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TWO NEW CAVE DWELLING SPECIES OF THE ANT GENUS *BRACHYPONERA* EMERY, 1900 (HYMENOPTERA: FORMICIDAE, PONERINAE) FROM THAILAND

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Summary. Two new species, *Brachyponera kumtongi* Duanchay et Jaitrong, **sp. n.** and *Brachyponera troglomorpha* Duanchay et Jaitrong, **sp. n.**, are described based on the worker caste from northern Thailand. These species were collected from caves in both twilight and dark zones. A key to the five Thai species based on the worker caste is provided.

Key words: cave ant, taxonomy, new species, key to species, South East Asia.

Т. Дуанчай, С. Буттахон, Н. Пинкаев, В. Ятронг. Два новых пещерных вида муравьев рода *Brachyponera* Emery, 1900 (Hymenoptera: Formicidae, Ponerinae) из Таиланда // Дальневосточный энтомолог. 2024. N 511. С. 1-12.

Резюме. По рабочим особям из северного Таиланда описаны два новых вида муравьев: *Brachyponera kumtongi* Duanchay et Jaitrong, **sp. n.** и *Brachyponera troglomorpha* Duanchay et Jaitrong, **sp. n.** Оба вида были собраны в

сумеречных и темных зонах пещер. Приводится определительная таблица рабочих особей пяти известных из Таиланда видов рода *Brachyponera*.

INTRODUCTION

An annotated list of 529 species and subspecies of ants known from Thailand has been published recently (Khachonpisitsak *et al.*, 2020). After that a few of the new species from this country were described (Jaitrong *et al.*, 2021a, 2021b, 2022; Jarernkong *et al.*, 2023; Phosrithong *et al.*, 2024).

Brachyponera Emery, 1900 is a small genus belonging to the *Odontomachus* genus group in the subfamily Ponerinae of the family Formicidae. The genus was established as a subgenus of *Euponera* (Emery, 1900). Most members of the genus are solitary epigeic generalist predators and scavengers (Teranishi, 1929; Matsuura & Nishida, 2002; Antwiki, 2024). *Brachyponera chinensis* (Emery, 1895) was accidentally introduced to the southeastern United States (Nelder *et al.*, 2006) and New Zealand (Schmidt & Shattuck, 2014). Nests of the genus *Brachyponera* were generally reported constructing under stones, in soil or rotting wood (Wilson, 1958; Lachaud & Déjean, 1994; Matsuura & Nishida, 2002; Yamane, 2007; Gotoh & Ito, 2008). Nests of the genus are apparently polyomous (Gotoh & Ito, 2008) and colonies average between 30 and 2,000 workers (Lachaud & Déjean, 1994; Gotoh & Ito, 2008). Some species were known as poisonous ants (in Japan: Fukuzawa *et al.*, 2002; in Korea: Cho *et al.*, 2002; in the United States: Nelder *et al.*, 2006). *Brachyponera* is natively distributed from Africa through southern Asia to Australia, with the peak diversity in Southeast Asia (Schmidt & Shattuck, 2014; Bolton, 2024). Recently, 18 valid species and five valid subspecies have been known in the genus (Bolton, 2024). Among them, 13 species were recorded in Southeast Asia. Khachonpisitsak *et al.* (2020) listed three species from Thailand, namely *B. chinensis* (Emery, 1895), *B. luteipes* (Mayr, 1862), and *B. nigrita* (Emery, 1895). Our recent examination of the cave ant specimens from Thailand revealed the presence of two new species of *Brachyponera*. A key to the Thai species of the genus *Brachyponera* based on the worker caste is given also.

MATERIAL AND METHODS

We examined *Brachyponera* specimens that are deposited in the Natural History Museum of the National Science Museum, Thailand (THNHM). The holotypes and paratypes of the new species were pin-mounted and compared with the high-resolution images of type specimens of the closely related species in Asia: *B. arcuata* (Karavaiev, 1925) (CASENT0915248, CASENT0916828, and CASENT0916829) and *B. jerdonii* (Forel, 1900) (CASENT0907282) which are available on Antweb (2024). Paratype workers of *B. batac* (Yamane, 2007), *B. flavipes* (Yamane, 2007), *B. pilidorsalis* (Yamane, 2007), and *B. wallacei* (Yamane, 2007) deposited in the Natural History Museum of the National Science Museum, Thailand (THNHM) were examined. The type series of the two new species are deposited in THNHM.

Most morphological observations were made with a ZEISS Discovery.V12 stereoscope. 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. Measurements were made using a micrometer attached to a ZEISS Discovery. V12 stereoscope. All measurements are expressed in millimeters to the nearest 0.01 mm.

The abbreviations used for the measurements and indices are as follows (see Sharaf *et al.*, 2011): **TL** – total length, the outstretched length of the ant from the mandibular apex to the gastral apex; **HW** – head width, the maximum width of the head behind the eyes in full face view; **HL** – head length, the maximum length of the head, excluding the mandibles; **SL** – scape length, excluding basal neck; **ED** – eye diameter, maximum diameter of eye with head positioned in profile such that anterior and posterior eye margins are in same plane of focus; **ML** – mesosoma length, the length of the mesosoma in lateral view, from the point at which the pronotum meets the cervical shield to the posterior base of the propodeal lobes or teeth; **MW** – mesosomal width, maximum width of promesonotum in dorsal view; **PL** – petiole length, the maximum length measured in dorsal view, from the anterior margin to the posterior margin; **PH** – petiole height, maximum height of petiole in profile (including subpetiolar process); **CI** – cephalic index ($HW \times 100/HL$); **OI** – ocular index ($ED \times 100/HW$); **SI** – scape index ($SL \times 100/HW$); **PI** – petiolar index ($PL \times 100/PH$).

TAXONOMY

Genus *Brachyponera* Emery, 1900

Brachyponera (as subgenus *Euponera*) Emery, 1900: 315. Type species: *Euponera* (*Brachyponera*) *croceicornis*, by monotypy.

Brachyponera (as subgenus *Euponera*): Emery, 1911: 83; Wheeler, 1922: 649.

Brachyponera: Bingham, 1903: 101; Wilson, 1958: 346; Schmidt & Shattuck, 2014: 77.

Pachycondyla (part.): Snelling, 1981: 389; Brown, in Bolton, 1994: 164.

DIAGNOSIS. Workers of *Brachyponera* can be distinguished from other ponerine genera by the following combination of characters: 1) mandible usually with basal pit (obsolete or vestigial in some species); 2) eye small and placed near mandibular insertions; 3) antenna 12-segmented; 4) metanotal groove deep; 5) propodeum located lower elevation than promesonotum and usually strongly narrowed dorsally; 6) propodeal spiracle small and round; 7) petiole squamiform; 8) prora absent from anterior margin of first gastral sternite; 9) gaster with only a slight girdling constriction; 10) metatibiae with two spurs (Schmidt & Shattuck, 2014).

In Southeast Asia, *Brachyponera* is most similar to the large size species of *Hypoponera*, but the latter lacks the mandibular pit, has a metatibial spur, and tend to be slightly smaller. *Brachyponera* is also similar to small size species of *Ectomomyrmex*, but *Brachyponera* can be separated from *Ectomomyrmex* by 1) body size tends to be smaller; 2) mesopleuron lacks a transverse groove (divided mesopleuron in *Ectomomyrmex*); 3) propodeum located lower in elevation than promesonotum and usually strongly narrowed dorsally (same level in *Ectomomyrmex*).

***Brachyponera kumtongi* Duanchay et Jaitrong, sp. n.**

<https://zoobank.org/NomenclaturalActs/EBE88190-5DBC-427E-98AC-3404E20CF5A7>

Fig. 1

TYPE MATERIAL. Holotype – worker (THNHM-I-00029078, THNHM), **Thailand:** Chiang Mai Province, Chiang Dao District, Chiang Dao Cave, 9.I 2023, W. Jaitrong leg., WJT090123-01. Paratypes: 14 workers (THNHM-I-00029079 to THNHM-I-00029092, THNHM), same data as holotype.

NON-TYPE MATERIAL EXAMINED. Sixteen workers (THNHM-I-00029093 to THNHM-I-00029104, THNHM-I-00029106 to THNHM-I-00029109), Thailand: Chiang Mai Province, Chiang Dao District, Chiang Dao Cave, 9.I 2023, W. Jaitrong leg., WJT090123-05; 19 workers (THNHM-I-00029110 to THNHM-I-00029128), same locality, date and collector, WJT090123-03; 4 workers (THNHM-I-00029135 to THNHM-I-00029138), same locality and collector, 3.I 2023, TH23-WJT-04; 5 workers (THNHM-I-00029143 to THNHM-I-00029145, THNHM-I-00029150 to THNHM-I-00029151), same locality, date and collector, WJT090123-04; 5 workers (THNHM-I-00029105, THNHM-I-00029139 to THNHM-I-00029142), same locality and collector, 10.I 2023, TH23-WJT-951; 4 workers (THNHM-I-00029129, THNHM-I-00029146 to THNHM-I-00029148), same locality and collector, 10.I 2023, TH23-WJT-954; 2 workers (THNHM-I-00029130 to THNHM-I-00029131), same locality and collector, 11.I 2023, TH23-WJT-959; 3 workers (THNHM-I-00029132 to THNHM-I-00029134), same locality and collector, 3.I 2023, TH23-WJT-05, 16 workers (THNHM-I-00029154, THNHM-I-00029157 to THNHM-I-00029169, THNHM-I-0002188 to THNHM-I-00029189), same locality, 3.X 2019, S. Jantarit leg., 9 workers (THNHM-I-00029174 to THNHM-I-00029182), Thailand: Nan Province, Chiang Dao District, Chiang Dao Cave, 19.V 2018, S. Jantarit leg.; 5 workers (THNHM-I-00029183 to THNHM-I-00029187); Thailand: Lamphun Province, La District, Luang Weang Keaw Cave, 13.V 2018, S. Jantarit leg.; 4 workers (THNHM-I-00029170 to THNHM-I-00029173), Thailand: Lamphun Province, La District, Luang Weang Keaw Cave, 12.V 2018, S. Jantarit leg.; 2 workers (THNHM-I-00029155 to THNHM-I-00029156), Thailand: Tak Province, Umphang District, Husi Lapoo Cave, 6.III 2019, S. Jantarit leg.

DESCRIPTION. Worker. Medium size (head width 0.78–0.90 mm); body reddish brown; eye very small, with 6–7 ommatidia (with 2–3 ommatidia along longest axis); mandible with basal pit; antennal scape relatively short compared with head width (SI 106–126); promesonotum distinctly convex to form a dome; propodeum in profile extremely located lower than promesonotum, long, its dorsal outline weakly convex; in profile propodeal dorsum longer than length of propodeal declivity; body finely micropunctate and covered densely with gray pubescence mixed with sparse short brown erect hairs.

Head: in full-face view, distinctly longer than broad, broadened medially; lateral margin weakly convex; posterior margin almost straight; posterolateral corner of head roundly convex. Mandible subtriangular and with basal pit; masticatory margin with six teeth, including largest apical tooth, followed by five large teeth; basal margin

sinuate. Clypeus in full-face view broad and convex medially, shorter than broad, its anterior margin entirely convex but feebly concave medially. Antennal scape long, when folded back in full-face view extending beyond posterolateral corner of head; antennal segment II almost as long as broad; segments III–VI each shorter than II but almost as long as broad; segment XII as long as segments X+XI. Frontal carina in full-face view distinct, reaching anterior to mid-length of head. Frontal lobe broad, outer margin roundly convex, coving antennal socket. Eye in profile located close to mandibular base, round, relatively small compared with maximum width of antennal scape, with 6–7 ommatidia (2–3 ommatidia along longest axis).



Fig 1. *Brachyponera kumthongi* Duanchay et Jaitrong, sp. n., holotype worker (THNHM-I-00029078, THNHM). A – body in profile view; B – head in full-face view; C – body in dorsal view.

Mesosoma: in profile promesonotum distinctly convex to form a dome; in dorsal view, pronotum almost as long as broad and clearly broader than mesonotum and propodeum; mesopleuron in profile clearly shorter than high, clearly demarcated from

metapleuron by deep suture; metapleuron not clearly demarcated from lateral face of propodeum. Propodeum in profile located extremely lower than promesonotum, long, its dorsal outline weakly convex; propodeal dorsum in profile round into propodeal declivity; in profile propodeal dorsum longer than length of propodeal declivity; propodeal declivity shallowly concave.

Petiole sessile; in profile petiolar node subtriangular, shorter than high, its anterior face weakly convex, while posterior somewhat flat; petiolar height distinctly twice as long as length of propodeal dorsum.

Body entirely finely micropunctate, except for mesopleuron smooth and shiny; procopa smooth and shiny; other parts of legs and antenna finely micropunctate; mandible somewhat smooth except for hair pits. Body entirely covered with short gray pubescence. Dorsal side of head, mesosoma, petiole and gaster with sparse short erect hairs; propodeal dorsum usually without erect hairs (present in some paratypes but if present then shorter than those on head and pronotum). Antenna and legs with dense short suberect hairs. Body reddish brown to dark brown. Antennal scape reddish brown, flagellum of antenna yellowish brown. Mandible reddish. Legs yellowish brown.

MEASUREMENTS AND INDICES. Holotype: TL 3.51, ED 0.07, HL 0.97, HW 0.80, SL 0.85, ML 1.30, MW 0.60, PL 0.31, PH 0.70, CI 82, OI 9, SI 106, PI 44. Paratypes (n = 10). TL 3.51–4.69, ED 0.07–0.10, HL 0.69–1.10, HW 0.78–0.90, SL 0.85–1.00, ML 1.29–1.45, MW 0.55–0.65, PL 0.31–0.41, PH 0.62–0.70, CI 75–92, OI 9–13, SI 106–126, PI 44–63.

DIAGNOSIS. New species is most similar to *Brachyponera arcuata* (Karavaiev, 1925) from Indonesia in having a reddish-brown body. However, new species can be easily separated from *B. arcuata* by 1) head slightly longer than broad (almost as long as broad in *B. arcuata*); 2) eye small, with 2–3 ommatidia along longest axis (eye relatively larger, with 6–7 ommatidia along longest axis in *B. arcuata*); 3) with sparse erect hairs on dorsa of head, mesosoma, and gastral tergite I (without erect hairs in *B. arcuata*); 4) in profile propodeal dorsum weakly convex (distinctly convex in *B. arcuate*, see figs. 1A and 3A for comparison). *B. kumtongi* sp. n. is similar to *B. jerdonii* (Forel, 1900) in general appearance. However, it can be distinguished from the latter by 1) eye small, with 2–3 ommatidia along longest axis (eye relatively larger, with about 10 ommatidia along longest axis in *B. jerdonii*); 2) antennal scape relatively longer (SI 106–126 in new species vs. SI 88 in *B. jerdonii*). *Brachyponera kumtongi* sp. n. is also similar to *B. troglomorpha* sp. n. in having a reddish-brown body but former can be easily separated from latter species by 1) eye with 2–3 ommatidia along longest axis (7–8 ommatidia in *B. troglomorpha*); 2) body color slightly darker (see figs 1 and 2 for comparison); 3) antennal scape with dense short suberect hairs (without erect hairs in *B. troglomorpha*); 4) propodeal dorsum longer than length of propodeal declivity (shorter in *B. troglomorpha*); 5) metapleuron micropunctate (smooth and shiny in *B. troglomorpha*).

HABITAT. This species is known only in caves in northern Thailand. We found workers in both twilight and dark zones. Nests were found in soil or under stones on the cave floor. Ant crickets (*Myrmecophilus* Berthold, 1827) were found together with foraging workers of the new species.

DISTRIBUTION. Chiang Mai, Lamphun, Nan, and Tak Provinces (Fig. 4).

ETYMOLOGY. The specific name is dedicated to Mr. Pornarin Kumtong (Head of Doi Chiang Dao Wildlife Sanctuary, Thailand), who supported W. Jaitrong for his field survey in northern Thailand.

***Brachyponera troglomorpha* Duanchay et Jaitrong, sp. n.**

<https://zoobank.org/NomenclaturalActs/71D26A37-2C8A-49F2-AB92-12CA7F3E7C3A>

Fig. 2

TYPE MATERIAL. Holotype – worker (THNHM-I-00029190, THNHM), **Thailand**: Nan Province, Muang District, Pha Sing Subdistrict, Ban Pha Tup, Bow Nam Thip Cave, 19.V 2018, S. Jantarit leg., SJ190518-01. Paratypes: 4 workers (THNHM-I-00029191 to THNHM-I-00029194), same data as holotype.

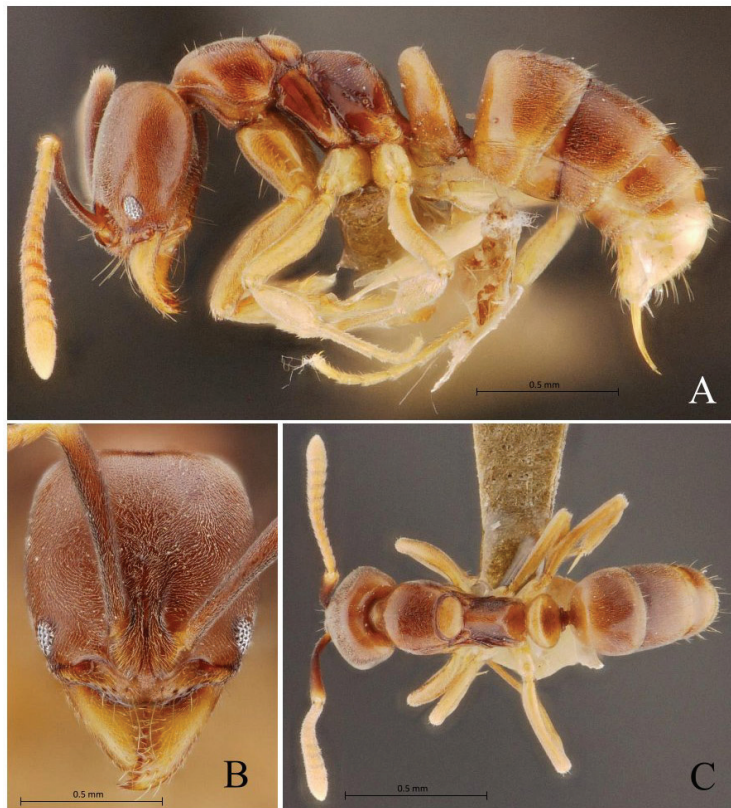


Fig 2. *Brachyponera troglomorpha* Duanchay et Jaitrong, sp. n., holotype worker (THNHM-I-00029190, THNHM). A – body in profile view; B – head in full-face view; C – body in dorsal view.

DESCRIPTION. Worker. Medium size (head width 0.74–0.78 mm); body reddish brown; eye large, with 31–33 ommatidia (with 7–8 ommatidia along longest axis); mandible with basal pit; antennal scape relatively short compared with head width (SI 93–100); promesonotum distinctly convex to form a dome; propodeum in profile extremely located lower than promesonotum, straight, short, slightly shorter than length of propodeal declivity; body entirely superficially micropunctate and covered with short white pubescence mixed with sparse short erect hairs.

Head: in full-face view, longer than broad, broadened medially; lateral margin weakly convex; posterior margin almost straight; posterolateral corner of head roundly convex. Mandibles subtriangular and with basal pit; masticatory margin with large apical tooth followed by a series of seven distinct teeth of gradually reducing size to basal tooth. Clypeus broad its anterior margin roundly convex. Antenna scape relatively short compared with head width, when folded back in full-face view slightly extending beyond posterior margin of head; antennal segment II slightly longer broad; segments III–VII each almost as long as broad; segment XII slightly longer than X+XI. Frontal carinae in full-face view distinct, reaching anterior to medlength of head. Frontal lobe broad, flat, its outer margin distinct convex, coving antennal socket. Eye in profile located close to mandibular base, round, relatively large compared with maximum width of antennal scape, weakly convex, ca. 31–33 ommatidia (with 7–8 ommatidia along longest axis); in full-face view, outer margin of eye reaching lateral margin of head.

Mesosoma: in profile promesonotum distinctly convex to form a dome; in dorsal view, pronotum almost as long as broad and clearly broader than mesonotum and propodeum; mesopleuron clearly shorter than high, clearly demarcated from pronotum, mesonotum, and metapleuron by deep suture; metapleuron not clearly demarcated from lateral face of propodeum. Propodeum in profile located extremely lower than promesonotum, its dorsal outline almost straight and shorter than length of propodeal declivity; propodeal dorsum round into propodeal declivity; propodeal declivity shallowly concave.

Petiole sessile; in profile petiolar node subtriangular, clearly shorter than high, its anterior face weakly convex, while posterior face flat; petiolar height $\geq$ twice as long as length of propodeal dorsum.

Body entirely finely superficially micropunctate, except for mesopleuron and metapleuron smooth and shiny; antenna and legs micropunctate; mandible rather smooth and shiny. Antennal scape and legs shiny.

Body entirely covered with short white pubescence mixed with sparse short erect hairs; erect hairs on propodeal dorsum and petiole absent. Antenna and legs without erect hairs. Body entirely yellowish brown. Antennal scape yellowish brown to reddish brown, flagellum of antenna yellowish brown. Legs yellow.

MEASUREMENTS AND INDICES. Holotype: TL 3.69, ED 0.12, HL 0.84, HW 0.74, SL 0.69, ML 1.02, MW 0.53, PL 0.25, PH 0.52, CI 88, OI 16, SI 133, PI 48. Paratypes (n = 4): TL 3.61–4.00, ED 0.10–0.14, HL 0.80–0.90, HW 0.74–0.78, SL 0.69–0.78, ML 1.02–1.15, MW 0.50–0.59, PL 0.24–0.25, PH 0.52–0.62, CI 87–96, OI 14–18, SI 93–100, PI 40–48.

DIAGNOSIS. *Brachyponera troglomorpha* sp. n. is most similar to *B. kumtongi* sp. n. in having a reddish-brown body and a dome-like promesonotum when seen in profile. See “remarks” under *B. kumtongi*. This new species is also similar to *B. jerdonii* and *B. arcuata* in general appearance that they share the large eye (with over 7 ommatidia along longest axis) and reddish-brown body. However, it can be distinguished from the latter two by propodeal dorsum almost straight, shorter than length of propodeal declivity (weakly to distinctly convex, almost as long as or longer than length of propodeal declivity in the latter two). The eye of *B. troglomorpha* sp. n. is smaller than that of *B. jerdonii* (with 7–8 ommatidia along longest

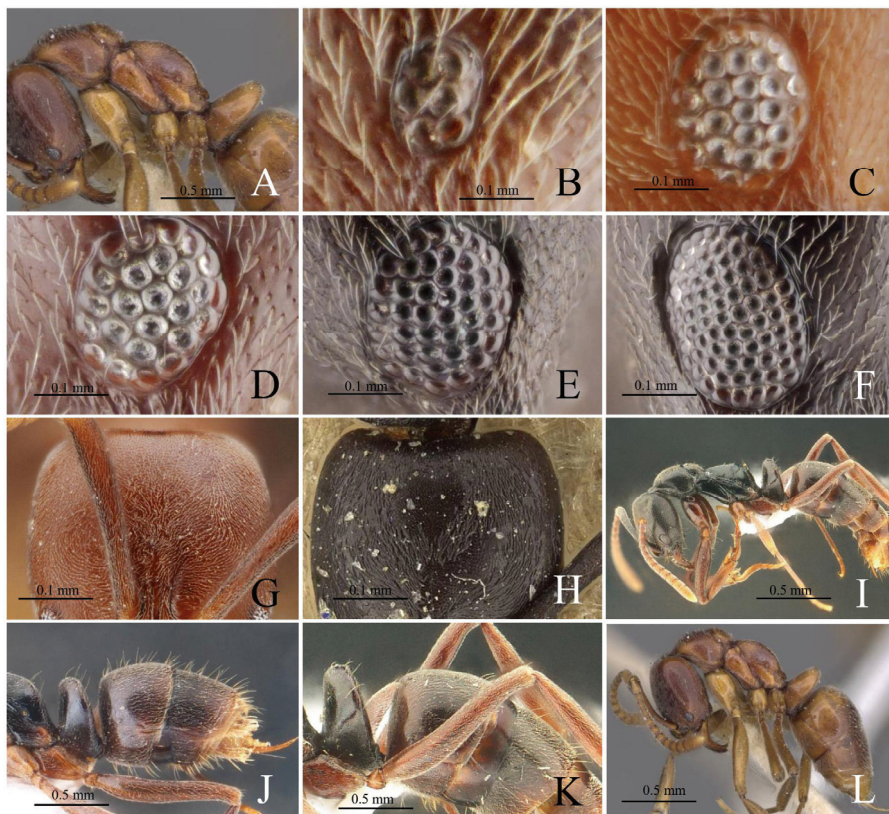


Fig 3. *Brachyponera* spp., workers. A, L – *Brachyponera arcuata* (holotype, CASENT 0915248); B – *B. kumtongi* sp. n. (holotype, THNHM-I-00029078); C, G – *B. troglomorpha* sp. n. (holotype, THNHM-I-00029190); D – *B. luteipes* (holotype, CASENT0915672); E – *B. chinensis* (holotype, CASENT0902494); F, K – *B. nigrita* (holotype, CASENT0903936); H, I – *B. luteipes* (holotype, CASENT0915672); J – *B. chinensis* (holotype, CASENT0902494). A, I, L – body in profile; B, C, D, E, F – eye in profile; G, H – head in full-face view, showing posterior margin; J, K – gaster in profile, showing condition of erect hairs.

axis in *B. troglomorpha*; ca. 9–10 ommatidia along longest axis in *B. jerdonii*). The new species is easily distinguished from *B. arcuata* by 1) head, pronotum, and gastral tergite with short erect hairs (clearly absent in *B. arcuata*); 2) frontal carina relatively long, reaching anterior to medlength of head (short, reaching level posterior margin of eye in *B. arcuata*); 3) body colour paler (darker in *B. arcuata*, see Figs. 2A and 3L for comparison).

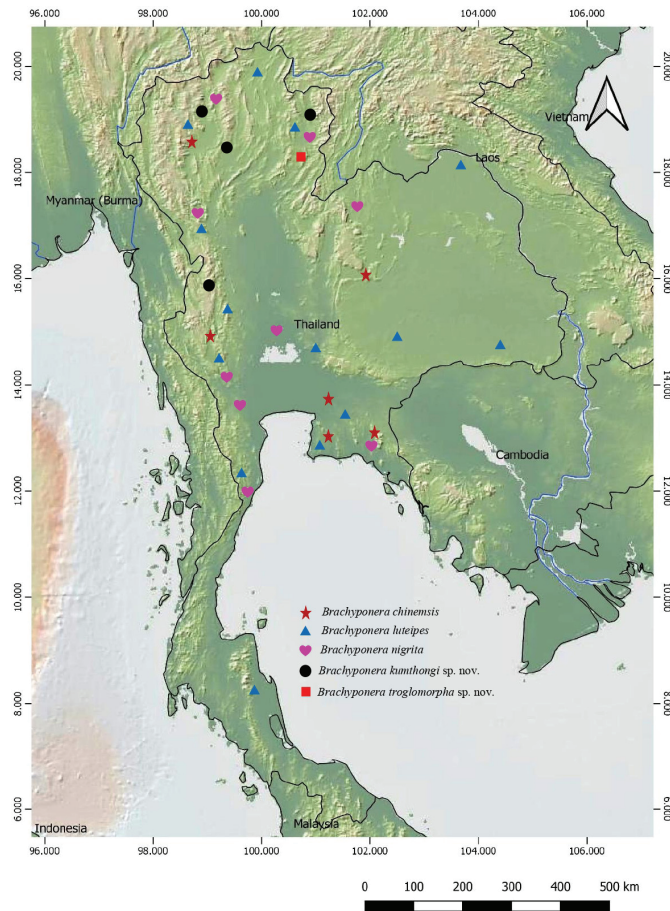


Fig 4. Distributions of *Brachyponera* spp. in Thailand.

HABITAT. This new species was collected from a cave in northern Thailand. The workers were working on the ground at dark zone of the cave.

DISTRIBUTION. Nan Province (Fig. 4).

ETYMOLOGY. The specific name refers to a unique element of subterranean life, like continual darkness.

Key to the Thai species of *Brachyponera* based on worker caste

1. Eye very small, present as a dot, with 2–3 ommatidia along longest axis (Fig. 3B)
 *B. kumtongi* sp. n.
- Eye medium to large sizes, with over 6 ommatidia along longest axis (Figs. 3C–F) 2
2. Eye with 7–8 ommatidia along longest axis; antennal scape short, when folded back in full-face view reach or just slightly extending beyond posterior margin of head (SI 93–100) 3
- Eye with 10–12 ommatidia along longest axis (Figs. 3E and 4F); antennal scape long, when folded back in full-face view distinctly extending beyond posterior margin of head (SI 100–136) 4
3. Head in full-face view with dense fine micropunctures (Fig. 3G); body yellowish brown to reddish brown (Fig. 2A); posterior margin of head almost straight (Fig. 3G).
 *B. troglomorpha* sp. n.
- Head in full-face view with dense irregular striations (fig. 3H); body black to dark brown; (Fig. 3I); posterior margin of head concave (Fig. 3H) *B. luteipes* (Mayr, 1862)
4. First gastral tergite with over 10 erect hairs (Fig. 3J); smaller species (HW 0.72–0.83 mm)
 *B. chinensis* (Emery, 1895)
- First gastral tergite with 3–4 erect hairs (Fig. 3K); larger species (HW 0.95–1.06 mm)
 *B. nigrita* (Emery, 1895)

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