

Amiota (Phortica) magna Species-complex, with
Descriptions of Three New Species from
China (Diptera, Drosophilidae)

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Abstract Precise morphological examination of specimens which have so far been recorded as *Amiota (Phortica) magna* OKADA, 1960 from allopatric populations in the Oriental Region revealed that they actually comprise a complex of four morphocryptic species: viz., *A. (Ph.) magna* from Japan, *A. (Ph.) foliata* sp. nov. from Guangdong and Hainan Is., *A. (Ph.) antillaria* sp. nov. from Taiwan, and *A. (Ph.) bicornuta* sp. nov. from Yunnan. A new species-complex, the *magna* complex, was established by these four species in the subgenus *Phortica* SCHINER.

Key words: *Amiota*; *Phortica*; *magna* species-complex; new species; China.

Phortica SCHINER, 1862 was originally established as a separate genus, but it is now placed as a subgenus in the genus *Amiota* LOEW by most authors (GRIMALDI, 1990; etc.). Up to the present, a total of 58 species and 1 subspecies have been reported from the world: 11 spp. from the Palearctic Region, 7 spp. from the Afrotropical Region, 2 spp. from Australia, 1 sp. each from the Neotropical and Nearctic Regions, and the rest 39 spp. and 1 ssp. from the Oriental Region. Two species-complexes have been recognized among them: the *variegata* complex by MÁCA (1977) and the *foliiseta* complex by TSACAS and OKADA (1983), although the diagnostic characters for the former are somewhat obscure (cf. TODA & PENG, 1990).

OKADA (1960) originally described *Amiota (Phortica) magna*, based on the type specimens collected from Tokyo, and reported that this species is distributed from Kanto, central part of Honshu, to Kyushu in Japan. Since then, this species had been regarded as endemic to Japan until PENG *et al.*

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(1990) reported this species from Guangdong, southern China. MACA and LIN (1993) also reported this species from Taiwan and Yunnan of China. In this study, we re-examined precisely specimens collected from these localities outside of Japan, comparing with specimens from Tokyo. In consequence, we found distinct differences in the morphology among them, especially of the male terminalia, and recognized three valid species from Taiwan, southern China (Guangdong and Hainan Is.), and southwestern China (Yunnan). Here, we establish a new species-complex, the *magna* complex, by four closely related species including three new species from China.

Amiota (Phortica) magna species-complex

Diagnosis. Surstylus with a single, very stout spine (Figs. 1, 4, 9, 14); sclerite between 10th sternite proper and cerci large, triangular, not pubescent (Figs. 2, 5, 10, 15); paramere foliate; aedeagus basolaterally with 1 pair of seemingly looped processes (Figs. 3, 6, 11, 16).

This species-complex consists of *A. magna* and the three new species which are described in this paper. *Amiota (Phortica) gigas* OKADA, 1977 and *Amiota (Phortica) pseudogigas* ZHANG & GAN, 1986 are somewhat related to this species-complex in having caudal black bands medially not protruding on abdominal tergites and surstylus bearing very stout spines. They, however, have several stout spines but not a single one on the surstylus and lack the conspicuous looped processes laterally at the base of aedeagus. The looped basolateral processes of aedeagus seem to be homologous to the aedeagal basal processes in many other *Phortica* species.

Many characters commonly seen in the four species of this species-complex are first described below.

Body: Eye brownish red, bare. Ocellar triangle, vertex, and occiput black; ocellars developed. Frontal vitta dark brown, medially with a few interfrontal setulae. Fronto-orbital plate black above, narrowly silvery white along eye margin. Face grayish yellow, lateroventrally white; carina grayish brown, broad, low. Clypeus medially white, laterally black. Gena grayish yellow to brown; postgena dark brown, narrowly white along eye margin. Pedicel grayish brown; 1st flagellomere grayish orange yellow; arista with neither lower branches nor terminal fork. Palpus somewhat triangular, yellow, with 1 prominent subapical and 2–3 lateral setae. Thorax yellowish brown, with brownish black patches and pollinose pattern. Postpronotal lobe pale yellow, with only 1 long seta. Prescutellar setae present. Acrostichal setulae in 10 irregular rows. Scutellum^m brown laterobasally yellowish; basal scutellar setae divergent, apicals crossed. Wings hyaline. Veins grayish yellow; r-m and dm-cu crossveins clouded. Basal medial-cubital crossvein present. R₂₊₃ slightly

curved to costa at tip; R_{4+5} and M_1 distally slightly convergent. C_1 setae less differentiated. Halter white. Legs yellow; femora brown, apically white; tibiae with 3 dark gray rings. Fore femur with especially long setae in 2–3 rows on posterior surface; mid and hind femora without such long setae. Dorsal preapical setae small, but present on all tibiae; apicals on fore and mid tibiae. Mid tarsus with 2 rows of cuneiform setulae on inner and outer sides; hind tarsus with 1 row of cuneiform setulae on outer side and 1 row of recurved setulae on underside. Fore and hind 1st tarsomeres each as long as 3 succeeding tarsomeres together; mid 1st tarsomere as long as the rest together. Abdominal tergites orange yellow; 1st and 2nd brownish black sublaterally and on lateral margins; 3rd and 4th each with broad, caudal black band laterally protruded and 1 pair of yellow patches on lateral margins; 5th with very broad, black band; 6th nearly entirely black except for median line. Sternites grayish yellow.

♂ terminalia: Epandrium pubescent caudomedially to dorsally, but bare anteroventrally, with about 11 setae on caudomedial to dorsal part; anteroventral corner protruded. Surstylus densely setigerous on distal inner surface but without wedge-like prensisetae. Tenth sternite composed of 1 pair of lateral lobes connecting surstyli with each other and large, quadrate median piece, separated from large, triangular, bare sclerite between 10th sternite and cerci. Cercus semicircular, separated from epandrium, densely setigerous and entirely pubescent. Membrane between epandrium and cercus entirely pubescent. Hypandrium narrow, arched, roundly curved in anterior portion, caudally with 1 pair of pubescent flaps; caudal ends contiguous to caudolateral corners of gonopod and anteroventral corners of epandrium. Gonopods fused, forming large posteromedian lobe caudally articulated with 10th sternite, medially narrow, anteriorly much dilated. Paramere with about 4 sensilla apically and 1 mediolaterally each on peg-like tooth except for 1 apical. Aedeagus composed of outer membranous tube and more or less sclerotized median rod; outer membrane posteriorly connected to anterior expansion of gonopod; median rod strongly sclerotized in basal half, submedially more or less sinuated, basally connected to basal corners of gonopod by 1 pair of small bridges and contiguous to elongated process from apodeme.

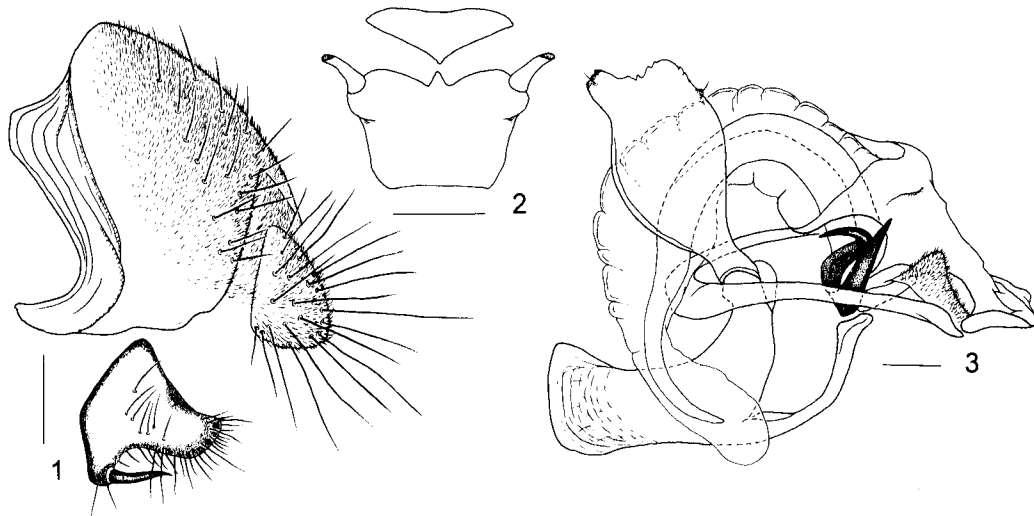
Amiota (Phortica) magna OKADA

(Figs. 1–3)

Amiota (Phortica) magna OKADA, 1960, *Mushi*, 34: 99.

Diagnosis. Gonopod without any sclerotized projections (Fig. 3); surstylus somewhat triangular (Fig. 1).

Measurements (♂): BL (body length) = 3.54–3.62 mm; ThL (thorax length) = 1.82–1.87 mm; WL (wing length) = 3.38–3.40 mm; WW (wing width)



Figs. 1–3. *Amiota (Phortica) magna* OKADA (♂ from Hachioji, Tokyo, Japan). 1, epandrium, surstylus, and cercus; 2, 10th sternite and sclerite between 10th sternite proper and cerci; 3, hypandrium, paramere, gonopod, and aedeagus. (Scale-line=0.1 mm)

= 1.38–1.40 mm.

Indices: arb (dorsal branches of arista/ventral branches of arista) = 4–5/0, FW/HW (frontal width/head width) = 0.41–0.45, ch/o (maximum width of gena/maximum diameter of eye) = 0.09–0.11, prorb (proclinate orbital/posterior reclinate orbital) = 1.14–1.16, rcorb (anterior reclinate orbital/posterior reclinate orbital) = 0.42–0.43, vb (subvibrissal/vibrissa) = 0.30–0.32, dcl (anterior dorsocentral/posterior dorsocentral) = 0.55–0.56, presctl (prescutellar/posterior dorsocentral) = 0.65–0.67, sctl (basal scutellar/apical scutellar) = 1.01–1.04, sterno (anterior katepisternal/posterior katepisternal) = 0.97, orbito (distance between proclinate and posterior reclinate orbitals/distance between inner vertical and posterior reclinate orbital) = 1.32–1.35, dcp (length distance between ipsilateral dorsocentrals/cross distance between anterior dorsocentrals) = 0.32–0.35, sctlp (distance between ipsilateral scutellars/cross distance between apical scutellars) = 0.97–0.98, C = 2.18–2.19, 4c = 1.49–1.50, 4v = 2.81–2.82, 5x = 0.91–0.96, ac = 3.36–3.37, M = 0.67–0.69, C3F = 0.74–0.75.

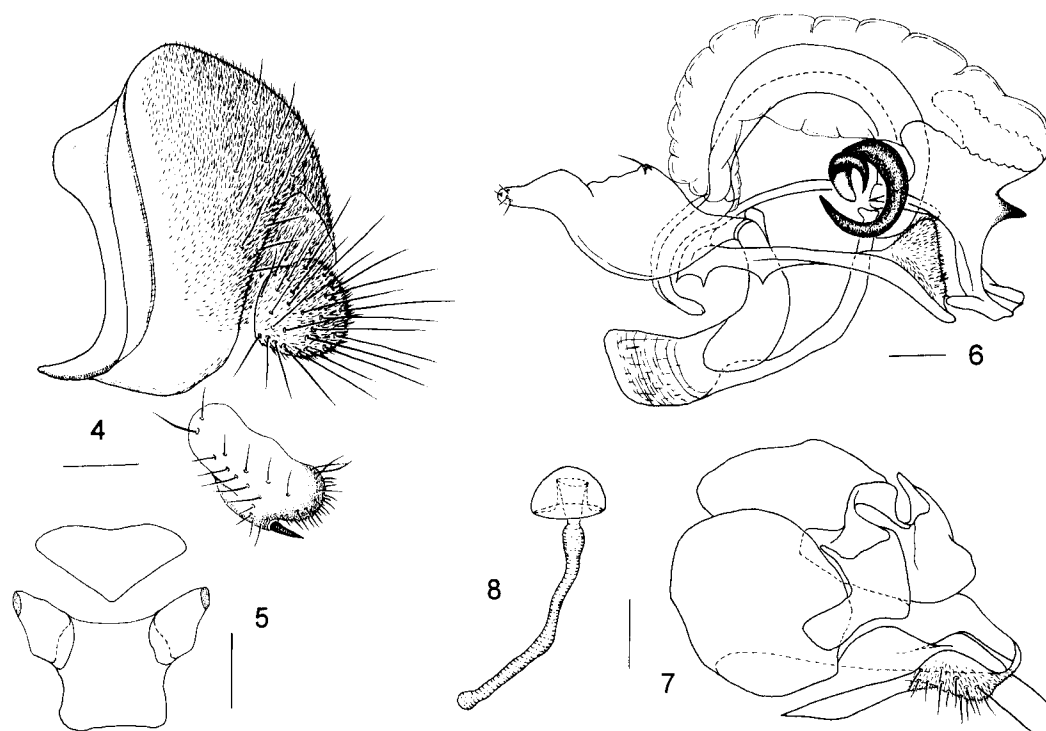
Specimens examined. Japan: 2♂, Hachioji, Tokyo, 13. III. 1994, coll. T. AOTSUKA (deposited in TODA's collection).

Distribution. Japan (Kanto, Chubu, Kinki, Chugoku, Kyushu).

Amiota (Phortica) foliata sp. nov.

(Figs. 4–8)

Diagnosis. Gonopod with a single, well sclerotized, cornute projection



Figs. 4–8. *Amiota (Phortica) foliata* sp. nov. (♂ and ♀ paratypes from Dinghushan, Guangdong, China). 4, epandrium, surstylus, and cercus; 5, 10th sternite and sclerite between 10th sternite proper and cerci; 6, hypandrium, paramere, gonopod, and aedeagus; 7, ♀ terminalia; 8, spermatheca. (Scale-line=0.1 mm)

medioventrally and 1 pair of quadrate flaps somewhat irregular on margin anteroventrally (Fig. 6); surstylus somewhat oblong, with a relatively short, stout spine (Fig. 4).

♂ terminalia (Figs. 4–6): Gonopod prominently protruded at anterodorsal corners. Bridges connecting between basal part of aedeagus and basal corners of gonopod somewhat triangular.

♀ terminalia (Figs. 7, 8): Oviscapt (8th sternite) distally not bilobed. Pregenital lamella and perineal sclerites very large; the former strongly sclerotized; the latter medially fused to each other, smooth on mesal surface (the terminology of these organs after MÅCA, 1977). Spermatheca small; capsule relatively shallow, dome-shaped; duct introverted into capsule.

Measurements: BL=4.37 mm in the holotype (range in 8♂ and 5♀ paratypes: 3.75–4.40 in ♂, 3.78–4.43 in ♀; ThL=1.96 mm (1.82–2.20 in ♂, 1.93–2.10 in ♀); WL=3.56 mm (2.88–3.63 in ♂, 3.38–3.75 in ♀); WW=1.50 mm (1.43–1.53 in ♂, 1.50–1.56 in ♀).

Indices: arb=4 (4–5)/0 (0), FW/HW=0.42 (0.41–0.45), ch/o=0.14 (0.13–0.15), prorb=1.08 (1.00–1.14), rcorb=0.33 (0.32–0.37), vb=0.38 (0.30–0.38), dcl=0.55 (0.56–0.60), presctl=0.81 (0.80–0.85), sctl=1.10

(1.04–1.10), sterno=0.97 (0.88–0.97), orbito=1.25 (1.26–1.32), dcp=0.27 (0.28–0.35), sctlp=1.25 (1.15–1.27), C=2.15 (1.95–2.21), 4c=1.49 (1.50–1.62), 4v=2.71 (2.89–3.06), 5x=1.05 (0.86–1.02), ac=3.25 (3.67–3.86), M=0.63 (0.59–0.81), C3F=0.71 (0.69–0.74).

Holotype ♂, China: Wuzhishan, Hainan Province, 19–21.V. 1993, coll. Y. S. CUI (DBSC: Department of Biology, Shenyang Teachers' College, Shenyang, China).

Paratypes: China: 4 ♂, same data as the holotype (DBSC); 4 ♂, 26.IV–4.VI. 1988, 5 ♀, 27.III–8.V. 1988, Dinghushan, Guangdong Province, coll. T. X. PENG (GIE: Guangdong Institute of Entomology, Guangzhou, China, and EHU: Entomological Institute, Hokkaido University, Sapporo, Japan).

Distribution. China (Guangdong, Hainan).

Relationship. This species is clearly distinguishable from *A. magna* by the shape of aedeagal basolateral process in addition to the diagnostic characters.

Etymology. Referring to the foliate paramere.

Amiota (Phortica) antillaria sp. nov.

(Figs. 9–13)

Diagnosis. Aedeagal outer membrane distally with numerous spinules; inner branch of aedeagal basolateral process short; gonopod anteroventrally much dilated and with another cornute projection in addition to medioventral one (Fig. 9).

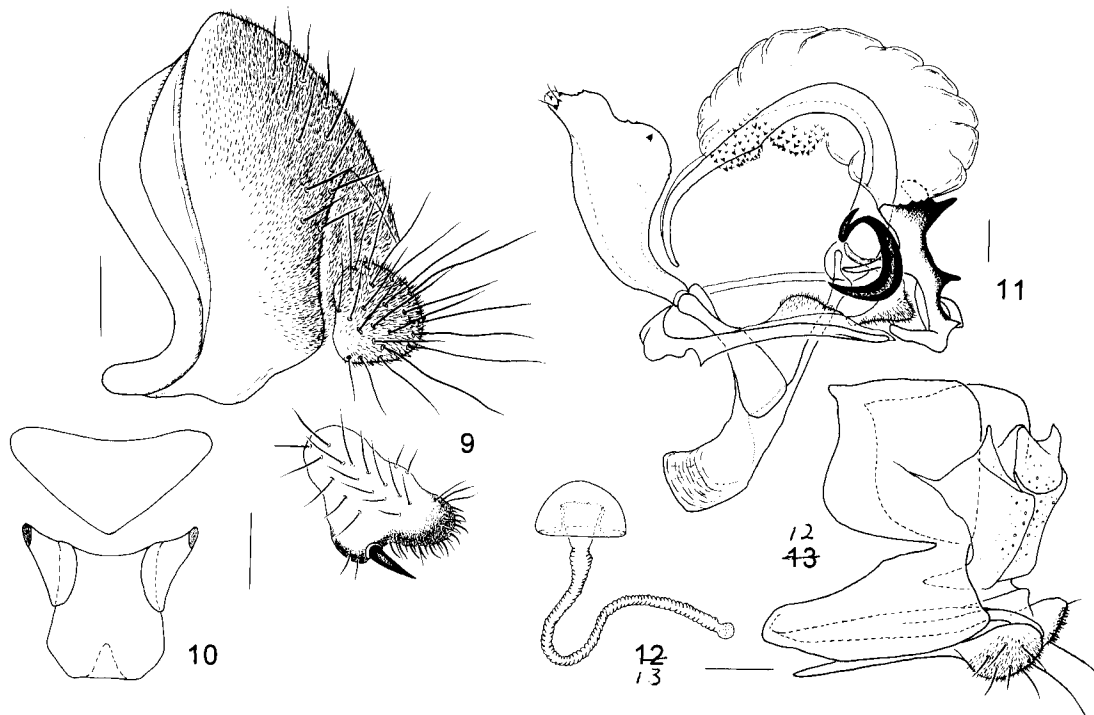
Some characters commonly seen in *A. foliata* sp. nov. are not referred to in the following description.

♀ Terminalia (Figs. 12, 13): Oviscapt (8th sternite) distally partly bilobed. Pregenital lamella less sclerotized; perineal sclerites with minute warts on mesal surface.

Measurements: BL=4.30 mm in the holotype (range in 10 ♂ and 2 ♀ paratypes: 3.80–4.47 in ♂, 4.28–4.30 in ♀), ThL=2.10 mm (1.89–2.33 in ♂, 2.10–2.25 in ♀), WL=3.56 mm (3.25–3.70 in ♂, 3.74–3.86 in ♀); WW=1.46 mm (1.44–1.68 in ♂, 1.64–1.68 in ♀).

Indices: arb=5 (5)/0 (0), FW/HW=0.35 (0.31–0.38), ch/o=0.12 (0.11–0.13), prorb=1.18 (1.10–1.16), rcorb=0.43 (0.38–0.42), vb=0.33 (0.30–0.34), dcl=0.55 (0.46–0.57), presctl=0.71 (0.68–0.75), sctl=0.98 (0.94–1.04), sterno=0.87 (0.88–0.97), orbito=1.15 (1.16–1.22), dcp=0.25 (0.25–0.28), sctlp=1.25 (1.15–1.27), C=3.29 (2.27–3.15), 4c=1.42 (1.38–1.42), 4v=3.06 (2.89–3.06), 5x=0.96 (0.86–1.02), ac=2.83 (2.67–2.86), M=0.63 (0.58–0.70), C3F=0.73 (0.69–0.74).

Holotype ♂, China: Shanlinxi, Taiwan, 16. X. 1992, coll. M. J. TODA (EHU).



Figs. 9–13. *Amiota (Phortica) antillaria* sp. nov. (♂ holotype and ♀ paratype from Shanlinxi, Taiwan, China). 9, epandrium, surstylus, and cercus; 10, 10th sternite and sclerite between 10th sternite proper and cerci; 11, hyandrium, paramere, gonopod, and aedeagus; 12, ♀ terminalia; 13, spermatheca. (Scale-line=0.1 mm)

Paratypes: Taiwan: 10♂, 2♀, same data as the holotype; 10♂, Fushan, 19. IV. 1997; 4♂, Chitou, 21, 22. IV. 1997, coll. M. J. TODA (EHU, DBSC, and IZT: Institute of Zoology, Academia Sinica, Taipei, Taiwan).

Distribution. China (Taiwan).

Relationship. This species resembles *A. foliata* sp. nov. in the shape of aedeagal basolateral process and anteriorly dilated gonopod, but can be clearly distinguished from it by the diagnostic characters.

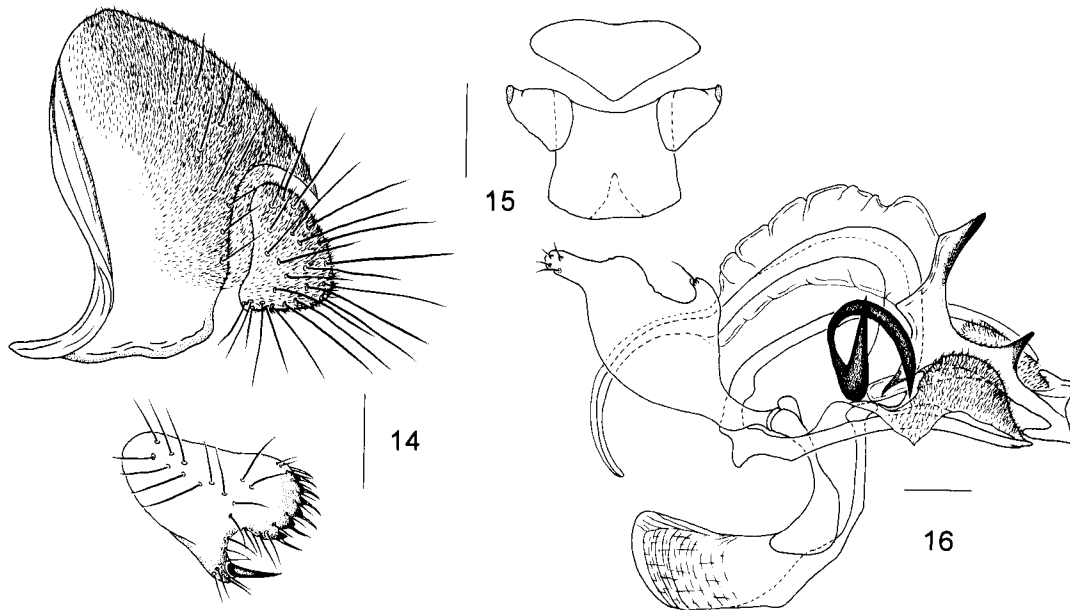
Etymology. Referring to the looped horn-like basolateral process of aedeagus.

Amiota (Phortica) bicornuta sp. nov.

(Figs. 14–16)

Diagnosis. Paramere somewhat concaved on distal margin between apical and mediolateral sensilla (Fig. 16); surstylus with small verrucae on distal margin (Fig. 14); gonopod with 2 cornute projections; aedeagal outer membrane bare (Fig. 16).

Some characters commonly seen in *A. foliata* sp. nov. are not referred to in



Figs. 14–16. *Amiota (Phortica) bicornuta* sp. nov. (♂ holotype from Kunming, Yunnan, China). 14, epandrium, surstylus, and cercus; 15, 10th sternite and sclerite between 10th sternite proper and cerci; 16, hypandrium, paramere, gonopod, and aedeagus. (Scale-line = 0.1mm)

the following description.

Measurements (♂): BL = 4.37 mm, ThL = 2.05 mm, WL = 3.44 mm, WW = 1.56 mm.

Indices: arb = 5/0, FW/HW = 0.45, ch/o = 0.14, pror = 1.02, rcorb = 0.43, vb = 0.28, dcl = 0.55, presct1 = 0.61, sct1 = 0.98, sterno = 0.97, orbito = 1.45, dcp = 0.35, sctlp = 1.05, C = 2.07, 4c = 1.58, 4v = 2.71, 5x = 0.92, ac = 3.17, M = 0.58, C3F = 0.70.

Holotype ♂, China: Kunming, Yunnan Province, 13. II. 1988, coll. W. X. ZHANG (DBSC).

Distribution. China (Yunnan).

Relationship. This species resembles *A. antillaria* sp. nov. in having 2 cornute projections on the gonopod, but can be clearly distinguished from it and other members of this species-complex by the diagnostic characters.

Etymology. Referring to the gonopod with 2 cornute projections.

Acknowledgements

We wish to thank Dr. T. X. PENG of Guangdong Institute of Entomology, Dr. W. X. ZHANG of Peking University, and Dr. Y. S. CUI of Shenyang Teachers' College, China; who collected the valuable specimens and provided us with them; and also Prof. H. WATABE and Dr. T. YASUNAGA of Hokkaido

University of Education, who allowed us to examine some specimens for comparison and helped us in this study. This work was supported partly by Key Youth Science Research Foundation of Liaoning Province Education Committee and by Cooperative Project in the Institute of Low Temperature Science, Hokkaido University.

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(Received June 3, 1997; Accepted August 14, 1997)