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


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**


**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.

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...............................  
   Worker unknown. Queen HW < 0.64 mm; brown with square head...............................  
   .................  

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