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Cryptopone subterranea sp. nov., a rare new cryptobiotic ant species (Hymenoptera: Formicidae) from India

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ABSTRACT. A cryptobiotic species *Cryptopone subterranea* sp. nov. is described based on the worker caste, collected in the foothills of the Indian Himalayas. It most resembles *C. motschulskyi* Donisthorpe, 1943, and distinctly differs from all described species of the genus. An identification key to the known Indian species of *Cryptopone* is provided.

Keywords: Ponerinae, *Cryptopone*, key, new species, taxonomy, Himalaya, India.

INTRODUCTION

The genus *Cryptopone* is a small group of ponerine ants distributed in the Neotropical, Nearctic, Palaearctic, Afrotropical, Oriental, Indo-Australian and Australian regions that includes about 20 species (Bolton et al. 2007, Bolton 2012). Although *Cryptopone* awaits a global taxonomic revision, important taxonomic contributions to this genus from Southeast Asia include Wang (1992), Zhou and Zheng (1997), Xu (1998), Zhou (2001) and Terayama (1999, 2009).

Mackay and Mackay (2010) treated *Cryptopone* as a junior synonym of *Pachycondyla*. However, Schmidt (2009, in his thesis), in a molecular-based study, found that the genus *Pachycondyla* is paraphyletic and should itself be split into several genera, with *Cryptopone* remaining distinct. As per Schmidt's molecular study, Chris A. Schmidt and Steve O. Shattuck (personal communication, 2012) are preparing a paper that revives *Cryptopone* from synonymy.

From India, only two species of *Cryptopone* have been reported to date: *C. testacea* Emery, 1893 and *C. nicobarensis* Forel, 1905 (Bolton 2012). *Cryptopone nicobarensis* was described based on the queen caste collected in the Nicobar Islands, while the only record of *C. testacea* in India is of a male described by Donisthorpe (1942) from Malabar, southern India. An identification key to the *Cryptopone* species of India is here provided.

MATERIALS AND METHODS

The specimens were collected by soil core sampler and hand-picking methods. The taxonomic analysis was conducted on a Nikon SMZ 1500 stereo zoom microscope. For digital images, an Evolution MP digital camera was used on the same microscope with Auto-Montage (Syncroscopy, a division of Synoptics Ltd.) software. Later, images were cleaned as per requirements using Adobe Photoshop CS5. Holotype and paratype have been deposited in PUPAC, Punjabi University Patiala Ant Collection, Patiala, India.

MEASUREMENTS AND INDICES

Morphological terminology for measurements (given in millimetres) and indices include:

Head length (HL):
Maximum length of head in full-face view, measured in straight line from the anteclypeus to the midpoint of the posterior margin of head.

Head width (HW):
Maximum width of head in full-face view.

Eye length (EL):
Maximum length of eye as measured normally in oblique view of the head to show full surface of eye.

Scape length (SL):
Maximum length of the scape excluding the basal neck and condyle.

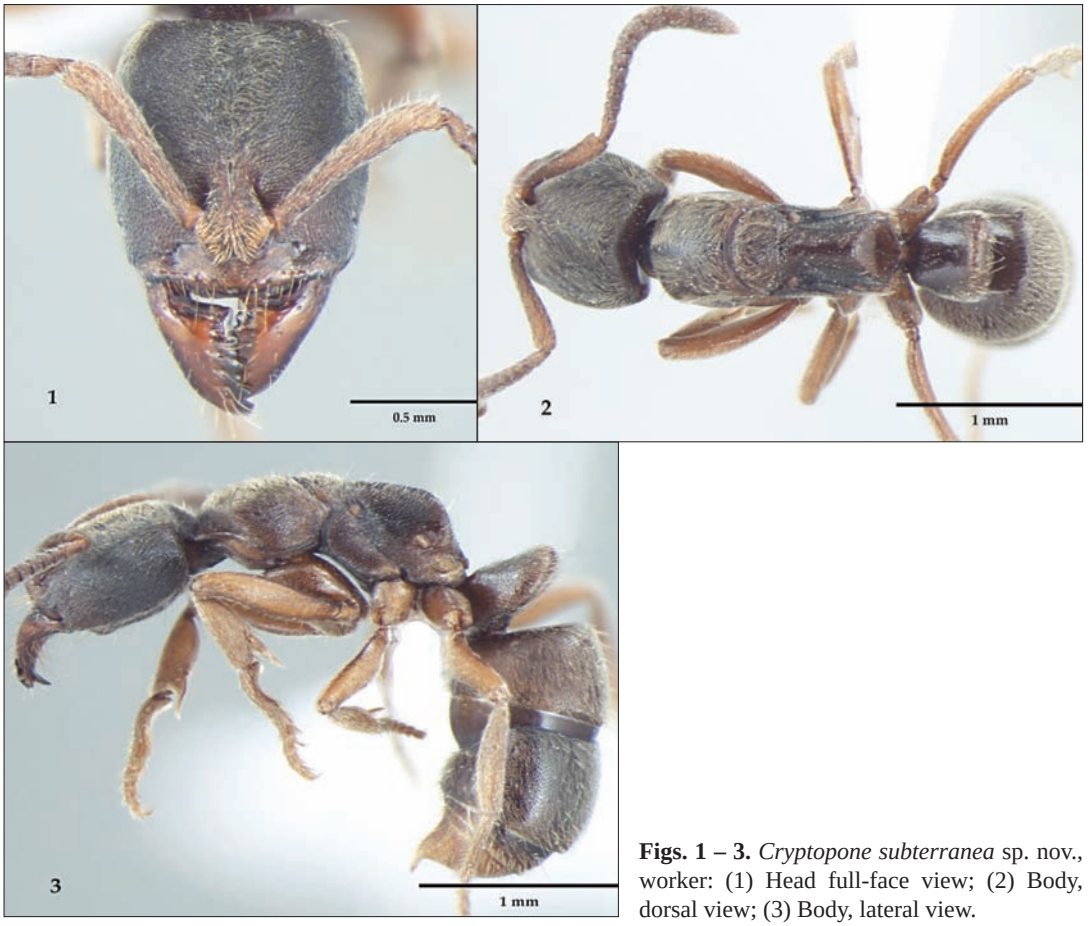
Weber length (WL):
Weber's length of mesosoma, measured in lateral view from the anterior surface of the pronotum (excluding the collar) to the posterior margin of the propodeal lobes.

Petiole length (PL):
Maximum longitudinal distance in lateral view between the anterior and posterior extensions of the petiolar node, excluding the anterior and posterior condyles.

Petiole height (PH):
In lateral view, the distance from the ventrum of the petiolar sternite to the apex of the petiolar tergite, taken as a vertical measurement perpendicular to the longitudinal axis of the petiole.

Gaster length (GL):
Length of the gaster in lateral view from the anteriormost point of first gastral segment to the posteriormost point of the last segment (excluding sting).

Total length (TL): HL+WL+PL+GL
Cephalic index (CI): (HW/HL) × 100
Scape index (SI): (SL/HW) × 100



Figs. 1 – 3. *Cryptopone subterranea* sp. nov., worker: (1) Head full-face view; (2) Body, dorsal view; (3) Body, lateral view.

***Cryptopone subterranea* sp. nov.**
(Figs. 1–3)

MATERIAL EXAMINED

HOLOTYPE: 1 (w), 14.vii.2009, India, Jammu and Kashmir, Surinsar, 32.7009°N 75.1512°E, 700 m a.s.l., by soil core sampler (coll. Aijaz A. Wachkoo). Paratype 1 (w), 18.vii.2009, India, Himachal Pradesh, Nagabari, 32.3004°N 75.8901214°E, 420 m a.s.l., by hand picking (coll. Aijaz A. Wachkoo).

WORKER

Measurements (in mm) (Holotype): TL 4.77; HL 1.11; HW 1.04; EL 0.05; WL 1.45; PL 0.33; PH 0.78; SL 0.81; GL 1.88. Indices: CI 93.69; SI 77.88
(Paratype) TL 4.59; HL 1.08; HW 1.02; EL 0.04; WL 1.39; PL 0.32; PH 0.76; SL 0.79; GL 1.80. Indices: CI 94.44; SI 77.45

Head subrectangular, slightly longer than broad, broadened posteriorly, sides convex; fronto-vertex margin shallowly concave in full-face view of the head. Mandibles elongate-triangular; bearing 9 teeth along masticatory margin; basal portion of mandible with a distinct oval fovea dorsolaterally. Antennae 12-segmented; scapes barely reaching the posterior margin of head. Eyes rudimentary, with 5–6 facets, placed at the level of antennal torulus. Anteclypeus concave in frontal view. Vertex deflexed and concave in dorsal view.

Pronotum with dorsal and lateral faces meeting at a blunt angle in dorsal view; promesonotal suture distinct, mesometanotal suture feeble; propodeum strongly constricted, distinctly narrower than mesonotum. Propodeum depressed slightly below level of mesonotum in lateral view, forming rounded angle with subvertical, evenly convex declivity. Propodeal spiracle elongate, slit-like.

Petiole a thick scale with rounded dorsolateral margins. In anterior view dorsal apex with round summit; sides strongly convex; in lateral view anterior face convex and posterior face shallowly concave. Gaster cylindrical, with tergite of first segment rising posteriorly, remaining segments of gaster gently curved downward; a strong constriction with transverse striae separates first and second gastral segments. Sting long, sharp and upcurved.

Head and mesosoma punctate-reticulate, mesopleuron and propodeal sculpture rugulose in lateral view; propodeum punctate and shiny in dorsal view. Mandibles smooth and shiny with scattered punctures; antennae, legs and gaster densely punctate overall; declivitous face of propodeum, petiolar dorsum and posterior face shiny.

Body covered all over with dense pubescence, which does not hide body sculpturing, pubescence sparse on propodeal dorsum and lateral mesosoma; longer suberect hairs also present, more conspicuous on gaster. Dorsal (outer) surface of middle tibia and middle basitarsus with traction-enhancing thickened narrow cuticular spines mixed with the normal finer pilosity.

Dark brown; head blackish, legs red brown.

ETYMOLOGY

The species is named for its subterranean habitat.

REMARKS

Cryptopone subterranea can be easily distinguished from *C. testacea* and *C. nicobarensis*, the earlier-known species of *Cryptopone* from India, by the presence of a 9-toothed mandible, whereas both the latter possess a 6-toothed mandible. It most resembles *C. motschulskyi* Donisthorpe, 1943, but can be easily distinguished by the presence of 9 teeth on mandible and by its larger size (HW 1.02–1.04 mm), while the latter has only 6 teeth and smaller size (HW 0.64 mm).

DISTRIBUTION AND HABITAT

This species seems to be rare in the Shivalik range of the Northwest Himalayas: only two specimens were found, in Jammu and Kashmir and Himachal Pradesh, during intensive surveys. One specimen was found along a small shady lakeside forest

fragment with loose and moist soil, the other under a stone below a tree. Observations indicate it is a hypogaeic specialist predator ant.

Key to *Cryptopone* from India

1. Mandibles 9-toothed; large, HW 1.02-1.04 mm..... *C. subterranea* sp. nov.
   Mandibles 6-toothed; small, HW < 0.6 mm.. 2
2. Worker HW 0.59 mm or usually much less. Queen HW 0.64 mm; medium yellowish brown with elongate head..... ..... *C. testacea* Emery
   Worker unknown. Queen HW < 0.64 mm; brown with square head..... ..... *C. nicobarensis* Forel

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