

Ant Species Diversity According To Disturbance Gradients In And Around Shegaon, Maharashtra India.

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Abstract: Study is carried out at three locations in and around Shegaon. Totally there found 7 species belonging to 6 genera under 4 subfamilies at all three sites. All out search and baiting methods were used to observe ants. Ant species diversity mostly found in AnandSagar Garden. Garden area showed the maximum percentage (85.72%), since there found well maintained natural condition and verity of plantation with fewer disturbances. As the disturbance goes increasing the diversity becomes decreasing.

Index Term: Anand Sagar Garden, Ant, *Crematogaster*, Disturbance, India, Shegaon, Shriram.

1. INTRODUCTION

Ants are considered as one of the most diverse, abundant and ecologically significant organisms on earth. Ants, prominent invertebrate group used in assessing ecological responses are one of nine proposed indicators (Underwood and Fisher, 2006). Ants are abundant insects and are considered important in ecosystem functioning. They have diverse ecological roles, including nutrient cycling, seed dispersal and population regulation of other insects (Holldobler and Wilson 1990; Folgarait 1998). Arthropods constitute the vast majority of global biodiversity. Among arthropods, ants are considered as ecologically dominant in most terrestrial environments. While ants have been increasingly appreciated as an indicator group in some regions (Bestelmeyer & Wiens 2001, Andersen & al. 2004), Shegaon city is situated in Buldana in the state of Maharashtra, India. The average elevation is 1669ft asl. It receives rainfall both from the South-west during June to September and North-east during November to December winds and the average rainfall is 792 mm (Agriculture Contingency Plan for District: Buldhana). The vegetation in Shegaon is of the dry deciduous type.

2. MATERIALS AND METHODS

2.1 STUDY AREA:

The present study was carried out in an attempt to understand and measure the status of ant diversity in selected areas (1) Residential area; it includes two accommodation campus and colleges. (2) Cultivated land (cotton field, Sugar cane, Jawar, soya bean). (3) AnandSagar garden an area of about 300 acres. These sites are located near the city and have good tree cover, but pedestrian pressure. This is developed by ShriGajananMaharajSansthan. The data were collected for a period of 6 months from January 2015 to Jun 2015.

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2.2 SAMPLE COLLECTION:

Ants were collected during morning and evening time using different method as described by Gadagkar et al., (1993).

All-Out Search Method: The most commonly used method is all-out search method. The ants were just picked up by hand using brushes or forceps. Care should be taken to collect all castes from a colony in the case of polymorphic species, because the phenomenon of polymorphism can lead to major confusions, during sorting and identification.

Baiting method: Honey baits were used to collect ants feeding on nectar. A piece of cotton dipped in honey was placed. With this oil baits used alternative to honey bait. Due to baiting those ants also attracted which were hidden in nest or tunnels that were not collected by any other method. Pitfall trap not used because unwanted number of ants died in trap. Only 5 specimens from each type of ants were collected to identify. Whenever it was unnecessary then only photographs were taken. Color images were created with digital canon camera of 16x multiple zoom.

2.3 IDENTIFICATION:

The captured ant species were brought to the laboratory. In the laboratory, the samples were separated and identified to genus level and species level. Identification was done with the help of keys given by Bingham (1903); Ali (1992); Bolton, B. (1994); Tiwari (1999).

3. RESULT:

Totally 7 species belonging to 6 genera, that spreads over 4 subfamilies (Table 1) were recorded. Of the 4 subfamilies, The Myrmicinae was the most dominant subfamily in terms of species richness with 3 Species and 2 genera. The most diverse subfamily was Myrmicinae followed by Formicinae and least number Dolichoderinae and Pseudomyrmicinae. During the present investigation comparatively lower species diversity (No of species: 3) was observed in residential area and high diversity of species (No of species: 6) was noticed in Anandsagar garden area and moderate species diversity (No of species: 5) were recorded in cultivated agricultural area (Table 3). With reference to percentage of species in three different location sites, garden area showed the maximum percentage (85.72%) than other two study sites. Followed by cultivated area recorded (71.42%) and lower percentage

(42.85%) was noticed in residential area (Fig 2). *Monomorium* and *Crematogaster* spp. exhibited the highest diversity. This subfamily gives 42.85% contribution, followed by Formicinae with 28.57% contribution and represented by two genera with one species in each genus, including the black crazy ants and carpenter ant. Dolichoderinae and Pseudomyrmicinae gives 14.28% contribution each with one species and one genus under each subfamily.

4. DISCUSSION:

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 (Gadagkar et al 1993). Environmental changes have an impact on macroarthropod abundance (Pearson and Derr, 1986; Adis and Latif, 1996). Many ant species are highly sensitive to the microclimate fluctuations and to habitat structure, and thus respond strongly to environmental change (Anderson, 1990; Alonso et al., 2000). Therefore as locations get affected by human activity the distributions of ant also get varied. Garden area represents higher number and diversity of ant, with four subfamilies. Then as the disturbance gets increased the pattern of ants also gets changed with its diversity. Cultivated area and residential area shows low diversity due to increasing disturbance. Environment in garden is very well maintained by Shri Gajanan Maharaj Sansthan here, by keeping all natural condition though found constructions and building. So many types of plants including tallest trees, shrubs, climbers and herbs with many types of grasses found planted there. Flowering plants also attracted the ants for nectar. This area experienced fewer disturbances in comparison to cultivated area. While in cultivated field antfauna found disturbed by many cultivating activity such as farming, soil burning during summer, spraying of different insecticides and herbicides, cutting of major trees and so many. Cultivated area contain number of plants but garden has planted variety of other plants beside common plants, so ants has found new area in garden for their food, shelter and also for variety of purpose. Kumar et al. (1997), Pachpor&Ghodke (2000-2001) and Savitha et al. (2008) have concluded that if there is abundant and verity of trees, habitats supports high diversity of ants. Thus, habitat variables such as canopy and litter can provide an ideal habitat for ants. In that area, ants found also in thousands of number. *Tapinoma melanocephalum* represents highest peak, with their presence at each tree with more number. It commonly found in cultivated field foraging in trails. In summer it was found mostly on neem trees. Anderson (1995) mentions that the Dolichoderines are open habitat species, highly active and aggressive and exert a major competitive influence on other ants. Secondly *Crematogaster ransonneti* was commonly found. It was arboreal ant foraging on trees in search of food and shelter. Nests were found on trees. *Monomorium indicum* was foraging on ground around their nest. Nest has small opening with small sandy granules forming elevation around nest opening. *M. indicum* was found attracted toward honey bait while *M. pharaonis* was found on oil baits. *Camponotus* spp. and *M. pharaonis* were found in all three locations. *Camponotus* commoly found on tree, but in cultivated area it

was found making nest in soil also. The subfamily pseudomyrmicinae represents only one species under only one genus, *Tetraoponera rufonigra*, commonly called Arboreal bicolored ant. It was found foraging on tallest trees like neem and travels up to apex of trees. In residential area, *Paratrechina longicornis*, *Camponotus compressus* and *Monomorium pharaonis*, only three species counted.

5. Conclusion:

When ants found suitable environment, they get attracted toward that location avoiding disturbed area. Anand Sagar is world famous, spiritual and nature loving garden; though it is manmade; but really natures biotic component like ants get attracted there. Lastly we can say that ants may get attracted toward Anand Sagar garden from surrounding area as like devotee people. More work is necessary to conclude more information from this natural area.

6. Tables:

Table 1. Subfamily wise distribution of ant genera and species.

Subfamily	Genera	Species
Formicinae	<i>Camponotus</i>	<i>compressus</i>
	<i>Paratrechina</i>	<i>longicornis</i>
Myrmicinae	<i>Monomorium</i>	<i>indicum</i>
		<i>pharaonis</i>
	<i>Crematogaster</i>	<i>Ransonneti</i>
Dolichoderinae	<i>Tapinoma</i>	<i>Melanocephalum</i>
Pseudomyrmicinae	<i>Tetraoponera</i>	<i>Rufonigra</i>
Total :	6	7

Table 2: Distribution of ant species in various localities.

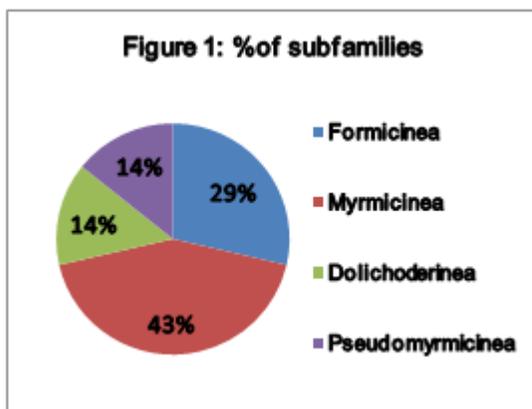
Species	Study area		
	Residential area	Anand Sagar Garden	Cultivate d fields
<i>Camponotus-compressus</i>	+	+	+
<i>Paratrechina-longicornis</i>	+	-	-
<i>Monomorium-indicum</i>	-	+	+
<i>Monomorium-pharaonis</i>	+	+	-
<i>Crematogaster-ransonneti</i>	-	+	+
<i>Tapinoma-melanocephalum</i>	-	+	+
<i>Tetraoponera-rufonigra</i>	-	+	+
Total	3	6	5

Table 2. Total number and percentage of Species per subfamily

Subfamily	Species	Percentage
Formicinea	2	28.58
Myrmicinea	3	42.86
Dolichoderinea	1	14.28
Pseudomyrmicinea	1	14.28
Total	7	100

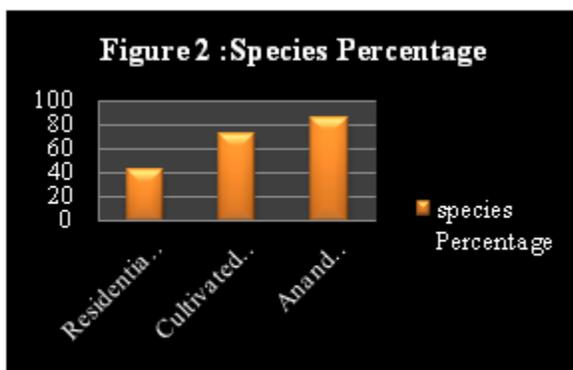
Table 3: Distribution of ant species in three different areas

Study area	Species	Percentage
Residential area	3	42.86
Cultivated area	5	71.42
AnandSagar Garden	6	85.71



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