

Three new species of the ant genus *Myopias* Roger, 1861 (Hymenoptera: Formicidae: Ponerinae) from Borneo

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Abstract. Forty-three species and two subspecies of the genus *Myopias* Roger, 1861 have been known from the Australian, Oceanian, Oriental, and southern Sino-Japanese realms. Among them, four species are known from Borneo. In this paper three new species are described from Sabah (East Malaysia), Borneo, based on the worker caste and dealate gyne: *Myopias etsukoae*, new species, *Myopias striaticeps*, new species, and *Myopias suwannaphaki*, new species. A key to the seven Bornean species based on the worker caste is provided.

Key words. distribution, Malaysia, *Myopias*, ponerine ant, taxonomy

INTRODUCTION

The genus *Myopias* Roger, 1861 was originally described from Sri Lanka by Roger (1861) with *Myopias amblyops* as the type species. The genus is in the subfamily Ponerinae Lepeletier de Saint-Fargeau, 1835, tribe Ponerini Lepeletier de Saint-Fargeau, 1835, *Odontomachus* Latreille, 1804 genus group (Schmidt & Shattuck, 2014). Currently, 43 valid species and two subspecies names are known (Jaitrong et al., 2018; Bolton, 2019). Twenty-eight species have been recorded from Southeast Asia including Taiwan and South China. Among them, four species: *Myopias breviloba* (Wheeler, 1919); *M. darioi* Probst & Boudinot in Probst et al., 2015; *M. maligna* (Smith, 1861); and *M. modiglianii* (Emery, 1900), are known from Borneo (Pfeiffer et al., 2011; AntWeb, 2019).

Myopias ants are generally rarely found, probably due to their cryptic nesting and foraging habits. They occur in a wide variety of wet to dry habitats, and from lowland to highland (Jaitrong et al., 2018). Colonies of *Myopias* are relatively small, with less than a hundred workers, and occur in rotten logs in rainforests or in the soil next to rocks in sclerophyll woodlands (Willey & Brown, 1983; Billen et al., 2013). An exception is *Myopias bidens*, with large colonies containing several hundred workers, and nesting in rotting wood in an advanced stage of decomposition (Jaitrong et al., 2018).

In September 2019, while examining ant specimens in the Seiki Yamane Collection, we found three undescribed species of this genus from Sabah (East Malaysia), Borneo, that are described herein as new to science.

MATERIAL AND METHODS

The holotypes and paratypes of *Myopias etsukoae*, new species, *Myopias striaticeps*, new species, and *Myopias suwannaphaki*, new species, are pin-mounted specimens. They were compared with the high-resolution images of syntypes, holotype, and paratypes of closely related species which are available on AntWeb (2019): *Myopias castaneicola* (Donisthorpe, 1938) – holotype, CASENT0902520, Papua, Kokoda; *Myopias chapmani* Willey & Brown, 1983 – paratype, CASENT0902533, Australia; *Myopias darioi* Probst & Boudinot, 2015 – holotype, CASENT0845705, Malaysia, Sabah, Maliau Basin; and *Myopias tenuis* (Emery, 1900) – cotype, CASENT0903925, N Guinea. Holotype (THNHM-I-00242) and paratypes (THNHM-I-00243 to THNHM-I-00244) of *Myopias minima* Jaitrong, Tasen & Guénard, 2018 were also examined.

Most morphological observations were made with a ZEISS Discovery V12 stereoscope. Multi-focused montage images were produced using NIS-Elements-D from a series of source images taken by a Nikon Digital Sight-R1i camera attached to a Nikon AZ100M stereoscope. Type specimens were measured for the body parts shown below using a micrometer (accurate to 0.01 mm). Holotypes of the three new species will be deposited in BORNEENSIS, Institute for Tropical Biology & Conservation, Universiti Malaysia Sabah (UMS), Sabah, Malaysia. Paratypes are deposited in Seiki Yamane Collection, Japan (SKYC); and the Natural History Museum of the National Science Museum, Thailand (THNHM).

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The abbreviations used for the measurements and indices are as follows:

- TL Total Length. Roughly measured from anterior margin of head (including mandible) to tip of metasoma in stretched specimens, excluding sting.
- HL Head Length. Length of head proper, excluding mandibles, measured in straight line from anterior clypeal margin to mid-point of a line drawn across posterior margin of head in full-face view.
- HW Head Width. Maximum width of head capsule measured in full-face view, excluding compound eyes.
- ED Eye Diameter. Maximum diameter of eye with head positioned in profile view such that anterior and posterior eye margins are in same plane of focus.
- SL Scape Length. Maximum straight length of antennal scape excluding basal constriction and condylar bulb, in medial view from scape base middle to scape apex.
- ML Mandibular Length. With head in full-face view, length of mandible measured along outer margin, as the chord distance from lateral insertion to mandible apex.
- PW Pronotal Width. Maximum width of pronotum measured in dorsal view.
- MSL Mesosomal Length (Weber's length). Diagonal length of mesosoma in profile, from the point at which pronotum meets cervical shield to posterior margin of metapleuron.
- PL Petiole Length. Measured from anterior margin to posteriormost point of petiolar tergite in profile view.
- PH Height of petiole in profile measured as the perpendicular distance from apex of anteroventral subpetiolar process to a line tangent to the dorsalmost point of node.
- DPW Dorsal Petiole Width. Maximum width of petiole in dorsal view.
- CI Cephalic Index. $HW \times 100 / HL$.
- SI Scape Index. $SL \times 100 / HW$.
- OI Ocular Index. $ED \times 100 / HW$.
- MI Mandibulo-cephalic Index. $ML \times 100 / HL$.
- LPI Lateral Petiole Index. $PH \times 100 / PL$.
- DPI Dorsal Petiole Index. $DPW \times 100 / PL$.

The general terminology of the worker ants follows Hölldobler and Wilson (1990), and Bolton (1994). For important characters of the worker in the genus *Myopias* used in this paper, see Willey and Brown (1983), Schmidt and Shattuck (2014), Probst et al. (2015), and Jaitrong et al. (2018).

TAXONOMY

Myopias etsukoae, new species (Fig. 1)

Types. **Holotype:** worker (BOR-JWY-01, UMS), East Malaysia, Borneo, Sabah, Danum Valley, 30 April 2000, coll. C. Brühl. **Paratypes:** nine workers (BOR-JWY-02 to

BOR-JWY-10, SKYC), and two workers (BOR-JWY-11 and BOR-JWY-12, THNHM), same locality as holotype.

Worker description (Fig. 1)

Measurements. **Holotype:** TL 4.92, HL 0.99, HW 0.86, SL 0.66, ED 0.20, ML 0.69, PW 0.69, MSL 1.45, PL 0.46, PH 0.56, DPW 0.43; CI 87, SI 77, OI 23, MI 70, LPI 121, DPI 93. **Paratypes** (n = 4): TL 4.85–4.92, HL 0.96–0.99, HW 0.83–0.86, SL 0.66–0.69, ED 0.17–0.20, ML 0.66–0.69, PW 0.66, MSL 1.39–1.42, PL 0.43–0.46, PH 0.50–0.56, DPW 0.40–0.43; CI 86–87, SI 77–84, OI 19–24, MI 69–70, LPI 115–123, DPI 92–100.

Head. In full-face view, head longer than broad (CI 86–87) (almost as long as broad when excluding median clypeal lobe), broader posteriorly, with sides convex and posterior margin almost straight; posterolateral corner of head roundly convex. Frontal lobe long, much longer than median clypeal lobe, slightly translucent. Median longitudinal frontal sulcus deep, extending near mid-length of head. Median clypeal lobe rectangular or weakly widened anteriorly, slightly broader than long, with a pair of diverging long lateral spines; its anterior margin shallowly convex, bearing minute median denticle. Mandible robustly linear and subfalcate, relatively short, and in profile down-curved; masticatory margin with four teeth, i.e., large basal tooth, large prebasal tooth, minute preapical tooth (denticle), and medium-sized apical tooth — the first three teeth are widely spaced, but preapical denticle is almost attached to the base of apical tooth; basal margin with well-defined protuberance. Eye relatively large, with ca. 20 ommatidia, located close to base of mandible; distance between mandibular base and anterior margin of eye almost as long as length of eye. Antennal scape robust and enlarged toward apex to approximate width of frontal lobe, reaching posterior margin of head; antennal segment II longer than broad and longer than each of segments III–VII; segments III–VII each broader than long; four apical segments forming a club.

Mesosoma. Stout, in profile with dorsal outline of promesonotum convex, sloping gradually to metanotal groove; promesonotal suture and metanotal groove distinct; mesopleuron clearly demarcated from metapleuron and mesonotum by shallow grooves composed of row of punctures, and divided into upper and lower portions by similar groove; metapleuron not demarcated from lateral face of propodeum; pronotum broader than mesonotum and propodeum in dorsal view. In profile view, propodeum relatively long and convex dorsal outline; junction roundly convex; declivity more or less flat.

Metasoma. Petiole in profile view subrectangular and sessile, higher than long, its anterior and posterior faces vertical, dorsal face weakly convex; in dorsal view petiolar node subrectangular, clearly broader than long (DPI 92–100), broader posteriorly; subpetiolar process well developed, subtriangular, with apex truncate and directed downward; anterior margin of subpetiolar process convex, while posterior margin almost straight and distinctively longer than the

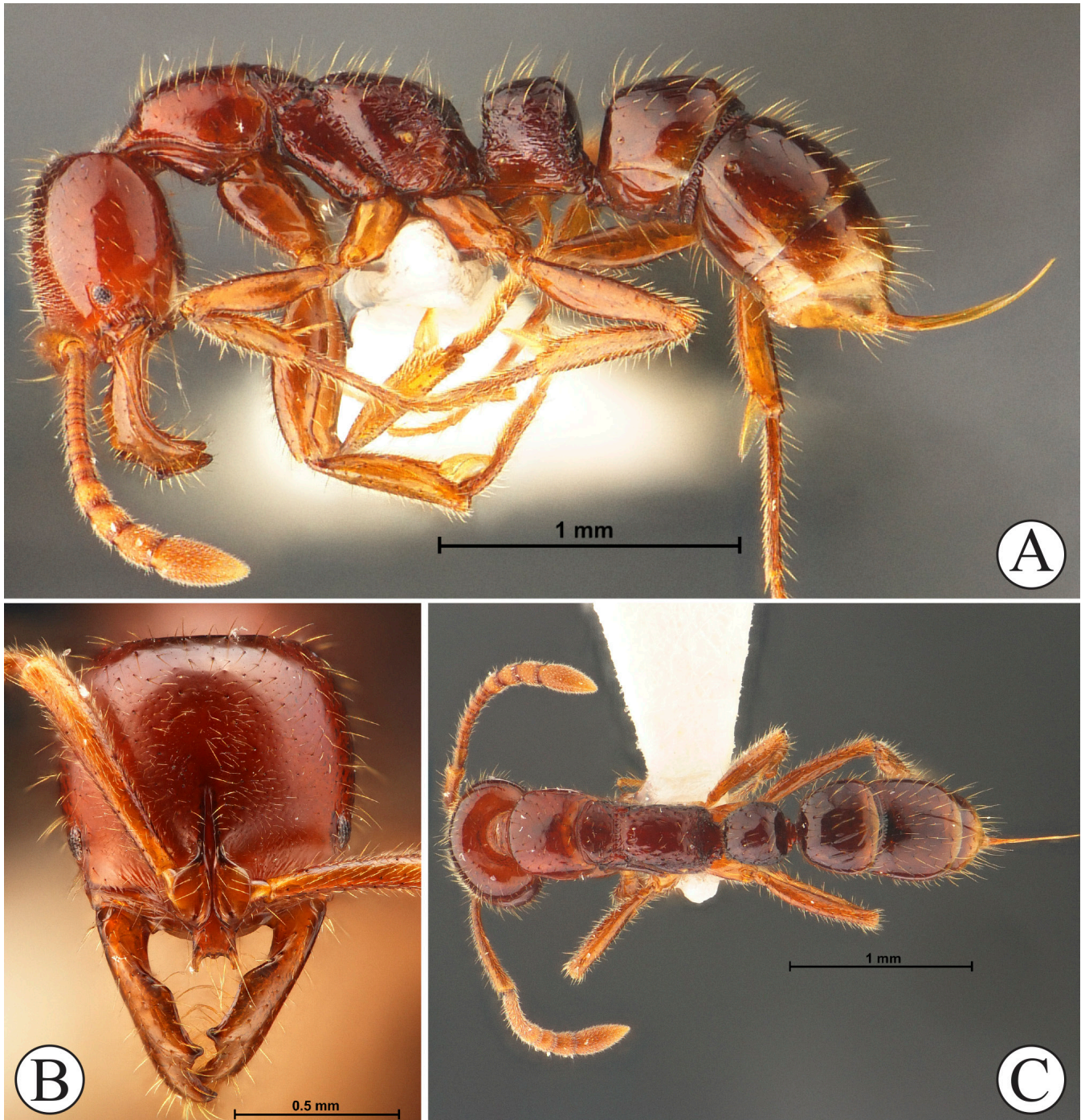


Fig. 1. *Myopias etsukoae*, new species, worker (holotype, BOR-JWY-01, UMS). A, body in profile view; B, head in full-face view; C, body in dorsal view.

former. Gaster (abdominal segments III–VII) elongate, in dorsal view, gastral segment I slightly narrower than II. Sting long, sharp and upcurved.

Dorsum of head punctate but interspaces smooth and shiny; lateral and ventral faces of head smooth and shiny. Pronotum and mesonotum smooth and shiny; mesopleuron largely smooth and shiny with sparse punctures in upper portion; metapleuron with smooth and shiny upper portion and irregularly striate lower portion; propodeum with shiny dorsum and irregularly striate lateral face. Lateral face of petiole irregularly striate, while dorsal face smooth and

shiny. Gaster smooth and shiny. Legs smooth and shiny. Dorsum of head with sparse long hairs mixed with dense shorter hairs; dorsa of mesosoma and metasoma with dense long hairs mixed with sparse short hairs; tip of metasoma with dense standing hairs; tibiae with sparse long erect hairs and dense appressed hairs. Body extensively reddish brown; head and pronotum paler than propodeum, petiole, and gastral segments I–II; mandible, antenna, and tip of gaster yellowish brown.

Etymology. The specific name is dedicated to Ms. Etsuko Yamane, who has supported our activity for a long period.

Habitat. Primary rainforest.

Distribution. Borneo (Sabah).

Remarks. *Myopias etsukoae*, new species, is most similar to *Myopias castaneicola* (Donisthorpe, 1938) from New Guinea in having a reddish brown body and deep metanotal groove. However, it can be separated from *M. castaneicola* by the following characteristics: 1) anterior margin of median clypeal lobe concave, its median portion with minute denticle (concave without minute tooth at median portion in *M. castaneicola*); 2) posterior margin of head almost straight (weakly concave in *M. castaneicola*); 3) lateral faces of propodeum and petiole strongly sculptured (smooth and shiny in *M. castaneicola*); 4) dorsal outline of propodeum weakly convex (almost straight in *M. castaneicola*).

***Myopias striaticeps*, new species**
(Figs. 2, 3)

Types. Holotype: worker (BOR-JWY-13, UMS), Borneo, East Malaysia, Sabah, Crocker Range N.P., Mahua Waterfall area, 4–5 November 2000, coll. Sk. Yamane. **Paratypes:** one gyne with same data as holotype (BOR-JWY-14, THNMH); one worker, Borneo, Kinabalu Park, Sayap Kinabalu (ca. 1,000 m alt.), 16 July 1996, coll. Sk. Yamane (BOR-JWY-15, SKYC).

Non-type material examined. One worker, Sabah, Kinabalu Park, Poring (550 m alt.), 17 March 1995, Sk. Yamane; one worker, same loc. (altitude unknown), 23 August 1997, Sk. Yamane; one worker, Sabah, Tawau Hills NP, 10 July 1996, Sk. Yamane; one worker, Sarawak, Lambir Hills NP, Tourist area, 20 January 1993, Sk. Yamane.

Worker description (Fig. 2)

Measurements. Holotype: TL 4.92, HL 0.99, HW 0.86, SL 0.66, ED 0.20, ML 0.69, PW 0.69, MSL 1.45, PL 0.46, PH 0.56, DPW 0.43; CI 87, SI 77, OI 23, MI 70, LPI 121, DPI 93. **Paratype:** TL 4.1, HL 1.08, HW 0.87, SL 0.73, EL 0.17, ML 0.65, PW 0.70, MSL 1.55, PL 0.46, PH 0.60, DPW 0.46; CI 81, SI 84, OI 20, MI 60, LPI 130, DPI 100.

Head. In full-face view, head clearly longer than broad (CI 81–87), subrectangular with sides weakly convex and posterior margin weakly concave; posterolateral corner of head bluntly angulate (note that the head is almost as long as broad if the anterior median lobe of the clypeus is excluded). Frontal lobe low, passing over lateral portion of anterior clypeal margin; frontal lobe slightly longer than median clypeal lobe. Median longitudinal frontal sulcus deep, extending slightly beyond $\frac{1}{3}$ of head length. Median lobe of clypeus subrectangular, slightly broader than long, its anterior margin distinctly concave to form roundly produced lateral corners. Mandible robustly linear and subfalcate, relatively long, down-curved in profile; masticatory margin with four teeth, i.e., large basal tooth, large prebasal tooth, minute preapical denticle, and sharp apical tooth (the first three are widely spaced, but preapical denticle is almost attached to the base of the apical tooth); basal margin with

well-defined protuberance. Eye relatively large, composed of ca. 15 ommatidia along longest axis, located close to base of mandible; distance between mandibular base and anterior margin of eye almost as long as length of eye. Antennal scape robust and gradually widened to its midlength where its width approximates width of frontal lobe, not reaching posterior margin of head; antennal segment II longer than broad and longer than each of segments III–VIII; segments III–VIII each shorter than broad; four apical segments forming club.

Mesosoma. Stout, in profile with dorsal outline of promesonotum weakly convex, sloping gradually to metanotal groove; promesonotal suture and metanotal groove distinct; mesopleuron clearly demarcated from metapleuron by shallow groove composed of chain of punctures and from mesonotum by more vague furrow, not clearly divided into upper and lower portions; metapleuron not demarcated from lateral face of propodeum, pronotum broader than mesonotum and propodeum in dorsal view. Propodeum in profile, weakly convex dorsal outline; junction obtusely angulate; declivity more or less flat.

Metasoma. Petiole in profile subrectangular and sessile, slightly higher than long, its anterior face vertical, dorsal and posterior faces weakly convex; in dorsal view, petiolar node subrectangular, slightly longer than broad (DPI 93), broader posteriorly; subpetiolar process well developed, in profile view subtriangular, apically truncate and directed downward; its anterior margin convex, while posterior margin weakly concave and distinctively longer than anterior margin. Gaster elongate, in dorsal view, gastral segment I slightly narrower than II. Sting long, sharp and upcurved.

Entire dorsum of head with irregular longitudinal striae; lateral and ventral faces of head smooth and shiny. Mesosomal dorsum entirely with irregular longitudinal striae; mesopleuron, metapleuron, and lateral face of propodeum striate from front to rear; lateral face of pronotum smooth and shiny; propodeal dorsum with longitudinal striation, and declivity with fine transverse striation. Petiole largely smooth and shiny. Gaster smooth and shiny. Legs predominantly smooth and shiny. Dorsum of head with sparse long hairs mixed with dense shorter hairs; dorsa of mesosoma and metasoma with dense long hairs mixed with sparse short hairs; tip of metasoma with dense standing hairs; tibiae with sparse suberect long hairs and dense appressed hairs. Dorsum of head dark brown, while its ventral face reddish brown; mesosoma entirely dark brown; petiole and gastral segments I–II dark brown; remaining gastral segments yellowish brown; mandible, antenna, and legs reddish brown.

Dealate gyne description (Fig. 3)

Measurements. Paratype (n = 1). TL 5.64, HL 1.06, HW 0.92, SL 0.69, ED 0.26, ML 0.69, PW 0.73, MSL 1.62, PL 0.46, PH 0.59, DPW 0.46, CI 88, SI 75, OI 29, MI 66, LPI 129, DPI 100.

Similar to the worker in structure, sculpture, pilosity, and colouration, with the following conditions that should be noted: body slightly larger; head in full-face view rectangular,

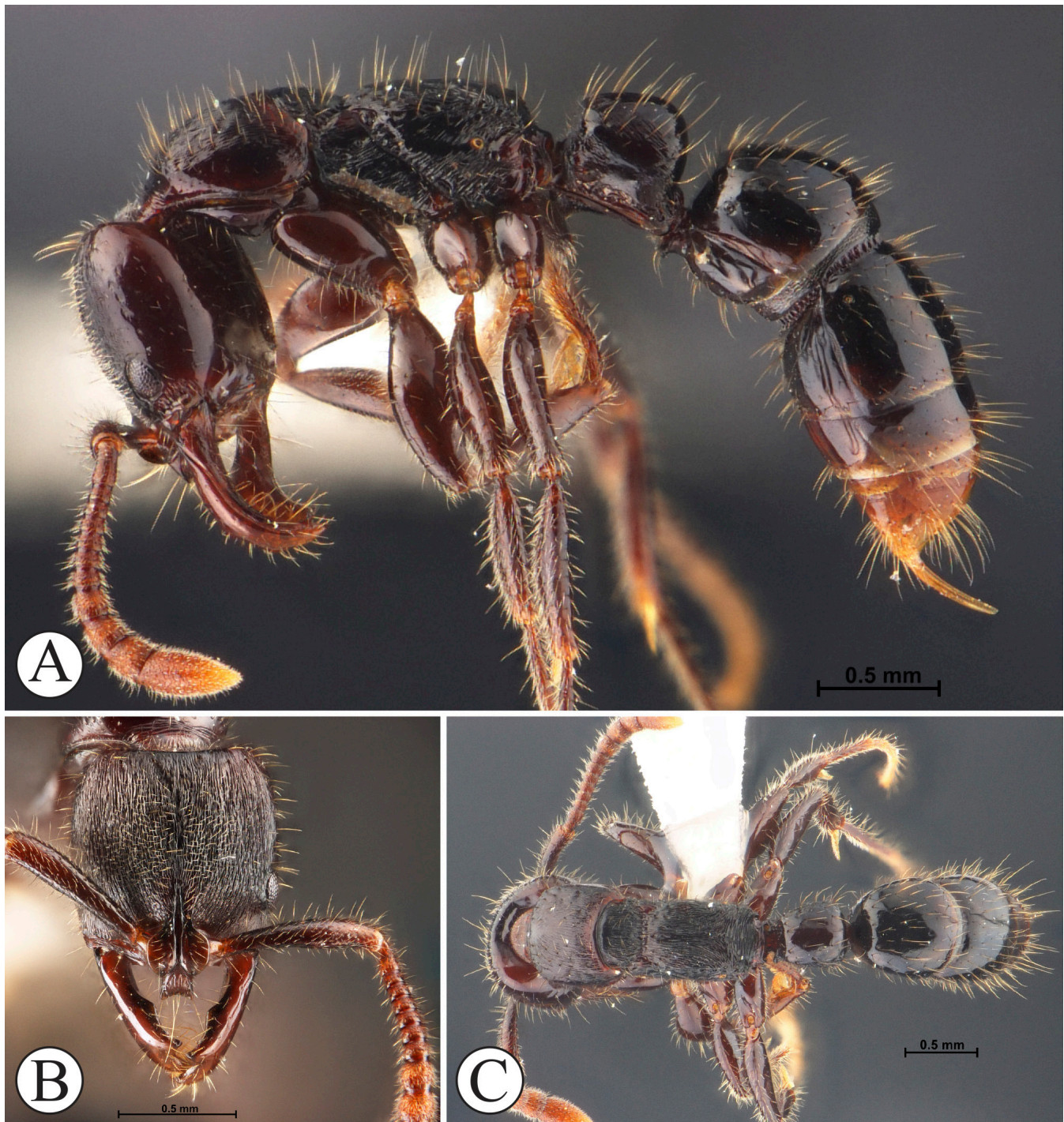


Fig. 2. *Myopias striaticeps*, new species, worker (holotype, BOR-JWY-13, UMS). A, body in profile view; B, head in full-face view; C, body in dorsal view.

with almost parallel sides and straight posterior margin; eye large, located close to the base of mandible; distance between eye and mandibular base much shorter than eye length; median ocellus as large as lateral ocellus in dorsal view, mesoscutum trapezoidal with slightly protruding anterior border; with mesosoma in profile, mesoscutum slightly bulged anteriorly and flattened caudad; parapsidal lines indistinct; scutellum oblong, clearly broader than long; metanotum short; metanotopropodeal sulcus deeply impressed; propodeum in profile with almost straight dorsal outline; propodeal junction roundly convex; petiole clearly shorter than high; gaster larger than in the worker.

Etymology. The specific name refers to the fine striation on the dorsum of the head.

Habitat. The type series was collected from highland primary forests (ca. 1,000 m a.s.l.).

Distribution. Borneo (Sabah and Sarawak).

Remarks. *Myopias striaticeps*, new species, is most similar to *M. philippinensis* (Menozzi, 1925) in having striae on the dorsa of the head and mesosoma. However, this species can be distinguished from the latter by the following characteristics



Fig. 3. *Myopias striaticeps*, new species, dealate gyne (paratype, BOR-JWY-14, THNHM). A, body in profile view; B, head in full-face view; C, body in dorsal view.



Fig. 4. *Myopias suwannaphaki*, new species, worker (holotype, BOR-JWY-16, UMS). A, body in profile view; B, head in full-face view; C, body in dorsal view.

in the worker caste: 1) propodeal junction obtusely angulate (roundly convex in *M. philippinensis*); 2) with mesosoma in dorsal view, posterior margin of mesonotum strongly convex (almost straight in *M. philippinensis*); 3) body entirely black to dark brown (reddish brown in *M. philippinensis*); and 4) dorsum of head entirely strongly striate (anteriormost portion punctate with weak striation in *M. philippinensis*). We examined four additional worker specimens that agree with the holotype in most characters. We omit these from the type series because they were collected from lowland forests, one in Lambir Hills National Park, Sarawak, and the other three from Poring, Sabah.

***Myopias suwannaphaki*, new species**
(Figs. 4, 5)

Types. **Holotype:** worker (BOR-JWY-16, UMS), East Malaysia, Borneo, Sabah, Maliau Basin, buffer zone, leaf litter, 270–300 m alt., 19 November 2011, coll. Sk. Yamane, SB11-SKY-39. **Paratypes:** seven workers (BOR-JWY-17

to BOR-JWY-23, SKYC), and two workers (BOR-JWY-24 and BOR-JWY-25, THNHM), same data as holotype; two dealate gynes (BOR-JWY-26, THNHM; and BOR-JWY-27, SKYC), same data as holotype.

Non-type material examined. Two workers, East Malaysia, Borneo, Sabah, Kinabalu Park, Poring (600 m alt.), 10 November 1996, coll. T. Kikuta; one worker, Danum Valley, 28 August 1995, coll. H. Okido.

Worker Description (Fig. 4)

Measurements. Holotype: TL 2.90, HL 0.59, HW 0.48, SL 0.40, ED 0.03, ML 0.36, PW 0.40, MSL 0.83, PL 0.23, PH 0.33, DPW 0.30; CI 81, SI 83, OI 7, MI 61, LPI 143, DPI 129. **Paratypes** (n = 5): TL 2.87–2.94, HL 0.56–0.63, HW 0.40–0.46, SL 0.36–0.40, ED 0.03–0.07, ML 0.33–0.40, PW 0.33–0.40, MSL 0.79–0.83, PL 0.23–0.26, PH 0.30–0.33, DPW 0.26–0.30; CI 67–78, SI 79–100, OI 7–14, MI 56–71, LPI 125–143, DPI 100–114.

Head. In full-face view, head clearly longer than broad (CI = 79–81) (longer than broad even excluding median clypeal lobe), subrectangular with sides weakly convex and posterior margin weakly concave; posterolateral corner of head bluntly angulate. Frontal lobe short, almost as long as median clypeal lobe, slightly translucent. Median longitudinal frontal sulcus deep, extending slightly beyond $\frac{1}{3}$ of head length. Median clypeal lobe narrow, clearly longer than broad, slightly broader anteriorly, its anterior margin weakly convex. Mandible robustly linear and subfalcate, relatively short, in profile view down-curved; masticatory margin with three teeth, i.e., large basal tooth, large prebasal tooth, and sharp apical tooth; basal margin entire. Eye very small, with ca. 4–5 ommatidia. Antennal scape robust and gradually widened toward apex to approximate width of frontal lobe, not reaching posterior margin of head; antennal segment II longer than broad and longer than each of segments III–VIII; segments III–VIII each shorter than broad; four apical segments forming a club.

Mesosoma. Stout, in profile, with weakly convex dorsal outline; mesonotum higher anteriorly than posteriorly, slightly higher than pronotum and propodeum; promesonotal suture distinct; metanotal groove indistinct or absent; mesopleuron clearly demarcated from metapleuron and mesonotum by shallow simple grooves; groove separating upper and lower portions of mesopleuron vestigial or absent; metapleuron not demarcated from lateral face of propodeum; pronotum in dorsal view slightly broader than mesonotum and propodeum; mesonotum about $\frac{2}{3}$ length of pronotum. Propodeum in profile with almost straight dorsal outline, sloping gradually to propodeal junction; junction obtusely angulate; posterior declivity more or less flat.

Metasoma. Petiole in profile view subrectangular and sessile, higher than long, its anterior face vertical, dorsal and posterior faces weakly convex; in dorsal view, petiolar node trapezoidal, slightly broader than long (DPI 100–129), broader posteriorly; subpetiolar process well developed, subtriangular, with apex truncate and directed downward; its anterior margin convex, while posterior margin almost straight and distinctively longer than the former. Gastral segments I to V elongate; in dorsal view, segment I slightly narrower than II. Sting long, sharp and upcurved.

Body extensively smooth and shiny; dorsum of head finely punctate; antennal scape and lateral face of propodeum at least partly striate; antennal club densely microsculptured and mat. Pilosity comparatively sparse; dorsa of head, mesosoma, and metasoma with sparse standing hairs mixed with dense shorter hairs; tip of metasoma with dense standing hairs; outer faces of tibiae with sparse suberect hairs and dense appressed hairs. Body entirely reddish brown to yellowish brown, mandibles and antennal scape darker than elsewhere.

Dealate gyne description (Fig. 5)

Measurements. Paratypes (n = 2): TL 3.04–3.07, HL 0.66–0.69, HW 0.50, SL 0.40–0.43, ED 0.10–0.13, ML 0.36, PW 0.40, MSL 0.89–0.92, PL 0.23–0.26, PH 0.33–0.36,

DPW 0.30–0.33, CI 71–75, SI 80–87, OI 20–27, MI 52–55, LPI 125–157, DPI 113–143.

Similar to the worker in structure, sculpture, pilosity, and colouration, with the following conditions that should be noted: body clearly larger; head in full-face view rectangular, with parallel sides and straight posterior margin; punctation on dorsum of head stronger than in the worker; eye large, almost as long as apical segment of antenna; distance between eye and mandibular base much shorter than eye length; median ocellus as large as lateral ocellus; pronotum in dorsal view much broader than long; mesoscutum in dorsal view trapezoidal, broader anteriorly with anterior margin roundly convex, margined laterally with carinae that are rather strong in posterior half; in profile, its anterior portion slightly bulged and flattened caudad; parapsidal lines indistinct; mesoscutellum oblong, clearly broader than long; metanotum very short; metanotopropodeal sulcus deeply impressed; dorsal outline of propodeum almost straight; propodeal junction nearly right-angled; striation around propodeal spiracle stronger than in the worker; petiole much shorter than high compared with the worker; gaster relatively larger than in the worker.

In one gyne entire body reddish brown, in the other mesosoma and petiole much paler than head and gaster; antenna and legs yellowish brown; area along posterior margin of pronotum dark brown.

Etymology. The specific name is dedicated to Mr. Kriangkrai Suwannaphak, who is a leading specialist in entomological sciences in Thailand and helped and inspired many young biologists.

Habitat. Edge of secondary forest.

Distribution. Borneo (Sabah).

Remarks. *Myopias suwannaphaki*, new species, is similar to *Myopias bidens* (Emery, 1900); *M. breviloba* (Wheeler, W.M., 1919); *M. chapmani* Willey & Brown, 1983; *M. darioi* Probst & Boudinot, 2015; *M. delta* Willey & Brown, 1983; *M. emeryi* (Forel, 1913); *M. julivora* Willey & Brown, 1983; *M. luoba* Xu, Z. & Liu, 2012; *M. mayri* (Donisthorpe, 1932); *M. minima* Jaitrong, Tasen & Guénard, 2018; and *M. tenuis* (Emery, 1900) in the following features: 1) body entirely smooth and shiny, and reddish to yellowish brown; 2) mesosoma with almost flat or weakly convex dorsal outline in profile view, with weak metanotal groove; 3) subpetiolar process subtriangular. *Myopias suwannaphaki* is most similar to *M. chapmani*, *M. darioi*, and *M. tenuis* in having a long and narrow median clypeal lobe with its anterior margin convex. However, *M. suwannaphaki* is easily separated from *M. darioi* by the size of eye in the worker caste (eye larger in *M. suwannaphaki*, with ca. 4–5 ommatidia; present but indistinct in *M. darioi*) and mandibular dentition (masticatory margin with three teeth in *M. suwannaphaki*; four teeth in *M. darioi*). *Myopias suwannaphaki* is separated from *M. chapmani* by a shorter



Fig. 5. *Myopias suwannaphaki*, new species, dealate gyne (paratype, BOR-JWY-26, THNHM). A, body in profile view; B, head in full-face view; C, body in dorsal view.

antennal scape, not reaching posterior margin of head in *M. suwannaphaki* (extending beyond posterior margin of head in *M. chapmani*), and the propodeum being extensively smooth and shiny in *M. suwannaphaki* (entirely reticulate in *M. chapmani*). *Myopias suwannaphaki* can be distinguished from *M. tenuis* by indistinct metanotal groove (sometimes even absent) in *M. suwannaphaki* (distinct in *M. tenuis*), and the petiolar node shorter than broad in *M. suwannaphaki* (as long as or slightly longer than broad in *M. tenuis*). Two specimens (CASENT0179634 and CASENT0179634-D01; images available on AntWeb), collected from Malaysia, Sabah, Maliau Basin, 4°49'49"N, 116°54'1"E, 21 November 2007, by Noel Tawatao (NT163) from litter in a rainforest with a Winkler bag, have been identified as *Myopias* my01. Images of these specimens agree well with the worker of *M. suwannaphaki* in having a long and narrow median clypeal lobe, with its anterior margin convex. Thus, these specimens (ANTWEB CASENT0179634 and CASENT0179634-D01) can be conspecific with *M. suwannaphaki*.

DISCUSSION

Currently seven species of the genus *Myopias* are known from Borneo including the three described in this paper. Among them four species (*M. darioi*, *M. etsukoe*, new species, *M. striaticeps*, new species, and *M. suwannaphaki*, new species) have so far been confined to Borneo (Sabah). The other three (*M. breviloba*, *M. maligna*, and *M. modiglianii*) are widely distributed in Southeast Asia (Probst et al., 2015; Jaitrong et al., 2018; AntWiki, 2020). *Myopias breviloba* and *M. modiglianii* were recorded from Sundaland and the Philippines, while *M. maligna* is distributed in Sundaland (Borneo, Sumatra, and southern Thailand) and Wallacea (Sulawesi). The new species inhabit primary rainforest and nest in rotting wood on the forest floor, the same as in all species found in Thailand, which were also collected from rotting wood and mostly found in primary forests (Jaitrong et al., 2018). Two species, *M. etsukoe* and *M. striaticeps*, inhabit lowland, while *M. striaticeps* can be found from lowland to highland.

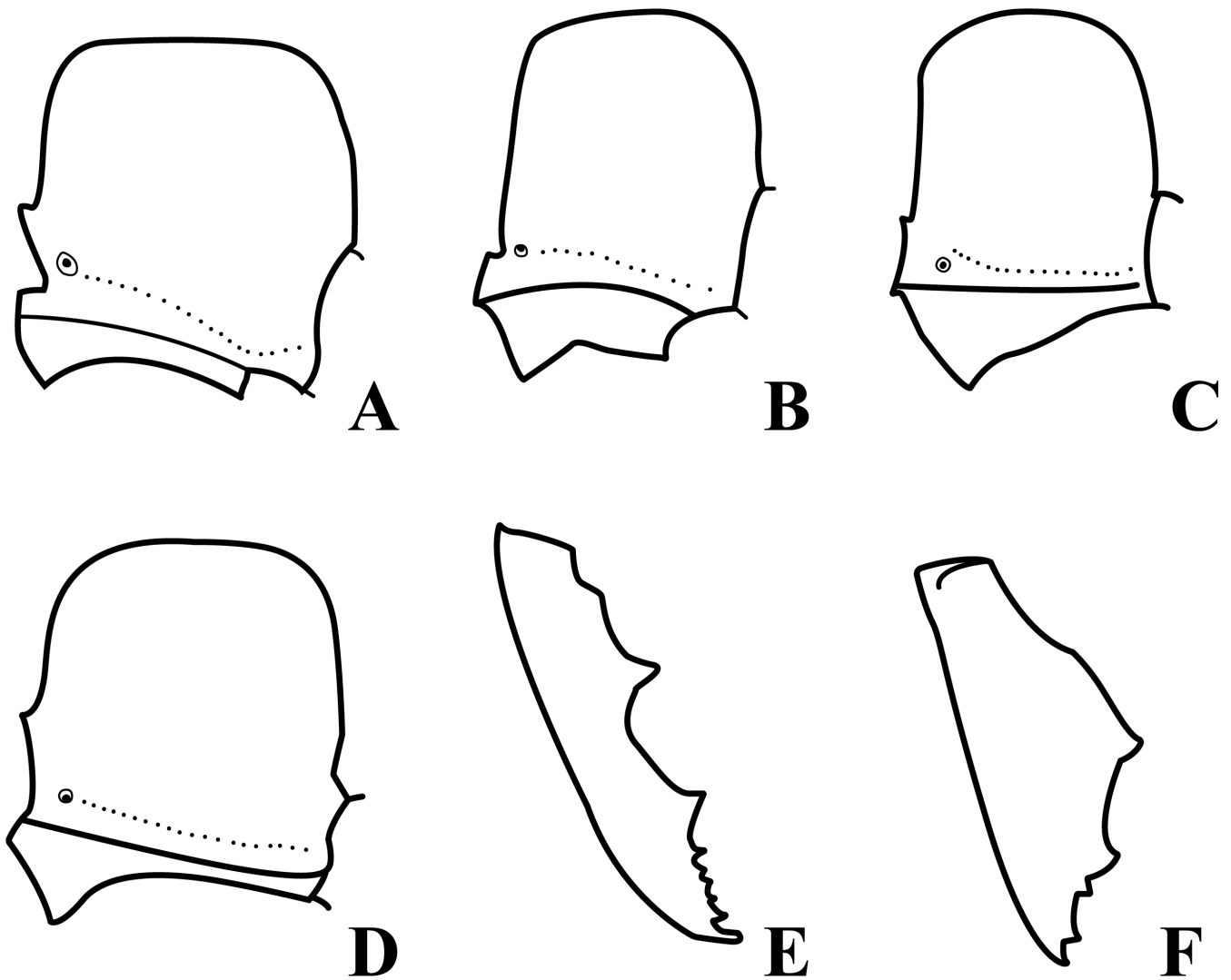


Fig. 6. Morphological characters used in the key. A–D, petiole in profile; E–F, shape and dentition of right mandible. A, E, *Myopias maligna*; B, F, *Myopias modiglianii*; C, *Myopias suwannaphaki*, new species; D, *Myopias etsukoe*, new species.

The mandibular dentition (Fig. 6E, F), the shape of the median clypeal lobe, the shape of the subpetiolar process (Fig. 6A–D), and the size of the eye are among the important characters used to distinguish the species group of the genus found in Borneo. These morphological characters were used by several authors who provided keys to species of the genus also in other areas (Xu et al., 2014; Probst et al., 2015; Jaitrong et al., 2018). The Bornean species can be divided into three species groups by the morphological characters mentioned above. **The first group** (*M. maligna*) is characterised by 1) masticatory margin of mandible with 7–8 teeth; 2) median clypeal lobe long and broad, its anterior margin almost straight; 3) subpetiolar process subrectangular, with its ventral margin concave; 4) eye relatively large (more than 10 ommatidia along longest axis). **The second group** (*M. modiglianii*) is characterised by 1) masticatory margin of mandible with five teeth; 2) median clypeal lobe short, its anterior margin convex; 3) subpetiolar process subrectangular, with its ventral margin concave; 4) eye relatively large (more than 10 ommatidia along longest axis). **The third group** (*M. breviloba*, *M. darioi*, *M. etsukoe*, new species, *M. striaticeps*, new species, and *M. suwannaphaki*,

new species) is separated from the former two groups by 1) masticatory margin of mandible with 4–5 teeth; 2) median clypeal lobe long, its anterior margin concave or straight; 3) subpetiolar process subtriangular; 4) eye absent or very small (0–6 ommatidia along longest axis). The genus is clearly monomorphic in the worker caste with a small size variation occurring within species. Thus, the body size can be a good indicator in separating apparently similar species, for example *M. maligna* (6.50–8.00 mm in total body length) from *M. modiglianii* (11.40–11.50 mm in total body length). The sculpturing and colour are also important for species identification.

Key to Bornean species based on worker caste

1. Subpetiolar process not triangular, usually complex in shape, with anteroventral corner bearing a ventrally pointed tooth, posteroventral corner bearing a posteriorly pointed tooth (Fig. 6A, B). Seen from dorsolateral view, masticatory margin of mandible with more than 4 teeth (Fig. 6E). Eye relatively large, with more than 10 ommatidia along longest axis.....2
- Subpetiolar process subtriangular, located anteroventrally, its apex truncate and pointed downward (Fig. 6C, D). Seen from

- dorsolateral view, masticatory margin of mandible with 3–4 teeth (subapical tooth often very difficult to see) (Fig. 6F). Eye reduced, with 0–6 ommatidia along longest axis.....3
2. Seen from dorsolateral view, masticatory margin of mandible with 7–8 teeth (Fig. 6E). With head in full-face view, posterolateral corner bluntly angulate. Anterior margin of median clypeal lobe almost straight. Larger species (TL 11.40–11.50 mm; HW 1.85–1.90 mm). *M. maligna*
- Seen from dorsolateral view, masticatory margin of mandibles with 5 teeth. With head in full-face view, posterolateral corners roundly convex. Anterior margin of median clypeal lobe convex. Smaller species (TL < 8.00 mm; HW < 1.50 mm) *M. modiglianii*
3. Dorsum of head with dense fine striation (Fig. 2B) *M. striaticeps*, new species
- Dorsum of head without fine striation (Figs. 1B, 4B)4
4. Anterior margin of median clypeal lobe concave5
- Anterior margin of median clypeal lobe straight or weakly convex6
5. Anterior margin of median clypeal lobe extensively concave, its median portion with minute tooth (denticle). Lateral face of petiole irregularly striate. In dorsal view, petiole almost as long as broad *M. etsukoae*, new species
- Anterior margin of median clypeal lobe weakly concave without minute tooth at median portion. Lateral face of petiole smooth and shiny. In dorsal view, petiole slightly longer than broad. *M. breviloba*
6. Median clypeal lobe almost as long as broad or slightly shorter than broad. With mesosoma in dorsal view, metanotal groove distinct *M. darioi*
- Median clypeal lobe narrow, clearly longer than broad. In dorsal view, petiole slightly broader than long. With mesosoma in dorsal view, metanotal groove indistinct or almost absent..... *M. suwannaphaki*, new species

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