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DIVERSITY OF ANTS (HYMENOPTERA: FORMICIDAE) FROM VARIOUS LOCALITIES OF RAHATA, (MS), INDIA

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ABSTRACT

The ant samples were collected from various localities in Rahata tehsil from August 2018 to May 2019. Most of the ant species are found in agricultural and grass land habitats as compare to human habitat. All the collected ant samples were represents to super family Formicoidea of order Hymenoptera, eighteen different species belongs to family Formicidae under four subfamilies and twelve genera. Out of which majority of species in subfamily Myrmicinae represents (44.45%), subfamily Formicinae (33.33%), followed by subfamily Ponerinae (16.67%) and minimum in subfamily Dolichoderinae (5.55%). The genus represent numbers of species are like Camponotus (3), Crematogaster (2), Monomorium (2), Pheidole (2), Leptogeys (2), Myrmicaria (1), Solenopsis (1), Oceophylla (1), Paratrechina (1), Polyrchis (1), Pachycondyla (1) and Tapinoma (1) respectively. Ants are playing important ecological role in ecosystem.

Keywords: Hymenoptera, Formicidae, Ants, Rahata, habitats, ecological role

INTRODUCTION

Ants belonging to the family Formicidae are one of the most dominant groups of insects. They are adapting to any adverse situations. Ants are social insects and found everywhere in terrestrials habitats; except polar region. The order hymenoptera is the third largest insect order, Coleopteran and Diptera are first and second largest order in all insect groups **[1]**. The order Hymenoptera includes the honey bees, wasps, termites and ants. Ants are terrestrial insects they make nest in soil as an ant colony. They play important ecological role in nutrient cycling, pollination of several crops population regulation of other insects **[2]**, **[3]**. The literature on ants ecology suggest that there are 11000 plants on the earth that depends on ants for pollination, seed dispersal and soil recycling to increase the soil fertility **[4, 5]** furthermore, ants make their presence of almost all levels of terrestrial food webs **[6]**. Ants feed on plant seed, nector, honey dew secreted by sap sucking insects and fungi. They may be carnivores, scavengers, predators and play the important role in food web **[7]**. The ants are supposed to act as engineers of the ecosystem. They play very crucial role in the ecosystem by improving the soil and involve in process of decomposition **[8, 9]**.

There are about 12571 ant species recorded all over world. As per the recent classification all ants are grouped into 21 subfamilies **[10]**. From India a total 828 species and subspecies are listed, representing 100 genera grouped in 10 subfamilies **[4]**. In Maharashtra a total 100 species and 10 subspecies belonging to 83 genera published by Sheela S. (ZSI, state fauna series of Maharashtra, India) **[11]**. The updated checklist of ants of India published in 2016 by Himender Bharti on the basis of literature survey mentioned 181 species of ants in Maharashtra, India **[4]**.

The main objective of this research is to determine the ant species diversity in the Rahata tehsil in different habitat such as residential area, agricultural and grassland habitat. In the study area no any previous investigation done by researchers. This study is a preliminary survey which can be helpful to future database of ant's diversity in study area.

MATERIALS AND METHODS:

Study area:

The ant samples were collected from various localities in Rahata tehsil. Rahata is located on the Nagar-Manmad road, just 5 km from holy place Shirdi and Bhagwatimata temple at Kolhar 20 km from Shirdi. Rahta tehsil located in latitude and longitude coordinates are: N 19.712702 and E 74.483337. It is a large agricultural spot, surrounded by plenty of small farms and wonderful green fields. For the

collection of ants different ecological habitats were chosen like agricultural, grassland and residential area. Collection of ants carried out by all out search method from August 2018 to May 2019.

Collection and Identification

Ants were collected manually by using brush and forceps during day time, generally morning and evening was best time for collection suggested by **[12, 13]**. Ants were hidden in their nests or tunnels so it is difficult to collect them, for collection of hidden ant specimens using the bait method suggested by Shriram N. **[14]**. The collected specimens of the ants were transferred into vials containing 70% ethyl alcohol. There were separate vials used for each specimen. Then all the specimens were brought the laboratory for identification and preservation. Identification of ant species made with the help of stereo zoom trinocular microscope on the basis of taxonomic keys of Bolten B. **[15]**, Bingham C. T. **[16]**, Mathew and R. N. Tiwari **[17]**, Lee C.Y. and E. Tan **[18]**, Sheela S. **[1, 11]**.

RESULTS AND DISCUSSION:

In present study totally 18 species belonging to 12 genera of four subfamilies were recorded. There were six species in four genera of subfamily Formicinae, three species in two genera of subfamily Ponerinae, eight species in five genera of subfamily Myrmicinae and one species in one genera of subfamily Dolichoderinae shown in **Table 1**.

All the ant species collected from three different habitats like agriculture, grassland and residential areas from different localities of Rahata tehsil. Study area is known for agriculture development, farmers are cultivating crops like sugarcane, pomegranate, guava, wheat, jowar, corn and different types of vegetables. Most of the species found in agricultural and grassland habitat and few are in residential areas represented in **Table 2**. During study maximum number of eight species of five genera collected in subfamily Myrmicinae and minimum number one species in subfamily Dolichoderinae.

Recently from India total 828 valid species and subspecies in 100 genera grouped in 10 subfamilies reported by HimenderBharti *et al*. **[4]**. The study of formicidae of India was studied by Bingham **[16]**, Forel A. **[19, 20]** reported 45 species of Maharashtra. In India diversity was studied by many researchers as Ali [21], [22], Gadagkar *et al*. **[23]**, Sunil Kumar *et al*. **[24]**, Sheela S. **[1]**. In Maharashtra ArvindChavan *et al*. **[25]** reported 34 species in 20 genera identified from Amravati district Maharashtra, India. Sheela S. **[11]** from zoological survey of India reported 100 species and 10 subspecies belonging to 33 genera ant taxa

from Maharshtra. P. M. Bhoje *et al* **[7]** studied from Kolhapur district Maharashtra and reported 36 species in 2 subfamilies. Shriram N. Ghait *et al*. reported 7 species in 4 subfamilies from Shegaon, Maharashtra **[14]**. B. V. Sonune *et al*. reported 17 species in 13 genera of 4 subfamilies **[26]**. S. Chavan *et al*. studied 14 species in 11 genera of 5 subfamilies from Nanded, region Maharashtra **[5]**. P. P. Ratnaparkhi *et al*. studied ants diversity from Akola and reported eight species in different seasons **[27]**. Himender Bharti in 2016 as his updated checklist of the ants of India.reported 181 species and subspecies with 46 genera on the basis of various publications of researchers from Maharashtra state India **[4]**.

All the collected ant samples from Rahata tehsil were represents to super family Formicoidea of order Hymenoptera, eighteen different species belongs to family Formicidae under four subfamilies and twelve genera. Out of which majority of species in subfamily Myrmicinae represents (44.45%), subfamily Formicinae (33.33%), followed by subfamily Ponerinae (16.67%) and minimum in subfamily Dolichoderinae (5.55%) shown in table 3 and **Figure 1**. At the genus level Camponotus (3), Crematogaster (2), Monomorium (2), Pheidole (2), Leptogeys (2), Myrmicaria (1), Solenopsis (1), Oceophylla (1), Paratrechina (1), Polyrchis (1), Pachycondyla (1) and Tapinoma (1) consist of species respectively mentioned in **Table 1**.

Ant genera like Camponotus, Oceophylla, Crematogaster, Paratrechina, Polyrchis, Leptogenys and Tapinoma found all the three habitats during the study period shown in table 2. All the genera of recorded species are found in agricultural habitat except the Pachycondyla. But the species *Pachycondylasulcata* are found only in grassland habitat and it is ground dwelling. In the genus Camponotus three species are found in all the habitats, like *C. compressus, C. taylori* and commonly known as carpenter ants. These species are found on tree and making nests at the bottom of trees. Carpenter ants are important insect pest causing damages in building **[18, 25]**.

The geneus Crematogaster very commonly found on plants as well as ground in study area. There are two species recorded *Crematogaster rogenhoferi* and *Crematogaster subnuda*. Genus Monomorium previously reported as a house hold pest **[1, 25]** in study area species *M. indicum* and *M. latinode* are very commonly found in residential area. These species are attracting to stored food material in houses. Genus Pheidole previously reported in Maharashtra by **[19, 20]** species *Pheidoleghatica* and *Pheidolew roughtonni* found on soil surface in

agricultural and grassland habitats. Species *Oceophyllas amragdina* found on trees in all three habitats and making a nests on trees by sticking and bending of leaves. In study area this species are preferably found on mango trees (*Mangifera indica*). These species is known as "weaver ant". The species *Leptogenys diminuta* and *Lepotogenys* sip. were collected in all habitats and found on soil surface. The genera Tapinoma, Polyrchis and Paratrechina were found on trees in grassland, agricultural and residential area. Species Polyrchisrastellata making small nests on trees and commonly known as 'spiny ant' **[11]**. Species Solenopsisgeminata commonly known as 'fire ant'. They making their nests underground and previously reported by S. Chavan from Maharashtra **[5]**.

Table 1: Diversity of Ants (Hymenoptera: Formicidae) from Rahata tehsil.

Family	Subfamily	Genus	Species
Formicidae	Myrmicinae	*Monomorium*	*Monomorium indicum* (Forel, 1902)
			Monomorium latinode (Mayr, 1872)
		Myrmicaria	*Myrmicaria brunnea* (Saunders,1841)
		Pheidole	*Pheidolewroughtonni* (Forel, 1902)
			Pheidoleghatica (Forel, 1902)
		Crematogaster	*Crematogaster rogenhoferi* (Mayr, 1879)
			Crematogaster subnuda (Mayr, 1879)
		Solenopsis	*Solenopsis geminate (*Fabricius, 1804)
	Formicinae	*Camponotus*	*Camponotus compressus* (Fabricius, 1787)
			Camponotus taylori (Forel, 1892)
			Camponotus sp.
		Oceophylla	*Oceophyllas amragdina* (Fabricius, 1775)
		Paratrechina	*Paratrechina longicornis* (Latreille, 1802)
		Polyrchis	*Polyrchisra stellata* (Latreille, 1802)
	Ponerinae	*Leptogenys*	*Leptogenys diminuta* (Smith, 1857)
			Leptogenys sp.
		Pachycondyla	*Pachycondyla sulcata* (Mayr, 1867)
	Dolichoderinae	*Tapinoma*	*Tapinomamelano cephalum* (Fabricius, 1793)

Table 2: Distribution of ant species in different habitats from Rahata tehsil

Ant species	Ants found in Habitat		
	Residential area	Agriculture	Grassland
Monomorium indicum (Forel, 1902)	+	+	-
Monomorium latinode (Mayr, 1872)	+	+	-
Myrmicaria brunnea (Saunders,1841)	+	+	+
Pheidole wroughtonni (Forel, 1902)	-	+	+
Pheidole ghatica (Forel, 1902)	-	+	+
Crematogaster rogenhoferi (Mayr, 1879)	+	+	-
Crematogaster subnuda (Mayr, 1879)	+	+	+
*Solenopsis geminate (*Fabricius, 1804)	-	+	+
Camponotus compressus (Fabricius, 1787)	+	+	+
Camponotus taylori (Forel, 1892)	+	+	+
Camponotus sp.	-	+	+
Oceophyllas amragdina (Fabricius, 1775)	+	+	+
Paratrechin alongicornis (Latreille, 1802)	+	+	+
Polyrchisra stellata (Latreille, 1802)	+	+	+
Leptogenys diminuta (Smith, 1857)	+	+	+
Leptogenys sp.	+	+	+
Pachycondylas ulcata (Mayr, 1867)	-	-	+
Tapinomamelan ocephalum (Fabricius, 1793)	+	+	+

CONCLUSION

Most of the ant species are found in agricultural and grass land habitats as compare to human habitat. Study area is providing suitable environment for distribution of ants. Ants are playing important ecological role in ecosystem. This study is a preliminary survey which can be helpful to future database of ant's diversity in study area **(Table 3, Figure 1)**.

Table 3: Total number of species in subfamilies

Subfamily	Species	Percentage
Myrmicinae	8	44.45
Formicinae	6	33.33
Ponerinae	3	16.67
Dolichoderinae	1	5.55

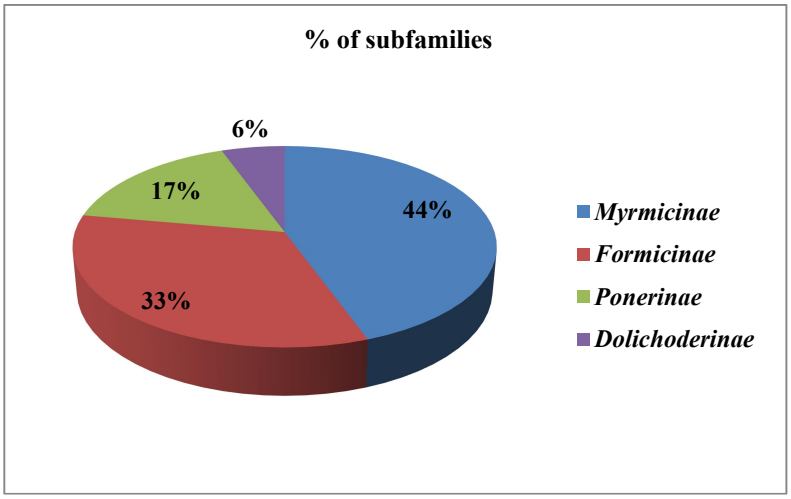

Figure 1: Percentage of subfamilies

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