

Five new species of *Dilobocondyla* (Hymenoptera: Formicidae) with a revised key to the known species

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ABSTRACT. Five new species of *Dilobocondyla* are described. *Dilobocondyla gasteroreticulatus* sp. nov. is reported from India based on worker and female castes. *Dilobocondyla eguchii* sp. nov. and *D. propotriangulatus* sp. nov. are reported from Vietnam, *D. yamanei* sp. nov. from Malaysia and *D. gaoyureni* from China based on worker caste only. *Dilobocondyla fouqueti* Santschi is redescribed, with reports of male and female castes. A revised key to the genus is also provided. With the addition of these five new species, the genus is now represented by 15 species and two subspecies globally.

Keywords: *Dilobocondyla*, new species, revised key, India, Malaysia, Vietnam, China, Guangdong.

INTRODUCTION

Genus *Dilobocondyla* Santschi, which belongs to tribe Formicoxenini, is a small genus of the subfamily Myrmicinae. It is represented by ten species and two subspecies, from the Oriental and Indo-Australian regions (Bolton 2011). All species of this genus seem to be rare and most are represented by a single specimen only. A key to the known species was provided by Wheeler (1924) based on workers and gynes. Contributions to this genus are by Walker (1859), Emery (1898), Stitz (1911), Forel (1911, 1915), Viehmeyer (1914, 1916), Wheeler (1916, 1924, 1935), Donisthorpe (1932), Taylor (1991), Wang and Wu (1992) and Varghese (2006).

In the present study, five new species of this genus are described. *Dilobocondyla gasteroreticulatus* sp. nov. is reported from the Shivalik range of the Northwest Himalayas. *Dilobocondyla eguchii* sp. nov. and *D. propotriangulatus* sp. nov. are reported from Vietnam, *D. yamanei* sp. nov. from Malaysia and *D. gaoyureni* from China, based on worker caste only. These five new species are quite distinct in the worker caste from the already reported

species. A revised key to all the known species of *Dilobocondyla* is also provided herewith.

MATERIALS AND METHODS

The digital images of these species were prepared on a Nikon SMZ-1500 stereo zoom microscope using Auto-Montage software. Later, images were cleaned as needed, using Adobe Photoshop CS5.

Type material of *D. gasteroreticulatus* and *D. yamanei* is currently housed in PUPAC (Punjabi University Patiala Ant Collection), Patiala, India. Two paratypes of *Dilobocondyla gasteroreticulatus* will be deposited in NHM (Natural History Museum, London), UK. Type material of *D. eguchii* and *D. propotriangulatus* will be deposited in VNMN (Vietnam National Museum of Nature, Hanoi) and that of *D. gaoyureni* will be deposited in KFBG (Kadoorie Farm and Botanic Garden, Hong Kong).

MEASUREMENTS AND INDICES

Measurements and indices employed in this study include:

Eye diameter (ED):

Maximum length of compound eye.

Gaster length (GL):

Maximum length of gaster in lateral view, from the anterior-most point of the first gastral segment to the posterior-most point (excluding sting).

Head length (HL):

Length of the head proper, excluding the mandibles, measured in a straight line from the mid-point of the anterior clypeal margin to the mid-point of the posterior head margin, in full-face view.

Head width (HW):

Maximum width of the head in full-face view (measured including the eyes).

Mesosomal length (ML):

Diagonal length of the mesosoma in profile from the point at which the pronotum meets the cervical shield to the posterior base of the metapleuron.

Minimum frontal-carina distance (MFC):

Minimum distance between the frontal carinae.

Petiole height (PTH):

Maximum height of petiole in profile.

Petiole length (PTL):

Maximum length of petiole in dorsal view.

Petiole width (PTW):

Maximum width of petiole in dorsal view.

Postpetiole height (PPTH):

Maximum height of postpetiole in profile.

Postpetiole length (PPTL):

Maximum length of postpetiole in dorsal view.

Postpetiole width (PPTW):

Maximum width of postpetiole in dorsal view.

Pronotal width (PRNW):

Maximum width of the pronotum in dorsal view.

Scape length (SL):

Maximum straight-line length of the antennal scape excluding the basal constriction or neck close to the condylar bulb.

Total length (TL):

Sum of HL, ML, PTL, PPTL and GL.

Cephalic index (CI):

$(HW/HL) \times 100$

Petiole width index (PTWI):

$(PTW/PTL) \times 100$

Postpetiole width index (PPTWI):

$(PPTW/PPTL) \times 100$

Scape index (SI):

$(SL/HW) \times 100$

Dilobocondyla eguchii* sp. nov. (Figs 1-4)*MATERIAL EXAMINED****HOLOTYPE:**

Worker, 4.i.2005, Lam Dong Province, Da Lat City "Thung Lung Tinh Yeu" (approx. 11.995499°N, 108.455486°E, 1550 m), Vietnam, coll. K. Eguchi; VNMN.

WORKER**Dimensions (Holotype):**

HL 1.13; HW 1.07; ED 0.27; SL 0.69; MFC 0.49; PRNW 0.80; ML 1.57; PTL 0.53; PTW 0.27; PTH 0.25; PPTL 0.42; PPTW 0.38; PPTH 0.34; GL 1.19; CI 94.69; SI 64.49; PTWI 50.94; PPTWI 90.48; TL 4.84 (1 measured)

Head a little longer than broad, slightly broader posteriorly than in front, sides almost straight, posterior head margin not emarginate; posterior corners minutely dentate; mandibles with 6 teeth, masticatory margin of mandibles with large apical, preapical and basal tooth; clypeus flat, anterior border emarginate with a clear notch in the middle, sinuate at the corners; frontal area



Figs. 1 – 4. *Dilobocondyla eguchii* sp. nov., Worker: (1) Head in full-face view; (2) Body, lateral view; (3) Body, dorsal view; (4) Gaster, dorsal view.

indistinct; antennae slender, 12-segmented with distinct 3-segmented club; scape slender, curved at the base, reaching up to 3/4 of head length; eyes large, placed at midlength of the head; mesosoma convex, not broader than head; pro-mesonotal suture indistinct; pronotum broader than long, its anterior lateral angles acute; metanotal groove broad, not deep; dorsal face of propodeum almost equal to its declivity and slanting towards declivity, propodeal lobes rounded; petiole almost twice as long as broad, with rounded sides, arcuate in profile, with a strong antero-ventral tooth; postpetiole longer than broad, broader posteriorly and forming a node; gaster broadly oval in dorsal view; legs with femora strongly incrassate and tibiae slightly thickened.

Head longitudinally rugose, occiput and sides rugoreticulate, with 14 strong rugae between frontal carinae at the level of eyes; interrugal space punctured, sub-opaque; frontal carinae diverging, not continuing to the posterior corners of the head; antennal scrobes only moderately deep; mandibles longitudinally rugose, interrugal

space smooth and shiny; clypeus rugulose, sub-opaque, with strong median and lateral carinae; mesosoma, petiole and postpetiole rugoreticulate and sub-opaque; meso-metapleuron longitudinally rugose except for smooth and shiny upper half of metapleuron; propodeal declivity smooth and shiny; gaster finely reticulate, sub-opaque, with first segment fine and dense longitudinal striations starting from its base reaching up to almost half of its length; legs subopaque and punctate.

Body brownish black; mesosoma, petiole and postpetiole with reddish tinge; mandibles, scape and trochanter yellowish brown. Whole body covered with abundant, erect, long, blunt, whitish pilosity, gaster with sparse pubescence.

ETYMOLOGY. The species is named in honour of Dr Katsuyuki Eguchi who collected and generously donated it for the present study.

REMARKS. In *D. borneensis*, *D. didita*, *D. gaoyureni*, *D. karnyi*, *D. propotriangulatus*, *D. sebesiana* and *D. yamanei* too the frontal carinae

do not continue to the posterior corners of the head, but *D. eguchii* sp. nov., can be separated from these by the following combination of features: the presence of 14 strong rugae between the frontal carinae at the level of eyes; abundant long, erect hairs on mandibles; much longer striations on the first segment of the gaster; petiole length (PTL) 0.53 mm; and brownish black body colour.

Dilobocondyla eguchii sp. nov. is most similar to *D. borneensis*, from which however it can be easily distinguished on the basis of the following combination of characters: presence of 14 (vs 10) strong rugae between frontal carinae at the level of the eyes; and gaster finely reticulate, sub-opaque, with first gastral tergite having fine and dense longitudinal striations starting from its base reaching up to almost half its length (at only the base in *D. borneensis*).

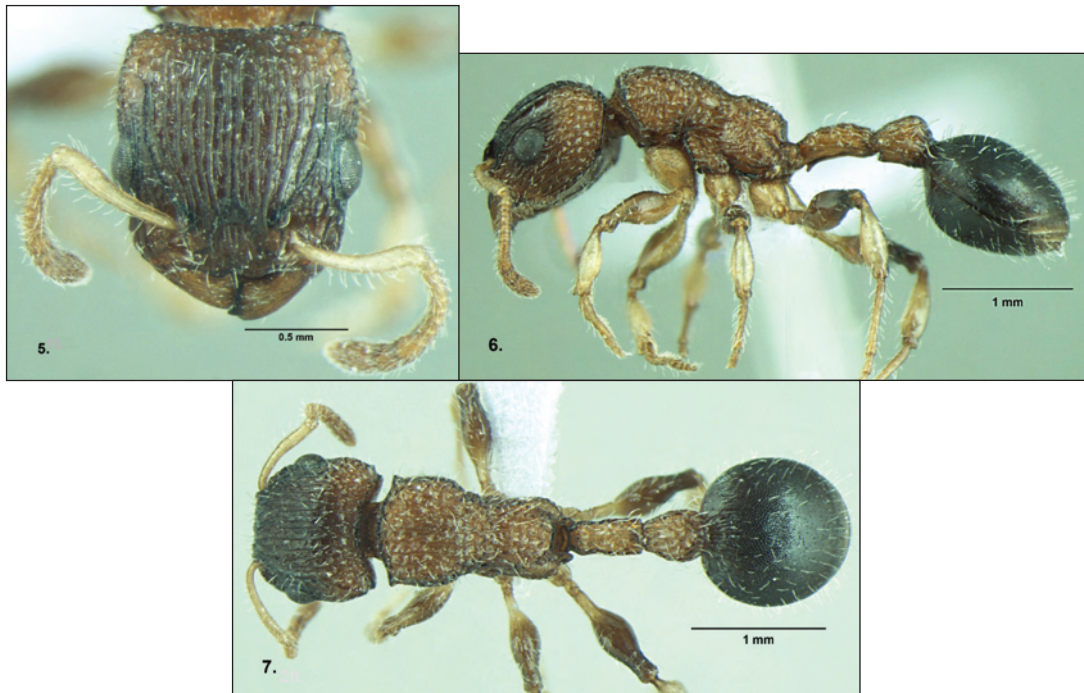
Other significant differences from *D. borneensis* include: posterior head margin non-emarginate (vs emarginate in *borneensis*); tibiae reticulate (vs finely longitudinally striate) and gaster with sparse pubescence (vs no pubescence).

DISTRIBUTION AND HABITAT. This species is collected from Da Lat City on the Langbiang Plateau in the southern parts of the central highlands, which has a mild climate: the mean monthly temperature extremes range from 13-22°C in January to 17-26°C in April-May (World Climate Guide 2012). The collection area (Vietnamese for 'Valley of Love') is a highly-modified decorative floral garden.

***Dilobocondyla gaoyureni* sp. nov. (Figs 5-7)**

MATERIAL EXAMINED

HOLOTYPE: Worker, 2.vi.1996, Chebaling National Nature Reserve, Shixing County, Shaoguan City District, Guangdong Province, China, approx. 24.5°N, 104.2°E, approx. 350 m, coll. J.R. Fellowes; KFBG.



Figs. 5 – 7. *Dilobocondyla gaoyureni* sp. nov., Worker: (5) Head in full-face view; (6) Body, lateral view; (7) Body, dorsal view.

WORKER

Dimensions (Holotype):

HL 1.17; HW 1.17; ED 0.30; SL 0.75; MFC 0.55; PRNW 0.86; ML 1.66; PTL 0.64; PTW 0.28; PTH 0.26; PPTL 0.51; PPTW 0.40; PPTH 0.40; GL 1.31; CI 100.00; SI 64.10; PTWI 43.75; PPTWI 78.43; TL 5.29 (1 measured)

Head as long as broad, slightly broader posteriorly than in front, sides almost straight, posterior head margin broadly emarginate; posterior corners acutely dentate and directed outward; mandible with 6 teeth, masticatory margin of mandibles with large apical and preapical tooth; clypeus flat, anterior border emarginate with a clear notch in the middle, sinuate at the corners; frontal area triangular, longer than broad; antennae slender, 12-segmented with distinct 3-segmented club; scape slender, curved at the base, reaching up to 3/4 of head length; eyes large, placed slightly below midlength of the head; mesosoma not broader than head; pro-mesonotal dorsum convex, pro-mesonotal suture indistinct; pronotum width almost 2 times its length, its anterior lateral angles acute; metanotal groove constricted, broad, deep; dorsal face of propodeum slightly longer than declivitous part, declivity concave; propodeal lobes rounded; petiole length much (2.3 times) greater than width, with rounded sides, slender, with a strong antero-ventral tooth; postpetiole longer than broad, broader posteriorly and forming a node; gaster broadly oval in dorsal view; legs with femora strongly incrassate and tibiae slightly thickened.

Head longitudinally rugose, with 13 strong rugae between frontal carinae at the level of eyes; occiput and sides rugoreticulate, interrugal space punctured and sub-opaque; frontal carinae divergent, not continued to the posterior corners of the head; antennal scrobes moderately deep; mandibles longitudinally rugose; clypeus with a strong median and four lateral carinae, few rugulae on its posterior portion, interrugal space punctured and subopaque; frontal triangle subopaque and finely punctate; mesosoma, petiole and postpetiole strongly rugoreticulate and shiny; meso-metapleuron weakly longitudinally rugose and shiny; propodeal declivity smooth and shiny; gaster finely and densely reticulate, basal part

longitudinally rugose with interrugal space subopaque; coxae of legs strongly punctured, femora smooth and tibiae faintly punctured.

Head and gaster blackish brown; posterior lobes of head, mesosoma, petiole and postpetiole ferruginous; mandibles, antennae and legs light yellowish brown. Whole body covered with abundant, long, subdecumbent whitish pilosity except mandibles, which each have 3-4 hairs only.

ETYMOLOGY. At the request of the collector Dr John Fellowes the species is named in honour of the late Dr Gao Yuren of South China Institute of Endangered Animals, a well-loved champion of the threatened wildlife of South China.

REMARKS. In *D. borneensis*, *D. didita*, *D. eguchii*, *D. karnyi*, *D. propotriangulatus*, *D. sebesiana* and *D. yamanei* the frontal carinae do not continue to the posterior corners of the head, but *D. gaoyureni* sp. nov. can be separated from these by the following combination of features: presence of 13 strong rugae between the frontal carinae at the level of eyes; mandibles with 3-4 hairs; gaster reticulate; petiole length (PTL) 0.64 mm, abundant long and subdecumbent pilosity; and head and gaster blackish-brown in colour. *Dilobocondyla gaoyureni* sp. nov. is especially similar to *D. propotriangulatus* in having frontal carinae not prominent, antennal scrobes moderately deep and gaster reticulate, and in overall body sculpture and coloration. However, it can be easily distinguished from the latter on the basis of the following characters: 13 (vs 14) strong rugae between frontal carinae at the level of eyes; the clypeus with 5 (vs 3) strong carinae; and propodeal lobes rounded (vs broadly triangular with rounded apices). Apart from distinct morphometry, other significant differences from *D. propotriangulatus* include the body with subdecumbent hairs (vs stiff and erect) and interrugal space punctured and subopaque (vs shiny).

DISTRIBUTION AND HABITAT. Known from a single record, from one of Guangdong's most intact lowland tropical forests (Kadoorie Farm & Botanic Garden 2003).



Figs. 8 – 11. *Dilobocondyla gasteroreticulatus* sp. nov., Worker: (8) Head in full-face view; (9) Body, lateral view; (10) Body, dorsal view; (11) Gaster, dorsal view.

***Dilobocondyla gasteroreticulatus* sp. nov. WORKER**
(Figs. 8-14)

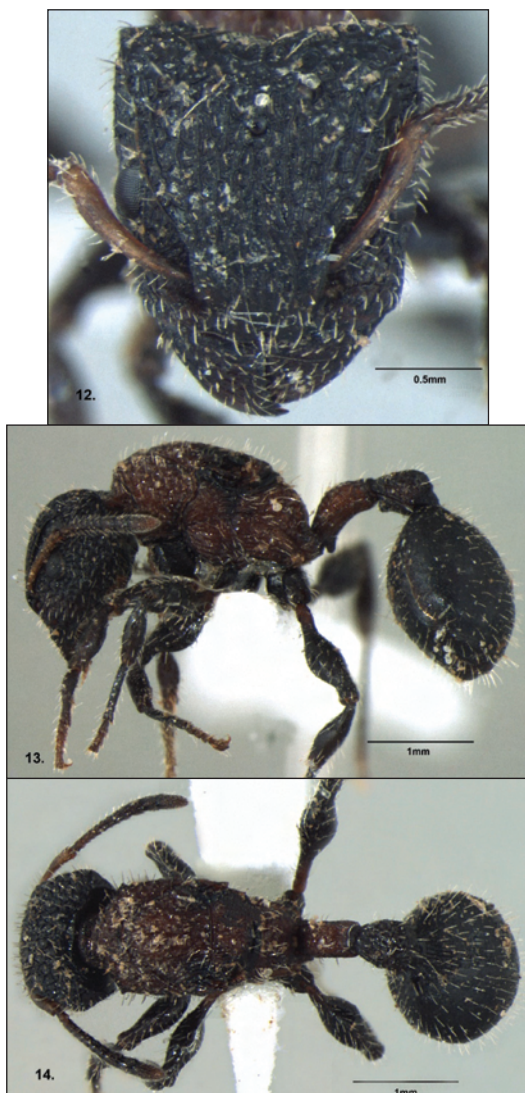
MATERIAL EXAMINED

HOLOTYPE: Worker, 19.v.2010, Forest Research Institute (30.343732°n, 77.992802°E), Dehradun, Uttarakhand, 640 m, Sal tree, coll. R. Kumar.

PARATYPES: 7(w), 26.v.2010, Forest Research Institute (30.340436°n, 78.003616°E), Dehradun, Uttarakhand, 640 m, mango tree, coll. R. Kumar; 1(q), 26.v.2010, Forest Research Institute (30.340436°n, 78.003616°E), Dehradun, Uttarakhand, 640m, mango tree coll. H. Bharti; 4(w), 17.vi.2010 Baijnath (32.057618°n, 76.643103°E), Himachal Pradesh, 1000 m, mango tree, coll. R. Kumar; PUPAC and NHM.

Dimensions (Holotype and paratypes): HL 1.19-1.33; HW 1.19-1.34; ED 0.25-0.31; SL 0.73-0.81; MFC 0.52-0.58; PRNW 0.85-0.92; ML 1.47-1.96; PTL 0.59-0.67; PTW 0.28-0.31; PTH 0.28-0.33; PPTL 0.49-0.55; PPTW 0.39-0.42; PPTH 0.36-0.42; GL 1.44-1.56; CI 100-100.75; SI 60.45-63.2; PTWI 43.08-49.15; PPTWI 76.36-84; TL 5.48-6.03 (8 measured)

Head as long as broad, slightly broader posteriorly than in front, sides slightly convex, posterior head margin broadly and deeply emarginate; posterior corners dentate, at right angles; mandibles with 6 teeth, masticatory margin of mandibles with large apical, preapical and basal tooth; clypeus flat, anterior border emarginate with a clear notch in the middle, sinuate at the corners; frontal area



Figs. 12 – 14. *Dilobocondyla gasteroreticulatus* sp. nov., Gyne: (12) Head in full-face view; (13) Body, lateral view; (14) Body, dorsal view.

triangular, longer than broad; antennae slender, 12-segmented with distinct 3-segmented club; scape slender, curved at the base, reaching up to 3/4 of head length; eyes large, placed at midlength of the head; mesosoma not broader than head; pro-mesonotal dorsum convex, pro-mesonotal suture indistinct; pronotum broader than long, its anterior lateral angles blunt; metanotal groove broad, not deep; dorsal face of propodeum gradually slanting towards declivity, basal part longer than declivitous part, propodeal lobes rounded; petiole length more than twice the

breadth and with parallel sides, arcuate in profile, with a strong antero-ventral tooth; postpetiole longer than broad, posterior part broader than anterior part and forming a node; gaster broadly oval in dorsal view; legs with femora strongly incrassate and tibiae slightly thickened.

Head longitudinally rugose with a few cross-meshes up to vertex, behind which more rugoreticulate, with 12 strong rugae between frontal carinae at the level of eyes; interrugal space punctured, sub-opaque; frontal carinae diverging, long, prominent, continuing to the posterior corners of head; antennal scrobes deep; mandibles longitudinally costulate, rugulose, interrugal space smooth and shiny; clypeus with tiny rugulae posteriorly, opaque, with strong median and a pair of lateral carinae; frontal triangle opaque, finely punctate; sides of the head, mesosoma, petiole, postpetiole strongly rugoreticulate, mid-dorsum of pronotum faintly longitudinally rugose; mesometapleuron rugoreticulate; propodeal declivity smooth and shiny; whole of the gaster finely and densely reticulate and opaque, with the basal part of the first gastral tergite longitudinally striate; legs opaque, coxae and femora finely punctured, with transverse rugulae on fore coxae, tibiae finely longitudinally striate.

Mesosoma, petiole and postpetiole castaneous; head, gaster and legs blackish except scape, trochanter and terminal four segments of tarsus yellowish brown. Whole body covered with abundant, long, obtuse, whitish pilosity.

GYNE

Dimensions: HL 1.35; HW 1.32; ED 0.32; SL 0.82; MFC 0.58 ; PRNW 1.11; ML 2.23; PTL 0.71; PTW 0.35; PTH 0.36; PPTL 0.6; PPTW 0.47; PPTH 0.46; GL 1.76; CI 97.78; SI 62.12; PTWI 49.3; PPTWI 78.33; TL 6.65 (1 measured)

Similar to worker except head slightly longer than broad, with three ocelli; mesonotum, katepisternum and metapleuron longitudinally rugose; scutellum and anepisternum rugoreticulate; postpetiole black in colour.

ETYMOLOGY. The species is so named due to the presence of fine reticulations on the gaster.

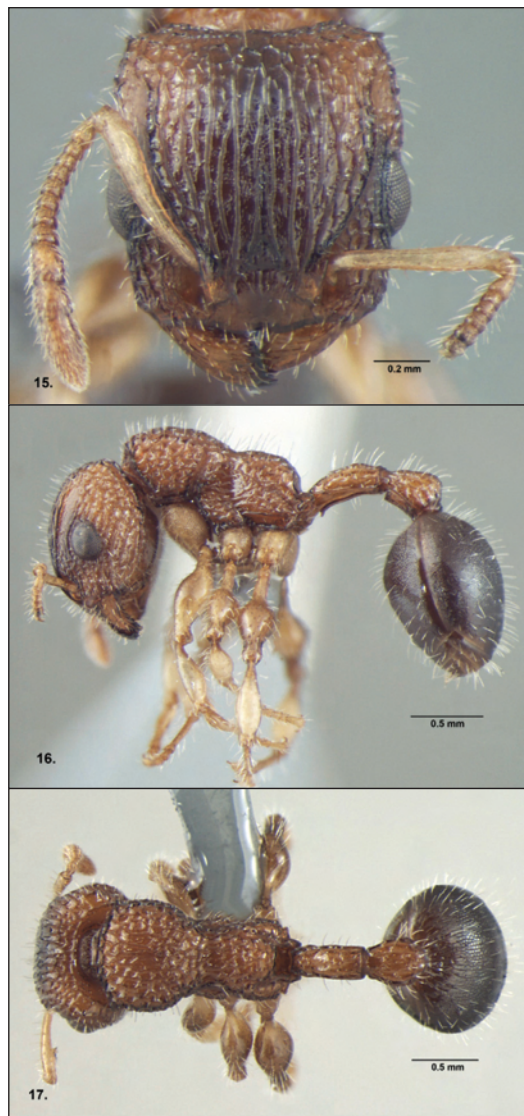
REMARKS. *Dilobocondyla gasteroreticulatus* sp. nov. is somewhat similar to *D. fouqueti* Santschi. However, this new species can be easily distinguished from *D. fouqueti* on the basis of the following combination of characters. The gaster in *D. fouqueti* is smooth and shiny but in *D. gasteroreticulatus* the whole of the gaster is reticulate and opaque (Fig. 11). Similarly the legs are shiny in *D. fouqueti*, while in *D. gasteroreticulatus* the legs are sculptured and subopaque. Other significant differences which separate it from *D. fouqueti* include: head with posterior corners dentate; frontal area distinct; humeral angles blunt, mid-dorsum of pronotum faintly longitudinally rugose; anepisternum and metapleuron rugoreticulate. In contrast in the case of *D. fouqueti* the posterior corners of the head are blunt; the frontal area is indistinct; the humeral angles are acute, the mid-dorsum of the pronotum is rugoreticulate, and the anepisternum and metapleuron are smooth and shiny. The above-stated distinguishing characters between these two species have been found to be consistent in gynes of both species treated during the present study as well. Some other significant distinguishing characters have been observed in gynes. These include the metapleuron being longitudinally rugose and the scutellum rugoreticulate in *D. gasteroreticulatus*, while in *D. fouqueti* the metapleuron is rugoreticulate and the scutellum is longitudinally rugose.

DISTRIBUTION AND HABITAT. This species has been found to be uncommon, and recorded from only two habitats during intensive surveys of Northwest Shivalik. The species has been collected from semi-arid environments, and seems to be arboreal in nature.

***Dilobocondyla propotriangulatus* sp. nov.**
(Figs. 15 – 17)

MATERIAL EXAMINED

HOLOTYPE: Worker, 25-26.v.2004, Yen Tu, (approx. 21.10168°N, 106.43094°E, 400 m), Bac Giang, North Vietnam, coll. Bui & Eguchi; VNMN.



Figs. 15 – 17. *Dilobocondyla propotriangulatus* sp. nov., Worker: (15) Head in full-face view; (16) Body, lateral view; (17) Body, dorsal view.

WORKER

Dimensions (Holotype):

HL 1.09; HW 1.07; ED 0.30; SL 0.67; MFC 0.45; PRNW 0.81; ML 1.62; PTL 0.61; PTW 0.24; PTH 0.24; PPTL 0.46; PPTW 0.35; PPTH 0.35; GL 1.21; CI 98.17; SI 62.62; PTWI 39.34; PPTWI 76.09; TL 4.99 (1 measured)

Head almost as long as broad, slightly broader posteriorly than in front, sides slightly convex, posterior head margin broadly emarginate; posterior corners acutely dentate and directed outward; mandibles with 6 teeth, masticatory margin of mandibles with large apical and preapical tooth; clypeus flat, anterior border emarginate with a clear notch in the middle, sinuate at the corners; frontal area triangular, longer than broad; antennae slender, 12-segmented with distinct 3-segmented club; scape slender, curved at the base, reaching up to 3/4 of head length; eyes large, placed slightly below midlength of the head; mesosoma not broader than head; pro-mesonotal dorsum convex, pro-mesonotal suture indistinct; pronotum breadth almost 2 times its length, its anterior lateral angles acute; metanotal groove highly constricted, broad, deep; dorsal face of propodeum slightly convex and horizontal, basal part longer than declivitous part, declivity concave; propodeal lobes broadly triangular with rounded apex; petiole length much longer than (2.5 times) its breadth, with rounded sides, slender, with a strong antero-ventral tooth; postpetiole longer than broad, broader posteriorly and forming a node; gaster broadly oval in dorsal view; legs with femora strongly incrassate and tibiae slightly thickened.

Head longitudinally rugose, occiput and sides rugoreticulate, with roughly 14 strong rugae between frontal carinae at the level of eyes; interrugal space punctured, somewhat shiny; frontal carinae diverging, not continuing to the posterior corners of the head; antennal scrobes only moderately deep; mandibles longitudinally rugose; clypeus with a strong median and two lateral carinae with few rugulae posteriorly, interrugal space smooth and shiny; frontal triangle sub-opaque, finely punctate; mesosoma, petiole and postpetiole strongly rugoreticulate and shiny; meso-metapleuron rugoreticulate but weakly sculptured, smooth and shiny; propodeal declivity smooth and shiny; gaster finely and densely reticulate, basal part having longitudinal rugae with interrugal space smooth and shiny; coxae with prominent punctures, femora and tibiae finely punctured.

Head, mesosoma, petiole and postpetiole ferruginous with middle of the head dark brown; mandibles, antennae and legs light yellowish



Figs. 18 – 20. *Dilobocondyla yamanei* sp. nov., Worker: (18) Head in full-face view; (19) Body, lateral view; (20) Body, dorsal view.

brown, gaster brownish black. Whole body covered with abundant, long, stiff, erect and whitish pilosity.

ETYMOLOGY. The species is named as propodeal lobes are broadly triangular with rounded apices.

REMARKS. The unique character of this species is the presence of broadly triangular

propodeal lobes with rounded apices, while in the rest of the *Dilobocondyla* species reported or treated hitherto they are rounded in shape. In *D. borneensis*, *D. didita*, *D. eguchii*, *D. gaoyureni*, *D. karnyi*, *D. sebesiana* and *D. yamanei* too, the frontal carinae do not continue to the posterior corners of the head, but *D. propotriangulatus* sp. nov. can be separated from these by the following combination of characters. The presence of 14 strong rugae between the frontal carinae at the level of eyes separate it from *D. borneensis* and *D. yamanei*, which have 10 and 9 rugae respectively. The restriction of longitudinal rugae to the basal part of the gaster, and the ferruginous colour of the body, distinguish it from *D. eguchii*, whose first gastral tergite has fine and dense longitudinal striations reaching almost half of its length, and whose body is brownish black. The strong median and lateral carinae on the clypeus, the rugoreticulate mesopleurae and the shiny body of *D. propotriangulatus* separate it from *D. karnyi* whose clypeus has a delicate median and two lateral carinae, no sculpture on the mesopleurae and an opaque body. From *D. didita* it can be separated by the shorter frontal carinae, not quite reaching the posterior quarter of the head, whereas in *D. didita* the frontal carinae almost reaches the posterior corners of the head.

Dilobocondyla propotriangulatus sp. nov. is described based on the worker caste, while *D. sebesiana* is described only from the gyne.

DISTRIBUTION AND HABITAT. It is known from a single record in evergreen forest at quite low altitude (400 m).

***Dilobocondyla yamanei* sp. nov. (Figs 18-20)**

MATERIAL EXAMINED

HOLOTYPE: Worker, Ulu Gombak, Malay Peninsula, Malaysia (approx. 3.320131°N, 101.751852°E, 418 m) 30.v.2000, coll. S. Yamane; PUPAC.

WORKER

Dimensions (Holotype):

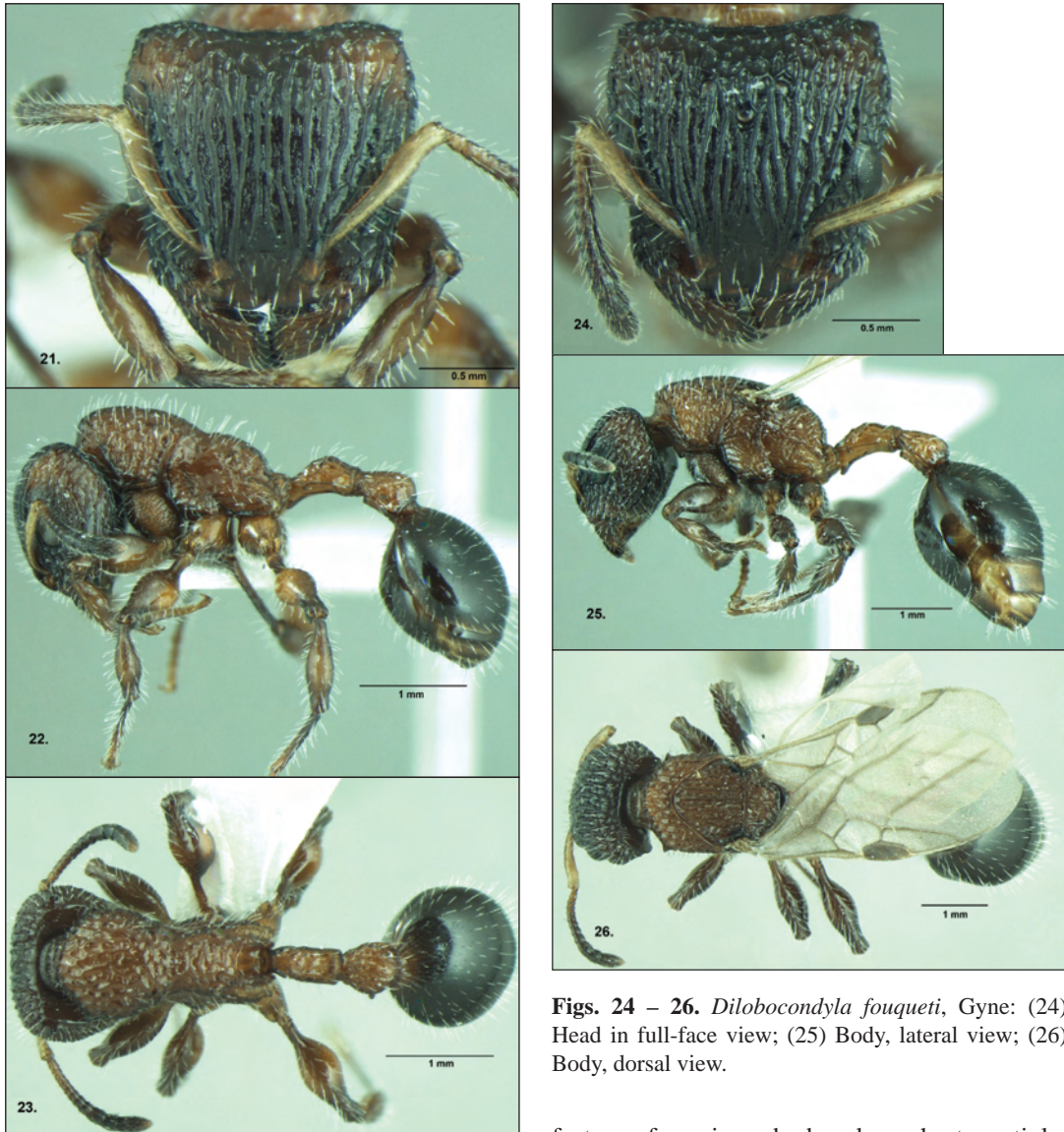
HL 1.17; HW 1.22; ED 0.3; SL 0.73; MFC 0.54; PRNW 0.87; ML 1.73; PTL 0.54; PTW 0.28; PTH

0.26; PPTL 0.42; PPTW 0.37; PPTH 0.36; GL 0.97; CI 104.27; SI 59.84; PTWI 51.85; PPTWI 88.1; TL 4.83 (1 measured)

Head broader than long, slightly broader behind than in front, sides slightly convex, posterior head margin weakly emarginate, posterior corners acutely dentate directed outward; head below the posterior corners constricted; mandibles with 6 teeth, masticatory margin of mandibles with large apical, preapical and basal tooth; clypeus flat, anterior border emarginate with a clear notch in the middle, sinuate at the corners; frontal area triangular, longer than broad; antennae slender, 12-segmented with distinct 3-segmented club; scape slender, curved at the base, reaching up to 3/4 the length of head; eyes large, placed at midlength of the head; mesosoma not broader than head; pro-mesonotal dorsum convex, pro-mesonotal suture indistinct; pronotum broader than long, its anterior lateral angles projecting as blunt teeth; metanotal groove broad, shallow; propodeum short, convex, basal and apical faces almost equal, propodeal lobes rounded; petiole long, twice as long as broad, arcuate in profile, with parallel sides, having ventral tooth; postpetiole longer than broad, posterior part broader, forming a node; gaster broadly oval in dorsal view: femora strongly incrassate, tibiae slightly thickened.

Head longitudinally rugose up to level of eyes, the rest rugoreticulate, interrugal space punctured and opaque; frontal carinae diverging, not continuing to the posterior corners of the head; antennal scrobes moderately deep; 9 rugae between frontal carinae at the level of eyes; mandibles longitudinally costulate, rugulose, interrugal space smooth and shiny; clypeus opaque, with 3 strong carinae; frontal triangle smooth, finely punctate; sides of the head, mesosoma, petiole and postpetiole strongly rugoreticulate and subopaque; meso-metapleuron smooth and shiny; propodeal declivity smooth and shiny; gaster finely and densely reticulate, opaque, with the base of the first tergite longitudinally striate; legs subopaque, coxae strongly punctured, femora and tibiae finely punctured.

Whole of body colour ferruginous except clypeus, mandibles and sternites with some yellowish tinge, and covered with abundant, long, obtuse, whitish pilosity.



Figs. 21 – 23. *Dilobocondyla fouqueti*, Worker: (21) Head in full-face view; (22) Body, lateral view; (23) Body, dorsal view.

ETYMOLOGY. The species is named in honour of Professor Seiki Yamane, who generously donated it for present study.

REMARKS. In *D. borneensis*, *D. didita*, *D. eguchii*, *D. gaoyureni*, *D. karnyi*, *D. propotriangulatus* and *D. sebesiana* too the frontal carinae do not continue to the posterior corners of the head, but *Dilobocondyla yamanei* sp. nov. can be separated from these by the following combination of

Figs. 24 – 26. *Dilobocondyla fouqueti*, Gyne: (24) Head in full-face view; (25) Body, lateral view; (26) Body, dorsal view.

features: ferruginous body colour; shorter petiole; opaque body; presence of 9 rugae between frontal carinae; and also by body length (TL 4.83 mm). The most similar taxon to this species is *D. karnyi*, from which it can be easily distinguished on the basis of the following combination of characters: head broader than long (longer than broad in *D. karnyi*), length 4.83 mm (4.5 mm in *D. karnyi*), and petiole less than twice as long as broad (more than twice as long as broad in *D. karnyi*). Other significant differences which separate it from *D. karnyi* include: clypeus with a strong median and two lateral carinae, its anterior border strongly emarginate in the middle; propodeum with short basal part which is almost equal to declivity

surface; head, legs and interrugal spaces opaque; tibiae finely punctured; in the case of *D. karnyi*, the clypeus has only delicate carinae and its anterior border is only feebly emarginate; the propodeum with basal part longer than its declivitous face; the head, legs and interrugal spaces shiny and tibiae finely reticulate.

DISTRIBUTION AND HABITAT. It is known by a single record from Ulu Gombak, Malay Peninsula, Malaysia. The area is covered with secondary forest and the topography is rough, mostly steep hillsides.



Figs. 27 – 29. *Dilobocondyla fouqueti*, Male: (27) Head in full-face view; (28) Body, lateral view; (29) Body, dorsal view.

Redescription of *Dilobocondyla fouqueti* Santschi, 1910 with male and female caste

Dilobocondyla fouqueti (Figs. 21-29)

Systematics

Dilobocondyla fouqueti Santschi, 1910: 283 (w.) Vietnam. Senior synonym of *lightii*: Wang & Wu, 1992: 562.

MATERIAL EXAMINED

Worker, 07.vii.1993, Shing Mun, West-Central New Territories, Hong Kong, 220 m, coll. J.R. Fellowes; 1(w), 03.x.1996, Mau Ping San Uk, East-Central New Territories, Hong Kong, 230 m, Pitfall trap, coll. J.R. Fellowes; 1(w), 2(q) and 1(m), 14.xi.1996, Tit Kim Hang West, East-Central New Territories, Hong Kong, 60 m, coll. J.R. Fellowes; 1(w), 22.xi.1996, She Shan, West-Central New Territories, Hong Kong, 50 m, coll. J.R. Fellowes; KFBG.

WORKER

Dimensions:

HL 1.30-1.51; HW 1.33-1.51; ED 0.30-0.33; SL 0.80-0.95; MFC 0.62-0.73; PRNW 0.95-1.11; ML 1.90-2.37; PTL 0.68-0.79; PTW 0.28-0.37; PTH 0.31-0.37; PPTL 0.51-0.62; PPTW 0.40-0.50; PPTH 0.37-0.47; GL 1.44-1.75; CI 100.00-102.31; SI 60.15-63.70; PTWI 41.18-46.83; PPTWI 77.42-80.65; TL 5.83-7.04 (4 measured)

Head as long as broad, slightly broader posteriorly than in front, sides barely convex, posterior head margin with broad emargination; posterior corners blunt; mandibles with 6 teeth, masticatory margin of mandibles with large apical, preapical and basal tooth; clypeus flat, anterior border emarginate with a clear notch in the middle, sinuate at the corners; frontal area indistinct; antennae slender, 12-segmented with distinct 3-segmented club; scape slender, curved at the base, reaching up to 3/4 of head length; eyes large, placed at midlength of the head; mesosoma not broader than head; promesonotal dorsum weakly convex, pro-mesonotal suture indistinct; pronotum broader than long, its anterior lateral angles acute; metanotal groove

broad, shallow; dorsal face of propodeum gradually slanting towards declivity, basal part longer than declivitous part, propodeal lobes rounded; petiole elongate, length more than twice its width, with parallel sides, arcuate in profile, with a strong antero-ventral tooth; postpetiole longer than broad, posterior part broader than anterior part and forming a node; gaster broadly oval in dorsal view; legs with femora strongly incrassate and tibiae slightly thickened.

Head longitudinally rugose up to vertex, behind which more rugoreticulate, with 12 strong rugae between frontal carinae at the level of eyes; interrugal space punctured and shiny; frontal carinae divergent, long, prominent, continuing to posterior corners of the head; antennal scrobes deep; mandibles longitudinally costulate and rugulose, interrugal space smooth and shiny; clypeus with tiny rugulae posteriorly, shiny, with strong median and a pair of lateral carinae; sides of the head, mesosoma, petiole and postpetiole strongly rugoreticulate; anepisternum and metapleuron smooth and shiny, katepisternum rugoreticulate; propodeal declivity smooth and shiny; gaster smooth and shiny with the basal part of the first segment longitudinally striate; legs shiny, coxae punctured with transverse rugulae on fore coxae, femora smooth and tibiae finely longitudinally striate.

Mesosoma, petiole and postpetiole castaneous; head and gaster blackish brown, scape and legs yellowish brown; whole body covered with abundant, long, obtuse, whitish pilosity.

GYNE

Dimensions:

HL 1.53-1.59; HW 1.51-1.57; ED 0.33-0.35; SL 0.91-0.97; MFC 0.71; PRNW 1.28-1.33; ML 2.59-2.66; PTL 0.84-0.93; PTW 0.40-0.42; PTH 0.40; PPTL 0.70-0.73; PPTW 0.55-0.57; PPTH 0.50-0.51; GL 1.62-2.29; CI 98.74-98.69; SI 60.26-61.78; PTWI 45.16-47.62; PPTWI 75.34-81.43; TL 7.28-8.20 (2 measured)

Similar to worker except head slightly longer than broad, with three ocelli; mesonotum, katepisternum and scutellum longitudinally rugose while pronotum, anepisternum and metapleuron rugoreticulate; gaster yellowish brown except 1st and 2nd segment blackish brown.

MALE

Dimensions:

HL 1.06; HW 1.28; ED 0.39; SL 0.24; PRNW 1.04; ML 2.35; PTL 1.00; PTW 0.35; PTH 0.35; PPTL 0.86; PPTW 0.44; PPTH 0.46; GL 2.80; CI 120.75; SI 18.75; PTWI 35.00; PPTWI 51.16; TL 8.07 (1 measured)

Head much broader than long, sides convex, posterior head margin barely emarginate, with three ocelli; mandibles with well developed pointed teeth; clypeus convex, anterior margin rounded and entire; frontal area distinct, triangular; antennae 13-segmented, longer and without distinct club, funicular segments cylindrical and longer than broad; scape longer than 2nd segment but shorter than the rest of the segments; antennal scrobes deep; eyes large, convex and slightly below midlength of head; pronotum not broader than head, its anterior lateral angles acute; scutum broader than pronotum and divided into three plates, scutellum somewhat rounded; dorsal face of propodeum flat and vertical; petiole longer, almost 2.9 times its width, with small blunt antero-ventral tooth; gaster convex, elongate; femora and tarsi less incrassate than in workers.

Head and mesosoma longitudinally rugoreticulate and spaces between them punctured and shiny; mandibles, clypeus and frontal area longitudinally rugose; frontal carinae short and not continuing to the posterior corners of the head; petiole and postpetiole faintly reticulate; gaster smooth; legs finely punctured and shiny; wings transparent.

Head, mesosoma, petiole, postpetiole and coxae blackish; antennae, legs and gaster yellowish brown; body covered with long erect and subdecumbent hairs except antennae, 1st gastral tergite, coxae, trochanters, femora and tibiae with short suberect hairs.

REMARKS. *Dilobocondyla fouqueti* was described by Santschi (1910) from Vietnam, based on the worker caste only. Later a variety of this species *D. fouqueti lighti* was distinguished by Wheeler (1927) from China, based on size and colour variation. Wang and Wu (1992), while studying the ant fauna of China, considered that *D. fouqueti lighti* was just a morphological variation

of *D. fouqueti* and synonymised it. During the present study additional material pertaining to *D. fouqueti* from Hong Kong was analysed. The present analysis is consistent with the findings of Wang & Wu (1992) that there is noticeable colour variation in *D. fouqueti*. However, in the present investigation some specimens have been found to be much longer than those observed by Wang & Wu (1992). It can be concluded that the length in *D. fouqueti* is quite variable, ranging from 4.5 to 7.04 mm.

DISTRIBUTION AND HABITAT. *Dilobocondyla fouqueti* is distributed in Vietnam and China. All recent Hong Kong records are from mature patches of lowland forest. The species is uncommon, with only a handful of records from well-surveyed areas, and is at least partly arboreal.

Revised key to the species of *Dilobocondyla* (modified after Wheeler, 1924)

1. Frontal carinae not continuing to the posterior corners of the head and not so prominent; antennal scrobes only moderately deep.....2
 - Frontal carinae prominent, continuing to the posterior corners of the head; scrobes deeper9
2. Body brownish black; frontal area indistinct; petiole almost twice as long as broad.....3
 - Body ferruginous or yellowish brown; frontal area distinct; petiole either much longer than or less than twice as long as broad4
3. 10 strong rugae between frontal carinae; gaster with longitudinal striations at extreme base only; worker 4.5 mm in total length (Borneo)*borneensis* Wheeler
 - 14 strong rugae between frontal carinae; first segment of gaster with fine and dense longitudinal striations starting from its base reaching up to almost half of its length; worker 4.8 mm in total length (Vietnam)*eguchii* sp. nov.
4. Mesosoma, petiole and postpetiole opaque; sculpture absent on mesopleurae5
 - Mesosoma, petiole and postpetiole shiny; sculpture present on mesopleurae6
5. Head slightly longer than broad; clypeus with delicate carinae and anterior border feebly emarginate; petiole much longer (more than twice as long as broad); worker 4.5 mm in total length (Java)*karnyi* Wheeler
 - Head broader than long (HL 1.17, HW 1.22); clypeus with a strong median and two lateral carina and its anterior border strongly emarginate in the middle; petiole comparatively short (less than twice as long as broad); worker 4.8 mm in total length (Malaysia)*yamanei* sp. nov.
6. Frontal carinae almost reaching the posterior corners of the head; worker ≤ 3.5 mm in total length (Sri Lanka)*didita* (Walker)
 - Frontal carinae not reaching the posterior quarter of the head; petiole length much greater than (2.5 times) its width; worker ≥ 5 mm in total length.....7
7. Propodeal lobes either rounded or broadly triangular with rounded apex; mandibles with large apical and preapical tooth only; gaster brownish black; pilosity whitish; worker < 5.5 mm in total length8
 - Propodeal lobes rounded; mandibles with three large apical and few indistinct basal teeth; gaster paler; pilosity yellow (based on gyne, 6.5 mm in total length) (Sumatra) *sebesiana* Wheeler
8. Propodeal lobes rounded; 13 strong rugae between frontal carinae; clypeus with 5 strong carinae; body with subdecumbent hairs except mandibles which have no hairs; worker 5.3 mm in total length (Guangdong, China)*gaoyureni* sp. nov.
 - Propodeal lobes broadly triangular with rounded apex; 14 strong rugae between frontal carinae; clypeus with 3 strong carinae; body with stiff erect hairs; worker 5.0 mm in total length (Vietnam)*propotriangulatus* sp. nov.
9. At least the head black10
 - Head ferruginous or brown, like the remainder of the body.....12
10. Whole body black; gaster opaque (based on female, 4.75 mm) (Sulawesi) *selebensis* (Emery) (subspecies *D. selebensis simalurana* Forel, reported from Indonesia, large in size; worker 9.6 mm).

- Head and gaster black; gaster either smooth and shiny or reticulate and opaque; worker ≥ 5.48 mm11
- 11. Gaster smooth and shiny; anepisternum and metapleuron smooth and shiny; legs smooth, yellowish brown; worker 5.8 mm (Vietnam and China)*fouqueti* Santschi
 - Gaster reticulate and opaque; anepisternum and metapleuron rugoreticulate; legs opaque with fine sculpture, blackish; worker 5.48-6.03 mm (India)*gasteroreticulatus* sp. nov.13
- 12. External borders of mandibles either slightly sinuate or not; meso-metanotal constriction distinct; pronotum decidedly broader than long; worker average length 4 mm13
 - External borders of mandibles not sinuate; meso-metanotal constriction very feeble; pronotum nearly as long as broad, worker not exceeding 3.25 mm (Philippines)*chapmani* Wheeler [in subspecies *D. chapmani rufobrunnea* Wheeler from Philippines, worker slightly larger (3.80 mm); slightly more opaque surface throughout; coloration dark brown, with the pronotum above paler and more rufous; the mandibles, except the teeth, the sides of the clypeus, scapes, first funicular joint and tarsi beyond their first joint, brownish yellow].
- 13. Mandibles with 6 teeth, gaster striate only at base and striations very short; worker ≥ 3.93 mm (India)*bangalorica* Varghese
 - Mandibles either with 5 distinct teeth or with two distinct apical teeth followed by indistinct and irregular teeth; gaster either longitudinally striate or striate only at base14
- 14. Mandibles with 5 distinct teeth; gaster longitudinally striate. Less than 15 rugae between frontal carinae; worker 4.5 mm (Australia and New Guinea)*cataulacoidea* (Stitz)
 - Mandibles with two distinct apical teeth only; gaster striate at base only; 15-17 strong rugae between frontal carinae; head shorter, its posterior corners directed obliquely outward; sculpture feebler; petiole longer; gaster blackish brown; worker 3.25-3.75 mm (Singapore)*fulva* Viehmeyer

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