



Meranoplus periyarensis, a remarkable new ant species (Hymenoptera: Formicidae) from India



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ABSTRACT

Meranoplus periyarensis sp. nov. is the sixth species of its genus to be described from India. The others are: *M. bicolor* (Guerin-Meneville, 1844), *M. bellii* Forel, 1902; *M. laeviventris* Emery, 1889; *M. levis* Donisthorpe, 1942 and *M. rothneyi* Forel, 1902. A revised key to the Indian species is provided.

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Introduction

The taxonomic history of *Meranoplus* is straightforward. Bolton (1981) revived the tribe Meranoplini and consequently redefined it with only one extant genus, namely *Meranoplus*. The genus is currently represented by 87 species (Bolton, 2013). *Meranoplus* is distributed throughout the Old World tropics and subtropics with the greatest number of species in Australia (Bolton, 1981, Bolton et al., 2006). Schödl (1998) revised the genus from the Oriental region recognizing 14 species including 7 new species. Other significant contributions include: Guerin-Meneville (1844); Emery (1889); Forel (1902); Bingham (1903); Forel (1903); Donisthorpe (1942); Taylor (1987a,b, 1990); Schödl (1999, 2004); Wu and Wang (1995); and Taylor (2006).

Five species of genus *Meranoplus* have been reported from India to date (Bharti, 2011): *M. bicolor* (Guerin-Meneville), *M. bellii* Forel, *M. laeviventris* Emery, *M. levis* Donisthorpe, and *M. rothneyi* Forel. Of the species mentioned above only *M. bicolor* has wide distributional range throughout the Oriental region. All the remaining species show restricted distributional ranges; confined mostly to the Indian Subcontinent.

All the species are distinct and easily recognized by characters provided in the key and morphometric data sets in Table 1.

Materials and methods

The specimens of this species were collected by hand picking. Taxonomic analysis was conducted using a stereo zoom microscope (Nikon SMZ 1500). For the digital imaging, MP evolution digital camera was used on the same microscope, with Auto-montage (Syncroscopy, Division of Synoptics, Ltd.) software. Later, the images were cleaned as per requirements with Adobe photoshop CS6. Morphological definitions for measurements and indices follow Boudinot and Fisher (2013) and include:

ATL	<i>Abdominal Tergum IV Length</i> . Maximum length of fourth abdominal tergum measured with anterior and posterior margins in the same plane of focus.
ATW	<i>Abdominal Tergum IV Width</i> . Maximum width of fourth abdominal tergum with anterior, posterior, and lateral borders in the same plane of focus.
CDD	<i>Clypeal Denticle Distance</i> . Distance between clypeal denticle apices, measured in full-face view.
CW	<i>Clypeus Width</i> . Distance between the apices of the frontal lobes across the clypeus.
EL	<i>Eye Length</i> . Maximum eye length in profile view.
EW	<i>Eye Width</i> . Maximum eye width in profile view.

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Table 1
Morphometric data of Indian *Meranoplus* workers showing minimum and maximum values. Eight specimens measured for each species (excluding *M. laeviventris*; no specimen was available for study), – data not available.

	<i>M. bicolor</i>	<i>M. belli</i>	<i>M. laeviventris</i>	<i>M. levis</i>	<i>M. rothneyi</i>	<i>M. periyarensis</i> sp. nov.
ATL	1.97–2.31	1.51–1.62	–	1.31–1.63	1.04–1.08	1.02–1.08
ATW	1.87–2.00	1.52–1.56	–	1.37–1.46	0.95–0.99	1.05–1.12
CDD	0.22–0.30	0.28–0.33	–	0.17–0.25	0.13–0.15	0.09–0.12
CW	0.38–0.47	0.33–0.46	–	0.35–0.41	0.24–0.25	0.22–0.24
EL	0.17–0.23	0.23–0.24	–	0.21–0.24	0.19–0.22	0.18–0.21
EW	0.15–0.25	0.16–0.19	–	0.14–0.17	0.12–0.13	0.12–0.13
HL	0.75–0.95	1.10–1.41	0.98–1.071	0.93–1.21	0.76–0.80	0.74–0.79
HLA	0.25–0.35	0.44–0.45	–	0.22–0.23	0.24–0.27	0.25–0.30
HW	0.67–0.84	1.14–1.21	0.95–1.05	0.83–0.91	0.66–0.71	0.69–0.77
PML	0.79–0.87	0.87–0.90	–	0.72–0.77	0.41–0.44	0.52–0.57
PPH	0.32–0.42	0.48–0.51	–	0.48–0.49	0.25–0.29	0.31–0.35
PPL	0.21–0.27	0.22–0.24	–	0.19–0.21	0.13–0.15	0.17–0.19
PWA	1.25–1.31	1.04–1.05	–	1.07–1.16	0.63–0.66	0.73–0.76
PWP	0.50–0.57	0.64–0.66	–	0.80–0.88	0.34–0.38	0.50–0.55
PTH	0.34–0.42	0.47–0.53	–	0.44–0.49	0.32–0.35	0.33–0.35
PTL	0.24–0.32	0.31–0.38	–	0.29–0.32	0.15–0.19	0.18–0.22
SL	0.56–0.69	0.74–0.79	0.75–0.81	0.68–0.75	0.44–0.46	0.47–0.52
SPL	0.05–0.16	0.27–0.33	–	0.27–0.36	0.22–0.23	0.21–0.22
WL	0.69–0.91	0.97–1.2	–	0.93–1.21	0.54–0.56	0.63–0.68
CI	88–89	85–103	93–100	75–89	86–88	89–97
CS	0.71–0.89	1.12–1.31	–	0.88–1.06	0.71–0.75	0.71–0.78
EYE	45–53	32–34	–	38–39	43–46	41–43
OMI	68–65	51–53	–	95–104	79–81	70–72
PMI	143–150	126–146	–	107–115	118–120	113–115
PPI	64–65	45–47	–	65–66	51–52	54–55
PTI	70–76	65–71	–	39–42	46–54	54–63
PWI	63–65	73–74	–	110–114	82–86	94–96
SEI	300–330	300–310	–	310–320	430–470	380–400
SI	82–83	64–65	73–80	81–82	64–66	68–75

HL *Head Length*. Maximum length of head capsule, excluding mandibles, measured from anterior margin of clypeus to nuchal carina, with both in the same plane of focus.

HLA *Head Length, Anterior*. Distance between the anterior edges of the eyes to the mandible bases in full-face view.

HW *Head Width*. Maximum width of head capsule behind the eyes, in full-face view.

PML *Promesonotum Length*. Maximum length of promesonotum from posterior spine/denticle apices to anterolateral denticle apices; all four apices in the same plane of focus.

PPH *Postpetiole Height*. Measured from sternal process base to postpetiole apex in lateral view.

PPL *Postpetiole Length*. Measured from anterior to posterior inflections of postpetiole node in lateral view.

PWA *Promesonotal Width, Anterior*. Maximum width of promesonotal shield between anterolateral denticle apices in dorsal view.

PWP *Promesonotal Width, Posterior*. Distance between posterior-most promesonotal spine or denticle apices.

PTH *Petiole Height*. Measured from petiole sternum to apex in lateral view.

PTL *Petiole Length*. Measured from anterior to posterior inflections of petiole node.

SL *Scape Length*. Maximum length of the scape excluding basal constriction.

SPL *Propodeal Spine Length*. Workers: distance from inner posterior margin of propodeal spiracle to propodeal spine apex. Gynes: maximum propodeal spine length from basal inflection of spine, to spine apex.

WL *Weber's Length*. Maximum diagonal length of mesosoma from anterior inflection of pronotum to posterolateral corner of the metapleuron or the metapleural lobes, whichever is most distant.

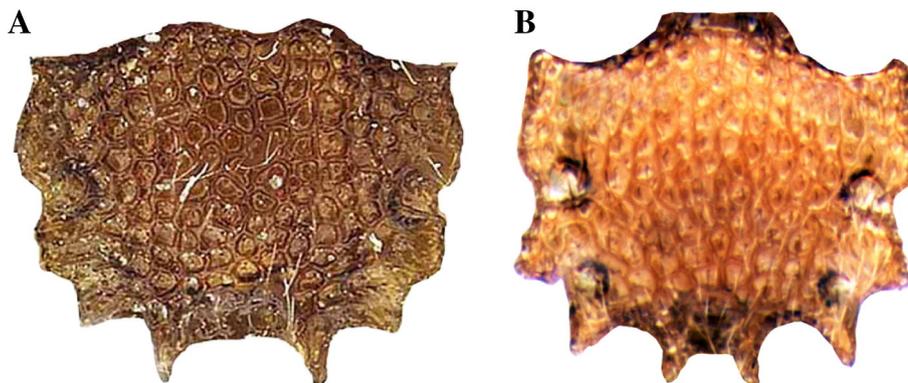


Fig. 1. A. *Meranoplus boltoni* promesonotal shield; B. *Meranoplus periyarensis* promesonotal shield.

Indices

CDI: *Clypeal Denticle Index*. $CDD \times 100 / CML$
 CI: *Cephalic Index* $HW \times 100 / HL$
 CS: *Cephalic Size*. $(HW + HL) / 2$
 EYE: *Eye Index* $100 \times (EL + EW) / CS$
 OMI: *Ocular–Mandibular Index*. $EL \times 100 / HLA$
 PMI: *Promesonotum Index 1*. $PWA \times 100 / PML$
 PPI: *Postpetiole Index*. $PPL \times 100 / PPH$
 PTI: *Petiole Index*. $PTL \times 100 / PTH$
 PWI: *Promesonotum Index 2*. $PWP \times 100 / PML$
 SEI: *Scape–Eye Index*. $EL \times 100 / SL$
 SI: *Scape Index*. $SL \times 100 / HW$

Acronyms of depositories

BMNH: Natural History Museum, London, U.K. (one of the paratypes will be deposited in BMNH).

PUAC: Punjabi University Patiala, Ant Collection at Department of Zoology and Environmental Sciences, Punjabi University, Patiala, Punjab, India (Holotype and additional paratypes are in PUAC).

Systematics

Meranoplus Smith, 1853: 224.

Type-species: *Cryptocerus bicolor* Smith, 1853: 224, by subsequent designation of Bingham, 1903: 166 (see Bolton, 2013 for complete taxonomic history).

Diagnosis

The ants belonging to genus *Meranoplus* have short masticatory margins, with 4–5 teeth. Antennal scrobes deep and long, bounded above by the widely separated frontal carinae and below by a sharp ridge which runs to the eye. Eyes large, situated behind midlength of head, pronotum and mesonotum fused into a plate or shield which is usually extended posteriorly and laterally so that the sides of the mesosoma and generally also the propodeum are invisible in dorsal view, petiole sessile, without an anterior peduncle, the node usually cuneate in profile, broadest basally and narrowing above; high-nodiform in some extralimital species (Bolton, 1981).

Meranoplus periyarensis sp. nov. (Figs. 1A, 2, 3, 4)

Type material

Holotype worker. INDIA: Kerala, Periyar tiger reserve, 9°46'N, 77°14'E, 1005 m, 10.x.2011, hand picking. Paratypes. 7 workers the same data as that of holotype (coll. Shahid A. Akbar).



Fig. 2. *Meranoplus periyarensis* sp. nov., lateral view.



Fig. 3. *Meranoplus periyarensis* sp. nov., dorsal view.

Worker measurements (holotype in brackets)

HL 0.74–0.79(0.77); HW 0.69–0.77(0.69); HLA 0.25–0.30(0.30); CW 0.22–0.24(0.22); CDD 0.09–0.12(0.12); SL 0.47–0.52(0.52); EL 0.18–0.21(0.21); EW 0.12–0.13(0.12); PML; 0.52–0.57(0.53); PWA; 0.73–0.76(0.73); PWP 0.50–0.55(0.50); SPL 0.21–0.22 (0.22); WL 0.63–0.68(0.63); PTL 0.18–0.22(0.22); PTH 0.33–0.35(0.35); PPL 0.17–0.19(0.19); PPH 0.31–0.35(0.35); ATW 1.05–1.12(1.05); ATL 1.02–1.08 (1.08); CI 89–97(89); SI 68–75(75); OMI 70–72(70); CDI 41–54 (54); SEI 340–400(340); PMI 113–115(115); PWI2 94–96(94); CS 0.71–0.78(0.73); EYE 41–43(41). PPI 54–54.3(54.3); PTI 54–62(62) (n = 8).

Head

Head almost as long as broad (CI 89–97). Mandibles armed with four teeth. Anterior margin of clypeus with bilobed lamina; lobes relatively wideset (CDI 41–54). Middle portion of clypeus excavated and smooth. Scrobal carina well developed, strong. Eyes large (EYE > 41). Maximum eye length about $\frac{3}{4}$ the length of the malar area (OMI 60–70).

Mesosoma

Promesonotal shield broader than long (PMI 113–115); distinctly margined, lamellate and overhanging sides of mesosoma laterally and propodeum posteriorly. Anterior corners of pronotum with prominent tooth, posteriorly the sides of the shield distinctly sinuate and constricted at about the level of (invisible) promesonotal suture. Posterior corners of promesonotal shield provided with a distinct, acute spine



Fig. 4. *Meranoplus periyarensis* sp. nov., head in full-face view.

on each side. Hind margin of mesonotum with distinct paramedian spines, between them a translucent lamella. Anterolateral denticles set wide relative to posterolateral denticles. Metapleural lobes well developed. Propodeal spines narrow and curved. Dorsomedian carina of propodeal spine curves medially across the posterior face of the propodeum.

Metasoma

Petiole cuneate in lateral view; without pedicel. Postpetiole globular in lateral view, taller than broad (PPI 54–54.3). Gaster oval shaped.

Sculpture

Mandibles striated. Head below antennae with longitudinal rugae while above eyes with reticulations. Dorsum of promesonotum with rugo-reticulate sculpture. Lateral face of pronotum with a few haphazardly oriented fine rugae. Lateral face of mesonotum (beneath overhanging shield) with weak foveate sculpture. Dorsal and lateral face of postpetiole rugulose. Gaster smooth and shining.

Vestiture

Body covered with moderate, decumbent or subdecumbent hairs prominent throughout the body. Large fine whitish hairs most prominent along lateral sides of head; apical funicular segments and legs also with erect hairs.

Color

Bright yellowish orange.

Distribution and habitat

The species seems to be of rare occurrence as it was encountered only once during the extensive surveys conducted in the area. The workers of this species were collected near the roots of a tree while they were foraging.

Etymology

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

Remarks

The new species is aberrant in many characters and can be easily separated from other Indian species on the basis of lighter brown body colouration and smaller size. The new species shares most characters with *M. boltoni* Schödl, 1998 from which it can be separated on the basis of combination of following characters. In *M. boltoni* the anterior margin of clypeal mid-portion is produced into a narrow shelf with a row of blunt denticles, posterior corners of promesonotal shield are having short, acute spine on each side, pointing in a ca. 45° angle from the shield and hind margin of mesonotum with paramedian short, blunt spines (Fig. 1A), lateral propodeal spines situated rather high above middle of propodeal length, sculpture of head predominately rugo-reticulate and eyes smaller, while *M. periyarensis* is having clypeal mid portion strongly excavated without row of blunt denticles, posterior corners of promesonotal shield are having distinct spines on each side, which are not pointing in a ca. 45° angle from the shield and hind margin of mesonotum with paramedian prominent, blunt spines (Fig. 1B), lateral propodeal spines situated much higher above middle of propodeal length, sculpture of head posteriorly rugo-reticulate while anterior portion is mainly having longitudinal rugae without any reticulation and eyes are much larger.

Key to species of *Meranoplus* of India based on worker caste (modified after Schödl, 1998)

1. Petiolar crest distinctly bidentate, postpetiole with an acutely directed short spine. Mandibles with five teeth. Posterior mesonotal margin not, or only slightly overhanging the propodeum, the latter

- constituting a part of the dorsal mesosoma.....
*M. bellii* Forel
 Petiole never bidentate and postpetiole never with a short spine dorsally. Mandibles with four teeth, sometimes with an additional basal offset denticle. Posterior mesonotal margin usually distinctly overhanging the propodeum, the latter meeting the dorsum of the mesosoma almost at a right angle.....2
 2. Mandibles with five teeth, the basal tooth offset. Dorsal surfaces of head and promesonotum smooth, additionally distinctly carinate.....*M. levis* Donisthorpe
 Mandibles with four teeth. Dorsum of head and promesonotum always reticulate rugulose.....3
 3. Promesonotum with only one pair of posteriorly directed mesonotal spines, without additional postero-lateral and/or posterior paramedian mesonotal projections...4
 Promesonotum of different shapes, always with additional postero-lateral and/or posterior paramedian mesonotal projections.....5
 4. Promesonotal shield with a single pair of posteriorly directed long spines in the posterior mesonotal corners. Dorsal surfaces and appendages provided with exceptionally long, outstanding hairs as well as shorter pubescence.....
M. bicolor (Guerin-Meneville)
 Promesonotal shield with a single pair of posteriorly directed shorter, blunt or acute projections in the posterior mesonotal corners. Dorsal surfaces and appendages without extremely long, outstanding hairs.....*M. rothneyi* Forel
 5. Petiole in profile distinctly truncate dorsally. Promesonotal shield with one pair of translucent fenestrae.....
*M. laeiventris* Emery
 Petiole in profile cone shaped not truncate dorsally. Promesonotal shield with two pairs of translucent fenestrae.....
*M. periyarensis* sp.nov.

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