

***Pediobius sasae* (Hymenoptera: Eulophidae), a new species from galls on dwarf bamboo (*Sasa nipponica*) in Japan**

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Abstract

Pediobius sasae sp. nov. (Hymenoptera: Eulophidae) is described from Japan. This new species belongs to the “eubius-complex” of species and is compared to the species of that group. It was reared from galls induced by an unidentified gall midge of the tribe Oligotrophini (Diptera: Cecidomyiidae). The galls are formed on stems of dwarf bamboo (*Sasa nipponica*). *Pediobius sasae* is a solitary primary parasitoid on the gall midge, but possibly also acts as a secondary parasitoid of another parasitoid reared from the same host, an unidentified species of *Torymus* (Hymenoptera: Torymidae).

Key words: *Pediobius*, *Torymus*, Eulophidae, Torymidae, Oligotrophini, Cecidomyiidae, *Sasa nipponica*, Japan, taxonomy

Introduction

In connection with an investigation about deer browsing on dwarf bamboo and the subsequent effects on the interspecific relationships between a cecidomyiid host and its parasitoids on this plant (Ueda *et al.* 2006), one species of *Pediobius* was frequently encountered. The genus *Pediobius* Walker is a large genus with some 200 species known worldwide (Noyes 2002), and is found in all zoogeographical regions. The fauna of *Pediobius* in Japan has been thoroughly investigated (Kamijo 1977, 1983, 1986a, 1986b), and prior to this contribution 28 species of the genus were recorded from Japan (Kamijo 1986b). Comparisons with the known species of *Pediobius* clearly indicated that the species from *Sasa* was undescribed. The interesting biological information, i.e. the interaction between deer, dwarf bamboo, gall midge and the Hymenoptera parasitoids is published elsewhere (Ueda *et al.* 2006). However, this information is best linked to scientific species names and therefore one of the unnamed species is described and given a

scientific name here.

The genus *Pediobius* is diagnosed as follows: pronotum with a transverse carina close to the posterior margin; propodeum with strong plicae, parallel or diverging posteriorly; medioposterior part of propodeum drawn out to form a so-called nucha, which is usually short; petiole entirely reticulate, anterior end concave to embrace the prodeal nucha. The new species, *Pediobius sasae*, belongs in the “*eubius*-group” of species. This group forms a “complex” (e.g. Dawah 1988) or an “aggregate” (Boucek 1965) of species that are very difficult to separate morphologically. The species of the *eubius*-group are characterized by a transverse petiole and an elongate gaster in the female, an elongate petiole and inflexed pleurae of the gastral tergites in the male. Both sexes have indistinct and reticulate notaular depressions, an elongate and entirely reticulate scutellum with a narrow anterior part.

Another common feature for the species of the *eubius*-group is their host preference, the target being gall formers on grasses. In Europe the host records for the species in this group include mainly species of the genus *Tetramesa* (Hymenoptera: Eurytomidae), each *Pediobius* species showing host plant specificity at the species or genus level (Dawah *et al.* 2002). The host record for the new species described here also involves the plant family Poaceae, specifically dwarf bamboo (*Sasa nipponica* Makino & Shibata). The animal host is an unidentified species of gall midge (Diptera: Cecidomyiidae) of the tribe Oligotrophini. *Pediobius sasae* possibly also acts as a hyperparasitoid of an unidentified species of *Torymus* (Hymenoptera: Torymidae) that attacks the same host (Ueda *et al.* 2006).

In the key to the Japanese species of *Pediobius* (Kamijo 1986) *sasae* runs to *eubius* in couplet 27, but is separated from *eubius* by the strongly concave upper half of occiput (Fig. 6), and the very strong occipital carina, which is especially strong in the dorsolateral corners of the occiput (Fig. 7). Also in Boucek (1965) *sasae* runs to *eubius* (couplets 33-34), but *sasae* is separated from all European species in the *eubius*-group, including those described by Dawah (1988) and Dawah *et al.* (2002), by the characters mentioned above. In the key to the Nearctic species of *Pediobius* (Peck 1985) *sasae* runs to *eubius* (couplet 30) but is separated from *eubius* as mentioned above. The pronotal collar has a very weak transverse carina (Fig. 11) (absent in some specimens), distinguishing *sasae* from other species of *Pediobius* which have a strong pronotal carina. Together with the strongly concave upper occiput, the weak or absent, pronotal carina in *sasae* is an adaptation that enables this species to tilt its head strongly backwards. The purpose of this adaptation is yet to be discovered.

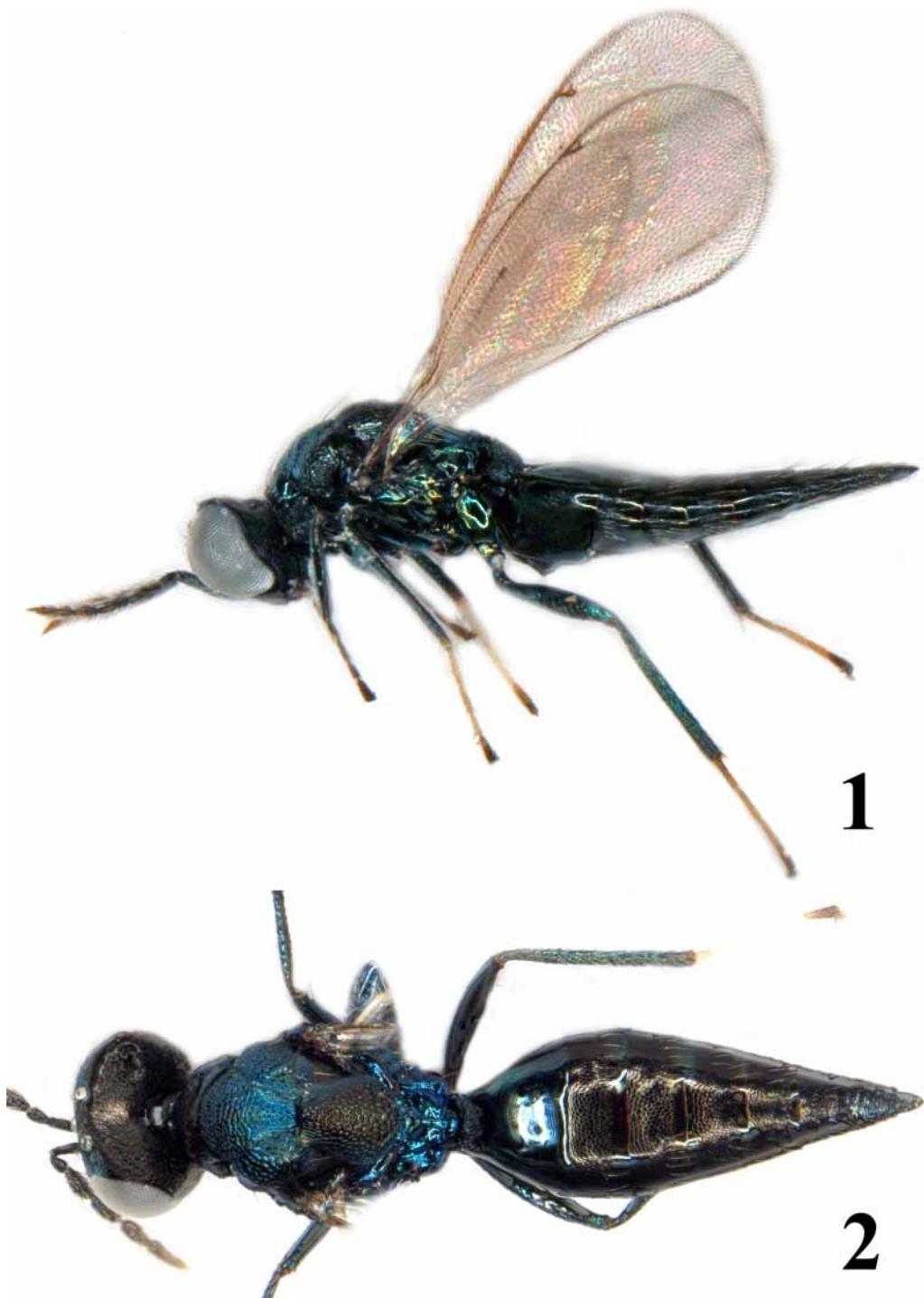
Pediobius sasae sp. nov.

Figs 1-15

Diagnosis

Upper half of occiput strongly concave (Fig. 6); occipital margin strongly carinate,

especially strong in the dorsolateral corners of the occiput (Fig. 7); transverse pronotal carina weakly developed or absent (Fig. 11).



FIGURES 1–2. *Pediobius sasae* sp. nov. 1. Habitus, lateral view, female. 2. Habitus, dorsal view, female.

Description

Length of body female 2.5–3.4 mm, male 2.0–2.7 mm.

Female (Figs 1–2), colour: Scape golden-green, pedicel and flagellomeres 1–3 dark brown with a metallic tinge, flagellomeres 4–5 pale brown, or all flagellomeres dark brown with a metallic tinge. Frons golden-red with golden-green spots, to entirely golden-green; lower face and malar space metallic purple. Vertex dark golden-purple. Mesoscutum golden-green, sometimes with a metallic blue tinge. Scutellum and axillae dark golden-purple. Dorsellum and propodeum golden-green, sometimes with a metallic blue tinge. Coxae, femora and tibiae golden-green with a metallic blue tinge; tarsal segments 1–3 yellowish-white, segment 4 dark brown. Wings hyaline. Petiole dark golden-purple. Gaster with first tergite golden-green, remaining tergites dark golden-purple.

Antenna as in Fig. 15, i.e. with ratios of the length of scape/pedicel/flagellomeres 1 to 5: 3.9:1.0:1.8:1.6:1.4:1.1:1.2. Frons with weak reticulation, shiny; frontal suture V-shaped; antennal scrobes as distinct narrow grooves, joining frontal suture separately. Vertex with strong reticulation. Malar sulcus absent or indicated by fine and small meshed reticulation. Occipital margin with a strong carina. Eyes with scattered short hairs. Ratios of height of head/width of head 0.71:1; length of head/width of head 0.52:1; height of eye/malar space/width of mouth opening 6.9:1.0:4.3; distances between posterior ocelli/between posterior ocelli and eye/between posterior ocelli and occipital margin 8.0:4.0:1.0; width of head/width of thorax across shoulders 1.3:1.

Thoracic dorsum strongly convex. Pronotum well developed, with a weakly developed transverse carina close to posterior margin, carina absent in some specimens. Mesoscutum with strong reticulation; notaular depressions indistinct, entirely reticulate. With a short but wide hole between midlobe of mesoscutum and scutellum. Scutellum strongly convex with strong reticulation throughout. Dorsellum flat and smooth, with two shallow foveae anterolaterally. Propodeum smooth and shiny; submedian carinae closest medially, diverging posteriorly and anteriorly from this point; propodeal callus with two setae. Fore wing speculum closed below. Ratios of length of fore wing/length of marginal vein/height of fore wing 1.9:1.3:1.0; length of postmarginal vein/length of stigmal vein 1.5:1.

Petiole 0.83X as long as wide, with strong small meshed reticulation. Gaster elongate with posterior part pointed; first tergite smooth and shiny, remaining tergites with fine reticulation and with posterior margin smooth and shiny. Ratio of length of mesosoma/length of gaster 0.58–0.61:1.

Male (Fig. 3), colour: Scape metallic bluish-green; flagellum with flagellomere 5 slightly paler than 1–4, all flagellomeres with metallic tinges. Frons golden-green with metallic blue tinges. Scutellum entirely dark golden-purple as in female, or with median part dark golden-purple and with sides and posterior part metallic bluish-green. Mesoscutum, dorsellum and propodeum metallic bluish-green. Gaster with first tergite metallic bluish-green with purple tinges. Colour otherwise as in female.

Antenna as in Fig. 14, i.e. with ratios of the length of scape/pedicel/flagellomeres 1 to 5: 3.5:1.0:2.6:2.5:2.6:2.5:3.0. Ratios of height of head/width of head 0.70:1; length of head/width of head 0.43:1; height of eye/malar space/width of mouth opening 2.6:1.0:1.8; distances between posterior ocelli/between posterior ocelli and eye/between posterior ocelli and occipital margin 9.0:5.0:1.0; width of head/width of thorax across shoulders 1.3:1. Head otherwise as in female.

Ratios of length of fore wing/length of marginal vein/height of fore wing 1.8:1.1:1.0; length of postmarginal vein/length of stigmal vein 1.5:1. Mesosoma otherwise as in female.

Petiole 1.3–1.7X as long as wide. Genitalia as in most species of subfamily Entedoninae (Hansson 1996) (Fig. 10), i.e. with digitus as long as wide, two equally large digital spines, volsellar setae short and relatively slender, and parameres only slightly protruding. Ratio of length of mesosoma/length of gaster 1.2–1.5:1. Petiole and gaster otherwise as in female.

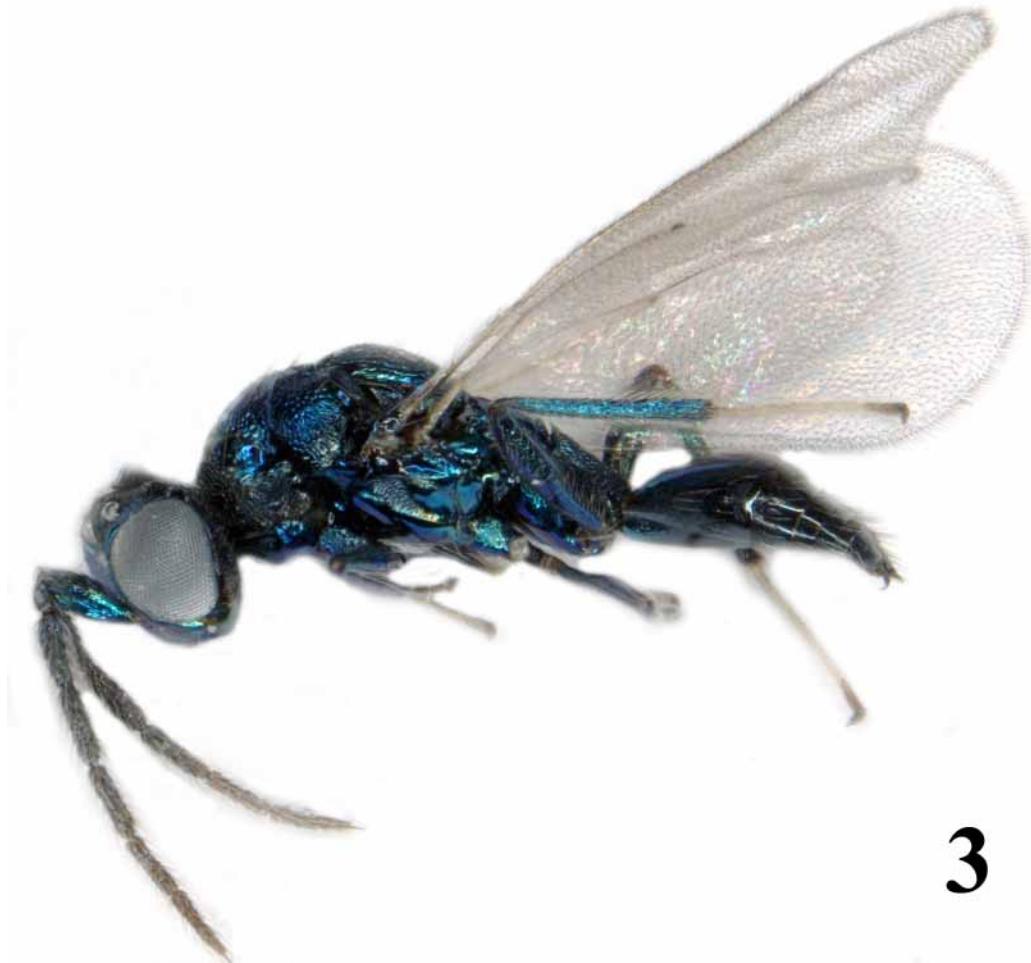


FIGURE 3. *Pediobius sasae* sp. nov. Habitus, lateral view, male.

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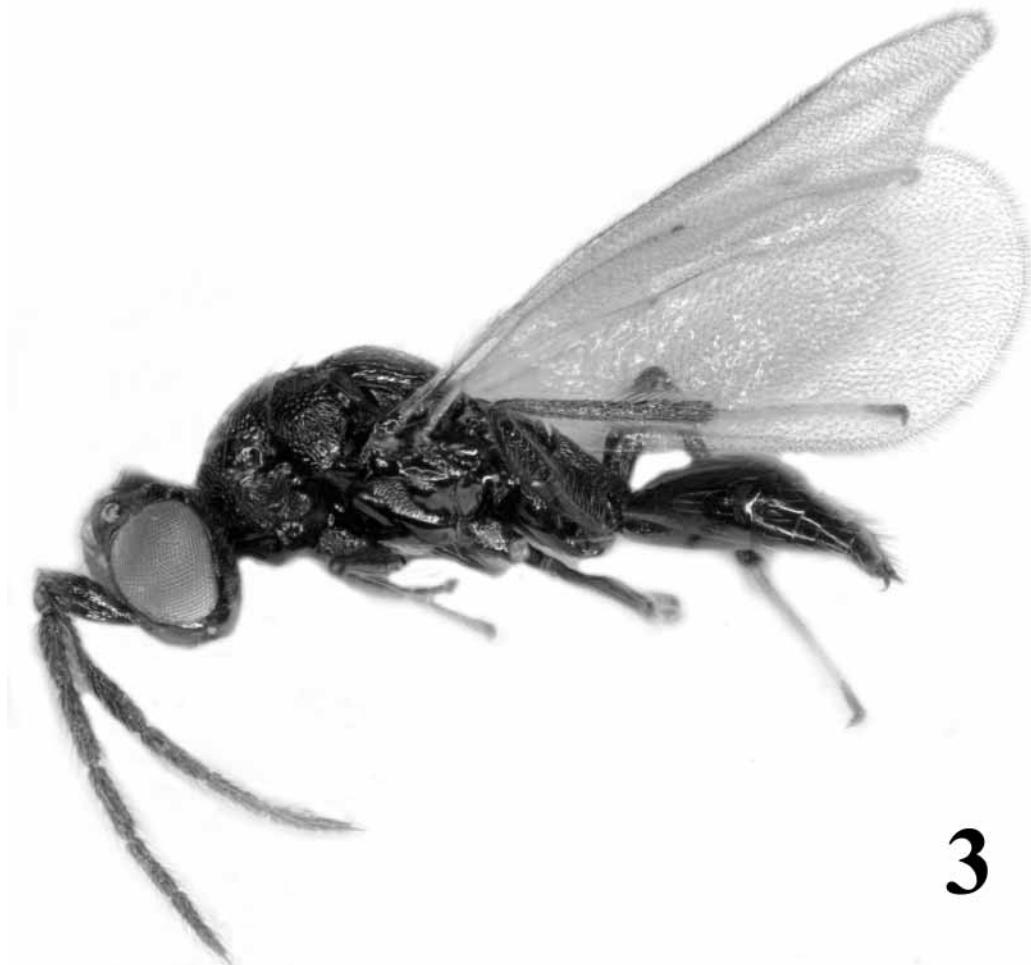
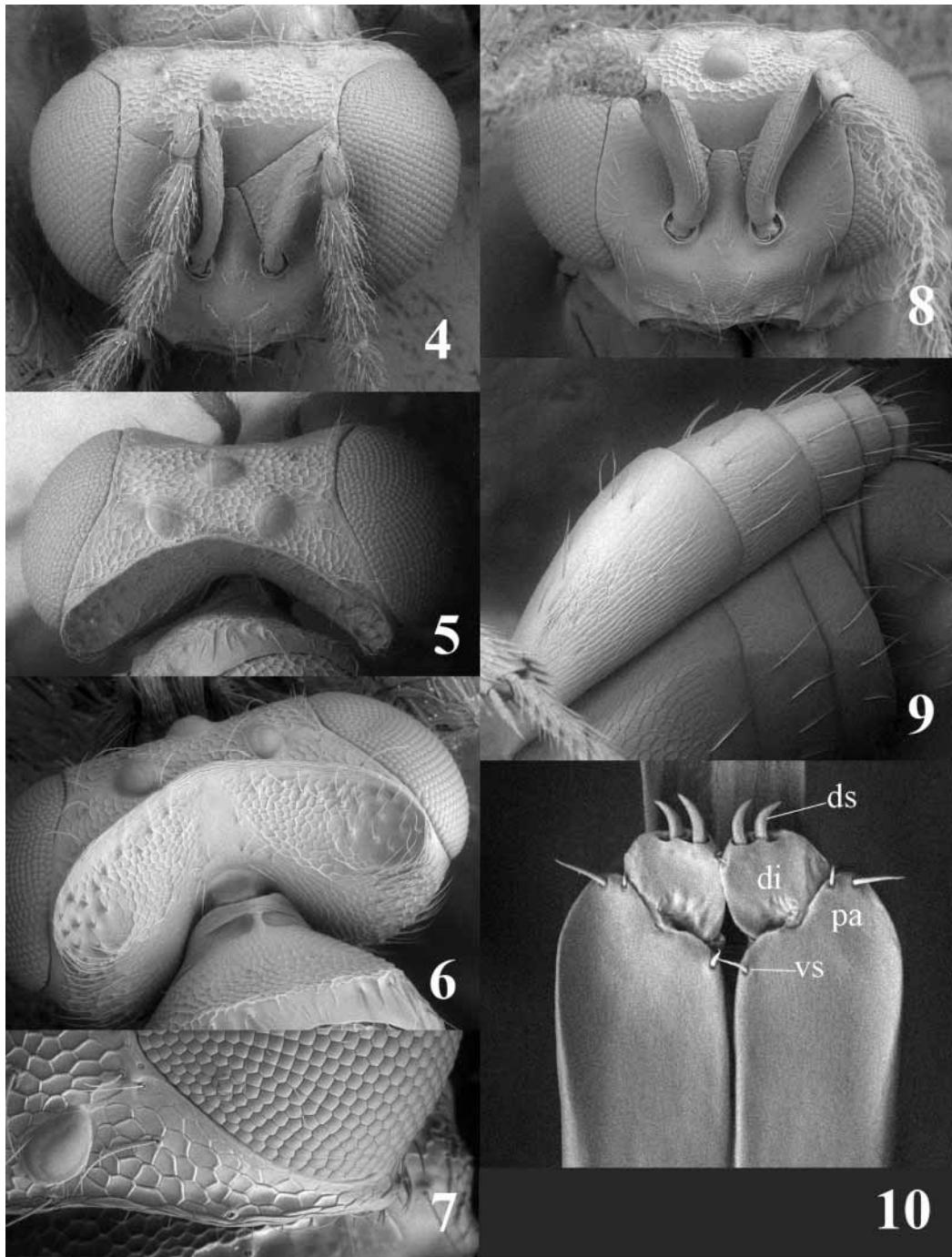
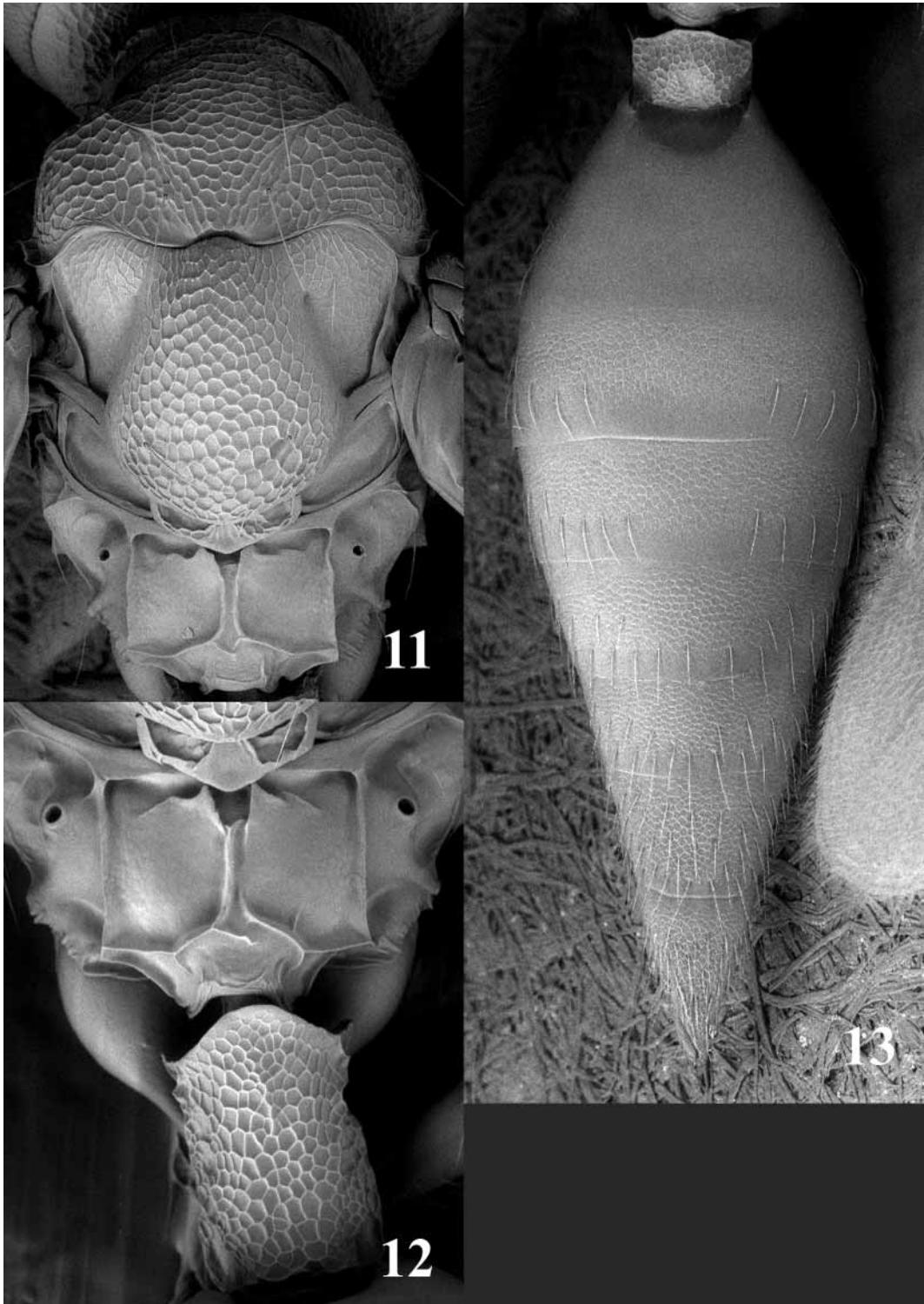


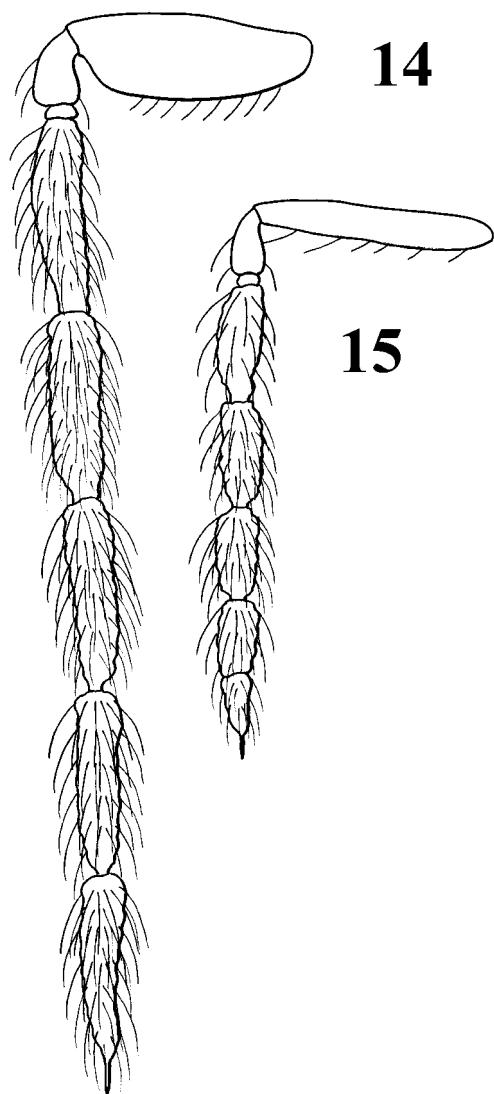
FIGURE 3. *Pediobius sasae* sp. nov. Habitus, lateral view, male.



FIGURES 4–10. *Pediobius sasae* sp. nov. 4. Head, frontal view, female. 5. Vertex, female. 6. Upper occiput, female. 7. Right dorsolateral corner of occipital carina, female. 8. Head, frontal view, male. 9. Gastral tergites with inflexed pleurae, ventral view, male. 10. Apical part of phallobase, ventral view, male. Abbreviations: di = digitus; ds = digital spines; pa = paramere; vs = volsellar setae.



FIGURES 11–13. *Pediobius sasae* sp. nov. 11. Mesosoma, dorsal view, female. 12. Propodeum and petiole, dorsal view, male. 13. Gaster, dorsal view, female.



FIGURES 14–15. *Pediobius sasae* sp. nov. 14. Antenna, lateral view, male. 15. Antenna, lateral view, female.

Biology

Parasitoid of an unidentified gall midge belonging to the tribe Oligotrophini (Diptera: Cecidomyiidae) forming galls on dwarf bamboo (*Sasa nipponica* Makino & Shibata). Possibly also a hyperparasitoid of *Torymus* sp. (Hymenoptera: Torymidae).

Distribution

Japan (Nara Prefecture, Mt. Ōdaigahara).

Material examined

Holotype female labeled "Japan: Nara Prefecture, Mt. Ōdaigahara, 34°11'N, 136°06'E, 1540 m, 24.iv.2003, A. Ueda" (Lund University Zoology Museum, Sweden). Paratypes: 79 females and 50 males with same label data as holotype (Australian National Insect Collection, Canberra; Canadian National Collection of Insects, Ottawa; collection of Christer Hansson; Hokkaido University Museum, Japan; Lund University Zoology Museum, Sweden; Natural History Museum, London, England; Smithsonian National Museum of Natural History, Washington, D.C., U.S.A.; Texas A&M University collection, College Station, U.S.A.; University of California, Riverside, U.S.A.).

Acknowledgements

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