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The Ant Genus *Discothyrea* Roger, 1863 (Hymenoptera, Formicidae, Proceratiinae) of Thailand

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ABSTRACT

Two species of the proceratiine ant genus *Discothyrea* Roger, 1863 are recorded for the first time in Thailand. In the present paper, the queen of *Discothyrea diana* Xu, 2014 is described for the first time. A key to the Thai species based on the worker caste is provided.

Keywords: ants, *Discothyrea diana*, *Discothyrea kamiteta*, new record, taxonomy, Thailand.

INTRODUCTION

Members of the ant genus *Discothyrea* Roger, 1863 are small, relatively cryptic ants that are generally found in rotten wood, among leaf litter, or under stones (Brown, 1958). Colony sizes of most species are very small (Katayama, 2013; Kubota and Terayama, 1999). This genus is distributed in the tropical and subtropical regions of Africa, Asia, and Oceania, with only a few hailing from the New World and Madagascar (Janicki *et al.*, 2016, Guénard *et al.*, 2017, Hita-Garcia *et al.*, 2019). To date, 49 extant and two fossil species have been recorded globally (Bolton, 2020) with 12 species coming from Asia. The subject species has not been previously recorded from Thailand.

Recently, while examining ant specimens in the Natural History Museum of the National Science Museum, Thailand, we found new country records for the two *Discothyrea* species. We are going to add these species to the ant fauna of Thailand. The queen of *Discothyrea diana* Xu, 2014 is described here for the first time. A key to the Thai species based on the worker caste is provided.

MATERIALS AND METHODS

This study is based on specimens deposited at the Natural History Museum of the National Science Museum, Thailand. The specimens were compared with high resolution images of the holotype of *Discothyrea diana* Xu, 2014 (provided by Professor Zhenghui Xu) and non-type of *Discothyrea kamiteta* Kubota and Terayama, 1999 (which are available on AntWiki, 2020). Most morphological observations were made with a ZEISS Discovery V12 stereomicroscope. Multi-focused montage images were produced using NIS element 3.7 from a series of source images taken by a Nikon MNB42100 digital camera attached to a Nikon ECLIPSE E600 microscope. Ten specimens for each species were measured using a micrometer. All measurements are expressed in millimeters to the hundredths place.

Abbreviations used for the standard measurements and indices are as follows (after Xu *et al.*, 2014):

TL Total Length: The total outstretched length of the individual, from the mandibular apex to the gastral apex.

HL Head Length: The straight-line length of the head in perfect full-face view, measured from the mid-point of the anterior clypeal margin to the midpoint of the posterior margin. In species where one or both of these margins is concave, the measurement is taken from the mid-point of a transverse line that spans the apices of the projecting portions.

HW Head Width: The maximum width of the head in full-face view, excluding the eyes.

CI Cephalic Index = HW x 100/HL.
SL Scape Length: The straight-line length of the antennal scape, excluding the basal constriction or neck.
SI Scape Index = SL x 100/HW.
ED Eye Diameter: The maximum diameter of the eye.
PW Pronotal Width: The maximum width of the pronotum measured in dorsal view.
MSL Mesosoma length (=AL-Alitrunk Length): The diagonal length of the mesosoma in lateral view, measured from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron.
PL Petiole Length: The length of the petiole measured in lateral view from the anterior process to the posteriormost point of the tergite, where it surrounds the gastral articulation.
PH Petiole Height: The height of the petiole measured in lateral view from the apex of the ventral (subpetiolar) process vertically to a line intersecting the dorsalmost point of the node.
DPW Dorsal Petiole Width: The maximum width of the petiole in dorsal view.
LPI Lateral Petiole Index = PH x 100/PL.
DPI Dorsal Petiole Index = DPW x 100/PL.

The general terminology of the worker ants follows Hölldobler and Wilson (1990) and Bolton (1994). For important characteristics of the worker in the genus used in this paper, see Xu *et al.* (2014).

Abbreviations of the type depositories and others are as follows:

MHNG Natural History Museum of Geneva, Geneva, Switzerland.
THNHM Natural History Museum of the National Science Museum, Pathum Thani, Thailand.
SWFU Southwest Forestry University, Kunming, Yunnan Province, China.

RESULTS AND DISCUSSION

NEW RECORDS

***Discothyrea diana* Xu, 2014**
(Figures 1–2)

Discothyrea diana Xu, 2014: 38, figs 7–12. Type locality: China, Yunnan Province, Mengla County, Mengla Town, Bubang Village (SWFU).

Material examined. Eastern Thailand: Chanthaburi Province, Khao Kid Chakud N.P., hill evergreen forest, 19.I.2006, Watana leg., colony no. WJT06-E1021 (2 workers, THNHM-I-13626, THNHM); Chanthaburi Province, Khao Kid Chakud N.P., hill evergreen forest, 19.I.2006, Watana leg., (1 worker, THNHM-I-13627, THNHM); Chanthaburi Province, Khao Kid Chakud N.P., hill evergreen forest, 21.I.2006, Watana leg., colony no. WJT06-E-1045 (1 worker and 1 queen, THNHM-I-13628 and THNHM-I-13629, THNHM); Chanthaburi Province, Khao Kid Chakud N.P., hill evergreen forest, 21.I.2006, Watana leg., colony no. WJT06-E1041 (1 worker, THNHM-I-13630, THNHM). **Southern Thailand:** Nakhon Si Thammarat Province, Noppitum District, Krung Ching Subdistrict, San Yen, 200–500 m a.s.l., 16.IV.2007, W. Jaitrong leg., colony no. WJT07-TH-665 (4 workers, THNHM-I-13624 to THNHM-I-13625, THNHM).

Worker description (Figure 1).

Measurements. Workers (n=4): TL 1.52–1.72; HW 0.40–0.43; HL 0.43–0.46; SL 0.20–0.26; ED 0.03; PW 0.30; MSL 0.40–0.46; PL 0.13; PH 0.13–0.17; DPW 0.17; CI 86–93; SI 50–67; LPI 100-125; DPI 125.

Head in full face view oval, longer than broad, much narrower anteriorly than posteriorly, with side roundly convex, posterior margin weakly concave medially, and posterolateral corner rounded. Frontal carinae short and close to each other, extending posteriorly 1/3 of head length. Antenna 7-segmented, with one segment club; scape short, narrow at base and gradually swollen apically, reaching half-length of head; antennal segment II broader than each of III–IV, terminal segment VII [antenna 7-segmented. Why VI is terminal?] slightly longer than III–VII combined. Clypeus short and anterior margin convex. Mandible triangular, masticatory margin edentate. Frontal lobes fused to each other forming a rough triangular area, almost as long as broad. Frontal carinae short, close to each other and reaching to level of anterior margin of eye. Eye relatively small, with 5–6 ommatidia, located 1/3 of head-length in lateral view. Mesosoma in lateral view stout, with roundly convex dorsal outline; posterodorsal corner of propodeum right angled, posterior margin of propodeum concave; propodeal lobe large and round; mesopleuron not clearly demarcated from mesonotum but demarcated from metapleuron by shallow furrow. Petiole relatively short, low, dorsal face sloping down anteriorly and weakly convex. Subpetiolar process large, subtriangular, convex apically, and pointed downward. In lateral view, gastral tergite I larger than mesosoma and gastral tergite II, and weakly convex dorsal outline.

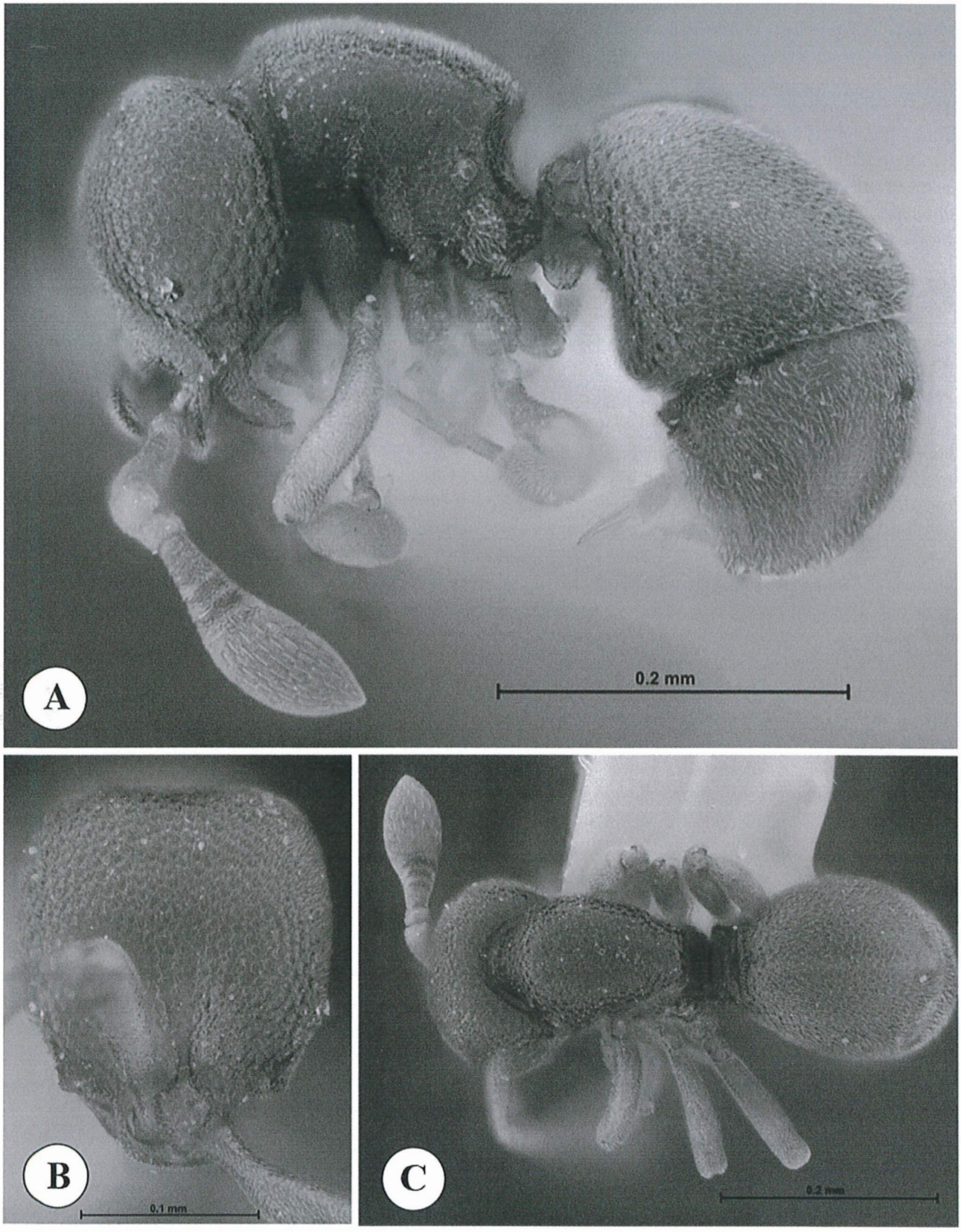


Figure 1. *Discothyrea diana*, non-type worker. A, body in lateral view; B, head in frontal view; C, body in dorsal view.

Head, mesosoma, petiole, and first gastral segment densely and coarsely punctured, interspaces much smaller than puncture diameter, punctures on sides of head, pronotum and first gaster segments even larger. Rest of gastral segments densely finely punctured. Whole body covered with dense sub-decumbent to decumbent short pubescence, without standing hairs. Scapes and tibiae with dense decumbent pubescence, without standing hairs. Color reddish brown, apical antennal segments, legs, and gastral apex yellowish brown.

Dealate queen description (Figure 2).

Measurements. Queen (n=1): TL 1.85; HW 0.4; HL 0.46; SL 0.23; ED 0.07; PW 0.33; MSL 0.5; PL 0.13; PH 0.2; DPW 0.2; CI 85; SI 58; LPI 150; DPI 150

Head in full face view oval, longer than broad, much narrower anteriorly than posteriorly, with side roundly convex, posterior margin weakly concave medially, and posterolateral corner rounded. Frontal carinae short and close to each other, extending posteriorly 1/3 of head length. Antenna 7-segmented with one segment club; scape short, narrow at base and gradually swollen apically, and reaching half-length of head; antennal segment II broader than each of segments III–IV, terminal segment (VII) slightly longer than III–VI combined. Clypeus short, with its anterior margin convex. Mandible triangular, masticatory margin edentate. Frontal lobes fused forming a triangular area, almost as long as broad. Frontal carinae short, fused to form single carina and at level of anterior margin of eye. Eye larger than in worker, with ca. 16 ommatidia, located 1/3 of head-length in lateral view; ocelli present, located slightly above level of posterior margin of eye; distances between anterior ocellus and lateral ocelli almost as long as distance between lateral ocelli. Mesosoma in lateral view stout, weakly convex dorsal outline; mesopleuron clearly demarcated from lateral face of pronotum, mesoscutum, and metapleuron by distinct sutures; anepisternum clearly demarcated from katepisternum by shallow oblique mesopleural sulcus; metapleuron not demarcated from lateral face of propodeum; propodeum short, its posterodorsal corner roundly angled, posterior margin of propodeum concave; propodeal lobe large and round. With mesosoma in dorsal view, pronotum sub-rectangular, its anterior margin strongly convex, posterior margin strongly concave; mesoscutum large, slightly longer than broad, anterior margin strongly convex, posterior margin weakly convex; mesoscutellum almost as long as broad, broader anteriorly, anterior margin almost straight and posterior margin convex; metanotum very short. Petiole and gaster same as in worker.

Sculpturing, coloration and pilosity same as in worker.

Habitat. This species was found to nest in the soil of dry evergreen forests, mixed deciduous forests and teak plantation. The species inhabits lowlands.

Distribution. China (Xu, 2014) and Thailand (new record).

Remarks. Discothyrea diana is similar to Discothyrea stumperi Baroni Urbani, 1977 from Bhutan and Discothyrea yueshen Terayama, 2009 from Taiwan in general appearance as they share the frontal carinae closely spaced and strongly narrowed posteriorly, and small body size. However, Discothyrea diana can be separated from the latter two by 1) posterior margin of head in full-face view feebly concave medially in D. diana (weakly convex in the latter two); 2) antenna 7-segmented in D. diana (8-segmented in the latter two); 3) subpetiolar process large and subtriangular in D. diana (low and almost absent in the latter two); constriction between gastral segments I and II absent in D. diana (distinct in D. stumperi). Although the Thai specimens agree well with the holotype images of D. diana, the worker body size is smaller than in the type series (TL 1.52–1.72 mm; HW 0.40–0.43 mm in Thai specimens VS TL 2.8 mm; HW 0.5 in the holotype).

***Discothyrea kamiteta* Kubota & Terayama, 1999**
(Figure 3–4)

Discothyrea kamiteta Kubota and Terayama, 1999: Figures 1–3 (w.). Type locality: Japan.

Material examined. Eastern Thailand: Chanthaburi Prov., Khao soi Dao W.S., mixed deciduous forest (MEF), 30.IX.2006. Watana leg., Q6 (5 workers, THNHM); Chanthaburi Prov., Khao Soi Dao, teak plantation, 26.XI.2006. Watana leg., Q3 (1 worker, THNHM); **Central Thailand:** Central Thailand, Nakhon Nayok Prov. Pak Phli Dist., Na Hin Lat Village, Wang Muang Waterfall, 30.X.2019, W. Jaitrong leg., colony no. TH19-WJT-30 (30 workers). **Southern Thailand:** Surat Thani Prov., Ban Takhun Dist., Ratchaprapa Dam, Khlong Pae Station, 1.III.2019, W. Jaitrong leg., colony no. WJT010319-06 (24 workers and 1 queen, THNHM).

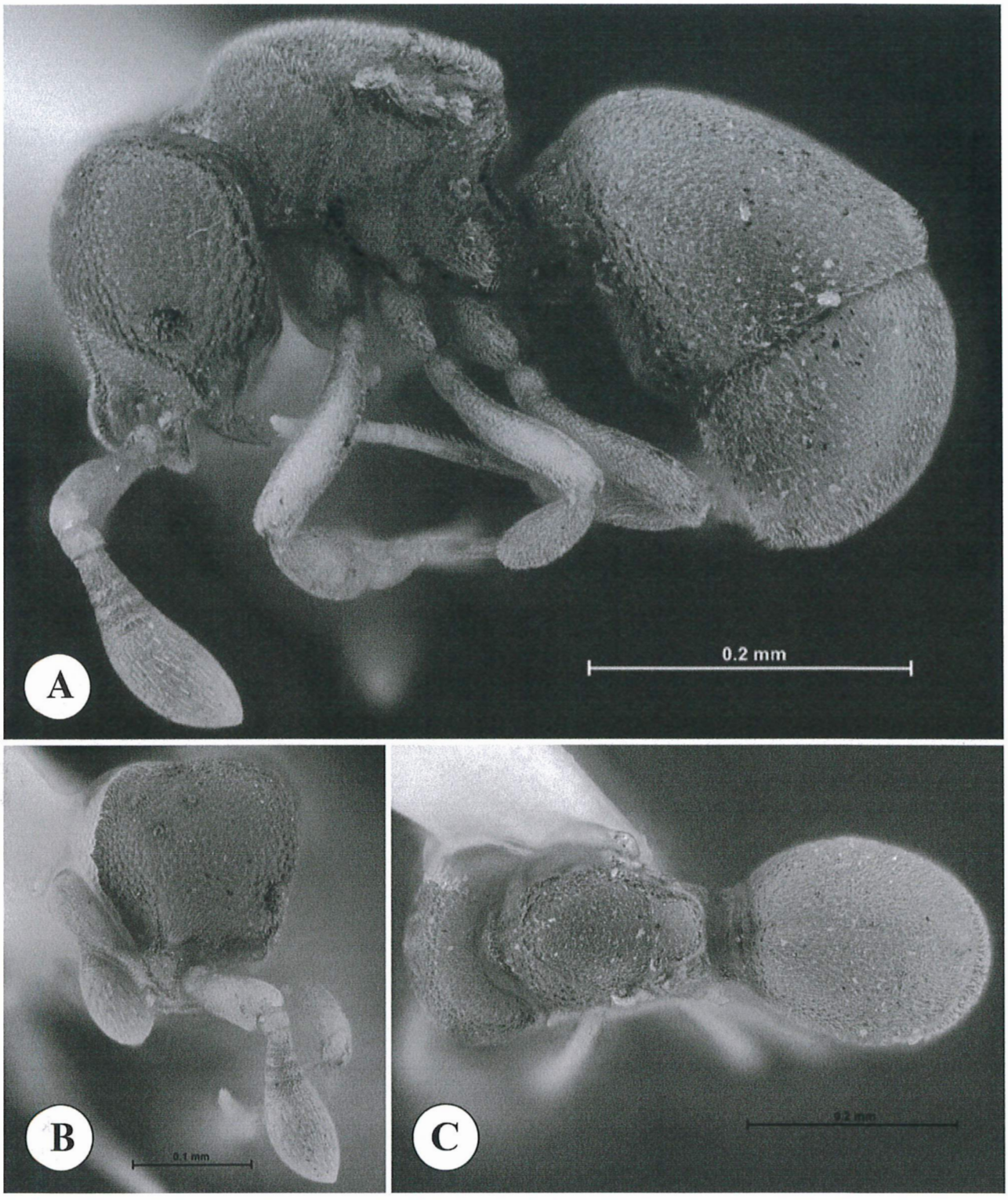


Figure 2. *Discothyrea diana*, non-type queen. A, body in lateral view; B, head in frontal view; C, body in dorsal view.

Worker description (Figure 3).

Measurements. Workers (n=4): TL 2.11–2.21; HW 0.40–0.56; HL 0.63–0.66; SL 0.40–0.43; ED 0.03; PW 0.36–0.43; MSL 0.43–0.53; PL 0.13–0.17; PH 0.26–0.3; DPW 0.23–0.26; CI 80–85; SI 75–81.25; LPI 220–225; DPI 160–200.

Head in full face view subtrapezoidal, clearly longer than broad, much narrower anteriorly than posteriorly, with side convex, posterior margin weakly convex, and posterolateral corner rounded. Frontal lobes wide

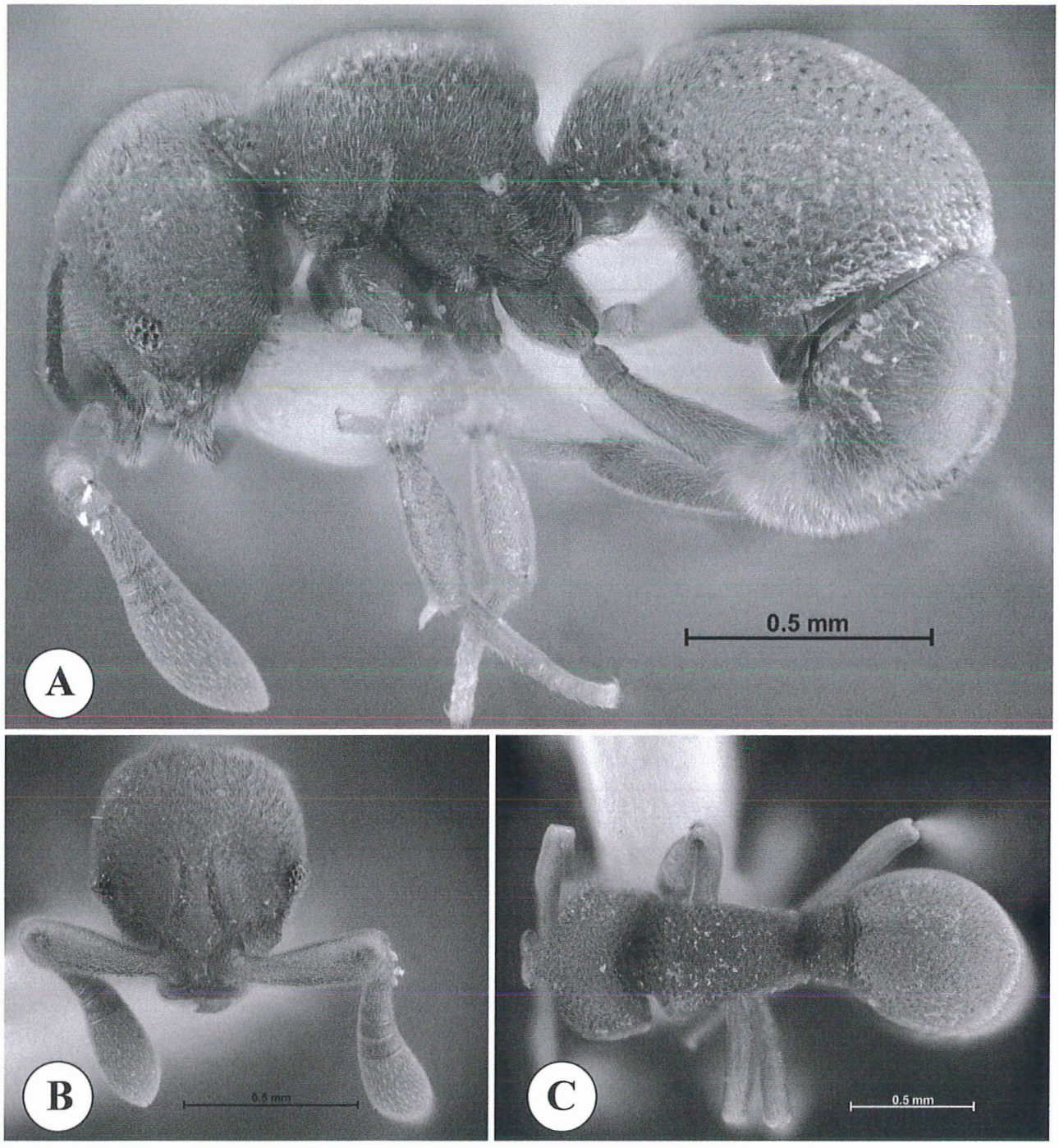


Figure 3. *Discothyrea kamiteta*, non-type worker. A, body in lateral view; B, head in frontal view; C, body in dorsal view.

with angulated sides. Frontal carinae widely spaced, extending posteriorly beyond level of posterior margin of eye. Antenna 9-segmented, with one segment club; scape relatively long, narrow at base and gradually swollen apically, reaching posterior margin of head; antennal segment II broader than each of III–IV, terminal segment (IX) slightly longer than III–VII combined. Anterior clypeal margin straight. Mandible triangular, masticatory margin edentate. Eye relatively large, with 25–30 ommatidia, located anterior to mid-length of head in lateral view. Mesosoma in lateral view stout, with roundly convex dorsal outline; posterodorsal corner of propodeum roundly convex, posterior margin of propodeum concave; declivity of propodeum shallowly concave; propodeal lobe large and round; mesopleuron not clearly demarcated from mesonotum but demarcated from metapleuron by shallow and narrow furrow. With waist in lateral view, petiolar node high, its anterior face steeply sloping down anteriorly. In dorsal view

petiole thick, broader than long and clearly separated from first gastral tergite by deep suture. Subpetiolar process low, its ventral outline roundly convex. Gastral tergite I larger than mesosoma and gastral tergite II, with roundly convex dorsal outline.

Head, mesosoma, petiole, and first gastral tergite densely and coarsely punctured, interspaces much smaller than puncture diameter, punctures on side of head, pronotum and first gaster tergite even larger. Remaining gastral segments densely, finely punctate. Body covered with dense white pubescence, and without standing hairs. Scapes and tibiae with dense decumbent pubescence. Body monotone, reddish brown, but gaster slightly paler than head and mesosoma; antenna and legs yellowish brown.

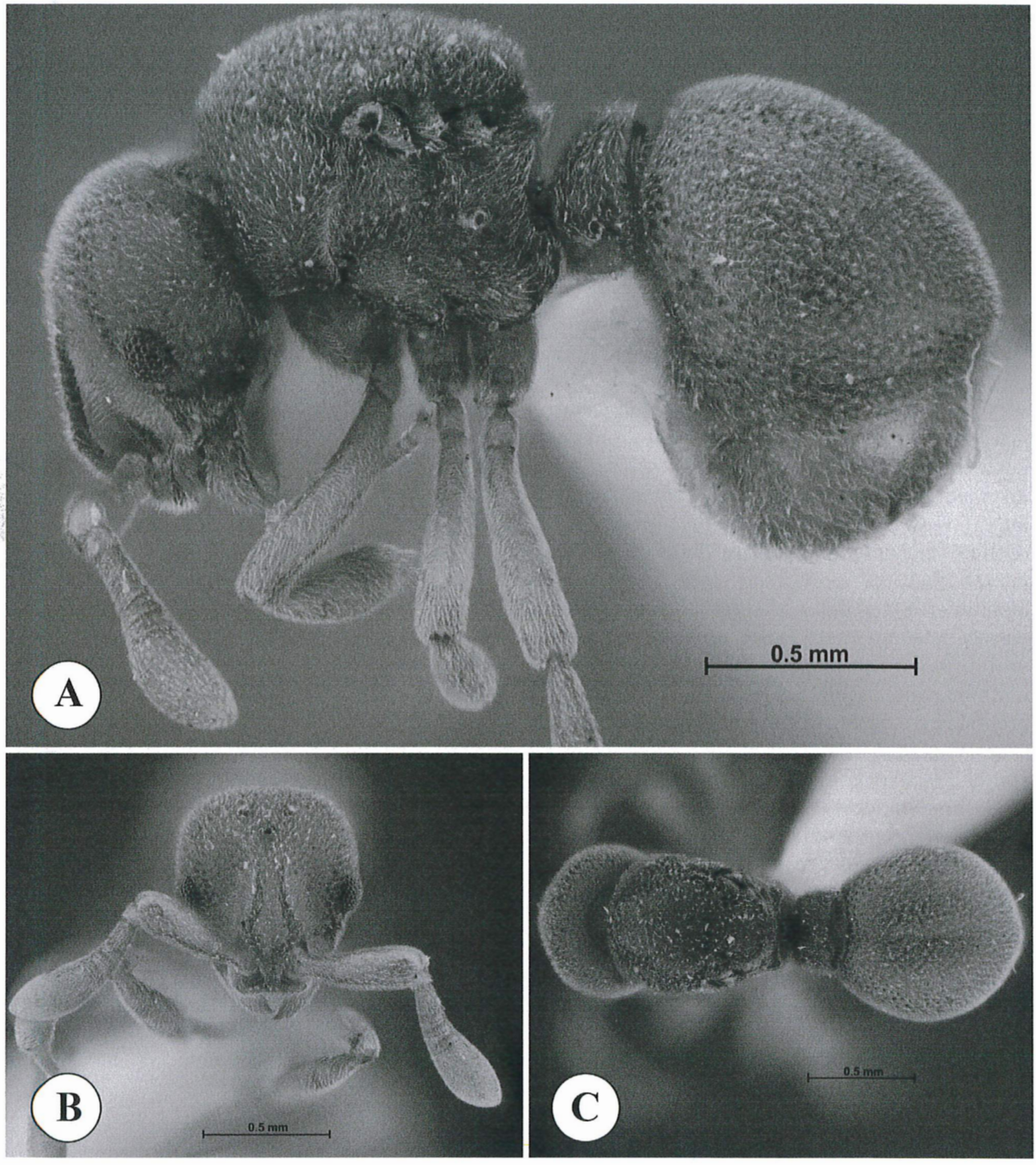


Figure 4. *Discothyrea kamiteta*, non-type queen. A, body in lateral view; B, head in frontal view; C, body in dorsal view.

Dealate queen description (Figure 4).

Measurements. Queen: TL 2.44; HW 0.53; HL 0.66; SL 0.43; ED 0.07; PW 0.43; MSL 0.56; PL 0.17; PH 0.36; DPW 0.26; CI 80; SI 81.25; LPI 220; DPI 160.

Head in full face view oval, longer than broad, much narrower anteriorly than posteriorly, with side roundly convex, posterior margin weakly convex, and posterolateral corner rounded. Frontal lobes wide with angulated sides. Frontal carinae widely spaced, extending posteriorly beyond level of posterior margin of eye. Antenna 9-segmented, with one segment club; scape relatively long, narrow at base and gradually swollen apically, reaching posterior margin of head; antennal segment II broader than each of segments III-IV, terminal segment (IX) slightly longer than III-VII combined. Anterior clypeal margin straight. Mandible subtriangular, its masticatory margin edentate. Eye relatively larger than that of worker, with ca. 40 ommatidia, located anterior to med-length of head in lateral view; ocelli present, located anterior to posterior margin of head; distances between anterior ocellus and lateral ocelli slightly shorter than distance between lateral ocelli. Mesosoma in lateral view stout, with weakly convex dorsal outline; mesopleuron clearly demarcated from lateral face of pronotum, mesoscutum, and metapleuron by distinct sutures; anepisternum clearly demarcated from katepisternum by shallow oblique mesopleural sulcus; metapleuron not demarcated from lateral face of propodeum; propodeum short, its posterodorsal corner sharply angled, posterior margin of propodeum feebly concave; propodeal lobe large and round. Mesosoma in dorsal view pronotum short, its anterior margin roundly convex, posterior margin strongly concave; mesoscutum large, slightly longer than broad, anterior margin strongly convex, posterior margin almost straight; mesoscutellum elliptical, clearly broader than long; metanotum very short. Petiole and gaster same as in worker.

Sculpturing and coloration same as in worker; pilosity denser and longer than in worker.

Habitat. *Discothyrea kamiteta* prefers primary forests, and nests in soil or rotting wood.

Distribution. Japan (Kubota and Terayama, 1999; Katayama 2013), China (Liu *et al.*, 2015), and Thailand (new record).

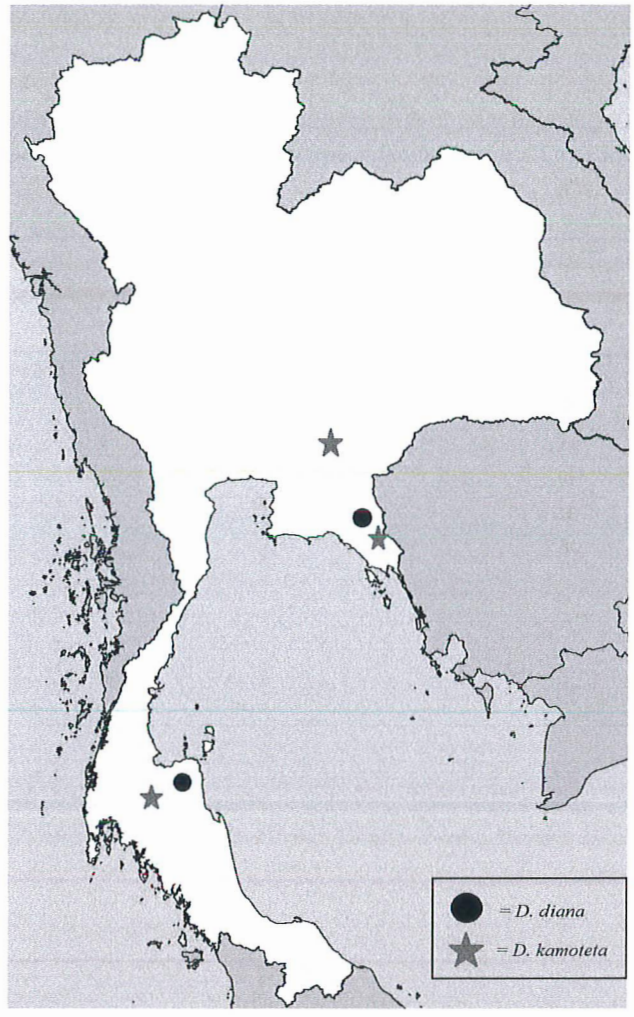


Figure 5. Distribution of *Discothyrea diana* and *Discothyrea kamiteta* in Thailand.

Remarks. *Discothyrea kamiteta* is most similar to *Discothyrea sauteri* Forel, 1912 from Taiwan in general appearance. However, it can be distinguished from D. sauteri by the following characteristics: 1) antenna with 9 segments (8 segments in *D. sauteri*); 2) eye size relatively larger than than in *D. sauteri*; 3) posterodorsal corner of propodeum roundly convex (almost right-angled in *D. sauteri*). However, the Thai specimens are relatively smaller than the type series (TL 2.11–2.21 mm, HW 0.40–0.56 mm in Thai specimens; TL 2.3 mm, HW 0.71 in the holotype).

Key to the Thai species based on worker caste

1. Frontal carina closely spaced and strongly narrowed posteriorly (figure 1B); antenna with 7 segments; eye small, with 5–6 ommatidia; petiole not clearly separated from gastral segment I (figure 1A–C); subpetiolar process large and subtriangular (figure A). ..... *D. diana*
- Frontal carina widely spaced or weakly narrowed posteriorly (figure 3C); antenna with 9 segments; eye large, with 25–30 ommatidia; petiole clearly separated from gastral segment I (figure 3A–C); subpetiolar process low, its ventral margin roundly convex (figure 3A). ..... *D. kamiteta*

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