Toda ♂ from Hokkaido, Japan. (D) Hind leg (anterior view) of *Amiota (Amiota) taurusata* Takada, Beppu and Toda ♂ from Hokkaido, Japan (scale-line = 0.1 mm).

***Amiota (Amiota) apodemata* Gupta and Panigrahy
(figure 3A, B)**

Amiota (Amiota) apodemata Gupta and Panigrahy, 1987: 57; Chen and Toda, 1998a: 272.

Diagnosis. Vertical process of gonopod very narrow, slightly bifid at apex; paramere narrow in lateral view, triangularly notched apically, with three to four sensilla submedially.

Description. Female: Sixth sternite broad (figure 3A); seventh tergite not separated mid-dorsally; pregenital lamella semicylindrical (figure 3A).

Specimens examined. China: Jianfeng, Hainan Is., 200 m, 17♂, 4♀, 21–22 September 1993, *ex* tree trunks, M. J. Toda leg.

Distribution. China (Hainan Is.), India.

***Amiota (Amiota) parvipyga* Chen and Toda
Amiota (Amiota) parvipyga Chen and Toda, 1998a: 273.**

Diagnosis. Vertical process of gonopod very narrow, but not bifid apically; paramere broad in lateral view, with a few serrations subapically and submedially on outer margin and one to two sensilla near subapical inner margin.

Specimen examined. Indonesia: Holotype ♂, Bogor, Java, 8 December 1996, *ex* tree trunk, M. J. Toda leg. (MZB).

Distribution. Indonesia (Java).

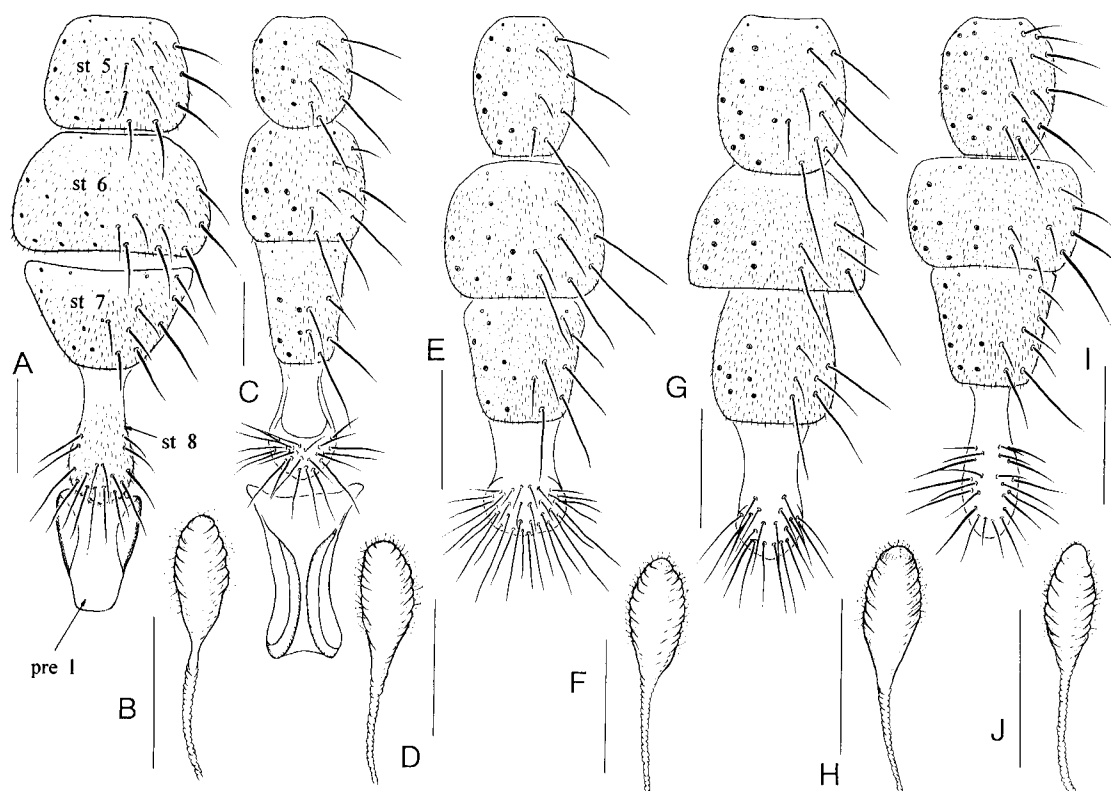


FIG. 3. (A, B) *Amiota (Amiota) apodemata* Gupta and Panigrahy ♀ from Hainan Is., China. (C, D) *Amiota (Amiota) pengi* Chen and Toda ♀ from Hainan Is., China. (E, F) *Amiota (Amiota) pontianakensis* Chen and Toda ♀ from West Kalimantan, Indonesia. (G, H) *Amiota (Amiota) ratnae* Chen and Toda ♀ from West Kalimantan, Indonesia. (I, J) *Amiota (Amiota) sinuata* Okada ♀ from Ryukyu Is., Japan. (A, C, E, G, I) Abdominal fifth to eighth sternites (st 5–8) and pregenital lamella (pre I) (scale-line = 0.1 mm); (B, D, F, H, J) spermatheca (scale-line = 0.05 mm).

***Amiota (Amiota) yangonensis* Chen and Toda**

Amiota (Amiota) yangonensis Chen and Toda, 1998a: 274.

Diagnosis. Vertical process of gonopod broad, somewhat spoon-shaped; paramere apically round in lateral view, expanded basolaterally and with six to eight sensilla on mesal surface.

Specimen examined. Myanmar: Holotype ♂, Yangon, 14 January 1982, ex tree trunk, M. J. Toda leg. (EHU).

Distribution. Myanmar (Yangon).

***Amiota (Amiota) planata* sp. nov.**

(figure 4)

Diagnosis. Arms of aedeagal apodeme protruded ventrad, nearly to level of apices of parameres and vertical lobe of gonopod (figure 4C, D).

Description. Male: Postocellar setae absent. Ocellar triangle and upper two-thirds of frontal vitta brownish black; lower one-third of frontal vitta and fronto-orbital plate orange brown. Face brown on upper half. Gena orange brown.

Wing with 14–15 distinct, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} .

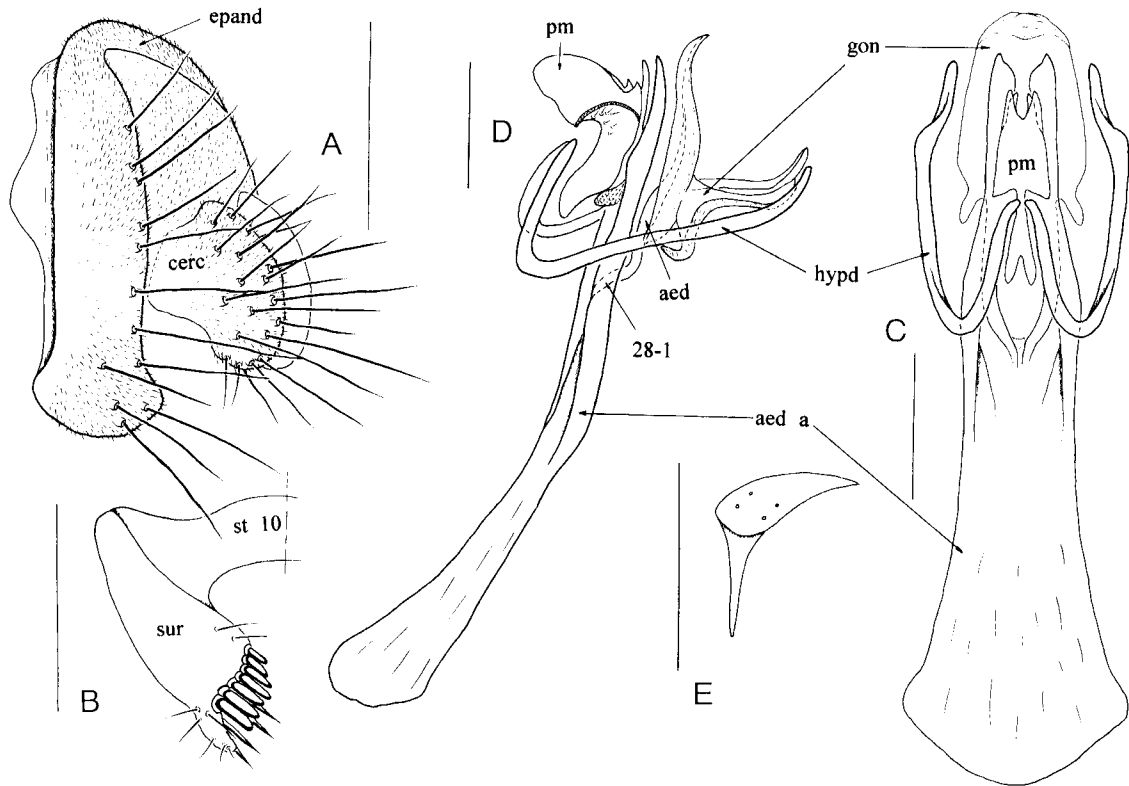


FIG. 4. *Amiota (Amiota) planata* sp. nov. ♂, a paratype from Ryukyu Is., Japan: (A) epandrium (epand) and cercus (cerc); (B) surstylus (sur) and tenth sternite (st 10); (C) hypandrium (hypd), gonopod (gon), parameres (pm), aedeagus (aed) and aedeagal apodeme (aed a) (ventral view); (D) hypandrium, gonopod, parameres, aedeagus and aedeagal apodeme (lateral view); (E) ejaculatory apodeme (scale-line = 0.1 mm).

Legs: Mid tarsus with two rows of minute, cuneiform setulae on posteroventral surface.

Male terminalia: Epandrium small, constricted more than one-half width mid-dorsally, with 12–14 setae near posterior to ventral margins (figure 4A). Surstylus lacking pubescence, with finger-like process at posteroventral corner, about seven prenisetae on distal margin, and a few stout, spine-like setae on inner surface (figure 4B). Tenth sternite entirely fused to surstyli laterally, lacking lobe-like processes (figure 4B). Hypandrium separated into two lateral arches narrowly at middle of anterior portion (figure 4C). Gonopods anteriorly forming vertical lobe lining closely aedeagus (figure 4D). Parameres subbasally fused to each other (figure 4C). Aedeagus single, somewhat sclerotized, spoon-shaped lobe, basally fused to apodeme (figure 4D). Aedeagal apodeme nearly straight (figure 4D). Ejaculatory apodeme: apical plate with two pits per side; stalk thick, short (figure 4E).

Measurements: BL (body length) = 2.20 mm in the holotype (range in 4♂ paratypes: 2.60–2.80); ThL (thorax length) = 1.04 mm (1.20–1.24); WL (wing length) = 1.80 mm (2.10–2.12); WW (wing width) = 0.80 mm (0.92–1.00).

Indices: arb = 5/3 (5/3), avd = 1.00 (1.00), adf = 2.00 (2.00), flw = 1.80 (1.80), FW/HW = 0.30 (0.30), ch/o = 0.09 (0.09), prorb = 1.00 (0.95–1.00), rcorb = 0.90 (0.85–0.90), vb = 0.40 (0.40), dcl = 0.50 (0.50–0.65), presctl = 0.55 (0.55–0.60), sctl = 1.00 (0.96–1.00), sterno = 1.00 (0.90–1.00), orbito = 2.00 (2.00), dcp = 0.28 (0.28), sctlp = 1.20 (1.10–1.20), C = 1.24 (1.24–1.47), 4c = 1.89 (1.80–1.90),

$4v=2.78$ (2.50–2.80), $5x=1.75$ (1.40–1.80), $ac=5.67$ (4.50–5.75), $M=0.77$ (0.70–0.80), $C3F=0.76$ (0.76–0.83).

HOLOTYPE: ♂, Japan: Iriomote, Ryukyu Is., 1 July 1998, *ex* tree trunk, M. T. Kimura leg. (EHU).

PARATYPES: 4♂, same data as the holotype (EHU), 18♂, same data as the holotype except 10–19 June 1999, M. J. Toda and H.-w. Chen leg. (DBSC).

Distribution. Japan (Ryukyu Is.).

Relationship. This species is very similar to *A. yangonensis* in the shapes of aedeagus and gonopod, but the latter has the arms of aedeagal apodeme not protruded so ventrad but apically articulated with the bases of parameres.

Etymology. In reference to the nearly straight aedeagal apodeme.

The *sinuata* species-group

Amiota (Amiota) sinuata species-group, Chen and Toda, 1998b: 409.

Diagnosis. Prescutellar setae absent; hypandrium anteriorly connected with ventromedian part of paramere by articulating plate; parameres fused to each other basomedially; aedeagal apodeme slightly curved.

Included species: *bicolorata* Bock, 1989; *hernowoi* Chen and Toda, 1998; *javaensis* Chen and Toda, 1998; *pengi* Chen and Toda, 1998; *pontianakensis* Chen and Toda, 1998; *ratnae* Chen and Toda, 1998; *sinuata* Okada, 1968.

Amiota (Amiota) hernowoi Chen and Toda

Amiota (Amiota) hernowoi Chen and Toda, 1998b: 412.

Diagnosis. Paramere flat distally, quadrate apically, basally with three acute projections which are connected to each other with membrane.

Specimens examined. Indonesia: Paratypes 5♂, Pontianak, West Kalimantan, 7 December 1996, M. J. Toda leg. (EHU).

Distribution. Indonesia (West Kalimantan).

Amiota (Amiota) javaensis Chen and Toda

Amiota (Amiota) javaensis Chen and Toda, 1998b: 414.

Diagnosis. Gonopod with larger knob-like projection just behind vertical lobe, but lacking projections at base of vertical lobe; paramere entirely slender, with about nine ordinary sensilla arranged nearly in a row, lacking additional minute ones.

Specimen examined. Indonesia: Paratype 1♂, Bogor, Java, 27 November 1996, M. J. Toda leg. (EHU).

Distribution. Indonesia (Java).

Amiota (Amiota) pengi Chen and Toda

(figure 3C, D)

Amiota (Amiota) pengi Chen and Toda, 1998b: 413.

Diagnosis. Gonopod basally with a pair of round apically, somewhat recurved projections, vertical lobe and knob-like projection behind vertical lobe; paramere slender distally, basally somewhat triangular in lateral view, with about three ordinary sensilla in patch submedially and about five sensilla in a row distally, but lacking additional minute ones.

Description. Female: Seventh tergite deeply constricted mid-dorsally on anterior margin, but not separated; eighth sternite lacking pubescence, with long setae on distal one-third (figure 3C); pregenital lamella recurved distally (figure 3C).

Specimens examined. China: Paratypes 60♂, 5♀, Jianfeng, Ledong, Hainan Is., 21 September 1993, M. J. Toda leg. (EHU).

Distribution. China (Hainan Is.).

***Amiota (Amiota) pontianakensis* Chen and Toda**
(figure 3E, F)

Amiota (Amiota) pontianakensis Chen and Toda, 1998b: 411.

Diagnosis. Paramere dilated distally, triangularly expanded subapically, and not expanded basolaterally, medially with four to six sensilla in small patch (distalmost one or two sensilla somewhat apart from the others).

Description. Female: Seventh tergite not separated mid-dorsally; eighth sternite lacking pubescence, with long setae on distal one-third (figure 3E); pregenital lamella not sclerotized.

Specimens examined. Indonesia: Paratypes 33♂, 2♀, Pontianak, West Kalimantan, 7 December 1996, M. J. Toda leg. (EHU).

Distribution. Philippines (Luzon), Indonesia (West Kalimantan).

***Amiota (Amiota) ratnae* Chen and Toda**
(figure 3G, H)

Amiota (Amiota) ratnae Chen and Toda, 1998b: 412.

Diagnosis. Surstylus not expanded ventrally; paramere flat distally, roundly dilated apically, without any acute projections basally; apical plate of ejaculatory apodeme with two pits per side.

Description. Female: Seventh tergite not separated mid-dorsally; eighth sternite lacking pubescence, with long setae on distal one-third (figure 3G); pregenital lamella unsclerotized.

Specimens examined. Indonesia: Paratypes 5♂ 2♀, Bogor, Java, 27–30 November 1996, M. J. Toda leg. (EHU).

Distribution. Indonesia (West Kalimantan, Java).

***Amiota (Amiota) sinuata* Okada**
(figure 3I, J)

Amiota (Amiota) sinuata Okada, 1968: 305; Chen and Toda, 1998b: 410.

Diagnosis. Paramere round but not dilated apically, basally expanded laterad, medially with seven to eight sensilla arranged in small patch.

Description. Female: Seventh tergite not separated mid-dorsally; eighth sternite with dense setae on distal one-half, lacking pubescence (figure 3I); pregenital lamella unsclerotized.

Specimens examined. Japan: Holotype ♂ and paratype 1♂, Yakushima, 30 July 1963, T. Okada leg. (NSMT); Iriomote, Ryukyu Is., 1♂, 30 June 1998, 1♂, 22 October 1994, 14♂, 5♀, 1 July 1998, *ex tree trunks*, M. T. Kimura leg., 136♂, 78♀, 10–19 June 1999, *ex tree trunks*, M. J. Toda and H.-w. Chen leg. China: Jianfeng, Hainan Is., 1♀, 21 September 1993, *ex tree trunk*, M. J. Toda leg. Myanmar: Yangon, 1♂, 10 January 1982, M. J. Toda leg.

Distribution. China (Guangdong, Hainan Is.), Japan (Yakushima, Ryukyu Is.), Myanmar (Yangon).

The *nagatai* species-group

Diagnosis. Costal vein with 14–15 distinct, peg-like spinules on ventral surface between R_{2+3} and R_{4+5} ; aedeagus separated into a pair of unbifurcated processes shorter than paramere.

Included species: *nagatai* Okada, 1971; *okinawana* Okada, 1971; *kimurai* sp. nov.

Amiota (Amiota) nagatai Okada

Amiota (Amiota) nagatai Okada, 1971: 97 [*Amiota (Amiota) alboguttata*, forma *nagatai* Okada, 1960: 96]; Toda and Peng, 1992: 202.

Diagnosis. Vertical lobe of gonopod large, with a pair of horn-like processes apically.

Specimens examined. China: Dinghushan, Guangdong, 15♂, 14–23 May 1987, ex banana traps, T. X. Peng leg. Japan: Iriomote, Ryukyu Is., 6♂, 16–18 June 1999, ex tree trunks, H.-w. Chen leg.

Distribution. China (Guangdong), Japan (Kyushu, Ryukyu Is.).

Amiota (Amiota) okinawana Okada

Amiota (Amiota) okinawana Okada, 1971: 86; Toda and Peng, 1992: 202; Máca and Lin, 1993: 2.

Diagnosis. Paramere about 1.8 times as long as aedeagus, apically less sclerotized and much narrower than aedeagus.

Specimens examined. Japan: Holotype ♂, Komi, Iriomote, Ryukyu Is., 9 July 1966, T. Okada and F. Hihara leg. (NSMT); Iriomote, Ryukyu Is., 4♂, 1 July 1998, ex tree trunks, M. T. Kimura leg. China: Dinghushan, Guangdong, 6♂, 31 August to 6 September 1988, ex banana traps, T. X. Peng leg.

Distribution. China (Taiwan, Guangdong), Japan (Ryukyu Is.).

Amiota (Amiota) kimurai sp. nov.

(figure 5)

Diagnosis. Paramere about 1.3 times as long as aedeagus, strongly sclerotized and as thick as aedeagus at apex (figure 5E).

Description. Ocellar triangle and upper three-quarters of frontal vitta velvety brownish black; lower one-quarter of frontal vitta orange brown. Gena orange brown.

Legs: Mid tarsus with two rows of minute, cuneiform setulae on posteroventral surface. Hind trochanter with one dark brown, lobe-shaped process.

Abdominal sixth tergite tapered laterally, broadened dorsally.

Male terminalia: Epandrium small, constricted more than one-half width mid-dorsally, with 15–17 setae near posterior to ventral margins (figure 5A). Surstylus lacking pubescence, with finger-like process at posteroventral corner, and about seven prensisetae on distal margin (figure 5B). Tenth sternite deeply constricted mid-ventrally, but not separated, entirely fused to surstyli laterally; lateral lobe-like process elongated, curved (figure 5B). Anterior portion of hypandrium slightly broadened, and invaginated (figure 5C). Aedeagus basally fused to paramere

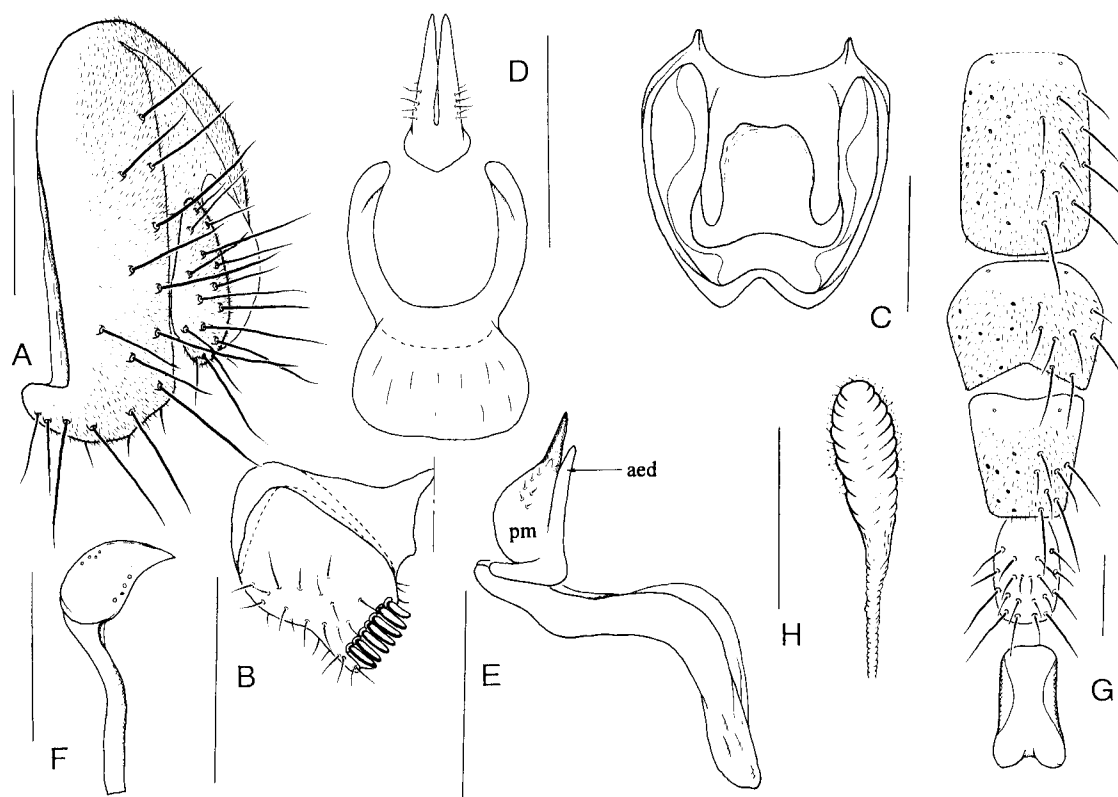


FIG. 5. *Amiota (Amiota) kimurai* sp. nov. ♂, a paratype from Ryukyu Is., Japan: (A) epandrium and cercus; (B) surstylus and tenth sternite; (C) hypandrium and gonopod (ventral view); (D) parameres, aedeagus and aedeagal apodeme (ventral view); (E) parameres, aedeagus and aedeagal apodeme (lateral view); (F) ejaculatory apodeme. ♀, a paratype from Ryukyu Is., Japan: (G) abdominal fifth to eighth sternites and pregenital lamella; (H) spermatheca. (A–G) Scale-line=0.1 mm; (H) scale-line=0.05 mm.

(figure 5E). Ejaculatory apodeme: apical plate with four pits per side; stalk curved medially (figure 5F).

Female: Sixth sternite notched on posterior margin; seventh tergite separated mid-dorsally, pubescent only on posterior margin; eighth sternite lacking pubescence; pregenital lamella semitube-like (figure 5G).

Measurements: BL=2.60 mm (6♂ paratypes: 2.60–2.84, 1♀ paratype: 2.82); ThL=1.28 mm (♂: 1.20–1.40, ♀: 1.36); WL=2.00 mm (♂: 2.00–2.12, ♀: 2.08); WW=0.92 mm (♂: 0.92–1.00, ♀: 1.02).

Indices: arb=4/3 (4/2–3), avd=1.00 (1.00), adf=2.00 (2.00), flw=1.60 (1.60), FW/HW=0.33 (0.30–0.34), ch/o=0.08 (0.08–0.10), pror=1.00 (0.94–1.00), rcorb=0.85 (0.80–0.85), vb=0.35 (0.35–0.40), dcl=0.50 (0.40–0.60), presctl=0.70 (0.60–0.70), sctl=1.00 (0.90–1.00), sterno=1.20 (1.15–1.20), orbito=2.00 (1.90–2.00), dep=0.25 (0.25–0.28), sctlp=0.90 (0.80–1.00), C=1.56 (1.47–1.87), 4c=1.45 (1.45–1.55), 4v=2.27 (2.25–2.80), 5x=1.50 (1.40–2.00), ac=5.33 (5.00–5.67), M=0.55 (0.64–0.80), C3F=0.81 (0.82–0.87).

HOLOTYPE: ♂, Japan: Iriomote, Ryukyu Is., 1 July 1998, *ex* tree trunk, M. T. Kimura leg. (EHU).

PARATYPES: 20♂, 1♀, same data as the holotype except 27 June to 1 July 1998 (EHU), 257♂, same data as the holotype except 10–19 June 1999, M. J. Toda and H.-W. Chen leg. (EHU and DBSC).

Distribution. Japan (Ryukyu Is.).

Relationship. This species is very similar to *A. okinawana* in many characters, but can be clearly distinguished by the diagnostic characters.

Etymology. Patronym, in honour of Prof. M. T. Kimura of Hokkaido University.

The *basdeni* species-group

Diagnosis. Surstylus with one to five aristate processes separated from or fused to each other on mesal surface; vertical lobe of gonopod with two sclerotized, basally fused M-shaped processes.

Included species: *basdeni* Fonseca, 1965; *clavata* Okada, 1971; *curvistyla* Okada, 1971; *elongata* Okada, 1971; *flagellata* Okada, 1971; *palpifera* Okada, 1971; *aristata* sp. nov.; *macai* sp. nov.

Amiota (Amiota) basdeni Fonseca

Amiota (Amiota) basdeni Fonseca, 1965: 242; Máca, 1980: 339.

Diagnosis. Surstylus with three to four aristate processes basally fused to each other and forming palm-like lobe on mesal surface; paramere slender, pointed apically, weakly sclerotized, with 9–10 long sensilla medially; aedeagus slender, apically pointed, heavily sclerotized.

Specimens examined. Czech Republic: Morayia, 1♂, 27 June 1998, J. Máca leg. Switzerland: Bergdietikon, 1♂, 16–21 July 1979, G. Bächli leg.

Distribution. Great Britain, Czech Republic, Hungary, Switzerland.

Amiota (Amiota) clavata Okada

Amiota (Amiota) clavata Okada, 1971: 84 [*Amiota (Amiota) alboguttata*, forma *clavata* Okada, 1960: 94].

Diagnosis. Surstylus with palm-like lobe bearing four to five aristate processes on mesal surface; paramere and aedeagus thick, heavily sclerotized, apically expanded and finely serrated on margins; paramere with four to five sensilla subbasally.

Specimens examined. Japan: Hokkaido: Sapporo, 6♂, 6–23 July 1973, 1♂, 8 August 1973, 1♂, 24 July 1975, M. J. Toda leg.; Nopporo, 2♂, 26 August 1996, around human eyes, H.-W. Chen leg.

Distribution. Russia (Amur Region, Khabarovsk Region, Ussuri Region), China (Jilin), Japan (Hokkaido, Honshu).

Amiota (Amiota) curvistyla Okada

Amiota (Amiota) curvistyla Okada, 1971: 86.

Diagnosis. Surstylus with palm-like lobe bearing about three aristate processes on mesal surface; paramere heavily sclerotized, round apically, basally much expanded and with about five sensilla; aedeagus black, apically pale, narrow and somewhat looped, subapically with short, additional process.

Specimens examined. Japan: Holotype ♂, Yamanashi, 28 July 1970, F. Hihara leg.; paratype 1♂, Gumma, 16 August 1961, T. Okada leg. (NSMT).

Distribution. Japan (Honshu).

Amiota (Amiota) elongata Okada
(figure 6A, B)

Amiota (Amiota) elongata Okada, 1971: 86 [*Amiota (Amiota) alboguttata*, forma *elongata* Okada, 1960: 95].

Diagnosis. Surstylus with palm-like lobe bearing about four aristate processes on mesal surface; paramere pointed apically, heavily sclerotized, lacking sensilla, with two processes basally: lateral one heavily sclerotized, broad, short, while ventral one less sclerotized, slender, apically pointed, with a few serrations on ventral margin; aedeagus distally slender and unsclerotized, pointed apically.

Description. Female: Seventh tergite separated mid-dorsally; eighth sternite with numerous short, stout setae on posterior margin and two long setae laterally (figure 6A); pregenital lamella very large (figure 6A).

Specimens examined. Russia: Ussurijsk, Far East, 11♂, 21–22 July 1994, M. J. Toda leg. Japan: Hokkaido: Sapporo, 16♂, 4–25 July 1973, 1♂, 12 July 1974, 3♂, 3 July 1975, 7♂, 24 July 1975, 3♂, 4 August 1975, 1♂, 14 August 1975, M. J. Toda leg.; Nopporo, 3♂, 26 August 1996, around human eyes, H.-W. Chen leg.; Tomakomai, 2♂, 3♀, 24–31 July 1997, 4♂, 1♀, 24–31 August 1997, *ex* banana traps, S. Tanabe leg.

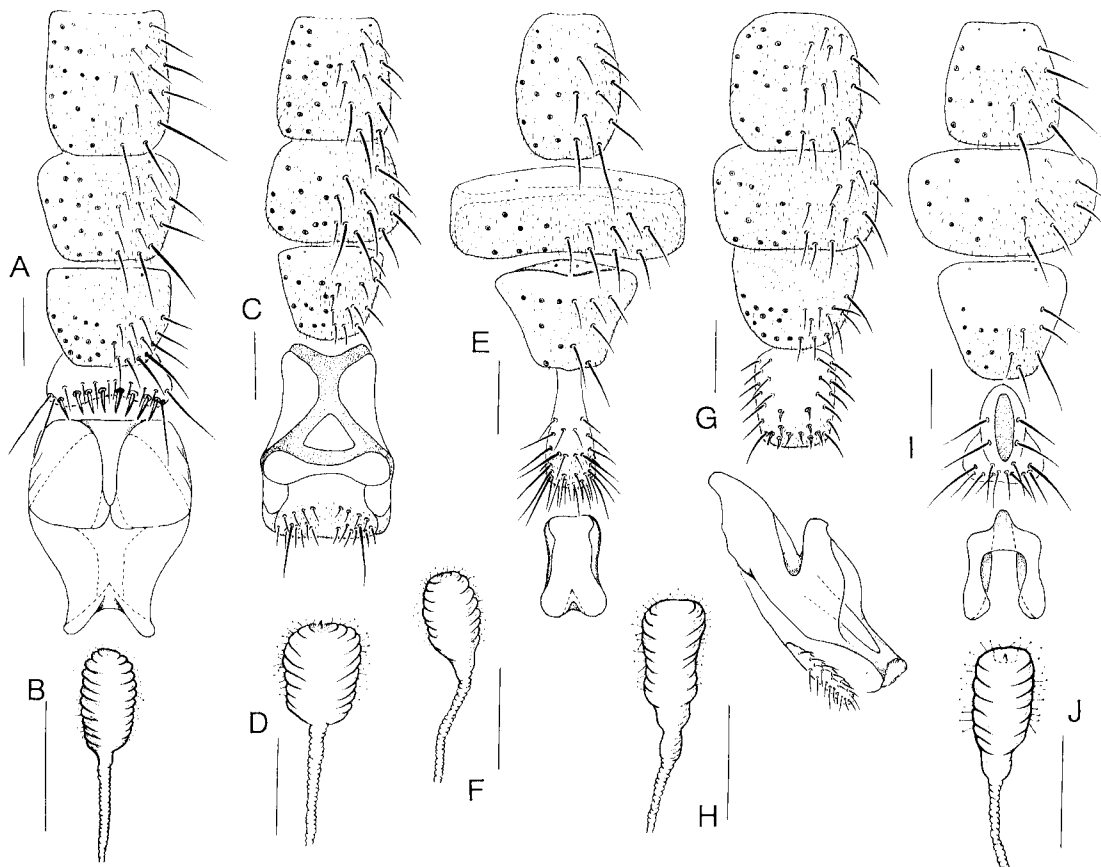


FIG. 6. (A, B) *Amiota (Amiota) elongata* Okada ♀ from Hokkaido, Japan. (C, D) *Amiota (Amiota) flagellata* Okada ♀ from Hokkaido, Japan. (E, F) *Amiota (Amiota) taurusata* Takada, Beppu and Toda ♀ from Hokkaido, Japan. (G, H) *Amiota (Amiota) albilabris* (Roth) ♀ from Hokkaido, Japan. (I, J) *Amiota (Amiota) alboguttata* (Wahlberg) ♀ from Bohemia, Czech Republic. (A, C, E, G, I) Abdominal fifth to eighth sternites and pregenital lamella (scale-line=0.1 mm); (B, D, F, H, J) spermateca (scale-line=0.05 mm).

Distribution. Russia (Amur Region, Khabarovsk Region, Ussuri Region), China (Jilin), Korea, Japan (Hokkaido, Honshu).

***Amiota (Amiota) flagellata* Okada**

(figure 2A, 6C, D)

Amiota (Amiota) flagellata Okada, 1971: 88.

Diagnosis. Hind tarsus anteriorly with long, fringe-like setae (figure 2A); surstylus with only one aristate process on mesal surface; paramere and aedeagus pointed apically, fused to each other basally; paramere broad, heavily sclerotized, lacking sensilla, medioventrally with small, triangular projection; aedeagus slender, lightly sclerotized.

Description. Female: Seventh tergite separated mid-dorsally; eighth sternite with numerous short, thick setae and one long seta laterally (figure 6C); pregenital lamella very large, medially sclerotized (figure 6C); spermatheca apically with small, nipple-like projection at centre of slight depression (figure 6D).

Specimens examined. Japan: Tomakomai, Hokkaido, 1♂, 5♀, 7 July 1997, *ex* banana traps, S. Tanabe leg. China: Changbaishan, Jilin, 6♂, 31 July to 6 August 1990, M. J. Toda leg.

Distribution. China (Jilin), Korea, Japan (Hokkaido, Honshu).

***Amiota (Amiota) palpifera* Okada**

Amiota (Amiota) palpifera Okada, 1971: 89.

Diagnosis. Surstylus with one to two aristate processes basally not fused to each other on mesal surface; paramere and aedeagus slender, straight, articulated with each other basally; paramere entirely densely pubescent, and unsclerotized, with about five sensilla basally; aedeagus heavily sclerotized, flattened apically, but round in lateral view.

Specimens examined. Russia: Ussurijsk, Far East, 1♂, 21 July 1994, M. J. Toda leg. China: Changbaishan, Jilin, 1♂, 8 July 1992, around human eyes, H.-W. Chen leg.

Distribution. Russia (Amur Region, Khabarovsk Region, Ussuri Region), China (Jilin), Japan (Honshu).

***Amiota (Amiota) aristata* sp. nov.**

(figure 7)

Diagnosis. Surstylus with palm-like lobe bearing about four aristate processes on mesal surface (figure 7B); paramere broad, but narrow apically, with about seven sensilla submedially (figure 7D, E).

Description. Male: Ocellar triangle and upper half of frontal vitta dark brown; lower half of frontal vitta and fronto-orbital plate brown. Gena yellowish brown.

Wing with 18–21 minute, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} .

Legs: Mid tarsus with a row of minute cuneiform setulae on posteroventral surface.

Male terminalia: Epandrium constricted more than one-half width mid-dorsally, with about 15 setae near posterior to ventral margins (figure 7A). Surstylus nearly entirely pubescent, with finger-like process at posteroventral corner, about 11 long

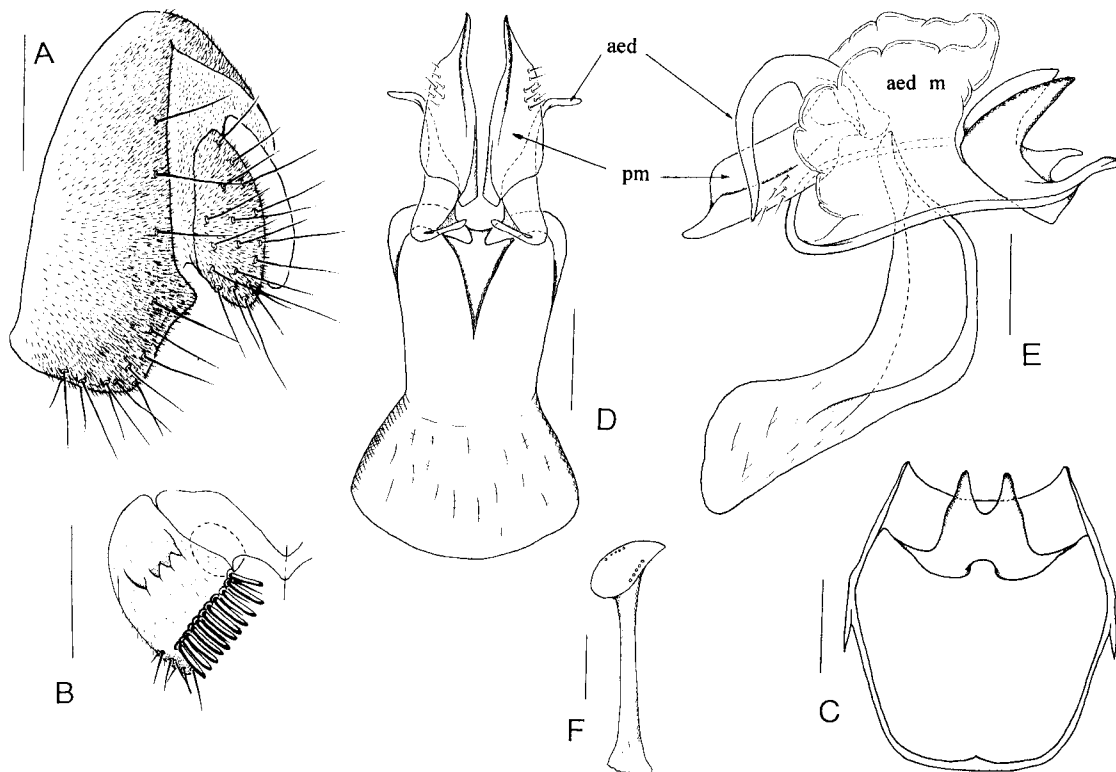


FIG. 7. *Amiota (Amiota) aristata* sp. nov. ♂, a paratype from Hubei, China: (A) epandrium and cercus; (B) surstylus and tenth sternite; (C) hypandrium and gonopod (ventral view); (D) parameres, aedeagus and aedeagal apodeme (ventral view); (E) hypandrium, gonopod, paramere, aedeagus, aedeagal outer membrane (aed m) and aedeagal apodeme (lateral view); (F) ejaculatory apodeme (scale-line=0.1 mm).

prensisetae on distal margin, and a few, stout spine-like setae on inner surface (figure 7B). Tenth sternite deeply constricted mid-dorsally; lateral lobe-like process spherical (figure 7B). Anterior portion of hypandrium slightly broadened at middle (figure 7C). Paramere basally articulated with aedeagus (figure 7D, E). Aedeagus separated into a pair of processes as long as paramere, medially to distally slender and strongly curved ventrad (figure 7D, E); outer membrane basally erected (figure 7E). Ejaculatory apodeme: apical plate with five pits per side (figure 7F); stalk thick, long (figure 7F).

Measurements: BL=3.35 mm (1♂ paratype: 2.88); ThL=1.35 mm (1.32); WL=2.66 mm (2.60); WW=1.18 mm (1.13).

Indices: arb=5/3 (5/3-4), avd=0.65 (0.65), adf=1.60 (1.55), flw=1.45 (1.50), FW/HW=0.36 (0.34), ch/o=0.09 (0.09), prorrb=0.99 (0.98), rcorb=0.68 (0.65), vb=0.28, dcl=0.53 (0.48), presctl=0.67 (0.64), sctl=1.15, sterno=0.98 (0.97), orbito=2.00 (1.94), dcp=0.30 (0.32), sctlp=1.02 (1.10), C=1.63 (1.74), 4c=2.00 (1.73), 4v=3.16 (2.82), 5x=1.17 (1.33), ac=4.33 (3.80), M=0.74 (0.73), C3F=0.61 (0.66).

HOLOTYPE: ♂, China: Shennongjia, Hubei, 27 July 1992, M. J. Toda leg. (DBSC).

PARATYPE: 1♂, same data as the holotype except 26 July 1992 (EHU).

Distribution. China (Hubei).

Relationship. This species is somewhat similar to *A. clavata* in the morphology of paramere and aedeagus, but different from it in the detailed structure of these

two organs, which are lightly sclerotized and slender apically in this species, but strongly sclerotized and much dilated apically in *A. clavata*.

Etymology. In reference to the aristate processes on the surstylus.

Amiota (Amiota) macai sp. nov.
(figure 8)

Diagnosis. Surstylus with palm-like lobe bearing about three aristate processes on mesal surface (figure 8B); paramere and aedeagus slightly dilated apically; paramere with about three sensilla submedially (figure 8D, E).

Description. Male: Ocellar triangle dark brown. Frons brown to dark brown. Face brown. Gena brown.

Wing with 18–20 minute, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} .

Legs: Mid tarsus with a row of minute cuneiform setulae on posteroventral surface.

Male terminalia: Epandrium constricted more than one-half width mid-dorsally, with about 17 setae near posterior to ventral margins (figure 8A). Surstylus nearly entirely pubescent, with finger-like process at posteroventral corner, about ten long prensisetae on distal margin, and a few stout, spine-like setae on inner surface (figure 8B). Tenth sternite deeply constricted mid-dorsally, with a pair of setae laterally; lateral lobe-like process spherical (figure 8B). Anterior portion of hypandrium slightly broadened at middle (figure 8C). Paramere articulated basally with

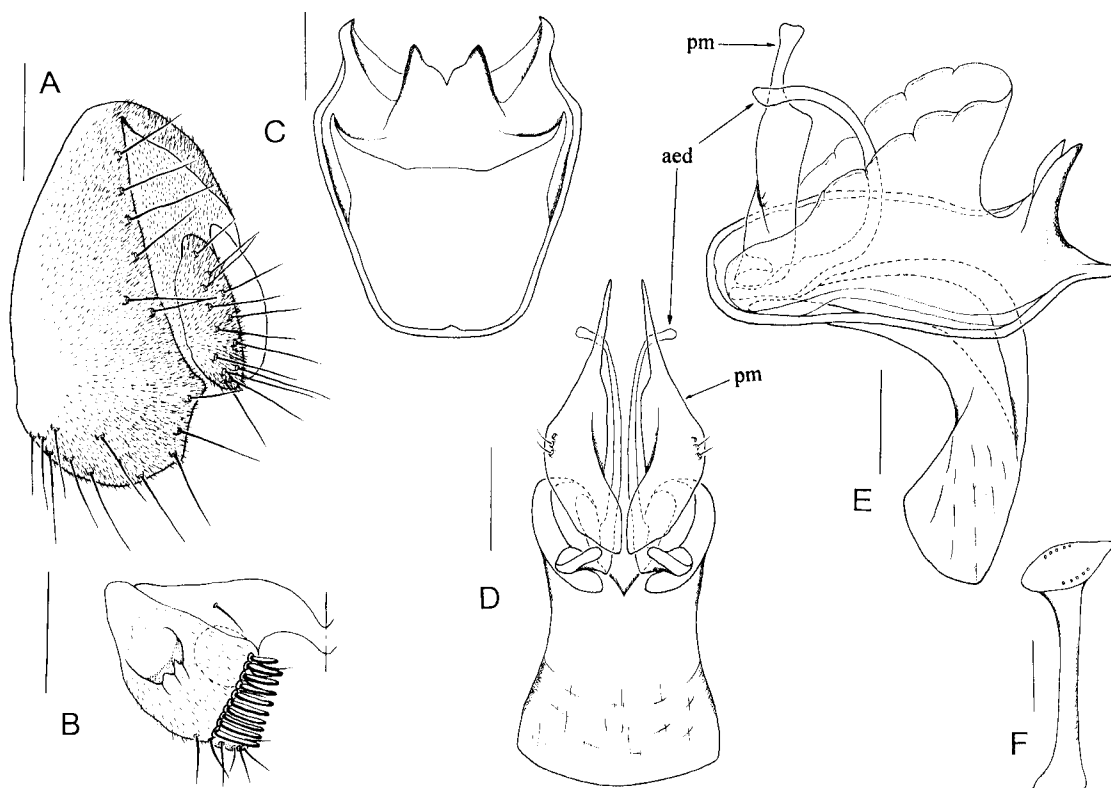


FIG. 8. *Amiota (Amiota) macai* sp. nov. ♂, a paratype from Hubei, China: (A) epandrium and cercus; (B) surstylus and tenth sternite; (C) hypandrium and gonopod (ventral view); (D) parameres, aedeagus and aedeagal apodeme (ventral view); (E) hypandrium, gonopod, paramere, aedeagus, aedeagal outer membrane and aedeagal apodeme (lateral view); (F) ejaculatory apodeme (scale-line = 0.1 mm).

aedeagus (figure 8D, E). Aedeagus separated into a pair of slender processes as long as paramere and strongly curved ventrad (figure 8D, E); outer membrane erect basally (figure 8E). Ejaculatory apodeme: apical plate with five pits per side (figure 8F); stalk thick, long (figure 8F).

Measurements: BL=3.13 mm (5♂ paratypes: 2.82–3.22); ThL=1.50 mm (1.35–1.76); WL=2.97 mm (2.81–3.13); WW=1.32 mm (1.10–1.34).

Indices: arb=5/4 (5/3–4), avd=0.65 (0.65), adf=1.40 (1.35–1.50), flw=1.60 (1.50–1.65), FW/HW=0.36 (0.34–0.40), ch/o=0.09 (0.09–0.10), prorb=0.99 (0.98–1.04), rcorb=0.65 (0.65–0.70), vb=0.32 (0.30–0.32), dcl=0.53 (0.48–0.53), presctl=0.67 (0.64–0.72), sctl=1.15 (1.08–1.17), sterno=0.88 (0.83–0.97), orbito=1.50 (1.50–1.54), dcp=0.30 (0.30–0.34), sctlp=1.02 (1.02–1.10), C=2.00 (1.72–2.06), 4c=1.39 (1.32–1.50), 4v=2.14 (2.11–2.42), 5x=1.42 (1.36–1.46), ac=3.90 (3.82–4.88), M=0.61 (0.62–0.65), C3F=0.64 (0.64–0.69).

HOLOTYPE: ♂, China: Shennongjia, Hubei, 26 July 1992, 1520 m, M. J. Toda leg. (DBSC).

PARATYPES: 15♂, same data as the holotype except 26–27 July 1992 (EHU and DBSC).

Distribution. China (Hubei).

Relationship. This species closely resembles *A. aristata* in many characters of male terminalia, but can be clearly distinguished from it by the diagnostic characters.

Etymology. Patronym, in honour of Dr J. Máca of Czech Agency for Nature Conservation.

The *taurusata* species-group

Diagnosis. Hind femur with small, lobe-like flap basoventrally; hind tibia apico-dorsally much extended like flap; hind first tarsomere expanded dorsally; fourth tergite laterally broadened and protruded more than others.

Included species: *aquilotaurusata* Takada, Beppu and Toda, 1979; *sacculipes* Máca and Lin, 1993; *taurusata* Takada, Beppu and Toda, 1979.

Amiota (Amiota) aquilotaurusata Takada, Beppu and Toda

Amiota (Amiota) aquilotaurusata Takada, Beppu and Toda, 1979: 110.

Diagnosis. Aedeagus fused to base of paramere, deeply bifurcated: short process longer than one-half of long one.

Specimens examined. Japan: Holotype ♂, Nukabira, 1 July 1975, H. Watabe leg. (EHU). Russia: Ussurijsk, Far East, 4♂, 21–22 July 1994, M. J. Toda leg.

Distribution. Russia (Ussuri Region), China (Heilongjiang, Beijing), Japan (Hokkaido).

Amiota (Amiota) sacculipes Máca and Lin

Amiota (Amiota) sacculipes Máca and Lin, 1993: 5.

Diagnosis. All femora dark brown; ventral branches of arista distinctly shorter than one-half of dorsals; parameres each with three to four long sensilla subbasally, asymmetrical: left one more inwardly curved than right one.

Specimens examined. China: Chitou, Taiwan, 2♂, 22 April 1997, M. J. Toda leg.

Distribution. China (Taiwan).

Amiota (Amiota) taurusata Takada, Beppu and Toda
(figure 6E, F)

Amiota (Amiota) taurusata Takada, Beppu and Toda, 1979: 107.

Diagnosis. Short process of aedeagus shorter than one-fifth of long one.

Description. Female: Sixth and seventh sternites heavily sclerotized; sixth about three times as broad as long, with developed apodeme on inner side (figure 6E); seventh tergite not separated mid-dorsally; pregenital lamella semitube-like (figure 6E).

Specimens examined. Japan: Hokkaido: Holotype ♂, Eniwa, 4 July 1974, M. J. Toda leg. (EHU); paratypes 2♂, same data as the holotype (EHU); Sapporo, 1♂, 3 July 1975, M. J. Toda leg.; Nakagawa, 7♂, 2♀, 18–25 August 1996, Tomakomai, 2♂, 30 June to July 1997, 7♂, 2♀, 24–31 July 1997, 9♂, 3♀, 7 August 1997, *ex* banana traps, S. Tanabe leg.

Distribution. Russia (Ussuri Region), China (Jilin), Japan (Hokkaido).

The *alboguttata* species-group

Diagnosis. Hind tibia ventrally with a row of long setae; hind second to fifth tarsomeres broadened; second shorter than 1.5 times of width.

Included species: *albilabris* (Roth, 1860); *alboguttata* (Wahlberg, 1838); *delta* Takada, Beppu and Toda, 1979; *dispina* Okada, 1960; *eos* Sidorenko, 1989; *falcilis* Takada, Beppu and Toda, 1979; *forcicula* Takada, Beppu and Toda, 1979; *lanceolata* Okada, 1971; *sigma* Okada, 1971; *subtusradiata* Duda, 1934; *todayi* Sidorenko, 1989; *trifurcata* Okada, 1968; *cuii* sp. nov.; *nuerhachii* sp. nov.; *spinata* sp. nov.; *watabei* sp. nov.

Amiota (Amiota) albilabris (Roth)
(figure 6G, H)

Drosophila albilabris Roth, in Zetterstedt, 1860: 6425.

Amiota (Amiota) albilabris: Okada, 1960: 91; Máca, 1980: 335.

Diagnosis. All femora and mid and hind tibiae dark brown; aedeagus heavily sclerotized, much broader than and as long as paramere in lateral view.

Description. Female: Sixth sternite larger than others, wider than long (figure 6G); seventh tergite separated mid-dorsally; eighth sternite with about ten short, thick setae on posterior portion (figure 6G); pregenital lamella, large, medially with dorsad protruding, apically fused lobes (figure 6G).

Specimens examined. Japan: Hokkaido: Sapporo, 3♂, 6 June 1973, 3♂, 20–23 June 1973, 2♂, 15 July 1973, 1♂, 12 July 1974, 1♂, 3 June 1975, 4♂, 17–24 June 1975, 1♂, 4 August 1975, M. J. Toda leg.; Nopporo, 4♂, 26 August 1996, around human eyes, H.-w. Chen leg.; Tomakomai, 1♂, 1 August 1997, *ex* banana trap, S. Tanabe leg. China: Changbaishan, Jilin, 2♂, 8 July 1992, Kuandian, Liaoning, 5♂, 8–12 June 1994, around human eyes, H.-W. Chen leg.

Distribution. Finland, Sweden, Great Britain, Czech Republic, Austria, Roumania, Switzerland, Yugoslavia, Russia (Amur Region, Khabarovsk Region, Ussuri Region, Sakhalin), China (Jilin, Liaoning), Korea (Quelpart Is.), Japan (Hokkaido).

Amiota (Amiota) alboguttata (Wahlberg)

(figure 6I, J)

Drosophila alboguttata Wahlberg, 1839: 22.*Amiota (Amiota) alboguttata*: Máca, 1980: 342.*Leucophenga leucostoma* Becker, 1908: 320.

Diagnosis. Hind tibia with about four long setae ventrally; paramere with apically bifurcated process at posterolateral corner and five to six sensilla on mesal surface; aedeagus broad, apically bifurcated.

Description. Female: Seventh tergite separated mid-dorsally; seventh sternite pubescent distally (figure 6I); eighth sternite small, with long setae on lateral and posterior margin (figure 6I); pregenital lamella anteriorly extended, posteriorly notched (figure 6I); spermatheca apically with small, nipple-like projection at centre of slight depression (figure 6J).

Specimens examined. France: Drôme, 1♂, ? August 1988, R. Allemand leg. Czech Republic: Bohemia, 1♀, 14 August 1979, 1♂, 1 October 1980, J. Máca leg.

Distribution. Norway, Finland, Sweden, Netherlands, Great Britain, Germany, Czech Republic, Austria, Roumania, France, Switzerland, Yugoslavia, Italy, Russia (northwestern to central European part, Crimea, Siberia).

Amiota (Amiota) delta Takada, Beppu and Toda

(figure 9A, B)

Amiota (Amiota) delta Takada, Beppu and Toda, 1979: 108.

Diagnosis. Hind tibia ventrally with five to six long setae; paramere with two narrow processes at posterolateral corner and about two sensilla near base of posterior process; aedeagus narrow, deeply bifurcated.

Description. Female: Seventh tergite separated mid-dorsally; eighth sternite very small, with setae lined on lateral margin (figure 9A); pregenital lamella large (figure 9A).

Specimens examined. Russia: Ussurijsk, Far East, 6♂, 20–22 July 1994, M. J. Toda leg. Japan: Hokkaido: Holotype ♂, Misumai, 5 September 1973, M. J. Toda, leg. (EHU); paratype 1♂, Jozankei, 23 July 1975, K. Beppu leg. (EHU); Nakagawa, 4♂, 18 August 1996, Tomakomai, 3♂, 30 June to 7 July 1997, 29♂, 7♀, 24–31 July 1997, 3♂, 7 August 1997, 1♂, 4♀, 24–31 August 1997, *ex* banana traps, S. Tanabe leg.

Distribution. Russia (Ussuri Region), China (Jilin), Japan (Hokkaido, Honshu).

Amiota (Amiota) dispina Okada*Amiota (Amiota) dispina* Okada, 1960: 97.

Diagnosis. Epandrium completely separated mid-dorsally; paramere with two large, heavily sclerotized, claw-like processes; aedeagus lost.

Specimens examined. Japan: Hokkaido: Sapporo, 1♂, 24 July 1975, M. J. Toda leg.; Nakagawa, 1♂, 25 August 1996, Tomakomai, 1♂, 7 August 1997, *ex* banana traps, S. Tanabe leg.

Distribution. Korea, Japan (Hokkaido, Honshu, Kyushu).

Remarks. Okada (1960) regarded a slender rod that is fused to the paramere apically (termed the anterior paramere) as a part of aedeagus. However, that should be a part of the paramere, because the homologous structure is seen in *Amiota*

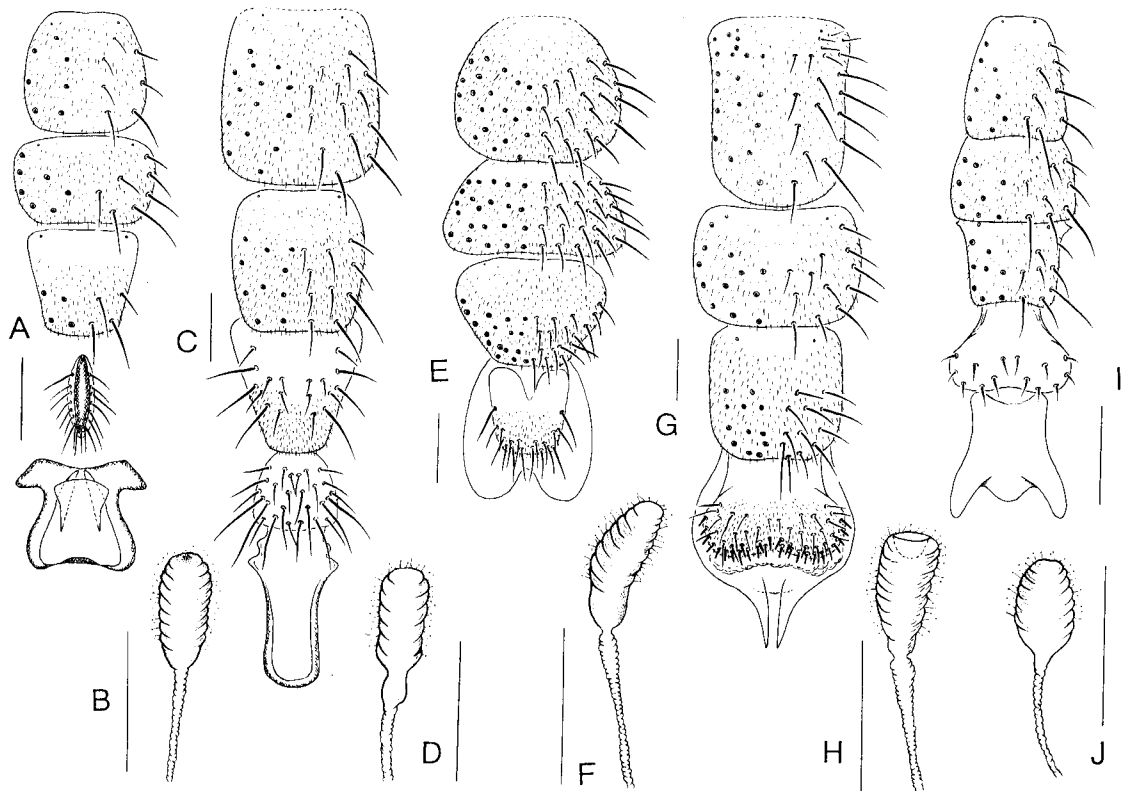


FIG. 9. (A, B) *Amiota (Amiota) delta* Takada, Beppu and Toda ♀ from Hokkaido, Japan. (C, D) *Amiota (Amiota) subtusradiata* ♀ from Hokkaido, Japan. (E, F) *Amiota (Amiota) trifurcata* Okada ♀ from Hokkaido, Japan. (G, H) *Amiota (Amiota) stylopyga* Wakahama and Okada ♀ from Hokkaido, Japan. (I, J) *Amiota (Amiota) subfurcata* Okada ♀ from Hokkaido, Japan. (A, C, E, G, I) Abdominal fifth to eighth sternites and pregenital lamella (scale-line=0.1 mm); (B, D, F, H, J) spermatheca (scale-line=0.05 mm).

(*Amiota*) *fulcilis* Takada, Beppu and Toda, 1979 that has the distinct aedeagus at the base of the paramere.

***Amiota (Amiota) eos* Sidorenko, 1989**

Amiota (Amiota) eos Sidorenko, 1989: 63.

Diagnosis. Epandrium pointed on ventral margin; gonopod with diamond lobe posteriorly and vertical lobe bearing four cusps.

Specimens examined. Russia: Ussurijsk, Far East, 14♂, 20–22 July 1994, M. J. Toda leg. China: Changbaishan, Jilin, 30♂, 31 July to 6 August 1990, M. J. Toda leg., 10♂, 8–13 July 1992, H.-W. Chen leg.; Kuandian, Liaoning, 1♂, 8 June 1994, around human eyes, H.-W. Chen leg.

Distribution. Russia (Amur Region, Khabarovsk Region, Ussuri Region), China (Jilin, Liaoning).

***Amiota (Amiota) fulcilis* Takada, Beppu and Toda**

Amiota (Amiota) fulcilis Takada, Beppu and Toda, 1979: 111.

Diagnosis. Paramere apically with two long, curved, strongly sclerotized processes and serrated margin between them; aedeagus lobate, deeply bifurcated apically.

Specimens examined. Japan: Hokkaido: Holotype ♂, Koryukozan, 10 June 1975,

M. J. Toda leg. (EHU); Koryukozan, 5♂, 10–17 July 1975, Tomakomai, 2♂, 26 July to 6 August 1983, M. J. Toda leg.

Distribution. Russia (Ussuri Region), Japan (Hokkaido).

***Amiota (Amiota) forficula* Takada, Beppu and Toda**

Amiota (Amiota) forficula Takada, Beppu and Toda, 1979: 113.

Diagnosis. Vertical lobe of gonopod with a pair of strongly sclerotized, basolateral processes which are pointed apically; aedeagus simple, longer than half of paramere.

Specimen examined. Japan: Holotype ♂, Namarikawa, Hokkaido, 1 July 1977, K. Beppu leg. (EHU).

Distribution. Japan (Hokkaido).

***Amiota (Amiota) lanceolata* Okada**

Amiota (Amiota) lanceolata Okada, 1971: 83.

Diagnosis. Surstylus lacking pubescence; paramere with small, narrow, but strongly sclerotized process subapicolaterally; aedeagus simple, about one-third as long as paramere.

Specimen examined. Japan: Holotype ♂, Yamanashi, 24 July 1968, T. Okada leg. (NSMT).

Distribution. Japan (Honshu).

Remarks. Okada (1971) confused the paramere (termed anterior paramere) and the aedeagus.

***Amiota (Amiota) sigma* Okada**

Amiota (Amiota) sigma Okada, 1971: 83.

Amiota (Amiota) trochlea Takada and Toda, 1973: 1. **Syn. nov.**

Diagnosis. Vertical lobe of gonopod somewhat triangular, elongated apically; aedeagus nearly entirely fused to paramere.

Specimens examined. Japan: Holotype ♂, Yamanashi, 24 July 1968, T. Okada and F. Hihara leg. (NSMT); Hokkaido: Holotype ♂ of *Amiota (Amiota) trochlea* Takada and Toda, 1973, Misumai, Sapporo, 2 September 1971, paratype 1♂ of *A. trochlea*, Misumai, Sapporo, 11 July 1971, M. J. Toda leg. (EHU); Sapporo, 2♂, 23 June 1973, 1♂, 3 July 1975, Eniwa, 1♂, 6–13 July 1975, Kitamoshiri, 1♂, 25 August 1996, Nakagawa, 1♂, 25 August 1996, *ex* banana traps, S. Tanabe leg.; Kyoto, Honshu, 1♂, 19–25 May 1987, M. J. Toda leg.

Distribution. Japan (Hokkaido, Honshu).

Remarks. Examining Okada's holotype specimen, we confirmed that Okada (1971) misjudged the arms of aedeagal apodeme as the aedeagus. In addition, we compared it with the holotype of *A. trochlea* and concluded that *A. trochlea* Takada and Toda is a junior synonym of *A. sigma* Okada. In the description of *A. trochlea*, Takada and Toda (1973) also misjudged a part of paramere as the aedeagus.

***Amiota (Amiota) subtusradiata subtusradiata* Duda**
(figure 9C, D)

Amiota (Amiota) subtusradiata Duda, 1934: 32; Máca, 1980: 336.

Amiota (Amiota) chungi Okada, 1971: 85 [*Amiota (Amiota) alboguttata*, forma *koreana* Okada and Chung, 1960: 25]. **Syn. nov.**

Amiota (Amiota) neochungi Takada, Beppu and Toda, 1979: 110 (synonymized by Toda *et al.*, 1996: 436).

Diagnosis. Fourth sternite large, black; aedeagal outer membrane well-developed basally, with a pair of tri-horned, roughly serrated and striated, strong sclerites just before strongly sclerotized, vertical rod of gonopod.

Description. Male: Aedeagus indistinguishably fused to paramere or lost.

Female: Fifth sternite large (figure 9C); seventh tergite separated mid-dorsally; seventh sternite pubescent distally (figure 9C); eighth sternite smaller, but with long setae (figure 9C); pregenital lamella marginally sclerotized (figure 9C).

Specimens examined. Russia: Yakutsk, East Siberia, 1♂, 1♀, 9–18 July 1993, *ex* banana traps, H. Watabe leg. Japan: Holotype ♂ of *Amiota neochungi* Takada, Beppu and Toda, 1979, Misumai, Sapporo, 20 August 1975 (EHU); Lake Toya, Hokkaido, 1♂, 6–13 August 1978, M. J. Toda leg. Korea: Holotype ♂ of *Amiota (Amiota) chungi* Okada, 1960, Mt. Sua-Ak, Kang-won, 16 July 1959, *ex* human eyes, Y. J. Chung leg. (NSMT).

Distribution. Finland, Czech Republic, Poland, Roumania, Russia (European part, Yakutia, Amur Region, Khabarovsk Region, Ussuri Region), Korea, Japan (Hokkaido).

Remarks. Examining the holotype specimen of *A. chungi*, we concluded that *A. chungi* Okada is a junior synonym of *A. subtusradiata* Duda. Okada and Chung (1960) misjudged the paired, tri-horned sclerites on the aedeagal outer membrane as the paramere (termed the anterior paramere) and the aedeagus, and did not figure the real paramere and aedeagus in the description of *Amiota (Amiota) alboguttata*, forma *koreana*. However, we found those organs on the slide-glass preparation of the holotype male terminalia, and confirmed that those are almost the same as those of *A. subtusradiata* even in the detailed structure. The sclerites on the aedeagal outer membrane were misjudged in various ways also by other authors, as the paramere (termed anterior paramere) by Takada *et al.* (1979) and as the proper aedeagus (?) by Máca (1980).

Amiota (Amiota) todai Sidorenko

Amiota (Amiota) todai Sidorenko, 1989: 63.

Diagnosis. Vertical lobe of gonopod with three small processes apically; paramere with one internal, thick, strongly sclerotized and one outer, narrow, unsclerotized process in addition to largest, apical one.

Specimens examined. Russia: Ussurijsk, Far East, 10♂, 20–22 July 1994, M. J. Toda leg.

Distribution. Russia (Amur Region, Khabarovsk Region, Ussuri Region), China (Jilin).

Amiota (Amiota) trifurcata Okada

(figure 9E, F)

Amiota (Amiota) trifurcata Okada, 1968: 308.

Diagnosis. Body yellow; epandrium not constricted mid-dorsally; aedeagus deeply bifurcated into two processes both about two-thirds as long as paramere.

Description. Female: Sixth sternite posteriorly broadened (figure 9E); seventh tergite mid-dorsally separated; eighth sternite constricted on anterior margin, lacking

pubescence on anterior half, with setae lined on posterior to lateral margins (figure 9E); pregenital lamella large, constricted on posterior margin (figure 9E).

Specimens examined. Russia: Ussurijsk, Far East, 1♂, 1♀, 20–22 July 1994, M. J. Toda leg. Japan: Hokkaido: Kitamoshiri, 1♂, 18 August 1996, Nakagawa, 1♂, 1♀, 25 August 1996, 3♂, 2♀, 24–31 July 1997, 4♂, 1♀, 24–31 July 1997, 7♂, 10♀, 7 August 1997, *ex* banana traps, S. Tanabe leg.

Distribution. Russia (Ussuri Region), Japan (Hokkaido, Honshu).

Amiota (Amiota) cuii sp. nov.
(figure 10)

Diagnosis. Vertical lobe of gonopod with dorsad-oriented, strongly sclerotized process apicomediaally (figure 10C, D).

Description. Male: Ocellar triangle and frontal vitta dark brown; fronto-orbital plate brownish orange in upper part, dark brown in lower part. Face and gena brownish.

Wing with 22–23 minute, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} .

Legs: Mid tarsus with a row of minute cuneiform setulae on posteroventral surface. Hind femur with about seven long setae posteroventrally; hind tibiae with about eight setae ventrally.

Sixth abdominal tergite laterally tapering, but reaching lateral margin of fifth tergite, broadened dorsally.

Male terminalia: Epandrium completely separated mid-dorsally, with 14–16 setae near posterior to ventral margins (figure 10A). Surstylus pubescent, not expanded at posteroventral corner, with about four long prenisetae on distal margin and a

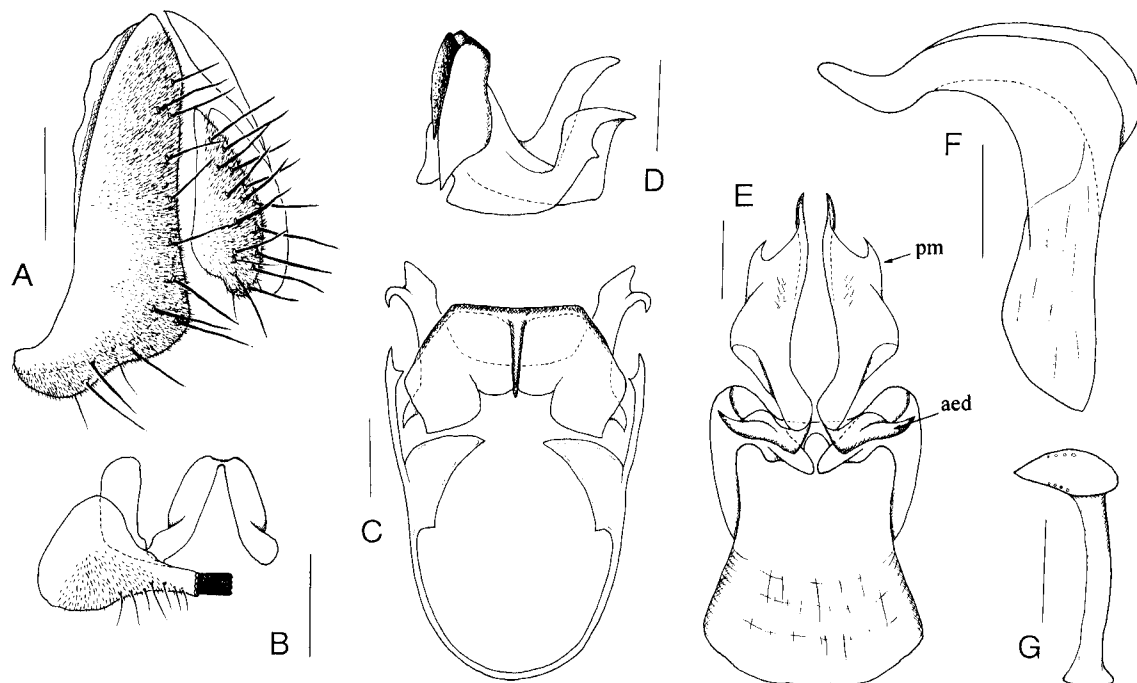


FIG. 10. *Amiota (Amiota) cuii* sp. nov. ♂, holotype: (A) epandrium and cercus; (B) surstylus and tenth sternite; (C) hypandrium and gonopod (ventral view); (D) gonopod (lateral view); (E) parameres, aedeagus and aedeagal apodeme (ventral view); (F) aedeagal apodeme (lateral view); (G) ejaculatory apodeme (scale-line = 0.1 mm).

few thin setae on ventral margin (figure 10B). Tenth sternite nearly bilobed, but not separated mid-dorsally, laterally narrowly fused to surstyli; lateral lobe-like process somewhat oblong (figure 10B). Anterior portion of hypandrium entirely thin (figure 10C). Parameres separated from each other, lobe-shaped, each with apical, large, strongly sclerotized and small, lateral unsclerotized processes and seven to eight sensilla on subdistal mesal surface (figure 10E). Aedeagus separated into a pair of simple rods, each fused to base of paramere (figure 10E). Ejaculatory apodeme: apical plate with four pits per side; stalk thick, long (figure 10G).

Measurements: BL = 3.35 mm; ThL = 1.34 mm; WL = 2.50 mm; WW = 1.14 mm.

Indices: arb = 5/4, avd = 0.50, adf = 1.30, flw = 1.50, FW/HW = 0.34, ch/o = 0.11, prorb = 0.90, rcorb = 0.63, vb = 0.28, dcl = 0.52, presctl = 0.47, sctl = 0.98, sterno = 0.87, orbito = 1.84, dcp = 0.33, sctlp = 1.18, C = 2.19, 4c = 1.52, 4v = 2.86, 5x = 1.25, ac = 4.92, M = 0.71, C3F = 0.69.

HOLOTYPE: ♂, China: Nonggang, Guangxi, 4–7 June 1993, around human eyes, Y. S. Cui leg. (DBSC).

Distribution. China (Guangxi).

Relationship. This species somewhat resembles *A. lanceolata* in the shape of paramere and aedeagus, but can be clearly distinguished from it by the vertical lobe of gonopod.

Etymology. Patronym, in honour of Dr Y. S. Cui of Shenyang Teachers' College.

Amiota (Amiota) nuerhachii sp. nov.

(figure 11)

Diagnosis. Paramere with flap-like expansion between apical and lateral processes (figure 11D).

Description. Male: Ocellar triangle and frontal vitta dark brown; fronto-orbital plate brownish orange in upper part, dark brown in lower part.

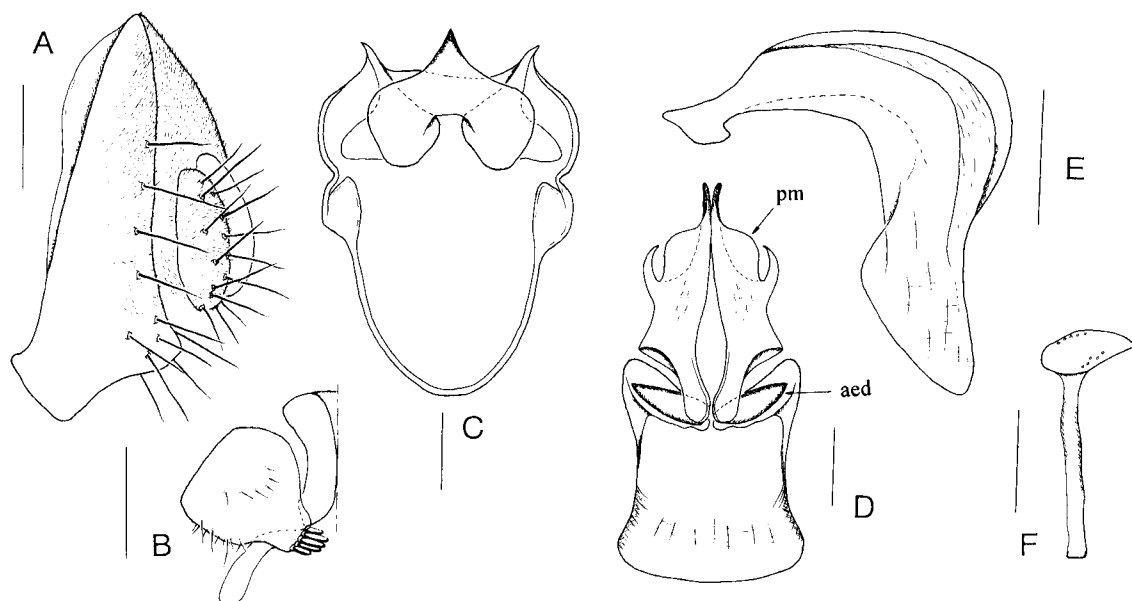


FIG. 11. *Amiota (Amiota) nuerhachii* sp. nov. ♂, holotype: (A) epandrium and cercus; (B) surstylus and tenth sternite; (C) hypandrium and gonopod (ventral view); (D) parameres, aedeagus and aedeagal apodeme (ventral view); (E) aedeagal apodeme (lateral view); (F) ejaculatory apodeme (scale-line = 0.1 mm).

Wing with 21–22 minute, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} .

Legs: Mid tarsus with a row of minute cuneiform setulae on posteroventral surface. Hind femur with seven to eight long setae posteroventrally; hind tibia with seven setae ventrally.

Sixth abdominal tergite tapering laterally, but reaching lateral margin of fifth tergite, broadened dorsally.

Male terminalia: Epandrium completely separated mid-dorsally, with 11–12 setae near posterior to ventral margins (figure 11A). Surstylus very slightly pubescent only on medial mesal surface, not expanded at posteroventral corner, with about five short prenisetae on distal margin, many thin setae on ventral margin, and a few ones on outer surface (figure 11B). Tenth sternite nearly bilobed, but not separated mid-dorsally, laterally narrowly fused to surstyli; lateral lobe-like process somewhat oblong (figure 11B). Anterior portion of hypandrium entirely thin (figure 11C). Vertical lobe of gonopod slightly sclerotized, protruded apically (figure 11C). Parameres separated from each other, lobe-shaped, each with apical, strongly sclerotized and lateral, less sclerotized processes and six to seven sensilla on medial mesal surface (figure 11D). Aedeagus separated into a pair of simple rods, each fused to base of paramere (figure 11D). Ejaculatory apodeme: apical plate with four pits per side; stalk thick, long (figure 11F).

Measurements: BL = 2.78 mm; ThL = 1.14 mm; WL = 2.40 mm; WW = 1.10 mm.

Indices: arb = 4/2-3, avd = 0.50, adf = 1.30, flw = 1.50, FW/HW = 0.36, ch/o = 0.13, pror = 0.94, rcor = 0.65, vb = 0.38, dcl = 0.62, prescl = 0.54, scl = 1.05, sterno = 0.87, orbito = 2.10, dcp = 0.34, scltp = 1.13, C = 2.10, 4c = 1.67, 4v = 3.17, 5x = 1.25, ac = 3.33, M = 0.83, C3F = 0.67.

HOLOTYPE: ♂, China: Changbaishan, Jilin, 11 July 1992, around human eyes, H.-W. Chen leg. (DBSC).

Distribution. China (Jilin).

Relationship. This species resembles *A. lanceolata* in the shape of vertical lobe of gonopod, but differs from it in having the lateral, less sclerotized process on the paramere (strongly sclerotized in *lanceolata*) and about five short prenisetae on the surstylus (six to seven long ones) in addition to the diagnostic character.

Etymology. Patronym, after the name of the first king of Manchuria originating from the area of Changbaishan, the type locality of this species.

Amiota (Amiota) spinata sp. nov.

(figure 12)

Diagnosis. Vertical lobe of gonopod with four posterod-oriented, sclerotized, acute processes and one anterod oriented, median one (figure 12B).

Description. Male: Ocellar triangle and fronto-orbital plate dark brown; frontal vitta orange brown. Face orange brown. Gena greyish yellow.

Legs: Mid tarsus with a row of minute cuneiform setulae on posteroventral surface.

Male terminalia: Epandrium narrow, entirely separated mid-dorsally, with 13–14 setae near posterior to ventral margins (figure 12A). Surstylus broad basally, narrow apically, slightly pubescent baso-ventrally, not expanded at posteroventral corner, with about four long prenisetae on distal margin and many thin setulae on medial to ventrapical outer surface (figure 12A). Anterior portion of hypandrium thin

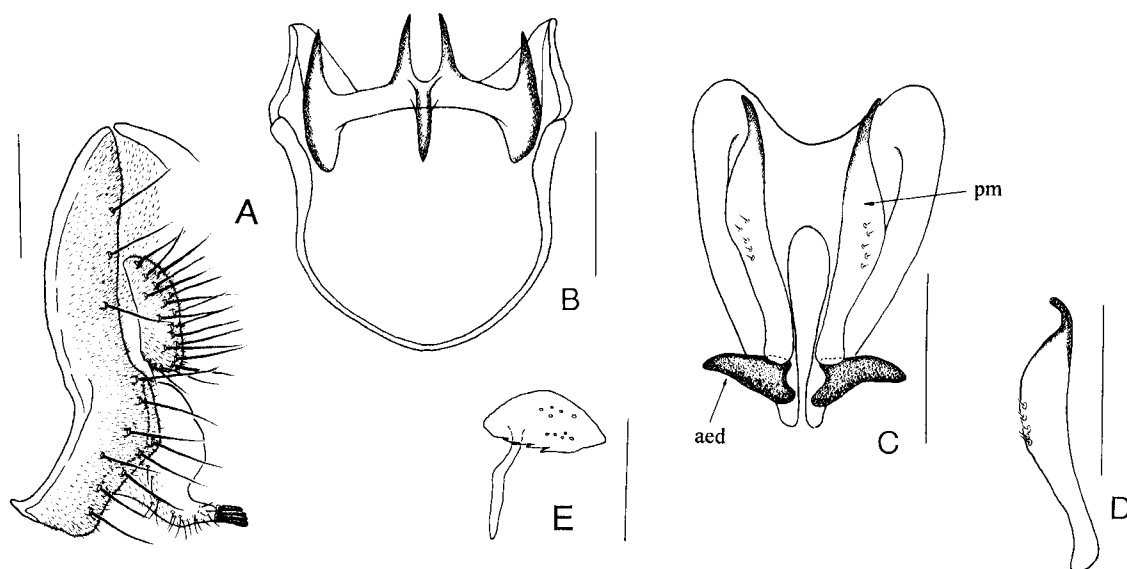


FIG. 12. *Amiota (Amiota) spinata* sp. nov. ♂, holotype: (A) epandrium, cercus and surstylus; (B) hypandrium and gonopod (ventral view); (C) parameres, aedeagus and aedeagal apodeme (ventral view); (D) paramere (lateral view); (E) ejaculatory apodeme (scale-line = 0.1 mm).

(figure 12B). Parameres separated from each other, slender, sclerotized and hooked apically, with about five sensilla medially but no process on lateral margin (figure 12C, D). Aedeagus separated into a pair of simple rods (figure 12C). Ejaculatory apodeme: apical plate with five pits per side (figure 12E); stalk attached submedially, as long as plate (figure 12E).

Measurements: BL = 2.80 mm; ThL = 1.19 mm; WL = 2.05 mm; WW = 1.00 mm.

Indices: arb = 5/4, FW/HW = 0.40, ch/o = 0.70, pror = 0.96, rcorb = 0.68, dcl = 0.58, presctl = 0.54, sctl = 1.10, sterno = 0.86, orbito = 1.94, dcp = 0.36, sctlp = 1.00, C = 1.83, 4c = 1.64, 4v = 2.70, 5x = 0.96, ac = 4.29, M = 0.62, C3F = 0.63.

HOLOTYPE: ♂, China: Zoujia, Jilin, 17 May 1990, H. Sun leg. (NENU).

Distribution. China (Jilin).

Relationship. This species somewhat resembles *A. cuii* in the shapes of surstylus and aedeagus, but clearly differs from it in the diagnostic character.

Etymology. In reference to the spine-like processes on the gonopod.

Amiota (Amiota) watabei sp. nov.

(figure 13)

Diagnosis. Surstylus with large, densely pubescent flap on outer mesal surface (figure 13B); aedeagus about one-half as long as paramere (figure 13D).

Description. Male: Wing with 22–23 minute, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} .

Legs: Mid tarsus with a row of minute cuneiform setulae on posteroventral surface. Hind femur posteroventrally with about five long setae; hind tibia ventrally with about 11 setae.

Sixth abdominal tergite tapering laterally, but reaching lateral margin of fifth tergite, broadened dorsally.

Male terminalia: Epandrium completely separated mid-dorsally, with 13–15 setae

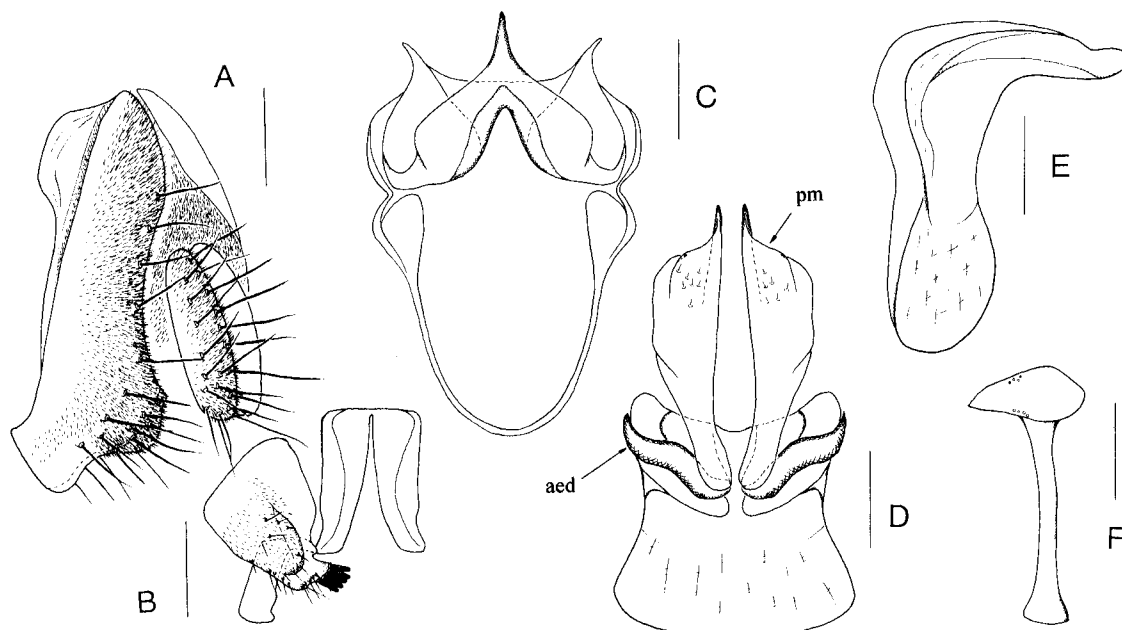


FIG. 13. *Amiota (Amiota) watabei* sp. nov. ♂, holotype: (A) epandrium and cercus; (B) surstylus and tenth sternite; (C) hypandrium and gonopod (ventral view); (D) parameres, aedeagus and aedeagal apodeme (ventral view); (E) aedeagal apodeme (lateral view); (F) ejaculatory apodeme (scale-line = 0.1 mm).

near posterior to ventral margins (figure 13A). Surstylus not expanded at posteroventral corner, with about five short prenisetae on distal margin, a few thin setulae on outer flap, and several on ventrapical part of inner surface (figure 13B). Tenth sternite nearly bilobed, but not separated mid-dorsally, laterally narrowly fused to surstyli; lateral lobe-like process somewhat oblong (figure 13B). Anterior portion of hypandrium entirely thin (figure 13C). Parameres separated from each other, lobe-shaped, slightly incised at posterolateral corner, each with apical, sclerotized process and six to seven sensilla on distal mesal surface (figure 13D). Aedeagus separated into a pair of somewhat sinuated rods, each fused to base of paramere (figure 13D). Vertical lobe of gonopod spade-shaped, strongly protruded and sclerotized apically (figure 13C). Ejaculatory apodeme: apical plate with four pits per side; stalk thick, long (figure 13F).

Measurements: BL = 2.84 mm; ThL = 1.23 mm; WL = 2.25 mm; WW = 1.13 mm.

Indices: arb = 4/3, avd = 0.50, adf = 1.30, flw = 1.50, FW/HW = 0.36, ch/o = 0.13, prorb = 0.98, rcorb = 0.73, vb = 0.40, dcl = 0.55, presctl = 0.57, sctl = 0.98, sterno = 0.97, orbito = 1.54, dcp = 0.32, sctlp = 1.02, C = 1.94, 4c = 1.88, 4v = 3.35, 5x = 1.17, ac = 4.57, M = 0.82, C3F = 0.69.

HOLOTYPE: ♂, China: Shennongjia, Hubei, 1520 m, 26 July 1992, around human eyes, H. Watabe leg. (DBSC).

Distribution. China (Hubei).

Relationship. This species resembles *A. lanceolata* in many characters, for example the shapes of paramere, aedeagus, and vertical lobe of gonopod, but can be clearly distinguished from it by the rudimentary, unsclerotized process at the posterolateral corner of the paramere, the number of prenisetae on the surstylus (six to seven in *lanceolata*) in addition to the diagnostic characters.

Etymology. Patronym, in honour of Prof. H. Watabe of Hokkaido University of Education.

Remarks. Body colour of the examined specimen had been almost lost, because of long preservation in 70% ethanol.

The *rufescens* species-group

Diagnosis. Prensisetae on surstylus long, pointed apically.

Included species: *rufescens* (Oldenberg, 1914); *stylopyga* Wakahama and Okada, 1958; *magniflava* sp. nov.

Amiota (Amiota) rufescens (Oldenberg)

Phortica rufescens Oldenberg, 1914: 21.

Amiota (Amiota) rufescens: Máca, 1980: 333.

Diagnosis. Surstylus with 10–11 prensisetae; vertical lobe of gonopod not expanded distally; paramere pubescent medially to distally.

Specimen examined. Czech Republic: Bohemia, 1♂, 25 August 1980, J. Máca leg.

Distribution. Finland, Great Britain, Switzerland, Czech Republic, Rumania, Russia (northwestern European part).

Remarks. Máca (1980) confused the paramere (termed the anterior paramere) and the aedeagus. The former is the very long, slender process medially with about five sensilla arranged nearly in line, while the latter is the strong sclerite completely fused to base of paramere and bearing two acute and one blunt projections.

Amiota (Amiota) stylopyga Wakahama and Okada

(figure 9G, H)

Amiota (Amiota) stylopyga Wakahama and Okada, 1958: 109.

Diagnosis. Surstylus with 14–15 prensisetae; vertical lobe of gonopod slightly expanded distally; paramere only faintly pubescent on subdistal inner margin.

Description. Female: Seventh tergite separated mid-dorsally; eighth sternite with numerous short, stout setae on posterior to lateral margins (figure 9G); pregenital lamella large, fork-like distally (figure 9G); spermatheca indented apically (figure 9H).

Specimens examined. Russia: Ussurijsk, Far East, 5♂, 1♀, 21–22 July 1994, M. J. Toda leg. Japan: Hokkaido: Nakagawa, 1♂, 25 August 1996; Tomakomai, 7♂, 30 June to 7 July 1997, 3♂, 13♀, 24–31 July 1997, 29♂, 14♀, 7 August 1997, 6♂, 24–31 August 1997, *ex* banana traps, S. Tanabe leg. China: Changbaishan, Jilin, 2♂, 11 July 1992, Kuandian, Liaoning, 1♂, 8–12 June 1994, around human eyes, H.-W. Chen leg.

Distribution. Russia (Irkutsk and Buryatiya Regions, Amur Region, Khabarovsk Region, Ussuri Region, Sakhalin), China (Heilongjiang, Jilin, Liaoning), Korea, Japan (Hokkaido, Honshu).

Remarks. Wakahama and Okada (1958) confused the paramere (termed the anterior paramere) and the aedeagus.

Amiota (Amiota) magniflava sp. nov.

(figure 14)

Diagnosis. Vertical lobe of gonopod broad, large, but short (figure 14C); paramere shorter than aedeagal apodeme, lobe-shaped, pointed apically, constricted

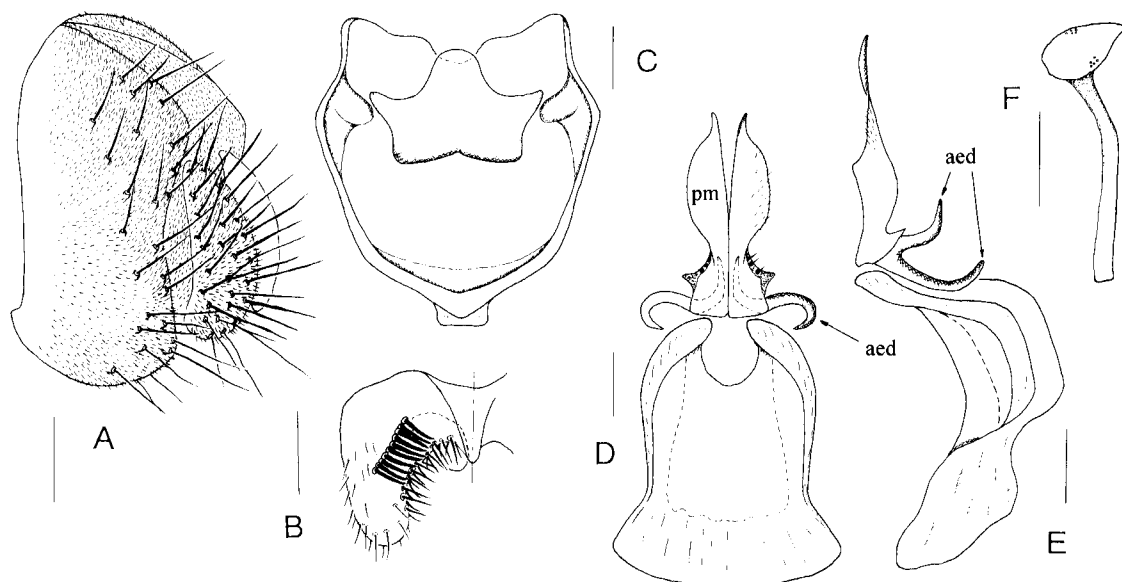


FIG. 14. *Amiota (Amiota) magniflava* sp. nov. ♂, a paratype from Hubei, China: (A) epandrium and cercus; (B) surstylus and tenth sternite; (C) hypandrium and gonopod (ventral view); (D) parameres, aedeagus and aedeagal apodeme (ventral view); (E) parameres, aedeagus and aedeagal apodeme (lateral view); (F) ejaculatory apodeme (scale-line = 0.1 mm).

mediolaterally, less heavily sclerotized, with pubescence on lateral half of medial to distal portion and about three sensilla on mediolateral margin (figure 14D, E).

Description. Male: Large-sized species; body brownish yellow, with argentine pollinose. Eyes brownish yellow. Ocellar triangle and upper half of frontal vitta brownish yellow; lower half of frontal vitta greyish brown. Pedicel and first flagellomere yellow. Face almost white. Clypeus and gena yellow.

Thoracic pleura with brown patches; scutellum brown.

Wing with 19–21 minute, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} .

Legs: Mid tarsus with two rows of minute cuneiform setulae on posteroventral surface.

First and second abdominal tergites yellowish white medially; others yellowish brown to dark brown, but medially light.

Male terminalia: Epandrium completely separated mid-dorsally, with 25–26 setae (figure 14A). Surstylus lacking pubescence, with finger-like process at posteroventral corner, about 10 long apically pointed prenisetae on distal margin, and many setae on inner margin and ventral part of inner and outer surfaces to outer mesal surface (figure 14B). Tenth sternite slightly protruded mid-ventrally; lateral lobe-like process spherical (figure 14B). Anterior portion of hypandrium somewhat broadened, with small apodeme (figure 14C). Parameres separated from each other (figure 14D, E). Aedeagus deeply bifurcated into curved processes, completely fused to base of paramere (figure 14D, E). Ejaculatory apodeme: apical plate with five pits per side; stalk thick, long, gently curved medially (figure 14F).

Measurements: BL = 4.20 mm (4♂ paratypes: 4.00–4.30); ThL = 1.93 mm (1.85–1.95); WL = 3.50 mm (3.25–3.35); WW = 1.64 mm (1.60–1.65).

Indices: arb = 6/6 (5-6/4-5), avd = 0.65 (0.65), adf = 1.30 (1.20–1.40), flw = 2.20 (2.00–2.20); FW/HW = 0.39 (0.36–0.40), ch/o = 0.10 (0.09–0.10), prorb = 0.98

(0.96–0.99), rcorb = 0.63 (0.59–0.62), vb = 0.48 (0.39–0.46), dcl = 0.65 (0.63–0.65), presctl = 0.75 (0.68–0.76), sctl = 0.98 (0.96–0.98), sterno = 0.67 (0.65–0.72), orbito = 1.50 (1.46–1.52), dcp = 0.29 (0.28–0.31), sctlp = 1.02 (0.98–1.01), *C* = 2.26 (2.07–2.20), 4*c* = 1.04 (1.25–1.30), 4*v* = 1.96 (2.15–2.37), 5*x* = 1.13 (0.96–1.08), *ac* = 3.38 (3.75–4.00), *M* = 0.52 (0.50–0.57), *C3F* = 0.63 (0.63–0.70).

HOLOTYPE: ♂, China: Shennongjia, Hubei, 28 July 1992, *ex* rock shelter, M. J. Toda leg. (DBSC).

PARATYPES: 4♂, same data as the holotype (EHU and DBSC).

Distribution. China (Hubei).

Relationship. This species is similar to *A. stylopyga* in the large-sized and yellowish coloured body and the distally pubescent paramere, but differs from it in the shapes of vertical lobe of gonopod (narrow and long in *stylopyga*) and paramere (as long as aedeagal apodeme, slender and heavily sclerotized).

Etymology. In reference to the big size and yellow colour of body.

Ungrouped species

Amiota (Amiota) acuta Okada

Amiota (Amiota) acuta Okada, 1968: 306.

Diagnosis. Vertical lobe of gonopod apically narrowly elongated and bifurcated.

Specimen examined. Holotype ♂, Tokyo, 3 June 1967, around human eyes, T. Okada leg. (NSMT).

Distribution. Japan (Honshu).

Remarks. Okada (1968) regarded the aedeagus as being fused to the paramere (termed the anterior paramere) and having about four sensilla, but the organ bearing sensilla should be the paramere.

Amiota (Amiota) balaenodentata Takada, Beppu and Toda

Amiota (Amiota) balaenodentata Takada, Beppu and Toda, 1979: 114.

Diagnosis. Prensistetae on surstylus small, pointed apically; paramere less sclerotized and densely pubescent distally, with one long and six to seven minute sensilla submedially; gonopod heavily sclerotized, posteriorly forming large, quadrate plate posteromedially bearing strongly sclerotized, claw-like projection and anterolaterally fused to hypandrium, anteriorly forming strongly sclerotized, thick, apically pointed vertical rod; aedeagal outer membrane with a pair of highly serrated, sclerotized processes.

Specimens examined. Japan: Hokkaido: Tomakomai: Holotype ♂, 6 August 1977 (EHU), 1♂, 27 July to 4 August 1979, 1♂, 20–27 July 1983, M. J. Toda leg.

Distribution. Japan (Hokkaido).

Remarks. Takada *et al.* (1979) misjudged the highly serrated, sclerotized structure on the aedeagal outer membrane as the aedeagus. However, the real aedeagus is a strongly sclerotized, short rod fused to the base of paramere.

Amiota (Amiota) collini Beuk and Máca

Amiota (Amiota) collini Beuk and Máca, 1995: 8.

Diagnosis. Male: Fifth tarsomere of fore leg black; fifth sternite densely setigerous (figure 1C); sixth tergite very large; surstylus narrow, long, with four to five long

prensisetae and about three long, spine-like setae on distal margin; lower margin of cercus protruded, with tuft of four to five setae.

Specimen examined. Czech Republic: Duchcov-Louny, 1♂, 9 May 1993, J. Máca leg.

Distribution. Great Britain, Czech Republic, Slovakia.

***Amiota (Amiota) dentata* Okada**

Amiota (Amiota) dentata Okada, 1971: 87; Máca and Lin, 1993: 2.

Diagnosis. Gonopods heavily sclerotized, separated medially, each anteriorly with vertical lobe bearing large serrations apically and laterally.

Specimens examined. China: Shennongjia, Hubei, 2♂, 27 July 1992, M. J. Toda leg.

Distribution. China (Taiwan, Hubei), Japan (Hokkaido, Honshu).

***Amiota (Amiota) filipes* Máca**

Amiota (Amiota) filipes Máca, 1980: 340.

Diagnosis. Parameres fused to each other basally, with a pair of hooked apically, blade-like, distal processes each bearing about four sensilla on laterodistal margin, a pair of small, acute processes lateromedially, a pair of short, strongly sclerotized processes laterobasally, and three long, asymmetrically curved, strongly sclerotized processes basally; aedeagus deeply bifurcated, somewhat U-shaped in lateral view, situated basolaterally and fused to paramere.

Specimen examined. Czech Republic: Paratype 1♂, Bohemia mer. 16 June 1973, J. Máca leg. (CANC).

Distribution. Switzerland, Czech Republic.

Remarks. Máca (1980) confused the detailed structure of paramere and aedeagus, regarding the short, laterobasal process as the paramere (termed the anterior paramere) and the remaining as the aedeagus.

***Amiota (Amiota) furcata* Okada**

Amiota (Amiota) furcata Okada, 1971: 85 [*Amiota (Amiota) alboguttata*, forma *furcata* Okada, 1960: 96 (part.)]; Máca and Lin, 1993: 2.

Diagnosis. Surstylus with 11–12 prensisetae; mid tibia with five to seven slightly long setae ventrally.

Specimens examined. Japan: Hokkaido: Sapporo, 35♂, 29 June to 20 July 1973, 2♂, 8 August 1973, 1♂, 15 August 1973, 1♂, 29 August 1973, 13♂, 17–24 June 1975, 23♂, 3 July 1975, 10♂, 24 July 1975, 4♂, 4 August 1975, 2♂, 29 August 1975, M. J. Toda leg.; Kitamoshiri, 4♂, 18–25 August 1996, Nakagawa, 4♂, 18–25 August 1996, Tomakomai, 1♂, 30 June to 7 July 1997, 1♂, 7 August 1997, *ex* banana traps, S. Tanabe leg. China: Mt. Emei, Sichuan, 4♂, 17–19 July 1992, Shennongjia, Hubei, 1♂, 26 July 1992, M. J. Toda leg.

Distribution. China (Taiwan, Hubei, Sichuan, Yunnan), Japan (Hokkaido, Honshu, Kyushu).

***Amiota (Amiota) orchidea* Okada**

Amiota (Amiota) orchidea Okada, 1968: 307.

Diagnosis. Proximal ventral branches of arista as long as dorsals; gonopod with

two rod-shaped processes: anterior one stretching to bases of parameres, with two small, fork-like processes apically, and posterior one bifurcated apically; paramere slightly sclerotized, with two finger-like processes distally and about six sensilla medially; aedeagus single, articulated with bases of parameres; aedeagal outer membrane with a pair of belts clothed with numerous sclerotized serrations.

Specimen examined. Japan: Paratype 1♂, Seito-shi, Miyazaki, 29 June 1960, Y. Nagata leg. (NSMT).

Distribution. Japan (Kyushu).

Remarks. Okada (1968) confused the aedeagus and the paramere (termed the anterior paramere), and regarded the paired, serrated structures on the aedeagal outer membrane as the processes from the gonopod (termed the posterior paramere).

Amiota (Amiota) promissa Okada

Amiota (Amiota) promissa Okada, 1960: 93.

Diagnosis. Paramere longer than one-half of aedeagal apodeme, heavily sclerotized, lacking sensilla, serrated on apico- and submedio-ventral margins, basally with slender, membranous process.

Specimens examined. Russia: Ussurijsk, Far East, 1♂, 20–22 July 1994, M. J. Toda leg. Japan: Kyoto, Honshu, 2♂, 19–25 May 1987, M. J. Toda leg.

Distribution. Russia (Ussuri Region), Japan (Hokkaido, Honshu).

Amiota (Amiota) subfurcata Okada

(figure 9I, J)

Amiota (Amiota) subfurcata Okada, 1971: 85 [*Amiota (Amiota) alboguttata*, forma *furcata* Okada, 1960: 96 (part.)]; Măca and Lin, 1993: 2.

Amiota (Amiota) pacifica Sidorenko, 1989: 63 (synonymized by Sidorenko, 1992: 260).

Diagnosis. Surstylus with six to seven prenisetae; mid tibia without erect, long setae ventrally.

Description. Female: Seventh tergite not separated mid-dorsally; eighth sternite lacking pubescence, but with about 14 short setae (figure 9I); pregenital lamella protruded posterolaterally (figure 9I).

Specimens examined. Russia: Ussurijsk, Far East, 1♂, 21 July 1994, *ex* banana trap, M. J. Toda leg. Japan: Hokkaido: Sapporo, 3♂, 20–23 June 1973, 13♂, 4–20 July 1973, 4♂, 4–14 August 1973, 4♂, 13–24 June 1975, 2♂, 3 July 1975, 5♂, 24 July 1975, M. J. Toda leg.; Nopporo, 3♂, 26 August 1996, *ex* around human eyes, H.-W. Chen leg.; Kitamoshiri, 19♂, 2♀, 18–25 August 1996, Nakagawa, 16♂, 4♀, 18–25 August 1996, Tomakomai, 2♂, 24–31 July 1997, *ex* banana traps, S. Tanabe leg.

Distribution. Russia (Yakutia, Amur Region, Khabarovsk Region, Ussuri Region), China (Jilin, Beijing, Zhejiang, Sichuan, Taiwan), Japan (Hokkaido, Honshu, Kyushu).

Amiota (Amiota) kamui sp. nov.

(figure 15)

Diagnosis. Gonopods separated medially, heavily sclerotized, each anteriorly forming sword-like, vertical process (figure 15C); parameres fused basally, slightly asymmetric: left one shorter than right one (figure 15D).

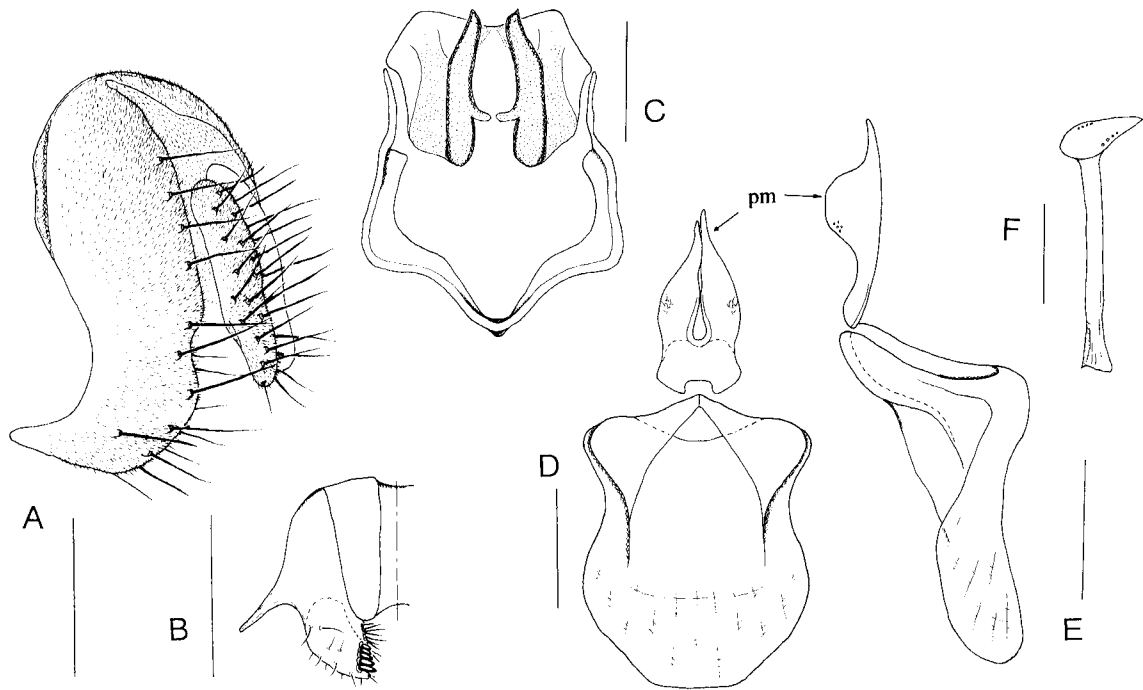


FIG. 15. *Amiota (Amiota) kamui* sp. nov. ♂, a paratype from Hokkaido, Japan: (A) epandrium and cercus; (B) surstylus and tenth sternite; (C) hypandrium and gonopod (ventral view); (D) parameres and aedeagal apodeme (ventral view); (E) parameres and aedeagal apodeme (lateral view); (F) ejaculatory apodeme (scale-line=0.1 mm).

Description. Male: Ocellar triangle and upper half of frontal vitta brownish black; lower half of frontal vitta and fronto-orbital plate dark brown. Antenna brown. Face dark brown on upper half. Gena pale brown.

Wing with 24–26 minute, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} .

Legs: Mid tarsus with a row of minute cuneiform setulae on posteroventral surface.

Male terminalia: Epandrium constricted more than one-half width mid-dorsally, with 17–18 setae near posterior to ventral margins (figure 15A). Surstylus lacking pubescence, not expanded at posteroventral corner, with about seven prenisetae increasing downward in size on distal margin, many relatively long setae on distal inner surface, and some small ones on ventral margin and outer mesal surface (figure 15B). Tenth sternite entirely fused to surstyli laterally; lateral lobe-like process elliptical (figure 15B). Anteromedial portion of hypandrium slightly broadened (figure 15C). Paramere lobe-shaped, weakly sclerotized, with about five sensilla medially (figure 15D, E). Aedeagus lost or indistinguishably fused to paramere (figure 15D, E). Ejaculatory apodeme: apical plate with four pits per side; stalk thick, about 2.5 times as long as plate (figure 15F).

Measurements: BL=2.22 mm (5♂ paratypes: 2.12–2.44); ThL=1.07 mm (0.97–1.14); WL=1.94 mm (1.67–2.24); WW=1.39 mm (1.20–1.51).

Indices: arb=4/4 (4-5/3-4), avd=0.50 (0.50), adf=0.85 (0.80–1.00), flw=1.20 (1.20–1.30), FW/HW=0.44 (0.46–0.47), ch/o=0.10 (0.09–0.11), pror=1.02 (0.92–1.08), rcorb=0.70 (0.72–0.75), vb=0.32 (0.41–0.50), dcl=0.55 (0.56–0.59), presctl=0.38 (0.44–0.55), sctl=0.88 (0.84–0.87), sterno=0.92 (0.88–1.08), orbito=1.71 (1.65–1.83), dcp=0.34 (0.29–0.38), sctlp=1.21 (1.30–1.35), C=1.82

(1.62–1.97), $4c=1.91$ (1.60–1.98), $4v=3.23$ (2.70–3.09), $5x=1.95$ (1.53–1.87), $ac=4.47$ (3.74–4.22), $M=1.04$ (0.76–0.93), $C3F=0.66$ (0.61–0.70).

HOLOTYPE: ♂, Japan: Sapporo, Hokkaido, 11–18 June 1988, M. J. Toda leg. (EHU).

PARATYPES: 2♂, same data as the holotype; Hokkaido: Oyafuru, Sapporo, 1♂, 3–10 June 1987, H. Watabe leg.; Tomakomai: 1♂, 5–15 June 1983, 1♂, 10–20 August 1983, M. J. Toda leg. (EHU and DBSC).

Distribution. Japan (Hokkaido).

Relationship. This species somewhat resembles *A. dentata* in the aedeagus indistinguishable and the gonopods separated from each other, but can be clearly distinguished from it by the morphology of parameres (separated from each other and heavily sclerotized in *dentata*).

Etymology. The specific name means ‘god’ in the language of Ainu, a native people of Hokkaido.

Species uncertain in affinity

Phylogenetic relationships of the following unstudied species remain uncertain: *albomaculata* Duda, 1926 (New Guinea, Australia); *atomia* Máca and Lin, 1993 (Taiwan); *bandai* Chassagnard and Tsacas, 1997 (Africa); *bakeri* (Sturtevant, 1927) (Philippines); *barretti* (Johnson, 1921) (C. America); *buccata* Wheeler, 1952 (N. America); *flavopruinosa* Duda, 1934 (Europe); *humeralis* Loew, 1862 (N. America); *lacteoguttata* (Portschinsky, 1892) (Russia); *leucostoma* Loew, 1862 (N. America); *melanoleuca* Tsacas, 1990 (Africa); *nigrescens* Wheeler, 1952 (N. America); *onchopyga* Nishiharu, 1979 (Japan); *perpusilla* (Walker, 1849) (Africa); *setigera* Malloch, 1924 (N. America); *steganoptera* Malloch, 1926 (N. to C. America).

Phylogeny

The heuristic search for maximum parsimony tree by PAUP resulted in 16 trees. Those trees were different from each other in the position of *kamui* and the topologies within the *sinuata* group and among the outgroup species. The strict consensus, rooted tree with a length of 69 steps, CI (consistency index)=0.696, and RI (character retention index)=0.914 is shown in figure 16. Apomorphies are indicated on each branch, based on the results of character optimization by DELTRAN and ACCTRAN, which were different in only one character state (30-0) from each other. The synapomorphy not identified by both DELTRAN and ACCTRAN was ignored in the subsequent discussion. According to the results of cladistic and bootstrap analyses, we discuss here the monophyly and synapomorphies for the *Amiota* (s. str.) species.

The monophyly of the subgenus *Amiota* was strongly supported by the following synapomorphies: a few anterior sensilla of medial cibarials short, stout, somewhat peg-like (2-1); face milky white on lower half (3-1); clypeus entirely dark brown to black (4-1); postpronotal lobe distinctly milky white on upper part (6-1); anepimeron distinct milky white on upper part (7-1); surstylus with comb of distinct, but short or long, peg-like prensisetae (21-1, 2, 3); aedeagal apodeme broad, dorsoventrally flattened (29-1).

Within the subgenus *Amiota*, the following clades were regarded as monophyletic based on 50% bootstrap value as a provisional criterion. Such bootstrap values

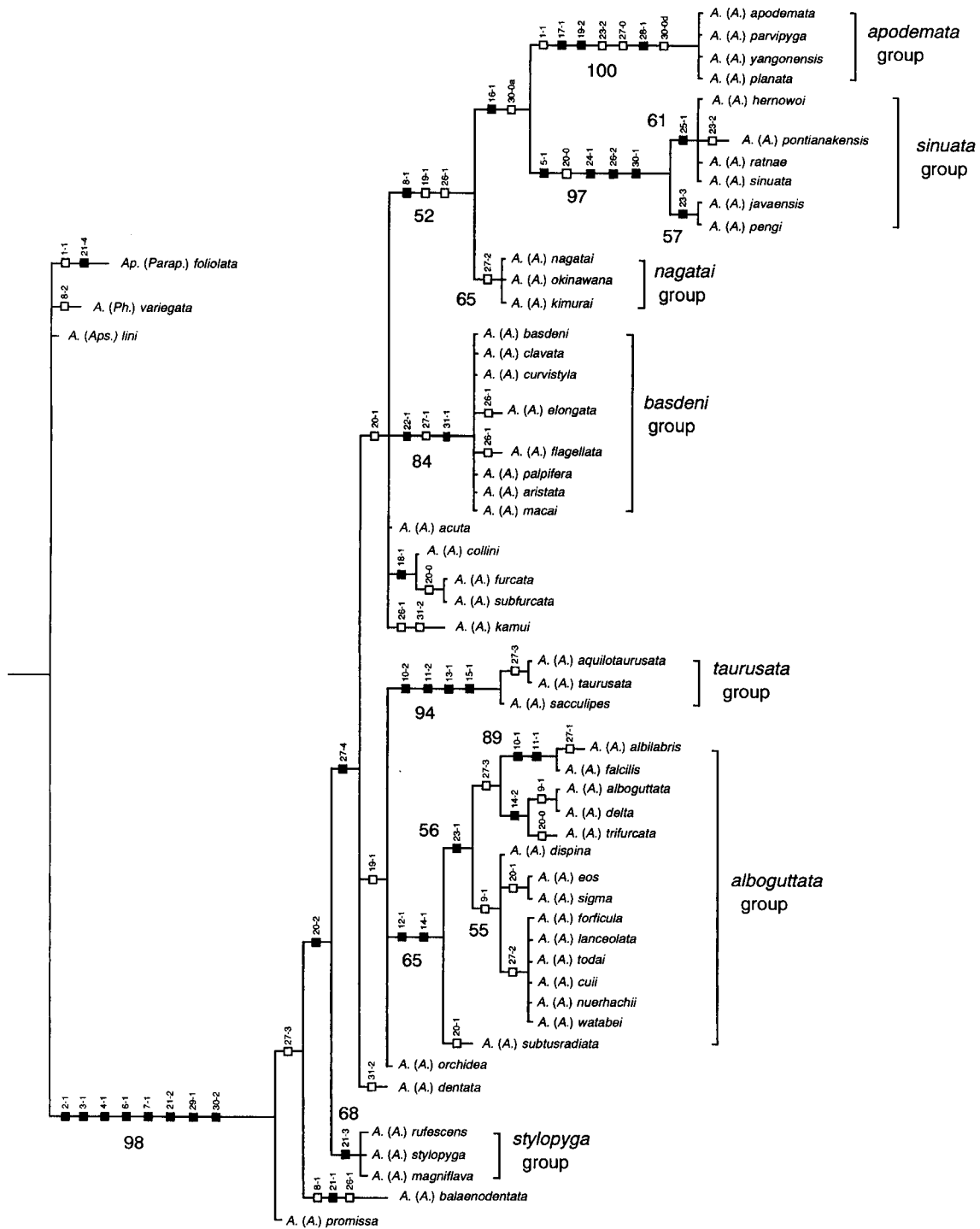


FIG. 16. The strict consensus tree of 16 maximum parsimony trees resulting from cladistic analysis by PAUP (3.1.1), with indication of apomorphies: (■) occurring only once on the tree; (□) including homoplasies (different results from DELTRAN and ACCTRAN marked with 'd' and 'a', respectively), and bootstrap values more than 50%.

supporting the monophyletic groups are shown at corresponding nodes of the cladogram in figure 16. Both of the two already established species-groups, the *apodemata* and the *sinuata* groups, were each regarded as monophyletic. The monophyly of the former group was strongly supported by the following synapomorphies: postocellar setae absent (1-1; a homoplasy seen in *Ap. foliolata*); fifth tergite laterally

with dark-coloured strips (17-1); sixth tergite very small, laterally pointed and not reaching ventral margin of fifth tergite (19-2); anterior margin of hypandrium narrowly separated (23-2; a homoplasy seen in *pontianakensis*); aedeagus single (27-0; regarded as having been regained by secondary fusion of paired ones); aedeagus basally fused to apodeme (28-1). The monophyly of the latter group was also strongly supported by the following synapomorphies: prescutellar setae absent (5-1); epandrium mid-dorsally not constricted (20-0; regarded as having secondarily reversed independently in this group, *trifurcata*, and the lineage leading to *furcata* and *subfurcata*); hypandrium anteriorly connected with ventromedian part of paramere by articulating plate (24-1); parameres fused to each other basomedially (26-2); aedeagal apodeme slightly curved (30-1). Furthermore, the *sinuata* group was divided into two monophyletic clades, *hernowoi* + *pontianakensis* + *ratnae* + *sinuata* and *javaensis* + *pengi*: the monophyly of the former was supported by the paramere apically with some very minute sensilla in addition to ordinary ones (25-1), and that of the latter by the hypandrium anteromedially broadly separated into lateral lobes (23-3).

The *nagatai* group was regarded as monophyletic on the basis of paired, unbifurcated aedeagus shorter than paramere (27-2; a homoplasy seen in the lineage leading to *forficula*, *lanceolata*, *todayi*, *cuii*, *nuerhachii* and *watabei*; see later), and made a monophyletic clade together with the *apodemata* and the *sinuata* groups, sharing the costal vein with 14–15 distinct, peg-like spinules on ventral surface between R_{2+3} and R_{4+5} (8-2), the lateral margin of sixth tergite more or less tapering (19-1, 2; a homoplasy of the former character state, sixth tergite tapering laterally but reaching ventral margin of fifth tergite, seen in the lineage leading to the *taurusata* and *albuguttata* groups and *orchidea*), and the more or less fused parameres (26-1, 2; the former character state, only basally fused parameres, regarded as having derived independently also in *elongata*, *flagellata*, *kamui* and *balaenodentata*).

The monophyly of the *basdeni* group was strongly supported by the following synapomorphies: surstylus with one to five aristate processes separated from or fused to each other on mesal surface (22-1); paired aedeagus as long as paramere (27-1; a homoplasy seen in *albilabris*); vertical lobe of gonopod with two sclerotized, basally fused M-shaped processes (31-1).

The monophyly of the *taurusata* group was strongly supported by the following autapomorphies: hind femur basoventrally with small, lobe-like flap (10-2); hind tibia apicodorsally much extended like flap (11-2); hind first tarsomere dorsally expanded (13-1); fourth tergite laterally protruded more than others (15-1).

The *albuguttata* group was regarded as the largest monophyletic group within the subgenus *Amiota*. The following two autapomorphies supported this monophyletic group: hind tibia ventrally with a row of long setae (12-1) and hind second to fifth tarsomeres broadened: second shorter than 1.5 times of width (14-1, 2). Excepting *subtusradiata*, the remaining species made a monophyletic group based on an autapomorphy: anterior portion of hypandrium entirely thin (23-1). Within the latter group, the following two monophyletic groups were recognized: *albilabris* + *falcilis* sharing the hind femur basoventrally slightly extended (10-1) and the hind tibia apicodorsally slightly extended (11-1) as autapomorphies, and *forficula* + *lanceolata* + *todayi* + *cuii* + *nuerhachii* + *watabei* sharing the paired, unbifurcated aedeagus shorter than paramere (27-2; see above for homoplasy).

The *rufescens* group was regarded as monophyletic on the basis of an autapomorphy: long, apically pointed prensisetae on surstylus (21-3).

Key to the studied species of the subgenus *Amiota* from Asia and Europe

Male

- 0 Face, postpronotal lobe, and wing base each with distinctly milky white spot; aedeagal apodeme broad, dorsoventrally flattened (subgenus *Amiota*) 1
- 1 Postocellar setae absent; fifth tergite laterally with coloured strips; lateral margin of sixth tergite apically pointed, not reaching ventral margin of fifth tergite; aedeagus single, basally fused to apodeme; aedeagal apodeme nearly straight (*apodemata* species-group). 2
- Postocellar setae present; fifth tergite laterally without coloured strips; lateral margin of sixth tergite, reaching ventral margin of fifth tergite; aedeagus, if present, basally not fused to apodeme; aedeagal apodeme curved 5
- 2 Arms of aedeagal apodeme protruded ventrad nearly to level of apices of parameres and vertical lobe of gonopod *planata* sp. nov.
- Arms of aedeagal apodeme not so protruded ventrad 3
- 3 Vertical process of gonopod broad, spoon-shaped *yangonensis* Chen and Toda
- Vertical process of gonopod very narrow 4
- 4 Paramere narrow in lateral view, apically triangularly notched, submedially with three to four sensilla; vertical process of gonopod slightly bifid at apex *apodemata* Gupta and Panigrahy
- Paramere broad in lateral view, with a few serrations subapically and submedially on outer margin and one to two sensilla near subapical inner margin; vertical process of gonopod not bifid apically *parvipyga* Chen and Toda
- 5 Prescutellar setae absent; plate connecting anterior part of hypandrium with ventro-median part of paramere present; parameres basally to medially fused to each other (*sinuata* species-group) 6
- Prescutellar setae present; plate connecting anterior part of hypandrium with ventro-median part of paramere absent; parameres separated from or at most basally fused to each other 11
- 6 Thorax brownish yellow; epandrium posteroventrally pubescent; surstylus without stout spines on inner surface; aedeagal apodeme longer than wide, basally not strongly expanded laterad; paramere distally with some very minute sensilla in addition to ordinary ones; ejaculatory apodeme with two or three pits on each side of apical plate 7
- Thorax yellow; epandrium posteroventrally unpubescent; surstylus with stout spines on inner surface; aedeagal apodeme as long as wide, basally much expanded laterad like fan; paramere with only ordinary sensilla; ejaculatory apodeme with five pits on each side of apical plate 10
- 7 Distal half of paramere laterally flat 8
- Distal half of paramere horizontally flat 9
- 8 Paramere apically not dilated, basally expanded laterad *sinuata* Okada
- Paramere apically dilated, subapically triangularly expanded, basally not expanded laterad. *pontianakensis* Chen and Toda
- 9 Surstylus ventrally much expanded; paramere apically quadrate, basally with three acute projections; ejaculatory apodeme with three pits on each side of apical plate *hernowoi* Chen and Toda
- Surstylus ventrally not so expanded; paramere apically roundly dilated, basally without any acute projections; ejaculatory apodeme with two pits on each side of apical plate *ratnae* Chen and Toda
- 10 Gonopod with a pair of apically round, somewhat recurved projections at base of vertical lobe *pengi* Chen and Toda
- Gonopod without projections at base of vertical lobe *javaensis* Chen and Toda
- 11 Ventral branches of arista as long as dorsals, about twice as long as width of first

- flagellomere; wing with about 14–15 distinct, peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} (*nagatai* species-group) 12
- Ventral branches of arista shorter than dorsals; peg-like spinules on ventral surface of costal vein between R_{2+3} and R_{4+5} smaller, more than 18 14
- 12 Vertical lobe of gonopod apically with a pair of horn-like processes *nagatai* Okada
- Vertical lobe of gonopod apically round, without any processes 13
- 13 Lobe-shaped process on hind trochanter medially black; paramere about 1.3 times as long as aedeagus, apically strongly sclerotized and as thick as aedeagus
- *kimurai* sp. nov.
- Lobe-shaped process on hind trochanter medially not black; paramere about 1.8 times as long as aedeagus, apically less sclerotized and much narrower than aedeagus *okinawana* Okada
- 14 Surstylus with one to five aristate processes separated from or fused to each other on mesal surface; vertical lobe of gonopod with two sclerotized, basally fused M-shaped processes (*basdeni* species-group) 15
- Surstylus without aristate processes; vertical lobe of gonopod without M-shaped process 22
- 15 Surstylus with one to two aristate processes basally not fused to each other on mesal surface 16
- Surstylus with palm-like lobe bearing three to five aristate processes on mesal surface 17
- 16 Hind tarsus anteriorly with long, fringe-like setae; paramere heavily sclerotized, lacking sensilla and pubescence, basally fused to aedeagus *flagellata* Okada
- Hind tarsomeres without fringe-like setae; paramere unsclerotized, with sensilla and pubescence, basally articulated with aedeagus *palpifera* Okada
- 17 Paramere and aedeagus both heavily sclerotized, black 18
- Paramere or aedeagus either not black 19
- 18 Palm-like lobe on surstylus bearing four to five aristate processes; aedeagus thick, apically expanded and finely serrated on margins *clavata* Okada
- Palm-like lobe on surstylus bearing about three aristate processes; aedeagus apically pale, narrow and somewhat looped, subapically with short, additional process *curvistyla* Okada
- 19 Paramere lacking sensilla, basally with two processes: lateral one heavily sclerotized, broad, short, while ventral one less sclerotized, slender, apically pointed, with a few serrations on ventral margin *elongata* Okada
- Paramere with sensilla but no basal processes 20
- 20 Paramere medially with 9–10 long sensilla; aedeagus heavily sclerotized, black
- *basdeni* Fonseca
- Paramere medially with a few short sensilla; aedeagus not black 21
- 21 Palm-like lobe on surstylus bearing about four aristate processes; paramere and aedeagus apically pointed; paramere submedially with six to seven sensilla *aristata* sp. nov.
- Palm-like lobe on surstylus bearing about three aristate processes; paramere and aedeagus apically slightly dilated; paramere submedially with about three sensilla *macui* sp. nov.
- 22 Hind femur basoventrally with hyaline, small, lobe-like flap; hind tibia apicodorsally much extended like flap; hind first tarsomere dorsally expanded; abdominal fourth tergite laterally broadened and protruded more than others (*taurusata* species-group) 23
- Hind femur and tibia without any flap-like extensions; hind first tarsomere not expanded; fourth tergite neither broadened nor protruded more than others 25
- 23 Ventral branches of arista distinctly shorter than one-half of dorsals; all femora dark brown *sacculipes* Máca and Lin

- Ventral branches of arista as long as one-half of dorsals; femora yellow 24
- 24 Short process of aedeagus longer than one-half of long one
- *aquilotaurusata* Takada, Beppu and Toda
- Short process of aedeagus shorter than one-fifth of long one
- *taurusata* Takada, Beppu and Toda
- 25 Hind tibia ventrally with a row of long setae; hind second to fifth tarsomeres
broadened: second shorter than 1.5 times of width (*alboguttata* species-group) 26
- Hind tibia ventrally without long setae; hind second to fifth tarsomeres not broadened
. 41
- 26 Hind femur basoventrally and tibia apicodorsally expanded 27
- Hind femur basoventrally and tibia apicodorsally not expanded 28
- 27 All femora and mid and hind tibiae dark brown; aedeagus as long as paramere
- *albilabris* (Roth)
- Legs entirely yellow; aedeagus shorter than paramere *falcilis* Takada, Beppu and Toda
- 28 Hind second to fifth tarsomeres much broadened: second shorter than wide 29
- Hind second tarsomere longer than wide 31
- 29 Body yellow; epandrium mid-dorsally not constricted; aedeagus deeply bifurcated
into two processes both about two-thirds as long as paramere *trifurcata* Okada
- Body glossy brownish black; epandrium entirely separated into two lateral lobes 30
- 30 Hind tibia ventrally with about four long setae; paramere with apically bifurcated
process at posterolateral corner and five to six sensilla on mesal surface; aedeagus
broad, apically bifurcated *alboguttata* (Wahlberg)
- Hind tibia ventrally with five to six long setae; paramere with two narrow processes
at posterolateral corner and about two sensilla near base of posterior process; aedeagus
narrow, deeply bifurcated *delta* Takada, Beppu and Toda
- 31 Ventral setae on hind tibia about 1.5 times as long as tibial width 32
- Ventral setae on hind tibia shorter than tibial width 34
- 32 Epandrium entirely separated mid-dorsally *dispina* Okada
- Epandrium deeply constricted mid-dorsally, but not separated 33
- 33 Epandrium pointed on ventral margin; gonopod with diamond lobe posteriorly and
vertical lobe bearing four cusps *eos* Sidorenko
- Epandrium not pointed on ventral margin; vertical lobe of gonopod somewhat trian-
gular, elongated apically *sigma* Okada
- 34 Fourth sternite large, black; epandrium deeply constricted mid-dorsally, but not
separated; surstylus with 10–11 prensisetae on distal margin and finger-like process
at posteroventral corner *subtusradiata* Duda
- Fourth sternite neither so large nor black; epandrium separated mid-dorsally; surstylus
with four to seven prensisetae but no finger-like process 35
- 35 Median process on vertical lobe of gonopod oriented dorsad or anterior 36
- Median process on vertical lobe of gonopod oriented ventrad 37
- 36 Vertical lobe of gonopod apicomediaally with dorsad oriented, strongly sclerotized
process *cuii* sp. nov.
- Vertical lobe of gonopod with four posterior oriented, sclerotized, acute processes
and one anterior oriented, median one *spinata* sp. nov.
- 37 Vertical lobe of gonopod apically with three small processes *todayi* Sidorenko
- Vertical lobe of gonopod apically protruded and pointed 38
- 38 Surstylus with large, densely pubescent flap on outer mesal surface *watabei* sp. nov.
- Surstylus without large, densely pubescent flap on outer mesal surface 39
- 39 Surstylus with six to seven prensisetae *lanceolata* Okada
- Surstylus with four to five prensisetae 40

- 40 Vertical lobe of gonopod basolaterally without any processes; paramere with flap-like expansion between apical and lateral processes; aedeagus about one-third as long as paramere *nuerhachii* sp. nov.
 Vertical lobe of gonopod basolaterally with a pair of strongly sclerotized, apically pointed processes; paramere without flap-like expansion between apical and lateral processes; aedeagus longer than one-half of paramere *forficula* Takada, Beppu and Toda
- 41 Body brownish yellow, large-sized (more than 4.0 mm in body length); prenisetae on surstylus long, apically pointed (*rufescens* species-group) 42
 – Body brownish black, small-sized (less than 4.0 mm in body length); prenisetae on surstylus short, or apically blunt 44
- 42 Paramere lobe-like, not black; vertical lobe of gonopod short *magniflava* sp. nov.
 – Paramere slender, rod-like, black, heavily sclerotized; vertical lobe of gonopod as long as paramere 43
- 43 Surstylus with 10–11 prenisetae; paramere pubescent medially to distally; vertical lobe of gonopod not expanded distally *rufescens* (Oldenberg)
 – Surstylus with 14–15 prenisetae; paramere only faintly pubescent on subdistal inner margin; vertical lobe of gonopod expanded distally *stylopyga* Wakahama and Okada
- 44 Fifth sternite triangularly notched on posterior margin, with dense, long setae 45
 – Fifth sternite quadrate, not notched posteromedially, without dense, long setae 47
- 45 Fore fifth tarsomere black; epandrium mid-dorsally constricted more than one-half of width; surstylus narrow, long, with four to five long prenisetae and about three long spine-like setae on distal margin; lower margin of cercus protruded, with tuft of four to five setae *collini* Beuk and Máca
 – Fore fifth tarsomere yellow; epandrium not constricted mid-dorsally; surstylus not elongated, with 6–12 short prenisetae; cercus not protruded below 46
- 46 Surstylus with 11–12 prenisetae; mid tibia medioventrally with five to seven slightly long, erect setae *furcata* Okada
 – Surstylus with six to seven prenisetae; mid tibia ventrally without erect, long setae *subfurcata* Okada
- 47 Epandrium entirely separated mid-dorsally 48
 – Epandrium not separated mid-dorsally 49
- 48 Proximal ventral branches of arista as long as dorsals; gonopod with two rod-shaped processes; anterior one stretching to bases of parameres, apically with two small, fork-like processes, and posterior one apically bifurcated; aedeagal outer membrane with a pair of belts clothed with numerous sclerotized serrations *orchidea* Okada
 – Proximal ventral branches of arista about two-thirds as long as dorsals; gonopods heavily sclerotized, medially separated, each anteriorly with vertical lobe bearing large serrations apically and laterally; aedeagal outer membrane not developed *dentata* Okada
- 49 Epandrium not constricted mid-dorsally 50
 – Epandrium deeply constricted mid-dorsally 51
- 50 Prenisetae on surstylus long, apically blunt; paramere longer than one-half of aedeagal apodeme, heavily sclerotized, lacking sensilla, serrated on apico- and submedioventral margins, basally with slender membranous process *promissa* Okada
 – Prenisetae on surstylus small, apically pointed; paramere shorter than one-third of aedeagal apodeme, distally less sclerotized and densely pubescent, with one long and six to seven minute sensilla but no serrations or membranous process *balaenodentata* Takada, Beppu and Toda
- 51 Aedeagus deeply bifurcated, somewhat U-shaped in lateral view, situated basolaterally and fused to paramere *filipes* Máca
 Aedeagus lost or indistinguishably fused to parameres 52

- 52 Vertical lobe of gonopod apically narrowly elongated and bifurcated; parameres separated from each other *acuta* Okada
 – Gonopods medially separated, heavily sclerotized, each anteriorly forming sword-like, vertical process; parameres fused basally, slightly asymmetric: left one shorter than right one *kamui* sp. nov.

Appendix

Data matrix for 56 studied species and 31 morphological characters

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
<i>Ap. (Parap.) foliolata</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	
<i>A. (Ph.) variegata</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>A. (Aps.) lini</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>A. (A.) apodemata</i>	1	1	1	1	0	1	1	2	0	0	0	0	0	0	0	1	1	0	2	1	2	0	2	0	0	1	0	1	0	1	0	0	
<i>A. (A.) parvipyga</i>	1	1	1	1	0	1	1	2	0	0	0	0	0	0	0	1	1	0	2	1	2	0	2	0	0	1	0	1	1	0	0		
<i>A. (A.) yangonensis</i>	1	1	1	1	0	1	1	2	0	0	0	0	0	0	0	1	1	0	2	1	2	0	2	0	0	1	0	1	1	0	0		
<i>A. (A.) planata</i>	1	1	1	1	0	1	1	2	0	0	0	0	0	0	0	1	1	0	2	1	2	0	2	0	0	1	0	1	1	0	0		
<i>A. (A.) hernowoi</i>	0	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	0	0	1	0	1	0	2	0	0	1	1	2	4	0	1	1	
<i>A. (A.) pontianakensis</i>	0	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	2	0	2	1	1	2	4	0	1	1
<i>A. (A.) ratnae</i>	0	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	0	0	1	0	1	0	2	0	0	1	1	2	4	0	1	1	
<i>A. (A.) sinuata</i>	0	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	0	0	1	0	1	0	2	0	0	1	1	2	4	0	1	1	
<i>A. (A.) jayaensis</i>	0	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	0	0	1	0	1	0	2	0	3	1	0	2	4	0	1	1	
<i>A. (A.) pengi</i>	0	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	2	0	3	1	0	2	4	0	1	1
<i>A. (A.) nagatai</i>	0	1	1	1	0	1	1	2	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	1	2	0	1	2	0	0	
<i>A. (A.) okinawana</i>	0	1	1	1	0	1	1	2	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	1	2	0	1	2	0	0	
<i>A. (A.) kimurai</i>	0	1	1	1	0	1	1	2	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	1	2	0	1	2	0	0	
<i>A. (A.) basdeni</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	1	0	1	0	1	2	1
<i>A. (A.) clavata</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	1	0	1	0	1	2	1
<i>A. (A.) curvistyla</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	1	0	1	0	1	2	1
<i>A. (A.) elongata</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	1	1	0	1	0	1	2	1
<i>A. (A.) flagellata</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	1	1	0	1	0	1	2	1
<i>A. (A.) palpifera</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	1	0	1	0	1	2	1
<i>A. (A.) aristata</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	1	0	1	0	1	2	1
<i>A. (A.) macai</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	1	0	1	0	1	2	1
<i>A. (A.) acuta</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	?	1	2	0	0	?	0	0	4	0	1	2	0	0	
<i>A. (A.) collini</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	2	0	0	0	0	0	4	0	1	2	0	0	
<i>A. (A.) fuscata</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	2	0	0	0	0	0	4	0	1	2	0	0	
<i>A. (A.) subfuscata</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	2	0	0	0	0	0	4	0	1	2	0	0	
<i>A. (A.) kamui</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	4	0	1	2	2	0	
<i>A. (A.) aquilotaurusata</i>	0	1	1	1	0	1	1	0	2	2	0	1	0	1	0	0	0	1	2	2	0	0	0	0	0	3	0	1	2	0	0	0	
<i>A. (A.) taurusata</i>	0	1	1	1	0	1	1	0	2	2	0	1	0	1	0	0	0	1	2	2	0	0	0	0	0	3	0	1	2	0	0	0	
<i>A. (A.) sacculipes</i>	0	1	1	1	0	1	1	0	2	2	0	1	0	1	0	0	0	1	2	2	0	0	0	0	0	4	0	1	2	0	0	0	
<i>A. (A.) albilabris</i>	0	1	1	1	0	1	1	0	0	1	1	1	0	1	0	0	0	0	1	2	2	0	1	0	0	1	0	1	0	1	2	0	
<i>A. (A.) falcilis</i>	0	1	1	1	0	1	1	0	0	1	1	1	0	1	0	0	0	0	1	2	2	0	1	0	0	0	3	0	1	2	0	0	
<i>A. (A.) alboguttata</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	2	0	0	0	0	1	2	2	0	1	0	0	0	3	0	1	2	0	0	
<i>A. (A.) delta</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	2	0	0	0	0	1	2	2	0	1	0	0	0	3	0	1	2	0	0	
<i>A. (A.) trifurcata</i>	0	1	1	1	0	1	1	0	0	0	0	1	0	2	0	0	0	0	1	0	2	0	1	0	0	0	3	0	1	2	0	0	
<i>A. (A.) dispina</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	2	2	0	1	0	0	0	4	0	1	2	0	0	
<i>A. (A.) eos</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	1	2	0	1	0	0	0	4	0	1	2	0	0	
<i>A. (A.) sigma</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	1	2	0	1	0	0	0	4	0	1	2	0	0	
<i>A. (A.) forficula</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	2	2	0	1	0	0	0	2	0	1	2	0	0	
<i>A. (A.) lonccolata</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	2	2	0	1	0	0	0	2	0	1	2	0	0	
<i>A. (A.) todai</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	2	2	0	1	0	0	0	2	0	1	2	0	0	
<i>A. (A.) cuii</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	2	2	0	1	0	0	0	2	0	1	2	0	0	
<i>A. (A.) mucrhachii</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	2	2	0	1	0	0	0	2	0	1	2	0	0	
<i>A. (A.) watabei</i>	0	1	1	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	1	2	2	0	1	0	0	0	2	0	1	2	0	0	
<i>A. (A.) subtusradiata</i>	0	1	1	1	0	1	1	0	0	0	0	1	0	1	0	0	0	0	1	1	2	0	0	0	0	0	4	0	1	2	0	0	
<i>A. (A.) orchidea</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	4	0	1	2	0	0	
<i>A. (A.) dentata</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	0	3	0	1	2	0	0	
<i>A. (A.) rufescens</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	0	3	0	1	2	0	0	
<i>A. (A.) stylopyga</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	0	3	0	1	2	0	0	
<i>A. (A.) magniflava</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	0	3	0	1	2	0	0	
<i>A. (A.) balaenodentata</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3	0	1	2	0	0	
<i>A. (A.) promissa</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	2	0	0	0	
<i>A. (A.) filipes</i>	0	1	1	1	0	1	1	0	0	0	0	0	0	?	?	?	?	?	?	2	0	0	?	0	0	3	0	1	2	0	0	0	
<i>A. (A.) spinata</i>	0	1	1	1	0	1	1	0																									

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