

Research article

Three new species of *Eupetersia* Blüthgen, 1928 (Hymenoptera, Halictidae) from the Oriental Region

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Abstract. Three new species, *Eupetersia* (*Nesoeupetersia*) *singaporensis* sp. nov., collected in a mangrove swamp in Singapore, and *Eupetersia* (*Nesoeupetersia*) *sabahensis* sp. nov., collected in the mountains of Sabah, Borneo, and *Eupetersia* (*Nesoeupetersia*) *yanegai* sp. nov., collected in Thailand, are described. This genus is more diversified in the sub-Saharan region, including Madagascar. The only other Oriental species, *E. nathani* (Baker, 1974), was described from India and is diagnosed and re-illustrated here.

Key words. Sphecodina, African-Oriental distribution, disjunction, bees, Apoidea.

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Introduction

The parasitic bee genus *Eupetersia* Blüthgen, 1928 is probably derived from the genus *Sphecodes* Latreille, 1804 (Michener 2007; Danforth *et al.* 2008). Diagnostic features have been listed by Pauly *et al.* (2001). The more reliable character is the relative length of the first and second flagellomeres which are subequal in length in *Eupetersia*, while flagellomere 2 is distinctly longer than the first in *Sphecodes*.

Eupetersia comprises 21 species in sub-Saharan Africa, eight species in Madagascar and one endemic species in the Seychelles (Cockerell 1912; Blüthgen 1928, 1936; Michener 1978; Pauly 1981; Pauly *et al.* 2001). Baker (1974) described a species based on a single specimen, *E. nathani*, from South India. Three additional Oriental species have recently been discovered respectively in Singapore, Borneo and Thailand. *Eupetersia* species are very rare in the collections of the Oriental region and probably also in the field, since only five specimens are thus far known, representing four distinct species.

The genus is divided in three subgenera: *Eupetersia sensu stricto*, *Nesoeupetersia* Blüthgen, 1936 and *Calleupetersia* Cockerell, 1938. The four oriental species belong to the subgenus *Nesoeupetersia*, which is more diversified in Madagascar (with also four species), while only one species occurs in mainland Africa.

Morphology suggests that *Eupetersia* are cleptoparasitic bees (e.g. female without scopa on their hind leg), but data on their specific hosts are entirely lacking. *Eupetersia* (*Nesoeupetersia*) *scotti* (Cockerell, 1912) from the Seychelles is probably a parasite of the bee *Lasioglossum* (*Ctenonomia*) *mahense*

(Cameron, 1908), the only other halictid found on this archipelago. In East Africa, *Eupetersia* species of the subgenus *Calleepetersia* have been collected around the nests of halictids of the genus *Zonalictus* Michener, 1978.

Material and methods

We defined taxa in the sense of the morphological species concept, too little information being available to consider eco-, etho- or pheno-species. We used Michener (2007) for general morphology.

Specimens are preserved in the following collections:

- SEMC = Division Entomology, (Snow Entomological Collection), University of Kansas
Natural History Museum (coll. Baker), Lawrence, Kansas, USA.
- RBINS = Royal Belgian Institute of Natural Sciences, Brussels, Belgium.
- NMNH = National Museum of Natural History (Naturalis), Leiden, The Netherlands.
- UCR = University of California, Riverside, USA.
- YUT = York University, Toronto, Canada.
- QSBG = Queen Sirikit Botanical Garden, Chiang Mai, Thailand.

Results

Classis Hexapoda Blainville, 1816
Ordo Hymenoptera Linnaeus, 1758
Superfamilia Apoidea Latreille, 1802
Epifamilia Anthophila Latreille, 1804
Familia Halictidae Thomson, 1869
Subfamilia Halictinae Thomson, 1869
Tribus Halictini Thomson, 1869
Subtribus Sphecodina Schenck, 1868
Genus *Eupetersia* Blüthgen, 1928

Eupetersia (Nesoeupetersia) singaporensis sp. nov.
(Fig. 1A-F, 7)

Etymology

The specific epithet refers to the type locality.

Material examined

Holotype

Male: SINGAPORE, Kranji Nature Trail (Sungei Buloh; 1°26'49.01"N, 103°43'47.94"E), KNT01, Malaise trap 1, 26 May 2009, mangrove, Reg. 29103, leg. P. Grootaert (RBINS, Brussels).

Diagnosis

Small species (5 mm long) with black brown body and dark legs, finely and sparsely punctuate on head and scutum.

Differential diagnosis

Differs from *Eupetersia nathani* by its smaller size (5 mm), brown metasoma, head and scutum more finely and sparsely punctuate. From *E. sabahensis* sp. nov. it differs by darker legs and larger head.

Description

BODY LENGTH. 5 mm. Forewing length: 3.8 mm.

COLOUR. Black, metasoma chestnut brown; legs testaceous, anterior legs and knees yellow testaceous; scape, tegulae, mandibles and labrum yellow (Fig. 1A); hairs on terga reddish black.

PUBESCENCE. Grey and rather poor, denser on face and vertical sides of propodeum.

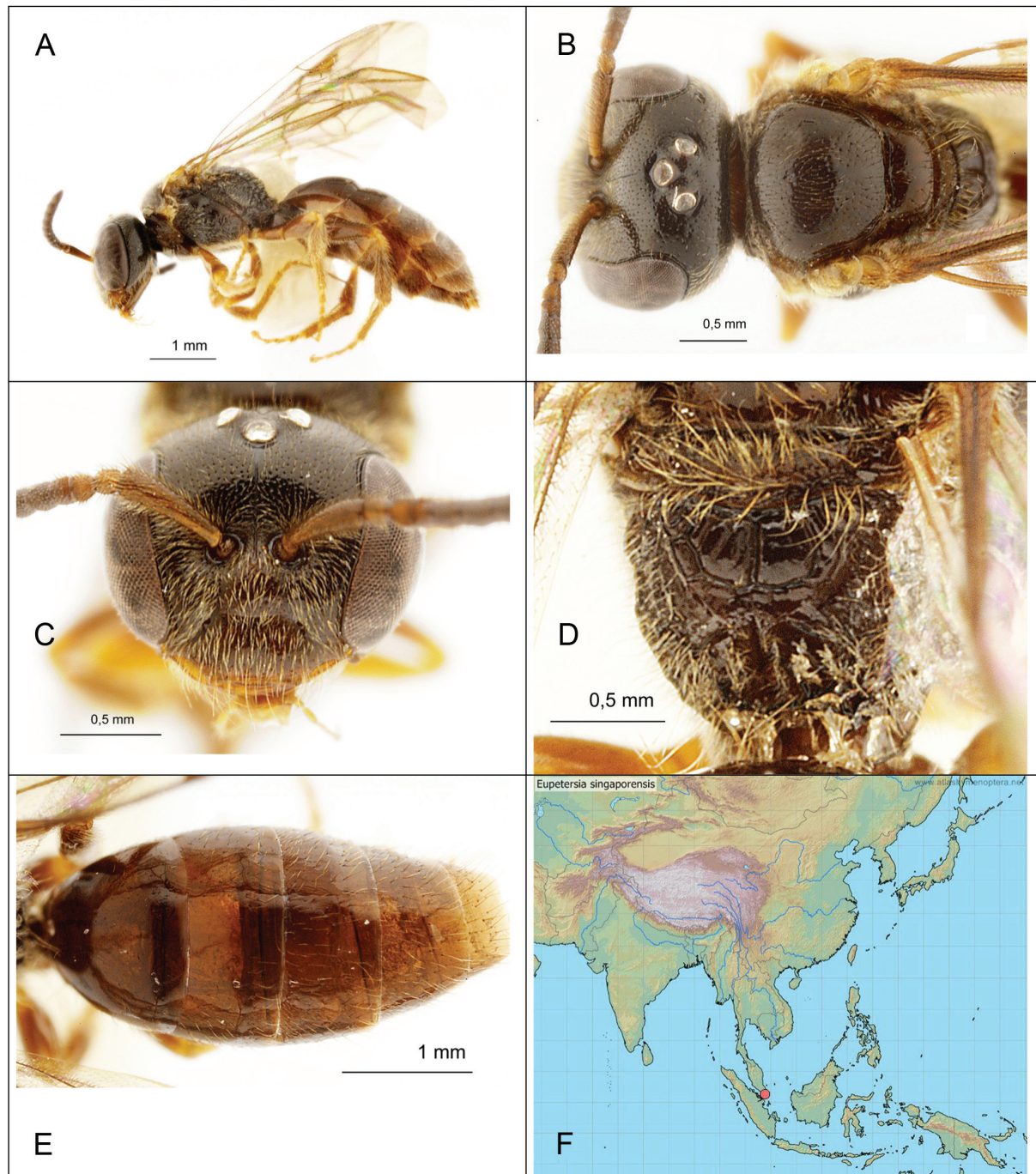


Fig. 1. *Eupetersia singaporensis* sp. nov., ♂ holotype. **A.** Lateral habitus. **B.** Dorsal view of head and mesosoma. **C.** Facial view. **D.** Propodeum. **E.** Metasoma. **F.** Geographic distribution.

STRUCTURE. Head wider than long, length/width = 0.84 (Fig. 1C). Vertex rounded. First and second flagellomeres subequal in length as in other *Eupetersia*. culpture. Head and scutum finely and sparsely punctate (Fig. 1B, C). Dorsal surface of propodeum with irregular carinae (Fig. 1D), terminating at posterior margin. Metasomal terga entirely shining and nearly impunctate (Fig. 1E). Pygidial area rounded posteriorly. Genitalia very small, gonocoxites not depressed and not striate.

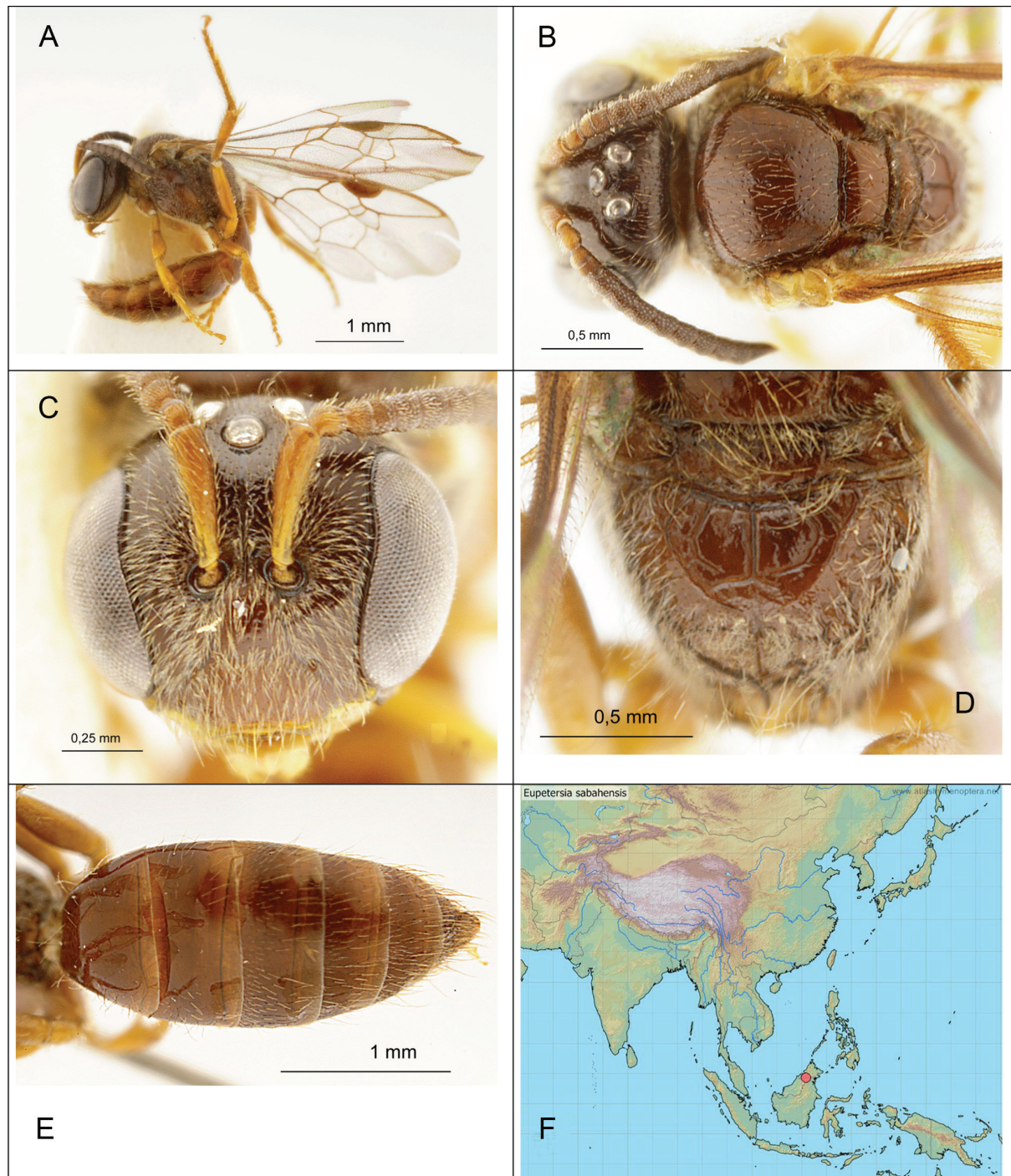


Fig. 2. *Eupetersia sabahensis* sp. nov., ♂ holotype. **A.** Lateral habitus. **B.** Dorsal view of head and mesosoma. **C.** Facial view. **D.** Propodeum. **E.** Metasoma. **F.** Geographic distribution.

***Eupetersia (Nesoeupetersia) sabahensis* sp. nov.**

(Fig. 2A-F)

Etymology

The specific epithet refers to the state of Malaysia in which the holotype was collected, Sabah on the island of Borneo.

Material examined**Holotype**

Male: MALAYSIA, SW Sabah, nr Long Pa Sia (West), c. 1050 m, 1-14 Apr. 1987, Malaise trap 3, leg. C. van Achterberg (NMNH, Leiden).

Diagnosis

Very small species (4.5 mm long) with black brown body and yellowish legs, finely and sparsely punctuate on head and scutum.

Differential diagnosis

Similar to *Eupetersia singaporensis* sp. nov. but smaller (4.5 mm), legs more yellow, vertex line more elevated. Differs from *E. nathani* by its smaller size, completely brown metasoma, head and scutum more finely and sparsely punctuate, yellow testaceous legs.

Description

BODY LENGTH. 4.5 mm. Forewing length 3.6 mm.

COLOUR. Black to chestnut brown, legs entirely yellow testaceous (Fig. 2A). Scapes, mandibles and labrum testaceous.

PUBESCENCE. Grey and rather poor, denser on face and vertical sides of propodeum.

STRUCTURE. Head length/width = 0.81 (Fig. 2C). Vertex rounded. First and second flagellomeres subequal in length as in other *Eupetersia*.

SCULPTURE. Head and scutum finely and sparsely punctuate (Figs 2B, C). Dorsal surface of propodeum with irregular carinae, terminating at posterior margin (Fig. 2D). Metasomal terga entirely shining and nearly impunctate (Fig. 2E). Pygidial area rounded posteriorly. Genitalia very small, gonocoxites not depressed and not striate, similar to those of *E. singaporensis* sp. nov.

***Eupetersia (Nesoeupetersia) nathani* Baker, 1974**

(Fig. 3A-D)

Material examined**Holotype**

Female: SOUTH INDIA, Nilgiri Hills, Cherangode, 1050 m, Nov. 1950, leg. PS. Nathan (coll. Baker at SEMC, Lawrence).

Differential diagnosis

Differs from *E. singaporensis* sp. nov. and *E. sabahensis* sp. nov. by the larger body (6 mm length), the red colour of terga 1-3, the black legs and scapes, the shorter vertex, the stronger punctuation of head and scutum.

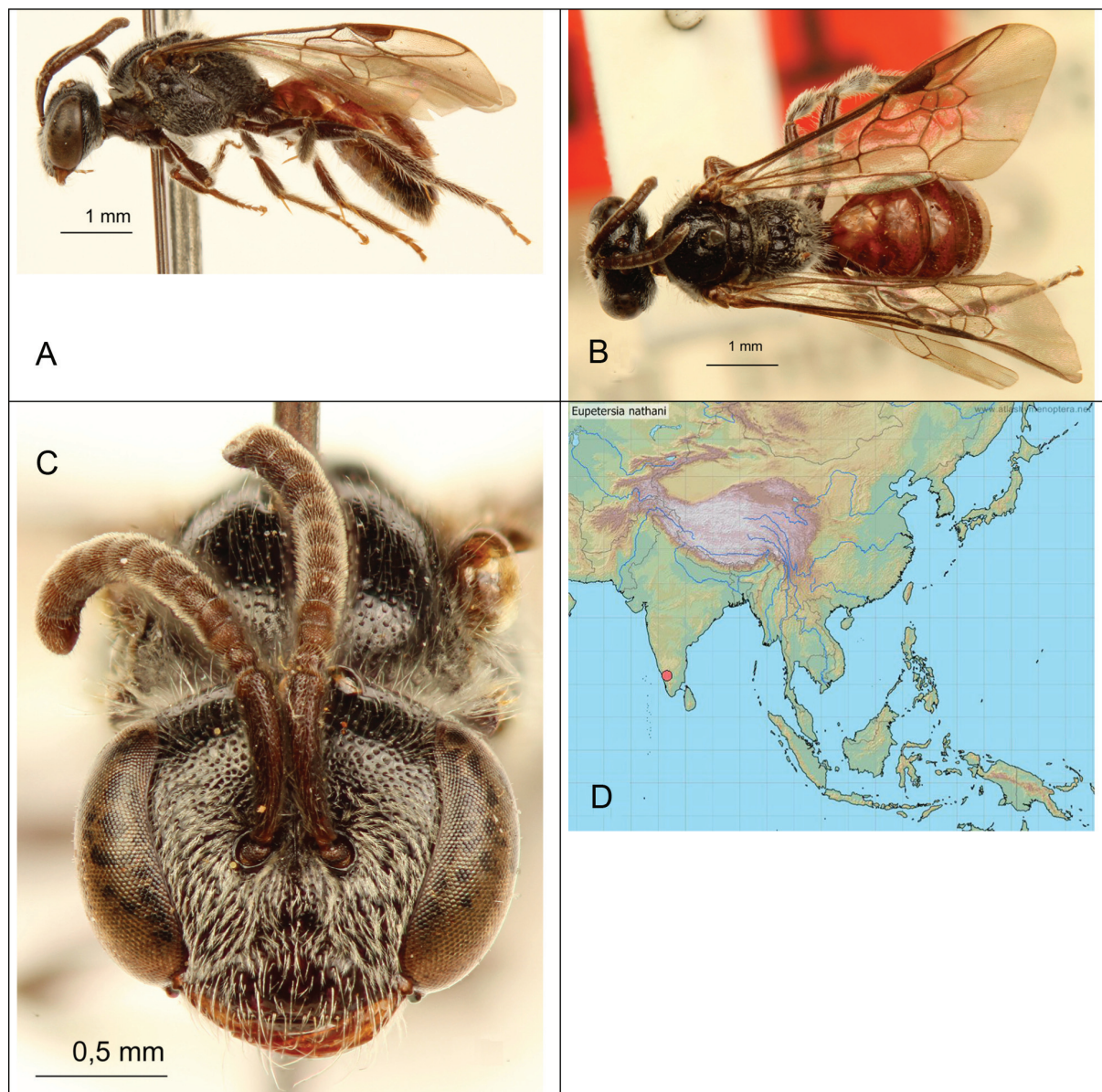


Fig. 3. *Eupetersia nathani* Baker, 1974, ♀ holotype. **A.** Lateral habitus. **B.** Dorsal view of habitus. **C.** Facial view. **D.** Geographic distribution.

***Eupetersia (Nesoeupetersia) yanegai* sp. nov.**
 (Figs 4-6)

Etymology

The name is in honour of the apidologist Doug Yanega who discovered the first specimen of this species in the collections of the California University, Riverside, and sent it to me for description.

Material examined

Holotype

Male: THAILAND, Phetchabun, Thung Salaeng Luang NP, 16°37.531'N 100°53.745'E, MT 16-22 Nov. 2006, K.W.N. Yen, T1159A (YUT); eventually to be returned to QSBG.

Paratype

Female: THAILAND, Phetchaburi, Kaeng Krachan NP, 955 m, Khao Panoen Thung Mt, 12°49'30N 99°21'55"E, 25-26 Jun. 2008, leg. B. Brown, UCRC n° 325766 (UCR).

Diagnosis

Medium size species (6 mm long) with characteristic orange pronotum and scutum. Clypeus bigibbous, completely orange in female.

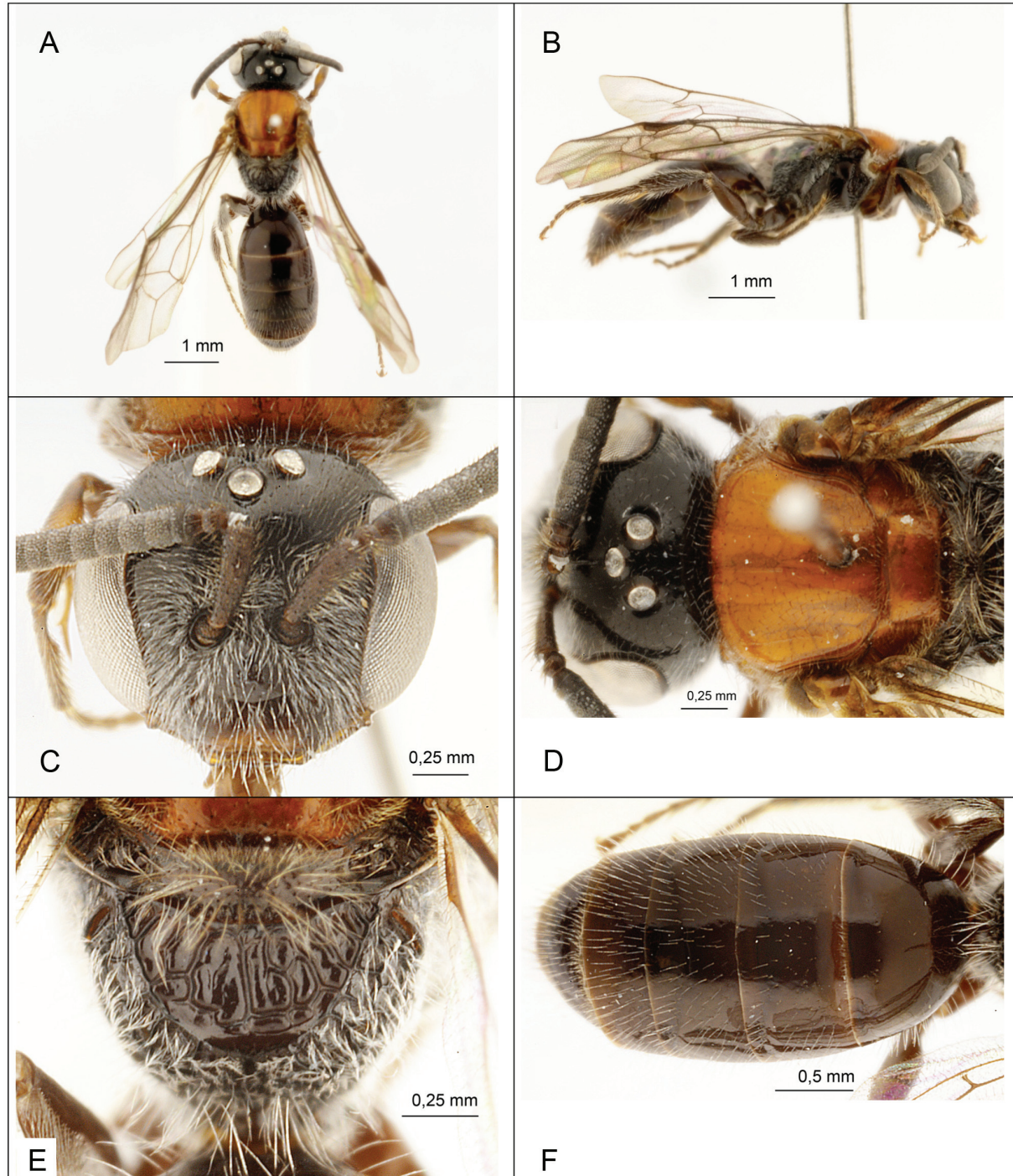


Fig. 4. *Eupetersia yanegai* sp. nov., ♂ holotype. **A.** Dorsal view of habitus. **B.** Lateral habitus. **C.** Head, facial view. **D.** Mesosoma and head. **E.** Propodeum. **F.** Metasoma.

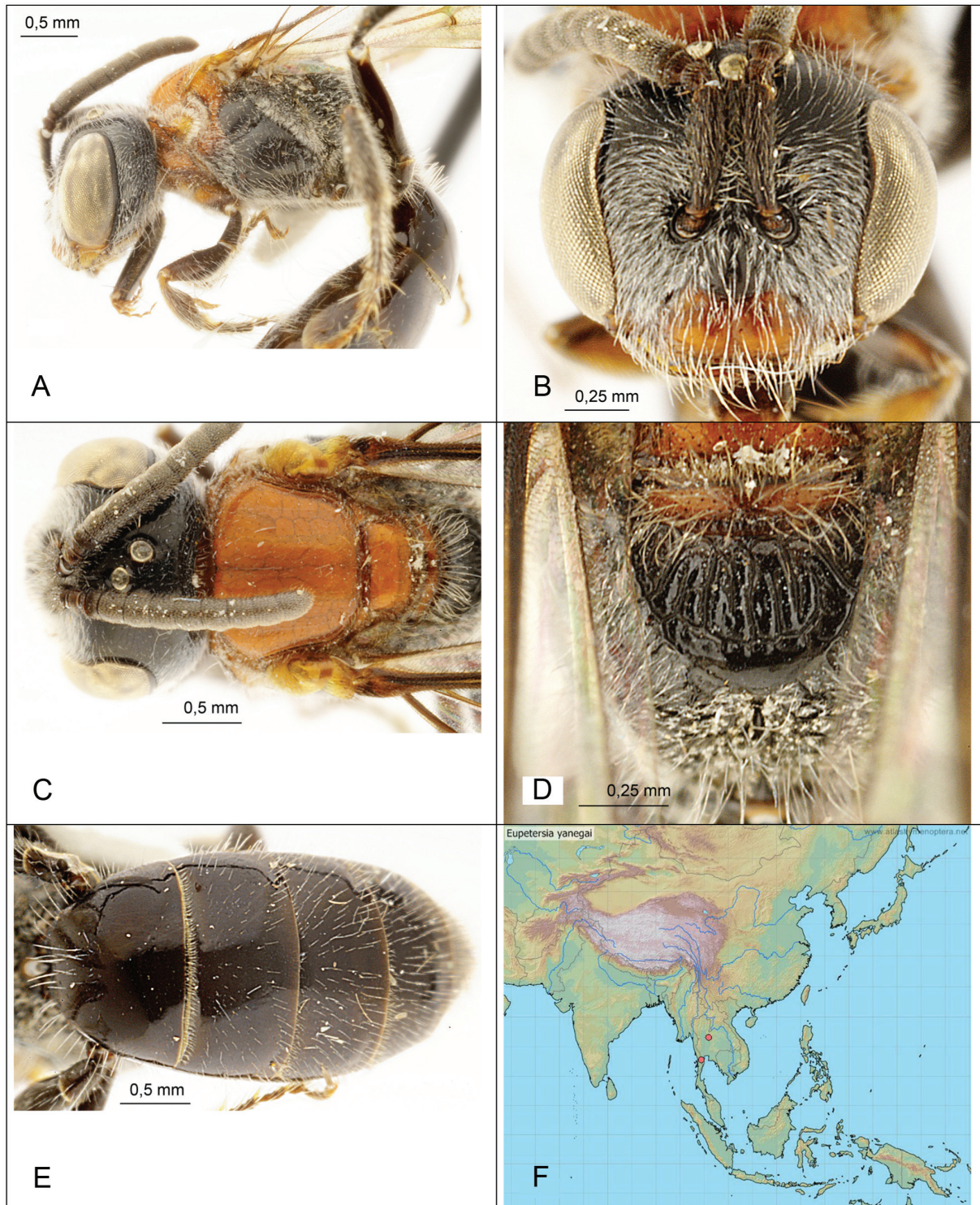


Fig. 5. *Eupetersia yanegai* sp. nov, ♀ paratype. **A.** Lateral view of head and mesosoma. **B.** Head, facial view. **C.** Head and mesosoma, dorsal view. **D.** Propodeum. **E.** Metasoma. **F.** Geographic distribution.

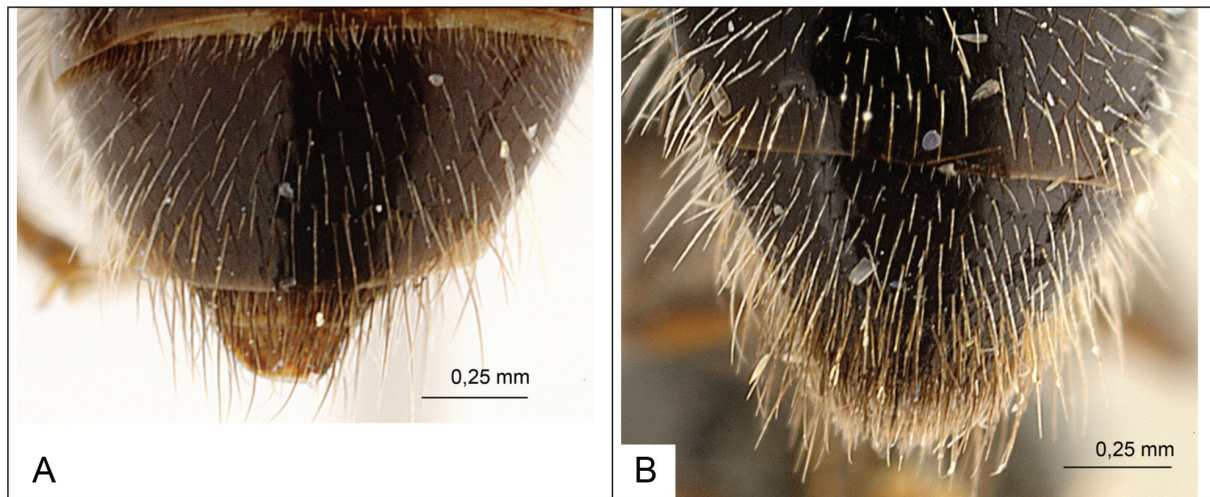


Fig. 6. *Eupetersia yanegai* sp. nov. **A.** ♂, end of metasoma with pygidial plate. **B.** ♀, end of metasoma without pygidial plate.



Fig. 7. Malaise trap in a mangrove swamp, habitat of *Eupetersia singaporensis* sp. nov., Kranji Nature Trail (Sungei Buloh), Singapore.

Differential diagnosis

Differs from all the other oriental species by orange colouration of the pronotum and scutum.

Description

Male

BODY. length 6 mm. Forewing length 5.5 mm.

COLOUR. Black, pronotum, scutum and scutellum orange. Labrum and mandibles pale yellow. Anterior part of clypeus amber. Legs black except for anterior part of foretibiae, which is chestnut brown.

PUBESCENCE. Metanotum with a tuft of long white setae, lateral and posterior sides of propodeum with white short plumose setae (Fig. 4E).

STRUCTURE. Head length/width: 0.87 (Fig. 4C). Clypeus bigibbous. Vertex well developed (Fig. 4D). First and second flagellomeres subequal in length as in other *Eupetersia*.

SCULPTURE. Head and scutum finely and sparsely punctate (Fig. 4C, D). Dorsal surface of propodeum with irregular carinae, terminating at posterior margin (Fig. 4E). Metasomal terga entirely shining and nearly impunctate (Fig. 4F). Pygidial area rounded to subquadrate posteriorly (Fig. 6A). Genitalia not dissected on the unique male specimen.

Female

Size, colour, pubescence, structure and sculpture. similar to the male, except as follow: antenna with 12 flagellomeres; metasomal tergum 5 with numerous setae and tergum 6 without pygidial plate (Fig. 6B); clypeus and metanotum completely orange (Fig. 5B, D); labrum brown.

Key to the Oriental species of *Eupetersia*:

1. Pronotum and scutum orange (Figs 4A, 5A); clypeus bigibbous.....*Eupetersia yanegai* sp. nov.
– Pronotum and scutum brown or black.....2
2. Larger species (6 mm long) with punctuation deeper (Fig. 3C).....*Eupetersia nathani* Baker, 1974
– Smaller species (4.5 - 5 mm long) with punctuation fine and superficial (Figs 1C, 2C).....3
3. Legs darker (Fig. 1A); head larger (length/width = 0.84) (Fig. 1C)...*Eupetersia singaporensis* sp. nov.
– Legs yellowish (Fig. 2A); head larger (length/width = 0.81) (Fig. 2C)...*Eupetersia sabahensis* sp. nov.

Discussion

It is known from other halictid cuckoo bees that body size and proportions might vary within a species depending on the host. *Eupetersia singaporensis* sp. nov. has been collected in a mangrove swamp in Singapore whereas *E. nathani* and *E. sabahensis* sp. nov. have both been collected in mountains at an altitude of about 1050 m. *Eupetersia singaporensis* sp. nov. and *E. sabahensis* sp. nov. are related and have rather similar male genitalia, but such distant habitats and different characters of size and colouration suggest that the two specimens must preferably be described as two distinct species. *Eupetersia yanegai* sp. nov. is characterized by the orange colouration of the scutum. *Eupetersia nathani* differs from the three other species by a stronger punctuation.

The Oriental Region is not as rich for this group as Africa or Madagascar, because the subgenera *Eupetersia sensu stricto* and *Calleupepersia* are entirely absent. But the discovery of the three new species shows that the Oriental region is as rich as Madagascar and richer than mainland Africa for the

subgenus *Nesoeupetersia*. This subgenus with an African-Oriental distribution seems restricted to the humid forested areas and is absent in mountains of East Africa and in southern Africa.

Following Michener (1979), many tropical groups of bees of the Old World occur in Africa, and then again from India eastward across southern Asia. A more humid climate across the Arabian peninsula, southern Iran and west Pakistan would connect or nearly connect these areas for the bees concerned, even with the continents in their present positions. Since more humid conditions undoubtedly existed in this area in the not very distant past, this disjunction is easy to understand. Some of the bee taxa involved are *Thrinchostoma* Saussure, 1890, *Pachyhalictus* Cockerell, 1929, *Ctenonomia* Cameron, 1903, *Ipomalictus* Pauly, 1999, *Ctenoplectra* Kirby, 1826, *Creightonella* Cockerell, 1908, two or more subgenera of *Chalicodoma* Lepeletier, 1841, various subgenera of *Xylocopa* Latreille, 1802, *Eucara* Friese, 1905, and *Braunsapis* Michener, 1969.

Acknowledgements

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Doug Yanega discovered the first specimen of *Eupetersia* from Thailand in the collection of the University of California, Riverside and Laurence Packer sent us the specimen of the same species preserved in the York University, Toronto, and collected during the TIGER project (the Thailand Inventory Group for Entomological Research) organized by Michael Sharkey.

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