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Two new species of myrmecophilous Pselaphinae from China (Coleoptera, Staphylinidae)

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Abstract: Two new myrmecophilous species of the supertribes Clavigeritae and Batrisitae are described from Yunnan, Southwest China: *Diartiger jiquanyui* **sp. nov.** associated with *Lasius* Fabricius ants, and *Myrmicophila yulong* **sp. nov.** associated with *Myrmica* Latreille ants. Both species are compared with and separated from related congeners, and images of their habitus and major diagnostic features are provided.

Keywords: Myrmecophile - new species - *Diartiger* - *Myrmicophila* - Yunnan.

INTRODUCTION

Our knowledge of the taxonomic and ecological diversity of myrmecophilous Pselaphinae in China has been continuously increasing during the past decade. A number of new genera and dozens of new species belonging to the supertribes Euplectitae, Goniaceritae, Pselaphitae, and especially Clavigeritae and Batrisitae were described from various areas of the country (*e.g.*, Yin *et al.*, 2010a-c, 2011a-c, 2012a-d, 2013, 2015a, b; Yin & Li, 2012, 2013a-c, 2014, 2015; Zhao *et al.*, 2010; Jiang & Yin, 2016, 2017; Yin, 2017a, b, 2018a, b; Yin & Lin, 2020; Yin & He, 2020). So far, the Chinese fauna of the obligate myrmecophilous supertribe Clavigeritae is represented by seven genera and 15 species, with the genus *Diartiger* Sharp being the most diverse group, containing seven species (Nomura, 1997; Li *et al.*, 2019; Yin & He, 2020). In China, members of *Diartiger* are most commonly found in the association with *Lasius* ants, and occasionally, also with *Ectomomyrmex* ants which often nest under stones or in decomposing logs. On the other hand, among the many recently described myrmecophiles belonging to the supertribe Batrisitae, the genus *Myrmicophila* Yin & Li is of particular interest regarding its distributional pattern and biology. Currently there are two species confined to the southwestern Chinese provinces of Yunnan and Xizang (Yin *et al.*, 2011b; Yin, 2021), which were collected only with *Myrmica* ants.

In May 2021 our colleague Quan-Yu Ji conducted a field trip in Yunnan, and collected a small series of pselaphines directly from ant nests in two localities. An examination of this material revealed two new species of *Diartiger* and *Myrmicophila*, which are described here.

MATERIAL AND METHODS

The type material of the new species described in this paper is deposited in the Insect Collection of Shanghai Normal University, Shanghai, China (SNUC). The text of the specimen label is quoted verbatim in quotation marks (‘’).

Dissected parts were preserved in Euparal on plastic slides that were placed on the same pin with the specimen. The habitus images of the beetle and host ant, as well as the ant’s full-face image was taken using a Canon 5D Mark III camera in conjunction with a Canon MP-E 65 mm f/2.8 1-5X Macro Lens, and a Canon MT-24EX Macro Twin Lite Flash was used as the light source. Images of the morphological details were produced using a Canon G9 camera mounted to an Olympus CX31 microscope under reflected or transmitted light. Zerene Stacker (version 1.04) was used for image stacking. All images were optimized and grouped into plates using Adobe Photoshop CC 2018.

The abdominal tergites and sternites are numbered following Chandler (2001) in Arabic (starting from the first visible segment) and Roman (reflecting true morphological position) numerals, *e.g.*, tergite 1 (IV), or sternite 1 (III).

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TAXONOMY

Diartiger jiquanyui sp. nov.

Figs 1A, 2

Type material: HOLOTYPE; ♂; CHINA, 'China: Yunnan, Deqin County, Yubeng Vill., 28°25'28.40''N, 98°48'38.89''E, ca. 2740 m, 8.iv.2021, Q.-Y. Ji leg., 云南德钦县云岭乡雨崩村' (SNUC). PARATYTYPE; 1 ♂; CHINA, same collection data as of holotype (SNUC).

Diagnosis: Body length approximately 2.4 mm. Anterior margin of clypeus broadly rounded. Antennomere 4 2.3 times as long as 3. Mesotrochanter with large curved ventral spine; mesofemur with blade-like ventral projection split into two lobes; mesotibia with row of denticles along mesal margin. Median lobe of aedeagus clearly separated into apical and basal parts.

Description: Male (Fig. 1A). Body length (combined length of head, pronotum, elytra and abdomen) 2.41-2.42 mm, colour reddish-brown.

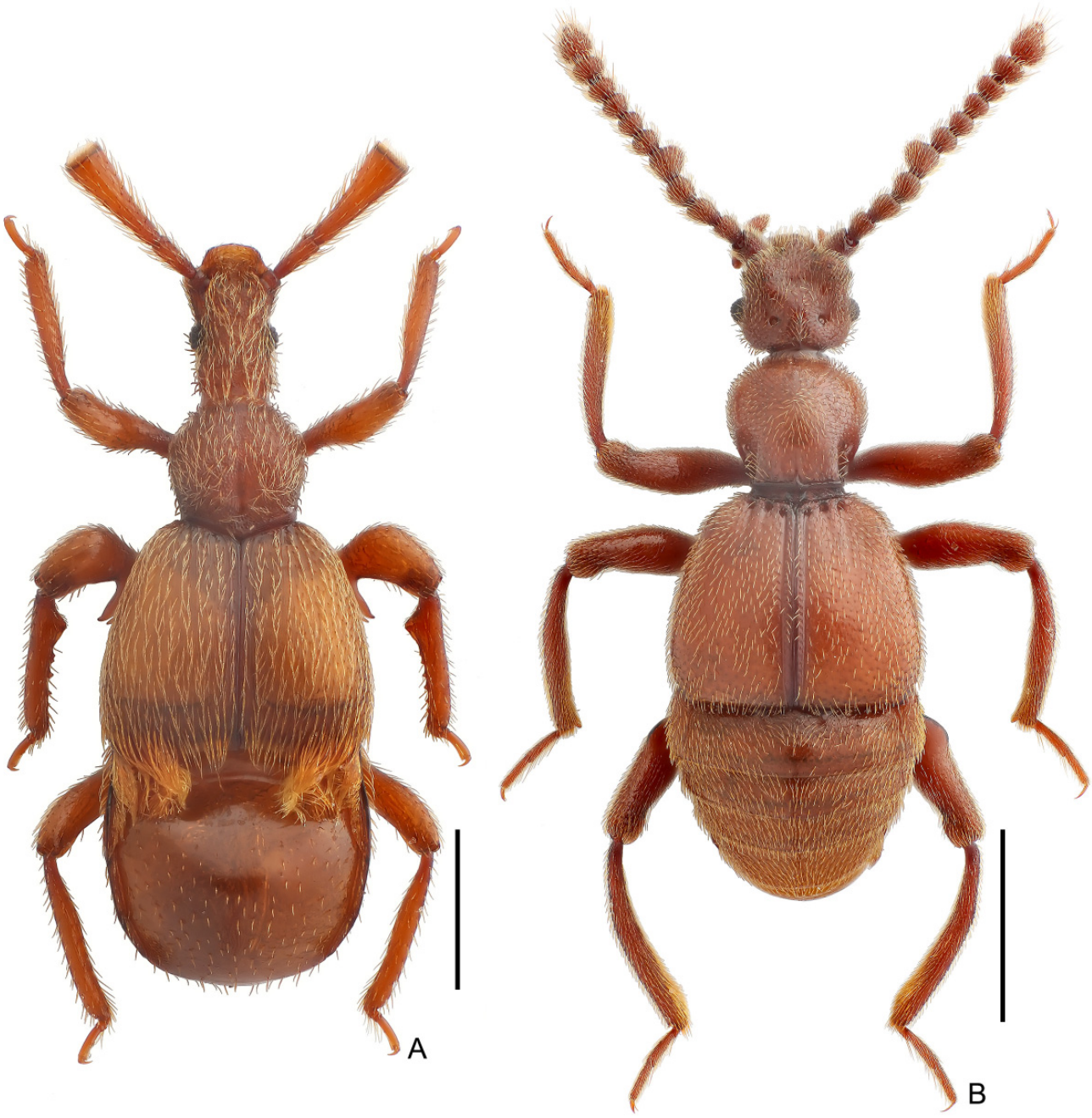


Fig 1. Dorsal habitus of two new species: (A) *Diartiger jiquanyui* sp. nov. (B) *Myrmicophila yulong* sp. nov. Scale bars: 0.5 mm in A, 1 mm in B.

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Head (Fig. 2A) elongate, length from anterior margin of clypeus to posterior margin of head (excluding neck region) 0.51-0.52 mm, width across eyes 0.29 mm; clypeus with broadly-rounded anterior margin; each eye composed of approximately 25 facets; antenna clubbed, with short antennomere and 2 and elongate 3 and 4 (Fig. 2B), length of antennomere 2 0.05-0.06 mm, 3 0.16-0.17 mm, 4 0.38-0.39 mm; antennomere 4 longest, narrowed at base and broadly apically, truncate at apex, approximately 2.3 times as long as 3; distinct gular foveae (posterior tentorial pits) close, in shared impression.

Pronotum (Fig. 2A) subglobose, surface roughly punctate, approximately as long as wide, length along midline 0.44-0.45 mm, maximum width 0.43-0.44 mm; widest at middle; with distinct median antebasal impression.

Elytra much broader than long (Fig. 1A), length along suture 0.64-0.65 mm, maximum width 0.86-0.87 mm; with linear microsculpture on disc, and long setae



Fig 2. Diagnostic characters of *Diartiger jiquanyui* sp. nov. (A) Head, pronotum, and elytral base. (B) Left antennomeres 2-4. (C) Trichomes on elytral and abdominal bases. (D) Prosternum and meso- and metaventrites. (E) Mesotrochanters, mesofemur and mesotibia. (F, G) Aedeagus, in lateral (F), and ventral (G) view. Scale bars: 0.2 mm in A, B, D, E; 0.1 mm in C, F, G.

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along posterior margin; posterolateral margins with sub-triangular tufts of setae (Fig. 2C). Metathoracic wings fully-developed. Prosternum (Fig. 2D) roughly sculptured medially; mesoventrite (Fig. 2D) with short intercoxal ridge, metaventrite (Fig. 2D) convex admesally, both ventrites with dense, thick setae along midline, with distinct linear microsculpture laterally.
Fore and hind leg simple; middle leg (Fig. 2E) greatly modified, mesotrochanter with long, sharp, and curved ventral spine, mesofemur with broad blade-like projection separated into two lobes, mesotibia moderately expanded at basal 1/3, with row of denticles of various size along mesal margin.
Abdomen large, slightly broader than long, length along midline 0.80-0.82 mm, maximum width 0.84-0.87 mm; composite tergite broadly and deeply concave mediobasally, with ball of trichomes (Fig. 2C) at basolateral region, first pair of paratergites (Fig. 2C) with linear trichomes.
Aedeagus (Fig. 2F, G) strongly sclerotized, length 0.35 mm; basal capsule with large basoventral projection, median lobe gradually narrowing apically, with small membranous structure at apex.
Female. Unknown.

Comparative notes: *Diartiger jiquanyui* sp. nov. differs from all known congeners from China by the broad, blade-shaped and deeply split projection of mesofemora, rowed denticles along the mesal margin of mesotibiae, as well as the median lobe of aedeagus clearly separated into two parts. In China, only *D. songxiaobini* (Yin & Li) from West Tianmu Mountain, Zhejiang, eastern China has a similarly structured aedeagus (Yin *et al*., 2010b), but in the latter species the forms of the spines of the middle legs are quite different.

Distribution: China: Yunnan.

Host ant: *Lasius* sp. (Fig. 4A-C).

Etymology: The new species is named after Quan-Yu Ji, the collector of the holotype.

Myrmicophila yulong sp. nov.

Figs 1B, 3

Type material: HOLOTYPE; ♂; CHINA, 'China: Yunnan, Lijiang City, Yulong Snow Mt., Lanyue Valley, 27°7'46.49''N, 100°14'30.14''E, ca. 2900 m, 29.iii.2021, Q.-Y. Ji leg., 玉龙雪山蓝月谷' (SNUC). PARATYPE; 1 ♀; CHINA, same collection data as of holotype (SNUC).

Diagnosis: Body length slightly over 3.5 mm. Antennomere 5 greatly extended mesally, 6 moderately transverse, 8-10 moniliform, successively broader. Mesotibia with distinct apical spur, slightly sinuate along mesal margins; metafemur broadly expanded on dorsal margins. Aedeagus with median lobe greatly extended apically and strongly curved ventrally.

Description: Male (Fig. 1B). Habitus stout, length (combined length of head, pronotum, elytra and abdomen) 3.66 mm, colour uniformly reddish-brown; dorsal surface of whole body finely punctate, with short recumbent setae on elytra and abdomen slightly denser than those on head and pronotum.
Head (Fig. 3A) sub-rectangular at base, length from anterior margin of clypeus to posterior margin of head (excluding neck region) 0.66 mm, width across eyes 0.69 mm; distinct asetose vertexal foveae at level of posterior margin of eyes; mediobasal ridge extending from posterior margin of head towards approximately posterior 1/3 of head length; frons broadly and shallowly impressed between moderately raised antennal tubercles; postocular margin angularly rounded; eyes moderately prominent, each composed of approximately 50 facets. Antenna elongate, lacking distinct club, length 1.70 mm; antennomere 1 (scape) thick, with deep dorso-ventral notch at apex, 2 and 3 much narrower than 1, elongate, successively broader and longer, 4 broader than 3, slightly transverse, 5 (Fig. 3B) transverse, strongly expanded on mesal margin, 6-10 moniliform, 6 broader than 7, 7 and 8 of similar width, 9 broader than 8, 9-10 gradually broader, 11 subconical, approximately as broad as 10. Gular area with foveae (posterior tentorial pits) close to each other, in shared oval impression, with thin gular ridge extending to mouthparts.
Pronotum (Fig. 3A) sub-globose, widest at anterior 2/5, length along midline 0.7 mm, maximum width 0.72 mm, with round lateral margins gradually narrowing from broadest point towards base and apex, anterior and posterior margin almost straight; with short median longitudinal sulcus at base, and distinct asetose lateral antebasal foveae.
Elytra broader than long, length along suture 1.07 mm, maximum width 1.34 mm, each elytron with three large, nude basal foveae, sutural stria complete, with short and shallow discal stria, lacking marginal stria. Metaventrite strongly convex lateral to midline.
Legs moderately elongate; foreleg simple; mesotibia (Fig. 2C) with distinct spur at apex, mesal margin slightly sinuate; metafemur (Fig. 2D) broadly expanded along dorsal margin before middle.
Abdomen slightly broader than long, widest at tergite 1 (IV), length along midline 1.23 mm, maximum width 1.33 mm. Tergite 1 (IV) at mid-length slightly longer than 2 (V), tergites 1 (IV) to 3 (VI) successively shorter, tergite 4 (VII) approximately as long as tergite 2 (V).
Aedeagus (Fig. 2E, F) well-sclerotized, length 0.75 mm; median lobe with large, transverse basal capsule and foramen; ventral and dorsal lobe each composed of flattened, apically pointed and curved sclerites; parameres paired and weakly-sclerotized, attached to ventral side of capsule.

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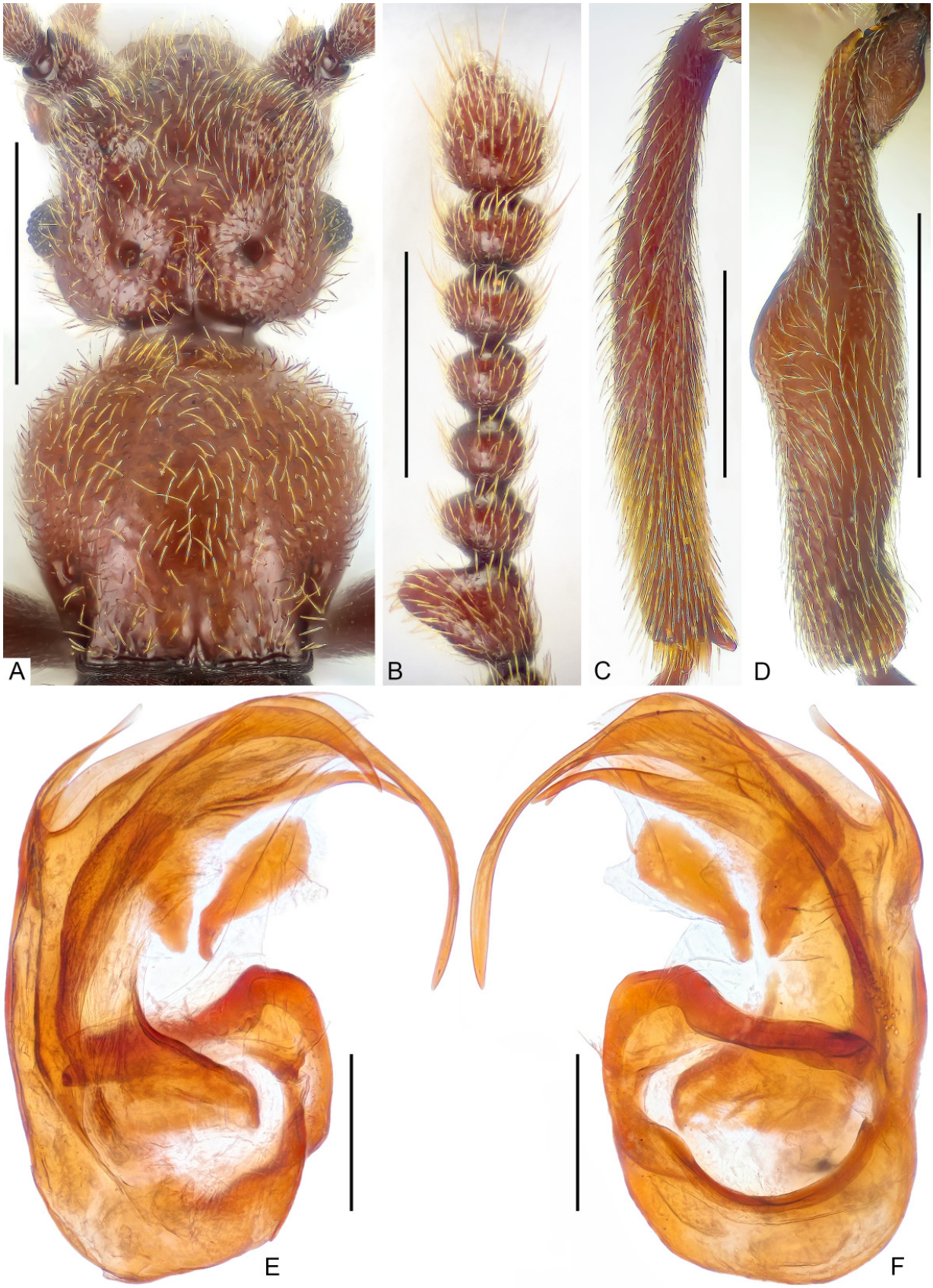


Fig 3. Diagnostic characters of *Myrmicophila yulong* sp. nov. (A) Head, pronotum. (B) Right antennomeres 5-11. (C) Mesotibia. (D) Metafemur. (E, F) Aedeagus, in dorsal(E) and ventral (F) view. Scale bars: 0.5 mm in A, D; 0.4 mm in B; 0.3 mm in C; 0.2 mm in E, F.

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Female. External morphology similar to male; antenna shorter and unmodified; mesotibia lacking spur at apex, metafemur lacking expansion. Measurements (as for male): body length 3.59 mm, length/width of head 0.65/0.71 mm, pronotum 0.73/0.75 mm, elytra 1.35/1.04 mm, abdomen 1.17/1.37 mm, length of antenna 1.62 mm, each eye with approximately 40 facets.

Comparative notes: Two species of *Myrmicophila* have been known: *M. tangliangi* Yin & Li from Yunnan (Yin *et al*., 2011b) and *M. motuoensis* Yin from Xizang (Yin, 2021), each was collected from nests of a different *Myrmica* species. The new species is in general similar to *M. tangliangi* and *M. motuoensis* by sharing identical positions of the male sexual characters on antennomeres 5 and metafemora, indicating close relationships between these three species. However, a number of characters, both external and internal, support the status of a distinct species of the population from Yulong Mountain. The development of the male antennomeres of *M. yulong* sp. nov. appears to be intermediate between *M. tangliangi* and *M. motuoensis*, the antennomeres 5-7 of the new species are relatively much broader than *M. tangliangi*, but narrower than those of *M. motuoensis*; the mesotibia is slightly sinuate along the mesal margin, but they are evenly

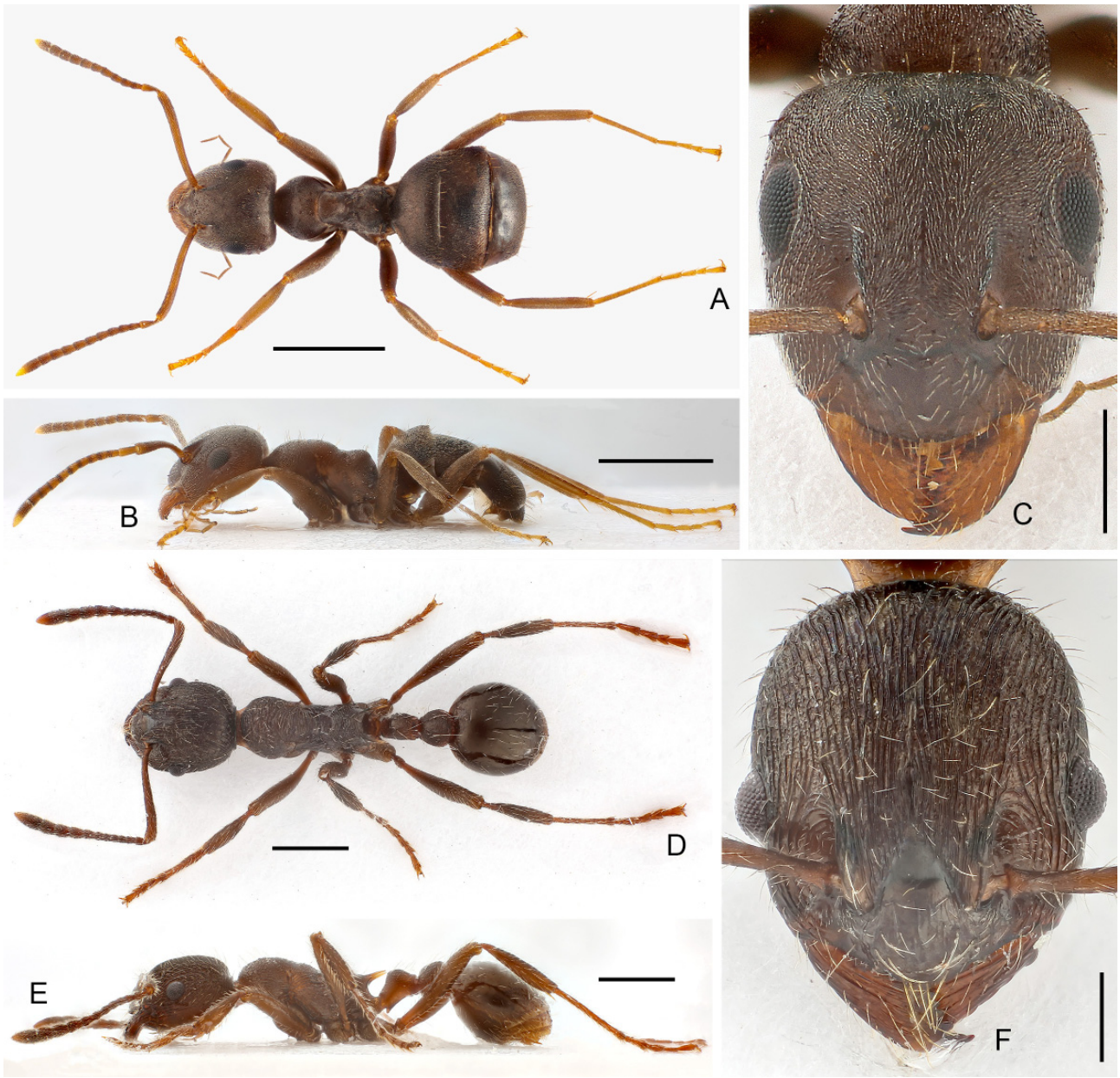


Fig 4. Hosts of *Diartiger jiquanyui* sp. nov. (A-C) and *Myrmicophila yulong* sp. nov. (D-F). (A, D) Habitus, dorsal. (B, E) Same, lateral. (C, F) Full face view. Scale bars: 1.0 mm in A, B, D, E; 0.5 mm in C, F.

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slightly curved in *M. tangliangi* and *M. motuoensis*; the apical spur of mesotibia is much larger than that of *M. motuoensis*, and of similar size but of a different shape as in *M. tangliangi* (triangular, blade-like); and the median lobe of the aedeagus is more greatly extended apically and more strongly curved ventrally than the other two species. In addition, the validation of the new species is also supported by ecological evidence. The ant host of *M. yulong* sp. nov. is morphologically more similar to that of *M. motuoensis* from Motuo, Xizang, but apparently represents a different species by the smaller body size, and presence of a distinct reversed V-shaped sulcus on the pronotal disc (sulcus vague in *Myrmica* sp. from Muotuo).

Distribution: China: Yunnan.

Host ant: *Myrmica* sp. (Fig. 4D-F).

Etymology: The new species is named after its type locality, the Yulong Snow Mountain.

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