



ANT DIVERSITY IN WADALI FOREST PARK AND UPPER WARDHA OF AMRAVATI REGION

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Abstract:

The distribution of ants diversity was decided to study in two locations i.e. Wadali garden and Upper Wardha dam forest area of Amravati region. This Wadali forest park region is located Amravati region and upper Wardha dam is near Simbhora village in Morshi taluka in Amravati district in the Indian state of Maharashtra. In this region we identified different types of Formicidae ants. In this study we tried to explore the distribution of ants in Wadali and upper Wardha forest area. In this area, three species of antes with three genera were identified Three species namely Red imported fire ant, *Solenopsisinvicta*, Carpenter ant, *Camponotus* and Pharaoh ant, *Monomoriumpharaonis* were observed. Out of these Carpenter ant and Red imported fire ant, *Solenopsisinvicta* was most dominant in this study Wadali garden. The aim of the study, diversity of ants to clarify the ant fauna of the area and add new record to the list of Indian ants.

Keywords : Ants,Wadali,Wardha

INTRODUCTION

Ants are important components of ecosystems not only because they constitute a great part of the animal biomass but also because they act as ecosystem engineers. All the known species of ants are eusocial. The family Formicidae belongs to the order Hymenoptera, which also includes sawflies, bees, and wasps. Ants evolved from a lineage within the Aculeate wasps and a 2013 study suggests that they are a sister group of the Apoidea. Ants are found on all continents except Antarctica, and only a few large islands such as Greenland, Iceland, parts

of Polynesia and the Hawaiian Islands lack native ant species.(Jones and Alice S. 2008; Thomas and Philip 2007). Ants occupy a wide range of ecological niches, and are able to exploit a wide range of food resources either as direct or indirect herbivores, predators, and scavengers. Most species are omnivorous generalists, but a few are specialist feeders. Their ecological dominance may be measured by their biomass and estimates in different environments suggest that they contribute 15–20% (on average and nearly 25% in the tropics) of the total terrestrial animal biomass, which exceeds that of the vertebrates (Schultz T.R 2000).

Ants are important components of ecosystems notonly because they constitute a great part of the animal biomass but also because they act as ecosystem engineers. All the known species of ants are eusocial. Globally, there are about 12,571 extant ant species. As per the recent classification, all ants are grouped into 21 subfamilies. Recently, the subfamily Martialinae has been added to the family Formicidae. All the ants species fall into the single family Formicidae. This family is included in the superfamily Vesipedae of the order Hymenoptera, which is placed in the class Insecta. The Myrmicinae is the largest subfamily of the Formicidae, with 138 genera, followed by Formicinae that have 39 genera and Ponerinae which have 25 genera. Indian Ant Fauna, represent diversity, includes 12 known subfamilies like; Aenictinae, Amblyoponinae, Cerapachyinae, Dolichoderinae, Dorylinae, Ectatomminae, Formicinae, Leptanillinae, Myrmicinae, Ponerinae,Proceratiinae andPseudomyrmecinae. All over the world there are 22 known subfamilies of ants. The current

species list includes approximately 600 species from 81 genera and will continue to increase in number as researchers begin to explore systematically the diverse habitats of ants across the region. Ants in India, occupy a variety of habitats such as leaf litter, trees, soil and dead logs, while tramp species prefer human-modified habitats. Myrmicinae forms the bulk of Indian ant diversity (45%) with genera Pheidole and Crematogaster having the most species. The subfamily, Formicinae is the second largest ant group (25% of species), with genera Camponotus and Polyrhachis constituting the majority of the diversity. The subfamily Ponerinae contributes about 14% of species of which genera Leptogenys the most diverse. Recently a list of 591 species of ants in India was released. The objective of this study was to find out ant diversity and distribution of ant in three different habitats such as forest, grassland and human habitats. This study will generate some valuable information about distribution and richness of ants species in and around the given locations

Many of the ants have been grouped/classified on the basis of peculiar tasks performed by them. The major groups are: **Harvester ants, Weaver ants, Leaf-cutter ants, Army ants**

The diversity seen in ant fauna globally suggests that they have attained the ability to survive in various biotopes, which means that they have specialised nesting structures to suit different environmental conditions. Anthills and ant nests are a maze of internal subdivisions wherein they conceal their inhabitants in a highly ordered manner. Accurate and intelligent construction and positioning of the nest and its chambers and passages internally suffices for the specific temperature and moisture levels necessities of the eggs, larvae at different instars, the queen and the different classes of workers (Dumpeert 1978). Ant nests are highly diverse taking a variety of forms and shapes. Ground nests are usually associated with most of the Ponerines as Harpegnathos, Streblognathos, Paraponera, Dinoponera, Megaponera and Odontoponera and majority of Myrmicines

2. LITERATURE REVIEW

Ants are diverse organisms that have an impact on their surrounding environment

(Hölldobler and Wilson 1990, Andersen and Sparling 1997, Majer and Nichols 1998, Peck et al. 1998, Lobry de Bruyn 1999, Agosti et al. 2000). They are one of the dominant organisms on land (Agosti et. 2000). If all the world's ants were combined, it is estimated that they would weigh about as much as all human beings (Hölldobler and Wilson 1994). They also participate in every part of the trophic system (Carroll and Janzen 1973, Trager 1998). They play a major role in dispersing seeds for many plant species (Berg 1975, Beattie, 1985, Willson et al. 1990), are the chief predators of insects and other arthropods (Mirenda et al. 1980, Youngs 1983, Porter and Savignano 1990), and other invertebrates (Whitcomb et al. 1973, Jackson et. 1998), and vertebrates prey on them for food (Milne and Milne 1950, Taigen and Pough 1983, Reiss 2001). Ants circulate and aerate more soil in the tropics than do earthworms, thus moving nutrients throughout the landscape (Lobry de Bruyn and Conacher 1990, Hölldobler and Wilson 1994). In a study of *Formica cinereamontana* Emery, (Baxter and Hole 1967) found that mineral soil in the upper half to two-thirds of a representative mound consists of about 85% B horizon material. Ants also fill diverse niches including soil (Tschinkel 2003), rotting logs (Chen et al. 2002), trees (Djipto-Lordon and Dejean 1999), leaf litter (Leponce et al. 2004), acorns (Pratt and Pierce 2001) and twigs (Armbrecht and Ivette Perfecto 2003)

Ants have mutualistic relationships with many plant and animal species. The carnivorous pitcher plant, *Nepenthes bicalcarata* Hook houses *Camponotus* sp. worker in its tendrils and feeds the ants captured prey that has fallen into the pitcher (Clark and Kitching 1995). The ants easily run up and down the slick walls and swim in the pitcher's digestive juices retrieving prey. In return, the ant prevents accumulation of organic matter, which would lead to the pitcher rotting (Clark and Kitching 1995). The oak-feeding aphid *Stomaphis quercus* Linnaeus only occupies trees that are within 17 m of the nests of the ant *Lasius fuliginosus* Latreille and is strongly associated with trees that housed these ants (Hopkins and Thacker 1999). The ants receive a nutritious food award of honeydew and in return, the ants protect the aphids from potential predators (Buckley 1987, Hopkins and Thacker 1999).

Ants have adapted to both cold and hot conditions (Cerdá et al. 1998). Hölldobler and Wilson (1994) observed the active foraging of ants on their visits to Finland in mid-May, north of the Arctic Circle, in 12 °C. In contrast, the Saharan silver ant, *Cataglyphis bombycina* Smith initiates foraging at surface temperatures exceeding 45 °C when most desert ants discontinue foraging as surface temperatures exceed 35-45 °C (Wehner et al. 1992).

MATERIAL AND METHOD

Ants, in general, are very easy to sample. Baiting techniques, pitfall traps, aspirators, litter sifting, Berlese-Tullgren or Winkler funnels for litter or soil core samples, and hand collections with forceps or nets are among the most common methods to sample ground foraging ants.

3.1. Collection of Ant

Field work was carried out in and around upperwardha dam and wadali park, Amravati. We employed intensive all out search method. i.e., Manual collection by using a brush and forceps during daytime from 11 AM to 5 PM. Generally, mornings and evenings gave best results for all out search method. The information about Date and time of collection, habitat, locality, was also recorded at the time of collection. The collected specimens were then transferred into vials. Then ants were brought to the laboratory of Department of Zoology, Shivaji Science College for identification, labeling and preservation.

Ant cleaning and sorting

Any dirt or adhered material to the body of the ant is cleaned with the help of brush dipped in water. Sorting is most basic thing, which needs to be done carefully. Samples are segregated from debris and washed in alcohol before preserving them. Immediately after collection all specimens are sorted out first into similar groups and each group is named as group 1, group 2 etc. Separate vials are used for different species. It is kept in separate vials with appropriate labels in order to avoid confusion.

Identification

Ant specimens were tentatively identified up to the genus level by using stereo microscope. Identification of species was done with the help of the project guide and the staff.

Species level identification was confirmed from the available research papers and informations.

OBSERVATION AND RESULT

Red imported fire ant (Fig. 1)

Classification

Kingdom: Animalia,
Phylum: Arthropoda
Class: Insecta
Order: Hymenoptera
Family: Formicidae
Subfamily: Myrmicinae
Tribe: Solenopsidini
Genus: *Solenopsis*
Species: *invicta*



Fig 1 Red imported fire ant

Red imported fire ants are found from Pohara forest. They have both a pedicel and postpediole. In other words, they belong to a group of ants that have two humps between the thorax and abdomen. The workers have 10 antennal segments terminating in a two-segmented club. These ants vary in size from 3-7mm and are a reddish or dark colored, stinging ant.

Colour: Red colored, Red imported fire ant, black colored, black imported fire ant.

Nesting: Usually build mounds outdoors in sunny areas and are very aggressive. Colonies can grow to hundreds of thousands.

Location: Acacia tree and bamboo tree.

Food facts: Eats almost any plant or animal matter. Prefers high-protein foods.

Pharaoh Ant (Fig. 2)**Classification**

Kingdom : Animalia
 Phylum: Arthropoda
 Class : Insecta
 Order: Hymenoptera
 Family: Formicidae
 Subfamily: Myrmicinae
 Tribe: Solenopsidini
 Fig. 2 Pharaoh Ant
 Genus: *Monomorium*
 Species: *pharaonis*

Pharaoh ants, *Monomorium pharaonis*, was found on shaded leaves present on the floor of the area of wadali park. They are omnivorous and have the obnoxious habit of getting into virtually everything, pharaoh ants can also pose a serious health threat in hospitals and veterinary clinics where they are attracted to intravenous units, medical preparations, and open wounds.

The pharaoh ant (*Monomorium pharaonis*) is a small (2 mm) yellow or light brown, almost transparent and notorious for being a major indoor nuisance pest, especially in hospitals. (David et al., 1994). This ant can be found almost anywhere in the world. Pharaoh ant eyesight is poor and they possess on average 32 ommatidia (Cranbrook 2013).

Color: Yellow with a reddish abdomen.

Nesting: Typically builds nests in wood, wall voids, baseboards, etc. Colonies are quite large, with many queens. They prefer warm humid areas near food and water.

Location: Present on dry shaded leaves of forest.

Food facts: Likes fats and oils.

Camponotus* (Fig.3)*Classification**

Kingdom: Animalia

**Fig.3 *Camponotus***

Phylum: Arthropoda
 Class: Insecta
 Order: Hymenoptera
 Family: Formicidae
 Subfamily: Formicinae
 Tribe: camponotini
 Genus: *camponotus*

Carpenter ants (*Camponotus* species) are the largest ants that abundant in forested areas. They may be either black or black with a reddish brown thorax. Carpenter ants nest in wood, almost always establishing colonies in wood that has been softened by decay. Carpenter ants mostly feed on a mixture of dead insects and honeydew.

Carpenter ants, genus *Camponotus*, belong to the subfamily Formicinae, which is characterized by a circular anal orifice (opening) surrounded by a fringe of hairs (hand lens of 20X required, Carpenter ants are large, having queens 16–18 mm long and workers varying from 6–13 mm long.

Color: black.

Nesting: Carpenters hollow out dead, moist wood in trees, firewood and fence posts to build nests, but they don't eat wood.

Location: This ant was found on firewood tree of forest region.

Food facts: Feeds on insects, insect secretions during the summer. Often invade structures in spring and fall looking for other food sources. Likes sweets.

References

- Buckley 1987, Hopkins and Thacker 1999
 Cerdá et al. 1998
 Cranbrook 2013
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