

Cerapachys browni and *Cerapachys costatus*, two new rare ant species (Hymenoptera: Formicidae) from India

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Abstract: Descriptions of *Cerapachys browni* sp. n. and *Cerapachys costatus* sp. n. from India are provided. *C. browni* is the member of the wide spread *dohertyi* group while *C. costatus* represents the 3rd species of the rare *crawleyi* group, with *C. sauteri* Forel, 1913 and *C. crawleyi* Wheeler, 1924 reported earlier. An identification key to the worker caste of Indian *Cerapachys* species is provided.

Key words: ants; Cerapachyinae; key; new species; Shivalik

Introduction

At present 146 species are listed in the ant genus *Cerapachys* from the Neotropical, Nearctic, Palearctic, Afrotropical, Malagasy, Oriental, Indo-Australian and Australian regions (Bolton et al. 2006; Bolton 2012). Since Brown's (1975) work on the tribe Cerapachyini, other significant contributions to the genus from South-east Asia include: Terayama et al. (1988), Morisita et al. (1989), Radchenko (1993), Wu & Wang (1995), Terayama (1996, 2009) and Borowiec (2009).

Below we describe *Cerapachys browni* sp. n. and *Cerapachys costatus* sp. n. based on single workers, collected in lower Shivalik range of Northwest Himalaya.

Cerapachys browni is a member of the dominant, rapidly spreading and radiating *dohertyi* group while *C. costatus* is an intriguing species, with striking costate sculpture; the mid and hind tibiae each have a large and small apical spur (plesiomorphic trait), characters shared with the Oriental *C. crawleyi* and *C. sauteri*. The generic placement of these two Oriental species is in question and the discovery of *C. costatus* may prove pivotal in taxonomic decisions regarding the generic status of these species, and is therefore very important from a phylogeographic and phylogenetic viewpoint.

Material and methods

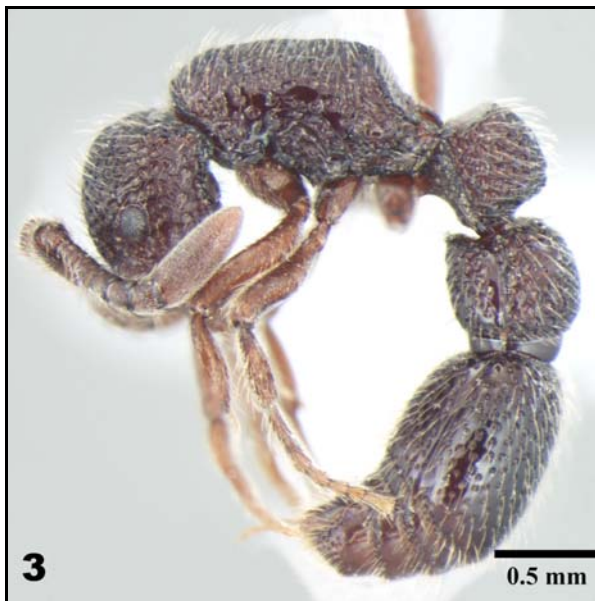
The ant specimens were collected by hand picking and taxonomic analysis was conducted using a Nikon SMZ 1500 stereo zoom microscope. For digital images, an MP evolution digital camera was used on the same microscope with Auto-Montage (Synchroscopy, Division of Synoptics, Ltd.) software. Later, images were cleaned as required with Adobe Photoshop CS5. Holotypes of both the species have been deposited in PUPAC, Punjabi University Patiala Ant Collection, Patiala.

Morphological terminology for measurements (given in millimeters) and indices include: HL – maximum length of head in dorsal view, measured in straight line from the anterior most point of the anterior clypeal margin to the mid-point of the vertexal margin; HW – maximum width of head in dorsal view; EL – maximum length of eye as measured normally in oblique view of the head to show full surface of eye; SL – maximum length of the scape excluding the basal neck and condyle; WL – Weber's length measured from the anterior surface of the pronotum proper (excluding the collar) to the posterior extension of the propodeal lobes; PL 1 – maximum length of the petiole in dorsal view; PW 1 – maximum width of the petiole in dorsal view; PL 2 – maximum length of the postpetiole in dorsal view; PW 2 – maximum width of the postpetiole in dorsal view; GL – length of the gaster in lateral view from the anteriormost point of first gastral segment to the posteriormost point (excluding sting); TL – total length: HL+WL+PL1+PL2+GL; CI – cephalic index: HW/HL × 100; SI – scape index: SL/HW × 100; PI – petiolar index: PW1/PL1 × 100.

Cerapachys browni Bharti et Wachkoo, sp. n. (Figs 1–3)

Worker measurements: TL 4.78; HL 1.00; HW 0.83; EL 0.18; WL 1.26; PL1 0.48; PW1 0.56; PL2 0.60; PW2 0.66; SL 0.65; GL 1.44. Indices: CI 83; SI 78; PI 116 ($n = 1$).

Head. Rectangular, slightly longer than broad, sides gently convex; vertex shallowly concave. Mandibles subtriangular, dentate. Antennae 12 segmented; scapes short and clavate, reaching up to 4/5th of posterior margin of head; apical funicular segment longest (0.57 mm), almost the length of scape. Eyes moderate, round, not protruded, placed at the middle of head; ocelli absent. Posterior 1/3rd of head ventrally exca-



Figs 1–6. *Cerapachys browni* sp. n.: 1 – Head, dorsal view; 2 – Body, dorsal view; 3 – Body, lateral view. *Cerapachys costatus* sp. n.: 4 – Head, dorsal view; 5 – Body, dorsal view; 6 – Body, lateral view.

vated giving temple a lobulated shape in lateral view. Anterior clypeal margin entire and convex; posterior margin deflexed and flat.

Mesosoma. Wider posteriorly; dorsal profile slightly convex; sutures absent. Propodeal declivity trun-

cate; anterior border of pronotum and propodeal angle marginate.

Metasoma. Petiole dorsally subrectangular, broader than long with sides diverging posteriorly; anterior face straight; dorsal profile convex. Subpetiolar

process large, directed posteriorly, located beneath anterior 1/3rd of the petiole; fenestra oval. Postpetiole broader than long. Gaster elongate; base of first gastral tergite with cross ribs.

Sculpture. Head, petiole and postpetiole uniformly rugo-reticulate, reticular interspaces shiny. Mesosoma similarly rugo-reticulate; metanotum and mesopleuron medially with a smooth patch; reticulations on metanotum, mesopleuron and sternite of postpetiole graded into an area of isolated foveae separated by shiny interspaces. Gaster foveate; foveae of anterior 1/4th of 1st gastral tergite are coarsest and densest, posteriorly foveae become progressively smaller and more scattered; foveae on remaining gastral tergites are confined to posterior 1/2 leaving anterior 1/2 smooth and shiny. Cinctus of 1st gastral tergite microreticulate. Scapes covered with dense foveolae; mandibles and legs with similar but scattered foveolae.

Vestiture. Whole body covered with moderate suberect pilosity; apical funicular segments pubescent.

Color. Black with mandibles, antennae and legs castaneous.

Material examined: Holotype. Worker, India, Uttarakhand, Rajaji Forest Area, 30.2483° N, 77.9878° E, 660 m a.s.l., 12.viii.2009, hand picking (coll. A.A. Wachkoo). The holotype is missing left hind leg.

Etymology. The species is named in the honor of William L. Brown, Jr.

Differential diagnosis. *C. browni* is the third member of *dohertyi* group from India with *C. aitkenii* Forel, 1900 and *C. indicus* Brown, 1975 known previously. It differs considerably from all previously known species. It may be distinguished from *C. aitkenii* by black color (unicolorous), rugo-reticulate sculpture and strongly constricted cinctus of gaster, with 1st gastral tergite much broader than postpetiole whereas *C. aitkenii* is bi-colored, foveate and 1st gastral tergite is as broad as postpetiole. *C. indicus* is reddish brown, foveate, petiole is longer than broad and head subtriangular while as petiole is broader than long and head is rectangular in *C. browni*.

Distribution and habitat. This species seems to be rare in Shivalik range of Northwest Himalaya and only a single specimen was found in a single locality of a reserved forest area (Rajaji Forest Area), in Uttarakhand during intensive surveys. This species was found in leaf litter, along the edge of a primary, subtropical, semi-evergreen forest with a good annual precipitation.

***Cerapachys costatus* Bharti et Wachkoo, sp. n.** (Figs 4–6)

Worker measurements: TL 7.13; HL 1.23; HW 1.14; EL 0.28; WL 2.23; PL1 0.86; PW1 0.75; PL2 0.61; PW2 1.12; SL 0.80; GL 2.20. Indices: CI 92; SI 70; PI 87 ($n = 1$).

Head. Rectangular, slightly longer than broad, sides gently convex; vertex shallowly concave. Mandibles subtriangular, edentate. Antennae 12 segmented; scapes short and clavate; reaching up to 5/7th of posterior margin of head. Eyes moderate, globular, protruded placed above the middle of head; 3 ocelli present. Anterior clypeal margin entire and convex; posterior margin deflexed and flat.

Mesosoma. Trunk shaped, wider posteriorly; dorsal profile convex; sutures absent except for distinct latero-pronotal mesopleural suture. Propodeal declivity truncate; anterior border of dorsopronotum and propodeal junction marginate; mid and hind tibiae each have a large and small apical spur.

Metasoma. Petiole dorsally rectangular, longer than broad with convex sides; anterior face straight; dorsal profile convex. Postpetiole broader than long. Gaster elongate; base of cinctus of first gastral tergite with cross ribs.

Sculpture. Head porcate-sinuate; malar space drab, clathrate; mandibles and scape covered with fine reticulations and scattered foveolae; funiculus microreticulate. Vertex, mesosoma, petiole and postpetiole costate-sulcate. Gaster foveate; gastral segments microreticulate.

Vestiture. Pilosity sparse, suberect; denser on scapes and legs; funiculus pubescent.

Color. Black with mandibles, antennae and legs castaneous.

Material examined. Holotype. Worker, India, Uttarakhand, FRI, 30.3416° N, 77.9903° E, 640 m a.s.l., 4.ix.2010, hand picking (coll. A.A. Wachkoo).

Etymology. The species epithet is Latin for costate, in reference to the distinguishing sculpture on mesosoma, petiole and postpetiole.

Differential diagnosis. This is an interesting species with remarkable costate sculpture, a character shared with only two Oriental species: *C. crawleyi* and *C. sauteri*. *C. costatus* can be easily distinguished from *C. crawleyi* by longitudinal costate sculpture of mesosoma and foveate gaster whereas latter is characterized by transverse costate sculpture on mesosoma and longitudinal costate sculpture on gaster. It separates from *C. sauteri* by rectangular head with porcate-sinuate sculpture and longitudinal costate sculpture on postpetiole while in *C. sauteri* head is subtriangular and sculpture is regular transverse costate on head and postpetiole.

Distribution and habitat. This species seems to be rare in the Shivalik range of Northwest Himalaya: the only known specimen was found in Forest Research Institute, Uttarakhand during intensive surveys. The species was found in leaf litter within a primary, subtropical, semi-evergreen forest with a good annual precipitation.

Key to species of *Cerapachys* of India based on worker caste

- 1 Antenna 9 segmented *C. biroii* Forel, 1907
 – Antenna 11 or 12 segmented 2
- 2 Antenna 11 segmented .. *C. besucheti* Brown, 1975
 – Antenna 12 segmented 3
- 3 Sculpture predominantly costate; large sized species
 TL > 7 mm *C. costatus* sp. n.
 – Sculpture predominantly punctuate on a smooth or
 finely sculptured background; small to medium sized
 species TL < 7 mm 4
- 4 Petiole with strong overhanging dorsolateral margins
 *C. longitarsus* (Mayr, 1878)
 – Petiole with dorsum rounding into sides; dorsolateral
 margins absent or vestigial 5
- 5 Dorsal surface of petiolar node with a smooth, median
 area *C. sulcinodis* Emery, 1889
 – Dorsal surface of petiolar node rounded and punctu-
 ate, without a differentiated median smooth area .. 6
- 6 Petiolar node seen from above longer than broad ...
 *C. indicus* Brown, 1975
 – Petiolar node as wide as, or wider than long 7
- 7 Head reddish brown or red; trunk and both nodes red;
 gaster black or dark brown; foveate
 *C. aitkenii* Forel, 1900
 – Body unicolours, black; rugo-reticulate
 *C. browni* sp.n.

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