

Phytodietus (*Weisia*) *clavotibialis* sp. n. (Hymenoptera: Ichneumonidae: Tryphoninae) from Japan, with a Key to the Oriental and Eastern Palaearctic Species of the Subgenus *Weisia* Schmiedeknecht, 1907

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Abstract: *Phytodietus* (*Weisia*) *clavotibialis* sp. n. belonging to the ichneumonid subfamily Tryphoninae Shuckard, 1840 is newly described based on a single female specimen from Tokushima Prefecture, Japan. A key to the Oriental and Eastern Palaearctic species of the subgenus *Weisia* is also proposed.

Key words: new species, parasitoid wasp, Lepidoptera, description, Eastern Palaearctic

Introduction

The virtually cosmopolitan genus *Phytodietus* Gravenhorst, 1829 belongs to the ichneumonid subfamily Tryphoninae Shuckard, 1840 (Hymenoptera). It comprises four subgenera, i.e. *Euctenopus* Ashmead, 1900, *Neuchorus* Uchida, 1931, *Phytodietus* Gravenhorst, 1829 and *Weisia* Schmiedeknecht, 1907 (TOWNES 1969, BENNETT 2015, SHIMIZU & WATANABE 2015) and 122 valid species (KOSTRO-AMBROZIAK & RESHCHIKOV 2016, SHIMIZU 2017). The members of *Phytodietus* are solitary koinobiont ectoparasitoids of the several semi-concealed lepidopteran larvae of the families Pyralidae and Tortricidae (e.g., BENNETT 2015).

The subgenus *Weisia* is easily distinguishable from the other *Phytodietus* subgenera on account of the absence of areolet of fore wings (e.g., TOWNES 1969, KASPARYAN 2007, BENNETT 2015). It comprises 15 species from the Afrotropical, Australasian, Neotropical, Oriental and Palaearctic regions (e.g., KOSTRO-AMBROZIAK 2011a, b, SHIMIZU & WATANABE 2015, SHIMIZU 2017).

In Japan, only a single species of *Weisia*, *P. (W.) pitambari* Kaur & Jonathan, 1979, has been re-

corded (SHIMIZU & WATANABE 2015, SHIMIZU 2017). However, recently, we recognised an undescribed species of *Weisia* from Japan. Here we describe this new species and provide a key to the species of the subgenus *Weisia* occurring in the Oriental and Eastern Palaearctic regions.

Materials and Methods

A single female specimen from the ichneumonid collection at the Ehime University Museum, Matsuyama, Japan (EUM) was examined.

A stereoscopic microscope (SMZ1500, Nikon, Tokyo, Japan) was used for the morphological description. Morphological measurements were made using a micrometer mounted on the stereoscopic microscope under 100× magnification. The photographs were made using a CCD camera (Digital Sight DS-Fi1, Nikon, Tokyo, Japan) attached to a stereomicroscope (S8APO, Leica, Wetzlar, Germany). The figures were edited using Adobe Photoshop® CS6 and Illustrator® CS6.

The morphological terminology mainly fol-

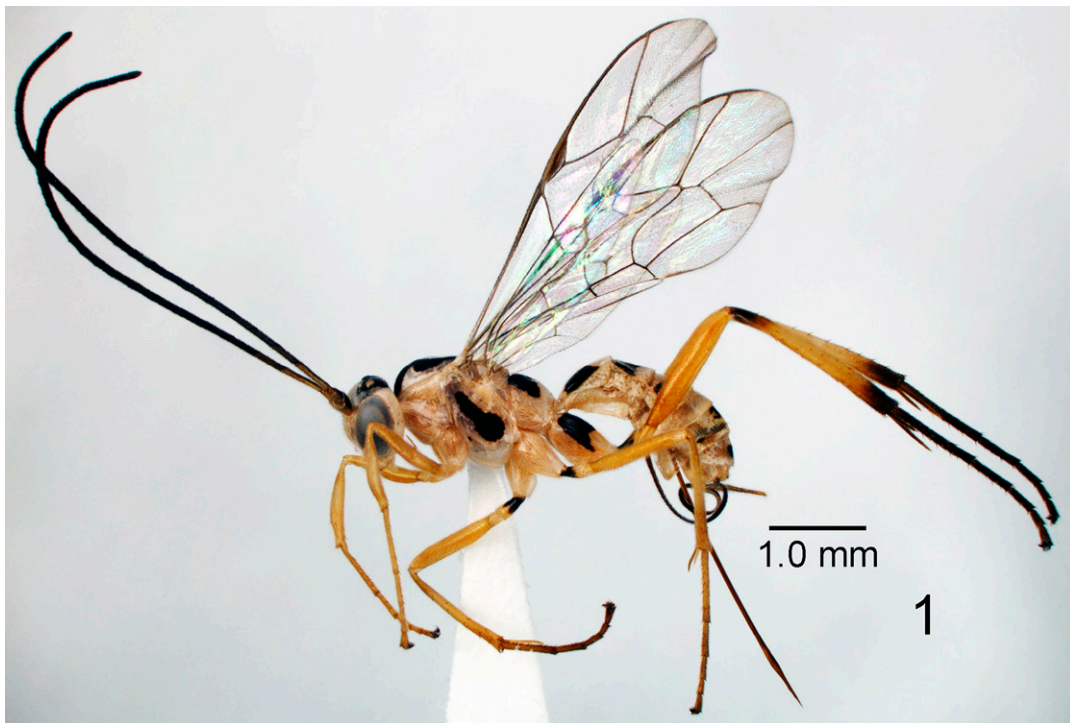


Fig. 1. *Phytodietus (Weisia) clavotibialis* sp. n., lateral habitus

lowed GAULD (1991). The terminology for surface microsculpture followed EADY (1968). The following abbreviations are used in this study: *Head*: IOD – inter-ocellar distance (shortest distance between inner margin of lateral ocelli); LOD – lateral-ocellar diameter (maximum diameter of lateral ocelli); OOD – orbito-ocellar distance (shortest distance between outer margin of lateral ocellus and orbit of eye). *Metasoma*: T – metasomal tergite.

Results

Subfamily Tryphoninae Shuckard, 1840

Tribe Phytodietini Hellen, 1915

Genus *Phytodietus* Gravenhorst, 1829

Subgenus *Weisia* Schmiedeknecht, 1907

Weisia Schmiedeknecht, 1907: 1257. Type species: *Weisia elegans* Schmiedeknecht, by monotypy.

Diagnosis: This subgenus is easily distinguishable from the other subgenera on account of the absence of areolet of fore wings (Figs. 1, 7).

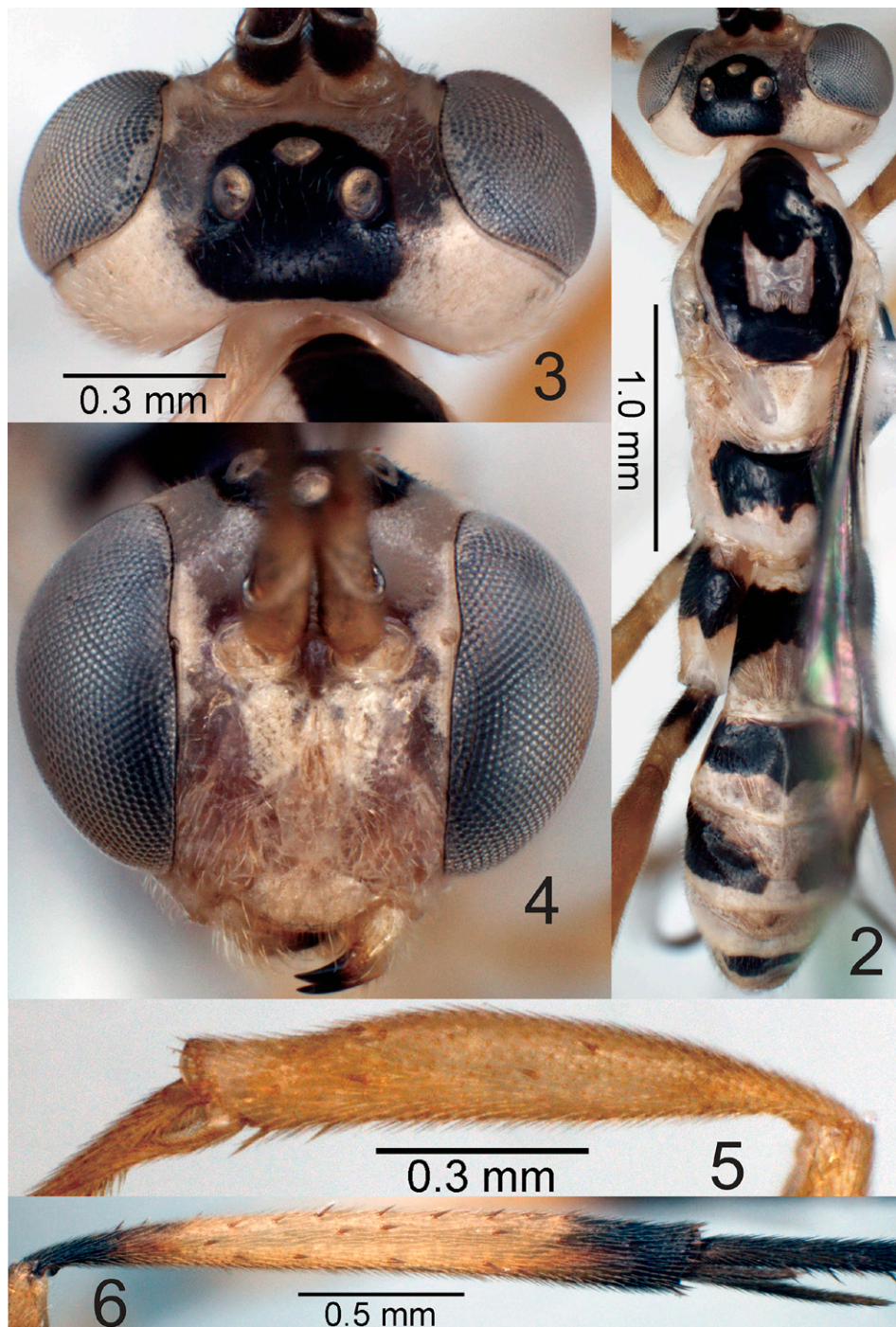
Bionomics: Gelechiid moth, *Sophronia* sp., was recorded as the host (SEYRIG 1932, BENNETT 2015). Also, species of *Weisia* were collected by light traps and Malaise traps (KOSTRO-AMBROZIAK 2010). KOSTRO-AMBROZIAK & RESHCHIKOV (2016) and SHIMIZU (2017) suggested that *P. (W.) pitambari* is multivoltine.

Distribution: Afrotropical, Australasian, Neotropical, Oriental and Palearctic (TOWNES

1969, KASPARYAN 2007, BENNETT 2015, SHIMIZU & WATANABE 2015).

Key to the Oriental and Eastern Palearctic species of *Weisia*

1. Mesosoma entirely black except for pronotum yellow. T1 entirely black. Malar space as long as basal width of mandible. Philippine.....*P. (W.) minutus* Kaur & Jonathan, 1979
– Mesosoma yellow with black marks (Figs. 1, 2). T1 yellow with black marks (Figs. 1, 2). Malar space 0.3–0.7 times as long as basal width of mandible.....2
2. Occipital carina absent. Malar space 0.7 times as long as basal width of mandible. India.*P. (W.) namkumensis* Kaur & Jonathan, 1979
– Occipital carina present (Fig. 3). Malar space 0.3–0.5 times as long as basal width of mandible.....3
3. Ovipositor sheath 0.9 times as long as hind tibia. Fore wing with 3rs-m, 4.0 times as long as M between 2m-cu and 3rs-m. Hind wing with 1-cu between M and cu-a distinctly longer than cu-a. Hind wing with Cu1. China.*P. (W.) laticarinatus* He & Chen, 1996
– Ovipositor sheath 1.3–1.5 times as long as hind tibia. Fore wing with 3rs-m, 1.3–3.4 times as long as M between 2m-cu and 3rs-m (Fig. 7). Hind wing with 1-cu between M and cu-a shorter than cu-a. Hind wing with or without Cu1 (Fig. 8).....4
4. Hind wing with Cu1 absent (Fig. 8). Fore wing with 3rs-m, 3.4 times as long as M between 2m-cu



Figs. 2–6. *Phytodietus (Weisia) clavotibialis* sp. n.: 2 – dorsal habitus; 3 – head in dorsal view; 4 – head in frontal view; 5 – fore tibia in mesal view; 6 – hind tibia in outer view.

and 3rs-m (Fig. 7). Lower end of occipital carina not joined to hypostomal carina. Fore femur uniformly yellowish. Fore tibia rather stout (Figs. 1, 5). Japan.*P.(W.)clavotibialis* Shimizu & Konishi, sp. n.

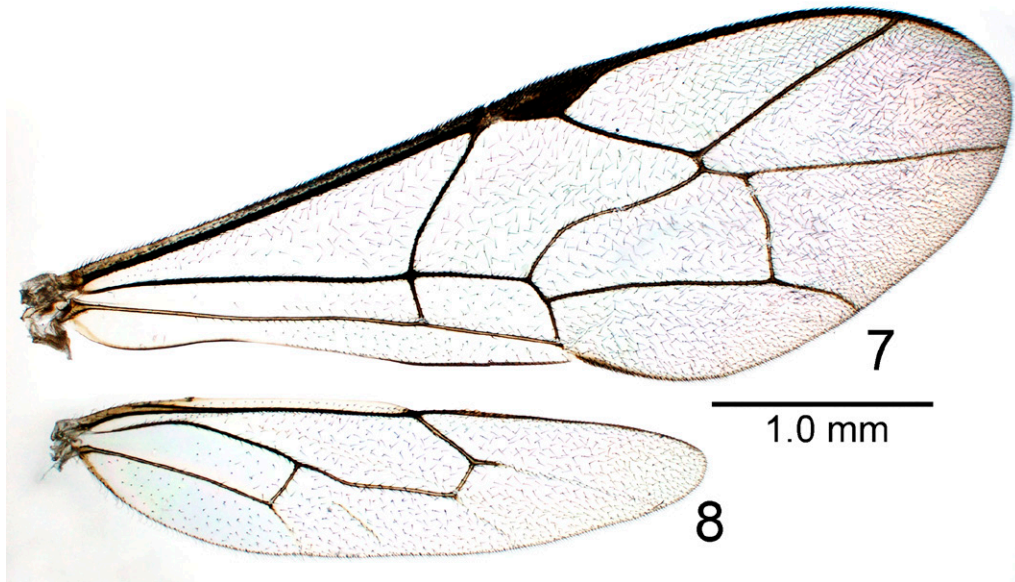
– Hind wing with Cu1 conspicuously present. Fore wing with 3rs-m, 1.3–1.8 times as long as M between 2m-cu and 3rs-m. Lower end of occipital carina joined to hypostomal carina. Outer surface of fore femur with a brownish median line. Fore tibia nor-

mal. India, Japan, Philippine, Taiwan and Thailand.*P.(W.)pitambari* Kaur & Jonathan, 1979

***Phytodietus (Weisia) clavotibialis* sp. n.**

(Figs. 1–8)

Type material: Holotype: female, Ōkawara, Sanagouchi Village, Tokushima Prefecture, Shikoku, Japan [33°57'28"N, 134°25'10"E], 17–21.08.2016, leg. K. Ōhara (Malaise trap) (EUM).



Figs. 7–8. *Phytodietus (Weisia) clavotibialis* sp. n.; 7 – fore wing; 8 – hind wing.

Etymology: The specific name is derived from the developed and club-shaped fore tibia (Fig. 5).

Diagnosis: The new species is morphologically most similar to the Australasian species, *P. (W.) queenslandicus* Kostro-Ambroziak, 2010 and also resembles *P. (W.) citrinus*, *P. (W.) laticarinatus*, *P. (W.) namkumensis*, *P. (W.) pitambari* and *P. (W.) queenslandicus* with its yellowish body with black marks (Figs. 1–4). The new species and *P. (W.) queenslandicus* are easily distinguishable from the others on account of the absence of hind wing vein Cu1 (i.e., the others have Cu1) (Fig. 8). Moreover, the new species can be distinguished from *P. (W.) queenslandicus* by the following blackish colour parts: basal part of hind tibia (Fig. 6), a mark of mesopleuron (Fig. 1), basal half of T1 and T2 (Fig. 2).

Description

Female: Body length ca. 5.0 mm. Head (Figs. 3, 4) 0.8 times as long as maximum width, entirely highly polished with setae. Face 0.9 times as long as wide, moderately punctate. Clypeus 0.4 times as long as wide, evenly convex, smooth, separated from face by a groove; its ventral margin evenly rounded in frontal view and blunt in profile. Malar space 0.5 times as long as basal width of mandible. Subocular sulcus present. Mandible evenly narrowed, its upper tooth slightly longer than lower tooth. Occipital carina present and its lower end not joined to hypostomal carina. IOD 1.3 times as long as LOD, OOD 1.2 times as long as LOD. Antenna with 32 flagellomeres. First flagellomere 1.4 times as long as second one.

Mesosoma (Figs. 1, 2) entirely smooth and highly polished with sparse short setae except mesosternum which rather densely and finely punctated with fine setae. Epomia absent. Mesoscutum 1.3 times as long as maximum width, evenly rounded in profile. Notauli absent. Scutellum moderately convex and evenly rounded in profile, without lateral longitudinal carinae. Epicnemial carina present, almost straight, its upper end not reaching anterior margin of mesopleuron. Submetapleural carina complete and subparallel-sided. Propodeum without any wrinkles, grooves or carinae.

Wings (Figs. 7, 8): Fore wing (Fig. 7) length ca. 4.5 mm. Marginal cell of fore wing 0.3 times as long as wide. Fore wing with 3rs-m, 3.4 times as long as M between 2m-cu and 3rs-m; Rs+M opposite to cu-a. Hind wing (Fig. 8) with Cu1 absent; R1 with five distal hamuli.

Legs (Figs. 5, 6): Fore tibia (Fig. 5) rather stout, its outer margin moderately expanded. Hind femur 5.7 times as long as wide. Outer hind tibial spur 0.6 times as long as inner one and 0.4 times as long as hind basitarsus (Fig. 6). Ratios of hind tarsomeres as follows: 1 : 2 = 2.0, 2 : 3 = 1.6, 3 : 4 = 1.6, 4 : 5 = 0.9.

Metasoma (Figs 1, 2) entirely polished with setae. T1 1.4 times as long as maximum width, evenly tapered from base to spiracle. Glymma present. Petiole 0.7 times as long as postpetiole. Dorsolateral edge of T1 rounded from base to spiracle. T2 0.8 times as long as maximum width. Laterotergite separated from tergites by a carina on T2 and anterior part of T3. Ovipositor sheath 1.3 times as long as hind tibia.



Fig. 9. Malaise trap site where the holotype of *Phytodietus (Weisia) clavotibialis* sp. n. was collected (photo by K. Ohara).

Colour (Figs. 1–8): Entirely yellowish with black marks (Figs. 1–6). The following parts black: apex of mandible (Fig. 4), interocellar area (Figs. 1–4), mark of mesoscutum (Figs. 1, 2), median mark of mesopleuron (Fig. 1), anterior half of propodeum (Figs. 1, 2), basal parts of median and hind trochanters (Fig. 1), mark of hind coxa (Figs. 1, 2), median transverse band of T1 (Figs. 1, 2), anterior transverse band of T2 (Figs. 1, 2), pair of median marks of T3 (Fig. 2), medio-anterior mark of T5 (Figs. 1, 2) and median mark of T7 (Fig. 1). The following part brownish: antennae except ventral part of scape to first flagellomere (Fig. 1), wing venations (Figs. 7, 8), base and apex of hind tibia (Figs. 1, 6), hind tarsomeres (Fig. 1), ovipositor and its sheath (Fig. 1). Wings hyaline (Figs. 7, 8).

Male: Unknown.

Bionomics: Almost unknown. The specimen was collected using a Malaise trap fixed in grassland surrounded by forest (Fig. 9).

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Discussion

This species possesses remarkably clavate fore tibia (Figs. 1, 5). Although the antenna exhibits no modification, the fore tibia may be an enlarged subgenual organ (BROAD et al. 2012).

Unfortunately, we could not find the additional specimens other than the holotype. However, the species of *Weisia* are usually significantly difficult to collect and the new species is morphologically easily distinguishable from the other species of the subgenus (see above key and diagnosis). Hence, herein we describe this new species based on only a single specimen.

This is the second species of *Weisia* from Japan. We also recognised the third species from Japan, but there were only male specimens, so we could not describe it.

Acknowledgements: We are grateful to K. Ōhara (Sanagochi Nature Center, Tokushima, Japan) for collecting and providing the holotype specimen. This work was partly supported by the Grant-in-Aid for JSPS KAKENHI (Grant number 25292034).

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Received: 07.07.2017

Accepted: 28.01.2018