Discothyrea periyarensis sp. n., a new proceratiine ant species (Hymenoptera: Formicidae: Proceratiinae) from India

Discothyrea periyarensis sp. n., новый вид муравьев-процератиин (Hymenoptera: Formicidae: Proceratiinae) из Индии

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Ключевые слова: Hymenoptera, Formicidae, Proceratiinae, *Discothyrea*, новый вид, Индия.

Abstract. *Discothyrea periyarensis* **sp. n.** is described from India. The new species represents the 10th valid species from Oriental region with *D. banna* Xu et al., 2014, *D. bryanti* (Wheeler, 1917), *D. diana* Xu et al., 2014, *D. globa* Forel, 1905, *D. kamiteta* Kubota et Terayama, 1999, *D. sauteri* Forel, 1912, *D. sringerensis* Zacharias et Rajan, 2004, *D. stumperi* Baroni Urbani, 1977 and *D. yueshen* Terayama, 2009 reported earlier. Among these, the new species shares most affinities with *D. bryanti* but with the frontal carinae only extending posteriorly to 1/2 length of head and anterior margin of clypeus not crenulate. The new species represents the 3rd valid species from India with *D. sringerensis* and *D. stumperi* reported earlier. A revised key to the known Oriental species is provided herewith.

Резюме. *Discothyrea periyarensis* **sp. n.** описан из Индии. Новый вид является десятым валидным видом в Ориентальной области помимо *D. banna* Xu et al., 2014, *D. bryanti* (Wheeler, 1917), *D. diana* Xu et al., 2014, *D. globa* Forel, 1905, *D. kamiteta* Kubota et Terayama, 1999, *D. sauteri* Forel, 1912, *D. sringerensis* Zacharias et Rajan, 2004, *D. stumperi* Baroni Urbani, 1977 и *D. yueshen* Terayama, 2009, указанных для региона ранее. Среди них новый вид наиболее близок к *D. bryanti*, но имеет фронтальные карины, продолжающиеся до половины длины головы, и передний край клипеуса без морщинок. Описываемый вид – третий валидный индийский вид вместе с известными ранее *D. sringerensis* и *D. stumperi*. Приведен обновленный определитель ориентальных видов рода.

Introduction

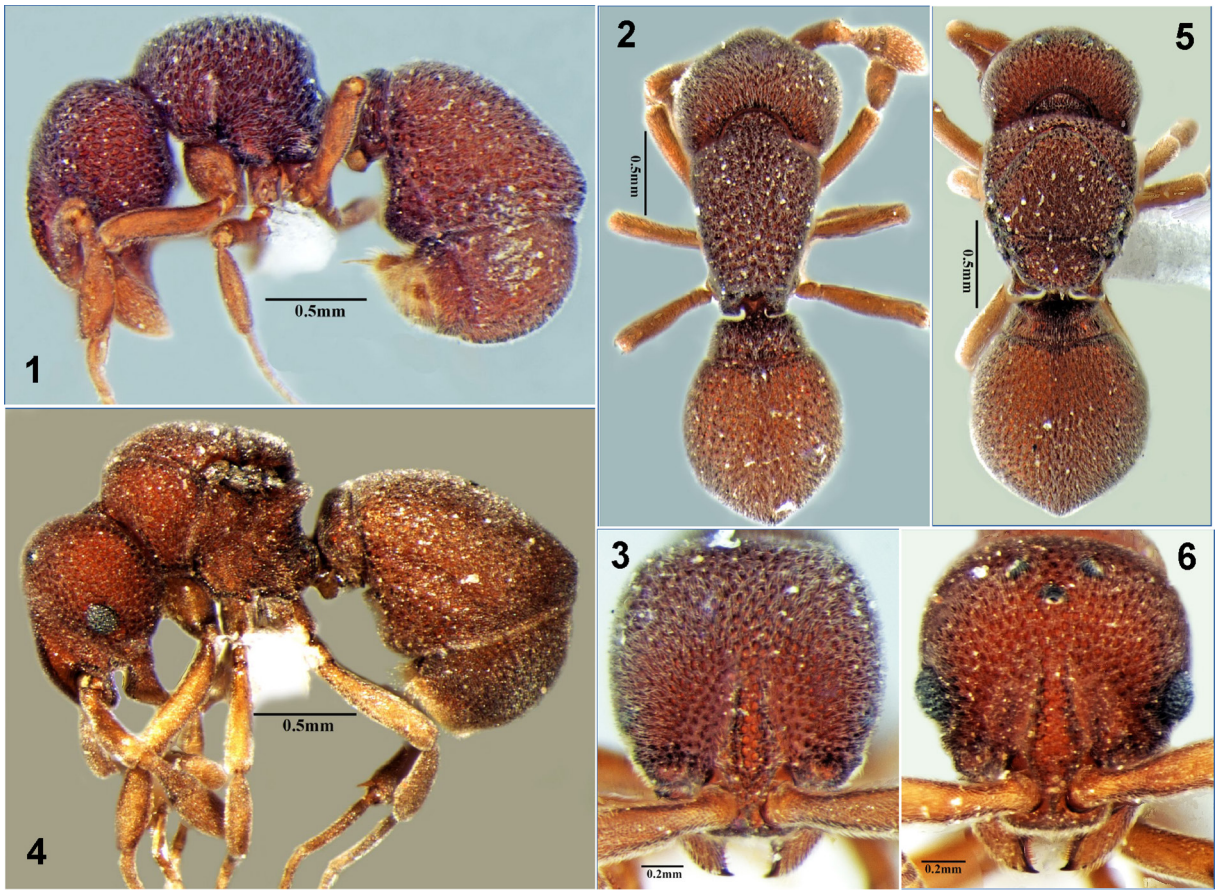
The ant genus *Discothyrea* Roger, 1863 includes small cryptic ants which are specialized predators of arthropod eggs and mostly nest in rotten wood, in leaf litter, or under stones [Brown, 1958a; Bolton, 1973]. The genus *Discothyrea* is distributed throughout tropical and subtropical regions of the World with 34 extant and 2 fossil species recorded so far [Bolton, 1995, 2014; Xu et al., 2014]. This distinctive genus can be easily recognized with large terminal antennal segment, reduced frontal lobes, short antennal scapes, and strongly arched 2nd gastral segment. However, the genus may be confused with the closely related *Proceratium* Roger, 1863 from which it is differentiated by the single tooth at the tip of the mandibles, the overhanging anterior margin of the clypeus, and the configuration of the antennae [Sarnat, Economo, 2012].

Brown [1958b] revised the genus and recognized 26 species in the World; other significant contributions to the genus include those of Forel [1905, 1912], Arnold [1916], Imai et al. [2003], Wheeler [1917, 1922], Baroni Urbani [1977], Kubota and Terayama [1999], Zacharias and Rajan [2004], Terayama [2009]. Recently Xu et al. [2014] described 2 new species from southwestern China and provided a key to known Oriental species of the genus.

Material and methods

Two specimens of the new species were collected from a leaf litter sample using Winkler sacs. Taxonomic analysis was conducted using a Nikon SMZ 1500 stereo zoom microscope. For digital images, MP evolution digital camera was used on the same microscope with Auto-Montage software (Syncroscopy, Division of Synoptics, Ltd.). Later, images were cleaned with Adobe Photoshop CS6.

Description pattern, morphological terminology for measurements (given in millimeters) and indices found below follow Bolton [1975] and Xu et al. [2014]: TL – total length, the total outstretched length of the individual, from the mandibular apex to the gastral apex; HL – head length, the straight-line length of the head in perfect full-face view, measured from the mid-point of the anterior clypeal margin to the midpoint of the posterior margin (in species where one or both of these margins are concave, the measurement is taken from the mid-point of a transverse line that spans the apices of the projecting portions); HW – head width, the maximum width of the head in full face view, excluding the eyes; CI – cephalic index = HW× 100 / HL; SL – scape length, the straight-line length of the antennal scape, excluding the basal constriction or neck; SI – scape index = SL × 100 / HW; ED – eye diameter, the maximum diameter of the eye; PW – pronotal width, the maximum width of the pronotum measured in dorsal view; MSL – mesosoma length (= AL – alitrunk length), the diagonal



Figs 1–6. *Discothyrea periyarensis* **sp. n.**
1–3 – worker: 1 – body, lateral view, 2 – body, dorsal view, 3 – head in full face view; 4–6 – queen: 4 – body, lateral view, 5 – body, dorsal view, 6 – head in full face view.
Рис. 1–6. *Discothyrea periyarensis* **sp. n.**
1–3 – рабочий: 1 – тело, вид сбоку, 2 – тело, вид сверху, 3 – голова, лицо; 4–6 – королева: 4 – тело, вид сбоку, 5 – тело, вид сверху, 6 – голова, лицо.

length of the mesosoma in profile view, measured from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron; PL – petiole length, the length of the petiole measured in profile from the anterior process to the posteriormost point of the tergite, where it surrounds the gastral articulation; PH – petiole height, the height of the petiole measured in profile from the apex of the ventral (subpetiolar) process vertically to a line intersecting the dorsal most point of the node; DPW – dorsal petiole width, the maximum width of the petiole in dorsal view; LPI – lateral petiole index = PH × 100 / PL; DPI – dorsal petiole index = DPW × 100 / PL.

Acronyms of depositories:

PUAC – Punjabi University Patiala, Ant Collection at Department of Zoology and Environmental Sciences (Punjab, India);

ATREE – Ashoka Trust for Research in Ecology and the Environment (Bangalore, Karnataka, India).

Discothyrea periyarensis **sp. n.**
(Figs 1–6)

Material. Holotype, worker: India, Kerala, Periyar Tiger Reserve, 9°46′N / 77°14′E, 1005 m a.s.l., 10.10.2011. Paratype: 1 gyne, same data as holotype, Winkler method (Coll. Shahid A. Akbar; det. H. Bharti and Shahid A. Akbar). Holotype and paratype in PUAC.

Additional material examined. *D. stumperi* Baroni Urbani, 1977: India, Sikkim, Phadamchen, 27°12′N / 88°37′E, 1040 m a.s.l, 1.06.2012, worker 11, gyne 1, Winkler method (Coll. Joginder Singh; det. H. Bharti and Joginder Singh) (PUAC).

D. sringerensis Zacharias et Rajan, 2004: paratype with label: India, Karnataka, Kumbarakodu Reserve Forest of Sringeri 13°29′N / 75°11′E, 26.08.2001, collected P.A. Sinu (ATREE).

Description. Worker measurements (mm): TL 1.67, HL 0.73, HW 0.63, CI 86.3, SL 0.44, SI 69.84, ED 0.04, PW 0.44, MSL 0. 81, PL 0.13, PH 0.31, DPW 0.29, LPI 238, DPI 223 (n = 1).

In full-face view, head longer than broad, roughly trapezoidal and narrowed anteriorly. Posterior margin nearly straight, posterolateral corners rounded. Sides evenly convex, notched in front of mandibular insertions. Mandibles triangular, masticatory margin edentate, apical tooth acute, small. Anterior margin of clypeus straight. Frontal lobes confused each other and formed a large roughly rhombic frontal area, distinctly longer than broad, anterolateral and posterolateral margins straight. Frontal carinae small and well separated, extending posteriorly to 1/2 of head-length. Antennae 10-segmented, apices of scapes reaching to 2/3 of distance from antennal sockets to posterolateral corners. Eyes small and convex, with 3–4 ommatidia on maximum diameter, located below the mid-length of sides. In posterior view, frontal area weakly elevated and roughly rhombic, with a broad base, anterior margin weakly convex, lateral corners acutely angled.

In lateral view, dorsum of mesosoma convex and sloping down posteriorly, promesonotal suture and metanotal groove absent. Posterodorsal corner of propodeum rounded or almost

bluntly angled, forming an angle much greater than 90°, declivity weakly concave. Propodeal lobes large and rounded. Petiolar node short and low, scale like, dorsal face sloping down anteriorly and weakly concave, anterodorsal corner indistinct. Subpetiolar process prominent, bluntly angled ventrally. 1st gastral segment large, about 2/3 of the total length of gaster. Constriction between the two basal gastral segments broad and deep.

In dorsal view, mesosoma trapezoidal and narrowed posteriorly, humeral corners nearly rounded, lateral margins nearly straight, posterior margin concave medially. Petiolar node transverse and rectangular, anterior and posterior margins nearly straight, lateral and posterior margins also straight.

Mandibles finely punctured. Head, mesosoma, petiole, and 1st gastral segment densely and coarsely punctured, interface much smaller than puncture diameter.

Whole body covered with dense, suberect to subdecumbent short pubescence, without standing hairs; mandibles with few large hairs. Scapes and tibiae with dense decumbent short pubescence, without standing hairs.

Colour reddish brown. Apical antennal segments, legs, and gastral apex yellowish brown. Eyes black.

Gyne measurements (mm): TL 2.01, HL 0.75, HW 0.67, CI 89.33, SL 0.5, SI 66.66, ED 0.13, PW 0.59, MSL 0.79, PL 0.16, PH 0.29, DPW 0.21, LPI 181, DPI 131 (n = 1).

Like workers with differences accepted for the caste including larger size; presence of 3 prominent ocelli; larger compound eye; large mesosoma and gaster.

Differential diagnosis. Among the known Oriental species *Discothyrea periyarensis* **sp. n.** is close to *D. bryanti* (Wheeler, 1917), but can be easily differentiated from it with following combination of characters: the frontal carinae extending posteriorly up to 1/2 length of head, anterior margin of clypeus not crenulate, cheeks without a prominent blunt tooth in front of the eyes, while in *D. bryanti* frontal carinae extending posteriorly to 2/3 length of head, anterior margin of clypeus crenulate, cheeks with a prominent blunt tooth in front of the eyes. The new species can also be easily separated from the Indian species (*D. sringerensis* Zacharias et Rajan, 2004 and *D. stumperi* Baroni Urbani, 1977) on the basis of propodeal declivity more gradual, in lateral view, posterodorsal corner of propodeum rounded or very bluntly angled, forming an angle much greater than 90°, while in the latter species propodeal declivity abrupt, in lateral view, posterodorsal corner of propodeum narrowly to acutely toothed, forming an angle equal to or smaller than 90°. Some of the other additional characters by which the new species differs from *D. sringerensis* include: smaller size (TL 1.67, HL 0.73, HW 0.63) with smaller eyes consisting of 3–4 ommatidia, anterior margin of clypeus not crenulate, frontal carinae extending back about 1/2 the length of head and propodeum without distinct propodeal teeth, while the latter is larger in size (TL 3.05, HL 0.8, HW 0.54) with larger eyes consisting of 11–12 ommatidia, anterior margin of the clypeus crenulated, frontal carinae extending back about 2/3 the length of head and propodeum with distinct propodeal teeth. And *Discothyrea periyarensis* **sp. n.** differs from *D. stumperi* Baroni Urbani, 1977 in having larger size (TL 1.67, HL 0.73, HW 0.63) and smaller eyes consisting of 3–4 ommatidia, posterodorsal corner of propodeum rounded to bluntly angled, forming an angle much greater than 90°, petiole scale like, much thicker with prominent subpetiolar process and mesosoma having humeral corners nearly rounded with lateral margins nearly straight, while the latter is smaller in size (TL 1.5, HL 0.53, HW 0.47) with larger eyes consisting of 10–12 ommatidia, posterodorsal corner of propodeum acutely toothed, forming an angle equal to or smaller than 90°, petiole compressed very thin, without any distinct subpetiolar process and mesosoma having distinct humeral angles with lateral margins strongly concave.

Ecology. The species was collected from moist leaf litter sample. The place had minimal sunlight exposure and very damp soil.

Etymology. The new species is named after its type locality.

Key to the known Oriental species of *Discothyrea* based on worker caste (modified after Xu et al. [2014])

1. Propodeal declivity more gradual, in lateral view, posterodorsal corner of propodeum rounded or very bluntly angled, forming an angle much greater than 90° 2
– Propodeal declivity abrupt, in lateral view, posterodorsal corner of propodeum narrowly to acutely toothed, forming an angle equal to or smaller than 90° 5
2. Antennae 10-segmented 3
– Antennae 9-segmented 4
3. Frontal carinae extending posteriorly to 2/3 length of head, anterior margin of clypeus crenulate. Malaysia; China: Hainan ..... *D. bryanti* (Wheeler, 1917)
– Frontal carinae only extending posteriorly to 1/2 length of head, anterior margin of clypeus not crenulate. India ... . *D. periyarensis* **sp. n.**
4. In full-face view, posterior margin of head weakly convex, anterior clypeal margin straight. In lateral view, dorsum of mesosoma strongly convex, posterodorsal corner of propodeum forming an obtuse angle, propodeal lobes bluntly angled. Petiolar node relatively short and thin, height/length ratio = 2: 1 (LPI = 200). Japan ..... *D. kamiteta* Kubota et Terayama, 1999
– In full-face view, posterior margin of head straight, anterior clypeal margin weakly convex. In lateral view, dorsum of mesosoma weakly convex, posterodorsal corner of propodeum rounded, propodeal lobes rounded. Petiolar node relatively long and thick, height/length ratio = 1.7: 1 (LPI = 170 with range of 156–188). China: Yunnan ..... *D. banna* Xu et al., 2014
5. Frontal area much longer than broad, roughly rhombic. Frontal carinae long and well separated, extending posteriorly to 1/2 to 2/3 of head-length 6
– Frontal area about as broad as long, roughly triangular, frontal carinae short and close to each other, extending posteriorly to about 1/3 of head-length 8
6. Frontal carinae extending posteriorly to 2/3 of head-length. Anterior clypeal margin crenulate. In dorsal view, dorsum of petiolar node transversely depressed. Antennae 10-segmented. Total length about 3.1 mm. India ..... *D. sringerensis* Zacharias et Rajan, 2004
– Frontal carinae extending posteriorly to 1/2 of head-length. Anterior clypeal margin not crenulate. In dorsal view, dorsum of petiolar node not transversely depressed. Antennae 8- or 9-segmented. Total length 1.5–1.8 mm 7

7. In full-face view, head distinctly broader than long, posterior margin of head nearly straight. In lateral view, posterodorsal corner of propodeum acutely toothed, subpetiolar process elongate and higher than half its length. In dorsal view, petiolar node thin and scale-form, about 6 times as broad as long. Antennae 9-segmented. Total length about 1.5 mm. Indonesia ..... *D. globa* Forel, 1905

– In full-face view, head distinctly longer than broad, posterior margin of head weakly convex. In lateral view, posterodorsal corner of propodeum right angled, subpetiolar process short and about half its length. In dorsal view, petiolar node thick and node-form, about 3 times as broad as long. Antennae 8-segmented. Total length 1.6–1.8 mm. China; Taiwan; Japan ..... *D. sauteri* Forel, 1912

8. In full-face view, posterior margin of head weakly concave medially. In dorsal view, dorsum of petiolar node transversely depressed. In lateral view, subpetiolar process large and roughly triangular. Antennae 7-segmented. China: Yunnan ..... *D. diana* Xu et al., 2014

– In full-face view, posterior margin of head weakly convex, not concave medially. In dorsal view, dorsum of petiolar node not transversely depressed. In lateral view, subpetiolar process small and short. Antennae 9-segmented 9

9. In full-face view, head distinctly longer than broad with CI = 89, sides strongly convex. In lateral view, posterodorsal corner of propodeum forming a right angle, apex of propodeal lobes bluntly angled. Total length 1.5 mm. Bhutan ..... *D. stumperi* Baroni Urbani, 1977

– In full-face view, head slightly broader than long with CI = 119, sides weakly convex. In lateral view, posterodorsal corner of propodeum forming an acute angle, apex of propodeal lobe rounded. Total length 1.7 mm. China; Taiwan ..... *D. yueshen* Terayama, 2009

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