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A new species of the genus *Tapinoma* Foerster, 1850 (Hymenoptera: Formicidae) from the Western Ghats, India

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ABSTRACT. *Tapinoma onaele* **sp. nov.** from the Kodagu region of the Western Ghats, India, is described as the fourth species in the *Tapinoma lugubre* species group. This species is morphologically close to *Tapinoma himalaicum* Bharti et al., 2013, as both have long scapes and deep and concave anteromedial clypeal margins. However, it differs from *T. himalaicum* in having a darker and brownish body, contrasting with a darker gaster, longer scapes, and the dorsal surface of the propodeum being convex and rising above the mesonotum. An identification key for workers of the *Tapinoma lugubre* species group is provided. *Tapinoma onaele* **sp. nov.** is crepuscular and nocturnal, ground-nesting, and forages in the leaf litter. The species was observed carrying seeds, insects, and tending scale insects (Hemiptera), suggesting it is generalist like other members of *Tapinoma*.

Keywords	Dolichoderinae, new species, Coffee Plantations, Kodagu, Western Ghats
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INTRODUCTION

Dolichoderinae is one of the four most speciose subfamilies of ants (Hymenoptera: Formicidae). Members of Dolichoderinae can be distinguished from other Formicidae by the absence of a sting and the presence of a slit-like opening at the tip of the gaster. The genus *Tapinoma* Foerster, 1850, of the subfamily Dolichoderinae, includes 80 extant species, 19 subspecies, and six fossil species (Bolton 2024). Species of this genus are found globally, ranging from the tropics to the temperate regions of the world (Brown 2000). *Tapinoma* are generalized in their diet, often found scavenging and tending Hemiptera for honeydew (Shattuck 1992). Most species are found in a wide variety of habitats, including forests, open habitats, and human dwellings (Brown 2000). This genus includes widespread tramp species, such as *Tapinoma melanocephalum* Fabricius, 1793 that have been introduced in many places across the world (Wetterer 2009).

Workers of the genus *Tapinoma* can be distinguished from other Dolichoderinae by the following combination of characters (Shattuck 1992): "mandibles with 3 to 7 teeth, about 7 denticles, and the basal angle indistinct and with a relatively uninterrupted curve between the

masticatory and basal margins; petiolar scale reduced or absent; first gastral segment projecting anteriorly and concealing petiole in dorsal view; dorsal face of propodeum shorter than declivitous face; erect hairs generally lacking on pronotum."

Of the 80 extant *Tapinoma*, three species having a distinct propodeal shape were grouped under the *Tapinoma lugubre* species group (Bharti et al. 2013). Species in this group can be distinguished from other species of the genus by the presence of propodeum with a distinct ridge or carina, or a high acute tooth-like structure (when viewed in profile). The *T. lugubre* species group currently includes three species: *T. lugubre* Santschi, 1917, which is widespread in Africa; *T. wilsoni* Sharaf & Aldawood, 2012, from the Arabian Peninsula (Saudi Arabia); and *T. himalaicum* Bharti et al., 2013, from the Indian subcontinent (India). Here, we describe a new species, *Tapinoma onaele* **sp. nov.**, belonging to the *T. lugubre* group from the Western Ghats of southern India. This new species is the fourth member of the *T. lugubre* species group.

MATERIALS AND METHODS

The holotype of this new species was collected using leaf litter extraction from a coffee plantation in Virajpet in the southern Western Ghats. The paratypes were hand-collected from three localities—Indian Institute of Science campus in Bangalore, Puttur, and Palakkad—in southern India. The specimens were measured using OLYMPUS SZX10.

Measurements and indices follow the standardized definitions by Shattuck (1990):

Lateral eye space (LES): The distance between the lateral edge of the head and the lateral edge of the eye measured in full-face view.

Eye length (EL): The maximum length of the eye measured in full-face view.

Eye width (EW): The maximum width of the eye measured in full-face view.

Eye spread (ES): The distance between the innermost edges of the eyes in full-face view.

Head width (HW): The maximum width of the head measured in full-face view.

Head length (HL): The maximum length of the head from the anterior clypeal margin to the midpoint of a line drawn across the occipital margin measured in full-face view.

Occiput-ocular distance (OOD): The distance between the posterior margin of the eye and the posterior margin of the occipital border measured in full-face view.

Ocular-clypeal distance (OCD): The distance between the anterior margin of the eye and the posterior margin of the clypeus measured in full-face view.

Clypeal length (CL): The maximum length of the clypeus measured in full-face view.

Scape length (SL): The maximum length of the scape excluding the basal radicle.

Pronotal length (PnL): The distance between the anterior edge of the pronotal collar to the pronotal-mesonotal suture measured in profile view.

Mesonotal length (ML): The distance between the pronotal-mesonotal suture to the metanotal groove measured in profile view.

Propodeal length (PpL): The distance between the metanotal groove to the posterior of the propodeal ridge measured in profile view.

Propodeal declivity length (PdL): The distance between the tip of the acute end of the propodeum to the ventral margin of the propodeal lobe along the declivity margin in profile view.

Cephalic index (CI): HW/HL.

Ocular index (OI): EW/EL.

Scape index (SI): SL/HW.

Propodeal declivity index (PDI): PpL/PdL.

Depositories:

IISc - Indian Institute of Science, Bangalore, Karnataka, India

GKVK - Gandhi Krishi Vignana Kendra, Bangalore, Karnataka, India

TAXONOMY

***Tapinoma onaele* sp. nov.**

http://zoobank.org/BADE3C04-17E4-43E7-BC59-2471F49B7EB6

Fig. 1

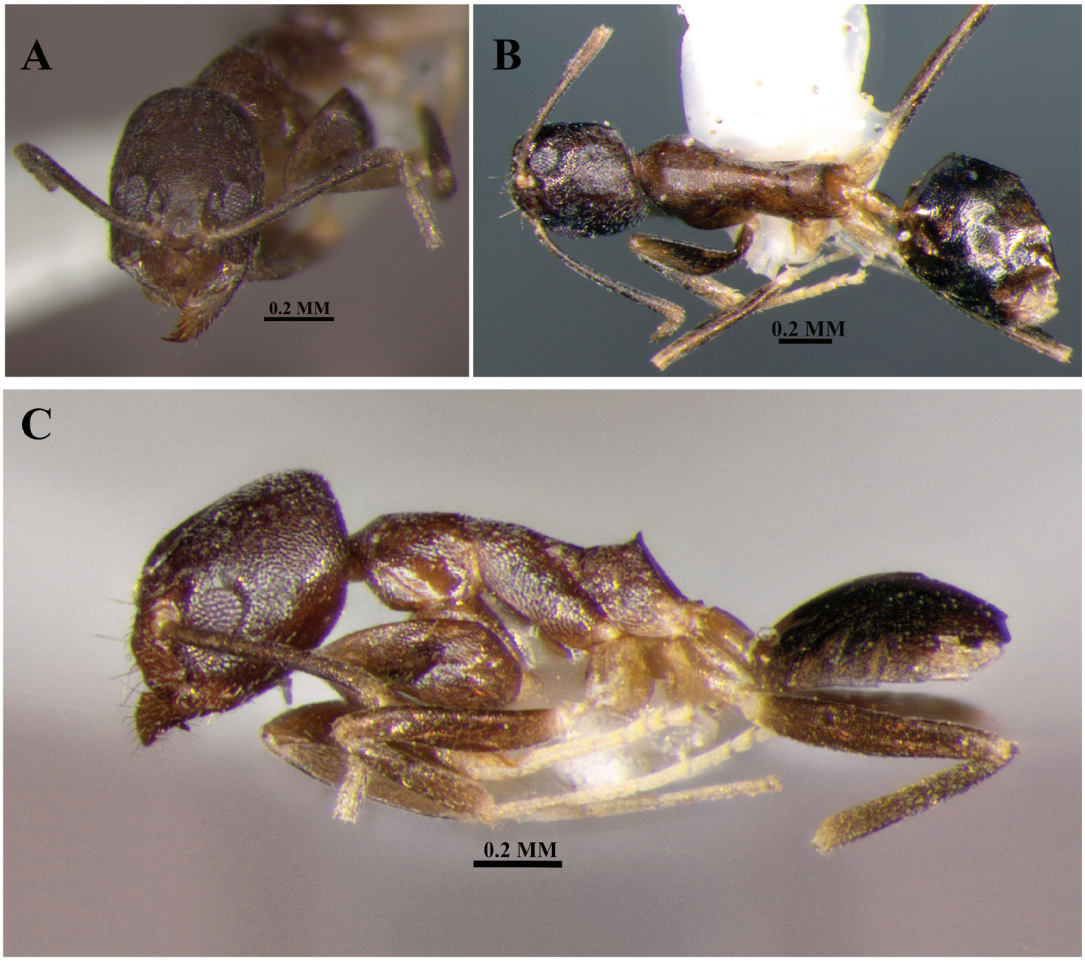

Fig. 1. *Tapinoma onaele* **sp. nov.**, Holotype, worker: (a) Head in full-face view, (b) Body in dorsal view, (c) Body in profile view.

Type Material:

Holotype worker- India: Karnataka, Kodagu district, Virajpet, 12.181754°N, 75.814091°E (±10 m), 917 m alt., leaf litter extraction, 02.ii.2021, Mohammad Abdus Shakur Leg. (IISc).

Paratypes: 2 workers; India: Karnataka, Bengaluru urban district, IISc Bangalore, 13.019865°N, 77.567646°E (±30 m), 939 m alt., Hand collection, 23.i.2023 & 24.i.2023; 12 workers; India: Karnataka, Bengaluru urban district, IISc Bangalore, 13.019865°N, 77.567646°E (±30 m), 939 m alt., Hand collection, 10.ii.2024 & 11.ii.2024, Mohammad Abdus Shakur Leg. 1 worker; India: Karnataka, Dakshina Kannada district, Puttur, 12.760601°N, 75.2050073°E (±30 m), 115 m alt., Hand collection, 09.xii.2023; 1 worker; India: Kerala, Palakkad district, Palakkad, 10.782537°N, 76.652701°E (±30 m), 120 m alt., Hand collection, 24.ii.2024, Paul Mangaly Leg. (IISc, GKVK).

Measurements (n = 17 workers; holotype measurements in parenthesis) - LES: 0.03 – 0.05 (0.04); EL: 0.13 – 0.15 (0.14); EW: 0.07 – 0.09 (0.08); ES: 0.19 – 0.24 (0.20); HW: 0.43 – 0.49 (0.45); HL: 0.58 – 0.63 (0.59); OOD: 0.25 – 0.30 (0.25); OCD: 0.06 – 0.09 (0.07); CL: 0.10 – 0.13 (0.12); SL: 0.59 – 0.65 (0.63); PnL: 0.25 – 0.3 (0.28); ML: 0.22 – 0.28 (0.26); PpL: 0.12 – 0.14 (0.12); PdL: 0.24 (0.24); CI: 0.70 – 0.81 (0.76); OI: 0.54 – 0.61 (0.6); SI: 1.27 – 1.39 (1.4); PDI: 0.51 – 0.58 (0.51).

Fig. 2. *Tapinoma onaele* **sp. nov.:** Workers carrying seed and dead mosquito to the nest.

Description.

Head: Head longer than broad by 1.3 times, posterior margin convex, slightly narrow than anterior, sides almost parallel, posterolateral corners rounded, vertex convex. Eyes relatively large, longer than wide, placed just below the midline of head. Antennae 12 segmented, scape long, surpassing posterior margin of head by at least 1/3 of its length. Frontal carinae present. Anteromedial clypeal margin concave, posterior clypeal margin concave between the anterior margin of antennal socket cavities. Masticatory margin of mandibles with 9 – 10 teeth and denticles, size gradually decreasing from apical to basal tooth, 3rd tooth smaller than 4th tooth.

Mesosoma: Mesonotal and metanotal groove distinct, dorsum of pronotum and mesonotum even, propodeum bulges distinctly above mesonotum; dorsal surface of propodeum slightly convex, dorsal face shorter than declivitous face, propodeal angle with a distinct ridge or carina, with high acute angle; metanotal spiracle placed on the dorsolateral margin in lateral view; propodeal spiracles present laterally and posteriorly near the declivitous face.

Petiole and Gaster: Petiolar scale small, inclined anteriorly. Gaster overhanging petiole.

Color, Sculpture, and Pilosity: Whole body brownish, head and gaster darker than mesosoma, almost black, petiole and legs lighter than mesosoma with a hint of yellow. Whole body with finely coriaceous sculpture. Anterior clypeal margin with setae, medial pair longer and lateral setae short; mandibles with faint striations and numerous long suberect setae; 1st gastral tergite covered in short appressed setae, lacking erect setae; remaining gaster tergites with setae present; head and antennal scapes covered in sparse short appressed setae.

Variation in workers: Posterolateral corners of the head of some paratype workers are angulated, unlike other workers with rounded posterolateral corners. The propodeum appears to be swollen in profile in a few paratype workers.

Etymology

The specific epithet "*onaele*" refers to leaf litter in the Kannada language of the type localities, reflecting the nesting habitat of this species. This term is used to draw attention to the importance of maintaining the leaf litter in the coffee plantations, a crucial microhabitat in sustaining the local myrmecofauna (Shakur 2021).

Differential diagnosis. This new species belongs to the *Tapinoma lugubre* species group. *Tapinoma onaele* sp. nov. can be distinguished from *T. himalaicum* and other species in this group by (1) Larger body size and longer scapes (SI >1.3) (*T. himalaicum* has shorter scapes, SI – 1.2); (2) dorsal surface of propodeum is convex and rises above the mesonotum (does not rise and is in line in *T. himalaicum* & *T. wilsoni*; rises above mesonotum but is flat in *T. lugubre*); (3) darker and brownish body (*T. himalaicum* has a lighter body); (4) gaster darker than rest of the body (black) (*T. himalaicum* has gaster concolorous with the rest of the body); (5) antennal scapes concolorous with head (*T. himalaicum* has scapes lighter than head); (6) Propodeum is longer (PpL ≥ 0.12 mm) and propodeal declivity index is larger (PDI > 0.5) (Propodeum in *T. himalaicum* is smaller (PpL ≤ 0.1mm) and propodeal declivity index is small (PDI ≤ 0.4)).

Key to the *Tapinoma lugubre* species group workers, modified from Bharti et al. (2013).

1. Anteromedial clypeal margin with a wide shallow medial concavity ....***T. lugubre*** Santschi (Africa)
Anteromedial clypeal margin more deeply concave **2**

2. Head relatively wide and short (CI 0.82). Scape relatively short, surpassing the posterior margin of head about 1/4 of its length (SI 0.88) .... ***T. wilsoni*** Sharaf & Aldawood (Arabian Peninsula)
Head narrower and longer (CI < 0.8). Scape very long, surpassing the posterior margin of head more than 1/3 of its length (SI > 1) **3**

3. Dorsal surface of propodeum is flat and in line with mesonotum. Scapes lighter in color than head. Scapes relatively smaller: Scape index < 1.2. Propodeal declivity index is ≤ 0.4. Body brownish yellow, concolorous with gaster .... ***T. himalaicum*** Bharti et al., 2013 (Western Himalaya, India)
Dorsal surface of propodeum is convex and rises above the mesonotum. Scapes concolorous with head. Scapes relatively longer: Scape index > 1.3. Propodeal declivity index is > 0.5. Body darker brown, gaster darker (blackish) .... ***T. onaele*** **sp. nov.** (Western Ghats, India)

NOTES ON ECOLOGY

The holotype was collected in a coffee plantation (*Coffea robusta* and *Coffea* arabica), with silver oak (*Grevillea robusta*), jack fruit (*Artocarpus heterophyllus*), and black plum (*Syzygium* spp.), as shade trees. The paratype colony at IISc, Bangalore, was found at the base of a golden trumpet tree, *Handroanthus chrysotrichus* (synonym *Tabebuia chrysotricha*). The site was dry, and the ground cover was from leaf litter.

Tapinoma onaele **sp. nov.** was found nesting in the ground and foraging on the ground, on bushes, and in leaf litter. This contrasts with *T. lugubre* and *T. himalaicum,* which have been suggested to be arboreal (Bharti et al. 2013; Yode et al. 2020). The workers were skittish and avoided the larger *Crematogaster* spp. nesting nearby. *Tapinoma onaele* tended to scale insects (Hemiptera) on the leaves of nearby plants. *Tapinoma onaele* appears to be generalist in diet, feeding on sucrose solution provided as bait; workers carried seeds and dead mosquitoes (Diptera) inside the nest (Fig. 2). Hourly observation of the nest over a twenty-four-hour period suggests the workers to be nocturnal as they were active between 17:00 and 09:00 hours, and inactive at other times of the day.

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REFERENCES

Bharti H, Kumar R, Dubovikoff D, 2013. A new species of the genus *Tapinoma* Foerster, 1850 (Hymenoptera: Formicidae) from India. *Caucasian Entomological Bulletin* 9(2): 303–304.

Bolton B, 2024. An online catalog of the ants of the world. Downloaded from https://antcat.org on 2 January 2024.

Brown WL, 2000. Diversity of ants. In: *Ants-Standard Methods for Measuring and Monitoring Biodiversity* (Agosti, D, Majer, J, Alonso, LE, & Schultz, T, eds.), Biological diversity hand book series, Smithsonian Institution Press, Washington and London, 280.

Santschi F, 1917. Fourmis nouvelles de la Colonie du Cap, du Natal, et de Rhodesia. *Annales de la Société Entomologique de France* 85: 279–296.

Shakur MA, 2021. Richness and compositional responses of ants to land use change. MSc thesis. Saurashtra University, Rajkot, 40 pp.

Sharaf MR, Aldawood A, El-Hawagry M, 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 SO, 1992. Generic revision of the ant subfamily Dolichoderinae (Hymenoptera: Formicidae). *Sociobiology* 21: 1–181.

Shattuck SO, 1990. Revision of the dolichoderine ant genus *Turneria* (Hymenoptera: Formicidae). *Systematic Entomology* 15(1): 101–117.

Wetterer JK, 2009. Worldwide spread of the ghost ant, *Tapinoma melanocephalum* (Hymenoptera: Formicidae). *Myrmecological News* 12: 23–33.

Yode C-VD et al., 2020. Evaluating Efficiency of Different Sampling Methods for Arboreal Ants (Hymenoptera: Formicidae) in A West African Forest-Savanna Mosaic. *Sociobiology* 67(4): 492–500.