

## *Tetraponera periyarensis*, a new pseudomyrmecine ant species (Hymenoptera: Formicidae) from India

HIMENDER BHARTI\* AND SHAHID ALI AKBAR

Department of Zoology & Environmental Sciences, Punjabi University,  
Patiala, Punjab – 147002 India.

\*Corresponding author's e-mail: himenderbharti@gmail.com

**ABSTRACT.** *Tetraponera periyarensis* sp. nov. is described based on a single worker collected from Manalar, part of Periyar Tiger Reserve, Kerala, India. This is the fourth species of the *rufonigra*-group of *Tetraponera* known from the Indo-Australian region, with *T. concava* Xu & Chai, 2004, *T. pilosa* Smith, 1858 and *T. rufonigra* Jerdon, 1851 reported earlier. An identification key to the worker caste of Indian species is provided.

**Keywords:** Hymenoptera, Pseudomyrmecinae, *Tetraponera*, new species, Kerala

### INTRODUCTION

The genus *Tetraponera* is composed of arboreal ants with large eyes and slender bodies. These ants are generalist inhabitants of dead twigs and branches. The genus is distributed throughout the Paleotropics (Ward 1990, 1991, 2001) and is currently represented by 94 species and 19 subspecies (Bolton 2013). Ward (2001) revised the genus from Oriental and Australian regions, establishing four species groups and treating 33 species. Recently, Xu and Chai (2004) revised the *Tetraponera* species from China, describing five new species and recognizing 13 species.

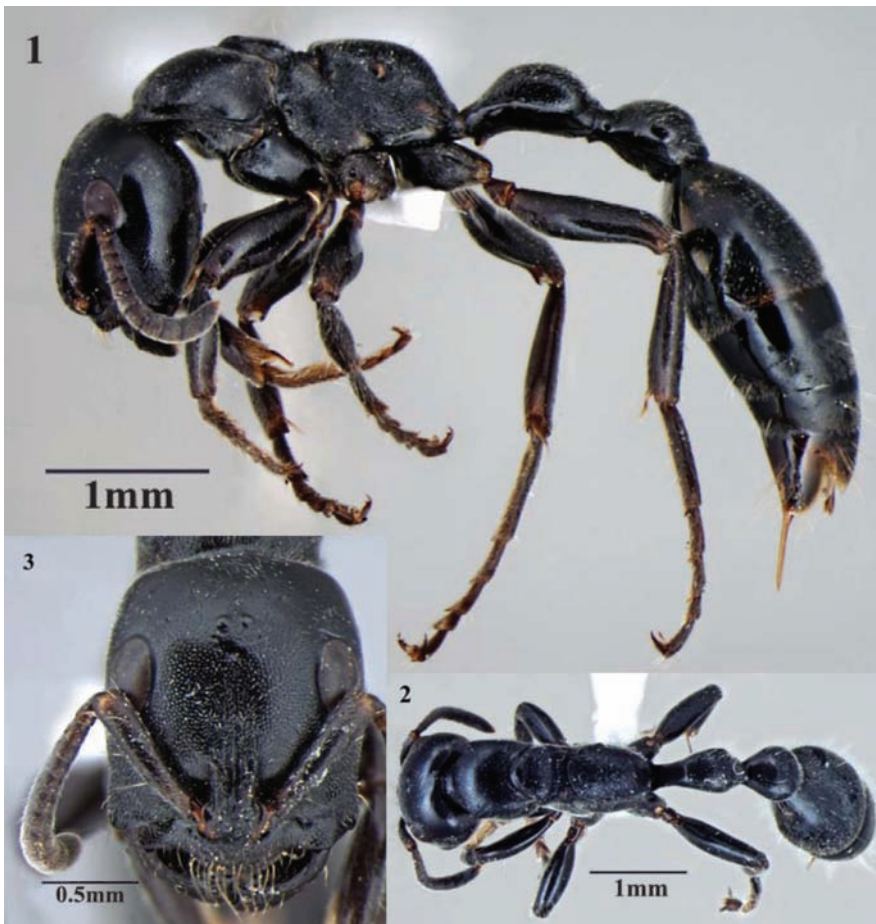
Nine species of *Tetraponera* have been reported to date from India (Bharti, 2011): *Tetraponera aitkenii* (Forel, 1902), *Tetraponera allaborans* (Walker, 1859), *Tetraponera attenuata* Smith F., 1877, *Tetraponera binghami* (Forel, 1902), *Tetraponera modesta* (Smith F., 1860), *Tetraponera nigra* (Jerdon, 1851), *Tetraponera nitida* (Smith F., 1860), *Tetraponera pilosa* (Smith F., 1858) and *Tetraponera rufonigra* (Jerdon, 1851). *Tetraponera periyarensis* sp. nov. represents the tenth species of the genus from India. An identification key to the worker caste of Indian species of *Tetraponera* is provided.

### MATERIALS AND METHODS

The specimen was collected by hand from Periyar Tiger Reserve in Kerala, India in 2011. Taxonomic analysis was conducted using a Nikon SMZ 1500 stereo zoom microscope. For digital images, a MP evolution digital camera was used on the same microscope with Auto-Montage software (Syncroscopy, Division of Synoptics, Ltd.). Later, images were cleaned as necessary with Adobe Photoshop CS6. Standard measurements and indices are as defined in Bolton (1994) and Ward (2001) and given in millimetres (mm): Head width (HW): Maximum head width, including eyes; Head length (HL): Head length taken along midline, from posterior margin of head to anterior extremity of clypeus; Eye length (EL): Eye length measured in same plane of view as HL; Minimum frontal carinae distance (MFC): Minimum distance between frontal carinae; Scape length (SL): Scape length excluding radicle; Propodeum height (PDH): height of the propodeum, measured in lateral view, from the base of the metapleuron to the maximum height of the propodeum, along a line orthogonal to the lower metapleural margin (see Ward, 2001: Fig. 3); Pronotum width (PrWM): Maximum width

of the pronotum at the dorsolateral margins. In species in which the lateral margins of the pronotum are not well defined, PrWM is measured at the point where the pronotal surface becomes vertical; Metapleural width (MTW): Maximum distance between the metapleura, measured in dorsal view (see Ward, 2001: Fig. 4); Length of profemur (FL): Length of profemur measured along its long axis in posterior view; Width of profemur (FW): Width of profemur measured in same view as FL and at right angles to it; Length of petiole (PL): Length of petiole in lateral view from lateral flanges of anterior peduncle to posterior margin of petiole; Height of petiole (PH): Maximum height of petiole measured in same view as PL, and excluding protruding teeth or lobes at anteroventral or posteroventral extremities of petiole; Width of petiole (DPW):

Maximum width of petiole measured in dorsal view; Length of metatibia (LHT): Length of metatibia excluding proximomedial condyle; Cephalic setal count (CSC): Number of standing hairs, that is, those forming an angle of  $45^\circ$  or more with the surface, visible on the posterior half of the dorsum of the head, as seen in lateral and posterior views; Mesosomal setal count (MSC): Number of standing hairs visible in profile on the mesosoma dorsum; “Cephalic index (CI = HW/HL)””; “Frontal carina index (FCI = MFC/ HW)””; “Relative eye length (REL=EL/HL)””; “Scape index (SI1 = SL/HW)””; “Scape index (SI2 = SL/EL)””; “Profemur index (FI = FW/FL)””; “Propodeal index (PDI = PDH/MTW)””; “Petiole length index (PLI = PH/PL)””; “Petiole width index (PWI = DPW/PL)””.



**Figs. 1 – 3.** Holotype worker of *Tetraponera periyarensis* sp. nov. (1) Body in profile view. (2) Body in dorsal view. (3) Head in full-face view.

## ACRONYMS OF DEPOSITORY

PUAC Punjabi University Patiala, Ant Collection at the Department of Zoology and Environmental Sciences, Punjabi University, Patiala, Punjab, India.

*Tetraponera periyarensis* sp. nov.

## MATERIAL EXAMINED

Holotype (worker) from India, Kerala, Periyar Tiger Reserve, Manalar, 1630 m a.s.l., 9°35'N, 77°18'E, 24 October 2011, hand picking, coll. Shahid A. Akbar. Holotype deposited in PUAC.

## DESCRIPTION OF WORKER

Measurements of holotype worker: HW 1.66; HL 1.86; LHT 1.60; CI 0.89; FCI 0.18; REL 0.26; SI1 0.55; FI 0.38; PLI 0.51; PWI 0.51; PDI 0.95; LHT/HW 0.96; EL 0.53; MFC 0.33; SL 0.92; LF2 0.13; LF3 0.14; LF4 0.13; FL 1.21; FW 0.46; PrWM 1.14; PDH 0.98; MTW 1.03; PL 1.36; PH 0.71; DPW 0.72; CSC 6; MSC 14; it is difficult to say anything definite about the body pilosity as only a single specimen was available and hairs may have been lost during handling.

Large sized species. Head longer than broad (HW 1.66 mm; HL 1.86 mm), posterior margin of the head weakly convex in fullface view with lateral sides gently rounded posteriorly. Median clypeal lobe broad and conspicuously protruding, anterior margin roundly convex. Distance between frontal carinae about as broad as maximum scape width. Mandibles broad and robust; basal margin (0.51 mm), larger than masticatory margin (0.38 mm); masticatory margin bearing 4 or 5 teeth; apical and preapical teeth are blunt while apicobasal tooth is acute; in between preapical and apicobasal tooth 1 or 2 small teeth are present, which are abraded and difficult to count. Scapes short and clavate (SL 0.92 mm), terminating near the anterior eye margins. Eyes of moderate size (REL 0.26 mm), vertex with 3 distinct ocelli. Pronotum convex in lateral view, with bluntly angled humeral corners and blunt lateral margins. Profemur slender (FI 0.38 mm). Mesonotum raised and descending suddenly to metanotal groove, latter moderately

wide. Propodeum weakly convex in lateral view, about as high as wide; dorsal face broad and flattened, rounded into the shorter declivitous face. Petiole longer than broad (PWI 0.51mm), with short anterior peduncle and somewhat elongate flattened node, anteroventral tooth present, directed ventrally. Postpetiole node longer than broad and as high as petiolar node. Gaster elongate.

Mandibles with longitudinal rugae; clypeus punctuate. Cephalic dorsum densely finely punctured; interface about as wide as punctures diameter; punctures fade out on occiput; clypeus punctuate; genae smooth and shining. Pronotum densely finely punctured, the rest of mesosoma densely coarsely punctured, lateral sides with short longitudinal striations in additions to the punctures. Metanotal groove with short longitudinal rugae. Petiole, postpetiole, and gaster smooth and shining.

The whole body with very sparse suberect hairs and dense decumbent pubescence. Scapes with a few suberect hairs and densely decumbent pubescence. Tibiae with dense decumbent pubescence, but without erect hairs. Body black, eyes and antennae blackish brown.

## ETYMOLOGY

The species is named after its type locality Periyar Tiger Reserve.

## DISTRIBUTION AND HABITAT

Manalar, part of Periyar Tiger Reserve and the type locality of the new species, is a fascinating green hill station. The study area is a border line area, which separates Kerala and Tamil Nadu states from each other. On one side, the region is surrounded by the tea gardens of Tamil Nadu, while along the other side, the dense primary evergreen forests of Kerala state are prevalent. The region has a wet, maritime tropical climate with mean average day time temperatures of about 28°C and an altitude of 1630 m. *T. rufonigra* was common at the same locality.

## COMPARATIVE NOTES

The new species obviously belongs to the *rufonigra*-group, which is characterized by large size, broad heads, well developed ocelli, angulate pronotal humeri and a developed anteroventral petiolar tooth. There are only three other reported species in the *rufonigra*-group from the Indo-Australian region: *T. concava*, *T. pilosa*, and *T. rufonigra*. Among these, the new species shares most affinities with *T. rufonigra*, but with the whole body black, clypeus punctuate, relatively shorter scapes (0.92 mm), and humeral corners of the pronotum bluntly angled. The new species is also close to *T. concava*, but with the whole body black, the basal margin of mandible without a single denticle, clypeus punctuate and anterior median lobe roundly convex. *T. pilosa*, is a distinct species and easily separated from other members of the *rufonigra*-group by its large eyes, subangulate humeri, shallow mesopropodeal impression and dense punctuate sculpture.

### Key to Indian species of *Tetraponera* based on worker caste (modified after Ward, 2001)

1. Head with three distinct ocelli; in dorsal view pronotal humeri appearing subangulate; head densely punctate, and lacking extensive shiny interspaces between the punctures; large species, (HW 1.14 – 2.07 mm) ..... 2

- Head almost always lacking ocelli, very rarely with two or three faint ocelli (in a few large workers of *T. nigra*); pronotal humeri varying from narrowly to broadly rounded, but not subangulate; head usually less densely punctate and with conspicuous shiny interspaces between the punctures; size variable (HW 0.49 – 1.48 mm) ..... 4

2. Larger species (HW 1.62 – 2.07 mm), with smaller eyes (REL 0.27 – 0.34 mm) ..... 3

- Smaller species (HW 1.14 – 1.51 mm), with larger eyes (REL 0.43 – 0.49 mm) ..... *T. pilosa* (F. Smith)

3. Body bicoloured, the dark head and gaster contrasting with orange-brown mesosoma (the

latter infuscated in some populations). Median lobe of clypeus longer and narrower, smooth and shining. Humeral corners of pronotum angulate ..... *T. rufonigra* (Jerdon)

- Body uniformly black. Median lobe of clypeus shorter and broader, with distinct punctures. Humeral corners of pronotum bluntly angled ..... *T. periyarensis* sp. nov.

4. Mandible slender, with three teeth on the masticatory margin, and 1 – 2 denticles on the basal margin; basal margin of mandible much longer than masticatory margin; posteroventral margin of petiole in the form of a thin, ventrally protruding hood, which is distinctly separated from the helcium venter, when the postpetiole is in its normal horizontal position; mesosternum densely pubescent; abdominal tergite IV sparsely pubescent, the appressed hairs separated by their lengths or more; relatively small species (HW 0.49 – 0.93 mm) ..... 5

- Mandible more robust, with four teeth on the masticatory margin, and 0 – 1 denticles on the basal margin; basal margin of mandible subequal to, or shorter than, masticatory margin; posteroventral margin of the petiole closely associated with the helcium venter, although it may be flanked by ventrolateral flanges; most of the mesosternum devoid of pubescence; abdominal tergite IV usually densely pubescent; size variable (HW 0.63 – 1.48 mm) ..... 6

5. Larger species (HW 0.62 – 0.93 mm, usually > 0.70 mm); body predominantly black, although petiole, postpetiole and limb appendages may be lighter in colour; propodeum typically low and broad, such that PDI 0.91 – 1.09 mm; the propodeum is inflated and prominently raised; pronotal margin varying from sharp-to soft-edged, and maximum width of the pronotum generally occurring below the margin ..... *T. allaborans* (Walker)

- Smaller species (HW 0.49 – 0.64 mm), body yellow or orange-brown coloured; propodeum notably tall (lateral view) and slender (posterior view), such that PDI 1.12 – 1.24 mm; pronotal margin usually relatively soft-edged and occurring



at the point of maximum width of the pronotum ....  
..... *T. modesta* (F. Smith)

6. Larger species (HW 0.95 – 1.48), with long legs (LHT/HL 0.80 – 0.97 mm); standing pilosity common, MSC 6-71 (usually > 10) and CSC 10-40, the cephalic hairs scattered over the dorsal surface of the head and often grading into shorter, suberect pubescence; mesopropodeal impression flanked laterally by raised prominences (containing the metanotal spiracles) but otherwise more or less open, not bounded by lateral ridges that enclose a pit-like depression (a shallow pit present in *T. binghami*) ..... 7

- Smaller species, on average (HW 0.63 – 1.44 mm); if HW > 0.92 mm, then standing pilosity less common (MSC 0-22, CSC 0-4) and the sparse cephalic hairs arranged in pairs on the dorsum of the head, distinct from the much shorter, appressed pubescence; legs generally shorter (LHT/HL 0.58 – 0.86 mm, rarely > 0.80 mm); mesopropodeal impression partly or entirely flanked laterally by raised ridges that enclose a pit-like depression ..... 9

7. Head elongate (CI 0.70 – 0.77 mm) and petiole very slender (PLI 0.34 – 0.43 mm) .....  
..... *T. binghami* (Forel)

- Head broader (CI 0.76 – 0.94 mm, usually > 0.80 mm); petiole shape variable but if CI < 0.80 mm (a few individuals of *T. nigra*) then petiole more robust (PLI > 0.50 mm) ..... 8

8. Petiole long and slender, PLI 0.38 – 0.47 mm, PL/HL 0.74 – 0.92 mm; mesosoma, petiole and postpetiole, when viewed in profile, with scattered standing pilosity accompanied by, and often grading into, a dense mat of shorter suberect hairs, present on all dorsal surfaces .....  
..... *T. attenuata* F. Smith

- Petiole shorter and higher, PLI 0.52 – 0.64 mm, PL/HL 0.57 – 0.72 mm; mesosoma, petiole and postpetiole, when viewed in profile, with standing pilosity and underlying suberect pubescence variably developed (and variably distinguishable), but at least the promesonotum and the anterior peduncle of petiole lacking a dense mat of short suberect hairs ..... *T. nigra* (Jerdon)

9. Petiole with a pair of acute, posteroventral teeth, formed from ventrolateral extensions of the petiolar sternite; pronotum with dense punctate sculpture on its anterior quarter which contrasts with the shiny (and less densely sculptured) posterior half of head and with the more sparsely punctate posterior regions of the pronotum; scapes shorter than eye length (SI2 0.83 – 0.98 mm) ..... *T. nitida* (F. Smith)

- Petiole lacking a pair of posteroventral teeth; pronotal sculpture variable but punctures more evenly distributed not concentrated solely on the anterior quarter (although they may be sparse medially) and usually not occurring in a density that contrasts strongly with that of the posterior half of the head; scapes longer than eye length (SI2 1.02 - 1.55 mm ..... *T. aitkenii* (Forel)

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## REFERENCES

Bharti H, 2011. List of Indian ants (Hymenoptera: Formicidae). *Halteres* 3: 79 – 87.  
Bolton B, 1994. *Identification guide to the ant genera of the world*. Harvard University Press, Cambridge. 222 pp.  
Bolton B, 2013. *Bolton's Catalogue and Synopsis*. Version: 1 January 2013. Downloaded from <http://gap.entclub.org/> on 10 January 2013.  
Forel A, 1902. Myrmicinae nouveaux de l'Inde et de Ceylan. *Revue Suisse de Zoologie* 10: 165 – 249.  
Jerdon TC, 1851. A catalogue of the species of ants found in Southern India. *Madras Journal of Literature and Science* 17: 103 – 127.  
Smith F, 1858. Catalogue of hymenopterous insects in the collection of the British Museum. Part VI. Formicidae. British Museum, London, 216 pp.  
Smith F, 1860. Catalogue of hymenopterous insects collected by Mr. A. R. Wallace in the islands of Bachian, Kaisaa, Amboyna, Gilolo,

- and at Dory in New Guinea. *Journal and Proceedings of the Linnean Society of London* 4: 93 – 143.
- Smith F, 1877. Descriptions of new species of the genera *Pseudomyrma* and *Tetraponera*, belonging to the family Myrmicidae. *Transactions of the Entomological Society of London* 1877: 57 – 72.
- Walker F, 1859. Characters of some apparently undescribed Ceylon insects, [part] *Annals and Magazine of Natural History* 4 (3): 370 – 376.
- Ward PS, 1990. The ant subfamily Pseudomyrmecinae (Hymenoptera: Formicidae): generic revision and relationship to other formicids. *Systematic Entomology* 15: 449 – 489.
- Ward PS, 1991. Phylogenetic analysis of pseudomyrmecine ants associated with domatia-bearing plants. In: *Ant-Plant Interactions* (C R Huxley and D F Cutler, eds.) Oxford University Press, Oxford, 335 – 352.
- Ward PS, 2001. Taxonomy, phylogeny and biogeography of the ant genus *Tetraponera* (Hymenoptera: Formicidae) in the Oriental and Australian regions. *Invertebrate Taxonomy* 15: 589 – 665.
- Xu Z and Chai Z, 2004. Systematic study on the ant genus *Tetraponera* F. Smith (Hymenoptera, Formicidae) of China. *Acta Zootaxonomica Sinica* 29(1): 63 – 76.

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