Zootaxa 2806: 53–59 (2011)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Two new species of the genus *Foenobethylus* Kieffer 1913 (Hymenoptera: Bethylidae) from China with a key to the known species

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Abstract

The genus *Foenobethylus* Kieffer 1913 is newly recorded from China. Two species: *F. hainanensis* **sp. nov.** (Hainan) and *F. zhejiangensis* **sp. nov.** (Zhejiang) are described and illustrated. A key to the world species of the genus is provided.

Key words: Chrysidoidea, Pristocertinae, New species, Oriental region

Introduction

The genus *Foenobethylus* Kieffer 1913 is a rare and small Oriental genus of Pristocerinae in Bethylidae (Kieffer 1914, Kurian 1954, Baltazar 1966, Gordh & Móczár 1990, Várkonyi & Polaszek 2007). In a recently published revision of this genus, Várkonyi and Polaszek (2007) have discussed the phylogenetic position of *Foenobethylus* within subfamily Pristocerinae and recognized five species from tropical Asia: *F. gracilis* Kieffer, *F. bidentatus* Várkonyi et Polaszek, *F. elongatus* Várkonyi et Polaszek, *F. emiliacasellae* Várkonyi et Polaszek and *F. thomascokeri* Várkonyi et Polaszek.

During the survey of the Chinese Bethylidae fauna, *Foenobethylus* Kieffer is discovered from China (Hainan and Zhejiang Provinces). Two additional new species are described and illustrated.

Material and methods

Specimens were collected from Hainan and Zhejiang Provinces of China in recent years. All specimens are examined and observed by using an Olympus stereomicroscope. Figures are made by a Q-Imaging digital camera mounted on a Zeiss Imager A1 stereomicroscope and manipulated with Image-Pro Plus software. The genitalia, subgenital plate and eighth sternum of the type specimen were removed and kept in a small plastic container with Glycerol. All type specimens are deposited in the Hymenopteran Collection of South China Agricultural University (SCAU).

Abbreviations are used in the text as follows: LH=length of head; WH=width of head; WF=width of frons; LM= length of mesosoma; LPD= length of propodeal disc; WPD= width of propodeal disc; POL= distance between posterior ocelli; OOL= distance between a posterior ocellus and compound eye; OL= distance between anterior ocellus and posterior ocellus; DAO=diameter of anterior ocellus.

Morphological terminology follows that of Terayama (2003a, b).

Accepted by A. Lelej: 7 Mar. 2011; published: 31 Mar. 2011

Results

Genus *Foenobethylus* Kieffer 1913

Foenobethylus Kieffer 1913: Insecta, Revue illustrée d'Entomologie, 3: 257. Type species: *Foenobethylus gracilis* Kieffer 1913 by original designation.
Foenobethylus Kieffer 1913: Várkonyi & Polaszek, 2007, Zootaxa, 1546: 5. Redescription.

Diagnosis. MALE. Body length 2.5–4.0 mm, fore wing length 2.0–3.0 mm. Head prognathous; compound eyes oval and bare; mandible with five teeth; propleuron anteriorly elongated; metanotum well developed, with a small emargination or fovea opposite apex of scutellum; fore femora strikingly swollen; hind femora moderately swollen, with one or two spines, teeth or protuberances on ventrally surface. FEMALE unknown.

Biology. Unknown.

Distribution. Oriental region (China, Thailand, Brunei, Philippines, Malaysia).

Key to species of genus *Foenobethylus*

(based on Várkonyi & Polaszek 2007)

1. Hind femur with a single blunt spine slightly distal of the middle; hind trochanter without ventral spine or tooth. Philippines . . . . . *F. gracilis* Kieffer
- Hind trochanter with a ventral spine, or if without, then hind femur with two spines or teeth 2
2. Hind trochanter without ventral spine; fore femur moderately swollen, at least 2.5 times as long as wide 3
- Hind trochanter with a ventral spine; fore femur distinctly swollen, less than 2.1 times as long as wide 5
3. Distance between posterior margin of compound eye and occipital carina as long as length of compound eye in dorsal view; eighth sternum with distal margin narrowly emarginated; terminal segment of maxillary palpus over 4.0 times longer than wide. Brunei . . . . . *F. bidentatus* Várkonyi et Polaszek
- Distance between posterior margin of compound eye and occipital carina longer than length of compound eye in dorsal view; eighth sternum with distal margin strongly emarginated; terminal segment of maxillary palpus less than 4.0 times longer than wide 4
4. Head in dorsal view 1.42 times as long as wide; terminal segment of maxillary palpus 2.5 times as long as wide; median carina of propodeum incomplete, reaching 0.6 length of propodeal disc. China (Hainan) . . . . . *F. hainanensis* **sp. nov.**
- Head in dorsal view 1.16 times as long as wide; terminal segment of maxillary palpus 3.5 times as long as wide; median carina of propodeum complete. China (Zhejiang) . . . . . *F. zhejiangensis* **sp. nov.**
5. Pronotum with anterior horizontal flange medially very narrow; hind trochanter with a needle-like long spine below; hind femur with a ventral oblique furrow; terminal segment of maxillary palpus less than 3.0 time longer than wide. Thailand . . . . . *F. emiliacasellae* Várkonyi et Polaszek
- Pronotum with anterior horizontal flange medially as broad as laterally; hind trochanter with a tooth or broad spine; hind femur ventrally flattened, without ventral oblique furrow; terminal segment of maxillary palpus over 3.0 time longer than wide . . 6
6. Head strongly narrowing behind; propodeal disc more elongate. Malaysia . . . . . *F. elongatus* Várkonyi et Polaszek
- Head only slightly narrowing behind; propodeal disc less elongate. Malaysia . . . . . *F. thomascokeri* Várkonyi et Polaszek

Foenobethylus hainanensis Liu, Chen et Xu, sp. nov.

(Figs 1–6, 13–15)

Type material. Holotype, male. CHINA: Hainan, Mt. Bawangling (19º11'N, 109º15'E), 7–11.VII,2006, Jing-xian LIU, No. 200700003. Paratypes: 2 males with the same data as holotype, No. 200700013, No. 200700029.

Diagnosis. This species is similar to *Foenobethylus bidentatus* Várkonyi et Polaszek, 2007 from Brunei by having the hind trochanter without a ventral tooth and hind femur with two ventral teeth, but it can be separated from the latter by having head distinctly narrowed behind compound eyes in dorsal view, the distance between posterior margin of compound eye and occipital carina longer than length of compound eye in dorsal view and subgenital plate with distal margin strongly emarginate.

Description. Holotype. Male. LH 0.5 mm, WH 0.35 mm, WF 0.2 mm, LPD 0.35 mm, WPD 0.2 mm, LFW 2.0 mm.

Head. Head (Figs 1–3, 5) in dorsal view 1.42 times as long as wide, elongate; frons and vertex coriaceous and sparsely punctate. Ocellar triangle forms a more or less right angle at the anterior ocellus. Mandible with five teeth.

Median lobe of clypeus rounded. Antenna with 13 segments, flagellum with suberect and short pubescence. Ratio of length to width of antennal segments as follows: 10:4, 5:3, 5:3, 4:3, 4:3, 4:3, 4:3, 4:3, 4:3, 4:3, 5:3, 5:3, 5:3; scape incrassate apically. Compound eyes small and bare. Distance between posterior margin of compound eye and occipital carina 1.2 times the length of compound eye in dorsal view. Distance between occipital carina and posterior ocelli 1.6 times the length of maximum diameter of the latter. POL : OOL : OL: DAO=8 : 20 : 5 : 3. Terminal segment of maxillary palpus 2.5 times as long as wide.

FIGURES 1–6. *Foenobethylus hainanensis* **sp. nov.** 1. Habitus, dorsal view. 2. Head and mesosoma, dorsal view. 3. Head, pronotum and mesoscutum, dorsal view. 4. Fore wing. 5. Head and mesosoma, lateral view. 6. Hind leg.

Mesosoma. Mesosoma (Figs 2, 3, 5) 3.1 times as long as depth and 2.2 times as long as wide. Pronotum (Figs 1–3) coriaceous, elongate and narrowed anteriorly, without horizontal shelf protruding above base of propleuron. Mesoscutum transverse, 0.6 times as long as wide; notauli complete with anterior 0.8 weak; parallel lines weakly

present. Scutellum flat and coriaceous. Metanotum emarginated centrally. Propodeum finely coriaceous, nearly smooth; propodeal disc 1.2 times as long as wide; median carina of propodeum with basal 0.6 strong and apical 0.4 indistinct, with weak wrinkles on its lateral sides.

Wings. Fore wing (Figs 1, 4) with costal, median and submedian cells closed. Radius with a weak node on basal 1/7.

Legs. Fore femur (Fig. 5) moderately swollen, 2.6 times as long as its maximum width. Hind trochanter without ventral tooth; hind femur (Fig. 6) with a long basal tooth on lateroventral edge and with a short and broad tooth ventrally.

Metasoma. Eighth sternum (Fig. 15) with distal margin moderately emarginate, centrally with sparse setae. Subgenital plate (Fig. 14) with distal margin strongly emarginated, with long setae.

Male genitalia. Distal part of parameres (Fig. 13) with long setae, central part weakly narrowed. Volsella with digitus not clear. Aedeagus as in Fig. 13.

Colour. Head black, with antennae dark brown. Mesosoma and metasoma blackish brown. Legs dark brown, with tibia and tarsus brown.

Variation. LH 0.6 mm, WH 0.36 mm, WF 0.25 mm, LPD 0.45 mm, WPD 0.3 mm, LFW 2.5 mm.

Distribution. China (Hainan).

Etymology. The specific name refers to the type locality.

***Foenobethylus zhejiangensis* Liu, Chen et Xu, sp. nov.**
(Figs 7–12, 16–18)

Type material. Holotype, male. CHINA: Zhejiang, Anji, Mt. Longwangshan (30º46'N, 119º36'E), 24.VI.1996, Qiang LI, No. 963099.

Diagnosis. This species can be distinguished from *Foenobethylus bidentatus* Várkonyi et Polaszek, 2007 by having the distance between posterior margin of compound eye and occipital carina 1.3 times the length of compound eye in dorsal view (equals to the length of compound eye of the latter), terminal segment of maxillary palpus 3.5 times as long as wide (over 4.0 times of the latter) and eighth sternum with distal margin strongly emarginate (with distal margin of eighth sternum narrowly emarginate of the latter).

Description. Holotype. Male. LH 0.7 mm, WH 0.60 mm, WF 0.4 mm, LM 1.5 mm, LPD 0.47 mm, WPD 0.4 mm, LFW 2.5 mm.

Head. Head (Figs 7–9, 11) in dorsal view 1.16 times as long as wide, broadly rounded towards occipital carina; frons and vertex coriaceous and sparsely punctate. Ocellar triangle forms slightly obtuse angle at the anterior ocellus. Mandible with five teeth. Median lobe of clypeus rounded. Antennae broken, only the left with the basal seven segments remaining, ratio of length to width of first to seventh segments as follows: 20:7, 7:5, 8:5, 8:5, 8:5, 8:5, 8:5, scape incrassate apically. Compound eyes small and bare. Distance between posterior margin of compound eye and occipital carina 1.3 times the length of compound eye in dorsal view. Distance between occipital carina and posterior ocelli 2.0 times the length of maximum diameter of the latter. POL : OOL : OL : DAO=10 : 20 : 3 : 4. Terminal segment of maxillary palpus 3.5 times as long as wide

Mesosoma. Mesosoma (Figs 8, 9, 11) 3.0 times as long as depth and 2.4 times as long as wide. Pronotum coriaceous, elongate and narrowed anteriorly, without narrow horizontal shelf protruding above base of propleuron. Mesoscutum transverse, 0.5 times as long as wide; notauli complete; parallel lines weakly present. Scutellum flat and coriaceous as mesoscutum. Metanotum emarginated centrally. Propodeum finely coriaceous, nearly smooth; propodeal disc 1.2 times as long as wide; median carina of propodeum strong and reaching to apical margin of propodeum, rugose on its lateral sides.

Wings. Fore wing (Figs 7, 10) with costal, median and submedian cells closed. Radius long, with a weak node on basal 1/7.

Legs. Fore femur (Fig. 11) moderately swollen, 2.5 times as long as its maximum width. Hind trochanter without ventral tooth; hind femur (Fig. 12) with a long basal spine on its inner edge and with a short and broad median tooth on middle.

Metasoma. Eighth sternum (Fig. 18) with distal margin strongly emarginate, centrally with dense setae. Subgenital plate deeply notched (Fig. 17).

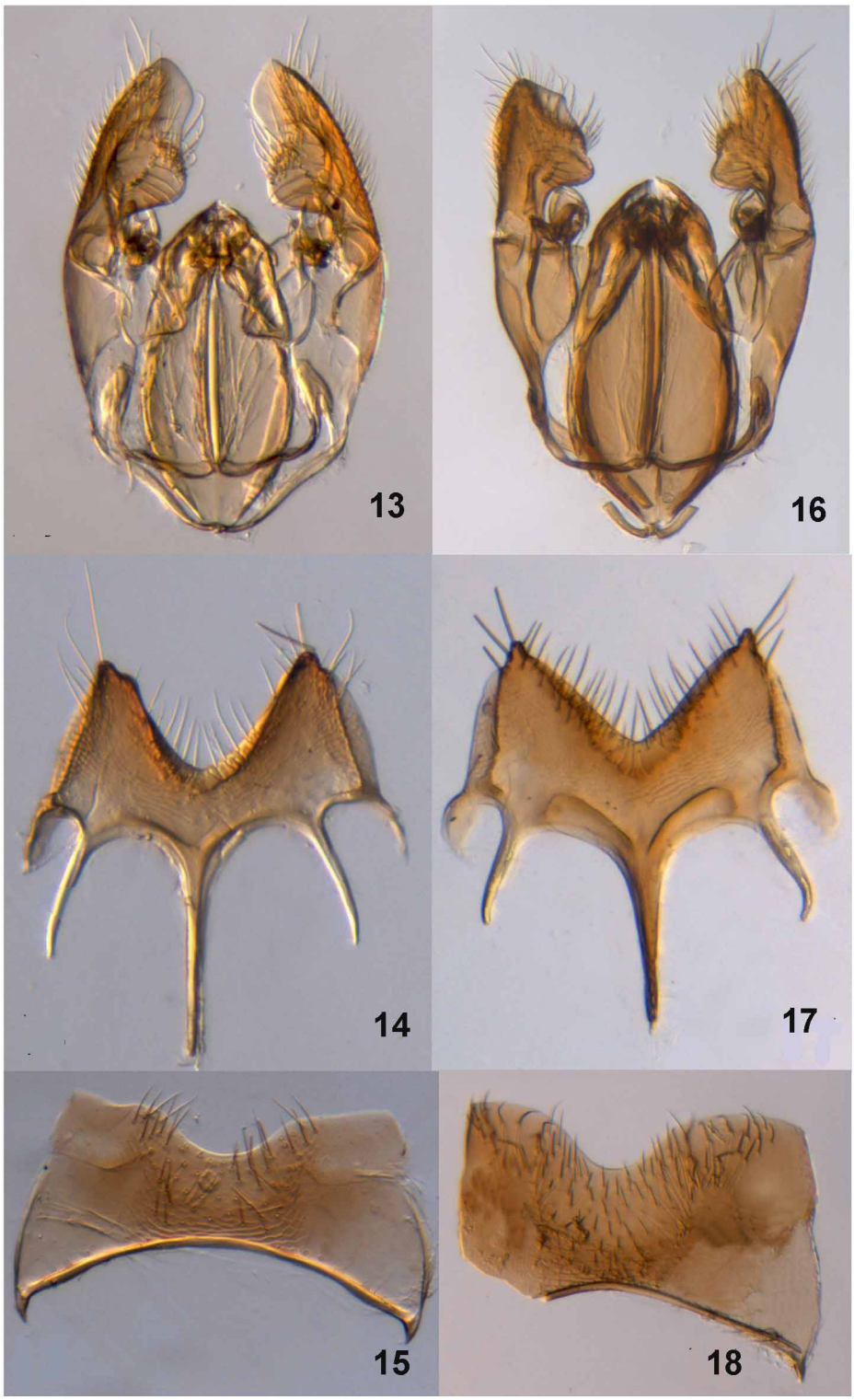
Male genitalia. Distal part of parameres (Fig. 16) with long setae, central part weakly narrowed. Volsella with digitus clearly visible. Aedeagus as illustrated (Fig. 16).

Colour. Head and mesosoma black. Antennae dark brown. Legs dark brown, with tibia and tarsus brown. Wings hyaline, veins brown, stigma blackish brown.

Ditribution. China (Zhejiang).

Etymology. The specific name refers to the type locality.

FIGURES 7–12. *Foenobethylus zhejiangensis* **sp. nov.** 7. Habitus, dorsal view. 8. Head and mesosoma, dorsal view. 9. Head and pronotum, dorsal view. 10. Fore wing. 11. Head and mesosoma, lateral view. 12. Hind leg.



FIGURES 13–18. *Foenobethylus hainanensis* **sp. nov.** (13–15) and *F. zhejiangensis* **sp. nov.** (16–18). 13, 16. Male genitalia. 14, 17. Subgenital palte. 15, 18. Eighth sternum.

Acknowledgements

We are grateful to Celso O. Azevedo (Universidade Federal do Espírito Santo, Vitória, Brazil) for his valuable help during his stay in our laboratory, Andrew Polaszek (Natural History Museum, London, U.K.) and Arkady Lelej (Institute of Biology and Soil Science, Vladivostok, Russia) for the review and kind suggestion to improve the

manuscript. This study is supported by the National Natural Science Foundation of China (No. 30370181, 30499341).

References

Baltazar, C.R. (1966) *A Catalog of Philippine Hymenoptera (with a Bibliography, 1758–1963). Pacific Insects Monograph, 8*, Entomology Department, Bernice P. Bishop Museum, Honolulu, 488 pp.

Gordh, G. & Móczár, L. (1990) A catalog of the World Bethylidae (Hymenoptera: Aculeata). *Memoirs of the American Entomological Institute*, 46, 1–364.

Kieffer, J.J. (1913) Serphides des Iles Phillippines. *Insecta, Revue illustrée d'Entomologie*, 3, 253–462.

Kieffer, J.J. (1914) *Hymenoptera, Proctotrupoidea, Bethylidae. Das Tierreich, 41*. R. Friedländer und Sohn, Berlin, 595 pp.

Kurian, C. (1954) Catalogue of Oriental Bethyloidea. *Agra University Journal of Research*, 3(1), 253–288.

Terayama, M. (2003a) Phylogenetic systematics of the family Bethylidae (Insecta: Hymenoptera) Part I. Higher classification. *The Academic Reports of the Faculty of Engineering of Tokyo Polytechnic University*, 26(1), 1–15.

Terayama, M. (2003b) Phylogenetic systematics of the family Bethylidae (Insecta: Hymenoptera) Part II. Keys to subfamilies, tribes and genera in the world. *The Academic Reports of the Faculty of Engineering of Tokyo Polytechnic University*, 26(1), 16–29.

Várkonyi, G. & Polaszek, A. (2007) Rediscovery and revision of *Foenobethylus* Kieffer, 1913 (Hymenoptera, Bethylidae). *Zootaxa*, 1546, 1–14.