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Monograph

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Review of *Palpostilpnus* Aubert (Hymenoptera, Ichneumonidae, Phygadeuontinae), with the description of ten new species

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Abstract. The taxonomic limits of *Palpostilpnus* Aubert, 1961 are reviewed. The genus is characterized mainly by having a very elongated maxillary palp; head short and depressed, with mandible small and with distinct basal groove; ovipositor short and slender, needle-like. A total of seventeen species are recognized, of which ten are described as new: *P. aki* sp. nov., *P. angka* sp. nov., *P. angkor* sp. nov., *P. hainanensis* sp. nov., *P. mangrovi* sp. nov., *P. pterodactylus* sp. nov., *P. ranui* sp. nov., *P. singaporensis* sp. nov., *P. tamasek* sp. nov. and *P. trifolium* sp. nov. The combination *Palpostilpnus rufinator* (Aubert, 1961) stat. rev. is proposed. An illustrated key to the known species of the genus is provided.

Keywords. Chiroticina, *Townostilpnus*, Oriental region, parasitoids, Malaise trap, geometric morphometrics.

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Introduction

Palpostilpnus Aubert, 1961 (Hymenoptera, Ichneumonidae, Phygadeuontinae) was described as a subgenus of the then newly proposed *Townostilpnus* Aubert, 1961 (Aubert 1961). The genus was

characterized mostly by having the propodeum broader than long, with the areola fused with the petiolar area; head short and depressed; antennae subapically distinctly enlarged; mandible very small; and mesoscutum strongly convex and broader than long. Aubert (1961) proposed four species for the genus: three from Southeast Asia, in the subgenus *Palpostilpnus*, characterized by having the maxillary palp very long, reaching the base of the hind coxa; and one from Corsica (France), in the subgenus *Townostilpnus*, with the palp of regular length.

Townes (1970) not only raised these two subgenera to genera but also placed them in different subtribes. *Palpostilpnus* was placed in the Chiroticina Townes, 1970, presumably on the basis of the very long maxillary palp, a character shared with other genera in the subtribe. *Townostilpnus* was placed in the Gelina Viereck, 1918, probably based on the mandible being sub-basally swollen, a defining character of the subtribe. Interestingly, Townes (1970) also transferred *P. rufinator* (Aubert, 1961) to *Townostilpnus*, even though that species does show unusually long palpi. Gupta (1987) raised the subspecies *P. striator papuator* (Aubert, 1961) to species level, and Sheng & Broad (2011) described a new species of *Palpostilpnus* from China, *P. brevis* Sheng & Broad, 2011. Two other species were later described from Jiangxi Province in China, *P. maculatus* Sheng & Sun, 2013 and *P. rotundatus* Sheng & Sun, 2013. Since then no new taxonomic accounts of the genus have been presented. Hosts and other biological aspects are also enigmatic.

The genus was included in a recent comprehensive investigation of the phylogeny of cryptine wasps (Santos 2017). The results suggested that the former tribe Phygadeuontini represents a polyphyletic group, and that its main lineage is more closely related to the Ichneumoninae than to the remaining Cryptinae (the latter result confirmed by Bennett *et al.* 2019). Hence, the tribe was raised to subfamily level pending a more detailed investigation of some unusual lineages. *Palpostilpnus* was recovered as part of the “Phygadeuontinae *sensu stricto*”, closely related to *Acrolyta* Förster, 1969 and *Gelis* Thunberg, 1827, but the relatively shallow taxonomic sampling of Phygadeuontini did not allow detailed inferences about its evolutionary history.

The present paper aims to review the generic delimitation of *Palpostilpnus*; to describe ten new species from the Oriental region, more than doubling the number of known species worldwide; and to provide new distributional records and an identification key to the species of the genus. We also provide a distribution map for the 17 species of *Palpostilpnus* (Fig. 1).

Material and methods

This work is based on 46 specimens of *Palpostilpnus*. The studied specimens belong to the following institutions (curators in parentheses):

- GSFPM = General Station of Forest Pest Management, China (Mao-Ling Sheng)
- HKU = Hong Kong University, Hong Kong (Benoit Guénard)
- KIZ = Kunming Institute of Zoology, Kunming, China (Kaiqing Li)
- LKCNHM = Lee Kong Chian Natural History Museum, Singapore (Wendy Wang)
- NHMUK = The Natural History Museum, London, UK (Gavin Broad)
- NHRS = Swedish Museum of Natural History, Stockholm, Sweden (Hege Vårdal)
- QSBG = Queen Sirikit Botanic Garden, Chiang Mai, Thailand (Wichai Srisuka)
- RBINS = Royal Belgian Institute of Natural Sciences, Brussels, Belgium (Wouter Dekoninck)
- SCAU = South China Agricultural University, Guangzhou, China (Jing-Xian Liu)
- USUC = Utah State University, Logan, Utah, USA (David Wahl)

Among the examined material, 31 specimens were obtained during mass collecting long-term projects. The Singapore Mangrove Insect Project (<http://evolution.science.nus.edu.sg/MIP.html>) of the NUS (National University of Singapore) sampled 11 mangrove sites for 24 months yielding 22 specimens of *Palpostilpnus*. Eight sites were sampled in Singapore for a review of Hybotidae (Diptera) made by the RBINS (Grootaert & Shamshev 2012) for 11 months. This material contained five specimens of *Palpostilpnus*. The Queensland Chinese Academy of Science Biodiversity Project ran by the XTBG (Xishuangbanna Tropical Botanical Garden, Yunnan, China) studied tree elevation transects in Yunnan Province of China: in tropical (Xishuangbanna, Mengla), sub-tropical (Ailao Shan) (Fig. 2A–B) and sub-alpine (Lijiang) regions (Ashton *et al.* 2016). The elevational range sampled, with four Malaise traps at each transect, varied: 800–1400 m a.s.l. at Mengla, 2000–2600 m a.s.l. at Ailao Shan and 3200–3800 m a.s.l. at Lijiang. Again, the material contained a single specimen of *Palpostilpnus* from Ailao Shan. An elevation transect project in Northern Thailand, the “Twin Peaks Project” (Liu & Reshchikov 2019; Plant *et al.* 2019) ran by the QSBG, sampled 11 sites starting at 400 m.a.s.l. to the summit of Doi Inthanon at 2534 m a.s.l, Chiang Mai Province, Thailand (Fig. 2C). The material here contained a single specimen of *Palpostilpnus*. In Hong Kong a Malaise trap was set by the fourth author (CB) at the same location between 2004 and the present (Barthélémy *et al.* 2018; Barthélémy & Olmi 2019); it yielded only two specimens of *Palpostilpnus* (Fig. 3A–B), and the Hong Kong Mangroves Project (Grootaert *et al.* 2019), which sampled 102 mangrove sites in 15 months, yielded a single additional specimen of *Palpostilpnus*. Summary descriptions of habitats are given in Table 1.

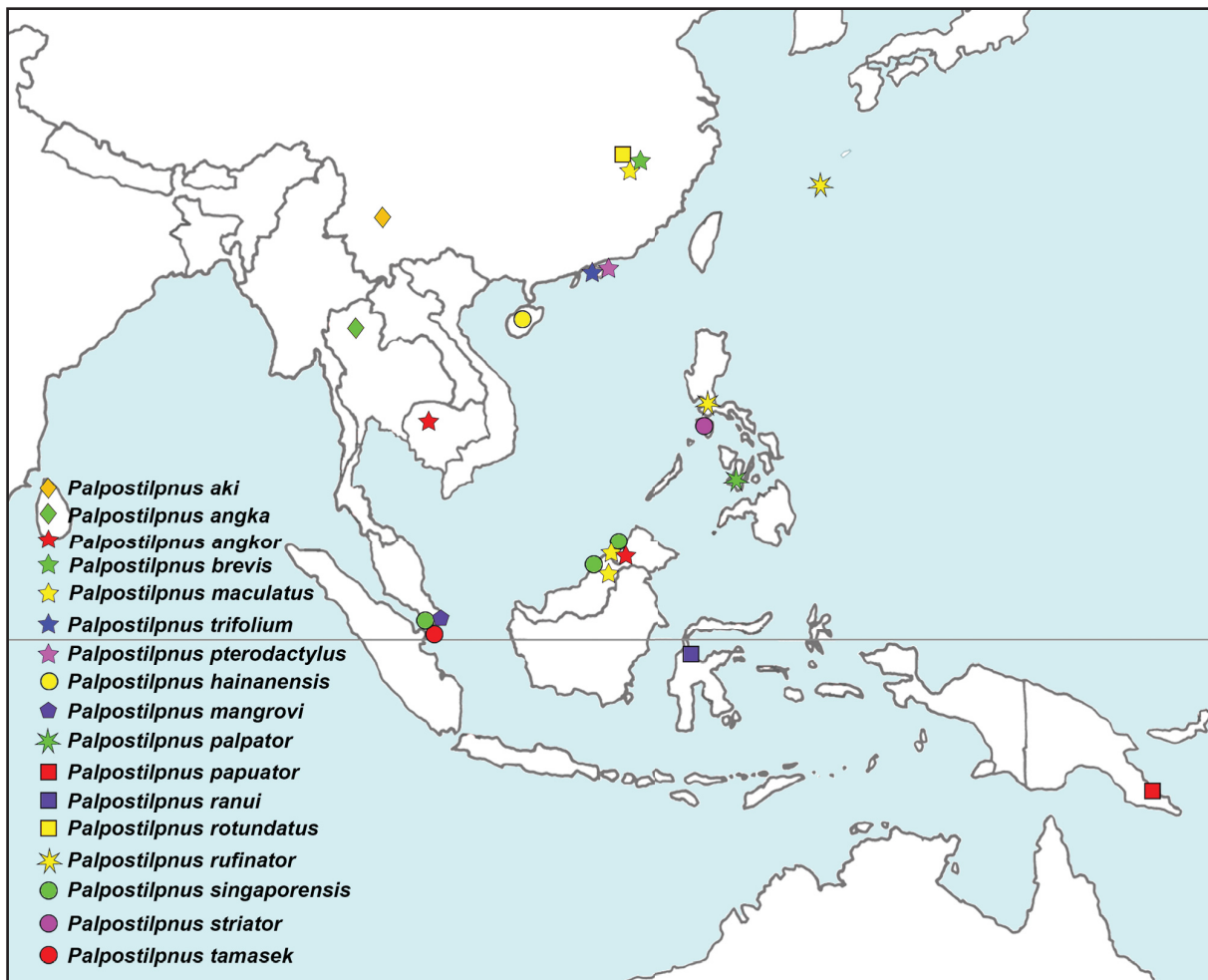


Fig. 1. Distribution of 17 species of *Palpostilpnus* Aubert, 1961.



Fig. 2. A. China, Yunnan, Ailao Shan, general view (photo: Akihiro Nakamura). B. Ailao Shan, two traps on the forest floor, habitat of *Palpostilpnus aki* sp. nov. (photo: Akihiro Nakamura). C. Malaise trap, Thailand, Doi Inthanon National Park, habitat of *P. angka* sp. nov. (photo: Wichai Srisuka).

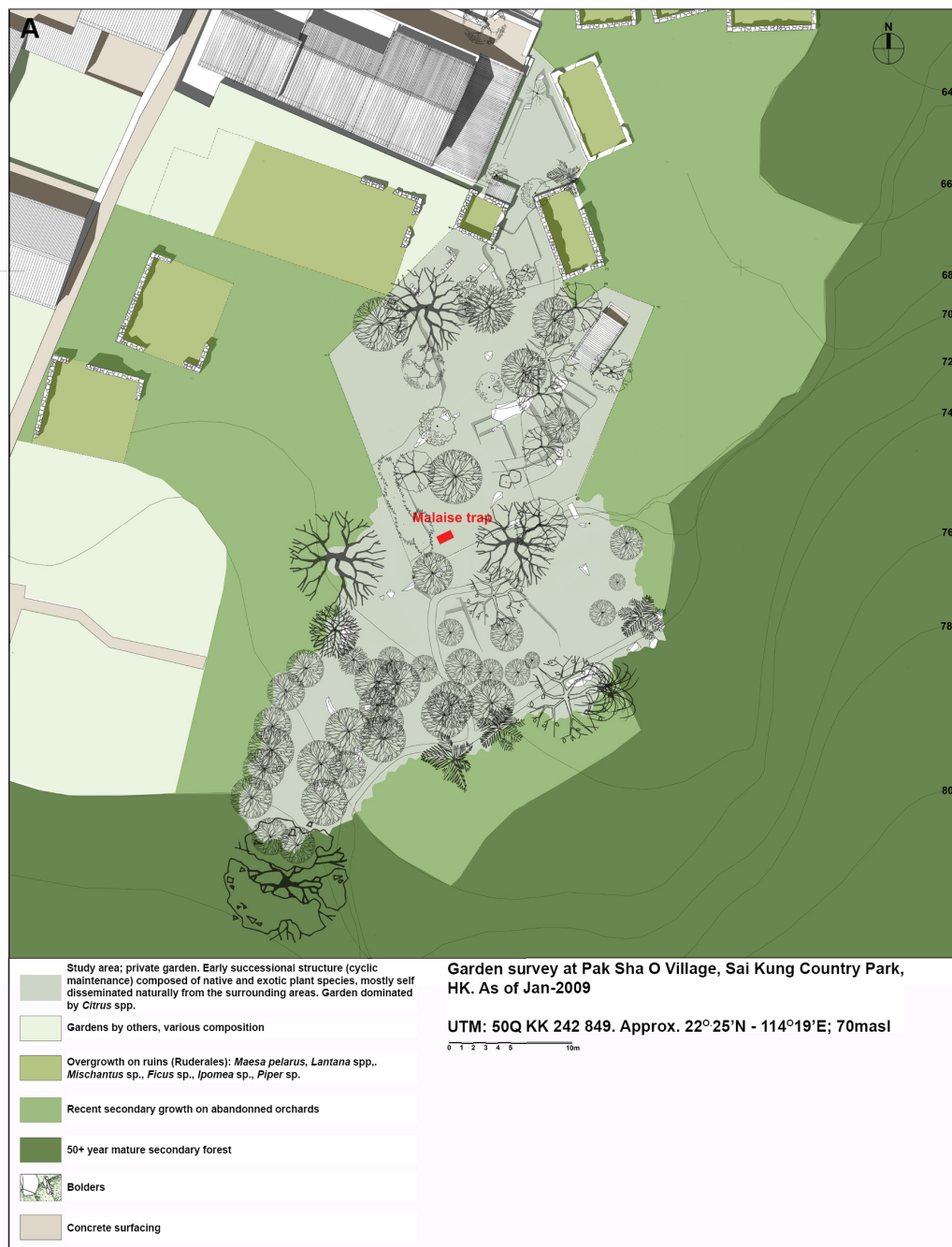


Fig. 3. **A.** Pak Sha O, Hong Kong, habitat of *Palpostilpnus pterodactylus* sp. nov. and *P. trifolium* sp. nov. Malaise trap surroundings. **B.** Panoramic shot of garden, Malaise trap on the far right (photo: Christophe Barthélemy).

Table 1. Habitats of new species of *Palpostilpnus* Aubert, 1961.

Species	Locality	Altitude	Climate	Habitat Structure		
				Forest	Mangroves	Gardens
<i>P. trifolium</i> sp. nov.	Pak Sha O, Hong Kong, China	70 m	tropical climate with wet and dry monsoons	–	–	early successional, dominated by <i>Citrus</i> spp. (old orchard), surrounded by evergreen mature secondary forest
<i>P. pterodactylus</i> sp. nov.	Mai Po Nature Reserve, Hong Kong, China	1–2 m	tropical climate with wet and dry monsoons	–	intertidal mangrove forest dominated by <i>Kandalaria oblovata</i>	–
<i>P. singaporensis</i> sp. nov.	Nee Soon, Singapore	0 m	equatorial	–	swamp forest composed of <i>Palauquium xanthochyllum</i> (de Vriese) Pierre ex Burck, <i>Xyloptia fusca</i> Maingay ex Hook.f. & Thomson and <i>Lophopetalum multinervium</i> Ridl.	–
<i>P. tamasek</i> sp. nov.	Nee Soon, Singapore	0 m	equatorial	–	swamp forest composed of <i>Palauquium xanthochyllum</i> (de Vriese) Pierre ex Burck, <i>Xyloptia fusca</i> Maingay ex Hook.f. & Thomson and <i>Lophopetalum multinervium</i> Ridl.	–
<i>P. mangrovi</i> sp. nov.	Bukit Timah, Singapore	4 m	equatorial	primary coastal hill dipterocarp forest dominated by <i>Shorea curtisii</i> Dyer ex King and <i>Dipterocarpus caudatus penangianus</i> Foxw.	–	–
<i>P. mangrovi</i> sp. nov.	Nee Soon, Singapore	0 m	equatorial	–	swamp forest composed of <i>Palauquium xanthochyllum</i> (de Vriese) Pierre ex Burck, <i>Xyloptia fusca</i> Maingay ex Hook.f. & Thomson and <i>Lophopetalum multinervium</i> Ridl.	–
<i>P. aki</i> sp. nov.	Ailao Shan, Yunnan, China	2200 m	humid subtropical	evergreen broad-leaved forest dominated by <i>Lithocarpus hancei</i> (Benth.) Rehder and <i>Camellia sinensis assamica</i> (Masters.) Kitam.	–	–
<i>P. angka</i> sp. nov.	Doi Inthanin, Chiang Mai, Thailand	710 m	tropical wet and dry	deciduous mixed forest dominated by <i>Teetana grandis</i> L.f., <i>Xylia xylocarpa</i> Rob. Taub., <i>Lagerstroemia calyculata</i> Kurz and <i>Miletia leucantha</i> Kurz	–	–
<i>P. angkor</i> sp. nov.	Angkor Wat, Cambodia	40 m	tropical wet and dry	secondary dipterocarp forest mostly composed of <i>Dipterocarpus alatus</i> Roxb., <i>Tetrameles nudiflora</i> R. Br., <i>Diospyros decandra</i> Lour., <i>Aglata spectabilis</i> (Miq.) Jain & Bennet, <i>Lagerstroemia calyculata</i> Kurz, <i>Irvingia malayana</i> Oliv. ex A. W. Benn., <i>Aegle marmelos</i> (L.) Corrêa and <i>Streblus asper</i> Lour.	–	–

All ichneumonid specimens from the Singapore Mangrove Insect Project and Nee Soon Swamp Forest Project (Kutty *et al.* 2018) were barcoded and pre-sorted into putative species (“MOTUs”) at NUS. This was feasible due to the development of fast and cost-effective NGS barcoding (Meier *et al.* 2015; Wang *et al.* 2018). NGS barcoding either uses an antenna for direct PCR (Wong *et al.* 2014) or DNA is obtained using quick-extraction methods without damaging the specimens (see Wang *et al.* 2018). All barcoded specimens are grouped into Molecular Operational Taxonomic Units (MOTUs) before being checked for congruence with morphology (“reverse workflow for specimen processing”: Wang *et al.* 2018). This workflow also allows for the association of immatures, males and females (Yeo *et al.* 2018). In the case of the ichneumonid specimens from Singapore, the MOTUs were congruent with the species that are here described on the basis of morphological characters.

Images were acquired digitally using the following systems: a Leica MC 170HD digital camera attached to Leica S8APO microscope (SCAU); a Dun Inc. Passport II microphotography system (fitted with a Canon 65 mm 5× MPE lens) (NUS); a Microscopic Solutions™ macropod imaging system using multiple (typically 75) focal planes, with stacks of photographs being combined using either Helicon Focus or Zerene Stacker software (using the “pmap” mode) into a single extended focus image; a Leica M205 C stereo microscope and the stacking software LAS ver. 4 at increments of 20–50 steps (HKU). All images were further processed in Adobe Photoshop® for minor adjustments.

Morphological terminology follows Gauld (1991). Wing vein nomenclature is based on Ross (1936) and the terminology on Mason (1986, 1990). The first and subsequent metasomal tergites are referred to as T1, T2, T3, etc.

In order to provide an exploratory, yet objective assessment of the unusual body shape observed among species of *Palpostilpnus*, we used geometric morphometrics to quantify the shape of the mesosoma in species of the genus and a representative assemblage of 347 other ichneumonid species from the dataset of Santos *et al.* (2019), mostly from Cryptinae Kirby, 1837 but including species from a total of eleven subfamilies: Adelnathinae Thomson, 1888, Banchinae Wesmael, 1845, Brachycyrtinae Viereck, 1919, Claseinae Porter, 1998, Cremastinae Förster, 1869, Cryptinae, Ichneumoninae Latreille, 1802, Phygadeuontinae Förster, 1869, Pimplinae Wesmael, 1845, Tryphoninae Shuckard, 1840 and Xoridae Shuckard, 1840.

Standardized photographs of the mesosoma in lateral view (Fig. 4A) for all analysed taxa were produced using either a Microoptics ML-100 digital imaging system, with a Canon EOS 60D camera attached to Infinity K2 and HDF lenses and a ML-1000 stroboscopic lighting system, or an EntoVision system (GTVision, Hagerstown, Maryland), including a Leica Z16 zoom lens attached to a JVC KY-75U 3-CCD digital video camera that feeds image data to a desktop computer. The shape of the mesosoma was assessed using seven landmarks recorded with the software ImageJ (Schneider *et al.* 2012). These landmarks were placed on seven precise morphological features of the mesosoma to provide an objective and reproducible assessment of shape (Fig. 4B). To avoid biases derived from sexual dimorphism, each species was estimated using a female specimen. Landmark data for the species of *Palpostilpnus* is available in the [Supplementary Material](#).

Landmarks were aligned and superimposed using a generalized Procrustes analysis (Dryden & Mardia 1993) in the package *geomorph* (Adams *et al.* 2014), removing information such as size and orientation to focus purely on geometric shapes. Mean shapes were then calculated for each taxon and the shape variation was explored in a principal component analysis (PCA) of the coordinates projected into the linear tangent space (Rohlf 1999) (Fig. 4B).

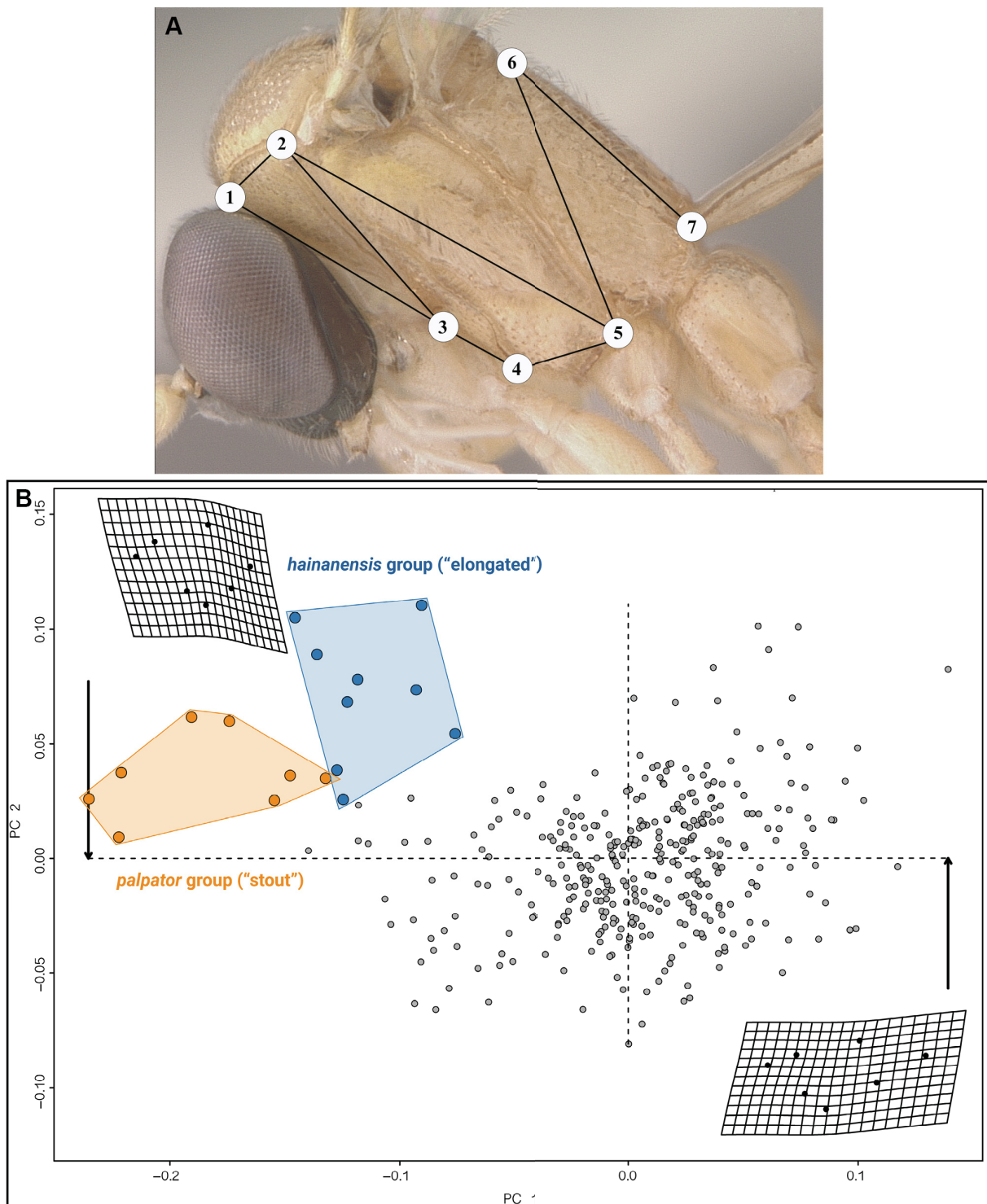


Fig. 4. Morphometrics. **A.** Landmarks used for the geometric morphometric analyses, following Santos *et al.* 2019. **B.** Two principal components (PC1 and PC2) of the shape space for the mesosoma, plotted over a Procrustes-aligned tangent space. Gray dots represent the general ichneumonid morphospace as represented by 347 species from eleven subfamilies. Orange dots and polygon delimit the morphospace occupied by species of the *palpator* group ("stout"), and blue dots and polygon represent species of the *hainanensis* group. Objects at each extremity of the X-axis are deformation grids representing the mean shapes at the extreme of the first principal component.

Results

Generic treatment

Class Hexapoda Blainville, 1816
Order Hymenoptera Linnaeus, 1758
Superfamily Ichneumonoidea Latreille, 1802
Family Ichneumonidae Latreille, 1802
Subfamily Phygadeuontinae Förster, 1869

Palpostilpnus Aubert, 1961

Palpostilpnus Aubert, 1961: 56–58 (type species: *Townostilpnus (Palpostilpnus) palpator* Aubert, 1961; designated in Townes 1970).

Expanded diagnosis

Head short and depressed; gena narrow, in frontal view not bulging behind eyes. Mandible small, sub-basally swollen, with basal, transverse groove. Malar sulcus indistinct. Maxillary palp reaching base of hind coxa or almost so. Antenna slightly shorter to distinctly longer than body, strongly enlarged and somewhat flattened at midlength, ventral face distinctly flattened, lighter in colour. Occipital carina reaching base of mandible. Mesosoma stout, short to moderately long, but always somewhat obliquely sloped. Sternaulus shallow, complete or distinct only on anterior 0.5. Episternal scrobe deep or shallow. Hind tibia gradually and distinctly enlarged towards apex. Hind tarsal claws very small. Areola fused with petiolar area; median longitudinal carinae, when present, parallel. Forewing crossvein 2m-cu inclivous, with one bulla. T1 1.5–2.5 times as long as apically broad, without median dorsal carina. Ovipositor very slender, needle-like, as long as 0.20–3.50 of hind basitarsus.

Remarks

The most readily recognizable diagnostic feature of *Palpostilpnus* is the very long maxillary palp, reaching the base of the hind coxa. Although very characteristic, this trait is not unique of *Palpostilpnus*: most of the genera placed in Townes' subtribe Chiroticina show somewhat elongated palpi. *Palpostilpnus* can be readily differentiated from these taxa by having the mandible small and slender, with a basal transverse groove, and a very slender, needle-like ovipositor. Since *P. rufinator* (Aubert, 1961) stat. rev. also shows all these character states, and bears much more morphological and biogeographical affinities with the remaining species of *Palpostilpnus* than with *Townostilpnus chagrinator* Aubert, 1961 (Aubert 1961, 1980; Di Giovanni & Scaramozzino 2019), we hereby transfer it back to *Palpostilpnus*.

The characteristic body shape is another diagnostic feature of *Palpostilpnus*, with the head being short and depressed, and the mesosoma stout and obliquely sloped. The PCA derived from geometric morphometric data (Fig. 4B) clearly shows that the shape of the mesosoma in species of this genus is fairly distinct from all other analyzed species. The results also support the division of the species recognized as *Palpostilpnus* into two reasonably clear species groups. Both show the distinctive features of the genus such as the long palp, the needle-like ovipositor and the obliquely sloped mesosoma. However, one group shows a somewhat elongated (more than 1.4 times as long as its height) and strongly slanted mesosoma (e.g., *P. ranui* sp. nov.), while in the other group the mesosoma is very short, stout (1.25–1.4 times as long as its height) and only slightly obliquely slanted (e.g., *P. singaporensis* sp. nov.). While it is unclear whether these two groups represent reciprocally monophyletic units, we suggest that they are informally designated as two species groups: (1) the *palpator* group for the “stout” species, including *P. angkor* sp. nov., *P. brevis*, *P. maculatus*, *P. palpator* (Aubert, 1961), *P. papuator*, *P. rufinator* stat. rev., *P. singaporensis* sp. nov. and *P. striator*; (2) the *hainanensis* group for the “elongated” species, including

P. aki sp. nov., *P. angka* sp. nov., *P. hainanensis* sp. nov., *P. mangrovi* sp. nov., *P. pterodactylus* sp. nov., *P. ramui* sp. nov., *P. rotundatus*, *P. tamasek* sp. nov. and *P. trifolium* sp. nov.

We have also encountered specimens that show a similar habitus to the species of *Palpostilpnus* recognized herein, with a depressed head and a short, stout, obliquely sloped mesosoma. However, these species lack the long palpi observed in the species of this genus. Hence, we prefer to wait for a comprehensive phylogenetic assessment of the species of *Palpostilpnus* and similar taxa before deciding upon the placement of these species.

Biology

Unknown.

Distribution

Oriental and Australasian. Known species are recorded from Brunei, China (Hainan, Hong Kong, Jiangxi, Yunnan), Indonesia (Sulawesi), Malaysia (Sarawak), Philippines, Singapore and Thailand in the Oriental region and Papua New Guinea in the Australasian region.

The hainanensis group

Palpostilpnus aki sp. nov.

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Figs 5–6

Diagnosis

Body obliquely elongate (Fig. 5A). Postero-ocellar distance 1.5 times as long as ocular-ocellar distance (Fig. 6G). Occipital carina complete. Epomia absent. Epicnemial carina present on lower half of mesopleuron. Propodeal carinae absent except for posterior portion of median longitudinal carina (Fig. 6C). T1 2.35 times as long as apically broad (Fig. 6A). Wings hyaline (Fig. 6H).

Etymology

This species is named after Dr. Akihiro Nakamura of the Xishuangbanna Tropical Botanical Garden.

Material examined

Holotype

CHINA • ♀; Yunnan, Ailao Shan; 2200 m a.s.l.; Plot B; Malaise trap 323XTBG; Aug. 2011; A. Nakamura *et al.* leg.; KIZ.

Description

Female

SIZE. Fore wing length 3.41 mm. Body oblique elongate, 1.42 times as long as its height (Fig. 5A).

HEAD. Face 1.7 times as broad as high, with moderately dense setae, strongly granulose and densely punctate, centrally weakly convex (Fig. 6B). Clypeal suture indistinct. Clypeus slightly convex, with basal half granulose and apical half weakly transversely striate, apical margin sharp, slightly convex. Mandible polished, sparsely setose, with dorsal tooth slightly longer than ventral tooth. Malar space nearly polished, 1.14 times as long as mandibular basal width. Gena glossy, sparsely punctate. Vertex punctate, posterior portion from posterior ocelli to occipital carina steeply slanted. Frons densely punctate, with lower half transversely rugose. Postero-ocellar distance 1.5 times as long as ocular-ocellar distance. Antenna shorter than body length, with 24 flagellomeres, ventral side from eighth flagellomere to apex flattened and thickened (Fig. 6F). Occipital carina complete.

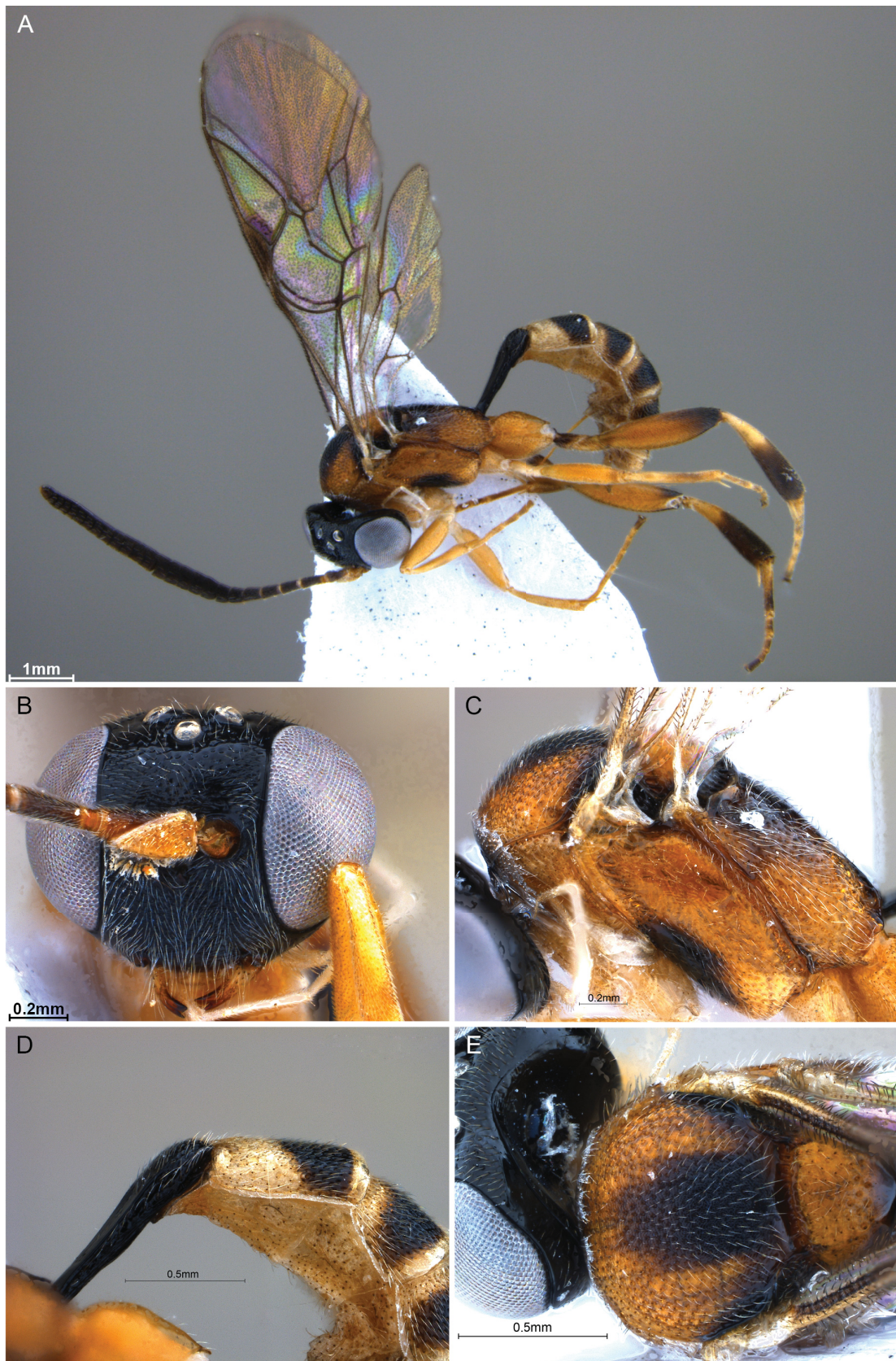


Fig. 5. *Palpostilpnus aki* sp. nov., holotype, ♀ (KIZ). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** T1–T3, lateral view. **E.** Scutum.

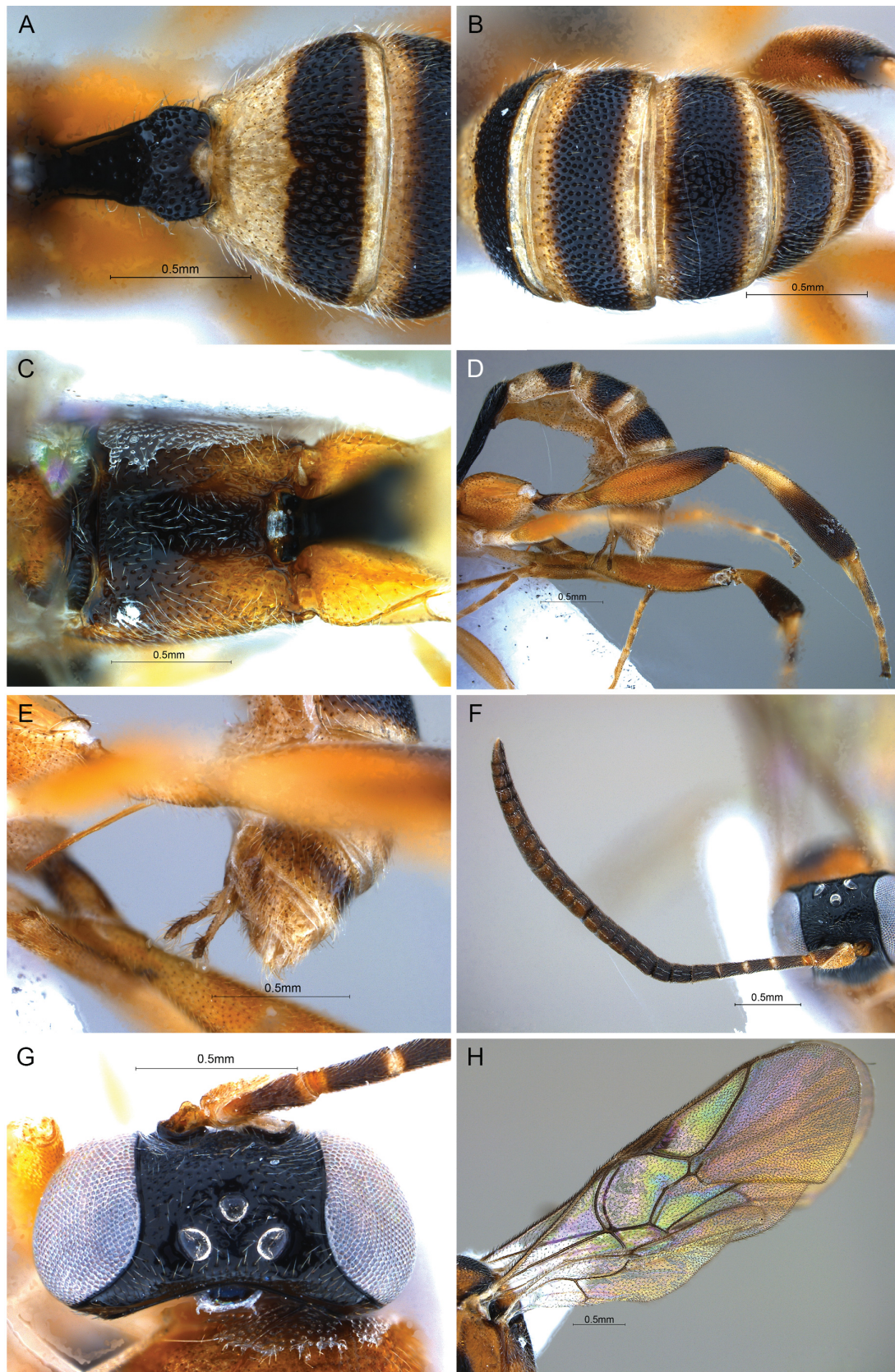


Fig. 6. *Palpostilpnus aki* sp. nov., holotype, ♀ (KIZ). **A.** T1 and T2, dorsal view. **B.** T3–T5, dorsal view. **C.** Propodeum, dorsal view. **D.** Hind leg. **E.** Ovipositor. **F.** Antenna. **G.** Vertex. **H.** Wing.

MESOSOMA. Pronotum ventrally smooth, dorsally distinctly punctate. Epomia absent. Mesoscutum ovoid, 0.8 times as long as wide, weakly convex, with leathery texture and dense punctures (Fig. 5E). Notaulus absent (Fig. 5C). Scutellum slightly evenly convex, shallowly punctate, with apex polished. Postscutellum polished, with scattered punctures. Mesopleuron polished, sparsely punctate, area above dorsal end of epicnemial carina smooth and weakly rugose (Fig. 5C). Epicnemial carina reaching to dorsal 0.5 of mesopleuron (Fig. 5C). Sternaulus absent (Fig. 5C). Metapleuron punctate and setose, punctures closed. Juxtacoxal carina absent. Submetapleural carina complete. Fore wing with 1cu-a distad of M becoming Rs by 0.3 of length of 1cu-a, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu slightly longer than 2cu-a (Fig. 6H). Hind wing with cu-a strongly inclivous and interrupted at lower 0.18. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of fore basitarsus with basal half distinctly bent. Hind coxa with sparse punctures. Hind femur stout, 2.6 times as long as its maximum width (Fig. 6D). Basal portion of hind tibia slender, gradually thick toward apex. Longer spur of hind tibia 0.4 times length of hind basitarsus. Propodeum gradually sloping in lateral view, shallowly punctate, punctures dense on central area and metapleuron, sparser on lateral portion of propodeum. Propodeal carinae absent except for apical portion of median longitudinal carina (Fig. 6C).

METASOMA. T1 2.35 times as long as apically broad, petiole flattened, smooth, centrally with scattered punctures; postpetiole densely punctate, without dorsolateral or median dorsal carinae; ventrolateral carina weak; spiracle small and slightly projected (Figs 5D, 6A). T2 coarsely and densely punctate (Fig. 6A). T3–T5 coarsely and densely punctate, punctures closer than those of T2 (Fig. 6B). T6 mostly finely and sparsely punctate, centrally polished. Ovipositor very thin, 1.32 times as long as hind basitarsus (Fig. 6E).

COLOUR. Head black. Mandible whitish yellow with teeth apically yellowish brown. Palpi white. Antenna black brown, scape yellowish brown, ventral side of petiole light brown, ventral side from eighth flagellomere to apex brown. Mesosoma yellowish brown, mesoscutum centrally and laterally black brown; apex of scutellum fuscous; mesopleuron with epicnemium black; basal half of propodeum fuscous and central area from base to apex black. Fore and middle legs brownish yellow, fore and middle trochanters whitish yellow, mid tibia and tarsus very lightly fuscous; hind coxa brownish yellow, trochanter fuscous, hind femur brownish yellow with apical 0.3 fuscous, hind tibia fuscous with basal 0.5 whitish yellow; hind tarsus fuscous with basal half of basitarsus and ventral sides of second to fifth segments brownish yellow. T1 entirely black; T2 with basal half and apical margin whitish yellow, with a transverse black band behind middle; T3–T4 black brown with basal and apical margins whitish yellow. Wings hyaline, veins and stigma fuscous. Ovipositor sheath slightly fuscous.

Male

Unknown.

Remarks

This species is similar to *P. rotundatus* Sheng & Sun, 2013, but differs from it by the absence of the median propodeal longitudinal carina (Fig. 6C). It is also similar to *P. trifolium* sp. nov. and *P. tamasek* sp. nov., from which it differs by the entirely reddish anterior and lateral part of the mesonotum (Fig. 5E) and entirely reddish scutellum (vs black anterior and yellowish lateral part of mesonotum and black scutellum in the latter species) and by the long T1 (2.35 times as long as apically broad, vs 1.8–1.9 times as long as apically broad in *P. trifolium* sp. nov. and *P. tamasek* sp. nov.).

Distribution

China (Yunnan).

Palpostilpnus angka sp. nov.

urn:lsid:zoobank.org:act:4CDE8813-7CC5-4B11-A2F8-0CA4EAAAF099

Figs 7–8

Diagnosis

Body oblique elongate (Fig. 7A). Postero-ocellar distance 2.0 times as long as ocular-ocellar distance (Fig. 8G). Occipital carina complete. Epomia distinct. Epicnemial carina distinct, reaching to upper 0.6 of mesopleuron. Carinae of propodeum absent, with pleural carina present posteriorly, sparsely punctate (Fig. 8C). T1 1.75 times as long as apically broad. Wings hyaline. T2–T5 centrally with a transverse black band (Fig. 8B).

Etymology

The species name refers to Doi Ang Ka (Thai: ดอยอ่างขาง), the former name of the type locality, Doi Inthanon.

Material examined

Holotype

THAILAND • ♀; Chiang Mai, Doi Inthanon National Park, Chomthong; 18°32'20.5" N, 98°36'05.3" E; 710 m a.s.l.; Malaise trap QSBG 2014-242; 27 Aug.–29 Sep. 2014; R. Sawkord, T. Somboonchai and S. Suriya leg.; QSBG.

Description

Female

SIZE. Fore wing length 3.1 mm. Body oblique elongate, 1.50 times as long as its height (Fig. 7A).

HEAD. Face 1.6 as broad as high, with moderately dense setae, granulose and punctate, centrally slightly longitudinally concave (Fig. 7B). Clypeal suture absent. Clypeus slightly convex, with fine striations, apical margin weakly rounded. Mandible polished, sparsely setose, with upper tooth slightly broader than lower tooth (Fig. 7B). Malar space 0.83 times as long as mandibular basal width. Gena polished, with separated minute punctures. Vertex rugose-punctate, almost vertically slanted behind posterior ocelli (Fig. 8G). Frons punctate, with granulose texture between punctures. Postero-ocellar distance 2.0 times as long as ocular-ocellar distance. Antenna shorter than body length, with 24 flagellomeres, moderately thickened and ventrally flattened from fifth to sixteenth flagellomeres, first flagellomere 3.80 times as long as its apical width and 1.25 times as long as second flagellomere (Fig. 8F). Occipital carina complete.

MESOSOMA. Pronotum ventrally smooth, dorsally distinctly rugose and punctate. Epomia distinct. Mesoscutum ovoid, 0.75 times as long as wide, with granulose texture and punctate. Notaulus absent (Fig. 7A). Scutellum flattened, sparsely punctate. Postscutellum polished, with scattered punctures. Mesopleuron punctate dorsally and ventrally, centrally with an oblique smooth area (Fig. 7A). Epicnemial carina distinct, reaching to upper 0.6 of mesopleuron (Fig. 7A). Sternaulus absent (Fig. 7A). Metapleuron sparsely punctate. Juxtacoxal carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu equal to that of 2cu-a. Hind wing with cu-a strongly inclivous and interrupted at lower 0.2. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of fore basitarsus with basal half distinctly bent. Hind coxa with sparse punctures. Hind femur stout, 3.3 times as long as its maximum width (Fig. 8D). Basal portion of hind tibia slender, sharply thick toward apex. Longer spur of hind tibia 0.46 times as long as hind basitarsus. Propodeum gradually sloping in lateral view, punctate. Propodeal carinae absent except carina of area postero-externa (Fig. 8C).



Fig. 7. *Palpostilpnus angka* sp. nov., holotype, ♀ (QSBG 2014-242). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** T1, dorsolateral view. **E.** Scutum.



Fig. 8. *Palpostilpnus angka* sp. nov., holotype, ♀ (QSBG 2014-242). **A.** T2–T4, dorsal view. **B.** T4–T5, dorsal view. **C.** Propodeum, dorsal view. **D.** Hind leg. **E.** Ovipositor. **F.** Antennae. **G.** Vertex.

METASOMA. T1 1.75 times as long as apically broad, petiole flattened, smooth, centrally with scattered punctures; postpetiole sparsely punctate, with dorsolateral or median dorsal carinae; ventrolateral carina distinct; spiracle small and rather projected (Fig. 7D). T2 coarsely and densely punctate (Figs 7D, 8A). T3–T5 coarsely and densely punctate (Fig. 8B). Ovipositor very thin, 0.6 times as long as hind basitarsus (Fig. 8E).

COLOUR. Head black. Mandible yellowish with apical tooth dark brown. Antenna black, scape whitish yellow, first and second flagellomeres fuscous, ventral sides of sixth to twenty-second flagellomere sandy-brown. Palpi whitish yellow. Mesosoma light testaceous. Legs testaceous, fore coxa and trochanter ivory, apex of hind femur fuscous; hind tibia with apical 0.3 fuscous. T1 testaceous with apex dark brown; T2 to T4 testaceous and with a transverse black band, T5 testaceous. Ovipositor sheath fuscous. Wings hyaline, veins and stigma fuscous.

Male

Unknown.

Remarks

This species is similar to *P. hainanensis* sp. nov. and *P. singaporensis* sp. nov., but it differs from *P. hainanensis* sp. nov. by having T2 to T5 with transverse black bands (vs T2 with light brown band, T3 to T5 with a pair of brown spots laterally); hind femur with apex black (not black in *P. hainanensis* sp. nov.); mesosoma entirely yellow (vs yellow with lower side of mesopleuron and propleuron black). It differs from *P. singaporensis* sp. nov. by having a shorter T1 (1.75 times as long as apically broad vs 2.0 times as long as apically broad).

Distribution

Thailand (Chiang Mai).

Palpostilpnus hainanensis sp. nov.

[urn:lsid:zoobank.org:act:CE2DDA98-118D-4106-8DB3-EED41FFB0A6A](https://zoobank.org/act:CE2DDA98-118D-4106-8DB3-EED41FFB0A6A)

Figs 9–10

Diagnosis

Body obliquely elongate (Fig. 9A). Postero-ocellar distance 3.0 times as long as ocular-ocellar distance (Fig. 10G). Occipital carina complete. Epomia indistinct. Epicnemial carina distinct, reaching to upper 0.7 of mesopleuron. Propodeal carinae absent. T1 1.8 times as long as apically broad (Fig. 9D). Wings hyaline (Fig. 10H).

Etymology

The specific name is derived from the type locality, Hainan Island.

Material examined

Holotype

CHINA • ♀; Hainan, Bawangling Nature Reserve; sweep net; 21–22 Oct. 2008; Jieming Yao leg.; SCAU.

Description

Female

SIZE. Fore wing length 3.5 mm. Body oblique elongate, 1.60 times as long as high (Fig. 9A).

HEAD. Face 1.6 times as broad as high, with moderately dense setae, slightly granulose and densely punctate, sublateral portion slightly longitudinally concave, centrally weakly convex (Fig. 9B). Clypeal suture very indistinct. Clypeus slightly convex, shiny, with weak transverse striation, apically straight (not evenly convex downwards) with sharp apical margin. Mandible polished, sparsely setose, with teeth sharp, upper tooth slightly broader than lower tooth. Malar space nearly polished, equal to mandibular width. Gena glossy, polished. Vertex (Fig. 10G) smooth, posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Postero-ocellar distance 3.0 times as long as ocular-ocellar distance (Fig. 10G). Frons with fine leathery texture, lower portion slightly concave. Antenna as long as body, with 24 flagellomeres, median portion rather thickened, first flagellomere 3.5 times as long as its apical width and 1.27 times as long as second flagellomere. Occipital carina complete, tapered upwards.

MESOSOMA. Pronotum smooth, sparsely and shallowly punctate. Epomia indistinct. Mesoscutum ovoid, 0.8 times as long as broad, convex, with fine leathery texture and indistinct punctures (Fig. 9E). Notaulus indistinct (Fig. 9C). Scutellum evenly convex, almost smooth, with very weak and indistinct leathery texture, with shallow punctures. Postscutellum transverse, smooth. Mesopleuron polished, anterior portion with fine punctures, lower portion with punctures indistinct, pubescent with white setae; posterior portion with fine transverse wrinkles and fine indistinct punctures (Fig. 9C). Epicnemial carina very short, defined only in lower portion of mesopleuron (Fig. 9C). Sternaulus distinct, diagonally crossing mesopleuron from middle anterior part to hind lower margin of mesopleuron (Fig. 9C). Metapleuron very long and narrow, with distinct shallow punctures, distance between punctures 0.2–3.0 times diameter of punctures. Juxtacoxal carina distinct. Submetapleural carina complete. Fore wing with 1cu-a distad of M becoming Rs by 0.3 of length of 1cu-a, 3rs-m absent; distal abscissa of M spectral; length of vein Cu 1.4 times as long as 2cu-a (Fig. 10H). Hind wing with cu-a strongly inclivous and interrupted at lower 0.3. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of basal portion of fore basitarsus distinctly bent. Hind coxa with fine and uneven punctures. Hind femur stout, 3.9 times as long as its maximum width (Fig. 10D). Basal portion of hind tibia slender, gradually thick toward apex. Longer spur of hind tibia 0.6 times as long as hind basitarsus. Propodeum gradually sloping in lateral view, with sparse fine punctures (Fig. 10C). Propodeal carinae absent.

METASOMA. T1 1.8 times as long as apically broad, smooth, petiole flat; postpetiole broad, without median dorsal carina or dorsolateral carina; ventrolateral carina weak; spiracle small, round, slightly convex (Fig. 10A–B). T1 and T2 coarsely and sparsely punctate (Fig. 10B). T3 coarsely and sparsely punctate (Fig. 10B). Ovipositor very thin, 1.4 times as long as hind basitarsus (Fig. 10E).

COLOUR. Mostly yellow. Flagellomeres starting from third, head (except basal parts of mandibles and apical margin of clypeus), lower part of pronotum and mesopleuron, area of scuto-scutellar groove, apical portion of hind tibia and apical portion of fifth tarsomere, transverse marks in hind part of T1, transverse mark of T2 and ovipositor sheath black. Scape, pedicel, base of first flagellomere, mandible except teeth, maxillary and labial palpi, all coxae and trochanters yellowish white. Pterostigma and veins yellowish brown. Wings slightly yellowish hyaline.

Male

Unknown.

Remarks

This species is similar to *P. singaporensis* sp. nov., from which it can be distinguished by the following combination of characters: metasoma almost entirely yellow (vs with broad transverse black bands) and ovipositor 1.4 times as long as hind basitarsus (vs 0.6 times in *P. singaporensis* sp. nov.).

Distribution

China (Hainan).

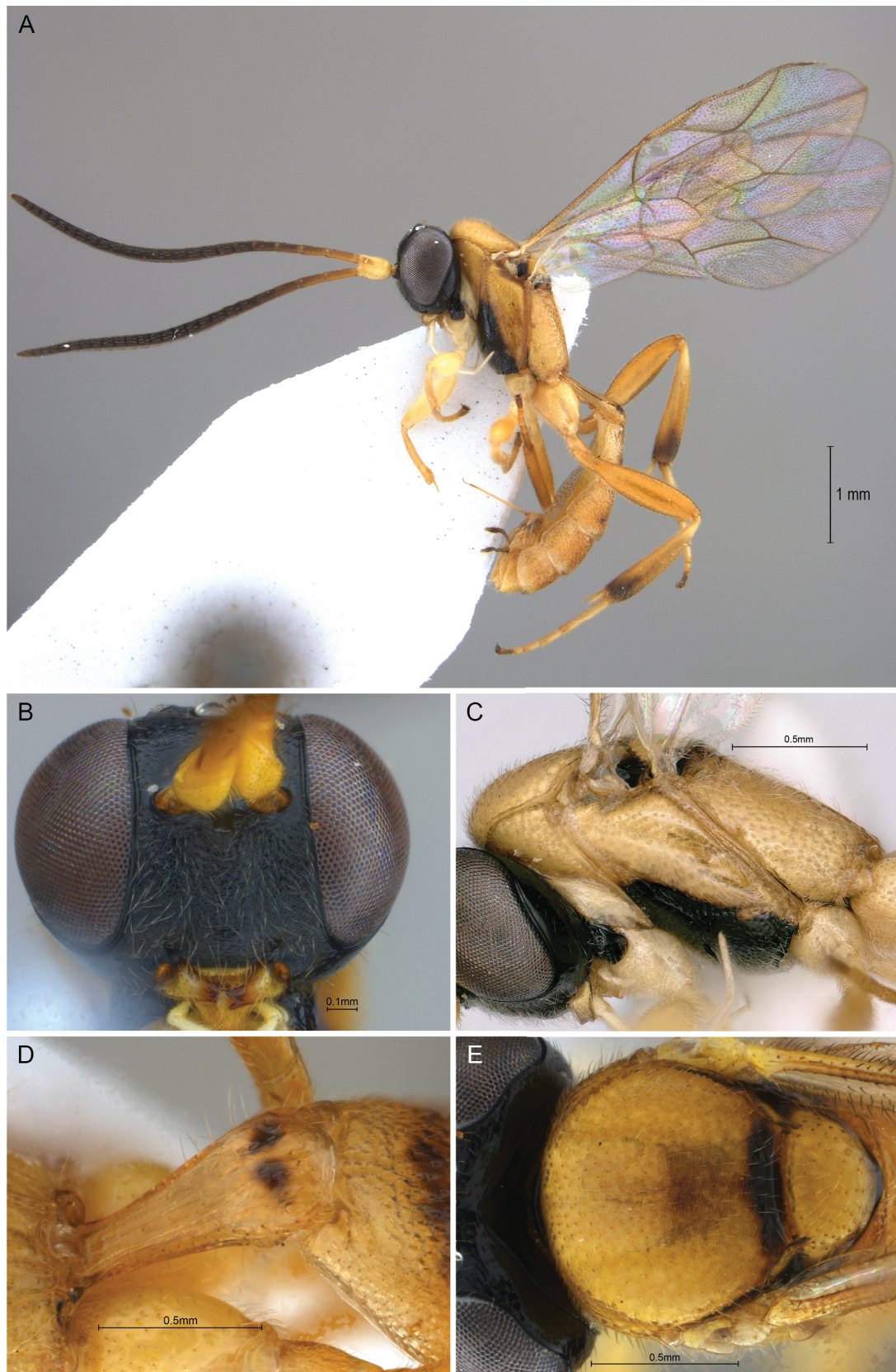


Fig. 9. *Palpostilpnus hainanensis* sp. nov., holotype, ♀ (SCAU). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** T1, dorsolateral view. **E.** Scutum.

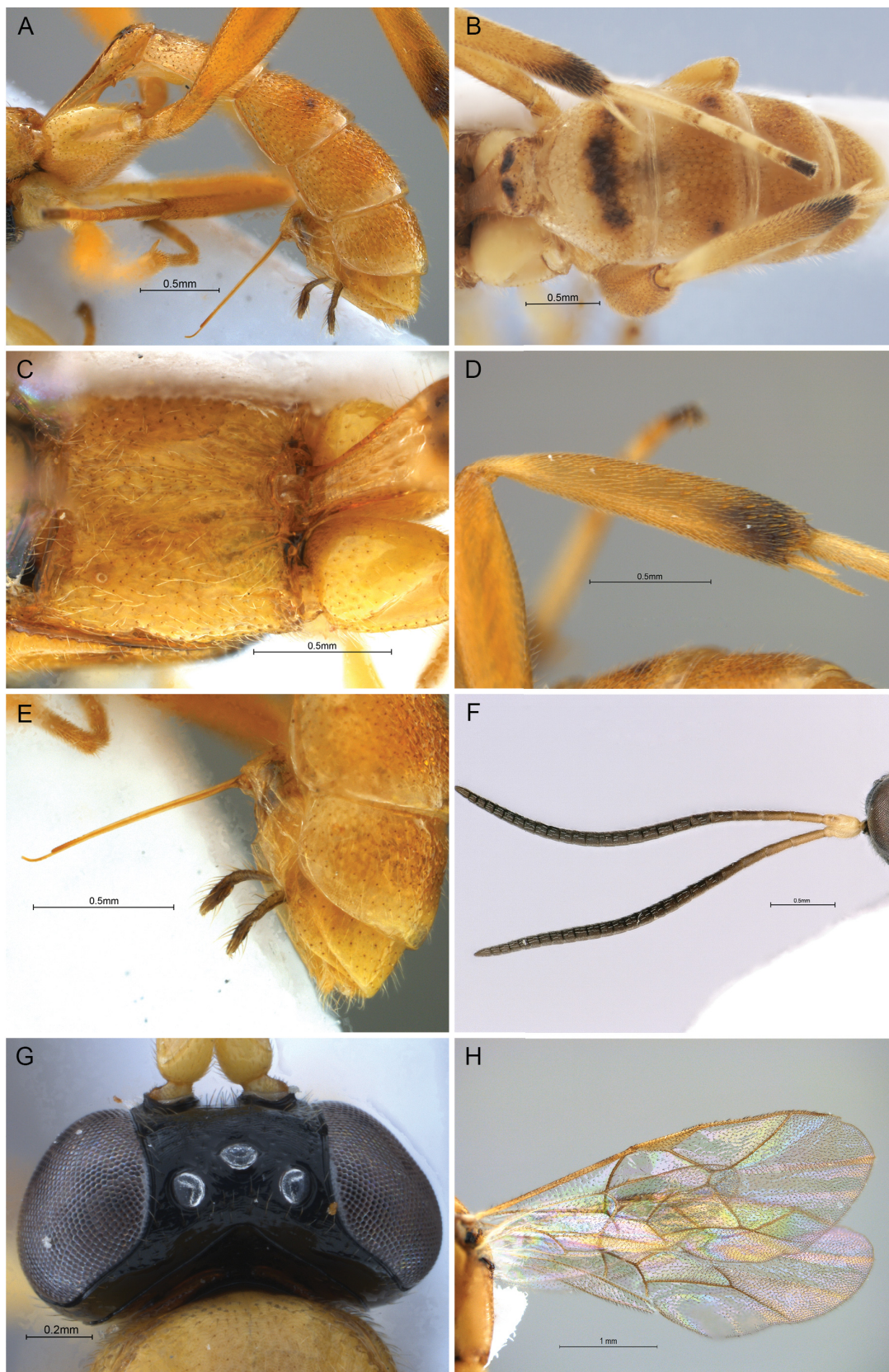


Fig. 10. *Palpostilpnus hainanensis* sp. nov., holotype, ♀ (SCAU). **A–B.** Metasoma, lateral and dorsal views. **C.** Propodeum, dorsal view. **D.** Hind leg. **E.** Ovipositor. **F.** Antennae. **G.** Vertex. **H.** Wings.

Palpostilpnus mangrovi sp. nov.

urn:lsid:zoobank.org:act:A751D18B-92A7-455E-ABAO-203AF40E1C01

Figs 11–12

Diagnosis

Body obliquely elongate (Fig. 11A). Postero-ocellar distance 2.0 times as long as ocular-ocellar distance (Fig. 12D). Occipital carina complete. Epomia indistinct. Epicnemial carina very short, defined only in lower portion of mesopleuron. Propodeal carinae absent, except forming area petiolaris (Fig. 12B). T1 1.8 times as long as apically broad (Fig. 11C). Fore wing infusate in middle (Fig. 12E).

Etymology

The specific epithet refers to the habitat in which this species was collected.

Material examined

Holotype

SINGAPORE • ♀; Nee Soon Swamp Forest; 1°23'00.3" N, 103°48'46.5" E; Malaise trap (NS1); 27 Jun.–3 Jul. 2013; NUS leg.; barcode: ZRC_30042; LKCNHM.

Paratypes

SINGAPORE • 1 ♀; Nee Soon Swamp Forest; 1°23'04.2" N, 103°48'40.7" E; Malaise trap (NS2); 13–20 Jun. 2012; NUS leg.; barcode: ZRC_BDP0029983; NHRS PT-HEVA000010858 • 1 ♀; Bukit Timah; 1.35127° N, 103.78161° E; maturing secondary forest; Malaise trap (BT09); 20–27 Jul. 2017; NUS leg.; barcode: ZRC_BDP0018400; LKCNHM • 1 ♀; Nee Soon Swamp Forest; 1°23'07.83" N, 103°48'39.48" E; Malaise trap #3; 13–20 Mar. 2006; K.I. Yeo leg.; RBINS.

Description

Female

SIZE. Fore wing length 2.3 mm. Body oblique elongate, 1.50 times as long as high (Fig. 11A).

HEAD. Face 1.5 times as broad as high, with moderately dense setae, longitudinally slightly convex centrally, forming rectangular area; with fine granulate texture, impunctate; sublateral portion slightly longitudinally concave (Fig. 11B). Clypeal suture indistinct. Clypeus slightly convex, matte, apically straight (not evenly convex downwards), with sharp apical margin. Mandible basally with granulate texture; teeth sharp, upper tooth slightly broader than lower tooth. Malar space smooth, 1.5 times as long as mandibular width. Gena glossy, smooth. Vertex coarsely punctate, distance between punctures 0.5–2.0 times diameter of puncture, posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave (Fig. 12D). Frons with fine leathery texture, lower portion slightly concave. Postero-ocellar distance 3.0 times as long as ocular-ocellar distance. Antenna slightly longer than body, with 25 flagellomeres, median portion slightly thickened (Fig. 11A). Occipital carina complete, tapered upwards.

MESOSOMA. Pronotum coarsely punctate dorsally, smooth and shining ventrally. Epomia indistinct. Mesoscutum ovoid, 0.87 times as long as broad, comparatively convex, with coarse dense punctures. Notaulus indistinct. Scutellum evenly convex, with coarse dense punctures. Postscutellum transverse, smooth. Mesopleuron smooth, polished, shallowly and sparsely punctate, pubescent with white setae. Epicnemial carina very short, defined only on lower portion of mesopleuron. Sternaulus indistinct. Metapleuron very long and narrow, with distinct shallow punctures, distance between punctures 0.2–3.0 times diameter of punctures. Juxtacoxal carina distinct. Submetapleural carina complete. Fore wing with 1cu-a distad of M becoming Rs by 0.6 of length of 1cu-a, 3rs-m absent, distal abscissa of M spectral; ramulus present; length of vein Cu slightly longer than 2cu-a (Fig. 12E). Hind wing with cu-a



Fig. 11. *Palpostilpnus mangrovi* sp. nov., holotype, ♀ (LKCNHM). **A.** Lateral habitus. **B.** Head, anterior view. **C.** T1, dorsal view. **D.** Scutum.

strongly inclivous and interrupted at lower 0.1. Distal abscissa of Cu pigmented. Distal abscissa of 1Cu spectral. Inner profile of basal portion of fore basitarsus distinctly bent. Hind coxa with fine uneven punctures. Hind femur stout, 4 times as long as its maximum width (Fig. 12C). Basal portion of hind tibia slender, gradually thick toward apex. Longer spur of hind tibia 0.5 times as long as hind basitarsus. Propodeum steeply sloping from near anterior margin to posterior end in lateral view, sparsely and coarsely punctate (Fig. 12B). Propodeal carinae partly present, forming trapezoidal combined area superomedia and area petiolaris (Fig. 12B).

METASOMA. T1 1.8 times as long as apically broad, smooth, petiole flat; postpetiole broad, without median dorsal carina or dorsolateral carina; ventrolateral carina weak; spiracle small, round, slightly



Fig. 12. *Palpostilpnus mangrovi* sp. nov., holotype, ♀ (LKCNHM). **A.** Metasoma, dorsal view. **B.** Propodeum, dorsal view. **C.** Ovipositor. **D.** Vertex. **E.** Wings.

convex (Fig. 11C). T2 coarsely and sparsely punctate, with distinct gastrocoelus (Fig. 12A). T3 coarsely and sparsely punctate (Fig. 12A). Ovipositor thin, 1.4 times as long as hind basitarsus (Fig. 12C).

COLOUR. Body mostly black. Scape, pedicel, first and second flagellomeres ventrally, T1 (except postpetiole black), anterior half of T2, fore margin of T3 and dorsal part of hind femur pale yellow, and tegula and legs (except hind trochanter, ventral part of hind femur and apical part of hind tibia black) white. Wings infusate in middle.

Male

Unknown.

Remarks

Palpostilpnus mangrovi sp. nov. is similar to *P. striator* Aubert, 1961 and *P. papuator* (Aubert, 1961) but can be distinguished from them by the following combination of characters: scutellum without wrinkles (Fig. 11D); body coarsely punctate (Fig. 11A); hind coxa, T1 and T2 partly yellowish (Fig. 11A); hind tarsus white (Fig. 11A); antenna with scape pale yellow, flagellomeres 1–3 varying from yellow to brown (Fig. 11A). *Palpostilpnus striator* and *P. papuator* have strong wrinkles on the scutellum; the body is rather polished and impunctate; hind coxa, tarsus and metasoma are black; middle flagellomeres of the antenna are coloured white dorsally.

Distribution

Singapore.

Palpostilpnus pterodactylus sp. nov.

urn:lsid:zoobank.org:act:0E8F8EF3-65D7-4940-8C91-6CA2F4CAE837

Figs 13–14

Diagnosis

Body oblique elongate (Fig. 13A). Postero-ocellar distance 2.0 times as long as ocular-ocellar distance (Fig. 14F). Occipital carina dorsally broadly absent. Epomia long and strong. Epicnemial carina reaching to upper 0.8 of mesopleuron. Propodeum with median longitudinal carina complete and pleural carina absent (Fig. 14B). T1 stout, 1.5 times as long as apically broad. Fore wing hyaline (Fig. 14G).

Etymology

The specific name is derived from the resemblance in lateral view of T1 and its carinae to the outlines of the head of a *Pterodactylus* sp. (with teeth!), an extinct genus of flying reptile pterosaurs.

Material examined

Holotype

CHINA • ♀; Hong Kong, Pak Sha O; 22°26.88' N, 114°19.19' E; 70 m a.s.l.; garden/orchard clearing; Malaise trap M263; 24 Sep.–8 Oct. 2016; Christophe Barthélémy leg.; NHRS HT-HEVA000010859.

Paratype

CHINA • ♀; Hong Kong, Tai Tan; 22.43857° N, 114.33327° E; among *Kandelia* sp.; Malaise trap 28M1; 5–19 Dec. 2017; C. Taylor and U. Chang leg.; HKU.

Description

Female

SIZE. Fore wing length 2.8 mm. Body oblique elongate, 1.42 times as long as high (Fig. 13A).

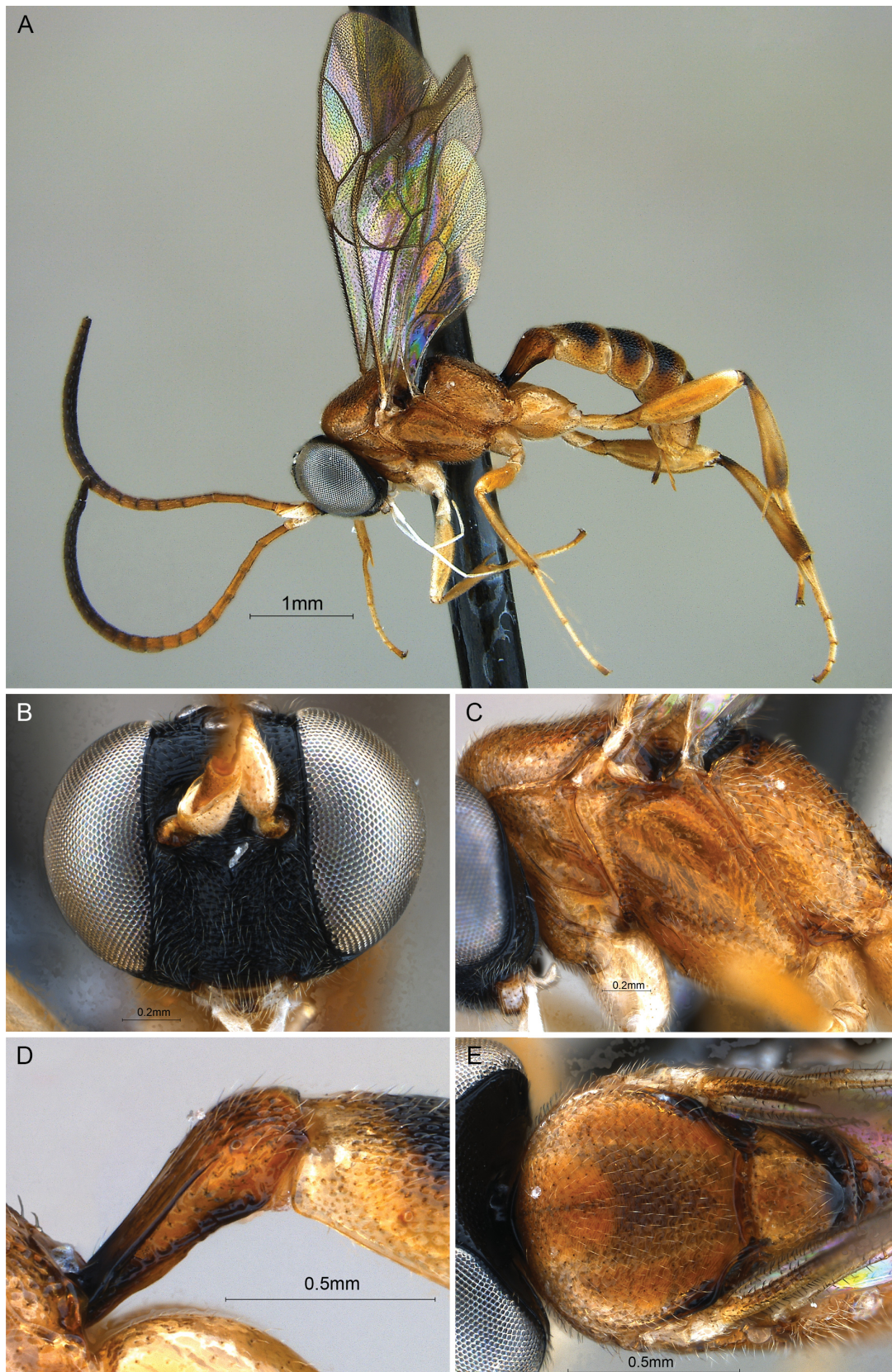


Fig. 13. *Palpostilpnus pterodactylus* sp. nov., paratype, ♀ (HKU). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** T1, lateral view. **E.** Scutum.

HEAD. Face as broad as high, slightly convex centrally, with fine granulose texture (approximately transversely wrinkled) and densely punctate (Fig. 13B). Clypeal suture indistinct. Clypeus with weak transverse striation, apical margin straight. Mandible with basal half smooth, scattered with sparse fine punctures, apical tooth sharp. Malar space with granulose texture, 1.4 times as long as mandibular basal width. Gena polished, with fine punctures. Vertex with posterior portion from posterior ocelli to occiput nearly vertically slanted (Fig. 14F). Frons transversely wrinkled, punctate in between. Postero-ocellar distance 2.0 times ocular-ocellar distance. Antenna with 25 flagellomeres, distinctly thickened from 8th to 20th flagellomeres and ventrally flattened (Fig. 14E). Occipital carina dorsally broadly absent, laterally present.

MESOSOMA. Pronotum smooth on lower half, finely punctate on upper half, posterior corner weakly rugose. Epomia long and strong. Mesoscutum short, 0.85 times as long as broad, with granulose texture and large shallow punctures, punctures close and tend to be rugose. Mesoscutum weakly convex anteriorly in lateral view. Notaulus absent. Scutellum flat, shiny and sparsely punctate. Mesopleuron centrally smooth and polished, dorsally with 3 irregular rows of punctures; sternaulus shallow, finely punctate. Epicnemial carina reaching to upper 0.8 of mesopleuron. Sternaulus shallow, finely punctate. Mesopleural suture distinctly foveolate. Metapleuron irregularly punctate, juxtacoxal carina weak. Submetapleuron complete. Postpectal carina interrupted in front of hind coxa. Fore wing with 1cu-a slightly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu slightly longer than 2cu-a. Hind wing with cu-a strongly inclivous and interrupted at lower 0.25. Distal abscissa of Cu pigmented in its proximal 0.4. Distal abscissa of M spectral. Inner profile of basal portion of fore basitarsus distinctly bent. Hind femur 2.4 times as long as its maximum width; hind tibia with longer spur 0.6 times as long as hind tibia. Propodeum gradually sloping in lateral view, sparsely punctate, smooth posterocentrally, shiny. Median longitudinal carina complete, third lateral area complete, pleural carina absent (Fig. 14B).

METASOMA. T1 1.5 times as long as apically broad, slightly wrinkled, postpetiole punctate, dorsolateral carina complete and strong, reaching to spiracle, ventrolateral carina complete and strong (Fig. 13D). T2 to T4 strongly punctate (Fig. 14A), broader than long (Fig. 14A). Ovipositor very thin, 0.65 times as long as hind basitarsus (Fig. 14D).

COLOUR. Head black. Antenna with scape whitish, pedicel and first to seventh flagellomeres yellowish brown, with eighth to apical flagellomere dorsally black brown and ventrally yellowish brown. Mandible whitish, with apical tooth black. Palpi whitish yellow. Mesosoma yellowish brown, apex of scutellum and metanotum black. Legs light brown, fore coxa and trochanter yellowish white, hind tibia with base and apex fuscous, hind tarsus whitish yellow. T1 brown with proximal base black; T2–T6 yellowish brown, centrally with a transverse black band. Ovipositor sheath light brown with apical tip fuscous. Wings hyaline, veins and stigma fuscous.

Male

Unknown.

Remarks

This species is similar to *P. rotundatus* Sheng & Sun, 2013, but can be distinguished from the latter by the following combination of characters: occipital carina broadly absent dorsally; T1 short and stout (1.5 times as long as apically broad vs 1.8 times as long as apically broad in *P. rotundatus*). This species can easily be separated from other congeneric species by its occipital carina being dorsally broadly absent.

Distribution

China (Hong Kong).

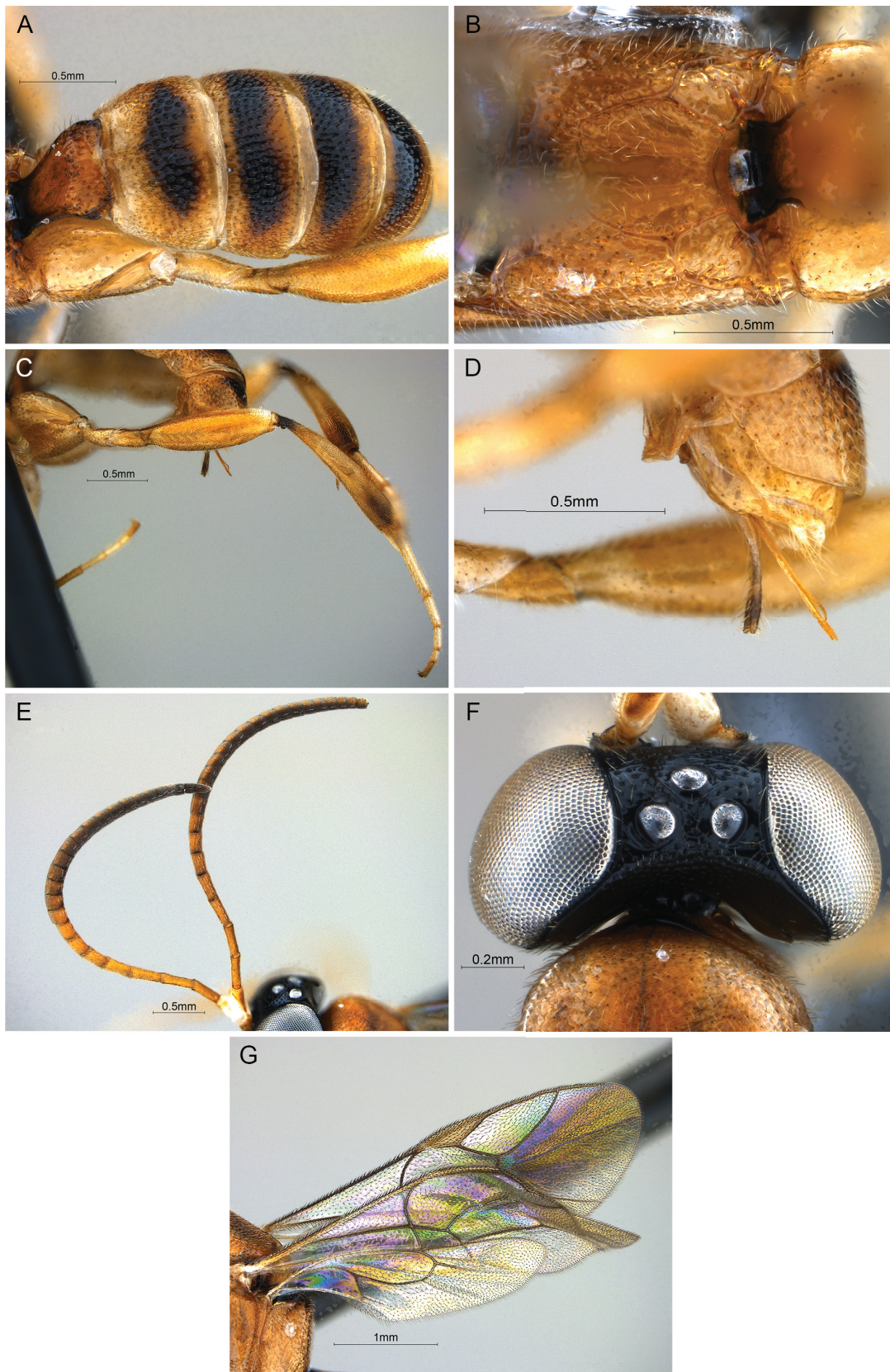


Fig. 14. *Palpostilpnus pterodactylus* sp. nov., paratype, ♀ (HKU). **A.** Metasoma, dorsal view. **B.** Propodeum, dorsal view. **C.** Hind leg. **D.** Ovipositor. **E.** Antennae. **F.** Vertex. **G.** Wing.

Palpostilpnus ranui sp. nov.

urn:lsid:zoobank.org:act:10E16953-FB09-4B62-82BB-1102259700A1

Figs 15–16

Diagnosis

Body obliquely elongate (Fig. 15A). Postero-ocellar distance 2.8 times ocular-ocellar distance. Occipital carina complete. Epomia distinct. Epicnemial carina vestigial, only distinguishable on part of mesosternum. Propodeal carinae absent except for posterior portion of median longitudinal carina (Fig. 16A). T1 2.2 times as long as apically broad (Fig. 15D). Wings hyaline (Fig. 16D).

Etymology

The specific name is derived from the type locality, Ranu River, on the island of Sulawesi, Indonesia.

Material examined

Holotype

INDONESIA • ♀; Sulawesi, Tengah, near Morowali, Ranu River area; 27 Jan.–27 Apr. 1980; NHMUK.

Paratype

INDONESIA • ♂; Sulawesi, Tengah, near Morowali, Ranu Lakes; 7–10 Mar. 1980; NHMUK.

Description

Female

SIZE. Fore wing length 3.2 mm. Body obliquely elongate, 1.80 times as long as high (Fig. 15A).

HEAD. Face 1.6 times as broad as high, centrally with faint convexity, with fine granulose texture and dense punctures, distance between punctures 0.2–0.3 times diameter of punctures. Clypeal suture weak but distinct. Clypeus distinctly convex, shiny, with distinct transverse striation, apical margin sharp, slightly convex. Basal portion of mandible smooth; teeth sharp, dorsal tooth pointed, slightly longer than ventral tooth. Malar space smoother than face, slightly striate, 1.1 times as long as basal width of mandible. Gena glossy, sparsely punctate, near dorsal corner of eye with slight swelling, but not forming distinct carina. Vertex (Fig. 16B) punctate, posterior portion from behind ocelli to occipital carina steeply slanted. Postero-ocellar distance 2.8 times ocular-ocellar distance. Frons densely punctate, lower portion slightly concave. Antenna as long as body, with 25 flagellomeres, median portion moderately thickened. Occipital carina complete, tapered upwards.

MESOSOMA. Pronotum ventrally smooth, dorsally distinctly punctate. Epomia distinct along posterior margin of collar, indistinct from other striations when diverging from pronotal collar. Mesoscutum (Fig. 15E) ovoid, 0.95 times as long as broad, comparatively convex, with fine leathery texture and dense punctures. Notaulus indistinct. Scutellum evenly convex, with shallow punctures. Postscutellum with few lateral punctures. Mesopleuron (Fig. 15C) centrally mostly smooth and shiny, externally to this central area distinctly punctate. Epicnemial carina vestigial, only distinguishable on part of mesosternum. Sternaulus distinct, diagonally crossing mesopleuron from middle anterior part to hind lower margin of mesopleuron. Metapleuron very long and narrow, with distinct shallow punctures, distance between punctures 0.2–0.3 times diameter of punctures. Juxtacoxal carina vestigial. Submetapleural carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu distinctly longer than 2cu-a. Hind wing with cu-a strongly inclivous and interrupted at lower 0.2. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of basal portion of fore basitarsus distinctly bent. Hind coxa finely punctured on anterior face, posteriorly smooth. Propodeum (Fig. 16A) with shallow, moderately dense punctures, moderately sloping from near anterior margin to posterior end; propodeal carinae absent except for vestiges of median longitudinal carina; spiracle small, circular.

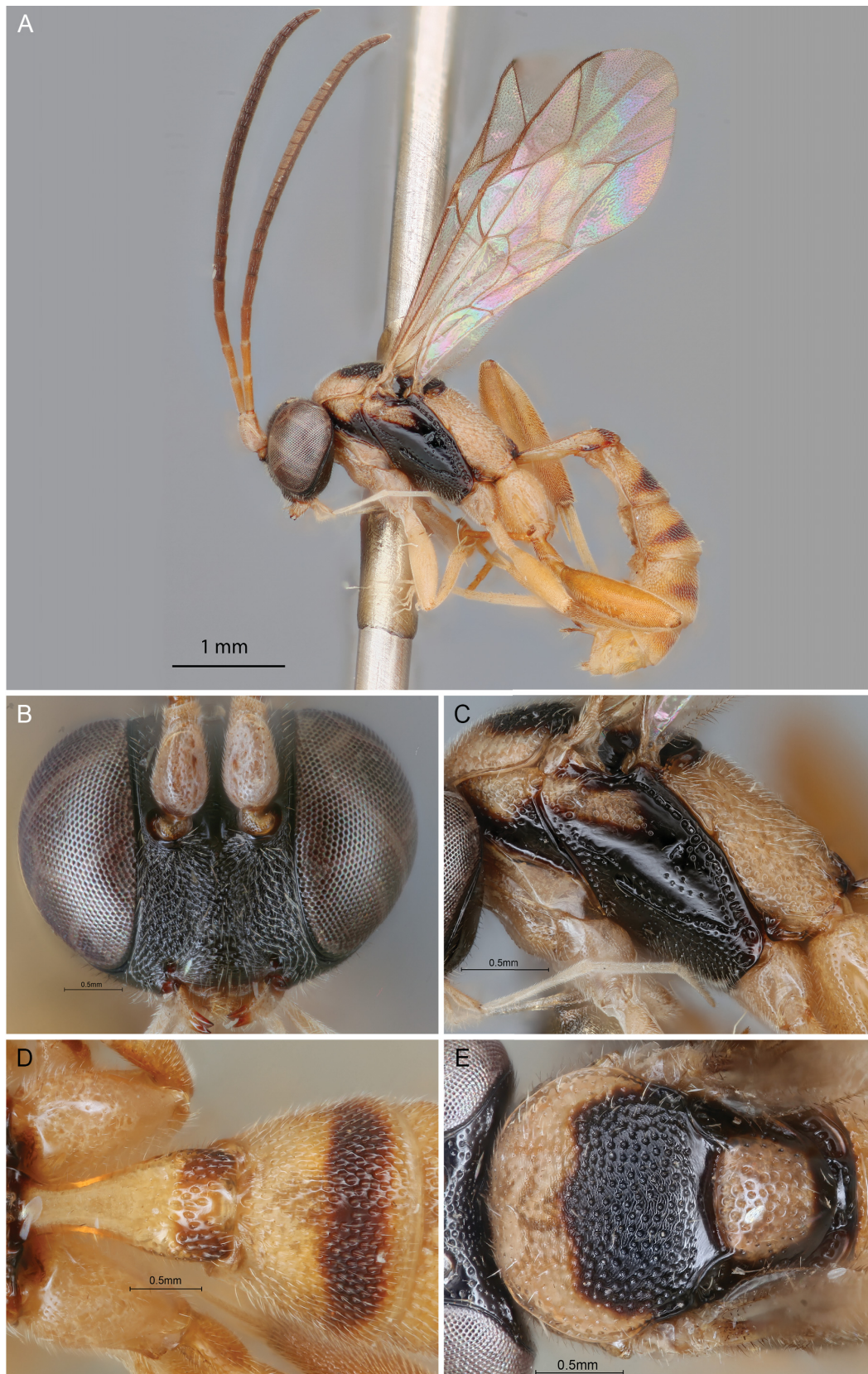


Fig. 15. *Palpostilpnus ranui* sp. nov., holotype, ♀ (NHMUK). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** T1 and T2, dorsal view. **E.** Scutum.



Fig. 16. *Palpostilpnus ranui* sp. nov., holotype, ♀ (NHMUK). **A.** Propodeum, dorsal view. **B.** Vertex. **C.** Antennae. **D.** Forewing.

METASOMA. T1 2.4 times as long as apically broad (Fig. 15D); petiole dorsally flat, with large shallow punctures, laterally finely punctate; petiole smooth and flat; postpetiole narrow; dorsolateral carina distinct until spiracle but apically weak; ventrolateral carina complete; spiracle small, round, not prominent. T2–T5 punctate-areolate; T2 broad posteriorly, 0.80 times as long as apically broad. T3 0.70 times as long as apically broad, parallel-sided. Ovipositor 0.23 times as long as hind tibia.

COLOUR. Mostly yellowish and black. Head black; basal 0.8 of mandible, scape and pedicel pale yellow; mandible apex and basal flagellomere ferruginous, flagellum gradually changing to dark brown by fourth flagellomere. Mesosoma mostly pale yellow; median portion of pronotum, posterior 0.6 of mesoscutum, axillary trough, apex of scutellum, postscutellum, mesopleuron except for anterodorsal spot, mesosternum and longitudinal dash on propodeum black. Fore and mid legs pale yellow, gradually darker towards apex. Hind coxa pale yellow; trochanter and femur ferruginous; hind tibia basally pale yellow, gradually changing to ferruginous towards apex; hind tarsus pale yellow. Wings hyaline. Pterostigma and veins yellowish brown. Metasoma mostly pale yellow or light ferruginous; postpetiole of T1 with dark ferruginous and black areas; T2–T5 with distinct sub-apical transverse stripes, black on T2 and gradually lighter until ferruginous on T5. Ovipositor sheath basally pale yellow, apically brown.

Male

Forewing 3.3 mm long. Antenna with 23 flagellomeres. Otherwise very similar to female except for slightly more slender body and secondary sexual dimorphism.

Remarks

This species is most similar to *P. hainanensis* sp. nov., particularly because of the obliquely elongated body and colour pattern. *Palpostilpnus ranui* sp. nov. can be differentiated from the latter by several relatively small differences, including more extensive black marks on the mesoscutum, mesopleuron and metasoma (Fig. 15A, C, E); tibia not apically black (vs apical 0.25 black in *P. hainanensis* sp. nov.); propodeum with traces of the median dorsal carina (vs entirely absent); extensive areas on anterior and posterior margins of mesopleuron densely punctate (vs mesopleuron almost entirely smooth); and epicnemial carina absent from mesopleuron (vs present on lower portion of mesopleuron).

Distribution

Indonesia (Sulawesi).

***Palpostilpnus rotundatus* Sheng & Sun, 2013**

Palpostilpnus rotundatus Sheng & Sun in Sheng, Sun, Ding & Luo, 2013: 237.

Diagnosis

Body obliquely elongate. Postero-ocellar distance 1.25 times ocular-ocellar distance. Occipital carina complete. Epomia present. Epicnemial carina distinct. Propodeal carinae absent except for forming combined area and pleural carina. T1 1.8 times as long as apically broad. Wings hyaline.

Material examined

CHINA • ♀; Jiangxi Province, Quannan County; 700 m a.s.l.; 10 Jun. 2008; SIT leg.; photographs examined; GSFPM.

Description

COLOUR. Head black. Labrum, mandible (except for black apical tooth) and palpi pale yellow. Antenna with scape and pedicel pale yellow, flagellum basally and ventrally reddish brown, dorsally from middle

length to apex fuscous. Mesosoma reddish brown. Propleuron laterally fuscous; anterior margin of pronotum, anterior upper corner of mesopleuron, and anterior margin of mesoscutum and scutellum (except for black apex) yellowish brown; mesoscutum with black marks on posterior half of median lobe and lateral lobe. Metanotum, epicnemium and anterior margin of submetapleural ridge black. Propodeum basally centrally with a black mark. T1 black, T2–T6 fuscous, basally and laterally yellowish brown, and apical margins yellow. Legs yellowish brown to reddish brown, hind tibia with base and apex fuscous, hind fifth tarsomere darkened.

Remarks

This species is similar to *P. angkor* sp. nov. but differs from the latter by having the mesoscutum densely reticulate-punctate (vs with large shallow punctures in *P. angkor* sp. nov.) and the postero-ocellar distance 1.25 times the ocular-ocellar distance (vs 3.4 times in *P. angkor* sp. nov.).

Distribution

China (Jiangxi).

Palpostilpnus tamasek sp. nov.

[urn:lsid:zoobank.org:act:D9178443-FC6A-4703-9313-6DFED7BB0DBC](https://zoobank.org/urn:lsid:zoobank.org:act:D9178443-FC6A-4703-9313-6DFED7BB0DBC)

Figs 17–19

Diagnosis

Body obliquely elongate (Fig. 17A). Postero-ocellar distance 0.7 times ocular-ocellar distance. Occipital carina complete. Epomia indistinct. Epicnemial carina reaching middle of mesopleuron. Propodeal carinae absent (Fig. 18A). T1 1.9 times as long as apically broad. Wings hyaline (Fig. 18D).

Etymology

The specific name is derived from the type locality, Tamasek, an early recorded name of a settlement on the site of modern Singapore.

Material examined

Holotype

SINGAPORE • ♀; Nee Soon Swamp Forest; 1°23'04.2" N, 103°48'40.7" E; Malaise trap (NS2); 18–24 Jul. 2013; NUS leg.; barcode: ZRC_BDP0039960; LKCNHM.

Paratypes

BRUNEI • 2 ♂♂; Ulu Temburong base camp hut; 4°26' N, 115°16' E; 300 m a.s.l.; 16 Feb.–19 Mar. 1982; M.C. Day leg.; NHMUK.

INDONESIA • 1 ♀; Seram, Solea village; Aug. 1987; M.C. Day leg.; Malaise trap; NHMUK BMNH(E) 1987-262 • 1 ♀; W Java, Gurung Haliman National Park; 21 Jan.–15 Feb. 2000; G. Broad leg.; canopy; NHMUK BMNH(E) 2006-170.

MALAYSIA • 1 ♀; Sarawak; May–Jun. 1978; N.M. Collins leg.; 4th Division Garrison Milu, RGS Expedition; NHMUK.

SINGAPORE • 1 ♀; same collection data as for holotype; 23–30 May 2012; barcode: ZRC_BDP0029921; LKCNHM • 1 ♂; same collection data as for holotype; 17–23 May 2013; barcode: ZRC_BDP0030019; LKCNHM • 1 ♀; same collection data as for holotype; 22–29 May 2012; barcode: ZRC_BDP0029970; LKCNHM • 1 ♂; same collection data as for holotype; 16–23 Oct. 2013; barcode: ZRC_BDP0040003; LKCNHM • 1 ♀; Nee Soon Swamp Forest; 1°23'00.3" N, 103°48'46.5" E; Malaise trap (NS1); 28 Mar.–3 Apr. 2013; NUS leg.; barcode: ZRC_BDP0039388; NHRS PT-HEVA000010860 • 1 ♂; same collection

data as for preceding; 21–28 Aug. 2013; barcode: ZRC_BDP0039306; NHRS PT-HEVA000010863 • 1 ♂; same collection data as for preceding; 13–20 Jun. 2012; barcode: ZRC_BDP0029963; LKCNHM • 1 ♂; same collection data as for preceding; 19–26 Jun. 2013; barcode: ZRC_BDP0030034; LKCNHM • 1 ♂; same collection data as for preceding; 24–31 Jul. 2013; barcode: ZRC_BDP0039510; LKCNHM • 1 ♂; same collection data as for preceding; 19–26 Jun. 2013; barcode: ZRC_BDP0030032; LKCNHM • 1 ♀; Bukit Timah; old secondary forest; Malaise trap; 1.35499° N, 103.78167° E; 12–19 Jul. 2017; NUS leg.; barcode: ZRC_BDP0019810; LKCNHM • 1 ♀; Bukit Timah; old secondary forest; Malaise trap; 1.35467° N, 103.78201° E; 12–19 Jul. 2017; NUS leg.; barcode: ZRC_BDP0018399; LKCNHM • 1 ♀; same collection data as for preceding; 29 Mar.–5 Apr. 2017; barcode: ZRC_BDP0019719; LKCNHM • 1 ♂; Nee Soon Swamp Forest; 1°23'07.83" N, 103°48'39.48" E; Malaise trap 3; 24 Feb.–3 Mar. 2006; K.L. Yeo leg.; RBINS • 1 ♀; same collection data as for preceding; 4–11 Mar. 2006; RBINS • 2 ♂♂; same collection data as for preceding; 15–22 Mar. 2006; RBINS.

Description

Female

SIZE. Fore wing length 3mm. Body oblique elongate, 1.72 times as long as high (Fig. 17A).

HEAD. Face 1.6 times as broad as high, centrally slightly convex, with coarse dense punctures, distance between punctures about 0.3 times diameter of punctures (Fig. 17B). Clypeal suture very weak. Clypeus slightly convex, shiny, distinctly striated, apically straight (not evenly convex downwards) with sharp apical margin. Basal portion of mandible smooth; teeth sharp, upper teeth slightly broader than lower. Malar space smooth, 0.3 times as long as basal width of mandible. Gena glossy, smooth and shiny, forming weak swelling but no carina in dorsal part between vertex and eye margin. Vertex strongly punctate, posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Postero-ocellar distance 2.40 times distance between lateral ocellus and eye margin. Frons densely punctate, lower portion slightly concave. Antenna as long as body, with 25 flagellomeres, median portion very thickened. Occipital carina complete, tapered upwards.

MESOSOMA. Pronotum smooth, with dense punctures on dorsal margin. Epomia indistinct. Mesoscutum (Fig. 17E) elongate, anteriorly protruding above pronotum, comparatively flat, with granulated texture and shallow punctures. Notaulus indistinct. Scutellum flat, elongate, with fine sparse punctures. Postscutellum slightly elongate, distinctly punctate. Mesopleuron (Fig. 17C) centrally and posteriorly smooth, shiny, anteroventral portion with distinct punctures. Epicnemial carina reaching middle of mesopleuron. Sternaulus distinct only on anterior 0.5 of mesopleuron. Metapleuron long and narrow, with distinct fine punctures, distance between punctures about 2.0 times diameter of punctures. Juxtacoxal carina absent. Submetapleural carina complete. Wings hyaline. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus present; length of vein Cu equal to 2cu-a (Fig. 18D). Hind wing with cu-a strongly inclivous and interrupted at lower 0.4. Distal abscissa of Cu pigmented. Distal abscissa of M spectral. Inner profile of basal portion of fore basitarsus distinctly bent. Hind coxa with fine and indistinct punctures. Propodeum (Fig. 18B) with sparse shallow punctures, gently sloping from near anterior margin to posterior end; propodeal carinae absent.

METASOMA. T1 1.9 times as long as apically broad, smooth, petiole flat; postpetiole narrow, convex, with hind margin notched; with sparse distinct punctures in lateral part, without median dorsal carina or dorsolateral carina; ventrolateral carina weak; spiracle small, round (Figs 17D, 18A). T2–T6 coarsely and sparsely punctate; T2 broad posteriorly, almost broad apically. T3 0.7 times as long as apically broad, parallel-sided (Fig. 18A). Ovipositor very thin, 1.5 times as long as hind basitarsus (Fig. 18C).

COLOUR. Body mostly ferruginous (but variable, see below). Flagellomeres starting from 2 dorsally, head (excluding basal parts of mandibles), pronotum, mesoscutum (except yellow anterior lateral edges), central part of scutellum, anterior part of mesopleuron, apical part of hind tibia, hind part of T1 and

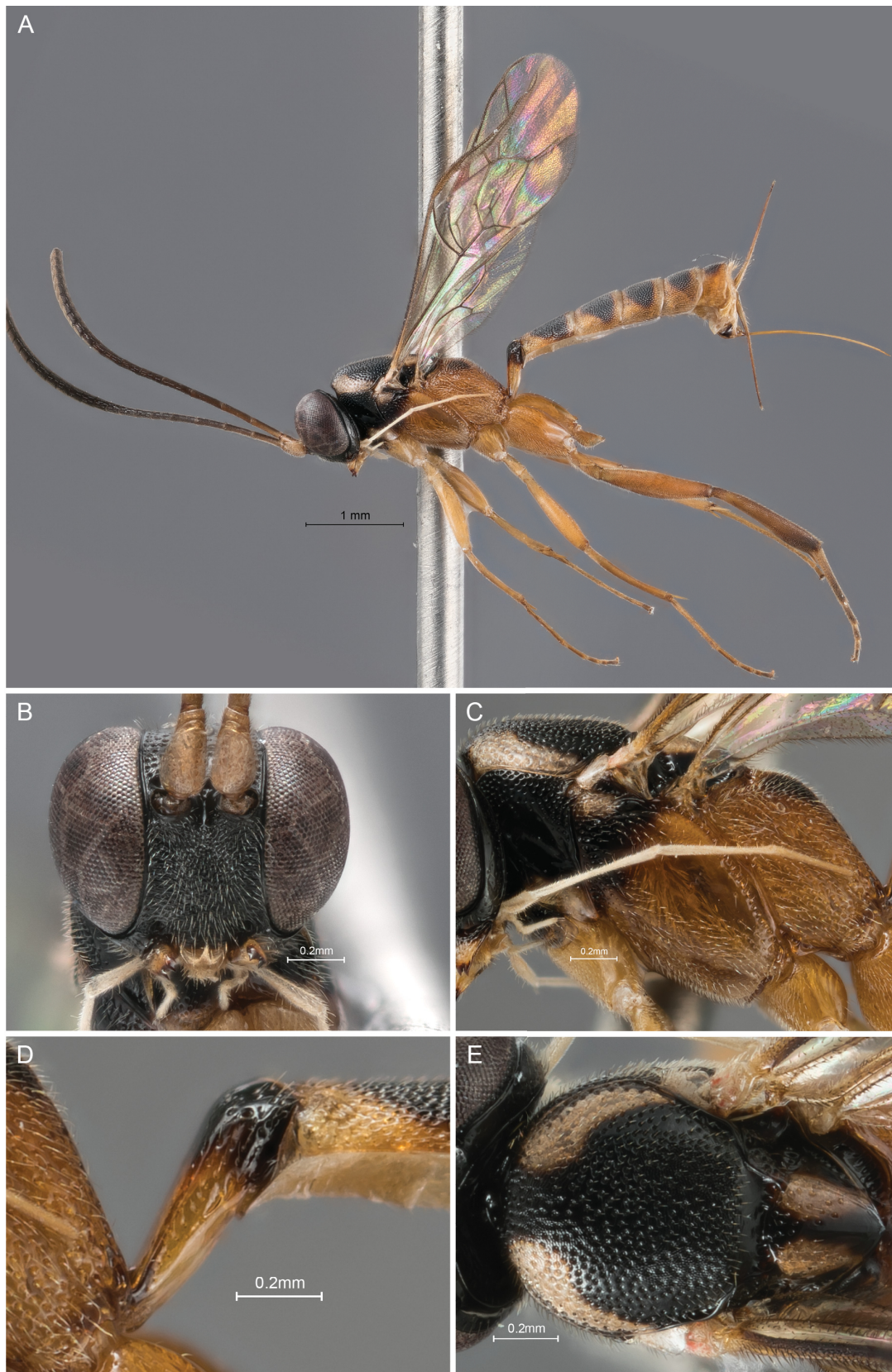


Fig. 17. *Palpostilpnus tamasek* sp. nov., holotype, ♀ (LKCNHM). A. Lateral habitus. B. Head, anterior view. C. Mesopleuron. D. T1, lateral view. E. Scutum.

central part of T2–T5 black. Anterior lateral edge of mesoscutum, anterior upper angle of mesopleuron, and fore and middle trochanters pale yellow. Palpi white. Pterostigma and veins yellowish brown. Wings hyaline.

Male (Fig. 19)

Mostly as in the female but T1 shorter, 1.7 times as long as apically broad, antennal flagellomeres paler ventrally, and most of mesopleuron, most of metasoma and basal part of propodeum dorsally black.

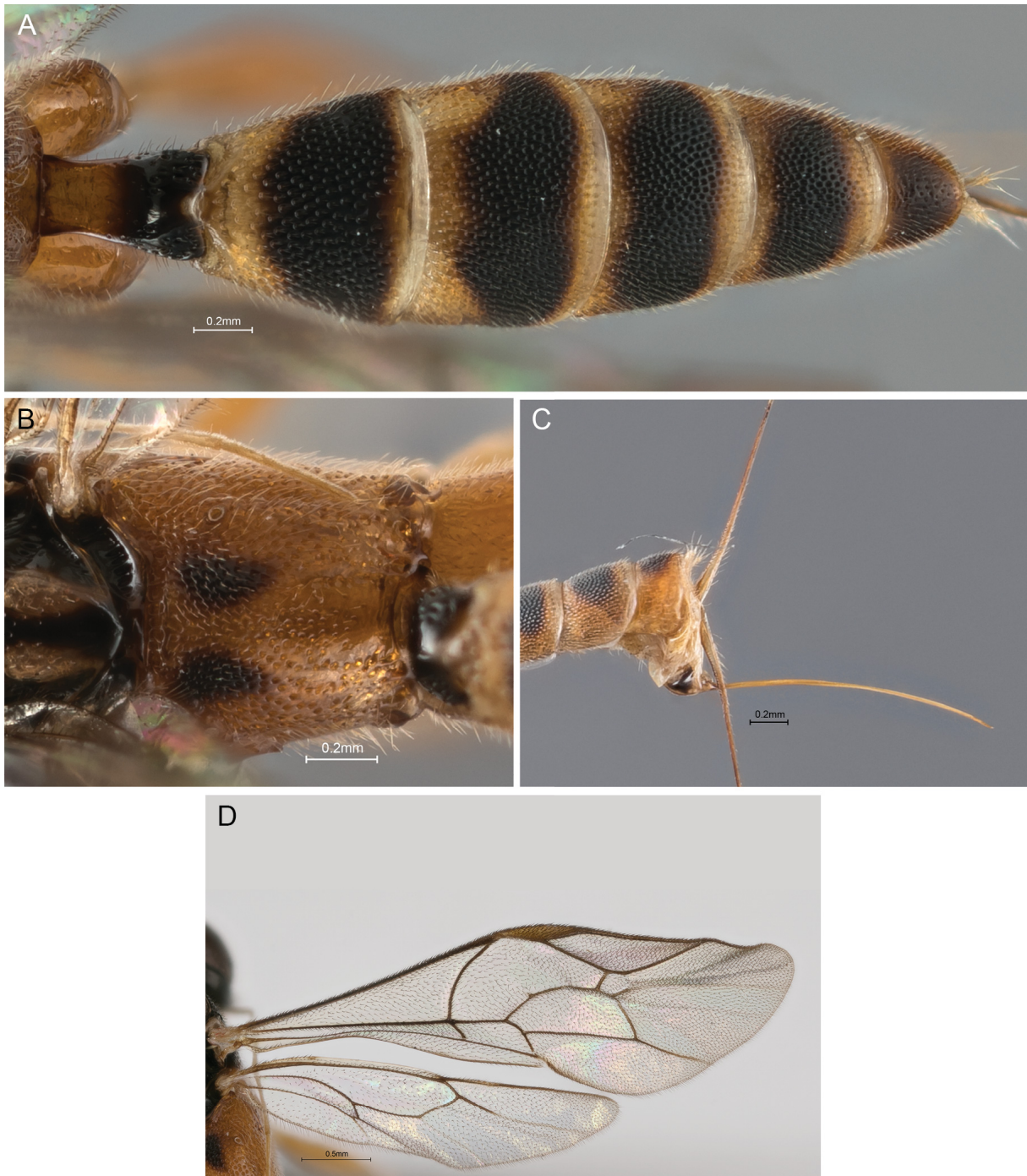


Fig. 18. *Palpostilpnus tamasek* sp. nov., holotype, ♀ (LKCNHM). **A.** Metasoma, dorsal view. **B.** Propodeum, dorsal view. **C.** Ovipositor. **D.** Wings.



Fig. 19. *Palpostilpnus tamasek* sp. nov., paratype, ♂ (LKCNHM). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** Propodeum. **E.** Hypopygium, ventral view.

Variation

Fore wing 3–3.5 mm long. Antenna with 23–25 flagellomeres. Specimens from Brunei and Indonesia with juxtacoxal carina vestigial, and with more extensive parts of the mesosoma black: 0.6–0.9 of mesopleuron area (anterodorsal portion), central stripe in scutellum and 0.4–0.6 of propodeum (anterior portion plus longitudinal stripe); T2–T5 also mostly black.

Remarks

This species is similar to *P. trifolium* sp. nov., but can be distinguished from the latter by having a distinctly more elongated body (1.72 times as long as high, vs 1.48 times as long as high in *P. trifolium* sp. nov.) and the following combination of characters: gena forming a blunt swelling in its upper part at vertex and eye margin; mesoscutum anteriorly protruding above pronotum; scutellum yellow laterally; vein 2-Cu slightly shorter than 2cu-a; ovipositor longer, 3.5 times as long as hind basitarsus (Fig. 18C).

Distribution

Singapore.

Palpostilpnus trifolium sp. nov.

[urn:lsid:zoobank.org:act:0B9DAD64-288F-4E1D-823D-0292A6CA9906](https://zoobank.org/act:0B9DAD64-288F-4E1D-823D-0292A6CA9906)

Figs 20–21

Diagnosis

Body obliquely elongate (Fig. 20A). Postero-ocellar distance 1.5 times ocular-ocellar distance (Fig. 21G). Occipital carina complete. Epomia distinct. Epicnemial carina short, defined only in ventral portion of mesopleuron. Propodeal carinae incomplete, except area postero-externa (Fig. 21C). T1 1.8 times as long as apically broad. Wings hyaline (Fig. 21H).

Etymology

The specific name is derived from the generic Latin name of clover, *Trifolium* L., in reference to the trilobed colour pattern on the scutum of this species.

Material examined

Holotype

CHINA • ♀; Hong Kong, Pak Sha O; 22°26.88' N, 114°19.19' E; 70 m a.s.l.; garden/orchard clearing; Malaise trap M018.C.Hy.10; 7–13 Jun. 2004; C. Barthélémy leg.; NHRS HT-HEVA000010861.

Description

Female

SIZE. Fore wing length 4.2 mm. Body oblique elongate, 1.48 times as long as high (Fig. 20A).

HEAD. Face 2.0 times as broad as high, longitudinally slightly convex centrally, forming rectangular area, sublateral portion longitudinally slightly concave (Fig. 20B). Clypeal suture indistinct. Clypeus flat, matte, striated, apically flat, with sharp apical margin. Basal portion of mandible smooth; teeth sharp, of equal length. Malar space smooth, equal to basal width of mandible. Gena glossy, smooth and shiny. Vertex (Fig. 21G) smooth, posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Postero-ocellar distance 1.5 times ocular-ocellar distance (Fig. 21G). Frons with fine leathery texture, lower portion slightly concave (Fig. 21G). Antenna slightly shorter than body, with 24 flagellomeres, median portion very thickened (Fig. 21F). Occipital carina complete, tapered upwards.

MESOSOMA. Pronotum smooth, sparsely and shallowly punctate. Epomia distinct. Mesoscutum ovoid, 0.97 times as long as broad, convex, with granulated texture and distinct punctures (Fig. 20E).

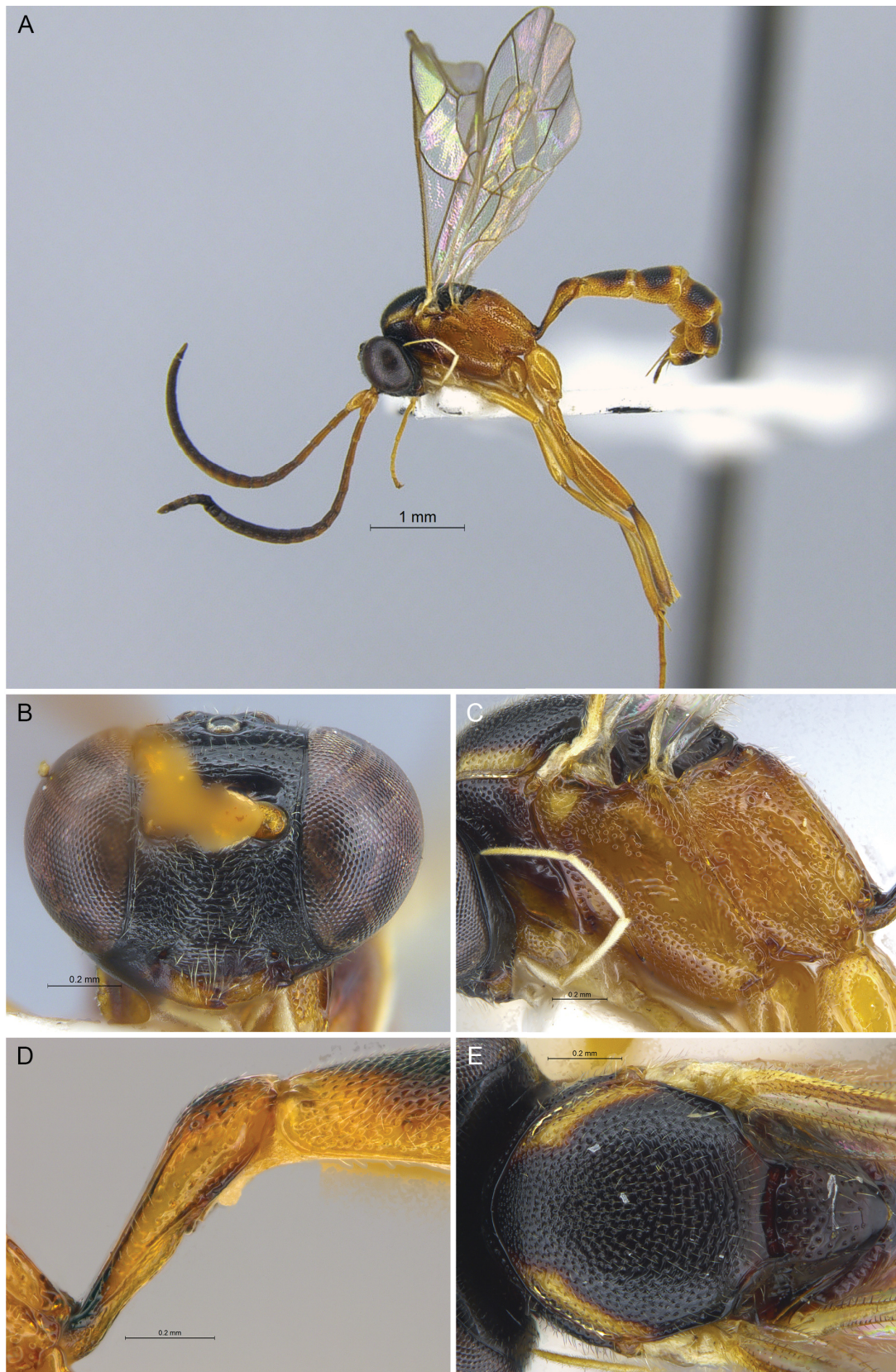


Fig. 20. *Palpostilpnus trifolium* sp. nov., holotype, ♀ (NHRS HT-HEVA000010861). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** T1, lateral view. **E.** Scutum.



Fig. 21. *Palpostilpnus trifolium* sp. nov., holotype, ♀ (NHRS HT-HEVA000010861). **A.** Metasoma, dorsal view. **B.** T2–T3, dorsolateral view. **C.** Propodeum, dorsal view. **D.** Hind leg. **E.** Ovipositor. **F.** Antenna. **G.** Vertex. **H.** Wing.

Notaulus indistinct (Fig. 20E). Scutellum evenly convex, almost smooth, with distinct sparse punctures. Postscutellum transverse, smooth. Mesopleuron (Fig. 20C) smooth, shiny, anterior portion with shallow punctures; lower portion with punctures indistinct; posterior portion smooth. Epicnemial carina short, defined only in ventral portion of mesopleuron. Sternaulus indistinct, defined in middle anterior part of mesopleuron. Metapleuron very long and narrow, with distinct shallow punctures, distance between punctures 0.75–1.2 times diameter of punctures. Juxtacoxal carina absent. Submetapleural carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu slightly longer than 2cu-a (Fig. 21H). Hind wing with cu-a strongly inclivous and interrupted at lower 0.16. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of basal portion of fore basitarsus distinctly bent. Hind coxa with fine and indistinct punctures. Basal portion of hind tibia slender, gradually thick toward apex. Propodeum gradually sloping in lateral view, with sparse fine punctures. Propodeal carinae absent except apical part of medial longitudinal carina and lateral part of posterior transverse carina closing area postero-externa (Fig. 21C).

METASOMA. T1 1.8 times as long as apically broad, smooth, petiole flat; postpetiole broad, convex, with sparse distinct punctures, without median dorsal carina or dorsolateral carina; ventrolateral carina weak; spiracle small, round (Figs 20D, 21A–B). T2 coarsely and sparsely punctate, broad posteriorly, 1.4 times as long as apically broad. T2 0.6 times as long as apically broad, parallel-sided, also coarsely and sparsely punctate. T3–T5 distinctly punctate, with same punctuation (Fig. 21B). Ovipositor very thin, 0.9 times as long as hind basitarsus (Fig. 21E).

COLOUR. Body mostly reddish yellow. Flagellomeres starting from 3 dorsally, head (excluding basal parts of mandibles), pronotum, mesoscutum (except yellow anterior lateral edges), scutellum and central part of T2–T5 black. Palpi white. Pterostigma and veins yellowish brown. Wings hyaline.

Male

Unknown.

Remarks

This species is similar to *P. tamasek* sp. nov., but can be distinguished from the latter by the following combination of characters: body short (Fig. 20A); mesoscutum not protruding above pronotum; scutellum entirely black; lengths of veins 2-Cu and 2cu-a equal; ovipositor short, 0.9 times as long as hind basitarsus (Fig. 21E).

Distribution

China (Hong Kong).

The palpator group

***Palpostilpnus angkor* sp. nov.**

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Fig. 22

Diagnosis

Body short and stout, mostly pale yellow and black (Fig. 22A); T2–T5 with distinct sub-apical transverse black stripes; antenna distinctly shorter than body, medially strongly flattened; postero-ocellar distance 3.4 times ocular-ocellar distance; mesoscutum moderately long, 0.9 times as long as broad (Fig. 22E), distinctly convex, anteriorly slightly projecting over pronotum; propodeal carinae absent except for vestiges of posterior transverse carina and posterior portion of median longitudinal carina; wings hyaline (Fig. 22A); T1 1.7 times as long as apically broad (Fig. 22D). Ovipositor 0.27 times as long as hind basitarsus.

Etymology

The specific name is derived from the type locality, Angkor Wat.

Material examined

Holotype

CAMBODIA • ♀; Siem Reap Province, Angkor, Praeh Khan Temple; Malaise trap; 24 Jan.–21 Feb. 2006; Oul Yothin leg.; RBINS.

Paratype

BRUNEI • 3 ♀♀; Labi; 200 m a.s.l.; mixed dipterocarp forest; Aug–Sep. 1979; I. Gauld leg.; NHMUK.

Description

Female

SIZE. Fore wing length 3.3 mm. Body short and stout, 1.50 times as long as high.

HEAD. Face 1.4 times as broad as high, centrally slightly convex, alutaceous (Fig. 22B). Clypeal suture indistinct, but clypeus distinctly delimited by change of sculpturing. Clypeus slightly convex, shiny, distinctly striated, with sharp, truncate apical margin. Basal portion of mandible smooth; dorsal tooth lanceolate, broader than ventral tooth. Malar space alutaceous, 1.3 times as long as basal mandible width. Gena glossy, mostly smooth with sparse shallow punctures, dorsally forming weak carina posterior to dorsal corner of eye and with angled, carina-like elevation between lateral ocellus and occipital carina. Vertex (Fig. 22E) sparsely punctate, posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Postero-ocellar distance 3.4 times ocular-ocellar distance. Frons coriarius-punctate, lower portion not distinctly concave. Antenna distinctly shorter than body, with 25 flagellomeres, median portion strongly thickened. Occipital carina complete.

MESOSOMA. Pronotum punctate-areolate (Fig. 22C). Epomia indistinct. Mesoscutum (Fig. 22E) moderately long, as long as broad, distinctly convex, anteriorly slightly projecting over pronotum, with granulated texture and large shallow punctures. Notaulus indistinct. Scutellum flat, elongate, with fine sparse punctures. Postscutellum punctate. Mesopleuron (Fig. 22C) centrally smooth, shiny, distinctly punctate on its margins. Epicnemial carina reaching dorsal 0.6 of mesopleuron. Sternaulus distinct on anterior 0.8 of mesopleuron. Metapleuron long and narrow, shallowly punctate-areolate. Juxtacoxal carina short but distinct. Submetapleural carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu slightly longer than 2cu-a. Hind wing with cu-a strongly inclivous and interrupted at lower 0.18. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of basal portion of fore basitarsus distinctly bent. Hind coxa anteriorly shallowly punctate, posteriorly smooth. Propodeum steeply sloping in lateral view (Fig. 22C), mostly covered by dense shallow punctures, posterocentrally smoother. Propodeal carinae absent (Fig. 22D).

METASOMA. T1 1.7 times as long as apically broad, petiole dorsally flat and smooth, laterally punctate; postpetiole slightly convex, moderately broad; with sparse, distinct punctures, dorsolateral carina complete and strong until spiracle; ventrolateral carina complete but anteriorly weak; spiracle small, round, not prominent. T2–T5 coarsely and sparsely punctate; T2 widened posteriorly, almost apically wide. Ovipositor 1.7 times as long as hind basitarsus.

COLOUR. Mostly yellowish and black. Head black; basal 0.8 of mandible, scape and ventral face of pedicel pale yellow; mandible apex, dorsal face of pedicel and basal flagellomeres ferruginous, flagellum gradually changing to dark brown by fifth flagellomere. Pronotum, propleuron, posterior 0.7 of mesoscutum, axillary trough, most of mesopleuron, mesosternum and about 0.9 of propodeum black. Anterior arc on mesoscutum, scutellum, ovoid spot on anterior corner of mesopleuron, metapleuron and two small sublateral spots on posterior end of propodeum pale yellow. Fore and mid legs pale

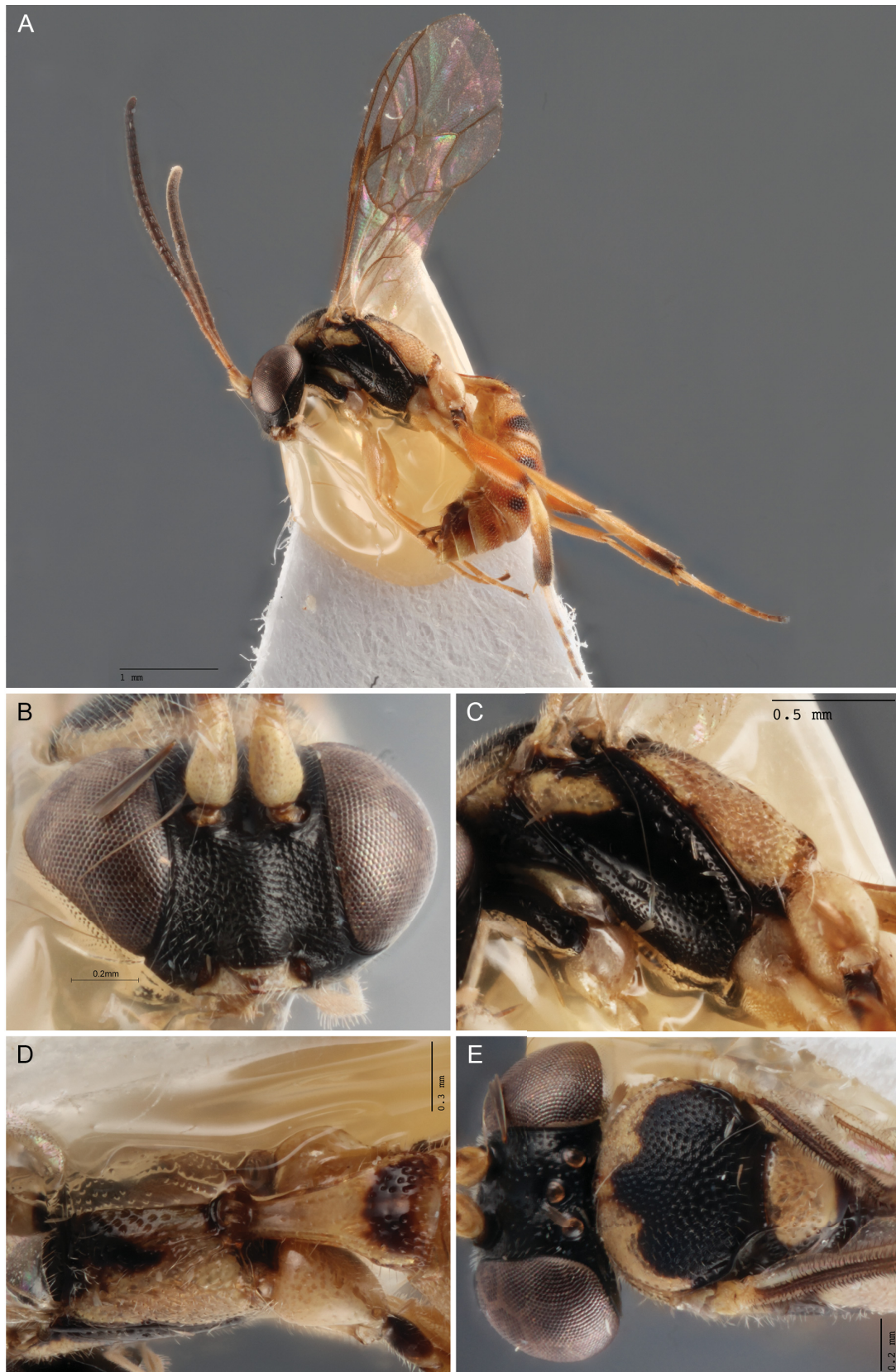


Fig. 22. *Palpostilpnus angkor* sp. nov., holotype, ♀ (RBINS). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** Propodeum and T1, dorsal view. **E.** Scutum.

yellow, gradually darker towards apex. Hind coxa extensively black on mesal face; trochanter black; trochantellus and femur ferruginous, with small black marks; hind tibia basally pale yellow, gradually changing to ferruginous and black towards apex; hind tarsus pale yellow except for black T5. Wings hyaline. Pterostigma and veins yellowish brown. Metasoma mostly pale yellow or light ferruginous; T1 dorsally with transverse black stripe opposite spiracle, area immediately adjacent to stripe ferruginous; T2–T5 with distinct sub-apical transverse black stripes; T6 and T7 laterally ferruginous, T8 almost entirely ferruginous. Ovipositor sheath basally pale yellow, apically brown.

Male

Unknown.

Variation

Fore wing 3.1–3.5 mm long. Antenna with 23–25 flagellomeres. Dorsoposterior corner of pronotum sometimes with small yellowish mark; anterior pale yellow arc on mesoscutum sometimes medially interrupted; pale yellow mark on mesopleuron sometimes restricted to subalar ridge; punctures on mesopleuron restricted to its margin to variously invading the central, otherwise smooth, area; black areas in propodeum covering 0.2–0.9 of its area; black marks on hind coxa and trochanter sometimes reduced; black stripe on T2 sometimes incomplete; marks on T3 and T4 variable in size, sometimes distinct as clear circular spots, sometimes almost indistinct.

Remarks

Very similar to *P. maculatus* Sheng & Sun, 2013, from which it can be differentiated mainly by the following characters: mesoscutum longer (as long as broad) and distinctly convex, anterior margin projecting over pronotum (vs 0.75 times as long as broad in *P. maculatus*, and flat, not projecting over pronotum); T1–T5 all with distinct black stripes (vs distinct stripes only at T1 and T2, while T3 and T4 with small sublateral marks); antenna shorter and stouter; postero-ocellar distance distinctly much longer (3.4 times vs 2.3 times ocular-ocellar distance).

Distribution

Brunei, Cambodia.

Palpostilpnus brevis Sheng & Broad, 2011

Palpostilpnus brevis Sheng & Broad, 2011: 63 (holotype, ♀, in GSFPM, not examined).

Diagnosis

Clypeal suture very weak and indistinct. Postero-ocellar distance equal to distance between lateral ocellus and eye margin. Notaulus distinct. Hind wing with cu-a interrupted at lower 0.2. Lateral carinae of area basalis combined into one carina. Ovipositor very short, 0.4 times as long as length of hind basitarsus. T2 and T3 yellowish brown to reddish brown. Wings hyaline. Antennal flagellum with middle flagellomeres coloured white dorsally.

Remarks

This species is similar to *P. palpator* (Aubert, 1961), but differs from it by the following combination of characters: notaulus distinct, T2–T4 reddish (black in *P. palpator*), middle antennal flagellomeres coloured white, frons with fine leathery texture and unevenly punctate, ovipositor 0.4 times as long as length of hind basitarsus (2.1 times in *P. palpator*), fore and mid coxae white, and hind tibia dark brown.

Distribution

China (Jiangxi).

Palpostilpnus maculatus Sheng & Sun, 2013

Palpostilpnus maculatus Sheng & Sun in Sheng, Sun, Ding & Luo, 2013: 235.

Diagnosis

Body short and stout. Postero-ocellar distance 2.3 times ocular-ocellar distance. Epomia distinct. Epicnemial carina distinct, reaching upper 0.8 of mesopleuron. Propodeal carinae absent except for vestiges of posterior transverse carina and posterior portion of median longitudinal carina. T1 1.7 times as long as apically broad. Wings hyaline.

Material examined

Holotype

CHINA • ♀; Jiangxi, Guangshan National Natural Reserve; 400–500 m a.s.l.; 15 Jun. 2009; SIT leg.; photographs examined; GSFPM.

Other material

BRUNEI • 2 ♀♀; Labi; 200 m a.s.l.; mixed dipterocarp forest; Aug.–Sep. 1979; I. Gauld leg.; NHMUK.

MALAYSIA • 2 ♀♀; Sarawak, 4th division, Gunung Mulu National Park; May–Jun. 1978; N.M. Collins, RGS Expedition leg.; NHMUK • 2 ♀♀, 2 ♂♂; same collection data as for preceding; Jun.–Jul. 1978; NHMUK.

Redescription

Female

SIZE. Fore wing length 3.3 mm. Body short and stout, 1.45 times as long as high.

HEAD. Face 1.8 times as broad as high, centrally slightly convex, coriaceous-punctate (punctures best observed in oblique view). Clypeal suture absent. Clypeus slightly convex, shiny, distinctly striated, with sharp, slightly convex apical margin. Basal portion of mandible smooth; dorsal tooth lanceolate, broader than ventral tooth. Malar space coriaceous, 1.4 times as long as basal width of mandible. Gena glossy, mostly smooth with sparse shallow punctures, dorsally forming two weak carinae, posterior to dorsal corner of eye and lateral ocellus. Vertex sparsely punctate, posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Postero-ocellar distance 2.3 times ocular-ocellar distance. Frons coriaceous-punctate, lower portion not distinctly concave. Antenna slightly shorter than body, with 27 flagellomeres, first flagellomere 1.1 times as long as second flagellomere, median portion of antenna moderately thickened. Occipital carina complete.

MESOSOMA. Pronotum punctate-areolate. Epomia distinct. Mesoscutum short, 0.75 times as long as broad, almost flat, with granulated texture and large, shallow punctures. Notaulus indistinct. Scutellum flat, elongate, with fine sparse punctures. Postscutellum smooth. Mesopleuron centrally smooth, shiny, distinctly punctate on speculum, ventrad of sternaulus and anteriorly to epicnemial carina. Epicnemial carina reaching dorsal 0.8 of mesopleuron. Sternaulus distinct on anterior 0.6 of mesopleuron. Metapleuron long and narrow, shallowly punctate-areolate. Juxtacoxal carina short but distinct. Submetapleural carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus present; vein Cu slightly longer than 2cu-a. Hind wing with cu-a strongly inclivous and interrupted at lower 0.3. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of basal portion of fore basitarsus distinctly bent. Hind coxa anteriorly shallowly punctate, posteriorly smooth. Propodeum mostly covered by dense shallow punctures, posterocentrally smoother, steeply sloping from near anterior margin to posterior end; propodeal carina absent, lateral longitudinal and posterior transverse carinae only represented by vestigial traces on posterior end of propodeum.

METASOMA. T1 1.9 times as long as apically broad, smooth, petiole dorsally flat; postpetiole slightly convex, broad, apex of T1 3.2 times as long as base; with sparse, distinct punctures, dorsolateral carina complete and strong until spiracle; ventrolateral carina complete but anteriorly weak; spiracle small, round, not prominent. T2–T5 coarsely and sparsely punctate; T2 broad posteriorly, 0.62 times as long as apically broad. T3 0.45 times as long as apically broad, parallel-sided. Ovipositor 1.42 times as long as hind basitarsus.

COLOUR. Mostly yellowish and black. Head black; basal 0.8 of mandible, scape and ventral face of pedicel pale yellow; mandible apex, dorsal face of pedicel and basal flagellomeres ferruginous, flagellum gradually changing to dark brown by fifth flagellomere. Mesosoma mostly pale yellow; pronotum except collar, propleuron, small spot on anterior margin of mesoscutum, posterior 0.7 of mesoscutum, axillary trough, most of mesopleuron, mesosternum and sublateral spots on propodeum black. Fore and mid legs gradually darker towards apex. Hind coxa with small black marks on mesal face; hind trochanter and femur ferruginous, trochanter with lateral black spots; hind tibia basally pale yellow, gradually changing to ferruginous and black towards apex; hind tarsus pale yellow except for black T5. Wings hyaline. Pterostigma and veins yellowish brown. Metasoma mostly pale yellow or light ferruginous; T1 dorsally with transverse black stripe opposite spiracle, area immediately adjacent to stripe ferruginous; T2 with distinct sub-apical transverse black stripe; T3 and T4 with small (almost indistinct on T4) sublateral black marks. Ovipositor sheath basally pale yellow, apically brown.

Male

Unknown.

Variation

Fore wing 3.0–3.5 mm long. Antenna with 26–27 flagellomeres. Mesopleuron sometimes with yellow spot on posteroventral corner. Black areas in propodeum covering 0.05–0.5 of its area (specimens from Brunei with less extensive black marks). Black stripe on T2 sometimes incomplete; marks on T3 and T4 variable in size, sometimes distinct as clear circular spots, sometimes almost indistinct.

Remarks

This species is similar to *P. angkor* sp. nov., from which it can be differentiated mainly by the following characters: mesoscutum very short, 0.75 times as long as broad, and flat, not projecting over pronotum (vs as long as broad and distinctly convex, anterior margin projecting over pronotum in *P. angkor* sp. nov.); black stripes on metasoma restricted to T1 and T2, with small sublateral marks on T3 and T4 (vs distinct stripes only on T1–T5); antenna longer and more slender; postero-ocular distance distinctly much shorter (2.3 times vs 3.4 times ocular-ocular distance); and T1 more distinctly widened apically (apical width 3.2 times vs 2.5 times as wide as basal width).

Distribution

Brunei, China (Jiangxi), Malaysia (Sarawak).

Palpostilpnus palpator (Aubert, 1961)

Fig. 23

Townostilpnus (*Palpostilpnus*) *palpator* Aubert, 1961: 56.

Palpostilpnus palpator – Townes 1970: 16.

Diagnosis

Clypeal suture indistinct. Notaulus indistinct. Fore wing with M absent. Propodeal carinae partly present. Ovipositor 2.1 times as long as hind basitarsus. Body mostly black with scape, pedicel and legs reddish-yellow, and palpi white (Fig. 23A–B). Wings hyaline.

Material examined

Holotype

PHILIPPINES • ♀; Negros, Mt Canlaon; 5–8 May 1953; J. Aubert and H. Townes leg.; USUC.

Redescription

Female (holotype)

SIZE. Fore wing length 4.1 mm. Body short and stout, 1.35 times as long as high (Fig. 23).



Fig. 23. *Palpostilpnus palpator* (Aubert, 1961), holotype, ♀ (USUC). **A.** Lateral habitus. **B.** Lateral habitus. **C.** Mesopleuron. **D.** Head, anterior view. **E.** Scutum and vertex, dorsal view. **F.** Part of metasoma (T2).

HEAD. Face 1.61 times as broad as high, centrally slightly convex, finely granulose (Fig. 23D). Clypeal suture indistinct. Clypeus slightly convex, shiny, sparsely punctate, apical margin moderately thick and truncate. Basal portion of mandible with weak and fine punctures; upper and lower margins almost parallel; teeth sharp, upper tooth approximately as long as lower tooth. Malar space with fine leathery granulose texture. Malar sulcus indistinct. Malar space approximately 0.67 times as long as basal width of mandible. Gena glossy, smooth and shiny, with no distinct carina dorsally between vertex and eye. Vertex (Fig. 23E) smooth, polished; posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Postero-ocellar distance 2.45 times ocular-ocellar distance. Frons smooth and polished, lower portion slightly concave. Antenna slightly shorter than body, with 21 flagellomeres, median portion moderately thickened.

MESOSOMA. Pronotum mostly sparsely punctate, with longitudinal rugae near posterior margin. Epomia indistinct. Mesoscutum (Fig. 23F) wide and short, convex, with dense fine punctures. Notaulus distinct, reaching past half length of mesoscutum. Scutellum convex, densely pilose, anteriorly with fine, longitudinal striae (Fig. 23F). Postscutellum transverse, smooth. Mesopleuron centrally smooth, near margins densely punctate, densely pilose. Epicnemial carina short, extending through ventral 0.4 of mesopleuron (Fig. 23C). Sternaulus distinct, extending over entire mesopleuron. Juxtacoxal carina vestigial. Submetapleural carina complete. Fore wing with 1cu-a slightly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu slightly longer than 2cu-a (Fig. 23A). Hind wing with cu-a strongly inclivous and interrupted at lower 0.2. Distal abscissa of 1Cu spectral. Distal abscissa of M spectral. Inner profile of fore basitarsus with basal half distinctly bent. Hind coxa sparsely punctate on anterior face, elsewhere smooth. Hind femur stout, length 4.67 times its maximum width, with distinct ridge-like swelling on basal 0.3 of posterior face. Basal portion of hind tibia slender, gradually thick toward apex. Longer spur of hind tibia 0.40 times as long as length of hind basitarsus. Propodeum steeply sloping in lateral view, centrally smooth, anterior and lateral portions rugulose. Propodeum entirely carinated.

METASOMA (Fig. 23F). T1 approximately 2.5 times as long as apically broad; portion just before posterior apex bulging and distinctly broader than posterior margin; petiole flat, laterally smooth, dorsally with fine longitudinal striae extending into postpetiole; median dorsal carina absent; dorsolateral and ventrolateral carinae weak to almost indistinct, fading towards posterior apex; spiracle small, round, not prominent. T2 and T3 covered with fine, but distinct longitudinal striae. T2 long and widened posteriorly, approximately 1.4 times as long as apically broad. T3 approximately 1.0 times as long as apically broad, parallel-sided. Ovipositor 2.1 times as long as hind basitarsus (Fig. 23B).

COLOUR. Body almost entirely blackish, with legs mostly brownish to orange. Head black; scape and pedicel ferruginous-brown; flagellum brown, flagellomeres 6–10 dorsally white. Apex of mandible reddish. Palpi whitish. Mesosoma black. Fore leg ferruginous except trochanter whitish; mid and hind coxae brown, trochanters whitish; remainder of mid leg fuscous, except basal 0.6 of dorsal face of tibia whitish. Hind leg apical of trochanter dark brown, except basal 0.25 of tibia whitish. Fore wing with distinct median and subapical infusate bands. T4–T7 brownish, T5–T7 with posterior whitish band, second sternite whitish.

Male

Unknown.

Remarks

Palpostilpnus palpator is similar to *P. brevis* Sheng & Broad, 2011, but can be distinguished from the latter by the following combination of characters: notaulus indistinct, antenna and metasoma black, frons smooth, ovipositor 2.1 times as long as hind basitarsus (vs 0.4 times in *P. brevis*).

Distribution

Philippines (Negros).

Palpostilpnus papuator (Aubert, 1961)

Fig. 24

Townostilpnus (*Palpostilpnus*) *papuator* Aubert, 1961: 58.

Palpostilpnus papuator – Townes 1970: 17.

Diagnosis

Clypeal suture indistinct. Fore wing with M present. Propodeal carinae partly present. Ovipositor 2.1 times as long as hind basitarsus. Body mostly black, with middle flagellomeres dorsally, palpi, trochanters, basal part of hind tibia and T6 white (Fig. 23B). Wings infuscated, with two transverse bands.

Material examined

Holotype

PAPUA NEW GUINEA • ♀; Lanham Dobodura; Dec. 1943; H. Townes leg.; USUC.

Description

Female (holotype)

SIZE. Fore wing length 3.8 mm. Body short and stout, 1.40 times as long as high (Fig. 24).

HEAD. Face 1.13 times as broad as high, centrally slightly convex, finely granulose (Fig. 24C). Clypeal suture indistinct. Clypeus slightly convex, matte, transversely striate, apically evenly convex downwards, with sharp apical margin. Mandible basally sparsely punctate; teeth blunt, with subequal length. Malar space granulated, 0.8 times as long as basal mandible width. Gena glossy, smooth and shiny, with no distinct carina dorsally between vertex and eye. Vertex smooth to coriarius; posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Frons coriarius-rugose, lower portion slightly concave. Antenna slightly shorter than body, median portion moderately thickened.

MESOSOMA. Pronotum rugulose. Epomia indistinct. Mesoscutum wide and short, convex, mostly coriarius, with short transverse striae over notaulus. Notaulus distinct, reaching past half length of mesoscutum. Scutellum convex, with strong, regularly spaced longitudinal striae. Postscutellum transverse, smooth. Mesopleuron irregularly rugose, with sparse, small, smooth areas, sparsely pilose. Epicnemial carina short, extending through ventral 0.5 of mesopleuron (Fig. 24D). Sternaulus distinct, extending over entire mesopleuron. Juxtacoxal carina distinct. Submetapleural carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu slightly longer than 2cu-a. Hind wing with cu-a strongly inclivous and interrupted at lower 0.3. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of fore basitarsus with basal half distinctly bent. Hind coxa punctate along lateral longitudinal portion, elsewhere smooth. Hind femur stout, length 3.9 times its maximum width, with distinct ridge-like swelling on basal 0.3 of posterior face. Basal portion of hind tibia slender, gradually thick toward apex. Longer spur of hind tibia 0.35 times as long as length of hind basitarsus. Propodeum steeply sloping in lateral view, centrally smooth, anterior and lateral portions rugulose. Posterior transverse and median longitudinal carinae well developed, complete.

METASOMA (Fig. 26A). T1 approximately 2.5 times as long as apically broad; portion just before posterior apex bulging and distinctly broader than posterior margin; petiole flat, laterally smooth, dorsally with fine longitudinal striae extending into postpetiole; median dorsal carina absent; dorsolateral and ventrolateral carinae anteriorly distinct, fading towards posterior apex; spiracle small, round, not prominent. T2–T3 covered with fine, but distinct longitudinal striae. T2 long and widened posteriorly, approximately 1.4 times as long as apically broad. T3 approximately 1.0 times as long as apically broad, parallel-sided. Ovipositor 2.1 times as long as hind basitarsus.

COLOUR. Body almost entirely blackish, with legs mostly brownish to orange. Head black; scape and pedicel ferruginous-brown; flagellum brown, flagellomeres 6–10 dorsally white. Apex of mandible reddish. Palpi whitish. Mesosoma black. Fore leg ferruginous except trochanter whitish; mid and hind coxae brown, trochanters whitish; remainder of mid leg fuscous, except basal 0.6 of dorsal face of tibia whitish. Hind leg apicad of trochanter dark brown, except basal 0.25 of tibia whitish. Fore wing with distinct median and subapical infusate bands. T4–T7 brownish, T5–T7 with posterior whitish band, S2 whitish.

Remarks

This species is similar to *P. striator* Aubert, 1961, from which it can be distinguished by the following combination of characters: frons, mesonotum and mesosternum finely punctate, entirely dull, ovipositor 2.1 times as long as length of hind basitarsus (vs 1.5 times in *P. striator*).

Distribution

Papua New Guinea.

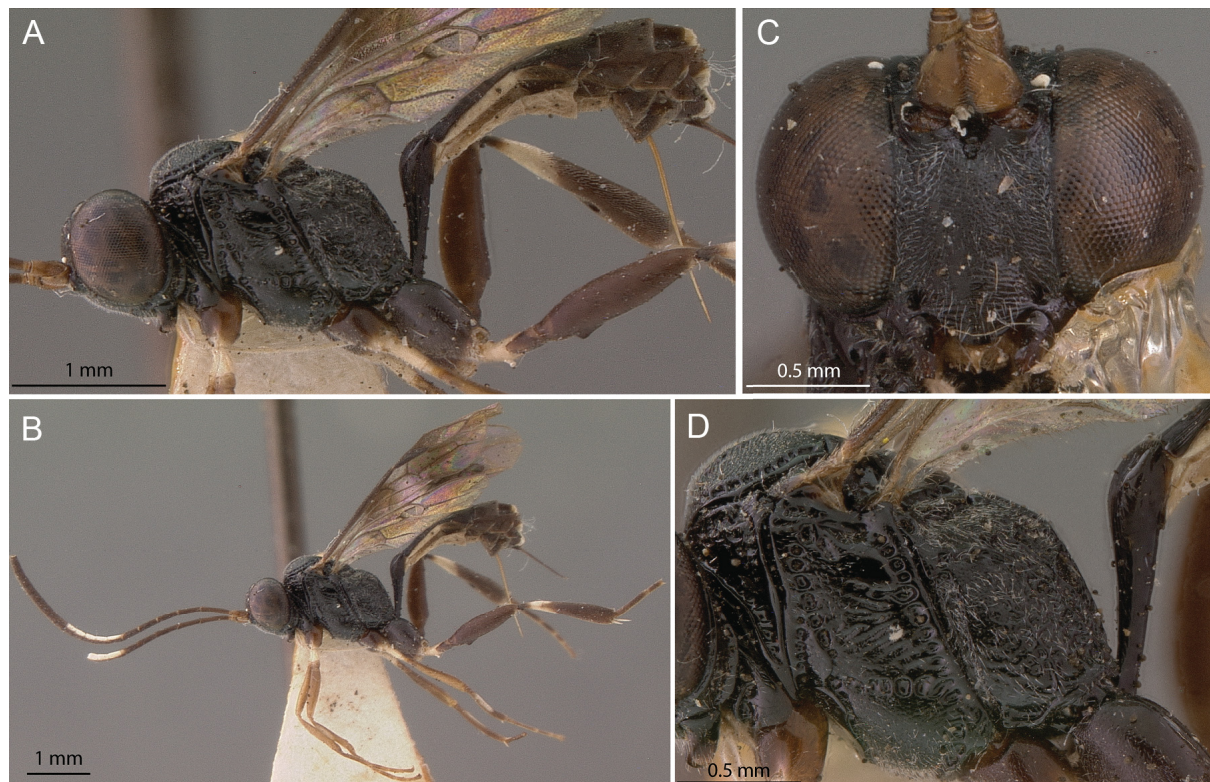


Fig. 24. *Palpostilpnus papuator* (Aubert, 1961), holotype, ♀ (USUC). **A.** Lateral habitus. **B.** Lateral habitus. **C.** Head, anterior view. **D.** Mesopleuron.

Palpostilpnus rufinator (Aubert, 1961) stat. rev.

Fig. 25

Townostilpnus (*Palpostilpnus*) *rufinator* Aubert, 1961: 58.

Palpostilpnus rufinator – Townes 1970: 17.

Diagnosis

Mesosoma mostly reddish (Fig. 25A–B). Scutellum densely punctate. Basal part of hind tibia white (Fig. 25A). Apical part of fore wing infusate.

Material examined

Holotype

PHILIPPINES • ♀; Luzon, Mt Macolod; 24 Oct. 1953; H. Townes leg.; USUC.

Description

Female (holotype)

SIZE. Fore wing length 4.0 mm. Body short and stout, 1.35 times as long as high (Fig. 25).

HEAD. Face 1.5 times as broad as high, centrally slightly convex, finely granulose (Fig. 25C). Clypeal suture indistinct. Clypeus slightly convex, matte, transversely striate, apically evenly convex downwards, with sharp apical margin. Mandible basally sparsely punctate; teeth blunt, of subequal length. Malar space granulated, 1.2 times as long as basal mandible width. Gena glossy, smooth and shiny, with no distinct carina dorsally between vertex and eye. Vertex (Fig. 25D) smooth to coriarius; posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Postero-ocellar distance 5.2 times ocular-ocellar distance (Fig. 25D). Frons coriarius-rugose, lower portion slightly concave. Antenna slightly longer than body, with 27 flagellomeres, median portion moderately thickened.

MESOSOMA. Pronotum rugulose. Epomia indistinct. Mesoscutum wide and short, convex, with coarse and dense punctures. Notaulus distinct, reaching past half-length of mesoscutum. Scutellum convex, with coarse shallow punctures (Fig. 25D). Postscutellum transverse, smooth. Mesopleuron punctate-rugose, with sparse, small, smooth areas, glabrate. Epicnemial carina long and curved in middle of mesopleuron (Fig. 25B). Sternaulus indistinct. Juxtacoxal carina indistinct from other metapleural rugae. Submetapleural carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of vein M spectral; ramulus absent; length of vein Cu equal to 2cu-a (Fig. 25A). Hind wing with cu-a strongly inclivous and interrupted at lower 0.2. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of fore basitarsus with basal half distinctly bent. Hind coxa punctate along lateral longitudinal portion, elsewhere smooth. Hind femur stout, 4.35 times as long as its maximum width. Basal portion of hind tibia slender, gradually thick toward apex. Longer spur of hind tibia 0.55 times as long as length of hind basitarsus. Propodeum steeply sloping in lateral view, with crowded coarse punctures, almost alveolate. Propodeal carinae indistinct except for vestiges of longitudinal carinae near insertion of T1.

METASOMA (Fig. 25E). T1 approximately 2.5 times as long as apically broad; petiole flat, smooth; postpetiole wide, with distinct punctures; median dorsal carina absent; dorsolateral and ventrolateral carinae distinct; spiracle small, round, not prominent. T2–T5 with coarse, adjacent punctures, almost alveolate. T2 widened posteriorly, approximately 0.6 times as long as apically broad. T3 approximately 0.6 times as long as apically broad, parallel-sided. Ovipositor 0.9 times as long as hind basitarsus.

COLOUR. Head and mesosoma mostly blackish, mesosoma mostly ferruginous. Head black; mouthparts fuscous and whitish; scape, pedicel and basal portion of flagellum light brownish, antenna dark brown towards apex. Mesosoma ferruginous; ventral portion of pronotum, fore coxa and trochanters dark

brown; fore and mid femora basally brown, light brown towards apex. Fore tibia and tarsus light brown; hind tibia light brown with anterior face whitish on basal 0.7; mid tarsus light brown and whitish; hind trochanters, femur, apical 0.6 of tibia and T2–T5 dark brown; basal 0.4 of tibia and basitarsus whitish. Wings hyaline, with large apical infusate band, but apical margin hyaline. Mesosoma mostly blackish; T1 ferruginous on anterior 0.4; T2 light brown on anterior 0.6; T6–T8 whitish.

Remarks

This species is similar to *P. striator* (Aubert, 1961), from which it can be distinguished by the following combination of characters: mandibles sub-basally swollen, with a basal, transverse groove; propodeum sloping gradually; mesosoma mostly reddish (Fig. 25A); fore wing with one infusate transverse band; antenna, scape and trochanters without white colouration.

Distribution

Philippines (Luzon), Japan (Okinawa).

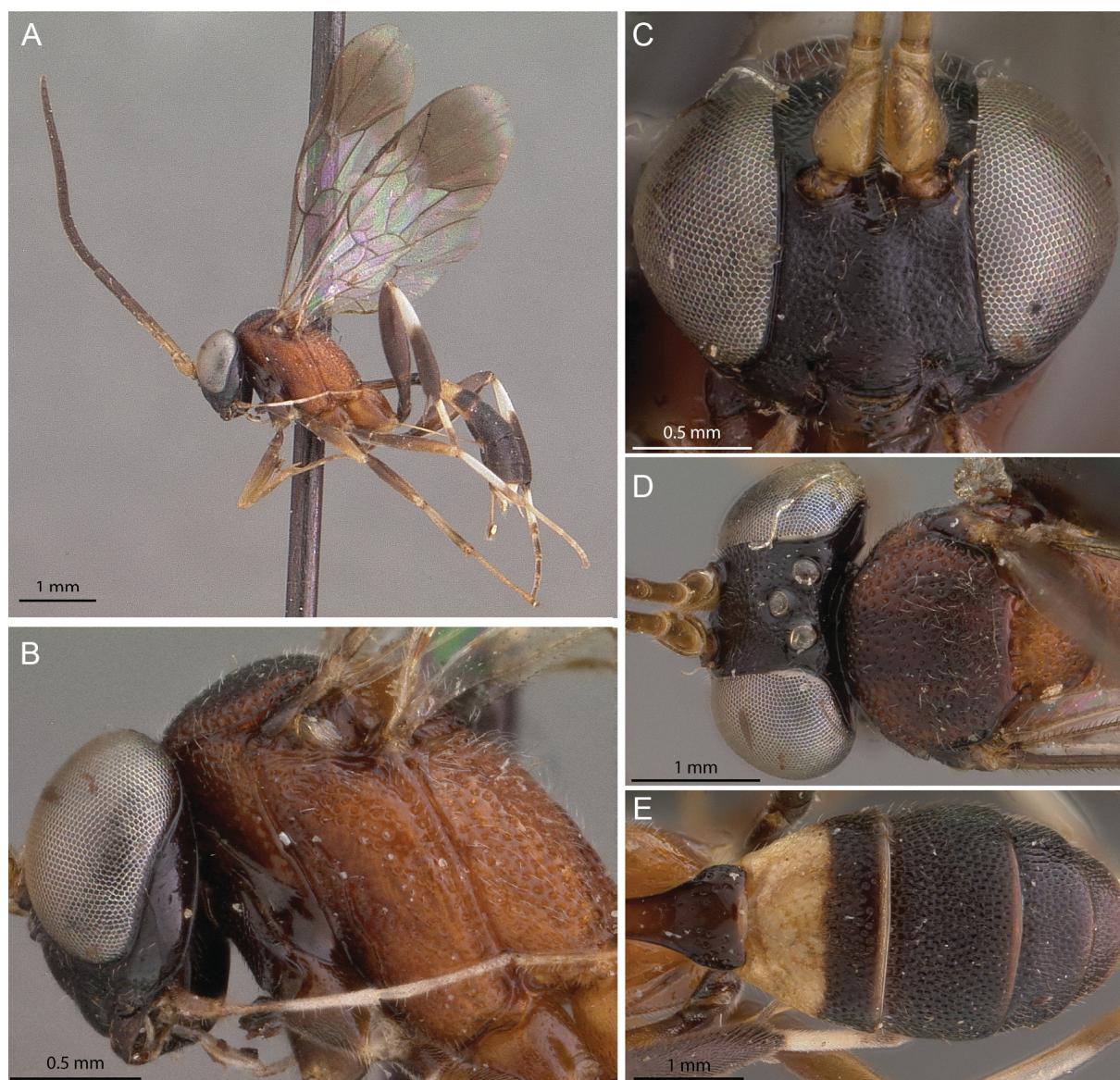


Fig. 25. *Palpostilpnus rufinator* (Aubert, 1961), holotype, ♀ (USUC). **A.** Lateral habitus. **B.** Mesopleuron. **C.** Head, anterior view. **D.** Scutum. **E.** Metasoma, dorsal view.

Palpostilpnus singaporensis sp. nov.

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Figs 26–27

Diagnosis

Body short and stout (Fig. 26A). Postero-ocellar distance 3.6 times ocular-ocellar distance (Fig. 27E). Epomia indistinct. Epicnemial carina long and curved in middle of mesopleuron (Fig. 26C). Propodeal carinae absent except for vestiges of posterior transverse carina and apical portion of dorsal longitudinal carina (Fig. 27B). Ovipositor 0.3 times as long as hind basitarsus (Fig. 27C). Body mostly yellow, with head, most of antenna, apical part of hind tibia and hind margin of T1–T4 black, scape and palpus white (Fig. 26A). Wings hyaline (Fig. 27F).

Etymology

The specific name is derived from the name of the type locality, Singapore.

Material examined

Holotype

SINGAPORE • ♀; Nee Soon Swamp Forest; 1°23'00.3" N, 103°48'46.5" E; Malaise trap (NS1); 13–20 Mar. 2013; NUS leg.; barcode: ZRC_39348; LKCNHM.

Paratypes

BRUNEI • 1 ♀; Belait District, Labi (mukim); 200 m a.s.l.; mixed dipterocarp forest; Aug.–Sep. 1979; I. Gauld leg.; NHMUK.

MALAYSIA • 1 ♀; Sarawak, 4th Division, Gunung Mulu National Park; May–Jun. 1978; N.M. Collins, RGS Expedition leg.; NHMUK.

SINGAPORE • 1 ♀; same collection data as for holotype; 3–10 Jul. 2013; barcode: ZRC_BDP0039318; NHRS PT-HEVA000010862 • 1 ♀; Nee Soon Swamp Forest; 1°23'04.2" N, 103°48'40.7" E; Malaise trap (NS2); 5–12 Mar. 2014; NUS leg.; barcode: ZRC_39559; LKCNHM.

Description

Female (holotype)

SIZE. Fore wing length 3.3 mm. Body short and stout, 1.28 times as long as high (Fig. 26A).

HEAD. Face 2.0 times as broad as high, centrally slightly convex; finely granulose (Fig. 26B). Clypeal suture very weak. Clypeus slightly convex, matte, slightly striate apically, evenly convex downwards, with sharp apical margin. Mandible basally smooth; teeth sharp, of subequal length. Malar space granulated, 0.8 times as long as basal mandible width. Gena glossy, smooth and shiny, with weak transverse carina dorsally between vertex and eye. Vertex (Fig. 27E) finely punctate, distance between punctures approximately 1–1.2 times diameter of punctures, posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave. Postero-ocellar distance 3.6 times ocular-ocellar distance (Fig. 27E). Frons finely coriarius, lower portion slightly concave. Antenna slightly shorter than body, with 27 flagellomeres, median portion moderately thickened. Occipital carina complete.

MESOSOMA. Pronotum coarsely punctate. Epomia indistinct. Mesoscutum (Fig. 26E) wide and short, convex, with coarse, dense punctures. Notaulus indistinct. Scutellum slightly convex, with coarse dense punctures. Postscutellum transverse, smooth. Centre of mesopleuron smooth, but outer areas

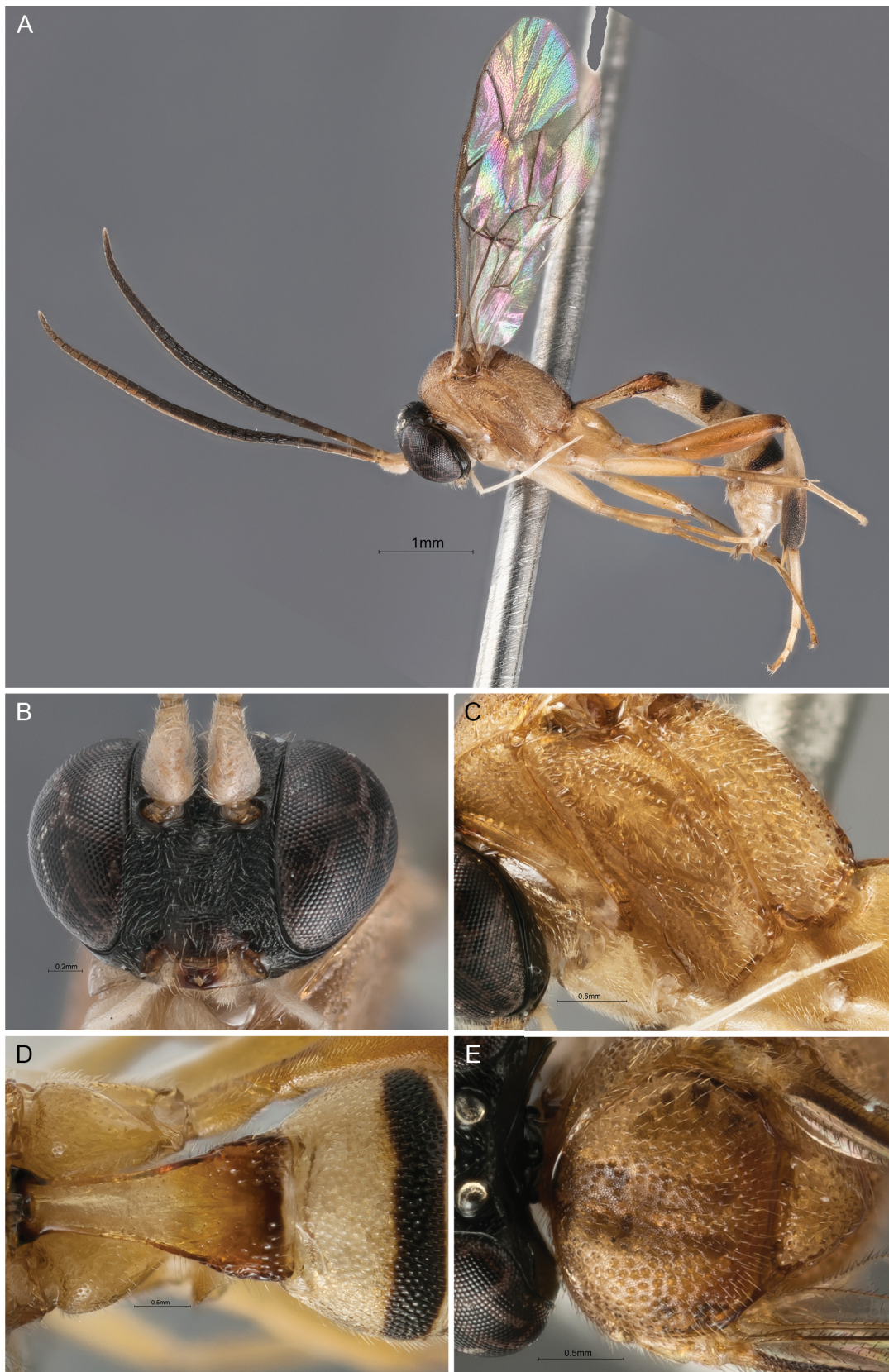


Fig. 26. *Palpostilpnus singaporensis* sp. nov., holotype, ♀ (LKCNHM). **A.** Lateral habitus. **B.** Head, anterior view. **C.** Mesopleuron. **D.** T1, dorsal view. **E.** Scutum.

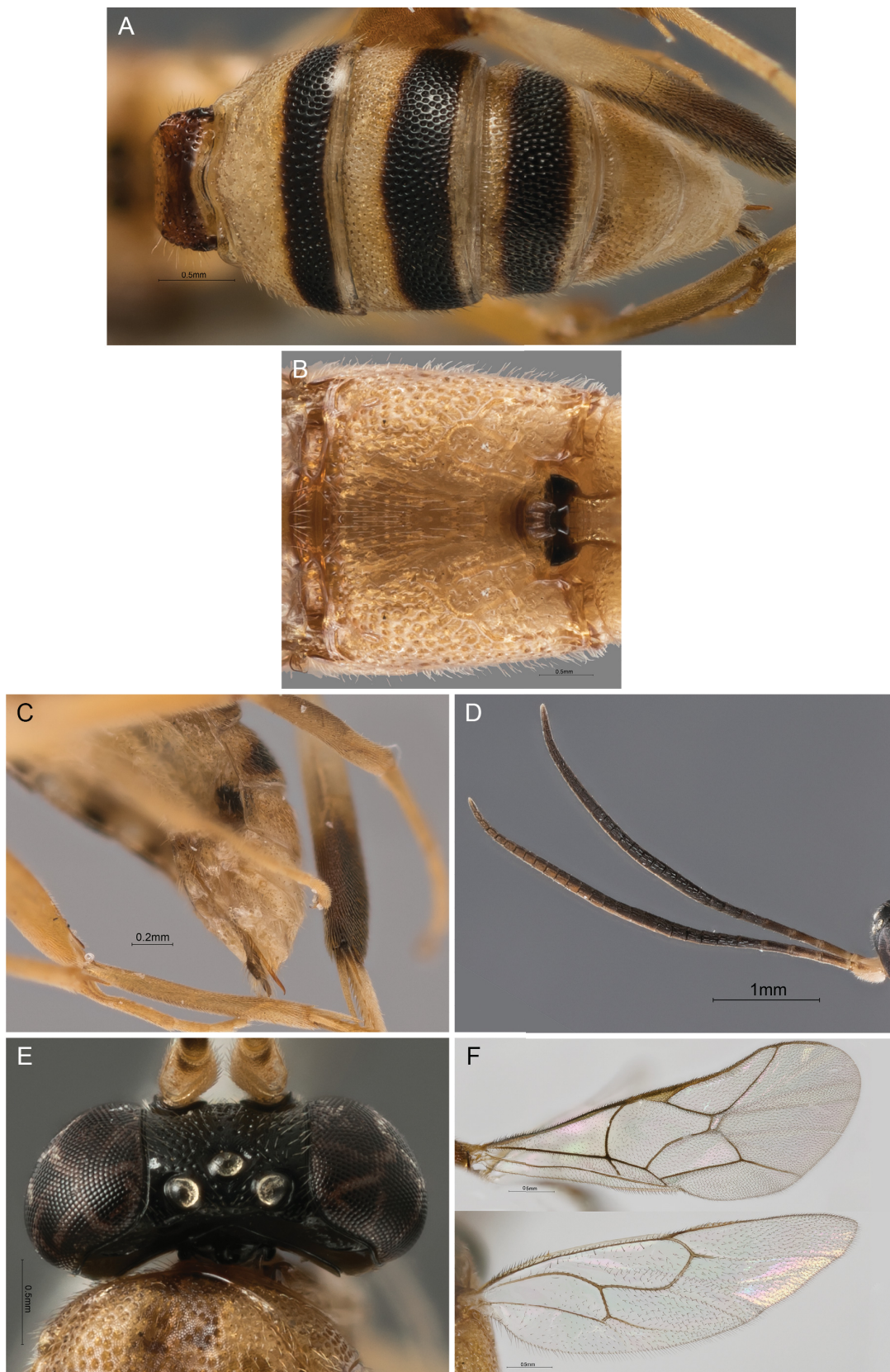


Fig. 27. *Palpostilpnus singaporensis* sp. nov., holotype, ♀ (LKCNHM). **A.** Metasoma, dorsal view. **B.** Propodeum, dorsal view. **C.** Ovipositor. **D.** Antennae. **E.** Vertex. **F.** Wings.

(near epicnemial carina, speculum and sternaulus) densely punctate (as pronotum and mesoscutum), pubescent with yellowish setae. Epicnemial carina long and curved in middle of mesopleuron (Fig. 26C). Sternaulus distinct, extending over entire mesopleuron. Metapleuron with distinct shallow punctures, distance between punctures 0.2 times diameter of puncture. Juxtacoxal carina distinct, but short. Submetapleurale carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of vein M spectral; ramulus absent; length of vein Cu slightly longer than 2cu-a (Fig. 27F). Hind wing with cu-a strongly inclivous and interrupted at lower 0.2. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of fore basitarsus with basal half slightly bent. Hind coxa anteriorly punctate, posteriorly smooth. Hind femur stout, length 4.2 times its maximum width. Basal portion of hind tibia slender, gradually thick toward apex. Longer spur of hind tibia 0.56 times as long as length of hind basitarsus. Propodeum steeply sloping in lateral view, with sparse coarse punctures, posterocentrally smoother (Figs 26B–C). Propodeal carinae absent except for vestiges of posterior transverse carina and apical portion of lateromedian longitudinal carina (Fig. 27B).

METASOMA (Fig. 27A). T1 2.0 times as long as apically broad, smooth, petiole flat, concave; postpetiole wide, without median dorsal carina; dorsolateral and ventrolateral carinae distinct; spiracle small, round, slightly prominent. T2–T6 coarsely and sparsely punctate. T2 widened posteriorly, 0.5 times as long as apically broad, with distinct gastrocoelus. T3 0.6 times as long as apically broad, parallel-sided. Ovipositor 0.3 times as long as hind basitarsus (Fig. 27C).

COLOUR. Body mostly yellow. Antenna dorsally, head, posterior stripe on T1–T4 and apical part of hind tibia black. Apex of mandible reddish. Antenna ventrally brownish. Scape ventrally, palpi, fore and middle trochanters, fore femur, apical part of metasoma and hind tarsus pale yellow.

Male

Unknown.

Variation

Fore wing 3.3–3.5 mm long. Antenna with 26–27 flagellomeres. Specimen from Brunei with black transverse stripe on apex of mesoscutum; black spots on hind tibia smaller; metasoma without distinct black stripes, but slightly darkened on posterior portion; ovipositor 0.4 times as long as hind basitarsus.

Remarks

This species is similar to *P. hainanensis* sp. nov., but it can be distinguished from the latter by having a distinctly stouter body (1.28 times vs 1.60 times as long as high in *P. hainanensis* sp. nov.) and the following combination of characters: T1 2.0 times as long as apically broad (1.8 times in *P. hainanensis* sp. nov.), ovipositor 0.3 times as long as hind basitarsus (1.3 times in *P. hainanensis* sp. nov.), mesopleuron entirely yellow and hind margin of T1–T4 black or at least distinctly darkened.

***Palpostilpnus striator* (Aubert, 1961)**

Fig. 28

Townostilpnus (*Palpostilpnus*) *striator* Aubert, 1961: 59.

Diagnosis

Body short and stout. Mesopleuron striated. Propodeal carinae partly present. Ovipositor 1.5 times as long as hind basitarsus. Body mostly black, with middle flagellomeres dorsally, palpi, trochanters, basal part of hind tibia and T6 white. Wings infuscate by two bends.

Material examined

Holotype

PHILIPPINES • ♀; Mindoro, Mt Dong; 18 Apr. 1954; J. Aubert and H. Townes leg.; photographs examined; USUC.

Description

Female (holotype)

SIZE. Fore wing length 4.0 mm. Body short and stout, 1.25 times as long as high (Fig. 28A).

HEAD. Face 1.45 times as broad as high, centrally slightly convex, finely granulose (Fig. 28D). Clypeal suture indistinct. Clypeus slightly convex, matte, transversely striate, apically evenly convex downwards, with sharp apical margin. Mandible basally smooth; teeth sharp, dorsal tooth broad and decurved, much longer than ventral one. Malar space granulated, 0.6 times as long as basal mandible width. Gena glossy, smooth and shiny, with no distinct carina dorsally between vertex and eye. Vertex smooth to coriaceous; posterior portion from behind ocelli to occipital carina slanted almost vertically, slightly concave.

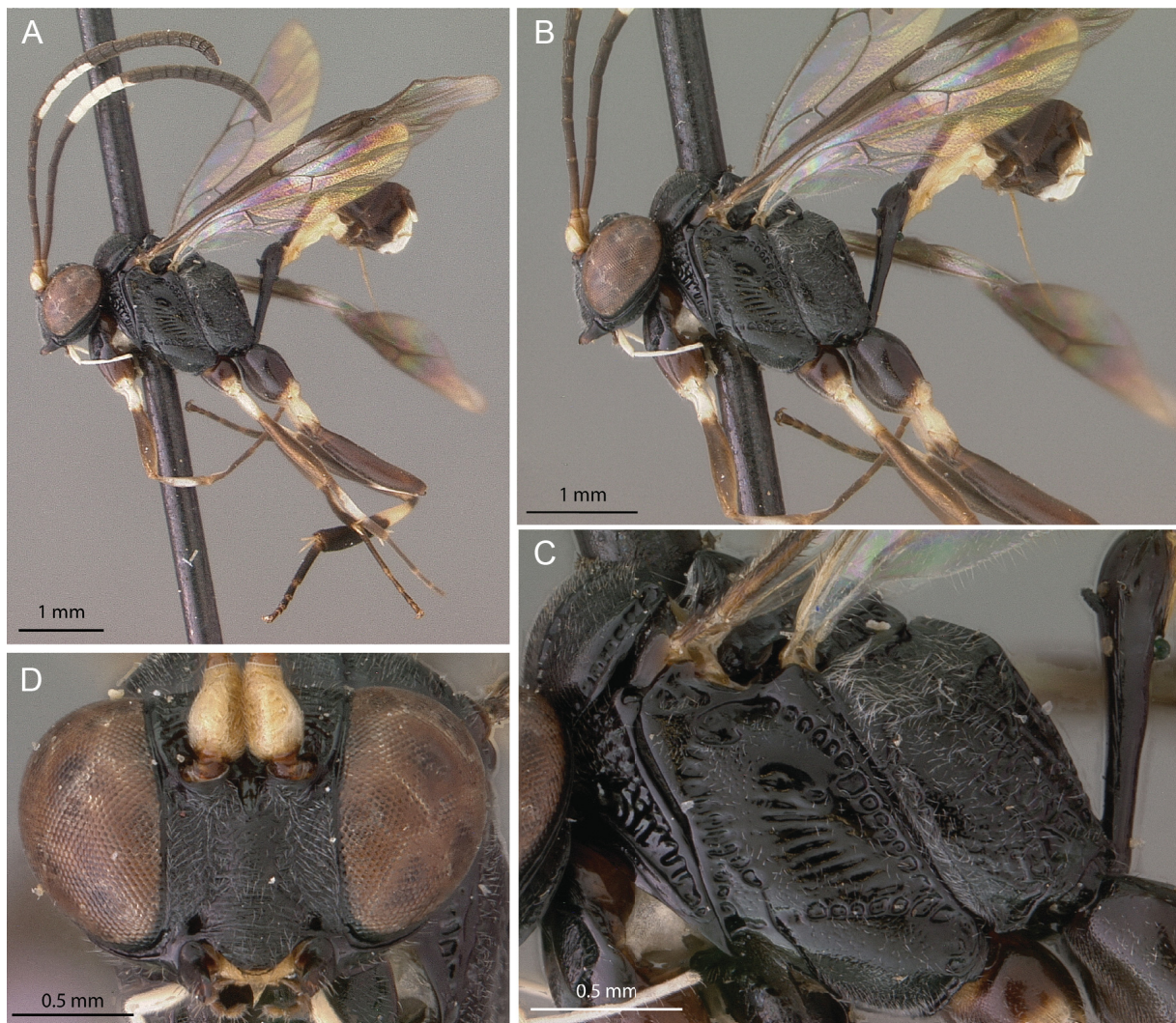


Fig. 28. *Palpostilpnus striator* (Aubert, 1961), holotype, ♀ (USUC). A–B. Lateral habitus. C. Mesopleuron. D. Head, anterior view.

Frons transversely striate, lower portion slightly concave. Antenna slightly shorter than body, with 21 flagellomeres, median portion strongly thickened.

MESOSOMA. Pronotum rugulose. Epomia indistinct. Mesoscutum wide and short, convex, mostly coriarius, with short transverse striae over notaulus. Notaulus distinct, reaching past half length of mesoscutum. Scutellum convex, with strong, regularly-spaced longitudinal striae. Postscutellum transverse, smooth. Mesopleuron mostly smooth, with three vertical lines of transverse striae extending near epicnemium, speculum and posterior margin, with sparse, small smooth areas, sparsely pilose. Epicnemial carina short, extending through ventral 0.4 of mesopleuron (Fig. 28C). Sternaulus distinct, extending over entire mesopleuron. Juxtacoxal carina indistinguishable from other metapleural rugae. Submetapleural carina complete. Fore wing with 1cu-a distinctly distad of M becoming Rs, 3rs-m absent, distal abscissa of M spectral; ramulus absent; length of vein Cu distinctly longer than 2cu-a. Hind wing with cu-a strongly inclivous and interrupted at lower 0.2. Distal abscissa of Cu spectral. Distal abscissa of M spectral. Inner profile of fore basitarsus with basal half distinctly bent. Hind coxa punctate along lateral longitudinal portion, elsewhere smooth. Hind femur stout, with distinct ridge-like swelling on basal 0.3 of posterior face. Basal portion of hind tibia slender, gradually thick toward apex. Longer spur of hind tibia 0.35 times as long as hind basitarsus. Propodeum steeply sloping in lateral view, centrally smooth, anterior and lateral portions rugulose. Propodeal carinae present and distinct.

METASOMA (Fig. 28A). T1 approximately 2.5 times as long as apically broad; portion just before posterior apex bulging and distinctly broader than posterior margin; petiole flat, laterally smooth, dorsally with fine, longitudinal striae extending into postpetiole; median dorsal carina absent; dorsolateral and ventrolateral carinae weak to almost indistinct, fading towards posterior apex; spiracle small, round, not prominent. T2 and T3 covered with fine but distinct longitudinal striae. T2 long and widened posteriorly, approximately 1.4 times as long as apically broad. T3 approximately 1.0 times as long as apically broad, parallel-sided. Ovipositor 1.5 times as long as hind basitarsus.

COLOUR. Body almost entirely blackish, with legs mostly brownish to orange. Head black; scape and pedicel ferruginous-brown; flagellum brown, flagellomeres 6–10 dorsally white. Apex of mandible reddish. Palpi whitish. Mesosoma black. Fore leg ferruginous except trochanter whitish; mid and hind coxae brown, trochanters whitish; remainder of mid leg fuscous, except basal 0.6 of dorsal face of tibia whitish. Hind leg apicad of trochanter dark brown, except basal 0.25 of tibia whitish. Fore wing with distinct median and subapical infuscate bands. T4–T7 brownish, T5–T7 with posterior whitish band, S2 whitish.

Remarks

This species is similar to *P. papuator* (Aubert, 1961), from which it can be distinguished by the following combination of characters: frons transversally striated, shiny, as well as mesonotum and mesosternum, ovipositor 1.5 times as long as hind basitarsus (2.1 times in *P. papuator*).

Distribution

Philippines (Mindoro).

Species *inquirenda*

Material examined

BRUNEI • 5 ♂♂; Labi; 200 m a.s.l.; mixed dipterocarp forest; Aug.–Sep. 1979; I. Gauld leg.; NHMUK
• 1 ♂; Sep. 1982; N. Stork leg.; NHMUK.

PHILIPPINES • 2 ♂♂; Leyte Island, Bay Bay, Visca Forest; 5–13 Sep. 1980; L. Tuangga leg.; NHMUK.

Remarks

For eight male specimens, any morphological association with known females was not evident. Some of them could correspond to the males of *P. angkor* sp. nov., and at least some of these specimens seem to belong to a distinct taxon. Males of *Palpostilpnus*, however, show a complex dynamic of morphological variability, making its interpretation too risky with few specimens and without the corresponding female. Hence, the specimens in question are better interpreted, at least for now, as species *inquirenda*. Further studies with a refined population sampling of the genus should shed light on the interpretation of these specimens and of additional, undescribed taxa.

Key to world species of *Palpostilpnus* Aubert, 1961

1. Fore wing with infuscate transverse band (Figs 11A, 12E, 23B, 24A, 27A)2
 - Fore wing lacking infuscate transverse band (Figs 5A, 6H, 7A, 9A, 10H, 13A, 14G, 15A, 16D, 17A, 18D, 19A, 20A, 21H, 22A, 23A, 25A, 26F)5
2. Fore wing with one infuscate transverse band (Figs 11A, 12E, 24A). Antenna without median white band (Figs 11A, 24A). T2 with coarse punctures (Fig. 12A). Propodeum sloping gradually3
 - Fore wing with two infuscate transverse bands (Figs 23B, 27A). Antenna with median white band (Figs 23B, 27A). T2 with fine punctures. Propodeum sloping steeply4
3. Mesosoma mostly reddish (Fig. 25A). Infuscate transverse band of fore wing rather distal. Hind tarsus brown, with white basitarsus. Body shallowly and sparsely punctate. Ovipositor as long as hind basitarsus. T1 about 3 times as long as apically broad*P. rufinator* (Aubert, 1961)
 - Mesosoma black (Fig. 11A, D). Infuscate transverse band of fore wing on distal 0.6 (Fig. 12E). Hind tarsus white. Body coarsely and densely punctate. Ovipositor 1.4 times as long as hind basitarsus. T1 1.8 times as long as apically broad (Fig. 11C)*P. mangrovi* sp. nov.
4. Frons, mesonotum and mesosternum transversally striated, shiny. Ovipositor 1.5 times as long as hind basitarsus (28A)*P. striator* (Aubert, 1961)
 - Frons, mesonotum and mesosternum finely punctate, entirely dull. Ovipositor 2.1 times as long as hind basitarsus (Fig. 24B)*P. papuator* (Aubert, 1961)
5. Occipital carina broadly absent dorsally (Fig. 14F). T1 short and stout, 1.5 times as long as apically broad (Fig. 13D)*P. pterodactylus* sp. nov.
 - Occipital carina complete dorsally (Fig. 10G). T1 longer, 1.7–2.35 times as long as apically broad (Figs 9D, 17D, 20D)6
6. Combined area of propodeum (area superomedia and area petiolaris) absent or, if present, anteriorly open (Figs 6C, 10C, 16A, 18B, 21C)7
 - Combined area of propodeum (area superomedia and area petiolaris) present and anteriorly closed (Fig. 22D)14
7. T2 (or T3–T4) with a pair of small black spots laterally (Fig. 10B)8
 - T2–T4 with a transverse central black band, or entirely black (Figs 18A, 21B)9
8. Mesosoma black, with yellow marks. Mesoscutum with coarse granulate texture and distinct fine punctures*P. maculatus* Sheng & Sun, 2013
 - Mesosoma yellow, with lower part of mesopleuron and prescutellar groove black (Fig. 9C, E). Mesoscutum with fine leathery texture and indistinct punctures (Fig. 9E)*P. hainanensis* sp. nov.

9. Mesoscutum black, with anterior portion laterally yellow (Figs 17C, E, 20C, E)10
 – Mesoscutum mostly yellow or brown, with black marks (Figs 5E, 15E)11
10. Propodeum with area postero-externa complete (Fig. 21C). Scutellum entirely black (Fig. 20E).
 Ovipositor 0.9 times as long as hind basitarsus*P. trifolium* sp. nov.
 – Propodeum with area postero-externa incomplete (Figs 18B, 19D). Scutellum laterally yellow
 (Fig. 17E). Ovipositor 3.5 times as long as hind basitarsus*P. tamasek* sp. nov.
11. Epicnemial carina absent (Fig. 15C). Hind tibia apically ferruginous (Fig. 15A)*P. ranui* sp. nov.
 – Epicnemial carina present (Fig. 5C). Hind tibia apically black or entirely black (Figs 5A, 6D)12
12. Mesoscutum with black marks (Fig. 5E). T1 entirely black (Fig. 6A). Area postero-externa
 absent (Fig. 6C)*P. aki* sp. nov.
 – Mesoscutum yellowish, without black marks (Figs 7E, 25E). T1 testaceous with postpetiole brown
 (Figs 7D, 25D). Area postero-externa present (Figs 8C, 26B)13
13. Postero-ocellar distance 2.0 times as long as ocular-ocellar distance (Fig. 8G). Mesosoma elongate,
 about 1.50 times as long as high (7C). Hind part of T2 coloured black as a lens, T3 and T4
 transversally coloured black in their middle (Fig. 8A–B)*P. angka* sp. nov.
 – Postero-ocellar distance 3.6 times as long as ocular-ocellar distance (Fig. 26E). Mesosoma
 short, about 1.25 times as long as high (Fig. 26C). Hind part of T2–T4 coloured black as a
 band (Fig. 26A)*P. singaporensis* sp. nov.
14. Mesosoma and metasoma entirely black (Fig. 23A)15
 – Mesosoma and metasoma black with yellow colouration (Fig. 22A)16
15. Antenna with 34 flagellomeres. Lower side of hind femur without tubercles. Ovipositor sheath
 shorter than apical depth of metasoma. Antenna with middle flagellomeres coloured white dorsally.
 Hind tarsus testaceous*P. brevis* Sheng & Broad, 2011
 – Antenna with 22 flagellomeres. Lower side of hind femur with basal tubercle. Ovipositor sheath
 longer than apical depth of metasoma. Antenna with middle flagellomeres coloured entirely
 brownish (Fig. 23A). Hind tarsus black*P. palpator* (Aubert, 1961)
16. Mesoscutum with large, shallow punctures (Fig. 22E). Postero-ocellar distance 3.4 times as long
 as ocular-ocellar distance (Fig. 22E)*P. angkor* sp. nov.
 – Mesoscutum densely reticulate-punctate. Postero-ocellar distance 1.25 times as long as ocular-
 ocellar distance*P. rotundatus* Sheng & Sun, 2013

Discussion

While the biology of *Palpostilpnus* is still enigmatic, we can hypothesize that the ovipositor morphology (thin, needle-like) might be an adaptation of this group to oviposit into very early host stages. A similar link between ovipositor morphology and biology has been shown for other groups of Ichneumonidae with known host records, such as members of the tribe Pionini (Ctenopelmatinae), which start their development in the host's eggs (McConnell 1938; Cameron & Wharton 2011) or in early instar host larvae (Pschorn-Walcher & Zinnert 1971). In addition to that, the head of species of the genus resembles that of some Diptera with divided eyes (e.g., Chloropidae and Ephydriidae). This may be assumed with some caution to be a case of some type of parasitoid–host mimicry (aggressive mimicry) (Vane-Wright 1976, 1980; Pasteur 1982), e.g., a wolf in sheep's clothing (Heneberg *et al.* 2018). On the other hand,

members of the predator fly family Hybotidae hunt Ichneumonidae (personal report). Some hybotids are known for the resemblance of their wing colouration with that of some parasitoids, e.g., *Holceupelmus* Cameron, 1905 egg parasitoids, which could be a mimetic association (Smith 1969). The same infusate colour pattern occurs on the wings of several species of *Palpostilpnus* (*P. mangrovi* sp. nov., *P. rufinator*, *P. striator*, *P. papuator*).

The habitats of those species for which it is known are woodlands (Table 1), either evergreen broad-leaved (Figs 2A–B, 3) or deciduous mixed forest at mountainous sites, or dipterocarp, swamp or intertidal mangrove forests in the lowlands. The exception is Pak Sha O in Hong Kong, which is a lowland site; however, it is surrounded by mature secondary evergreen forest. These habitats invariably represent fragile ecosystems, which are increasingly under the threat of destruction, either indirectly (global warming, and other environmental impacts) or directly (habitat destruction). In the face of rapid habitat loss in Southeast Asia in general, coupled with the fact that most species collected are singletons, implying a certain level of rarity, we hope that this work will encourage more research and hopefully, down the line the formulation of conservation strategies. Indeed, while the sampling methodology did not yield significant biological facts, the simple Malaise trap nevertheless provided for metrics that doubled the known number of representatives of the genus, also increasing our knowledge of distribution and species groups.

Palpostilpnus has an Oriental and Australasian distribution, with most of the species known from Southeast Asia. All the species with known habitats are associated with woodland areas (Table 1, Figs 2–3). We must point out that many of the species are represented by singletons, and in the face of rapid habitat destruction in Southeast Asia we see value in describing and documenting 10 species new to science. Our work can hopefully stimulate extra attention to this problem and encourage further studies of the global fauna of *Palpostilpnus*. We expect that additional new species of this taxon will be discovered in the future.

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Legend for Supplementary Material

Supplementary Material: Original photographs and landmark data for species of *Palpostilpnus* Aubert, 1961 used in the geometric morphometric analyses. The remaining species were adopted from the dataset of Santos *et al.* (2019). Data for *P. maculatus* Sheng & Sun, 2013, *P. rotundatus* Sheng & Sun, 2013 and *P. brevis* Sheng & Broad, 2011 were taken from images in the respective original descriptions.