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**SYSTEMATIC REVISION OF THE JAPANESE SPECIES OF THE SUBFAMILY
AMPHIGERONTIINAE (PSOCODEA: 'PSOCOPTERA': PSOCIDAE)**

By KAZUNORI YOSHIKAWA

Abstract

YOSHIKAWA, K., 2010. Systematic revision of the Japanese species of the subfamily Amphigerontiinae (Psocodea: 'Psocoptera': Psocidae). *Ins. matsum. n. s.* 66: 11–36, 17 figs.

Japanese species of the barklouse subfamily Amphigerontiinae (Psocidae) were systematically revised. Seven species belonging to five genera were recognized, including the following new taxa: *Glossoblaste* n. gen., *Glossoblaste amamiensis* n. sp., and *Neopsocopsis sakishimensis* n. sp. The genus *Metagerontia* Li, 2002 was recognized as a new junior synonym of *Anomaloblaste* Endang, Thornton & New, 2002, and the genus *Pentablaste* Li, 2002 was recognized as a new junior synonym of *Neopsocopsis* Badonnel, 1936. *Anomaloblaste tribulosa* (Li, 2002) n. comb., *Neopsocopsis longiptera* Vishnyakova, 1986, and *Amphigerontia contaminata* (Stephens, 1836) were newly recorded from Japan. The female of *An. tribulosa* was recorded for the first time and its genitalic structures were described. The species previously recorded from Japan as *Blaste obtusa* or *Neoblaste cubitalis* was identified as *Neoblaste papillosus* Thornton, 1960. Male and female terminal structures of all species were illustrated, except for *G. amamiensis* known only from a male. Amphigerontiinae have been subdivided into four tribes, and the tribal system was tentatively confirmed by recent molecular analysis. However, morphology of some Japanese species contradicted the tribal subdivisions and thus the system was not employed in this revision.

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INTRODUCTION

Although numbers of different subfamilial or tribal systems have been proposed for Psocidae, the subfamily Amphigerontiinae of the family has long been recognized as a natural group (reviewed in Yoshizawa & Johnson, 2008). The subfamily is characterized by a prominent autapomorphy: widely and strongly sclerotized 8th sternum in male (e.g., Badonnel, 1943; Roesler, 1943; Lienhard, 1998; Mockford, 1993). Systematic placement of an enigmatic genus *Kaindipsocus* Smithers & Thornton, 1981 (type genus of the tribe Kaindipsocini which is recently assigned to this subfamily: Lienhard & Smithers, 2002) is still debatable, but monophyly of Amphigerontiinae excluding *Kaindipsocus* is well supported morphologically and molecularly (Lienhard 2008; Yoshizawa & Johnson, 2008).

In contrast, as pointed out in my previous paper (Yoshizawa, 2008), the classification and identification system of the Japanese species of Amphigerontiinae have been problematic. Until recently, only two species of the subfamily were known from Japan, *Amphigerontia jezoensis* and *Blaste obtusa* (= *Neoblaste papillosus*: see below) (Tomita & Haga, 1991). These species are distantly related and have been assigned to different tribes Amphigerontiini and Blastini, respectively (Li, 2002; Yoshizawa & Johnson, 2008). In a published key (Tomita & Haga, 1991), these two species were diagnosed based only on the characters subsequently used to diagnose Amphigerontiini and Blastini. As a result, almost all Japanese species of Amphigerontiinae will key out to one of these two species even if the specimens on hand do not identify with either of them. Therefore, the main purpose of this paper is to revise the Japanese species of the subfamily Amphigerontiinae systematically and to provide a more comprehensive key to species.

As mentioned above, the subfamily is now subdivided into four tribes, Kaindipsocini, Stylatopsocini, Amphigerontiini and Blastini. The latter three subfamilies were proposed by Li (2002). Later, Yoshizawa & Johnson (2008) established Kaindipsocini, with *Kaindipsocus* as the type genus which was not studied by Li (2002). Validity of Amphigerontiini and Blastini was accepted tentatively based on molecular analyses (Yoshizawa & Johnson, 2008) but taxa examined in the study were extremely limited (only three of 14 genera of the subfamily: Lienhard & Smithers, 2002). These tribes are characterized only by a couple of forewing venation character states: i.e., veins Rs and M are connected by a cross vein and the proximal and distal margins of the discoidal cell are nearly parallel in Amphigerontiini whereas veins Rs and M are fused and the basal and distal margins of the discoidal cell are not parallel in Blastini. However, the wing venational characters are highly variable sometimes even between closely related species or genera of Psocidae (Bess & Yoshizawa, 2007) and thus the higher taxa should be defined based on more phylogenetically relevant characters, like genitalic morphology (Mockford, 1993). The present study revealed that genitalic morphology of some Japanese species contradict the tribal subdivisions based only on the wing venational character states. Therefore, I concluded that the tribal subdivisions of the subfamily in the present sense are inappropriate, and both Amphigerontiini and Blastini do not represent natural groups. In this study, I do not employ the tribal subdivision of the subfamily, although an official nomenclatural act should be postponed until more samples are analyzed. Possible phylogenetic framework within the subfamily is also proposed based on the morphological observation.



Fig. 1. Habitus of *Anomaloblaste tribulosa*, female.

MATERIALS AND METHODS

Specimens on which descriptions of coloration were based have been preserved in 80% ethanol until here described. For detailed methods of dissection and illustration, see Yoshizawa (2002). Terminology followed Yoshizawa (2002, 2005), but some terms were newly established here for the structures of hypandrium and gonapophyses which were mentioned in figure plates using the following abbreviations: LP–lateral process; PP–paired posterior processes; PL–posteromedian lobe (all hypandrial structures); IL–internal lobe of external valve of gonapophyses. All specimens, including types, are stored in the Hokkaido University Insect Collection, Sapporo unless specified. The collector’s name was omitted for the non-type specimens collected by myself.

SYSTEMATICS

Key to genera and species of Amphigerontiinae in Japan

(Genera and species are keyed out based mainly on easily observable characters, and order of the key does not reflect phylogenetic relationship.)

1. Forewing Rs and M fused for various lengths (Fig. 2A, C–F) 2
 - Forewing Rs and M connected by cross vein (Fig. 2B, G, H) 6
2. First and second sections of CuA1 forming angle (Fig. 2C–F); male paraproctal distal lobe short and broad (Fig. 6A); distal margin of hypandrium ornamented with pair of lateral processes and paired posterior processes (Fig. 6C) 3
 - First and second sections of CuA1 almost straight, forming triangular areola postica (Fig. 2A); male paraproctal distal lobe long (Fig. 3A); distal margin of hypandrium simple, without any process (Fig. 3C) (female unknown) (genus *Glossoblaste*) *G. amamiensis* n. sp.
3. Hypandrium with distinct posteromedian lobe, lateral processes directed posterodorsally (Fig. 10C); egg guide broadened apically, with short setae on lateral margin (Fig. 11A)
 - (genus *Neopsocopsis*) 4
 - Hypandrium without posteromedian lobe, lateral processes directed poterointernally (Fig. 6C); egg guide parallel sided or narrowing apically, without setae on lateral margin (Figs 7A, 8A).....
 - (genus *Neoblaste*) 5

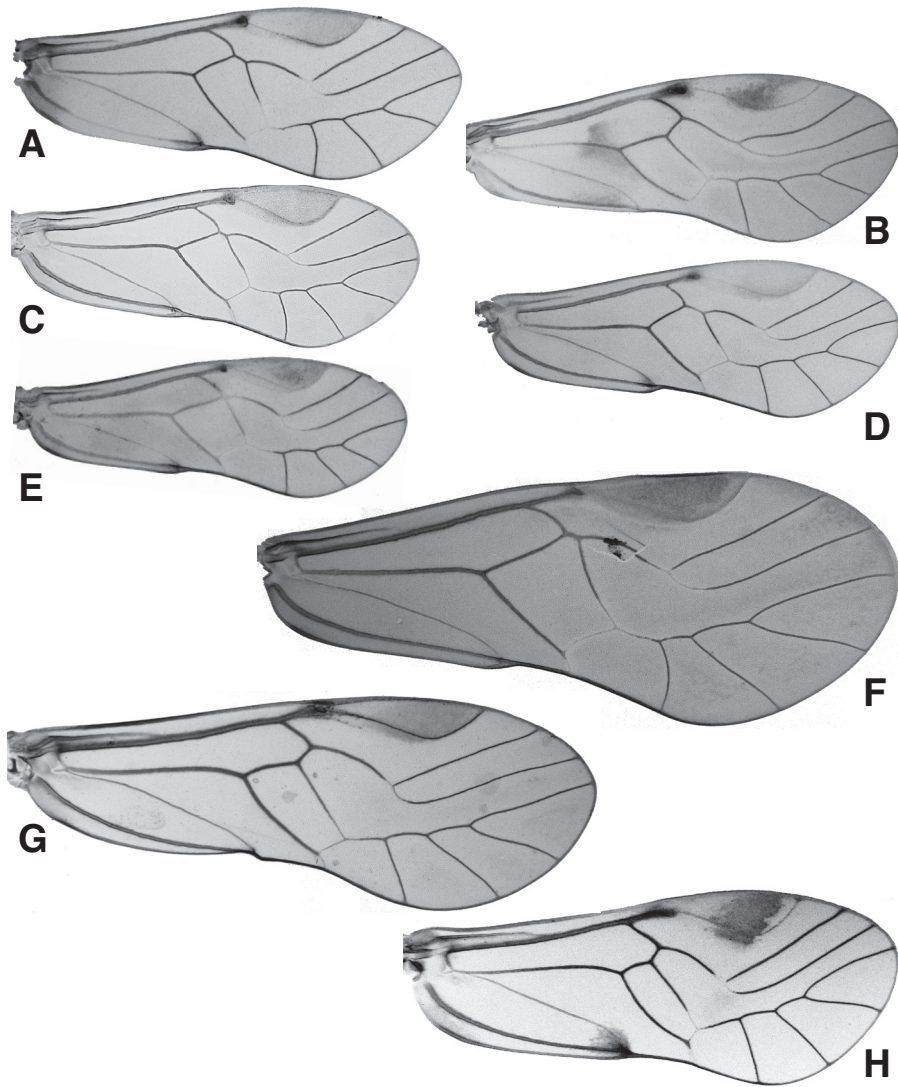


Fig. 2. Male wings of Japanese species of Amphigerontiinae. A. *Glossoblaste amamiensis*. B. *Anomaloblaste tribulosa*. C. *Neoblaste tateokana*. D. *N. papillosus*. E. *Neopsocopsis sakishimensis*. F. *N. longiptera*. G. *Amphigerontia jezoensis*. H. *A. contaminata*.

4. Small in size, forewing length about 2.5–3 mm; male epiproct fully sclerotized (Fig. 10B); hypandrial paired posterior processes well developed, much longer than posteromedian lobe (Fig. 10D); phallosome closed anteriorly (Fig. 10E); egg guide with short neck region; body of subgenital plate broadly membranous anteromedially (Fig. 11A); internal lobe of external valve of gonapophyses narrow, narrowing to internal tip (Fig. 11B) *N. sakishimensis* n. sp.
- Large in size, forewing length about 4.5–5 mm; male epiproct with broad membranous region medially (Fig. 12B); hypandrial paired posterior process small, almost equal length with posteromedian lobe (Fig. 12D); phallosome open anteriorly (Fig. 12E); egg guide with

- relatively long neck region; body of subgenital plate narrowly membranous anteromedially (Fig. 13A); internal lobe of external valve of gonapophyses broad, with nearly parallel anterior and posterior margins (Fig. 13B) *N. longiptera*
5. Posterodorsal margin of male clunium deeply hollowed (Fig. 6B); male epiproct with almost flat dorsal surface, with weak swelling anteromedially (Fig. 6AB); hypanrial lateral processes covered with denticles, weakly expanded laterally, paired posterior processes pointed apically, without process between them (Fig. 6C); phallosome well sclerotized, closed anteriorly (Fig. 6D); egg guide short, about as long as basal width; body of subgenital plate with deep triangular membranous region anteriorly (Fig. 7A) *N. tateokana*
- Posterodorsal margin of male clunium almost straight (Fig. 8B); male epiproct with apparent keel on anterior margin (Fig. 8AB); hypanrial lateral processes smooth except for denticulated dorsal margin, very strongly expanded laterally, paired posterior processes truncated apically, with small conical process between them (Fig. 8CD); phallosome weakly sclerotized, open anteriorly (Fig. 8E); egg guide long, much longer than basal width; body of subgenital plate with shallow but broad membranous region anteriorly (Fig. 9A) *N. papillosus*
6. Posterior region of male epiproct sclerotized, its anterior margin with anterodorsal expansion (Fig. 14AB); posterior margin of hypandrium ornamented with prominent lobes and processes (Fig. 14CD); phallosome V-shaped, opened apically, posteriorly with three lobe-like projections (Fig. 14E); body of subgenital plate with sclerotized band anteromedially (Fig. 15A); internal lobe of external valve of gonapophyses expanded posteriorly; dorsal valve of gonapophyses with distal process (Fig. 15B) (genus *Amphigerontia*) 7
- Posterior 2/3 of male epiproct membranous, its dorsal surface only slightly swelling (Fig. 4AB); posterior margin of hypandrium ornamented with three tiny processes medially (Fig. 4C); phallosome U-shaped, closed apically, posteriorly with long parameres directed laterally and pointed apically (Fig. 4D); body of subgenital plate without sclerotized band anteromedially (Fig. 5A); internal lobe of external valve of gonapophyses without posterior expansion; dorsal valve of gonapophyses without distal process (Fig. 5B) (genus *Anomaloblaste*) *A. tribulosa*
7. Larger in size, forewing length about 4–4.5 mm; forewing uniformly brownish, without distinct markings (Fig. 2G); posterior surface of posteromedian lobe of hypandrium concave; hypanrial lateral processes sharply pointed apically (Fig. 14CD); posterior margin of egg guide rounded (Fig. 15A) *A. jezoensis*
- Smaller in size, forewing length about 3.5–4 mm; forewing transparent, with blackish brown markings at distal half of pterostigma and distal end of cell cup (Fig. 2H); posterior surface of posteromedian lobe of hypandrium convex; hypanrial lateral processes obtuse apically (Fig. 16CD); posterior margin of egg guide pointed (Fig. 17A) *A. contaminata*

Taxonomy of Japanese species

Subfamily Amphigerontiinae

Genus *Glossoblaste* new

Etymology. *Glossa* refers to the tongue-like projections on the posterior margin of the male clunium (Fig. 3B) observed in the type species of the genus.

Type species. *Glossoblaste amamiensis* n. sp.

Remarks. The hypanrial and phallosomal structures of the type species of this genus seem to preserve many plesiomorphic conditions within the Amphigerontiinae (excluding the genus *Kaindipsocus* which is considered to represent the most basal split of the subfamily and is used here to estimate the polarity of character states) as follow: weakly sclerotized 8th sternum; distal lobe of paraproct not shortened (Fig. 3A); distal

margin of hypandrium simple and not ornamented with processes or lobes (Fig. 3C). In contrast, the widely sclerotized 8th sternum partly overlapping the clunium (Fig. 3A) suggests its closer relationships to derived members of Amphigerontiinae. Therefore, *G. amamiensis*, type species of *Glossoblaste*, cannot be assigned to any known genus and its assignment to a new genus can be justified. In contrast, the clunial-epiproct relationship of *G. amamiensis* is highly specialized (Fig. 3B), and the triangular areola postica also represents an apomorphic condition (Fig. 2A). Now the genus consists only on one species so that it is unclear whether such apomorphies are useful to assign other species to the genus or unique to the species.

Glossoblaste amamiensis n. sp.
(Figs 2A & 3)

Description. Male. Head white in ground color; vertical and orbital regions heavily marked with blackish brown markings; coronal suture black; frontal suture broadly bordered with blackish brown band dorsally; frons with pair of broad bands medially; eye black, small, IO/D=2.2; ocelli white, ocellar field black; antennal socket bordered with blackish brown band; postclypeus with eight rows of brown spots; anteclypeus brown; antenna and mouth parts brown.

Thorax. Prothorax brown. Mesonotum mostly blackish brown; posterointernal margin of lateral lobes of scutum margined with pale band. Metanotum brown. Meso- and metapleurites brown except for membranous regions white.

Legs brown; dorsal surface of hind femur and distal end of all tibiae darker.

Forewing (Fig. 2A) hyaline, proximal end of wing and distal end of cell cup brownish; veins blackish brown except for around Rs fork and CuA1–M fusion hyaline; Rs and M fused for short distance; distal margin of discoidal cell straight; first and second sections of CuA1 straight, forming triangular areola postica. Hindwing hyaline; veins blackish brown.

Abdomen white, with irregular blackish brown markings. Terminalia. 8th sternum (Fig. 3AC) widely but weakly sclerotized. Clunium (Fig. 3AB): anteriorodorsal margin shallowly concave, posterolaterally with weak lateral projection, posterodorsally with pair of tongue-like projections reaching to posterior end of epiproct. Epiproct (Fig. 3AB) largely membranous, anteromedially with dorsal projection extending through interval between clunial tongue-like projections, posterior margin with group of short setae medially. Paraproct (Fig. 3AB) with long distal lobe; distal process directed dorsally. Hypandrium (Fig. 3C) simple, without any ornamentations, lateral surface hollowed. Phallosome (Fig. 3D) open anteriorly, phallobase weakly sclerotized, posteriorly with slender and apically pointed parameres directed dorsolaterally.

Length (in mm). B=2.5; FW=3.1; HW=2.2.

Female unknown.

Holotype male (KY413). Wano, Amami-Oshima Is., Ryukyus, Japan, 24. iv. 1996, K. Yoshizawa.

Distribution. Japan (Amami-Oshima Is.).

Remark. According to Smithers (1982), *Lasiopsocus dicellus*, a member of the Amphigerontiinae (Lienhard & Smithers, 2002), possesses a pair of lobe-like structures arising from the clunium-epiproct border. If these lobes arise from the clunium, a pair of posterior projections on the male clunium in *G. amamiensis* may support close

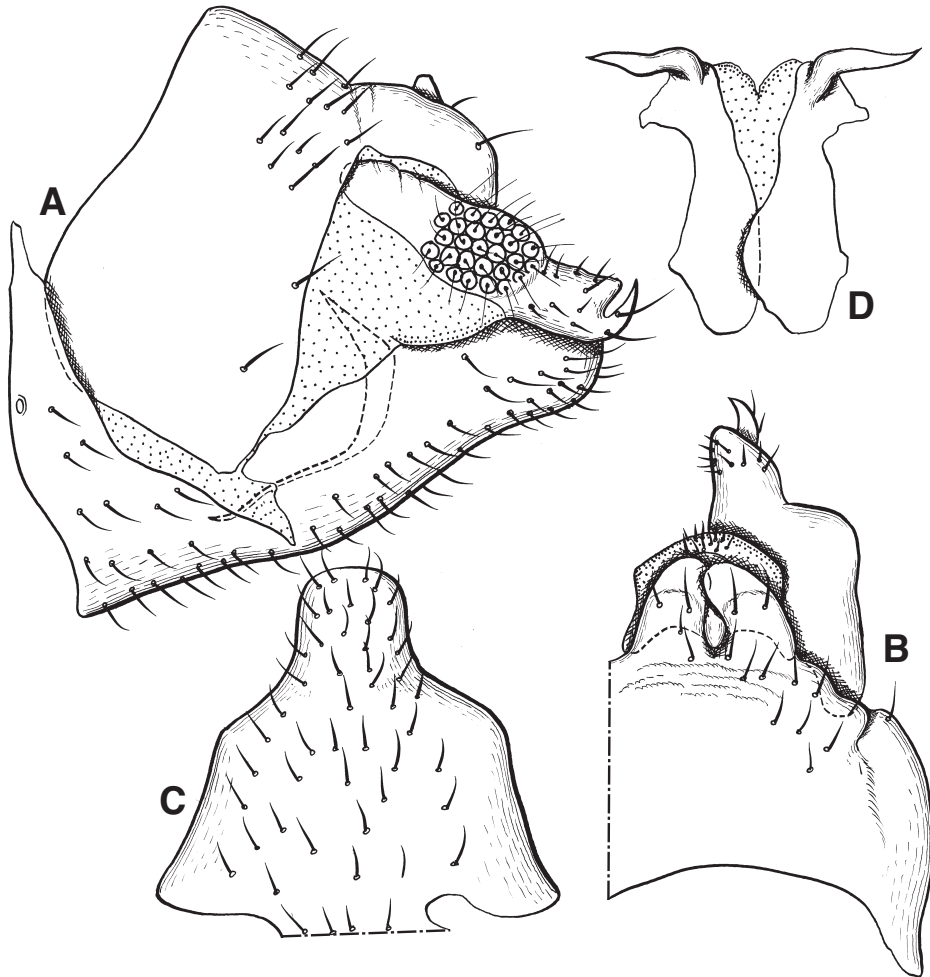


Fig. 3. Male terminalia of *Glossoblaste amamiensis*. A. Terminalia, lateral view. B. Terminalia, dorsal view. C. Hypandrium, ventral view. D. Phallosome, ventral view.

relationship between these two genera. However, my present examination of a male specimen of *L. dicellus* revealed that the paired lobes of this species belong to the epiproct, and the posterior margin of the clunium is simple in this species.

Genus *Anomaloblaste* Endang, Thornton & New

Anomaloblaste Endang, Thornton & New, 2002: 120. Type species: *Anomaloblaste spinivalva* Endang, Thornton & New, 2002.

Metagerontia Li, 2002: 1350. Type species: *Metagerontia tribulosa* Li, 2002. New synonym.

Remarks. *Anomaloblaste* was established based only on females, and *Metagerontia* was established based only on a male. Both genera are characterized by an apomorphic

character: long Rs–M cross vein.

In the present study, I examined a species which can be identified as *M. tribulosa*, type species of *Metagerontia*. The specimens include both males and females. The female genitalic structure of this species (Fig. 5) is very similar to *A. spinivalva*, type species of *Anomaloblaste*, in having the apically pointing and elongated egg guide (probably represents apomorphic conditions). Therefore, I concluded that the genera *Anomaloblaste* and *Metagerontia* should be treated as synonym.

Both genera were established in 2002. The published month of Li (2002) is clearly noted as July 2002. Published month of Endang et al. (2002: *Invertebrate Systematics* Volume 16, Issue 1) is not clearly stated. However, six issues were published for volume 16 of the journal (i.e., an issue per every two months on average) so that the publication date of issue 1 of this journal should not be later than June 2002. Therefore, *Anomaloblaste* has priority, and *Metagerontia* is treated here as a junior synonym of this genus.

Terminal structures of *Anomaloblaste* seem close to other groups of Amphigerontiinae (e.g., strongly sclerotized 8th sternum and hypandrium). Especially, the broad anterior margin of the phallobase (Fig. 4D) is similar to that of *Blaste*, which probably represents the apomorphic condition and thus supports their close phylogenetic relationship.

Anomaloblaste tribulosa (Li) n. comb.
(Figs 1, 2B, 4, 5)

Metagerontia tribulosa Li, 2002: 1350.

Description of female genitalia. Egg guide elongate, gradually narrowing to almost pointed posterior end, sclerotization and pigmentation very weak (Fig. 5A); body of subgenital plate short, anterior margin with broad U-shaped notch medially. Gonapophyses (Fig. 5B): ventral valve elongate, nearly equal width from base to pointed distal end; dorsal valve elongate, its distal end rounded, without conspicuous distal process; external valve broadly membranous. Internal plate (Fig. 5C) with weak and laterally expanded pigmentation around opening of spermatheca, and with pair of triangular blackish pigmentations posteriorly.

Specimens examined. [Tsushima] Imale many females, Izuhara, Tsushima Is., 2. vii. 1992, T. Ueno; [Kyushu] many males and females, Nokono-shima Is., Fukuoka C., 21. vi. 1994; [Ryukyus] 2 males 6 females, Fukai, Ishigaki-jima Is., Ryukyus, 22. iii. 1995, N. Takahashi; 1 female, Mt. Bannadake, Ishigaki-jima Is., 8. iv. 1996; 2 females, Tindahana, Yonaguni-jima Is., 7. iv. 1996.

Remarks. The morphology of male specimens listed above agrees with the original description of *Metagerontia tribulosa*. The female of this species is recorded here for the first time, and the present female specimens are very similar to *A. treubia* Endang, Thornton & New, 2002 in genitalic characters but are different from it in the pigmentations of the forewing and the internal plate.

This species is here recorded from Japan for the first time.

Distribution. Japan (Tsushima Is., Kyushu, Ishigaki-jima Is., Yonaguni-jima Is.); China (Hainan Dao Is.).

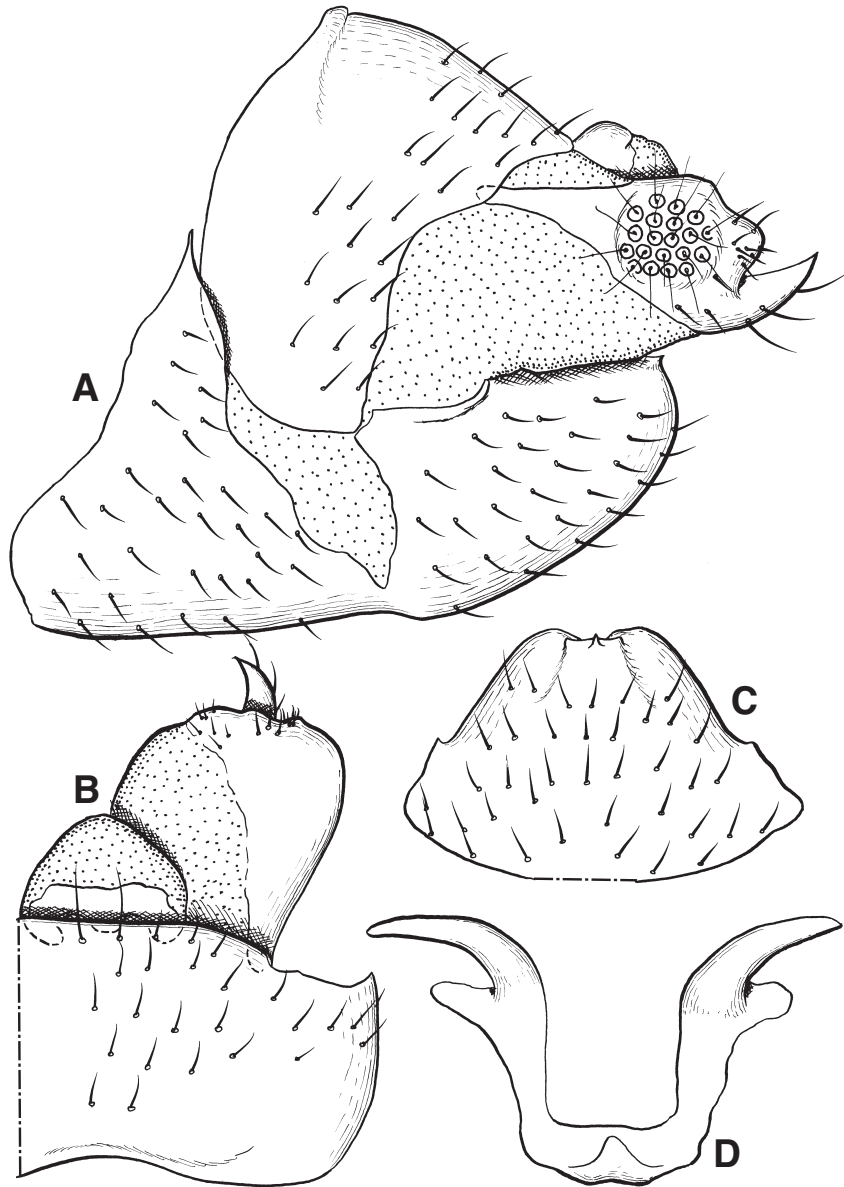


Fig. 4. Male terminalia of *Anomaloblaste tribulosa*. A. Terminalia, lateral view. B. Terminalia, dorsal view. C. Hypandrium, ventral view. D. Phallosome, ventral view.

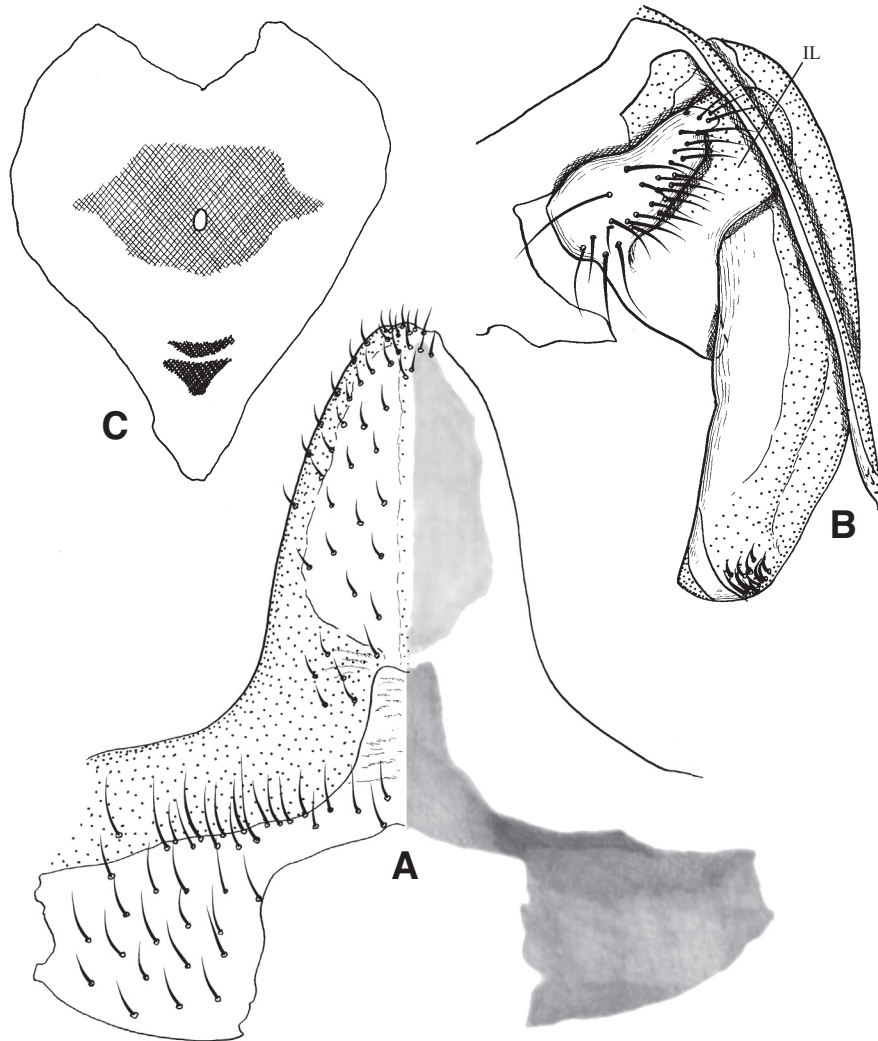


Fig. 5. Female genitalia of *Anomaloblaste tribulosa*, ventral view. A. Subgenital plate, showing structure (left) and coloration (right). B. Gonapophyses. C. Internal plate, showing coloration.

Genus *Neoblaste* Thornton

Neoblaste tateokana (Okamoto)
(Figs 2C, 6, 7)

Psocus tateokanus Okamoto, 1907: 131.

Psocidus tateokanus [sic]: Smithers, 1967: 111.

Blaste sp. Yoshizawa, 2000: 33.

Neoblaste tateokana: Yoshizawa, 2008: 30.

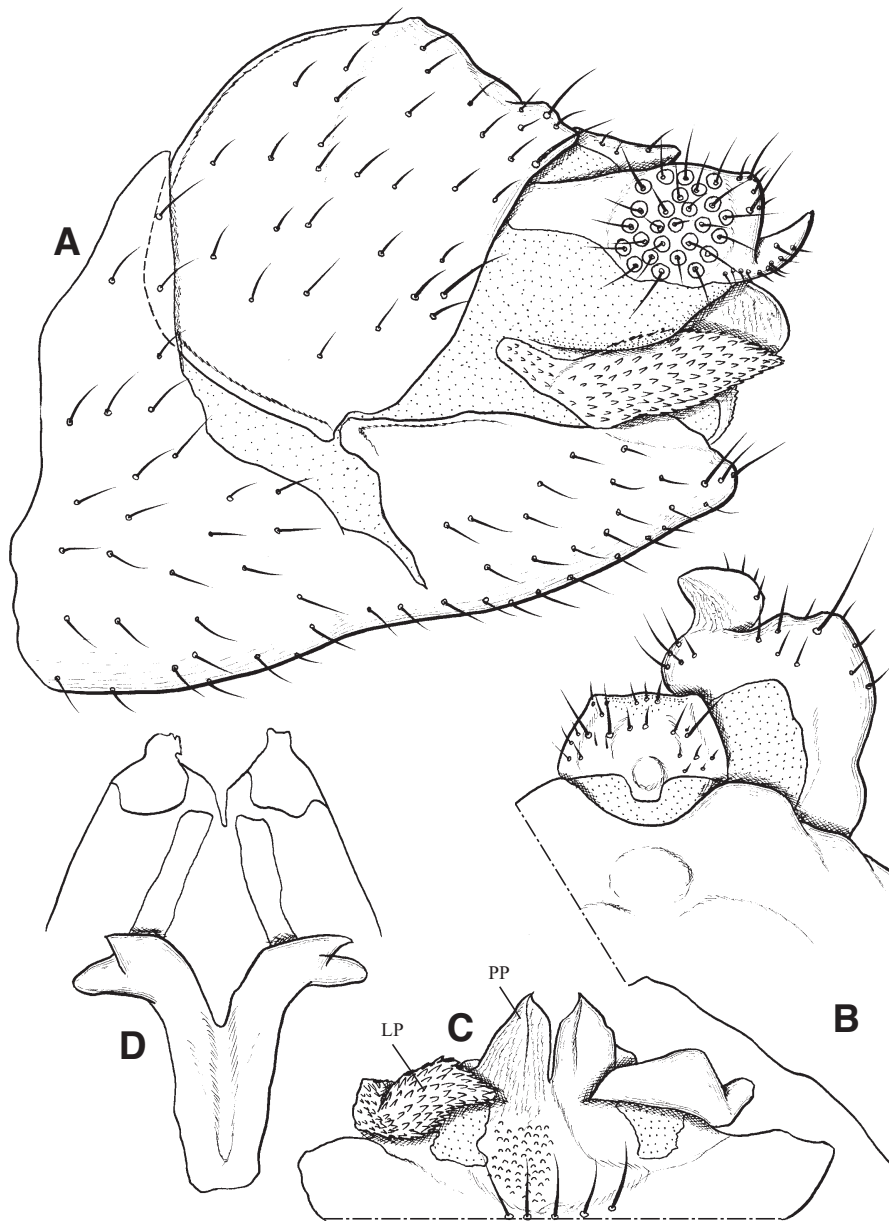


Fig. 6. Male terminalia of *Neoblaste tateokana*. A. Terminalia, lateral view. B. Terminalia, dorsal view. C. Hypandrium, posterior view. D. Phallosome, ventral view.

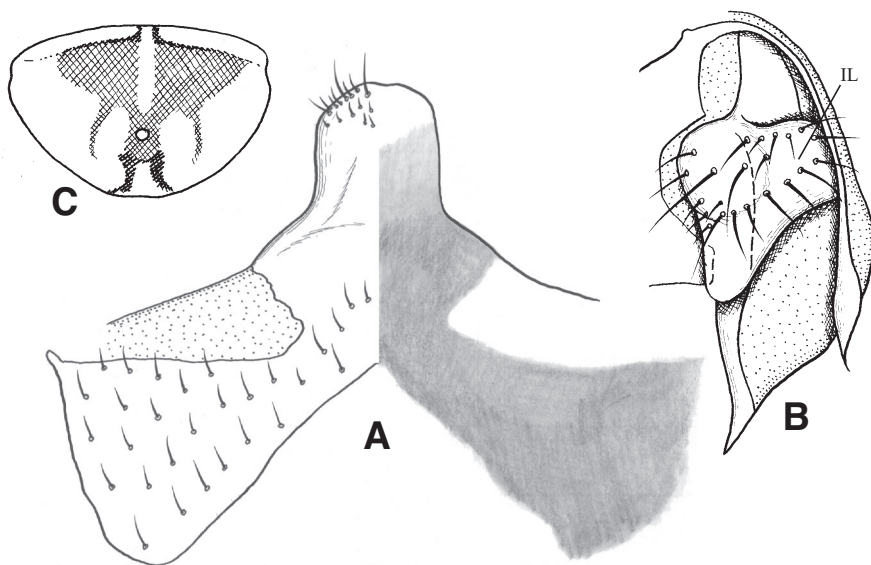


Fig. 7. Female genitalia of *Neoblaste tateokana*, ventral view. A. Subgenital plate, showing structure (left) and coloration (right). B. Gonapophyses. C. Internal plate, showing coloration.

Specimens examined. [Honshu] 1 male 2 females, Terayama-no-ana, Akiyoshidai, Yamaguchi Pref., 11. x. 1994, C. Lienhard; [Kyushu] 2 males 2 females, Mt. Hikosan (800m alt.), Oita Pref., 12. x. 1994, C. Lienhard (all stored in the Natural History Museum, Geneva). See also Yoshizawa (2008).

Remarks. See Yoshizawa (2008).

Distribution. Japan (Hokkaido, Honshu, Kyushu).

Neoblaste papillosus Thornton
(Figs 2D, 8, 9)

Neoblaste papillosus Thornton, 1960: 240.

Psocus obtusus: Okamoto, 1906: 198; Okamoto, 1907: 129 (not *Psocus obtusus* Hagen, 1858).

Blaste obtusa: Tomita & Haga, 1991 [not *Blaste obtusa* (Hagen, 1858)].

Neoblaste cubitalis: Yoshizawa, 2008: 33.

Specimens examined. 2 female identified as *Psocus obtusus* by Okamoto; [Honshu] 1 male 1 female, Kitatsugaru, Aomori Pref., 15. ix. 1997, T. Ichita; 1 female, Midorigaoka, Kuroishi C., Aomori Pref., 8. vii. 1998, T. Ichita; 1 male, same locality and collector, 25. vii. 1999; [Kyushu] 1 female, Minami-koen, Fukuoka C., 15. vi. 1992; [Ryukyus] 3 female, Shuri, Okinawa-jima Is., 19. v. 1993.

Remarks. *Psocus obtusus* Hagen was originally described from Sri Lanka. Yoshizawa (2008) mentioned that identification of Japanese *Psocus obtusus* by Okamoto (1906) was probably based on the re-description of the species collected in the Philippines (Enderlein, 1903). However, the Philippines species recognized as *P. obtusus* by Enderlein (1903) was later described as a different species under the name of *Psocus*

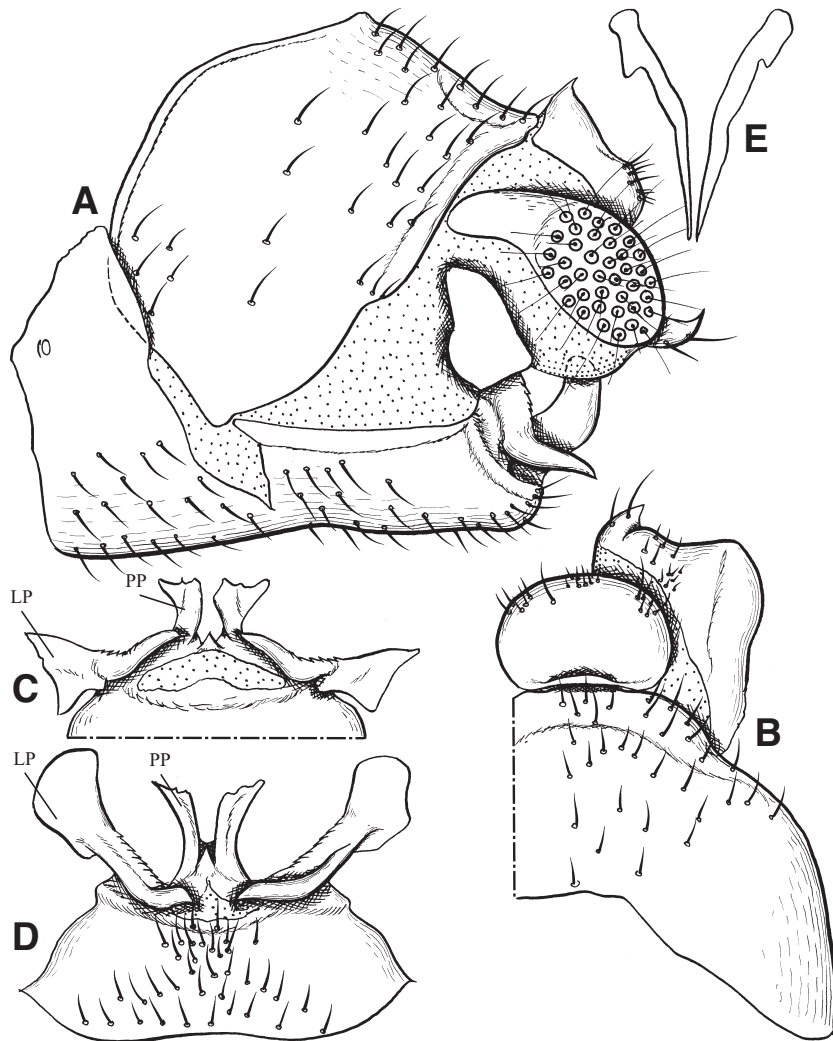


Fig. 8. Male terminalia of *Neoblaste papillosus*. A. Terminalia, lateral view. B. Terminalia, dorsal view. C. Hypandrium, posterior view. D. Hypandrium, ventral view. E. Phallosome, ventral view.

cubitalis Enderlein, 1919. Therefore, Yoshizawa (2008) concluded that the Japanese species originally recorded as *P. obtusus* should read *P. cubitalis*. This conclusion was withdrawn purely by tracing the literatures.

In the present study, I examined the Japanese specimens which can be identified as *P. cubitalis* based on Okamoto's re-description. The specimens examined here included two females identified as *P. obtusus* by Okamoto. Male and female genitalic morphology of the species is considerably different from *P. cubitalis* re-described by Thornton (1984). Instead, morphology of the species matched exactly the description of *Neoblaste papillosus* from Hong Kong.

Distribution. Japan (Honshu, Kyushu, Okinawa-jima Is.); Hong Kong.

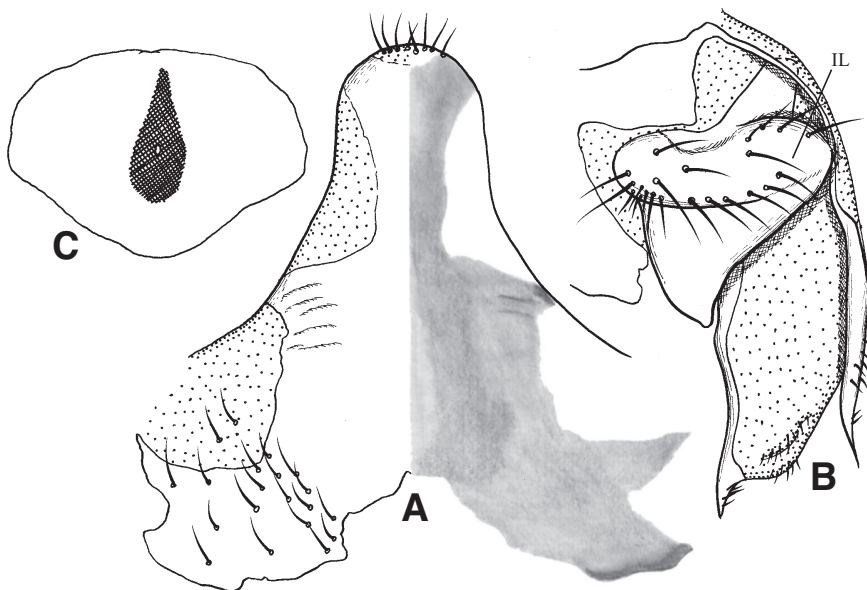


Fig. 9. Female genitalia of *Neoblaste papillosus*, ventral view. A. Subgenital plate, showing structure (left) and coloration (right). B. Gonapophyses. C. Internal plate, showing coloration.

Genus *Neopsocopsis* Badonnel

Neopsocopsis Badonnel, 1936: 419. Type species: *Neopsocus pyrenaicus* Badonnel, 1935, a junior synonym of *Psocus hirticornis* Reuter, 1893.

Pentablaste Li, 2002: 1367. Type species: *Pentablaste obconica* Li, 2002. New synonym.

Remarks. The genus *Pentablaste* was established by Li (2002) in which he noted that ‘New genus is related to *Neoblaste* Thornton, 1960, but differs from the latter by hypandrium with posterior processes divided into 5 branches, usually parameres joined by membrane, subgenital plate posterior lobe rounded apex’. Of them, five-branched hypandrial posterior processes represent an apomorphic condition which is also observed in the genus *Neopsocopsis* (Figs 10D, 12D).

In the present study, I examined two species of *Neopsocopsis*. *N. longiptera* is most closely related to *N. hirticornis*, the type species of *Neopsocopsis*, and is also very similar to *Pentablaste tetradrica* Li, 2002. *N. sakishimensis* n. sp. apparently belongs to *Neopsocopsis* and is also very close to *Pentablaste obconica* Li, 2002, the type species of the genus. Therefore, I treat here *Pentablaste* as a junior synonym of *Neopsocopsis* and transfer all species of *Pentablaste* to *Neopsocopsis* (see Appendix).

To date, *Neopsocopsis* is represented by only two species distributed in the Palaearctic Region. By the present nomenclatural acts, the distributional range of the genus is expanded, with highest diversity in the Oriental Region (nearly 20 species: see Appendix).

Potential apomorphies supporting monophyly of *Neopsocopsis* are follows: hypandrium with well developed, dorsally directed lateral processes, with their

posterior margin forming a keel and covered with denticles (Figs 10D, 12D: unique in Amphigerontiinae); egg guide of subgenital plate broadened distally (Figs 11A, 13A: also observed in some other genera of Amphigerontiinae).

Neopsocopsis sakishimensis n. sp.
(Figs 2E, 10, 11)

Description. Male. Head white in ground color; vertical markings dark brown; orbital markings brown; coronal suture black; frontal suture black; frons with blackish brown marking medially; gena white; eye black, IO/D=1.3; ocelli white, ocellar field black; antennal socket narrowly bordered with brown band; postclypeus brown except for white ventral margin; anteclypeus white; antenna dark brown, pedicel paler; labium, lacinial tip, and 4th maxillary palpomere blackish brown, other mouth parts pale brown.

Thorax. Prothorax brown. Mesonotum pale brown in ground color; scutal lobes each with large oval blackish brown marking, marking on anterior lobe bilaterally divided by narrow white line; anterolateral corners of scutellum blackish brown. Metanotum pale brown in ground color; lateral lobes of scutum each with large oval blackish brown marking; anterior margin of scutellum blackish brown. Meso- and metapleurites brown except for membranous regions white.

Legs pale brown; coxae, distal halves of tibiae, and tarsi of all legs darker.

Forewing (Fig. 2E) hyaline with brownish tinge, distal half of pterostigma pale brown, veins brown, except for around Rs–M fusion, Rs fork and M–CuA1 fusion hyaline; Rs and M touch at point or fused for very short distance; distal margin of discoidal cell straight or slightly concave; first and second sections of CuA1 forming angle, first section shorter than second one. Hindwing hyaline; veins blackish brown.

Abdomen white, anterior segments with blackish brown band dorsally. Terminalia. 8th sternum strongly sclerotized. Clunium (Fig. 10B): anterodorsal margin widely and shallowly hollowed; posteriorodorsal margin concave. Epiproct (Fig. 10AB) swollen dorsally, with tiny projection at middle of anterior margin. Paraproct (Fig. 10A) with distal lobe shortened and broadened; distal process short. Hypandrium (Fig. 10CD) ornamented with pair of lateral processes, paired posterior processes and posteromedian lobe; outer surface of lateral processes covered with denticles; paired posterior processes short, apically directed dorsolaterally; posteromedian lobe rounded distally, basally with pair of membranous regions. Phallosome V-shaped, closed anteriorly (Fig. 10E).

Length. B 2.2–2.5; FW 2.5–2.9; HW 2.0–2.3.

Female. Color and general morphology almost as in male; markings on head paler; eye IO/D=2.2. Genitalia. Egg guide rounded, with short neck; body of subgenital plate with broad membranous region anteriorly (Fig. 11A). Ventral valve of gonapophyses with long distal process; internal lobe of external valve slender, with pointed internal end (Fig. 11B). Internal plate (Fig. 11C) with pale brown pigmentation around spermathecal opening, with pair of blackish brown crescent-shaped markings laterally, and with rod-like darkly pigmented sclerotization anteriorly.

Length. B 2.6–3.0; FW 2.8–3.1; HW 2.2–2.5.

Holotype male, Sonai, Iriomote-jima Is., Ryukyus, Japan, 12. iv. 1996, K. Yoshizawa.

Paratypes. [Ryukyus] 12 males and 17 females, same data as holotype; 2 females, Kubura, Yonaguni-jima Is., 7. iv. 1996.

Remarks. This new species is similar to *Neopsocopsis obconica* (Li, 2002) n. comb.,

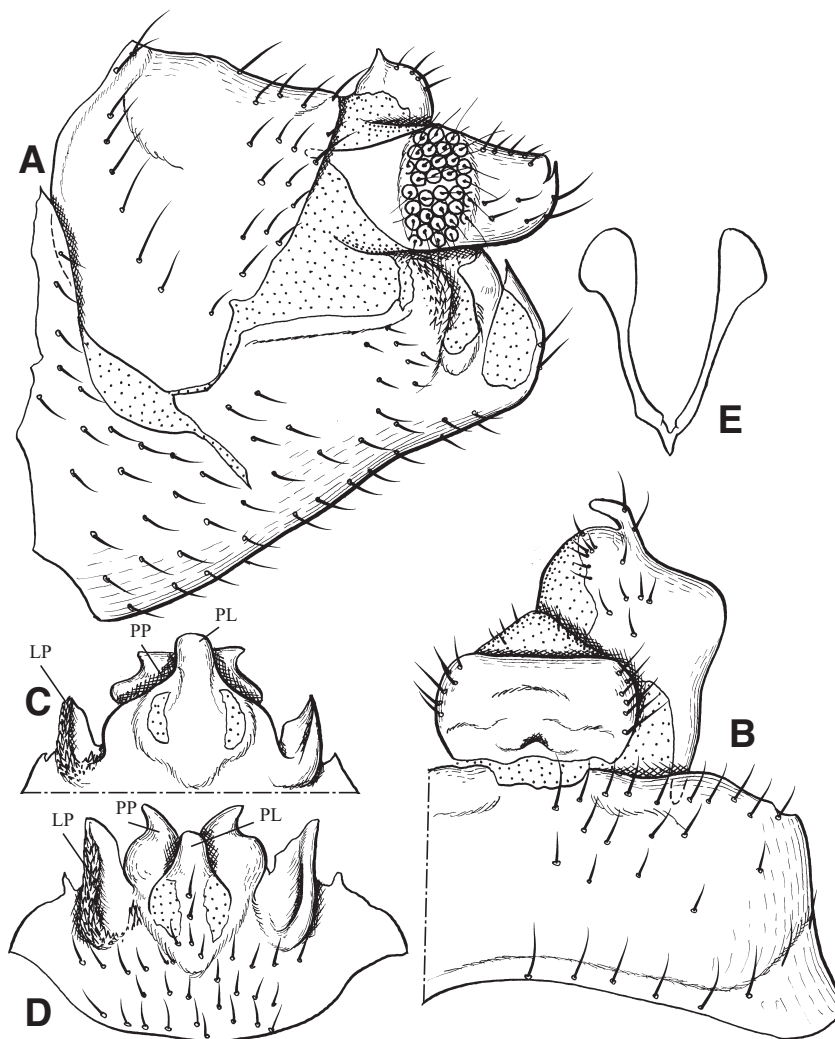


Fig. 10. Male terminalia of *Neopsocopsis sakishimensis*. A. Terminalia, lateral view. B. Terminalia, dorsal view. C. Hypandrium, posterior view. D. Hypandrium, ventral view. E. Phallosome, ventral view.

the type species of the genus *Pentablaste* n. syn., in the hypandrial ornamentalations but can be distinguished from it by the structures of the male clunium, male epiproct and female subgenital plate, and color pattern of female internal plate.

Distribution. Japan (Iriomote-jima Is., Yonaguni-jima Is.).

Neopsocopsis longiptera Vishnyakova
(Figs 2F, 12, 13)

Neopsocopsis longiptera Vishnyakova, 1986: 350.

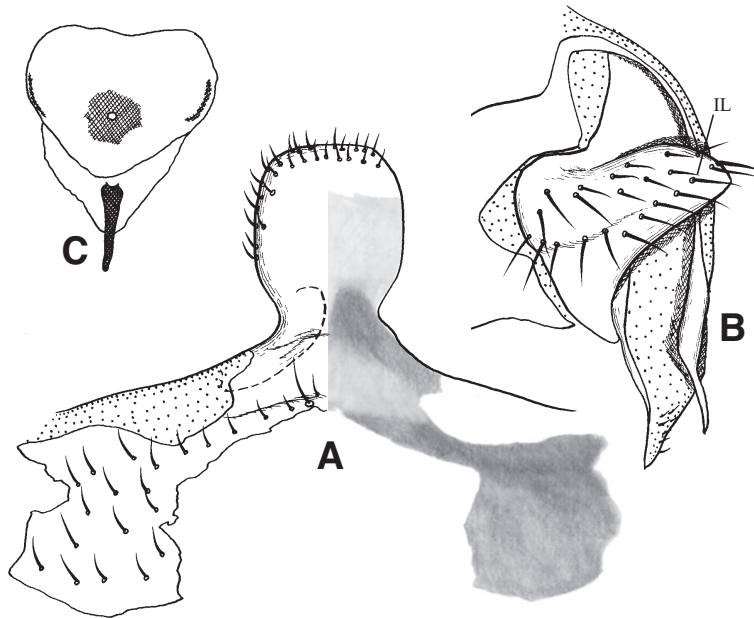


Fig. 11. Female genitalia of *Neopsocopsis sakishimensis*, ventral view. A. Subgenital plate, showing structure (left) and coloration (right). B. Gonapophyses. C. Internal plate, showing coloration.

Specimens examined. [Honshu] 5 males 14 females, Takizawa-mura, Iwate Pref., 7. vii. 1993; 17 males 13 females, Shimashima–Yatakesawa, Nagano Pref., 30. vi. 1996, N. Takahashi; 6 males 13 females, Mt. Mizugaki, Yamanashi Pref., 18. vii. 1997, N. Takahashi; 1 male 3 female, Masutomi Spa, Yamanashi Pref., 7. vii. 1997; 1 female, Minami-koen, Fukuoka C., 11. vi. 1992; 3 males 4 females, Yamada, Hisayama C., Fukuoka Pref., 5. vi. 1994.

Remarks. This species is very similar to *N. hirticornis* (Reuter, 1893) in male and female genitalic characters but differs from the latter in larger male eye and fully-winged female (Vishnyakova, 1986). These features exactly agree with those of the specimens listed above. This species is here recorded from Japan for the first time.

Distribution. Japan (Honshu, Kyushu); Russian Far East (Prymorsky).

Genus *Amphigerontia* Kolbe

Amphigerontia Kolbe, 1880: 104. Type species: *Psocus bifasciatus* Latreille, 1799.

Amphigerontia jezoensis Okamoto (Figs 2G, 14, 15)

Amphigerontia jezoensis Okamoto, 1907: 134.

Specimens examined. [Honshu] Many males and females, Omoriyama Park, Akita C., 4.

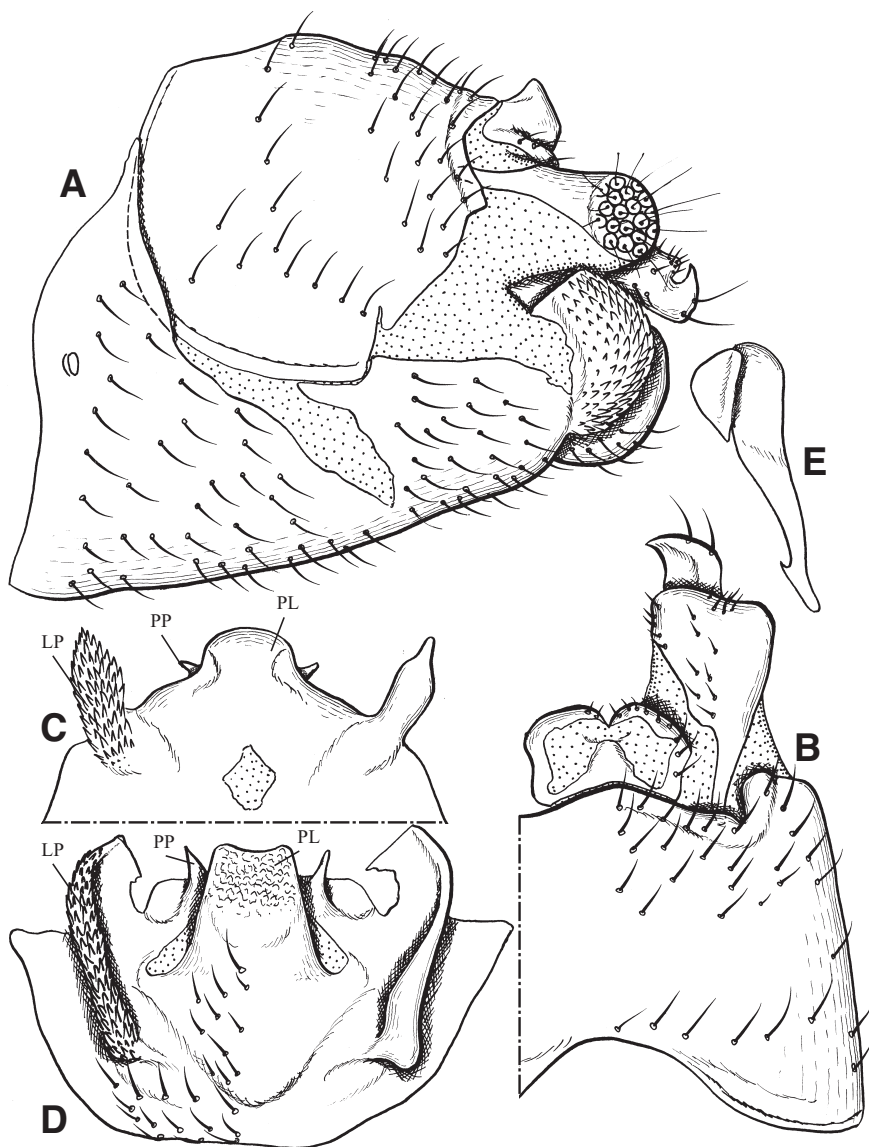


Fig. 12. Male terminalia of *Neopsocopsis longiptera*. A. Terminalia, lateral view. B. Terminalia, dorsal view. C. Hypandrium, posterior view. D. Hypandrium, ventral view. E. Phallosome, ventral view.

vii. 1993 and 1. vii. 1997; 6 females, Umegashima Spa., Shizuoka Pref., 22. vi. 1997; 1 male 3 females, Chojabara, Geihoku T., Hiroshima Pref., 10. vii. 1994; 1 female, Mt. Kakezu-yama, Geihoku T., Hiroshima Pref., 11. vii. 1994.

Remarks. As mentioned in Yoshizawa (2002), the type series of this species are unavailable. However, external features of the specimens examined here match exactly to the original description of this species.

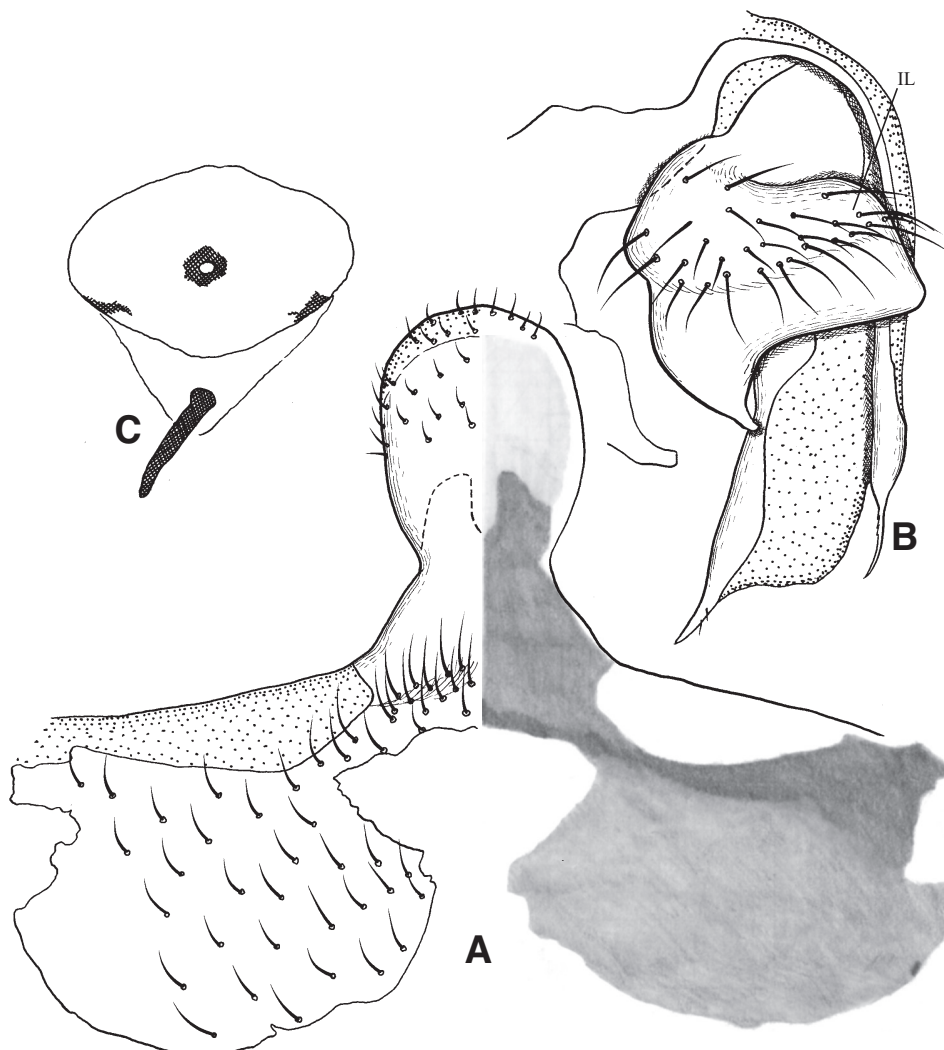


Fig. 13. Female genitalia of *Neopsocopsis longiptera*, ventral view. A. Subgenital plate, showing structure (left) and coloration (right). B. Gonapophyses. C. Internal plate, showing coloration.

Distribution. Japan (Hokkaido, Honshu), Taiwan, Russian Far East.

Amphigerontia contaminata (Stephens)
(Figs 2H, 16, 17)

Psocus contaminatus Stephens, 1836: 120.

Amphigerontia contaminata: Pearman, 1932: 204.

Specimens examined. [Kyushu] 8 males 4 females, Nokono-shima Is., Fukuoka C., 11. v.

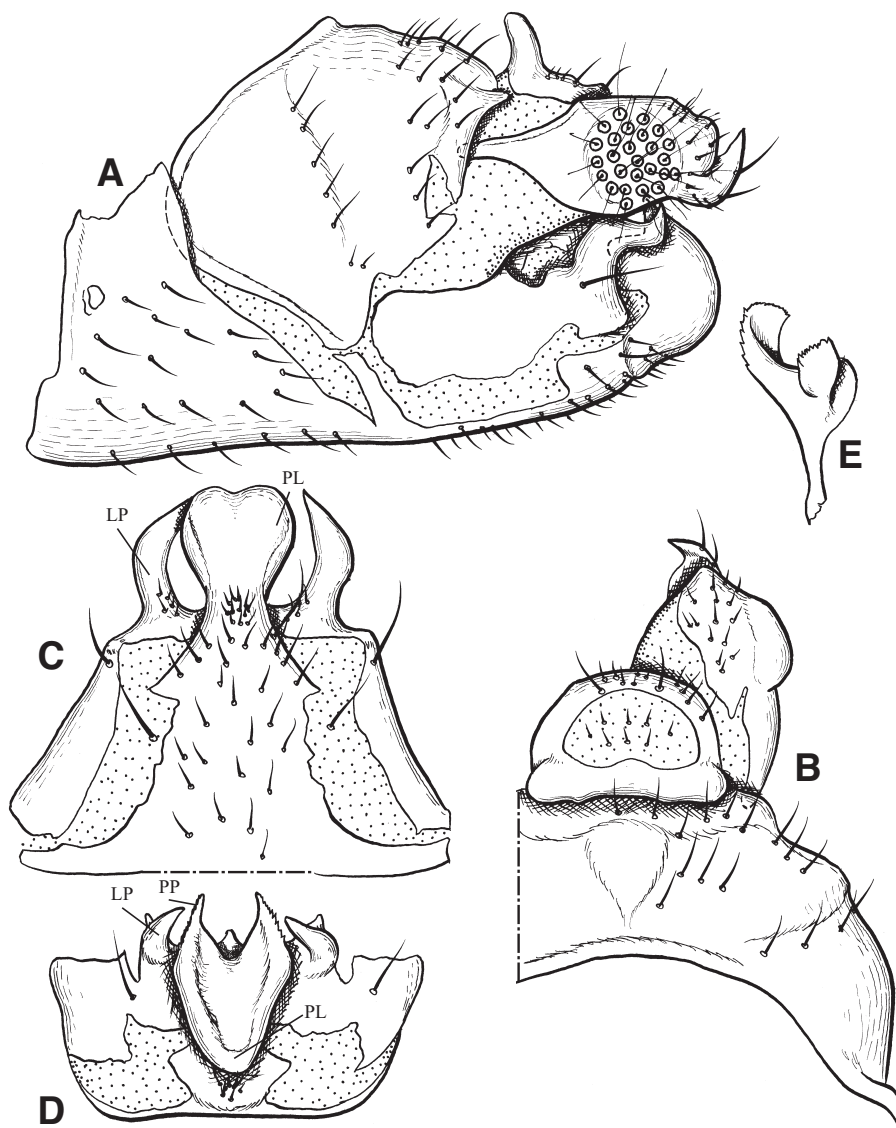


Fig. 14. Male terminalia of *Amphigerontia jezoensis*. A. Terminalia, lateral view. B. Terminalia, dorsal view. C. Hypandrium, posterior view. D. Hypandrium, ventral view. E. Phallosome, ventral view.

1994, R. Matsumoto.

Remarks. This Holarctic species is here recorded from Japan for the first time. The above-listed specimens agree exactly with redescrptions of this species including male and female genitalic morphology (e.g., Badonnel, 1943; Günther, 1974; Lienhard, 1998).

Distribution. Japan (Kyushu); Holarctic.

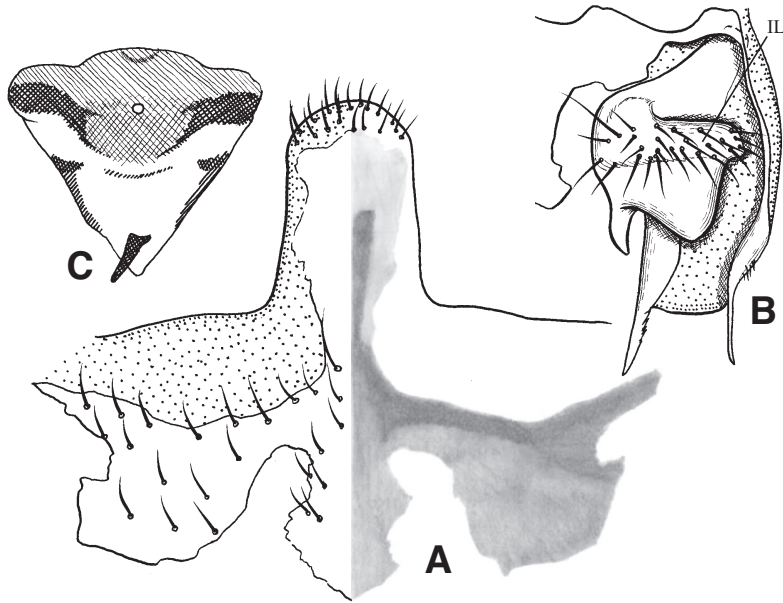


Fig. 15. Female genitalia of *Amphigerontia jezoensis*, ventral view. A. Subgenital plate, showing structure (left) and coloration (right). B. Gonapophyses. C. Internal plate, showing coloration.

DISCUSSIONS

As also mentioned in Introduction, the subfamily was subdivided into three tribes by Li (2002). According to this classification system, the presently examined genera can be classified as follow on the basis of the wing venational character: Amphigerontiini (*Amphigerontia* and *Anomaloblaste*: Fig. 2B, G, H) by Rs–M cross vein and Blastini (*Glossoblaste*, *Neoblaste* and *Neopsocopsis*: Fig. 2A, C–F) by Rs+M fusion (Li, 2002). Monophyly of both Amphigerontiini and Blastini was tentatively accepted by molecular phylogeny (Yoshizawa & Johnson, 2008) but taxon sampling for the analyses was very limited. In contrast, apomorphies observed in the genitalic characters do not support this classification system.

For example, the hypandrial ornamentations are very similar between *Amphigerontia* and *Neopsocopsis* in having a pair of lateral processes, paired posterior processes, and a posteromedian lobe (CD of Figs 10, 12, 14, 16), although these genera exhibit different conditions in Rs and M relationship (Fig. 2EF vs. GH). In contrast, *Anomaloblaste* shares an apomorphic Rs–M cross vein with *Amphigerontia* (Fig. 2A, G, H), but genitalic characters support close affinity between *Anomaloblaste* and *Blaste* (see Remarks of *Anomaloblaste*), although Rs+M of *Blaste* is fused (Li, 2002; Yoshizawa & Johnson, 2008). Previous studies (e.g., Bess & Yoshizawa, 2007) have shown that the wing venational characters, including the condition of Rs and M veins, are highly variable sometimes even between closely related genera or species of Psocidae. Therefore, in this paper, I did not employ the tribal system of the subfamily. Further morphological and

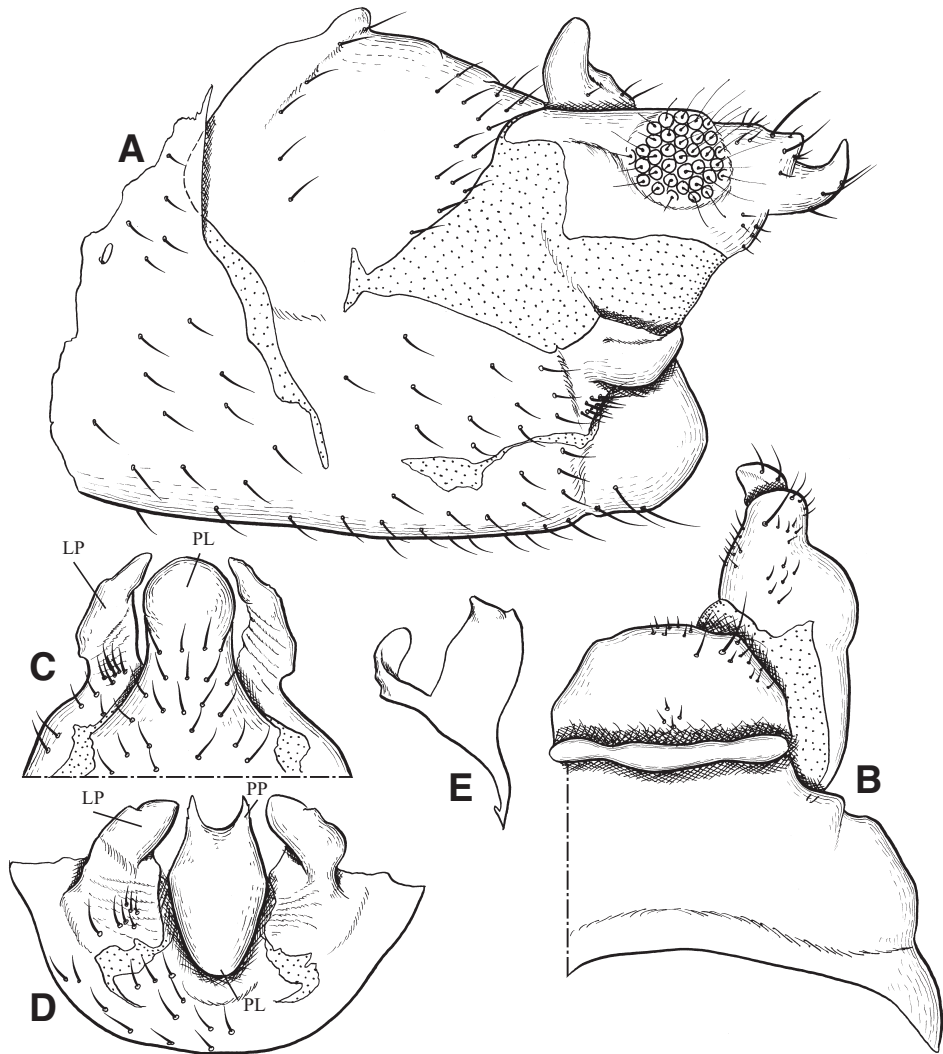


Fig. 16. Male terminalia of *Amphigerontia contaminata*. A. Terminalia, lateral view. B. Terminalia, dorsal view. C. Hypandrium, posterior view. D. Hypandrium, ventral view. E. Phallosome, ventral view.

molecular data are needed to establish a consistent higher system of Amphigerontiinae and to propose official nomenclatural acts.

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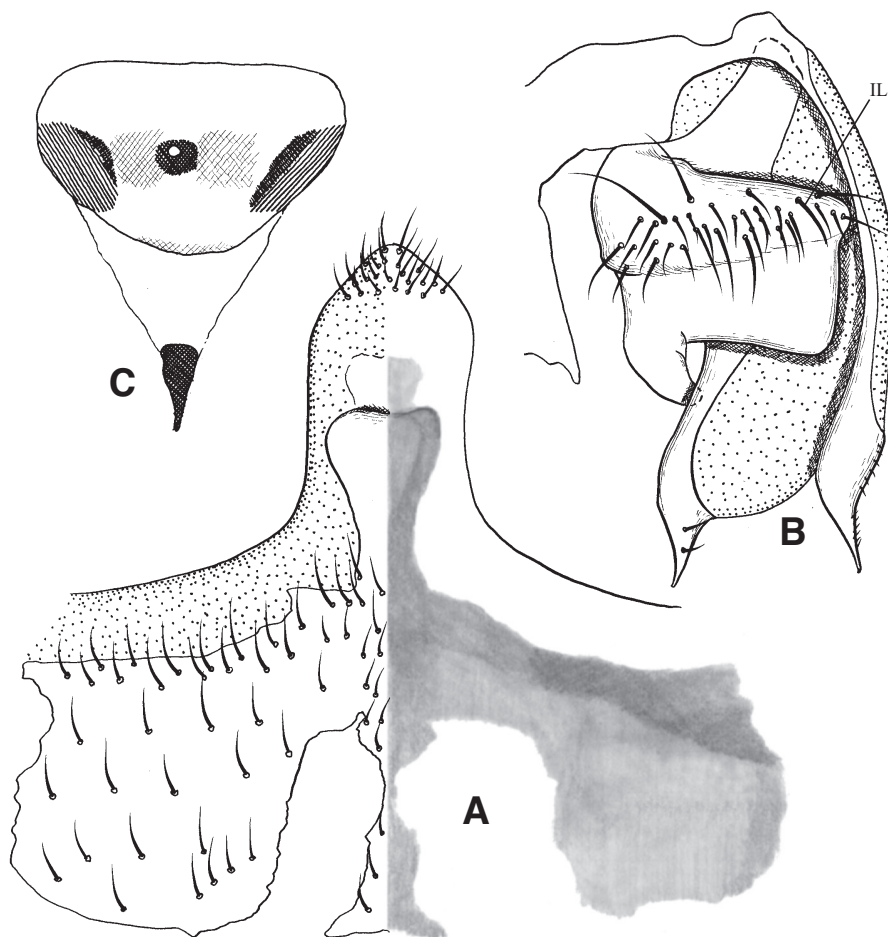


Fig. 17. Female genitalia of *Amphigerontia contaminata*, ventral view. A. Subgenital plate, showing structure (left) and coloration (right). B. Gonapophyses. C. Internal plate, showing coloration.

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APPENDIX. NEW COMBINATIONS RESULTED FROM THE SYNONYMY BETWEEN PENTABLASTE AND NEOPSOCOPSIS.

- Neopsocopsis auctachila* (Li) n. comb.
Pentablaste auctachila Li, 2002: 1382.
- Neopsocopsis clavata* (Li) n. comb.
Pentablaste clavata Li, 2002: 1368.
- Neopsocopsis flavae* (Li) n. comb.
Neoblaste flavae Li, 1995: 187.
Pentablaste flavae: Li, 2002: 1381.
- Neopsocopsis flavida* (Li) n. comb.
Blastopsocidus flavidae Li, 1989: 46.
Pentablaste flavidae: Li, 2002: 1376 .
Pentablaste flavida: Lienhard, 2003: 31.
- Neopsocopsis jinxiuica* (Li) n. comb.
Pentablaste jinxiuica Li, 2002: 1384.
- Neopsocopsis lanceolata* (Li) n. comb.
Pentablaste lanceolata Li, 2002: 1377.
- Neopsocopsis longicaudata* (Li) n. comb.
Pentablaste longicaudata Li, 2002: 1383.
- Neopsocopsis lushanensis* (Li) n. comb.
Pentablaste lushanensis Li, 2002: 1385.
- Neopsocopsis minuscula* (Li) n. comb.
Pentablaste minuscula Li, 2002: 1380.
- Neopsocopsis obconica* (Li) n. comb.
Pentablaste obconica Li, 2002: 1373.
- Neopsocopsis pentasticha* (Li) n. comb.
Neoblaste quinquentata Li, 1990: 9.
Pentablaste pentasticha Li, 2002: 1372.
Pentablaste pentaticha Li, 2002: 1890.
- Neopsocopsis pini* (Li) n. comb.
Blastopsocidus pini Li, 1990: 5.
Pentablaste pini: Li, 2002: 1378.
- Neopsocopsis profunda* (Li) n. comb.

- Neoblaste profunda* Li, 1995: 186.
Pentablaste profunda: Li, 2002: 1379.
- Neopsocopsis quinquedentata* (Li & Yang) n. comb.
Pentablaste quinquedentata Li & Yang, 1988: 79.
Pentablaste quinquedentata: Li, 2002: 1370.
- Neopsocopsis schizopetala* (Li) n. comb.
Neoblaste schizopetala Li, 1997: 488.
Pentablaste schizopetala: Li, 2002: 1375.
- Neopsocopsis tetraedrica* (Li) n. comb.
Pentablaste tetraedrica Li, 2002: 1371; Lienhard, 2003: 31.
Pentablaste tetraedirca Li, 2002: 1368.