

# The Ant Genus *Temnothorax* Mayr, 1861 (Formicidae: Myrmicinae) in Thailand, with a Description of a New Species

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**ABSTRACT.**— *Temnothorax* Mayr, 1861, a large ant genus with 502 valid species, 33 valid subspecies, and one valid fossil species (including the new species), is predominantly found in temperate regions of the Old and New Worlds. The genus is represented in Thailand by two named species: *Temnothorax barrettoi* Hamer & Guénard, 2023, and *T. sirindhornae* Phosrithong, Ignatius & Samung, sp. nov. Herein, *Temnothorax sirindhornae* sp. nov. is described based on worker and dealate queen castes from the highlands of western Thailand, and *T. barrettoi* is newly recorded from the country's lowlands. Notably, both species nest in dead twigs on trees.

**KEYWORDS:** distribution, Taksin Maharat National Park, taxonomy, Western Thailand

## INTRODUCTION

The ant genus *Temnothorax* was established by Mayr in 1861, with *Myrmica recedens* Nylander, 1856, as the type species. To date, 501 valid species, 33 subspecies and one fossil species of the genus have been recorded (Bolton, 2025). The genus exhibits a primarily Holarctic distribution, with the majority of species found in Europe (Csósz et al., 2024). The genus is also abundant in northern neotropical regions while being less prevalent in the Afrotropical region. Members of this genus inhabit a wide range of habitats from lowlands to high elevations up to 4,000 meters (Prebus, 2017), where they are generally found in narrow rock crevices (Seifert, 2018), dead branches, and leaf litter (Prebus et al., 2024). All members are associated mostly with moderately humid to arid deciduous forests or Mediterranean bushes (Salata et al., 2023). However, most species have adapted well in harsh habitats such as deserts as well as urban habitats (Satizabal et al., 2025). *Temnothorax* colonies are typically small, often consisting of fewer than 100 workers (Beckers et al., 1989; Prebus, 2015). However, colony sizes can reach up to approximately 1,300 individuals in some species (Bengston and Dornhaus, 2015).

Recently, more of *Temnothorax* have been documented in temperate and montane zones of Asia. In southern Asia, the genus has been extensively studied in India, particularly in the Himalayan regions, resulting in 13 described species (Bharti, 2011; Bharti et al., 2012; Schulz, 1997; Yusupov et al., 2020a). Three species are recorded from central Nepal (Subedi et al., 2023), and four from Pakistan. Notably, two species previously known only from India have also been found in Pakistan (Yusupov et al., 2020b).

A recent taxonomic review of the genera *Leptothorax* Mayr, 1855 and *Temnothorax* in eastern Asia has updated the species checklist to include 67 species from China (Qian and Xu, 2024; Wei et al., 2024). In addition to the mainland, three species were recorded from Hong Kong (Hamer et al., 2023) and eight from Taiwan (Terayama, 2009; Lin, 2021). Five species are known from the mountainous and port areas of South Korea (Shin et al., 2019; Kim et al., 2025). A further 16 species are known from across Japan. Among these, 14 species previously assigned to *Leptothorax* (junior synonyms) and subsequently transferred to *Temnothorax* by Bolton (2003) were listed (Terayama and Onoyama, 1999; Imai et al., 2003), with additional species added in subsequent decades. (Terayama et al., 2011; Terayama and Yamane, 2013).

Records of *Temnothorax* in Southeast Asia are limited. Eguchi et al. (2011) documented two unidentified species (previously synonymized under *Leptothorax*) from northern Vietnam at elevations above 1000 meters. Unidentified *Temnothorax* species have also been reported from Thailand (Khachonpisitsak et al., 2020; Jaitrong et al., 2024). Examination of specimens from the Natural History Museum of the National Science Museum, Thailand, revealed an unidentified species closely related to *T. bailu* and *T. angulohumerus*, and *Temnothorax barrettoi* Hamer & Guénard, 2023. We describe the unidentified species as new to science based on worker and ergatoid queen morphology. *Temnothorax barrettoi* is recorded from Thailand for the first time.

## MATERIALS AND METHODS

We examined specimens deposited at the Thai Natural History Museum (THNHM) in Bangkok,

Thailand. The holotype and paratypes of the new species were point-mounted dry specimens and compared with high-resolution images of the holotypes of the closely related species (*T. bailu* Qian & Xu, 2024 and *T. angulohumerus* Zhou, Huang, Yu & Liu, 2010) (Qian and Xu, 2024). The holotype of *Temnothorax barrettoi* Hamer & Guénard, 2023 deposited in Zoological Reference Collection, Lee Kong Chian Natural History Museum, Singapore (ZRC) was examined. Most morphological observations were made with a Nikon SMZ745 stereoscope. Multi-focused montage images were produced using NIS-Elements-D from a series of source images taken by a Nikon Digital Sight-Ri1 camera attached to a Nikon AZ100M stereoscope. The holotypes and paratypes of the new species were measured using a micrometer. All measurements are given in millimeters and to the second decimal place.

Standard measurements (in mm) and indices follow Bolton (1987):

- 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 eyes in full face view  
**HL** Head Length; the maximum length of the head, excluding the mandibles  
**SL** Scape Length, excluding basal neck  
**EL** Eye Length; the maximum diameter of the eye  
**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  
**PRW** Pronotum width; the maximum width of pronotum in dorsal view  
**PW** Petiole width, maximum width measured in dorsal view  
**PL** Petiole length, the maximum length measured in dorsal view, from the anterior margin to the posterior margin  
**CI** Cephalic Index (HW x 100/HL)  
**SI** Scape Index (SL x 100/HW)

## RESULTS

### Taxonomy

#### Subfamily Formicinae Latreille, 1809 Genus *Temnothorax* Mayr, 1861

*Temnothorax* Mayr, 1861: 68. Type species: *Myrmica recedens*, by monotypy.

*Temnothorax* junior synonym of *Leptothorax*: Forel, 1890: lxxii.

*Temnothorax* revived from synonym as subgenus of *Leptothorax*: Forel, 1892: 315; maintained as sub-

genus: Emery, 1915: 24; Forel, 1915: 27; Bondroit, 1918: 117; Wheeler, 1922: 679; Emery, 1924: 259.

*Temnothorax* junior synonym of *Leptothorax*: Baroni Urbani, 1971: 96; Bolton, 1982: 319; Bolton, 1994: 105.

*Temnothorax* revived status as genus: Bernard, 1967: 185; Arnol'di and Dlussky, 1978: 543; Dlussky and Fedoseeva, 1988: 79; Atanasov and Dlussky, 1992: 125; Bolton, 2003: 252, 270.

*Temnothorax* senior synonym of *Antillaemyrmex*, *Crocomyrmex*, *Dichothorax*, *Icothorax*, *Macro-mischa*, *Myrmammophilus*, *Myrafant*: Bolton, 2003: 252, 270.

**Diagnosis of worker.**— The genus *Temnothorax* is characterized by the following characteristics: 1) body length 2–4 mm; 2) antenna 12-segmented with a 3-segmented club; 3) mandibles armed with five teeth; 4) palp formula 5,3; 5) clypeus broadly inserted posteriorly between frontal lobes; 6) anterior clypeal margin convex in full-face view, not forming an apron over mandibular surface in profile; 7) promesonotal suture absent; 8) propodeum bidentate, body yellow to dark brown or black (Snelling et al., 2014; Fisher and Bolton, 2016; Salata and Borowiec, 2019; Salata et al., 2024).

#### *Temnothorax barrettoi* Hamer & Guénard, 2023 (Fig. 1)

*Temnothorax barrettoi* Hamer & Guénard, 2023, in Hamer et al. 2023: 119, figs 1, 2, 5.

**Type.**— Holotype (ZRC, examined): China, Hong Kong SAR, New Territories (Tai Po), Tai Po Kau Headland; 22°26'06.0" N, 114°11'35.52" E; 70 m a.s.l.; 19–26 Aug. 2022; Mat-thew T. Hamer and André Ibáñez leg.

**Non-type material examined.**— 8 workers (THNHM-I-00030246, THNHM) and 4 ergatoid queens (THNHM-I-00030247, THNHM), NE Thailand, Nakhon Ratchasima Province, Wang Nam Kheao District, Sakaerat ERS, Dry evergreen forest, 28 March 2023, W. Jai-trong leg., colony No. TH23-WJT-263.

**Measurements (in mm).**— **Worker** (n = 8) – TL 1.86–2.12, HW 0.42–0.46, HL 0.48–0.54, SL 0.28–0.32, EL 0.10–0.12, ML 0.50–0.54, PRW 0.32–0.34, PW 0.12–0.14, PL 0.18–0.24, CI 80–91, SI 60–72. **Ergatoid queen** (n = 4) – TL 1.90, HW 0.44–0.48, HL 0.50–0.54, SL 0.30–0.32, EL 0.12–0.14, ML 0.48–0.54, PRW 0.34–0.36, PW 0.14, PL 0.20, CI 88–92, SI 62–72.



**FIGURE 1.** *Temnothorax barrettoii*. **A–C.** non-type worker (THNHM-I-00030246); **D–F.** non-type ergatoid queen (THNHM-I-00030247). **A, D.** Body in lateral view; **B, E.** head in full-face view; **C, F.** body in dorsal view.

**Diagnosis.**— *Worker* (Fig. 1A–C). Head in full-face view subrectangular, longer than broad, almost parallel sided; occipital conners rounded. Antenna with 12 segments; scape of medium length (SI 60–72); apical segment longer and broader than following segments. Mandible broadly triangular, with five teeth.

Mesosoma in dorsal view slender; in dorsal view pronotum slightly shorter than broad; than mesonotum and propodeum; propodeal spine well developed, long and slightly downward curved toward the end. Petiole in lateral view, with moderately long peduncle, regularly rounded. Postpetiole globular, dorsal surface

with sparse, moderately long, erect hairs. First tergite in lateral view as long as mesosoma. Head, mesosoma, petiole and postpetiole reticulate, gaster smooth and shiny. Entire dorsum of body with dense erect hairs. Head, mesosoma, petiole, postpetiole and gaster yellowish; antenna and legs lighter yellow. **Ergatoid queen** (Fig. 1D–F) closely resembles the worker in body shape, sculpture, pilosity, and coloration, but can be distinguished by its slightly larger size, the presence of ocelli, and slightly shorter propodeal spines.

**Distribution.**— Hong Kong and Thailand (new record).

**Habitat.**— The holotype of this species was collected from a lowland area in China, Hong Kong (approximately 70 meters above sea level (a.s.l.)). A colony from Thailand (colony No. TH23-WJT) was discovered nesting within a dead twig located on the forest floor of a dry evergreen forest in Sakaerat Biosphere Reserve (approximately 250 meters a.s.l.). Furthermore, a single specimen was collected from the forest canopy, at a height of approximately 25 meters above ground, in the same locality. This colony is relatively larger than previously reported colonies, based on the number of individuals found, comprising 8 workers and 4 ergatoid queens. Notably, it was also observed to inhabit the forest canopy. The Thai specimens were found in a more structurally complex forest environment, including both the forest floor and canopy layers, suggesting a potentially broader ecological range or behavioral flexibility compared to the population in China, which was only recorded from ground-level leaf litter.

**Comparative notes.**— The Thai specimens closely match the holotype of *T. barrettoii*, differing only in the slightly coarser sculpture on the lateral face of mesosoma and straighter propodeal spine. Therefore, we identify the Thai species as *T. barrettoii*. Hamer et al. (2023) noted that *T. barrettoii* shares several characteristics with *T. zhejiangensis* Zhou et al., 2010 (sensu Zhou et al., 2010): erect hairs on the mesosomal dorsum, long, slightly downcurved propodeal spine, rounded humeri in dorsal view, a short petiole peduncle, and the petiole longer than high. However, *T. barrettoii* differs from *T. zhejiangensis* in the following characteristics:

- 1) *Temnothorax barrettoii* exhibits distinctly areolate-rugose dorsal head sculpture, whereas *T. zhejiangensis* has densely punctate sculpture. Punctuation is entirely absent on the dorsal head of *T. barrettoii*, and the areolate-rugose sculpture is unique among Chinese *Temnothorax*.

- 2) *Temnothorax zhejiangensis* also shows "fine striations indistinct but present on frons" (Zhou et al., 2010), while *T. barrettoii* lacks striation entirely.
- 3) The mesosomal dorsum sculpture differs: *T. zhejiangensis* is "densely punctate", while *T. barrettoii* exhibits a complex sculpture grading from areolate-rugose anteriorly to rugose posteriorly, with punctuation gradually increasing towards the propodeum, but not uniformly dense like *T. zhejiangensis*.
- 4) The lateral head margins are subparallel in *T. barrettoii*, converging anteriorly and at the occipital corners, whereas *T. zhejiangensis* has weakly convex head margins.
- 5) The scape of *T. barrettoii* is shorter (SL 0.331) and fail to reach the occipital border, unlike those of *T. zhejiangensis* (SL 0.39–0.48), which reach the border.
- 6) In lateral view, *T. barrettoii* has a flat mesosomal dorsum, whereas *T. zhejiangensis* has a convex mesosomal dorsum.

***Temnothorax sirindhornae* Phosrithong, Ignatius & Samung, sp. nov.**

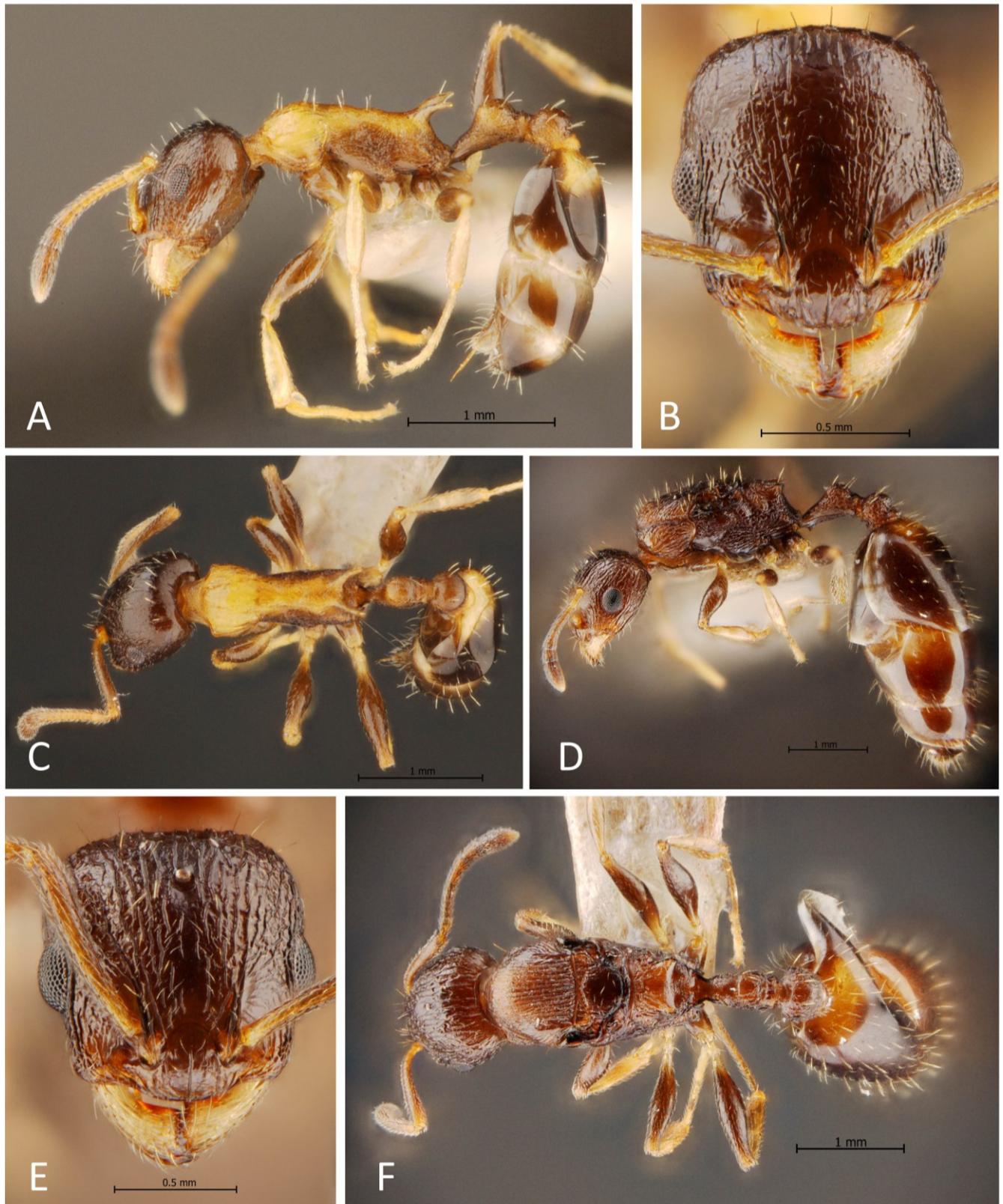
<http://zoobank.org/urn:lsid:zoobank.org:act:C2ED0491-0DCD-4AE6-8E71-0A800AAC9A00>  
(Figs 2, 3, 4A, C, E, G, 5A)

**Types.**— **Holotype:** worker (THNHM-I-00030180, deposited in THNHM), W Thailand, Tak Province, Mueang Tak District, Mae Toh Subdistrict, Taksin Maharat National Park, Krabak Yai Camp, 26.XII.2023, W. Jaitrong leg., TH23-WJT-2564. **Paratypes:** 14 workers (THNHM-I-00030181 to 00030194, THNHM), and 1 dealate queen (THNHM-I-00030212), same data as holotype; 17 workers (THNHM-I-00030195 to 00030211, THNHM) and 1 dealate queen (THNHM-I-00030213), W Thailand, Tak Province, Mueang Tak District, Mae Toh Subdistrict, Taksin Maharat National Park, Khao Pan Sib, 1000 m a.s.l., 25.XII.2023, W. Jaitrong leg., TH23-WJT-2537.

**Worker description** (Fig. 2A–C)

**Measurements.**— Holotype (paratype, n=31): TL 2.50 (2.00–2.90), HW 0.54 (0.48–0.54), HL 0.62 (0.56–0.62), SL 0.56 (0.44–0.52), EL 0.14 (0.12–0.16), ML 0.68 (0.62–0.72), PRW 0.38 (0.32–0.38), PW 0.14 (0.12–0.18), PL 0.28 (0.22–0.34), CI 87 (80–92), SI 103 (88–104).

Head in full face view longer than broad (CI 87); posterolateral corners roundly convex; posterior margin broadly convex; lateral margins of head subparallel. Clypeus broad, its anterior margin roundly convex. Mandible broadly triangular, masticatory margin with



**FIGURE 2.** *Temnothorax sirindhornae* sp. nov. A–C. holotype worker (THNHM-I-00030180); D–F. paratype dealate queen (THNHM-I-00030212). A, D. Body in lateral view; B, E. head in full-face view; C, F. body in dorsal view.



**FIGURE 3.** The collecting sites of *T. sirindhornae* sp. nov. in Taksin Maharat National Park. **A.** pine plantation in hill evergreen forest; **B.** hill evergreen forest; **C.** thysanolaena plant, *Thysanoleana maxima* Kuntze (Gramineae).

five distinct teeth. Antenna 12-segmented with three-segmented club, scape clavate and long (SI 103), but barely reaching posterior margin of head. Eye convex, located middle of head laterally, with eight ommatidia across longest width. Mesosoma in lateral view with subflat anteriorly and sloping gradually to base of propodeal spine; in dorsal view mesosoma broadened, at anterior most portion of pronotum, pronotum broadly convex anteriorly, humeri rounded; promesonotal suture and metanotal groove indistinct or absent. Propodeal spine long, distinctly longer than the width at its base, thick, and downcurved in profile. In dorsal view, propodeal spines slightly curved with apices weakly directed posterolaterally. Petiole longer than high with long anterior peduncle. In profile petiolar node with inclined and roughly straight anterior face, convex posterior face and very roughly rounded, thicker dorsum; postpetiole distinctly shorter than petiole and roundly convex dorsal outline. Gaster larger than mesosoma, gastral segments I–III larger than remaining segments.

Dorsal surface of the head weakly rugulose with interspaces smooth and shiny, while ventral surface

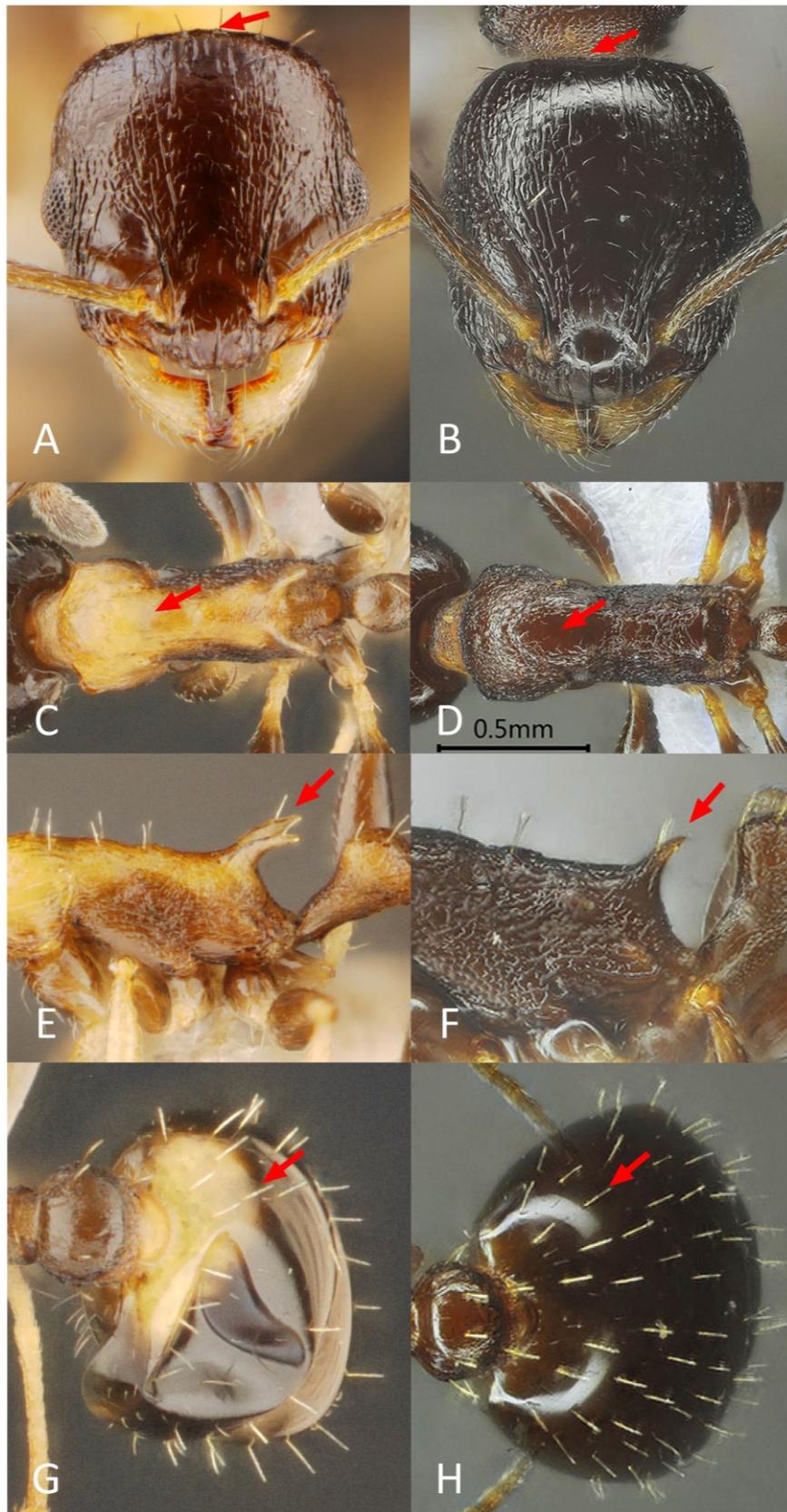
relatively smooth and glossy; mesosoma rugulose; petiole and postpetiole punctate; gaster entirely smooth and shiny; antennal scape micropunctate; legs smooth and shiny.

Body dorsum with sparse short erect hairs. Head, mesopleuron, metapleuron, gaster and femora dark brown; mandibles, antennae, dorsum of mesosoma, petiole, postpetiole, anterior most part of first gastral tergite, tibia, and tarsus yellowish brown; pilosity pale yellowish.

#### **Queen description** (Fig. 2D–F)

**Measurements.**— Paratypes (n = 2): TL 3.88–4.00, HW 0.62–0.68, HL 0.70–0.76, SL 0.54–0.58, EL 0.16–0.18, ML 1.02–1.08, PRW 0.56–0.58, PW 0.22–0.24, PL 0.30–0.40, CI 88–89, SI 85–87.

The queen is similar to the worker except for the following characteristics: 1) body size and eye slightly larger, 2) three ocelli present, located on vertex posterior to posterior margin of eye. Antennae 12-segmented. Pronotum in lateral view located lower than mesoscutum, convex dorsal outline. Mesoscutum in dorsal view widest at mid-length, with convex



**FIGURE 4.** *Temnothorax* spp. **A, C, E, G.** *Temnothorax sirindhornae* sp. nov. (holotype worker, THNHM-I-00030180); **B, D, F, H.** *Temnothorax bailu* (holotype worker, SWFU A10-3265, images cited from Qian and Xu (2024)).



**FIGURE 5.** *Temnothorax* spp. **A.** *Temnothorax sirindhornae* sp. nov. (holotype worker, THNHM-I-00030180); **B.** *T. angulohumerus* (holotype worker, GXNU0407358, images cited from Qian and Xu (2024) photos by Zhi-Lin Chen).

lateral margins; anepisternum distinctly separated from katepisternum by a well-defined groove. Mesosoma, in lateral view subsquare, slightly convex dorsal outline, 1.70–1.75 times as long as head; propodeal spines short, with blunt apex. Gaster larger than mesosoma.

Head, pronotum, and mesoscutum densely striate-reticulate with dense punctures interspaces, scutellum

with sparse longitudinal striation on dorsal and lateral sides propodeum punctate. Scape finely micropunctate. Petiole and postpetiole finely reticulate. Gaster smooth and shiny. Legs smooth and shiny.

Body dorsum with sparse erect hairs. body entirely dark brown; mandibles, tibiae and tarsi yellowish; pilosity pale yellow.



**FIGURE 6.** *Temnothorax yanwan* Terayama, 2009, holotype worker (NIAS). Body in lateral view, images cited from [www.antwiki.org](http://www.antwiki.org), photos by Hiraku Yoshitake & Takashi Kurihara.

**Etymology.**— The specific name is dedicated to Her Royal Highness Princess Maha Chakri Sirindhorn of the Kingdom of Thailand.

**Distribution.**— Western Thailand (Taksin Maharat National Park, Tak Province).

**Habitat.**— Two colonies of *T. sirindhornae* sp. nov. were collected from elevations 1,000 m a.s.l. in a pine plantation (Fig. 3A) and a hill evergreen forest (Fig. 3B). Colonies of the new species were small, each containing 15–16 workers and a single dealate queen. This species was found nesting in dead stems of *Thysanolaena maxima* Kuntze (Gramineae) (Fig. 3C). This colony size is relatively larger than that of several temperate species, such as *Temnothorax chushu*, which nests in dry twigs or rotten wood and was recorded in China with only 8 workers in a single colony (Qian and Xu, 2024).

**Comparative notes.**— *Temnothorax sirindhornae* sp. nov. is most similar to *Temnothorax bailu* Qian & Xu,

2024 (Fig. 4B, D, F, H), but it can be separated from *T. bailu* by 1) posterior margin of head roundly convex (almost straight in *T. bailu*); 2) dorsum of mesosoma yellowish-brown (dark brown in *T. bailu*); 3) propodeal spine relatively long and downcurved (short and straight (in *T. bailu*); 4) gastral tergites with sparser erect hairs (see Fig. 4G, H for comparison); 5) anterior-most portion of first gastral tergite yellowish brown (dark brown in *T. bailu*). *Temnothorax sirindhornae* sp. nov. is also similar to *T. angulohumerus* Zhou, Huang, Yu & Liu, 2010 (Fig. 5B), but differs from the latter by 1) pronotum weaker convex; propodeal spine longer than width at its base (as long as or shorter in *T. angulohumerus*); head dark brown in *T. sirindhornae* sp. nov. (reddish brown in the latter); body sculpture weaker (see Fig. 5A, B for comparison).

#### Adapted key to *Temnothorax* of Indochina

Couplet 40 of the preliminary key to the known Chinese species of *Leptothorax* and *Temnothorax* based on worker caste from Qian and Xu (2024) has been revised in the present study. Additional morpho-

logical characters are incorporated to facilitate the identification of this newly described species.

- 40a. Head dorsum coarsely reticulate. Body color yellow [China: Hong Kong (type locality)] (Fig. 1). ..... *T. barrettoi* Hamer & Guénard, 2023
- Head dorsum mainly longitudinally rugose. Body color dark brown to blackish brown .....40b
- 40b. Body blackish brown. Antenna brown except for club blackish. Mesosoma, gastral tergite blackish brown [China: Taiwan (type locality)] (Fig. 6). ...  
.....*T. yanwan* Terayama, 2009
- Body dark brown. Antenna, dosum of mesosoma, anteriormost portion of first gastral tergite yellowish brown (Thailand) (Fig. 2). .....  
..... *T. sirindhornae* sp. nov.

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### LITERATURE CITED

- Antwiki 2025. AntWiki. Available from <https://www.antwiki.org/> [accessed 14 July 2025].
- Arnołdi, K.V. and Dlussky, G.M. 1978. Superfam. Formicoidea. 1. Fam. Formicidae - ants. pp. 519–556. In: Medvedev, G.S. (ed.) 1978. Keys to the Insects of the European part of the USSR. Vol. 3. Hymenoptera. Part 1. Opređeliteli Faune SSSR 119: 3–584. [In Russian.]
- Atanassov, N. and Dlussky, G.M. 1992. Fauna of Bulgaria. Hymenoptera, Formicidae. Faunana Bŭlgariya 22: 1–310. [In Bulgarian.]
- Baroni Urbani, C. 1971. Catalogo delle specie di Formicidae d'Italia (Studi sulla mirmecofauna d'Italia X). Memorie della Società Entomologica Italiana 50: 5–287.
- Beckers, R., Goss, S., Deneubourg, J. and Pasteels, J.M. 1989. Colony size, communication and ant foraging strategy. *Psyche*, 96: 239–256.
- Bengston, S.E. and Dornhaus, A. 2015. Latitudinal variation in behaviors linked to risk tolerance is driven by nest-site competition and spatial distribution in the ant *Temnothorax rugatulus*. *Behavioral Ecology and Sociobiology*, 69: 1265–1274.
- Bernard, F. 1967. Faune de l'Europe et du Bassin Méditerranéen. 3. Les fourmis (Hymenoptera Formicidae) d'Europe occidentale et septentrionale. Paris: Masson, 411 pp.
- Bharti, H. 2011. List of Indian ants (Hymenoptera: Formicidae). *Halteres*, 3: 79–87.
- Bharti, H., Gul, I. and Schulz, A. 2012. Three new species of genus *Temnothorax* (Hymenoptera: Formicidae) from Indian Himalayas with a revised key to the Indian species. *Acta Zoologica Academiae Scientiarum Hungaricae*, 58: 325–336.
- Bolton, B. 1982. Afrotropical species of the myrmicine ant genera *Cardiocondyla*, *Leptothorax*, *Melissotarsus*, *Messor* and *Catantolus* (Formicidae). *Bulletin of the British Museum (Natural History)*. *Entomology* 45: 307–370.
- Bolton, B. 1987. A review of the *Solenopsis* genus-group and revision of Afrotropical *Monomorium* Mayr. *Bulletin of the British Museum (Natural History)* *Entomology*, 54: 263–452.
- Bolton, B. 1994. Identification guide to the ant genera of the world. Cambridge, Mass.: Harvard University Press, 222 pp.
- Bolton, B. 2003. Synopsis and classification of Formicidae. *Memoirs of the American Entomological Institute*, 71: 1–370.
- Bolton, B. 2025. An online catalog of the ants of the world. Available from: <https://www.antcat.org/catalog/429956?qq=Temnothorax> (accessed 15 Jan. 2025).
- Bondroit, J. 1918. Les fourmis de France et de Belgique. *Annales de la Société Entomologique de France* 87:1–174.
- Csőszy, S., Alicata, A., Báthori, F., Galkowski, C., Schifani, E., Yusupov, Z., Herczeg, G. and Prebus, M.M. 2024. Integrative taxonomy reveals inflated biodiversity in the European *Temnothorax unifasciatus* complex (Hymenoptera: Formicidae). *Zoologica Scripta*, 54(1): 33–49.
- Dlussky, G.M. and Fedoseeva, E.B. 1988. Origin and early stages of evolution in ants. In: Ponomarenko, A.G. (ed.) 1988. Cretaceous Biocenotic Crisis and Insect Evolution. Moskva: Nauka, pp. 70–144. [In Russian]
- Eguchi, K., Viet, B.T. and Yamane, S. 2011. Generic synopsis of the Formicidae of Vietnam (Insecta: Hymenoptera), Part I — Myrmicinae and Pseudomyrmecinae. *Zootaxa*, 2878(1): 1–95.
- Emery, C. 1915. Formiche raccolte nell'Eritrea dal Prof. F. Silvestri. *Bollettino del Laboratorio di Zoologia Generale e Agraria della Reale Scuola Superiore d'Agricoltura*. Portici 10: 3–26.
- Emery, C. 1924. Hymenoptera. Fam. Formicidae. Subfam. Myrmicinae. [concl.]. *Genera Insectorum*, 174C: 207–397.
- Fisher, B.L. and Bolton, B. 2016. *Ants of Africa and Madagascar, A Guide to the Genera*. Berkeley: University of California Press, 503 pp.
- Forel A. 1890. Fourmis de Tunisie et de l'Algérie orientale. *Annales de la Société Entomologique de Belgique* 34: lxi-lxxvi.
- Forel A. 1892. Die Ameisenfauna Bulgariens. (Nebst biologischen Beobachtungen.). 305–318.
- Forel, A. 1915. Fauna Simalurensis. Hymenoptera Aculeata, Fam. Formicidae. *Tijdschrift voor Entomologie*, 58: 22–43.
- Hamer, M.T., Lee, R.H. and Guénard, B. 2023. First record of the genus *Temnothorax* Mayr, 1861 (Formicidae: Myrmicinae) in Hong Kong, with descriptions of two new species. *European Journal of Taxonomy*, 879(1): 116–135.
- Imai, H.T., Kihara, A., Kondoh, M., Kubota, M., Kuribayashi, S., Ogata, K., Onoyama, K., Taylor, R. W., Terayama, M., Tsukii, Y., Yoshimura, M. and Ugawa, Y. 2003. *Ants of Japan*. Tokyo: Gakken, 224 pp.
- Jaitrong, W., Suwannaphak, K., Samung, Y. and Jeenthong, J. 2024. *Ants of Thailand (Second Edition)*. The National Science Museum Thailand, Pathum Thani, Thailand. 528 pp. [In Thai]
- Khachonpisitsak, S., Yamane, S., Sriwichai, P. and Jaitrong, W. 2020. An updated checklist of the ants of Thailand (Hymenoptera, Formicidae). *ZooKeys* 998: 1–182.
- Kim, D., Lee, H., Kim, N., Jang, B.J., and Kim, D.E. 2025. Monitoring of ant species surrounding the ports of South Korea. *Biodiversity Data Journal*, 13: e142634. doi: 10.3897/BDJ.13.e142634
- Lin, Z. 2021. Biota Taiwanica: Ant fauna of Taiwan (Hymenoptera: Formicidae) [Final research report, MOST 109-2621-B-018-

- 001]. Ministry of Science and Technology, Taiwan. National Changhua University of Education, 57 pp.
- Mayr, G. 1861. Die europäischen Formiciden. Nach der analytischen Methode bearbeitet. Wien: C. Gerolds Sohn, 80 pp.
- Prebus M. 2015. Palearctic elements in the old world tropics: A taxonomic revision of the ant genus *Temnothorax* Mayr (Hymenoptera, Formicidae) for the Afrotropical biogeographical region. *ZooKeys*, (483): 23–57.
- Prebus M. 2017. Insights into the evolution, biogeography and natural history of the acorn ants, genus *Temnothorax* Mayr (Hymenoptera: Formicidae). *BMC evolutionary biology*, 17(1): 250.
- Prebus, M.M., Nguyen, N., Doering, G.N. and Booher, D.B. 2024. *Temnothorax caryaluteus* sp. nov. (Hymenoptera: Formicidae): a new ant species from the eastern United States. *European Journal of Taxonomy*, 970: 175–202.
- Qian, Y., and Xu, Z. 2024. Taxonomy of the ant genera *Leptothorax* Mayr, 1855 and *Temnothorax* Mayr, 1861 (Hymenoptera: Formicidae) of China with descriptions of twenty-eight new species and a key to the known Chinese species. *European Journal of Taxonomy*, 936: 1–97.
- Salata, S. and Borowiec, L. 2019. Preliminary division of not socially parasitic Greek *Temnothorax* Mayr, 1861 (Hymenoptera, Formicidae) with a description of three new species. *ZooKeys*, 877: 81–131.
- Salata, S., Środoń, K. and Borowiec, L. 2023. A taxonomic revision of the *Temnothorax graecus* species-group (Hymenoptera: Formicidae) from Greece. *Annales Zoologici (Warsaw)*, 73(1): 51–68.
- Salata, S., Demetriou, J., Georgiadis, C. and Borowiec, L. 2024. The genus *Temnothorax* Mayr, 1861 (Hymenoptera: Formicidae) in Cyprus. *Zootaxa*, 5434(1): 1–69.
- Satizabal-Niemeyer, D., Bernadou, A., Wanke, C., Heinze, J. and Cordonnier, M. 2025. Urban structures are poor stepping stones for crevice-nesting ants in fragmented landscapes. *Insectes Sociaux*, 72: 53–58.
- Schulz, A. 1997. *Leptothorax nordmeyeri*, spec. nov., an interesting ant of sub-tropical India (Insecta, Hymenoptera, Formicidae, Myrmicinae). *Spixiana*, 20: 303–308.
- Seifert, B. 2018. The ants of Central and North Europe. *Lutra Verlags- und Vertriebsgesellschaft, Tauer, Germany*, 408 pp.
- Shin, D., Yoon, S. and Lyu, D. 2019. New records of genus *Temnothorax* (Formicidae, Myrmicinae) in Korea. *Korean Journal of Applied Entomology*, 58(3): 259–263.
- Snelling, R.R., Borowiec, M.L. and Prebus, M.M. 2014. Studies on California ants: a review of the genus *Temnothorax* (Hymenoptera, Formicidae). *ZooKeys*, 372: 27–89.
- Subedi, I.P., Yusupov, Z.M. and Budha, P.B. 2023. Three new species of the ant genus *Temnothorax* Mayr, 1861 (Hymenoptera: Formicidae, Myrmicinae) from Nepal. *Far Eastern Entomologist*, 475: 6–16.
- Terayama, M. and Onoyama, K. 1999. The ant genus *Leptothorax* Mayr (Hymenoptera: Formicidae) in Japan. *Memoirs of the Myrmecological Society of Japan*, 1: 71–97.
- Terayama, M. 2009. A synopsis of the family Formicidae of Taiwan (Insecta: Hymenoptera). *Research Bulletin of Kanto Gakuen University. Liberal Arts*, 17: 81–266.
- Terayama, M., Kubota, M., Karube, H. and Matsumoto, K. 2011. Formicidae (Insecta: Hymenoptera) from the island of Minami-iwo-to, the Volcano Island, with descriptions of two new species. *Bulletin of the Kanagawa Prefectural Museum. Natural science*, 40: 75–80.
- Terayama, M. and Yamane, S. 2013. Description of a new species of the genus *Temnothorax* Mayr from Japan (Hymenoptera, Formicidae). *Memoirs of the Myrmecological Society of Japan*, 3: 32–36.
- Wei, Y.M., Wu, T.Q., Zhong, Y., Huang, Y.Y. and Nie, G.C. 2024. A new bicolor species of the ant genus *Temnothorax* Mayr, 1861 (Hymenoptera: Formicidae) from Yunnan, China. *Journal of the Entomological Research Society*, 26(3): 419–428.
- Wheeler, W.M. 1922. *Ants of the American Museum Congo expedition*. New York: Bulletin of the American Museum of Natural History, 1139.
- Yusupov, Z.M., Dubovikoff, D.A. and Lopatina, E.B. 2020a. *Temnothorax kipyatkovi* sp. n. – a new species of ants (Hymenoptera: Formicidae) from India. *Caucasian Entomological Bulletin*, 16(2): 353–357.
- Yusupov, Z.M., Lakho, G.M. and Dubovikoff, D.A. 2020b. New additions to the fauna of ants of the genus *Temnothorax* Mayr, 1861 (Hymenoptera: Formicidae) of Pakistan. *Caucasian Entomological Bulletin*, 16(2): 347–352.
- Zhou, S., Huang, J., Yu, D. and Lin, Z. 2010. Eight new species and three newly recorded species of the ant genus *Temnothorax* Mayr (Hymenoptera: Formicidae) from the Chinese mainland, with a key. *Sociobiology*, 56: 7–26.
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