

***Tapinoma yacoubi*, sp. nov., a new ant species (Hymenoptera: Formicidae) from Saudi Arabia**

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We describe a new species, *Tapinoma yacoubi* sp. n., from the Al Sarawat Mountains in southwestern Saudi Arabia based on the worker caste. *Tapinoma yacoubi* looks similar to *T. luridum* Emery, 1908 from the Democratic Republic of Congo, but can be easily distinguished by its lack of setae on the frontal carinae, the convex posterior margin of the clypeus, the single pair of black based setae on the anterior clypeal margin, and the unsculptured body surface. We present an identification key to the Arabian *Tapinoma* based on the worker caste.

Keywords: Afrotropical Region; Dolichoderinae; Al Sarawat Mountains; identification key

<http://www.zoobank.org/urn:lsid:zoobank.org:pub:677ADF36-E8F1-4B2C-BFF2-306FFC94CB39>

Introduction

The genus *Tapinoma* Foerster, 1850 includes 70 extant and 6 fossil species distributed in the tropical and temperate regions worldwide (Brown, 2000; Bolton, 2021). Most *Tapinoma* species nest in a variety of microhabitats (e.g., in soil under rocks and other objects, in plant material, rotten or dead wood) and have broad food preference; most species are arboreal and generalized scavengers (Abdel-Dayem et al., 2021), while many feed on Hemiptera honeydew (Shattuck, 1992).

Only three *Tapinoma* have been previously documented from the Arabian Peninsula. Collingwood (1985) reported *T. melanocephalum* (Fabricius, 1793) and *T. simrothi* Krausse, 1911 from Saudi Arabia and Oman. These two species were later also recorded from Kuwait, Yemen, and the United Arab Emirates (Collingwood & Agosti, 1996; Collingwood et al., 1997, 2011). *Tapinoma wilsoni* Sharaf & Aldawood, 2012 was described from the Al Sarawat Mountains of Saudi Arabia, where it seems to be endemic (Sharaf et al., 2012). This description is based on the worker caste, and the queen caste was subsequently described by Al-Keridis et al. (2021). Abdel-Dayem et al. (2021) presented a comprehensive review of the taxonomy, distribution, and habitats of *Tapinoma* known from the Arabian Peninsula.

We describe and illustrate here a new species, *Tapinoma yacoubi*, from the Al Sarawat Mountains, Saudi Arabia, and present a key to the Arabian *Tapinoma*. *Tapinoma* now has four species known from the Arabian Peninsula.

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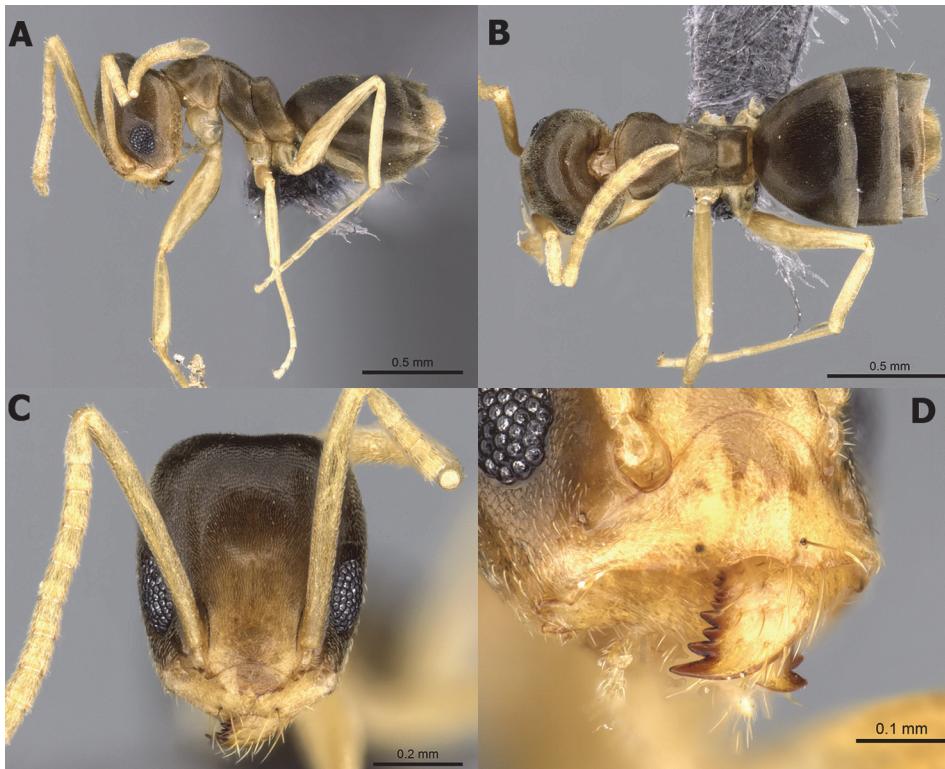


Figure 1 A–D. *Tapinoma yacoubi* sp. n., paratype worker, A: body in profile, B: body in dorsal View, C: head in full-face view, D: clypeus and mandibles, CASENT0264244, (photographer: Michele Esposito), antweb.org.

Material and Methods

Measurements and indices. Measurements and indices follow Bolton (2007), where details are available on how to take the measurements. All measurements are in millimeters. **HL** = Head Length excluding the mandibles; **HW** = Head Width (maximum width of head). **PW** = Pronotal Width; **SL** = Scape Length; **TL** = Total Length (outstretched length of specimen from mandibular apex to gastral apex); **WL** = Weber's length of mesosoma; **CI** = Cephalic Index ($CI = HW \times 100 / HL$); **DTI** = Dorsal Thoracic Index; in dorsal view, length from mid-point of anterior pronotal margin to midpoint of metanotal groove, divided by PW, $\times 100$. **EPI** = Eye Position Index; in full-face view straight-line length (parallel to long axis of head) from anterior most point of eye to anterior clypeal margin, divided by straight-line length from posterior most point of eye to posterior margin, $\times 100$. **OI** = Ocular Index; maximum diameter of eye divided by HW, $\times 100$. **SI** = Scape Index; SL divided by HW, $\times 100$.

Illustrations. Specimens were photographed by using Digital color images that were created using a Leica DFC 425 camera in combination with the Leica Application Suite software (version 3.8). All images presented are available online at AntWeb (www.antweb.org).

Results and Discussion

Tapinoma yacoubi Sharaf sp. nov. (Figures 1 A-D)

Holotype: Worker; SAUDI ARABIA: Al Baha Province, Baljurashi Forest (19.8055°N, 41.7119°E), 1930 m, 21.ix.2011 (leg. M. R. Sharaf), Acacia/Juniper woodland, deposited at King Saud University Museum of Arthropods, Riyadh, Kingdom of Saudi Arabia



Figure 2: Baljurashi Forest, type locality of *Tapinoma yacoubi* sp. n. (photograph: M. Sharaf).

(KSMA). – *Paratype*: One worker with same data as the holotype except the collector (leg. B. L. Fisher), deposited at California Academy of Sciences, San Francisco, USA (CASC, CASENT0262441).

Measurements (holotype worker with paratype in parentheses). TL: 2.18 (2.15), HL: 0.67 (0.62), HW: 0.53 (0.51), SL: 0.68 (0.62), PW: 0.35 (0.30), WL: 0.73 (0.69), EL: 0.18 (0.16). Indices: CI: 84 (82), SI: 127 (122), OI: 33 (31), EPI: 85 (83), DTI: 135 (130).

Diagnosis. This new species is diagnosed by the following combination of characters: anterior clypeal margin slightly concave concealing about half of mandibles, and posterior margin distinctly concave; body surface unsculptured and relatively shining; frontal carinae entirely lack standing setae.

Differential diagnosis. Among the Arabian *Tapinoma*, *T. yacoubi* sp. nov. appears closest to *T. simrothi* Krausse, 1911 but it can be readily separated by the shallowly concave anterior clypeal margin whereas *T. simrothi* has a deep median clypeal notch. *Tapinoma yacoubi* looks most similar to *T. luridum* Emery, 1908 from the Democratic Republic of Congo. The two species are similar in colour, body measurements, and the possession of relatively large eyes, long scapes that surpass posterior margin of head, convex outline of promesonotum and mesonotum, deeply impressed metanotal groove, and broad obtuse angle between the propodeal dorsum and declivity. However, *T. yacoubi* can be easily separated by the lack of setae on the frontal carinae, the convex posterior margin of clypeus, the single pair of black based setae on the anterior clypeal margin, and the unsculptured body surface. *Tapinoma luridum* has a single pair of black based setae at the midlength of the frontal carinae, a flat posterior clypeal margin, two pairs of black based setae at the anterior clypeal margin, and the body is faintly but characteristically reticulate-rugulose. Among the Arabian *Tapinoma*, *yacoubi* is readily recognized by the sharply depressed metanotal groove that has an obtuse angle in profile.

Description. Head. Head in full-face view longer than broad (CI 82-84) with convex sides and shallowly concave posterior margin; scape when laid back from its insertion

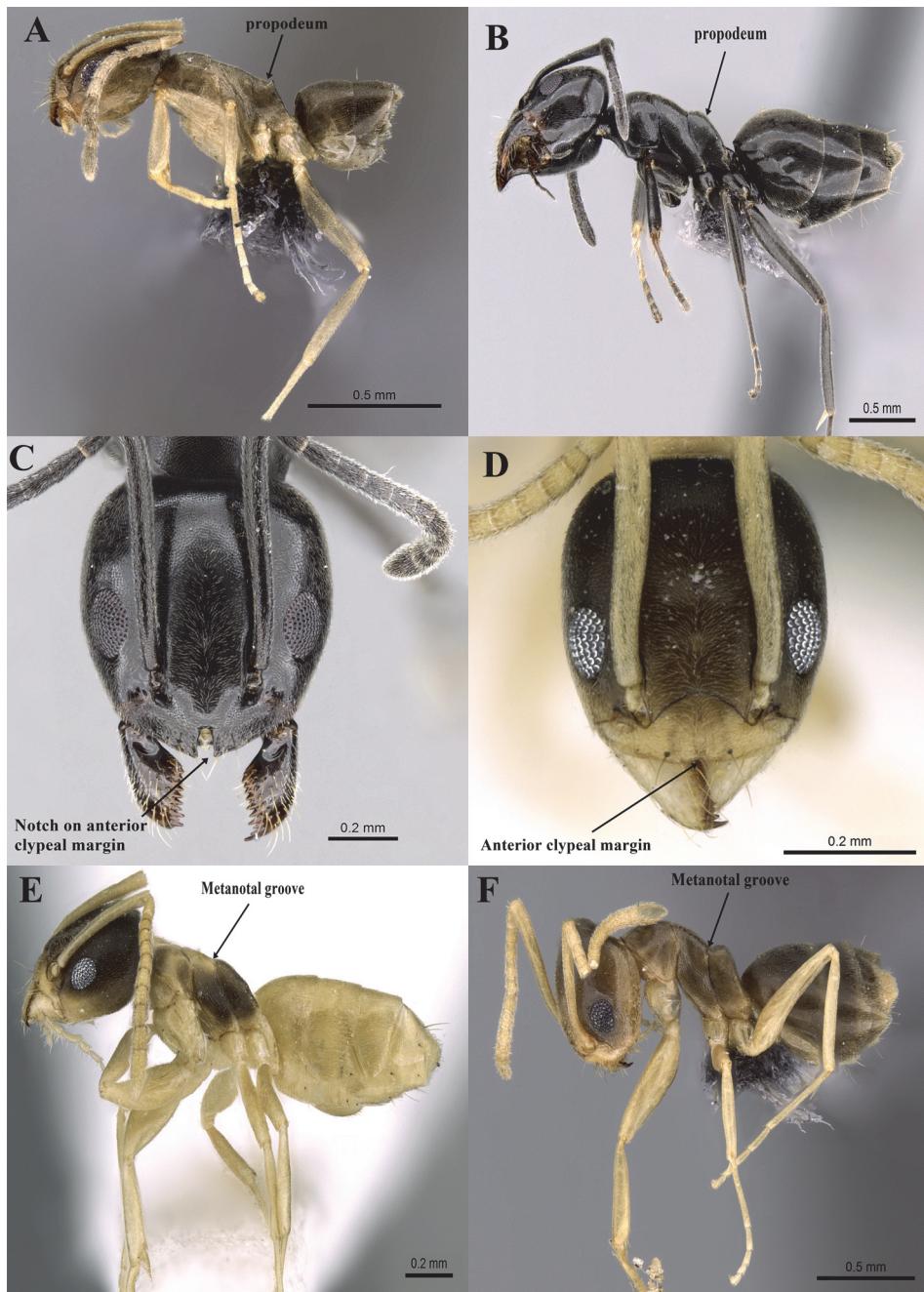


Figure 3 A–F: Members of the genus *Tapinoma*: A: *T. wilsoni*, propodeum (CASENT0263919, photograph: E. Ortega). B: *T. simrothi*, propodeum (CASENT0263927, photograph: E. Ortega). C: *T. simrothi*, clypeus (CASENT0263927, photograph: E. Ortega). D: *T. melanocephalum*, clypeus (CASENT0906356, photograph: E. Ortega). E: *T. melanocephalum*, metanotal groove (CASENT0906356, photograph: E. Ortega). F: *T. yacoubi* sp. n., metanotal groove, paratype worker (CASENT0264244, photograph: M. Esposito), antweb.org.

surpass posterior margin of head by about the length of the first two funicular segments (SI 122–127); all funicular segments longer than broad; anterior clypeal margin slightly concave concealing about half of mandibles, and posterior margin distinctly concave; masticatory margin of mandible armed with 10–11 teeth, the first tooth (counting from apex) is the largest, the second and fourth subequal and relatively smaller than the first; with head in full-face with the midlength passing in the posterior third of eye; eye large with 11 ommatidia in the longest row and fail to break lateral outlines of head. – *Mesosoma*. Mesosoma in profile with promesonotum and mesonotum forming a continuous curve that descend posteriorly to a sharply defined metanotal groove; metanotal groove appears as an obtuse angle between mesonotum and propodeal dorsum; propodeal dorsum short, elevating posteriorly and making an obtuse angle with declivity; declivity about 3x longer than propodeal dorsum; propodeal dorsum circular situated at the middle of declivity. – *Pilosity*. Frontal carinae entirely lack erect setae; anterior clypeal margin with one pair of basally well-defined dark setae; several longer yellow setae on anterior clypeal margin; entire cephalic surface and gastral tergites covered with dense appressed pubescence; mandible with several pairs of yellow hairs; mesosoma, first and second gastral tergites bare; third and fourth gastral tergites with few erect hairs located apically. – *Sculpture*. Body surface unsculptured and relatively shining. – *Colouration*. Body brown except for anterior third of head including clypeus, mandibles, antennae, fourth gastral tergite and legs clear yellow.

Etymology. The patronym *Tapinoma yacoubi* honors Sir Magdi Yacoub, an Egyptian heart surgeon at the Imperial College London, United Kingdom.

Habitat and Biology. The type locality (Figure 2) Baljurashi is a woodland forest at Al Baha Province with a mean temperature of 2°C during winter and 32°C during summer. It is characterized by the presence of water streams formed in the valleys during rainy season and the soil frequently has a high degree of humidity. The most dominant wild plants in the locality are: *Juniperus procera* Hochst. Ex Endle (Cupressaceae), *Acacia origena* A. Hunde (Fabaceae), *Acacia negrri* Pichi-Sermoli (Fabaceae), and *Solanum* sp. (Solanaceae). The holotype and the paratype were collected by sifting leaf litter next to *Acacia* tree, no additional material was encountered despite extensive surveys in the area over years of collecting in the region. Some other ant species were coexisting with the new species including *Crematogaster chiarinii* Emery, 1881; *Trichomyrmex mayri* (Forel, 1902); *Monomorium salomonis* (Linnaeus, 1758), *M. exiguum* Forel, 1894, *Tetramorium sericeiventre* Emery, 1877, and *Lepisiota obtusa* (Emery, 1901).

Key to the Arabian species of the genus *Tapinoma*

- 1 Propodeum in profile with the transition from dorsum to declivity sharply defined, the declivity concave and the angle with a raised apex (Figure 3A) *T. wilsoni* Sharaf & Aldawood
- Propodeum in profile with the transition from dorsum to declivity is a rounded angle (Fig. 3B) 2
- 2 Anterior clypeal margin with a deep median notch (Figure 3C) .. *T. simrothi* Krausse
- Anterior clypeal margin with a shallow median concavity (Figure 3D) 3
- 3 Bicoloured species, with head and mesosoma dark yellowish-brown, gaster yellow; metanotal groove shallowly impressed (Figure 3E) .. *T. melanocephalum* (Fabricius)
- Uniform brown except anterior third of head including clypeus, mandibles, antennae, fourth gastral tergite and legs clear yellow; metanotal groove deeply impressed (Figure 3F) *T. yacoubi* sp. n.

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Disclosure Statement

No potential conflict of interest was reported by the author.

References

- Abdel-Dayem, M. M., Al Dhafer, H. M., Aldawood, A. S., & Sharaf, M. R. (2021). An update to the taxonomy and distribution of the Arabian *Tapinoma* Foerster, 1850 (Hymenoptera: Formicidae) with an illustrated key and remarks on habitats. *Biodiversity Data Journal*, 9, e66058.
- Al-Keridis, L. A., Gaber, N. M., Aldawood, A. S. & Sharaf M. R. (2021). Description of the queen of the Arabian endemic Dolichoderine species *Tapinoma wilsoni* Sharaf & Aldawood, 2012 (Hymenoptera: Formicidae) with the first illustrated key to queens of the Arabian *Tapinoma* Foerster, 1850. *African Entomology*, 29, 233–237.
- Bolton, B. (2007). Taxonomy of the Dolichoderine ant genus *Technomyrmex* Mayr (Hymenoptera: Formicidae) based on the worker caste. *Contributions of the American Entomological Institute*, 35, 1–150.
- Brown, W. L. (Jr.) (2000). Diversity of ants. Standard methods for measuring and monitoring biodiversity. Pp. 45–79. In: Agosti, D., Majer, J., Alonso, E., & Schultz, T. R. (Eds.), *Ants. Biological Diversity Handbook Series*. Washington, D.C: Smithsonian Institution Press.
- Bolton, B. (2021). *An online catalog of the ants of the world*. <http://antcat.org>. Accessed on 23.iii.2021.
- Collingwood, C.A. (1985). Hymenoptera: Fam. Formicidae of Saudi Arabia. *Fauna of Saudi Arabia*, 7, 230–302.
- Collingwood, C. A., & Agosti, D. (1996). Formicidae (Insecta: Hymenoptera) of Saudi Arabia (part2). *Fauna of Saudi Arabia*, 15, 300–385.
- Collingwood, C. A., Tigar, B. J., & Agosti, D. (1997). Introduced ants in the United Arab Emirates. *Journal of Arid Environments*, 37, 505–512.
- Collingwood, C. A., Agosti, D., Sharaf, M. R., & van Harten, M. (2011). Order Hymenoptera, family Formicidae. *Arthropod Fauna of the UAE*, 4, 405–474.
- Sharaf, M. R., Aldawood, A. S., & El-Hawagry, M. S. (2012). A new ant species of the genus *Tapinoma* (Hymenoptera, Formicidae) from Saudi Arabia with a key to the Arabian species. *ZooKeys*, 212, 35–43.
- Shattuck, S. O. (1992). Generic revision of the ant subfamily Dolichoderinae (Hymenoptera: Formicidae). *Sociobiology*, 21, 1–181.