

On Five New Species of *Tetramorium* (Hymenoptera: Formicidae: Myrmicinae) From India

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Abstract: Five new species of *Tetramorium* viz. *T. cordatus*, *T. keralensis*, *T. malabarensis*, *T. petiolatus* and *T. sentosus* are described and illustrated. The affinities of these species with closely related ones are also discussed.

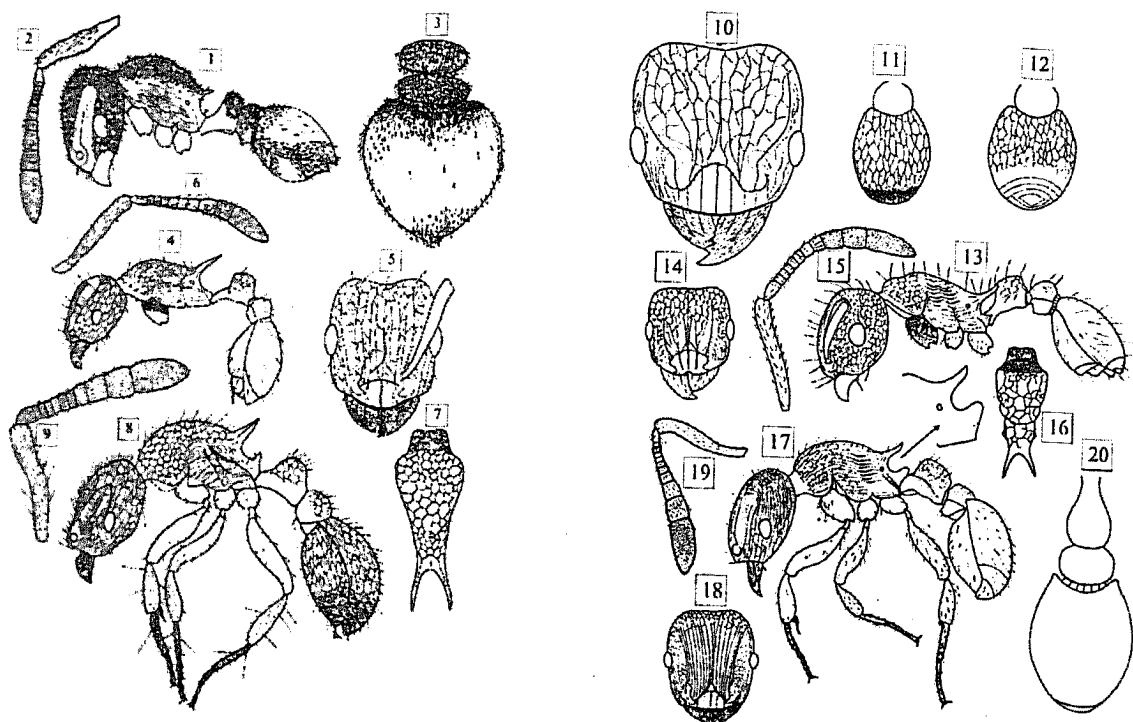
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While studying the Formicid fauna of Malabar (Sheela & Narendran, 1997), we came across five interesting species of Tetramorine ants which do not fit to the key to species of *Tetramorium* by Bolton (1976, 1977), Bingham (1903) and to any description of any known species of *Tetramorium* including that of Mathew (1980).

1. *Tetramorium cordatus* sp. nov. (Figs. 1-3)

Holotype Worker: Head finely reticulate, posteriorly transverse in front view; sides straight, mandibles feebly striate with three acute apical teeth followed by three or four small denticles; anterior margin of clypeus nearly arched, with a thin flange, clypeus broad, antero-medially a little depressed; a strong median carina and two or three pairs of feeble lateral carinae present on mid lobe, frontal area not distinctly defined; posterior clypeal margin not distinct; frontal lobes short, wide apart, frontal grooves reaching beyond eye by 1.2x length of eye, a median longitudinal carina separates scrobe into two distinct grooves for reception of scape and flagellum separately; scrobe deep rugulose, posterior margin clearly defined. Antennae 12-jointed, scape slender, flagellar segments 2-7 transverse, club formed of apical 3 joints, which is longer than remaining flagellar segments together (13:8); terminal club segment : preceding two together = 7:5. Eyes prominent, oval lateral, placed at mid transverse line, in profile more to anterior portion.

Thorax: Finely reticulate, laterally a little compressed, anterolateral corners of pronotum rounded; no sutures on thorax, in profile evenly convex; propodeal spines in dorsal view a little longer than distance between its bases (4 : 3.5); in profile its length : basal width = 4 : 2; metapleural lobes triangular, flat, acute at apex, but distinctly shorter



Figs. 1-3- *Tetramorium cordatus* sp. nov. 1-body profile, 2-antenna, 3-abdomen dorsal view; Figs. 4-7- *Tetramorium keralensis* sp. nov. 4- body profile, 5-head front view, 6-antenna, 7-thorax dorsal view; Figs. 8-12-*Tetramorium malabarensis* sp. nov. 8-body profile, 9-antenna, 10-head front view, 11-gaster dorsal view, 12-gaster ventral view; Figs. 13-16- *Tetramorium petiolatus* sp. nov. 13-body profile, 14-head front view, 15-antenna, 16-thorax dorsal view; Figs. 17-20- *Tetramorium sentosus* sp. nov. 17-body profile, 18-head front view, 19-antenna, 20-abdomen dorsal view.

than propodeal spines. Legs smooth, femora and tibiae swollen, tibial spur on mid and hind legs not conspicuous.

Abdomen: Pedicel reticulate, ventrolateral portions smooth, petiole more stoutly built with a short peduncle in front; petiole node: peduncle 5 : 3; petiole higher in a position than postpetiole; dorsal and anterior margins meet smoothly so that no angle at their junction, posteriorly no constriction on petiole, anterior margin almost vertical, dorsally convex (Fig. 3); in dorsal view post petiole broader than petiole (9.5 : 9), and both nodes anteroposteriorly compressed, transverse; petiole length : breadth 4 : 9; postpetiole 3.5 : 9.5. Gaster cordate, anterior 1/3 of T1 finely longitudinally striate, remaining portions smooth; junction between gaster and postpetiole not conspicuous due to presence of a thick felt of pubescence; T1 covering almost entire dorsum, in profile gaster slightly convex above and highly convex below.

Head, thorax and pedicel yellowish brown; gaster brownish black; antennae, mandibles and legs pale yellow; whole body except flagellum of antennae and tarsi of legs with abundant, short, trifid and quadrifid hairs; flagellum and tarsi with minute single pubescence.

Measurements: Total length 2.2 mm; Head length-0.59mm; Head width - 0.59mm; Cephalic index-100; eye diameter-0.12mm; Scape length-0.34mm; Scape index-58; Pronotal width-0.46mm; Alitrunk length - 0.59mm.

Holotype: Worker; India, Kerala, Calicut University Campus; Sheela S, 8-12-1991 (Department of Zoology, University of Calicut).

Discussion: This species is unique among the species of *Tetramorium* in having peculiar shape for its gaster. Gaster is cordate as in figure 3. But in all other species gaster is not cordate.

Etymology: The species is named as *cordatus* to indicate its heart shaped gaster.

2. *Tetramorium keralensis* sp. nov. (Figs. 4-7)

Holotype worker: Head finely reticulate, including ventral side except mid dorsal line, occipital margin widely emarginate in full face view; mandible striate, masticatory margin with three acute apical teeth followed by two or three widely spaced small denticles towards base, basalmost part without teeth; clypeus convex with a strong median longitudinal carina and two feeble lateral carinae; anterior clypeal margin entire, arched, with an anterior flange; frontal area depressed but not clearly defined, frontal carinae distinct reaching up to occipital corners; posterior margin of frontal groove not distinct, scrobe finely punctate with two or three weak transverse striae just above antennal insertions and a few weak rugae backwards; eyes dorsal margin arched, ventral margin almost straight, lateral, prominent, placed on transverse mid line. Antennae 11-jointed, scape reaching upto occipital margin; 1st flagellar segment elongate, second subequal, 3rd and 4th transverse, 5-6 subequal, 7th elongate club thick, formed of apical three joints, terminal club segment longer than preceding two together (19 : 15); club distinctly longer than remaining flagellar segments together (34 : 29.5); longest hairs on frontal carinae shorter than diameter of eye.

Throax: dorsally finely reticulate, lateral portions not much strongly reticulate as dorsal; anteriorly broad, narrowing posteriorly; pro, meso and metanotum together forming a single convexity, sutures absent on dorsum of thorax, pronotum anteriorly produced into a short neck, anterolateral corners of pronotum rounded, not angular; propodeal spines long, stout, its length 2.6x its basal width and 6x distance between bases; spines curved slightly inwards but diverging from base, spine length : peduncle of petiole (9 : 6); propodeal spiracles large, situated just below base of spines (Fig. 4); metapleural lobes short, rounded, not acute at apex; legs slender, elongate, smooth at base, fore coxae shagreened, mid and hind tibiae with simple, weak spur.

Abdomen: Petiole and postpetiole finely minutely punctate, peduncle of petiole smooth, polished, petiole node with a few faint reticulations, peduncle of petiole curved in front, node quadrate, a little higher than long, dorsally longer than broad, a little longer than anterior penduncle (7 : 6); post petiole broader than long, rounded, globose, lower in a level than petiole, anterior and posterior faces of petiole almost parallel, above nearly convex. Gaster smooth, polished and shining, somewhat globose, junction of postpetiole and gaster except mid ventral portion with cross ridges, first tergite covering more than 3/4 its total length; sting with lamelliform appendage spatulate, projecting at an angle from shaft (Fig. 4).

Head, thorax, antennae, mandibles, legs and pedicel uniformly ferrugino-testaceous, gaster blackish brown; head and thorax with erect, pedicel and gaster with suberect, rather sparse, brownish yellow blunt setae; legs and antennae with appressed small hairs, femora with one or two erect silvery hairs of moderate length sub-basally.

Measurements: Total length–3.86mm; Head length - 0.80mm; Head width–0.74mm; Cephalic index–93; Eye diameter–0.18mm; Scape length–0.65mm; Scape index–88; Pronotal width–0.59mm; Alitrunk length–1.02mm.

Holotype: Worker, India : Kerala, Peruvannamuzhi, Sheela S, 17.1.1995 (DZCU)

Paratype: 1 worker, India : Kerala, Iravikulam, K. C. Gopi, 10.3.1994.

Discussion: This species comes close to *Tetramorium yerburyi* F. in the presence of long propodeal spines, and rounded pronotal angles. But it differs from *yerburyi* in (1) petiole and postpetiole punctate (Petiole and postpetiole rugose and reticulate in *yerburyi*) (2) anterior and dorsal surfaces of petiole node not meet in a sharply defined right angle (anterior and dorsal surfaces of petiole node meet in a sharply defined right angle in *yerburyi*) (3) size under 4mm (size above 4mm in *yerburyi*).

Etymology: The species name *keralensis* is given after its locality 'Kerala'.

3. *Tetramorium malabarensis* sp. nov. (Figs. 8-12)

Holotype worker: Head deeply rugose-reticulate; occipital margin broadly emarginate, mandibles finely striate, masticatory margin broad with three distinct, acute apical teeth and three or four inconspicuous irregular, small denticles towards base; clypeus sub-triangular, anterior margin entire, almost transverse with a flange in front; posterior margin of clypeus arched, three distinct longitudinal carinae on mid lobe of clypeus; frontal area depressed, frontal lobes short, wide apart, frontal carinae extending beyond eyes; scrobe distinctly defined by sculpture within it. Antennae 12 jointed, scape slender, all flagellar segments except first one and club transverse, club 3-jointed, longer than remaining flagellar segments together (14: 10); terminal club segment longer than preceding two together (8 : 6); eyes small, placed laterally on midline of head touching ventral margin of scrobe, elongately oval.

Thorax: Deeply sculptured like head, but median portion of propodeum smooth; evenly convex above, sides not margined, broad anteriorly, narrowing posteriorly; sutures absent; propodeal spines thick stout, acute at apex, prismatic, its length : distance between bases 8 : 6; in profile spine length 2.6x its basal width; spine length in profile 2.16x length of anterior peduncle of petiole; metasternal teeth triangular, acute at apex, legs smooth short, thick, tibiae and tarsi with a few very long erect hairs, length of some of those hairs on tarsi almost equal to length of basitarsus; on tibiae—length of tibiae 2.5x length of hairs on it.

Abdomen: except anterior peduncle deeply sculptured like head and thorax, anterior peduncle smooth short; nodes subequal in length, length of petiole 2.3x length of peduncle; petiole broader than postpetiole but not as broad as pronotum; height of petiole equal to its length, height of postpetiole more than its length. Gaster biconvex first tergite and sternite finely, longitudinally reticulate, remaining segments shagreened apically, first tergite covering more than 3/4 its total length, anterolateral angles of gaster almost angular but not projecting forward as tubercles or teeth; lamelliform, appendage triangular, projecting at an angle from shaft (Fig. 8).

Colour deep reddish brown, legs yellow, mandibles reddish yellow with masticatory margin black, antennae and legs reddish yellow, nodes of pedicel and gaster a little darker than head and thorax. Entire specimen covered with long, thin, erect, pale yellow hairs.

Measurements: Total length – 3.12mm; Head length – 0.74mm; Head width – 0.74mm; Cephalic index – 100; Eye diameter – 0.15mm; Scape length – 0.34mm; Scape index – 46; Pronotal width – 0.59mm; Alitrunk length – 0.89mm.

Holotype: Worker, India : Kerala, Calicut University Campus, Sheela S, 10.12.1991 (Department of Zoology, University of Calicut).

Discussion: This species comes between *Tetramorium rugigaster* Bolt. and *Tetramorium transversarium* R. It differs from *rugigaster* in that (1) anterolateral angles of gaster angular but not produced into tubercles or teeth (in *rugigaster* anterolateral angles of gaster produced into fine tubercles) (2) first gastral tergite and sternite entirely finely reticulate (in *rugigaster* only basal half of first tergite and sternite rugulose).

The species differs from *T. transversarium* R. in that (1) petiole node normal (petiole node enormously developed in *transversarium*) (2) dorsum of first gastral tergite finely reticulate (basal 1/3 of first gastral tergite feebly rugulose and with traces of superficial punctation in *transversarium*).

Etymology: The species name *malabarensis* indicate its type locality.

4. *Tetramorium petiolatus* sp. nov. (Figs. 13-16)

Holotype worker : Head finely reticulate including ventral side, on ventral side sculpture not strong as on dorsal side and becoming feeble towards mid ventral line; reticulation within scrobe smaller than those of remaining parts; mandibles smooth polished with hair pits, masticatory margin with three acute teeth at apex followed by two denticles and then a bare area at base; clypeus anterior margin medially indented and depressed, no flange, mid lobe with three median carinae which extend backwards upto middle of head and branched beyond posterior clypeal margin; median carina not extending upto anterior margin, weak sublateral carinae also present on clypeus; frontal area triangular, shallow; frontal carinae distinct extending upto occipital corners; scrobe shallow, eyes large, prominent, lateral, almost round, situated almost on mid line, a little upwards. Antennae 12-jointed, scape slender reaching just below occipital corners, flagellar segments 2-7 transverse, F8, subequal F1 and club elongate, club 3-jointed, thick, longer than remaining flagellar segments together (19 : 16), terminal club segment longer than preceding two together (10:9).

Thorax: finely reticulate, reticulations on dorsal surface large, spaces within reticulation smooth, neck of pronotum punctate; with a short median transverse carina, anteriorly broad, on pronotum, a slight depression just below anterior margin (excluding neck) anterolateral corners angulate, sutures absent, margin of mesometanotal junction constricted, propodeal spines erect, not cylindrical, somewhat prismatic, pointing backwards and outwards, extreme tip pointing upwards, its length about 3x distance between its bases, and 2.5x basal width; 1.7x length of peduncle of petiole; metapleural lobes acutely pointed at apex; fore coxae shagreened remaining parts of legs smooth; femora medially swollen, spurs on mid and hind tibiae slightly pectinate.

Abdomen: Peduncle of petiole weakly punctate, nodes reticulate, sculpture on post-petiole weaker than that on petiole; petiole quadrate, convex above, posterior face a little higher than anterior face (Fig. 13); peduncle shorter than petiole node (6 : 10);

node height and length subequal; anterior and posterior faces sub-parallel, postpetiole rounded, lower in a level than petiole, anterior face sloping, petiole dorsally longer than broad, postpetiole transverse. Gaster smooth except few basigastral costulae, subglobose, first tergite covering more than 3/4 its length, anterior margin dorsoventrally with ridges.

Colour blackish brown, gaster darker than head and thorax; antennae, mandibles, legs, propodeal spines and apical margin of gastral tergites testaceous. Head, thorax, pedicel and abdomen with moderate amount of long and strong brownish yellow bristles, those on head and thorax, pedicel and abdomen with moderate amount of long and strong brownish yellow bristles, those on head and thorax erect, on pedicel suberect and on gaster subdecumbent; antennae and legs with abundant, short, decumbent hairs; femora with sparse long erect setae.

Measurements: Total length—4mm; Head length—0.93mm; Head width—0.93mm; Cephalic index—100; Eye diameter—0.24mm; Scape length—0.62mm; Scape index—67; Pronotal width—0.64mm; Alitrunk length—1.1mm.

Holotype: Worker, India : Kerala, Muthanga, Sheela. S, 7.10.1995. (Department of Zoology, University of Calicut).

Discussion: This species comes close to *Tetramorium pacificum* Mayr in the following characters : HW > 0.65mm, SL > 0.55mm, head rugosoreticulate, colour dark brown, T1 with basal costulae. But it differs from *pacificum* in that (1) in the shape of petiole node—in this new species postero-dorsal angle of petiole node a little above antero-dorsal but not much higher as in *pacificum* (2) eye larger in size than *pacificum* (0.18-0.21 in *pacificum*, 0.24 in new species) (3) cephalic index 100 (in *pacificum* 83-90) and scape index 67 (79-87 in *pacificum*).

Etymology: The species name '*petiolatus*' indicates the peculiar shape of the petiole.

5. *Tetramorium sentosus* sp. nov. (Figs. 17-20)

Holotype worker: Head anteriorly evenly rugulose, regulae diverging posteriorly and tending to be reticulate beyond level of posterior margin of eyes, posteriorly rugosoreticulate; genae and ventral portions of head longitudinally rugosoreticulate, scrobe with sculpture like that of nearby places; posterior margin of head transverse in front view, sides nearly straight, mandible closely longitudinally striate, masticatory margin with two acute apical teeth followed by two or three small teeth; clypeus with a narrow flange in front; a median strong carina accompanied by two pairs of weak carinae on either side present on mid lobe of clypeus; anterior margin entire, transverse, posterior clypeal margin arched, indistinct, frontal area very small, triangular; frontal lobes short, frontal carinae weak, extending well beyond eyes; posterior margin of scrobe faintly indicated, frontal carina reaching beyond eye by 1.25x length of eye, scrobes not distinctly marked; eyes elongate (Fig. 17) situated on mid transverse line, but in profile more close to mandibular base. Antennae 12-jointed, scape extending up to vertex, flagellar segments 2-8 transverse, 2-6 very short, club 3 jointed, terminal club segment longer than preceding two together (10 : 7) flagellum excluding club subequal to terminal club segment.

Thorax: Dorsally rugosoreticulate, sides rugulose, propodeum in between spines rugoso punctate; pronotum anteriorly transverse, sides not sharply pointed but giving a square shouldered appearance, in dorsal view margins straightly converging to propodeal spines; no sutures on thorax, episternum with a shallow diagonal depression, promesosternal separation faintly indicated, propodeal spines long, laterally compressed, directed backwards and upwards, tips acute and a little curved upwards, in dorsal view spines slightly diverging, distinctly longer than distance between its bases (7 : 5), length 2.3x basal width; propodeal spiracles situated below base of spines, almost at mid length of episternum, but towards posterior margin, metapleural lobes large, flat, shorter than propodeal spines, rounded at tip, subtriangular as in figure 17, length : basal width = 5 : 4; legs smooth, polished and shining, femora medially swollen, tibiae completely swollen, mid and hind tibiae with simple spurs.

Abdomen: Peduncle of petiole short smooth, petiole node rugosoreticulate with short ventral flange, post petiole weakly sculptured, peduncle subequal to metapleural lobes and shorter than propodeal spines; petiole massive, blocky, no constriction behind node, petiole height and length subequal, nearly convex above, anterior and posterior margins sub-parallel and vertical, post petiole shorter and a little lower than petiole, in dorsal view petiole length and breadth subequal and posteriorly broader than anterior side; post petiole in dorsal view distinctly broader than long, junction between post petiole and gaster with cross ridge. Gaster smooth polished and shining, anterior margin highly concave, anterolateral corners acute, projecting distinctly forward beyond posterior margin of post petiole; first tergite covering more than 3/4 its length.

Colour of head, thorax and pedicel brownish red, first tergite of abdomen excluding posterior margin dark reddish brown, posterior margin and remaining tergites reddish yellow; mandibles and antennae almost concolourous with head, legs reddish yellow; head, thorax, pedicel and gaster with brownish yellow, short, erect and suberect hairs, hairs abundant on gaster, legs with appressed very short hairs, tibiae with few long (as long as those on thorax) suberect hairs.

Measurements: Total length–2.16mm; head length–0.58mm; Head width–0.53mm; Cephalic index–91; Eye diameter–0.12mm; Scape length–0.40mm; Scape index–75; pronotal width–0.37mm; Alitrunk length–0.64mm.

Holotype: Worker, India : Kerala, Calicut University Campus, Sheela. S. 12.3.1995 (Department of Zoology, University of Calicut).

Discussion: This species comes close to *T. mixtum* F. in the following features (1) base of first gastral tergite concave behind post petiole and anterolateral corners of gaster prominent (2) mandibles striate in both species. But it differs from *mixtum* in (1) Anterolateral corners though projecting forward, not produced into blunt teeth or horn (2) anterior margin of clypeus entire, not indented medially (in *mixtum* anterior clypeal margin slightly indented medially). The new species is smaller in size than *mixtum*.

Etymology: The species is named as *Sentosus* to indicate the peculiar metapleural spine.

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