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N.B. Patkar
Department of Zoology Dr.
Babasaheb Ambedkar
Marathwada University
Aurangabad -431004, India.

B.V. Sonune
Department of Zoology
Dr. Babasaheb Ambedkar
Marathwada University
Aurangabad -431004, India.

R.J. Chavan
Department of Zoology
Dr. Babasaheb Ambedkar
Marathwada University
Aurangabad -431004, India.

A.M. Gaikwad
Department of Zoology
Dr. Babasaheb Ambedkar
Marathwada University
Aurangabad -431004, India.

Correspondence:
N.B. Patkar
Department of Zoology Dr.
Babasaheb Ambedkar
Marathwada University
Aurangabad -431004, India.

Taxonomic study of ants (Myrmicinae: Formicidae) from great Indian Bustard Wildlife Sanctuary, Maharashtra State, India

N.B. Patkar, B.V. Sonune, R.J. Chavan, A.M. Gaikwad

Abstract

The present communication deals with the taxonomic study of ants belonging to subfamily Myrmicinae, in and around Great Indian Bustard Wildlife Sanctuary located in Maharashtra, India. During present study genera *Monomorium*, *Crematogaster*, *Meranoplus*, and *Solenopsis* were illustrated. The species diversity of genus *Monomorium* is higher than genus *Crematogaster*, *Meranoplus*, and *Solenopsis*.

Keywords: Taxonomy, Ant, Myrmicinae, Great Indian Bustard Wildlife Sanctuary.

1. Introduction

Ants are one of the most dominant terrestrial animal groups in the tropics^[17] and one of the few forms universally recognized. There are about 15,000 living ant species belonging to 296 genera of which 9000-10000 have been described, all of which fall into single family Formicidae, which is classified into 16 subfamilies^[2]. Ants play an important role in terrestrial ecosystems such as pollinators, seed dispersal, predators of harmful insects, good soil turners and as a food source for other animals.

Ants are one of the least studied groups with respect to their taxonomy and ecology in India. Species identification of ants is difficult because of lack of reference collection and the fact that most of the available keys are either out of print and unavailable^[5] or are restricted to the ant fauna of specific regions^[16]. The Great Indian Bustard Wildlife Sanctuary is also known as Jawaharlal Nehru Bustard Sanctuary located in Ahmednagar and Solapur district of Maharashtra state. The faunal population in this sanctuary includes blackbuck, jungle cat, Indian fox, gazelle, hare, jackal, mongoose, porcupine and wolf. Reptiles include red sand boa, Indian cobra, Indian krait, Russell's viper, rat snake, and common skink etc. It also protects a highly endangered and endemic bird, the Great Indian Bustard (GIB) locally called 'Maldok' and at least 140 other bird species^[12]. But the ant diversity of Maharashtra in general and Solapur district in particular have not been studied. Hence present investigation has been undertaken to study the taxonomic study of ants at Great Indian Bustard Wildlife Sanctuary. Ants attracted many researchers throughout world due to their conspicuous nesting and social behavior, division of labour, parental care and tending aphids. The objective of the study was to collect and identify as many species as possible, so that it is accessible for ant researchers for comparison and study.

2. Materials and Methods

The Great Indian Bustard Wildlife Sanctuary is situated in Ahmednagar and Solapur district of Maharashtra state and lies in biogeographic zone Deccan Peninsula. This wildlife sanctuary coordinates between Longitude 18.° 21'00'' and Latitude 75.°11'.38''E. In this sanctuary, the forest subtype is 6A/C1, Southern tropical thorn forest is reported by Champion and Seth^[3]. The ants were randomly collected from June 2009 to May 2010, by hand collection method with the help of brush and forceps. The collected specimens were preserved in 70% alcohol and brought to the laboratory for further study. For photography Sony digital camera was used. The identification was made with the help of stereoscope trinocular microscope, based on taxonomic keys^[2, 9, 11, 14]. All microscopic measurements of ant specimens were made with the help of an ocular and stage micrometer.

3. Result and Discussion

During present study five species belonging to four genera and subfamily Myrmicinae were collected as shown in Table 1. The genus *Crematogaster*, *Meranoplus*, and *Solenopsis* were represented by one species each and genus *Monomorium* reported two species.

Table 1: Ant species collected and identified from Great Indian Bustard Wildlife Sanctuary, India.

Subfamily	Genus	Species
Myrmicinae	<i>Crematogaster</i>	<i>Crematogaster subnuda</i> Mayr
	<i>Monomorium</i>	<i>Monomorium destructor</i> Jerdon
		<i>Monomorium latinode</i> Jerdon
	<i>Meranoplus</i>	<i>Meranoplus bicolor</i> Guerin-Meneville
<i>Solenopsis</i>	<i>Solenopsis geminata</i> Fab.	

4. Taxonomy

Keys to the subfamily of Great Indian Bustard Wildlife Sanctuary

Members of the subfamily Myrmicinae are with two segmented pedicel (petiole and post-petiole), pygidium is transversally rounded and without arms, presence of eyes and frontal lobes and antennal sockets were well separated, frontal carinae usually large, nearly always covering the antennal insertions and well separated from each other. Most genera from Myrmicinae are polymorphic in nature.

1. Posterior margin of clypeus projecting in between antennal sockets; pro-mesonotal suture absent; hind tibiae with only simple spur ----- **Myrmicinae**

Keys to the Genera of Myrmicinae

1. Antennal segments with less than 12 joints -----2
- Antennal segments with 12 joints ----- 6
2. Antennal segments with 11 joints -----3
- Antennal segments with less than 11 joints -----4
3. Post-petiole articulated on dorsal surface of first gastral segment, the gaster in dorsal view roughly heart shaped and capable of reflection over the alitrunk, petiole dorsoventrally flattened without a node -----***Crematogaster***
- Post-petiole articulated on middle region or ventral surface of first gastral segment -----4
4. Antennal segments with 10 joints; -----***Solenopsis***
- Antennal segments with less than 10 joints; ----- 5
5. Antennae 9 jointed; club of flagellum defined --***Meranoplus***
- Antennae with less than 9 joints; club of flagellum well defined -----
6. Body hairs erect and trifid-----
- Body hairs erect, simple and not trifid ----- 7
7. Antennae with distinct club; clypeus usually bicarinate, propodeum without spines-----***Monomorium***

Keys to genus *Crematogaster*

1. Pilosity almost entirely wanting, only few scattered whitish hairs are present, the scape of antennae reaching a little beyond the top of the head; antennal club with 3 joints----- *subnuda*

Crematogaster subnuda Mayr

Family: Formicidae

Subfamily: Myrmicinae

Genus: *Crematogaster*

Species: *Crematogaster subnuda*,

Description

Head, thorax, petiole, post-petiole, antennae and legs are dark reddish brown while gaster was brownish black. Pilosity is sparingly spread on thorax and apex of gaster, pubescence are white, appressed, widely and regularly arranged all over the body. Head is as long as broad, roughly oval, sides are convex. Head usually smooth with a small striae surrounding antennal hollows. Mandibles are longitudinally striate with five teeth's. Clypeus broad, slightly convex, anterior portion nearly transverse, anterior and lateral sides fringed with setae. Frontal carinae were indistinct. Eyes are large lateral, situated slightly above the mid-line of head. Antennae were 11 segmented, apical 3 segments forming club, scape slender, long enough to reach top of head. Pronotum dorsally flat, rounded anteriorly, anterolateral suture indistinct, mesonotum are broad anteriorly but narrow posteriorly, mesonotal suture clearly indicated, metanotal groove well distinct. Propodeum lower in position, dorsally striate, narrow anteriorly, posterior margin having two straight and acute propodeal spines, propodeal spines thicker at base and narrower towards apex. Petiole are hemispherical in front, sides were angular and having minute denticle like sub-petiole process. Post-petiole contain two anterior tubercles separated by shallow longitudinal ridge and also have a transverse rounded tubercle at apex. Gaster is immense broad, cordate and elongate, covered by few short hairs and long hairs. Sting is exerted. Size: 4.5 to 5 mm.

Keys to genus *Monomorium*

1. Length 3-4 mm; pilosity moderate or thin brown, sub-erect, fine and rather long; pubescence absent; gaster broadly elliptical from above ----- *latinode*

- Length 2.5-3 mm; pilosity long, thin, pale yellow, more on gaster; pubescence sparse; gaster flat above, convex below and brownish black in colour with an faint yellow colour at base, single long hair on clypeus ----- *destructor*

Monomorium destructor Jerdon

Family: Formicidae

Subfamily: Myrmicinae

Genus: *Monomorium*

Species: *Monomorium destructor*

Description

Head antennae, thorax, legs and pedicel reddish or brownish yellow; gaster dark brown to black with an honey yellow color at base; head, thorax, pedicel and gaster smooth and shining; propodeum finely transversally striate which are continuing on meta-thorax sternites; mesonotum laterally finely minutely punctuate; mandibles weakly longitudinally striate; Head on either side of antennal hollows show faint striations; lateral portion of clypeus also finely striate. Pilosity long, thin, pale yellow in colour; more on gaster; pubescence sparse. Head is longer than broad. Each mandible is with 3-4 teeth, one apical tooth and three small denticles, clypeus anteriorly a little depressed, anterior margin is transverse, paired longitudinal carinae on clypeus; antennae 12 jointed including a 3 segmented club, scape reaching vertex of head; thorax dorsally flat and narrowing towards posterior side; promesonotum together form a single convexity. Metanotal groove distinct and deep with longitudinally ridges within groove continuing laterally; propodeum is without spines and postero-dorsal angle is prominent; petiole with a long peduncle in front and higher than post-petiole; post-petiole lower and broader than petiole; gaster is almost dorsally flat, ventrally convex with

antero-lateral angles are prominent; anterior margin roughly straight. Size -2.5 to 3mm.

***Monomorium latinode* Mayr**

Family: Formicidae
Subfamily: Myrmicinae
Genus: *Monomorium*
Species: *latinode*

Description

Head, thorax and pedicel brownish yellow mandibles antennae and legs faint yellow in colour; gaster dark brown, entire body is smooth contoured, polished and shining; pilosity is thin to moderate brown sub erect; pubescence missing. Head roughly ovoid, longer than broad; antennae 12 segmented, club is thick formed of apical 3 thick segments, scape of antennae reaching top of head; eyes are elliptical, laterally situated in front of middle of head; pro and mesonotum smooth and shining from dorsal, entire metanotum and sides of mesonotum are transversally striate; pro and mesonotum together forming a prominent convexity, metanotum is narrow and almost straight meso-metanotal suture distinct; Propodeum finely striate, dorsally flat posterior margin rounded with indistinct angle and with thin pilosity; propodeal spiracles distinctly indicated; petiole is smooth, shining, conical in shape, vertex is rounded, petiolar spiracle is prominent; post-petiole distinctly broader than petiole, shining and smooth, depressed at junction with gaster; gaster is broadly oval from above, pilosity is sparse dorsally. Size 3-4 mm

Keys to genus *Meranoplus*

1. Antennae 9 jointed; apical club of flagellum with 3 segments-----*Meranoplus*

***Meranoplus bicolor* Guerin-Meneville**

Family: Formicidae
Subfamily: Myrmicinae
Genus: *Meranoplus*
Species: *bicolor*

Description

Head, thorax, petiole and legs are red in color but gaster is brownish black. Head, thorax and post-petiole roughly striate, reticulate while propodeum and petiole smooth, polished; gaster finely reticulate. Entire body is covered by Soft, very long hairs (pilosity) as well as long and small hairs, but density are more on dorsal surface. Head trapezoidal; clypeus convex with fine vertical striations on dorsal surface and slightly inclined downwards; anterior margin of clypeus with two minute clypeal teeth; dentate mandibles faintly striate with very fine and sparse pubescence; inner margin of mandible is dentate; antennae 9-jointed; club of flagellum defined with 3 segments; eyes prominent, lateral in position; pronotum dentate; pro-mesonotal shield fused, with an notch on sides at pro-mesonotal suture; mesonotum posteriorly projecting in two long, straight and sharp spines; propodeum with two slender spines, shorter than mesonotal spines; petiole node smooth, triangular in profile; post petiole globose, larger than petiole and striate; gaster heart shaped. Size: Worker. Total Length: 4-5 mm

Keys to genus *Solenopsis*

1. Antennal segments with 10 joints; antennal club two

segmented-----*Solenopsis*

***Solenopsis geminata* Fab.**

Family: Formicidae
Subfamily: Myrmicinae
Genus: *Solenopsis*
Species: *geminata*

Description

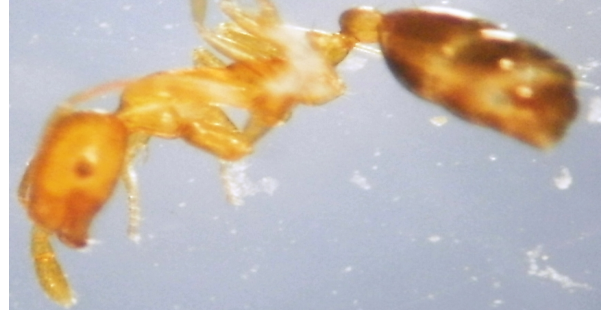
Body faint yellow to Reddish yellow in colour, gaster basally reddish yellow and remaining blackish brown, masticatory margin of mandibles black and shining, finely striate with 4 or 5 teeth's. Head is roughly square with antero-lateral margins showing fine striations; meso and meta sternites weakly rugosopunctate, entire body smooth polished and shining with scattered reddish yellow to faint brown erect and sub erect pilosity and on antennae and tarsi a thin appressed pubescence; mandibles with four teeth. Clypeus having a pair of longitudinal carinae that diverge anteriorly and run to margin where they often project as a pair of blunt teeth or denticles (bicarinate) with single central hair on frontal margin; antennal sockets are prominent from lateral view; antennae were 10 segmented, club thick with two segments, scape extends above posterior margin of head; eyes small, roughly circular, lateral on midline; vertex with a median, longitudinal superficial groove but not extending up to clypeus; pro-mesonotum forming a single convexity, pro-mesonotal suture absent; thorax emarginated at meso-metanotal groove; propodeum in a lower level than pro-mesonotum; apex of propodeum margined so that corners somewhat angulate; fine striations on the base of propodeum; petiole with a long peduncle in front with a small tubercle in the middle; node broader than long, rounded above; post-petiole sub globose, broader, thicker and slightly shorter in height than petiole; gaster roughly oval with a constriction at its joining with post-petiole; first tergite covering more than 4/5 gaster; sting powerful exerted. Size: Soldier: 7-8 mm; worker: 3-4.5 mm.

5. Results and Discussion

A total of five ant species belonging to four genera and subfamily Myrmicinae were reported from the study area. Genus *Monomorium* comprising two species and genus *Crematogaster*, *Meranoplus* and *Solenopsis* representing one species each have been found in the present study. *Crematogaster subnuda* were found actively foraging on *Acacia nilotica* (Babul), *Ziziphus mauritiana* (Bor) and *Azadirachta indica* (Neem) trees. *Crematogaster sp.* was found to be actively foraging and feeding on fruits of *Pithecellobium dulce* Roxb. (Vilayati chinch), is an introduced species and native of Mexico, Central America, and northern South America. *Meranoplus bicolor* were preferably found in the damp and moist layer of soil as well as litter. Corroborating our findings, genera *Monomorium*, *Crematogaster*, *Meranoplus* were also reported from Amravati city [4] and Punjab Shivalik range of North-West Himalaya [1]. Genus *Solenopsis* was reported in Vadodara district of Gujarat together with other three genera reported here [10]. After modern taxonomic revisions of *Monomorium* genus from Afrotropical region, the species number was increased from initial of 90 to 149 and the number of species from *Meranoplus* genus was decreased from 9 species to 8 species [17].



Solenopsis geminata Fab



Monomorium destructor Jerdon



Crematogaster subnuda Mayr



Meranoplus bicolor Guerin-Meneville

Photo Plate: 1

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