



Diversity and distribution of Ants (hymenoptera: formicidae) from nanded region, Maharashtra, India

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Abstract

The Survey Was Conducted During The Year- 2018, from Nanded District along with S. R. T. M. U. Nanded, Mudkhed, Kinwat And Penganga River of Maharashtra State, India to assess the diversity and distribution of the amazing species coming from the order-Hymenoptera, under the department of Zoology, School of Life Sciences, S. R. T. M. University, Nanded. The study reveal that under the surveyed area there are 14 biodiversity of ants belonging to 11 genera and 5 Sub-families- Formicidae, Myrmicinae, Pseudomyrmicinae, Dolichoderinae and Formicinae. The sub-family Myrmicinae dominated among different sub-families including 7 species. Whereas Pseudomyrmicinae, Dolichoderinae and Formicinae contain 2 species each and the sub-family Formicidae contains least species.

Keywords: hymenoptera, biodiversity, formicidae, S. R. T. M. U. N

1. Introduction

The insects are most diverse group of animals on this earth. The order Hymenoptera of class-Insecta of phylum Arthropod includes the honey bees, wasps, termites and Ants. Ants are ground dwelling insects they live in underground nest as an ant colony. The worker come top surface for foraging, food collection, searching new ways of establishment. These are tiny but busy insects and play an important role in pollination of several crops. The ants are everywhere except polar region and these are sub-terrestrial or ground insects mainly. The literature on ant ecology suggests that there are 11000 plants on the earth that depends on ants for pollination, seed dispersal and soil recycling to increase the soil fertility (Guenar, 2013) [4], (Pfeiffer et. al., 2013) [16]. The data is scanty and negligible for the ant species found (Bharti et. al., 2016) [4].

The main aim behind the selection of this research is to determine the ant species diversity in the selected study area in Nanded district of Maharashtra by random sampling, identify them by applying the classical taxonomic keys for it (Bharti et. al, 2016) [4]. Through this research, it will be first report on ant taxonomy from this region because most of the research has been done by ZSI, India and other International projects in Maharashtra limited to western Ghats and North East the mega biodiversity spot of India; but the ants in other parts of India are waiting to know their name. Ant do fly during specific season in new colony formation process especially during monsoon as like bees and wasps, they remain in the ground mounts (Nest in soil) and they utilize readily available resources.

1.1 Identification of ants

The body of ant is divided into three regions- head, thorax and abdomen. The head region consists of large, medium and blister like compound eyes. A pair of segmented antenna

having 6-12 segments. The anterior most part of the antenna has 2-3 club shaped structures. Other part of head region includes maxillary palp, teeth on mandibles and clypeus. The position of antenna, tubercles and spine on head, pre-optic teeth, sensory hairs on different parts of body, fringe of hair on the basal antennal region. All these structures are variable in different species of ants. The thoracic region consists of three pairs of walking legs with or without sensory hairs. On the legs at ventral apex of tibia there is a spur that may be pectinated or non-pectinated. The thoracic region and gastral segment of abdominal region are interconnected by a structure called petiole. The thoracic region is formed from pro-mesonotum, meso-notum, and sub-mesonotum and propodium. In some species there may be presence of one or more than one pairs of spines. In some species there may be second petiole called post petiole. There are petiolar process (S). The abdominal regions in ants are segmented having 3-4 segments. These are called gastral segments. Whole gastral segmental region is called as pygidium. There is an acidopore at the terminal end of Pygidium. Pygidium may be unarmed or armed with bristles like or a peg like structure. There may or may not be a rudimentary sting at the terminal region of pygidium. All these various structures are possible to observe under the dissecting microscope or binocular compound microscope. The classification of ants is based on variation in these morphological features of ants (Nicola plowes and Richard Petrock, 2000) [19].

2. Methodology

2.1 Collection methods of ants

The ant sample specimen were collected from the different regions in Nanded District of Maharashtra that includes residential areas, peripheral region of forests, from the coastal area of rivers and the streams. The details of sampling sites and identified species are as in table no.01 Using bait method,

ant-well method and forcep-brush-ethanol method, the specimen were collected during day time. The specimen were initially preserved in 70% ethanol; when brought to the laboratory the specimen were removed from collection and preservation bottles and treated with hot saline water. Common drinking water/distilled water was filtered well and saturated by adding the common salt and boiled in a beaker of 500 ml, and the specimen were removed from the sample bottles using brush and immersed gently in the hot and nearly boiling water. This kind of hot water treatment ensures the well fixation of the ant samples by stretching the antennae and the legs. It also act to spread the jaws and the hooks, spur on legs, straightening of sensory hair like structures on various parts of body was also helpful in characterizing the specimen to species level identification. The paratypes are preserved in 70% Ethanol in the Zoology collection, Zoology research

laboratory, S. R. T. M. University, Nanded, Maharashtra State, India.

3. Results and Discussion

The ant samples were collected from the SRTM University area from various places like department/School buildings, Students hostels, Staff residential quarters and Office building premises. Similarly the samples were also collected from the 10 km² area from the university campus. Few samples were collected from Hazur Sahib Nanded Railway station and Mudkhed town residential area of District Nanded, Maharashtra State, The outskirts of Kinwat town and Penganga river area near Kinwat. The sampling was carried out from Nanded district in Maharashtra in general. The details of ant samples identified are given in Table 1 and Table 2.

Table 1: Identified ant species with their habitat along with sub-family

Sr. No.	Name of ant species	Sub-Family	Habitat
01	<i>Formica pallidefulva</i> (Latreille, 1802)	Formicidae	Girls hostel, SRTMUN, on Neem tree, and Mango tree in SRTMUN Campus
02	<i>Pseudomyrmex pallides</i> (Smith, F., 1855)	Pseudomyrmecinae	Near SRTMUN campus pond, on the <i>Acacia vadiana</i>
03	<i>Solenopsis aurea</i> (Wheeler, W. M., 1906)	Myrmicinae	Near SRTMUN campus pond, on the <i>Butea monosperma</i>
04	<i>Solenopsis geminata</i> (Fabricius, 1804)	Myrmicinae	Residential area of Mudkhed town near Nanded, Maharashtra State
05	<i>Pheidole hyatti</i> (Emery, 1895)	Myrmicinae	Near SRTMUN campus pond, on the <i>Butea monosperma</i>
06	<i>Syscia augustae</i> (Wheeler, W. M., 1902)	Formicidae	Coastal area of Painganga, near Kinwat and Residential area in Nanded city, Maharashtra State
07	<i>Paratrechina longicornis</i> (Latreille, 1802)	Formicinae	Painganga river area near Kinwat, Maharashtra State
08	<i>Forelius mccooki</i> (McCook, 1879)	Dolichoderinae	Residential area of Mudkhed town near Nanded, Maharashtra State
09	<i>Dorymyrmex bicolor</i> (Wheeler, W. M., 1906)	Dolichoderinae	Painganga river area near Kinwat,
10	<i>Myrmecina Americana</i> (Emery, 1895)	Myrmicinae	Administrative Building of SRTM University, Nanded
11	<i>Pseudomyrmex brunneus</i> (Smith, F., 1877)	Pseudomyrmecinae	Near SRTMUN campus pond.
12	<i>Monomorium pharaonis</i> (Linnaeus, 1758)	Myrmicinae	Residential area in Nanded city (Degloor Naka)
13	<i>Crematogaster sp.</i> (Lund, 1831)	Myrmicinae	Painganga river area near Kinwat, Maharashtra State
14	<i>Monomorium minimum</i> (Buckley, 1867)	Myrmicinae	Residential area of Mudkhed town near Nanded, Maharashtra State

The ant samples collected were belongs to Super family-Formicoidea of Order- Hymenoptera. Fourteen different species belong to Family- Formicidae, under five sub-families and 11 different genera. *Butea monosperma*, *Azadiracta indica*, *Acacia nilotica* and *Acacia vadiana* were the host trees found to used by these ants in the study area. Some of the ants were found feeding on the termites infected to the trees like *Azadiracta indica* and *Butea monosperma* of these ants we found that *Forelius sp.*(Fig.6) And *Solenopsis sp.*(Fig.3,11) were found in the residential area like houses, shops, showrooms, hotels as most common genera of the ants from this region. The ants were belonging to five different Sub-families that include Formicidae, Pseudomyrmecinae, Myrmicinae, Formicinae and Dolichoderinae. From these sub-families Myrmicinae family dominates that includes seven genera whereas formicinae includes only one genus in the sample. Patkar et.al, (2014) [16] reported ant diversity from Great Indian Bustard Wild Life Sanctuary from Maharashtra State, India; explained five ant species belonging to four genera of subfamily: Myrmicinae, Monomorium and Crematogaster sp. Were found. *Azadiracta indica*, *Acacia nilotica* and *Ziziphus mauritiana* were the host plants preferred by the ants in this region, whereas in the present study the ant samples were found on the *Butea monosperma*, *Acacia vadiana* and *Mangifera indica* (Table.1) were the host

plants selected including the reported plants. Khot et. al., (2013)^[1] Reported Ant Diversity From Mumbai, Maharashtra from nature park in 2010-2012 and explained 28 species of ants representing 6 subfamilies like Aenictinae, Dolichoderinae, Formicinae, Myrmicinae, Porinae and Pseudomyrmecinae from which highest diversity was exhibited by subfamily Myrmicinae, whereas in the present study 11 genera are found from the subfamily Dolichoderinae, Myrmicinae, Pseudomyrmecinae, Formicinae and Formicidae.(Table.1).Among these the subfamily Myrmicinae is dominant. Chavan et. al,(2011)^[2] explored the distribution of ants in forest, grassland, human habitat located around the Amravati city, Maharashtra State, India. In this study they reported 34 species of ants in 24 identified Genera belonging to 5 subfamilies- Formicinae, Porinae, Dolichoderinae and Pseudomyrmecinae; among which the dominant genus was Crematogaster where as in the present study the Pseudomyrmex, Pheidole, Dorymyrmex, Formica, Monomorium, Solenopsis, Cerapachyinae are the identified genera. Seema kadu (2014)^[3] reported the diversity and species richness from Nagpur region, Maharashtra State, India, explained 23 species of ants belong to 18 genera from 5 subfamilies Myrmicinae, Formicinae, Porinae, Dolichoderinae and Pseudomyrmecinae whereas, in the present study the subfamily Formicidae also identified excluding the subfamily Porinae.

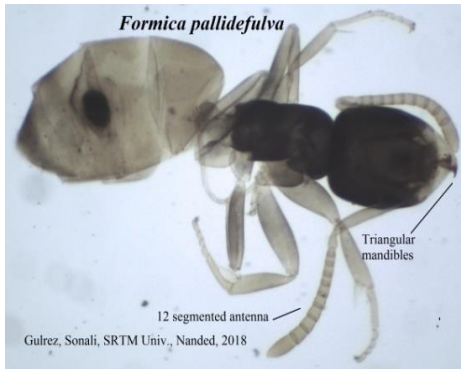


Fig 1: *Formica pallidefulva* (Latreille, 1802)



Fig 2-A: *Pseudomyrmex pallides* (Smith, F., 1855)

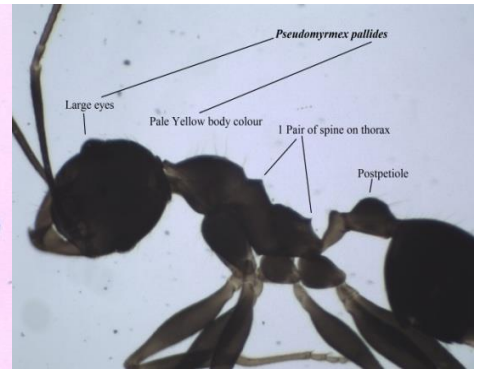


Fig 2-B: *Pseudomyrmex pallides* Dorsal view (Smith, F., 1855)

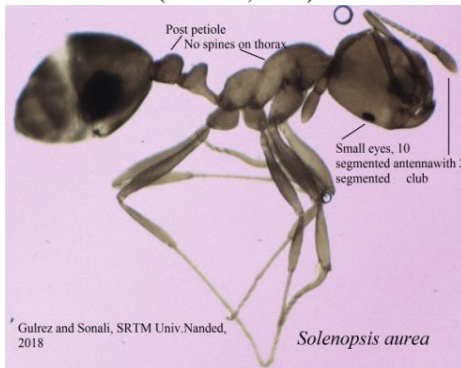


Fig 3: *Solenopsis aurea* (Wheeler, W. M., 1906)

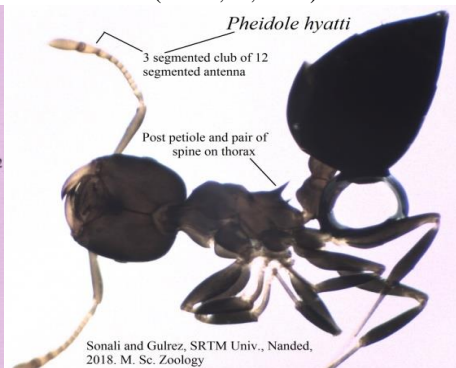


Fig 4: *Pheidole hyatti* (Emery, 1895)

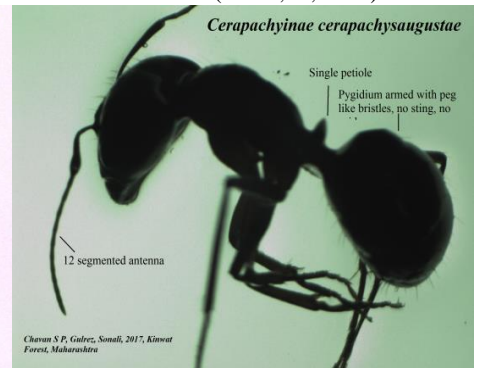


Fig 5: *Sycsia augustae* (Wheeler, W. M., 1902)

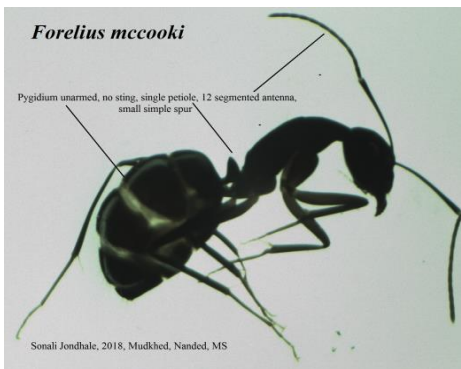


Fig 6: *Forelius mccooki* (McCook, 1879)

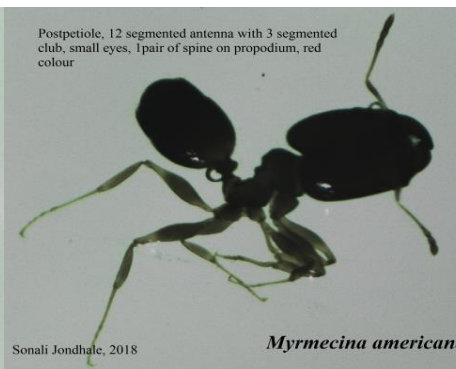


Fig 7: *Myrmecina americana* (Emery, 1895)



Fig 8: *Pseudomyrmex brunneus* (Smith, F., 1877)

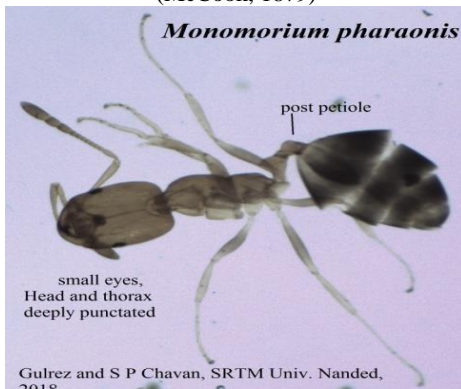


Fig 9: *Monomorium pharaonis* (Linnaeus, 1758)



Fig 10: *Monomorim minimum* (Buckley, 1867)

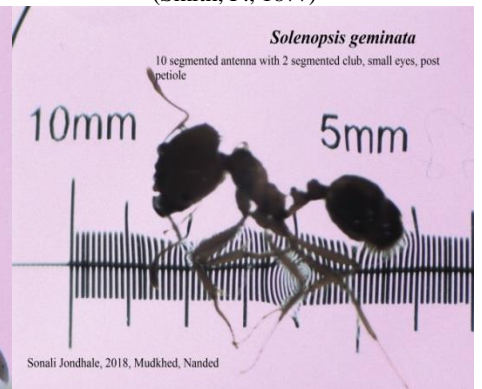


Fig 11: *Solenopsis geminate* (Fabricius, 1804)

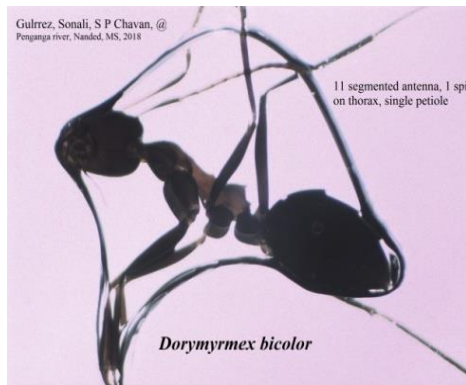


Fig 12: *Dorymyrmex bicolor* (Buckley, 1867)

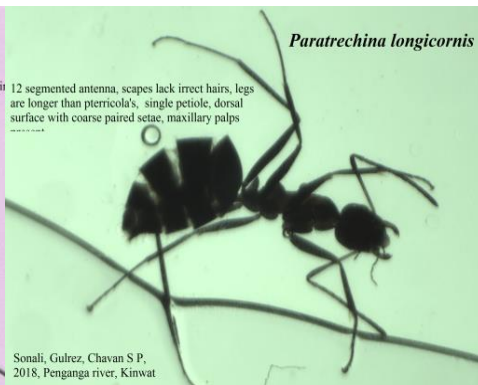


Fig 13: *Paratrechina longicornis* (Latreille, 1802)

Table 2: Species characters of ants found in Nanded region, Maharashtra State.

Sr. No.	Ant species	Petiole	Post Petiole	Eyes	Acidopore	Spine on thorax	Antenna	Mouth and jaws	Bristles
01	<i>Formica pallidefulva</i> (Latreille, 1802)	Present	Absent	---	---	Absent	Close to clipus, 12 segment	----	----
02	<i>Pseudomyrmex pallides</i> (Smith, F., 1855)	Present	Present	Large	---	Single spine	----	----	----
03	<i>Solenopsis aurea</i> (Wheeler, W. M., 1906)	Present	Present	small	---	----	10 segmented, 2 club	4 teeth on jaws	----
04	<i>Solenopsis geminata</i> (Fabricius, 1804)	Present	Present	small	---	--	10 segmented, 2 club	Bilobed head	----
05	<i>Pheidole hyatti</i> (Emery, 1895)	Present	Present	small	----	---	12 segmented, 3 club	No pointed teeth	----
06	<i>Syscia augustae</i> (Wheeler, W. M., 1902)	Present	Absent	Large	----	----	12 segmented	Cutting jaws	Black body color, short peg like bristles on pygidium
07	<i>Paratrechina longicornis</i> (Latreille, 1802)	Present	Absent	---	Present	Absent	12 segmented	Maxillary palp	bristles on pygidium
08	<i>Forelius mccooki</i> (McCook, 1879)	Present	Absent	Small	----	Absent	12 Segmented	----	Pygidium unarmed, no sting
09	<i>Dorymyrmex bicolor</i> (Wheeler, W. M., 1906)	Present	Absent	small	Absent	----	11 segmented	----	----
10	<i>Myrmecina americana</i> (Emery, 1895)	Present	Present	Small	----	1 pair of spines	12 segmented with 3 segmented club	---	Pygidium unarmed, no sting
11	<i>Pseudomyrmex brunneus</i> (Smith, F., 1877)	Present	Present	large	----	Single spine on thorax	12 segmented, 3 segmented club	----	----
12	<i>Monomorium pharaonis</i> (Linnaeus, 1758)	Present	Present	small	---	----	12 segmented, 3 segmented club	----	Reddish-yellow colour
13	<i>Crematogaster sp.</i> (Lund, 1831)	Present	Present	small	----	Single	10 segmented antenna	----	----
14	<i>Monomorium minimum</i> (Buckley, 1867)	Present	Present	small	----	----	12 segmented	----	----

4. Conclusion

From the selected study area in Nanded region 14 species belong to 11SS genera and 05 Sub-families of order Hymenoptera were found. Myrmecinae family was dominant amongst the surveyed samples. From a small area with random survey in general to determine the ant diversity the study was conducted that clues there may exist rich ant diversity hence further investigations are essential to plan. The Role of these ant species in ecosystem services will be another potential area for research from this region.

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