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Research Article

Diversity and Abundance of Ants (Hymenoptera: Formicidae) from Thiruthangal, Sivakasi (Taluk), Tamil Nadu

Abstract

The present study deals with the diversity of ants in three different sites of Thiruthangal, Sivakasi Taluk, Virudhunagar (Dist.), India. During the present study four subfamilies are noted. Myrmicinae is a dominant subfamily in three study sites. Dolichoderinae has a low relative abundance during the study period.

Introduction

Ants have characteristics relevant to the study of biodiversity, such as plasticity, high diversity, numerical and biomass dominance in various habitats, ease of sampling, as well as the presence of stationary nests, allowing re-sampling over time [1]. Globally, there are about 12,571 existing ant species. As per the recent classification, all ants are grouped into 21 subfamilies [2]. Ants in India inhabit a variability of habitats such as leaf litter, trees, soil and dead logs, while tramp species favour human-adapted habitats [3]. Functional characteristics of ant communities strongly influence overall ecosystem properties, and species composition thus affects ecosystem functions [4]. Ant communities have shown promise as environmental indicators and indicators for changes in biodiversity composition in other taxa [5,6]. Individual ant species can have strong effects on ant community composition [7]. The present work was aimed to conduct a survey of ant species diversity inhabited in residential site, industrial site and agricultural site in Thiruthangal.

Materials and Methods

Study area

The study was carried out in three different sites of Thiruthangal, Sivakasi Taluk. The study area lies between latitudes 9° 48' from north and longitudes of 77° 80' from east. Three ecological habitats are residential site, industrial site and agriculture site.

Sampling methods

The pitfall trap technique was adopted to measure the ant fauna over a study period in the study area. Ten sites were chosen to represent the three different localities. At each site, 20 pitfall traps (10 cm depth for each trap) were distributed systematically at 5-metre intervals within a 500 m2 area. Each individual trap remained in exactly the same position during the study period, allowing comparable results on the cumulative catches per trap. Traps were left open for 48 hr. The captured specimens in each trap were counted and then identified.

Relative abundance

The difference between the total number of individuals of all species and the total number of individuals of the species. Relative abundance of insects was calculated using the following formula [8] (Figure 1).

$$\text{RelativeAbundance (\%)} = \frac{\text{Total number of individuals of the species}}{\text{Total number of Individuals of all species}} \times 100$$

Result and Discussion

In the present study, the diversity of ant species in three different selected sites of Thiruthangal, Sivakasi Taluk was studied. Totally eleven species of ants belonging to four subfamilies were recorded in Table 1,2. From which eleven species, seven species were found in residential site, five ant species were found in industrial site and eleven species were found in agricultural site.
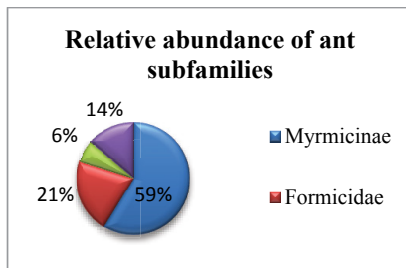
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Figure 1: Relative abundance of ant subfamilies.

Table 1: List of ants collected from the studied area.

S. No	Subfamily	Ant Species
1	Myrmicinae	*Monomorium minimum*
2		*Solenopsis invita*
3		*Solenopsis xyloni*
4		*Solenopsis geminate*
5		*Messor* sp
6		*Crematogaster subnuda*
7	Formicidae	*Camponotus compressus*
8		*Camponotus* sp1
9		*Polyrhachis* sp
10	Dolichoderinae	*Tapinoma* sp
11	Pseudomyrmecinae	*Tetraponera rufonigera*

Table 2: Distribution of ant species in three different sites.

S. No	Ant Species	Study area		
		Residential site	Industrial site	Agricultural site
1	*Monomorium minimum*	+	+	+
2	*Solenopsis invita*	+	+	+
3	*Solenopsis xyloni*	+	-	+
4	*Solenopsis geminata*	+	-	+
5	*Messor* sp	-	-	+
6	*Crematogaster subnuda*	-	-	+
7	*Camponotus compressus*	+	+	+
8	*Camponotus* sp1	-	+	+
9	*Polyrhachis* sp	-	-	+
10	*Tapinoma* sp	+	-	+
11	*Tetraponera rufonigera*	+	+	+

'+' Present '-' Absent

In the present study number of species is high in agricultural site. Sunilkumar et al., (1997) reported that, ant species richness generally increased with increase in vegetation and low number of species recorded in industrial site. It's may be due to release of chemical effluents in the site. Gokulakrishnan et al., (2014) reported lower diversity of ants in the industrial areas.

In the present investigation relative abundance of individuals of families Myrmicinae and Formicidae were more in the studied area. The reason for the overpopulation of these subfamilies was mainly due to their feeding habit on honey dews of homopterans, extra floral nectaries, arils (or) elaisomes of seeds and domatia, the microhabitat for ants [9,10].

Conclusion

An attempt has been made to study ant species diversity in Thiruthangal, Sivakasi (Talk) adopting pitfall trap as sampling method. Ants perform many ecological roles which are beneficial to humans being, including the control of pest populations. The Present study will yield valuable information of ant availability in the region.

Acknowledgment

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