

Assessment of Ant (Hymenoptera : Formicidae) Diversity from Kuthuparamba Area of Kannur District, Kerala, India

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ABSTRACT

Importance of ants in our ecosystem is well recognized. Abundance and stability make the ant population one of the most successful insect groups in the ecosystem. Present investigation was carried out to assess the ant diversity in Kuthuparamba region, Kannur District in Kerala state. Results showed 13 genera of ants representing three subfamilies. The subfamily Myrmicinae was found to be dominant with six genera followed by Formicinae with four genera and Ponerinae with three genera.

Keywords Formicidae, Subfamilies, Ecosystem, Bioindicators.

INTRODUCTION

Insect order Hymenoptera received much attention in biological surveys. This order is hyper diverse and vitally significant to all terrestrial systems owing to

their ecological importance, dominance and numbers. Ants are one of the ubiquitous groups of insects in ecosystems with potential use as bioindicators of disturbances (Mondejar and Nuneza 2022). Ants have useful characteristics for monitoring environmental impacts, ease of sampling and well-known taxonomy (Bokl *et al.* 2015). Role of ants in land management practice, monitoring soil condition, forest productivity is well known. They act as ecosystem engineers (Aswathi and Dhivya 2021).

Ants belong to the insect family Formicidae with 26 extant subfamilies, 428 known genera and 14711 species (Azhagu *et al.* 2017) able to survive in different kinds of ecosystems due to their social organization and ability to modify the habitats (Haritha and Krishnakumar 2019). Ant population depends on the soil conditions, vegetation structure as well as arthropod population. Agricultural intensification and alteration affect ant communities in several ways by changing microclimate, habitat structure and availability of resources (Zina *et al.* 2022). Because of their complex interactions with the environments, ants are often used as bio-indicators in environmental assessment programs such as landscape disturbances (Tania *et al.* 2018) ecosystem health (Bharti *et al.* 2016) heavy metal contaminations (Oksana *et al.* 2018). As species are lost at an alarming rate from the protected and non-protected areas, it is important to establish baseline data on the diversity and distribution of species. Very little documentation has been done on the ant diversity in northern Kerala hence a study was undertaken to assess the diversity and

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abundance of ants in selected areas in Kuthuparamba region, in Kannur District.

MATERIALS AND METHODS

Study was carried out in Kuthuparamba region located at 11.8319°N latitude, 75.5655°E longitude in Kannur district, Kerala State. The study area is experiencing a humid climate receiving 80% of its annual rainfall during the period of South-West monsoon which extends from June to end of September. The region is rich in vegetation including agricultural crops. Field trips were carried out in different parts of Kuthuparamba including sacred grove as well as home garden for a period of eight months from July to February. Ants were collected using pitfall traps and hand collection methods as described (Gadagkar *et al.* 1993). Collected specimens were identified upto genus level with standard keys (Bingham 1903, Ali 1992).

RESULTS AND DISCUSSION

During the study a total number of 760 individuals belonging to 13 genera under three subfamilies of ants were identified from the study area (Table 1). Subfamily Myrmicinae was the most dominant family with 6 genera followed by Formicinae (4 genera) and Ponerinae (3 genera). In terms of total number of individuals reported, Myrmicinae was the most dominant family (41.71% of total number of individuals) followed by Formicinae (36.84%) and Ponerinae (21.45%) (Fig.

Table 1. List of identified specimens from the study area.

Sl. No.	Subfamily	Genus
1	Myrmicinae	<i>Pheidologeton</i> Mayr 1862
2		<i>Myrmecaria</i> Saunders 1842
3		<i>Cardiocondyla</i> Emery 1869
4		<i>Solenopsis</i> Westwood 1840
5		<i>Tetramorium</i> Mayr 1855
6		<i>Crematogaster</i> Lund 1831
7	Formicinae	<i>Camponotus</i> Mayr 1861
8		<i>Oecophylla</i> Smith 1860
9		<i>Anoplolepis</i> Santschi 1914
10		<i>Paratrechina</i> Motschoulsky 1863
11	Ponerinae	<i>Diacamma</i> Mayr 1862
12		<i>Leptogenys</i> Roger 1861
13		<i>Odontomachus</i> Latreille 1804

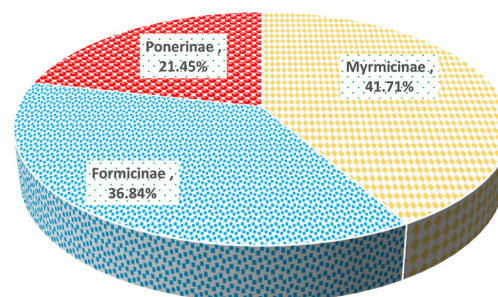


Fig. 1. Relative abundance of ant subfamilies in the study area.

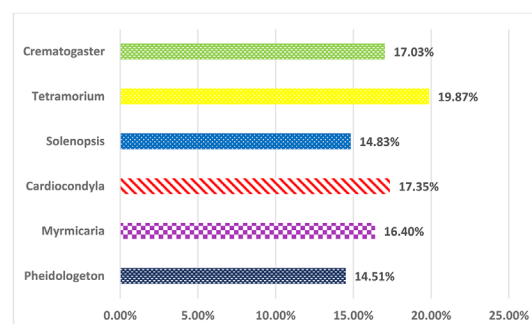


Fig. 2. Representation of ant genera in the subfamily of Myrmicinae.

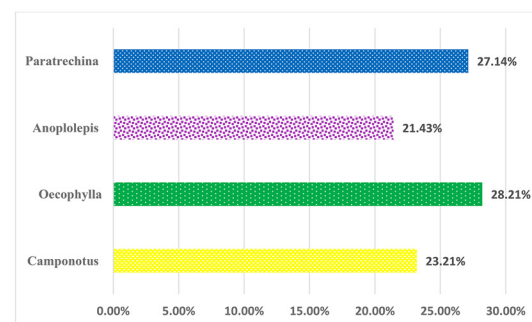


Fig. 3. Representation of ant genera in the subfamily of Formicinae.

1). Dominance exhibited by Myrmicinae subfamily could be attributed to the availability of nesting sites and food since niche differentiation has been proposed as a major mechanism for species coexistence (Greve *et al.* 2019). Subfamily Myrmicinae include specialists predators, scavengers and nectarivores. Several researchers reported Myrmicinae as the dominant subfamily in their study areas (Vanitha *et*

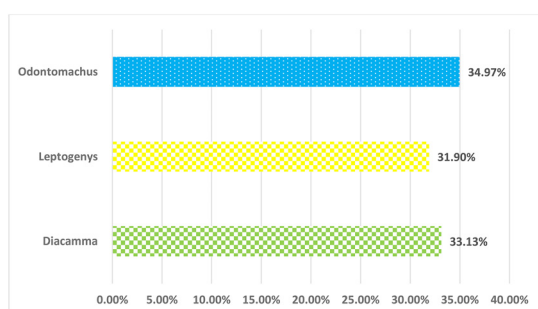


Fig. 4. Representation of ant genera in the subfamily of Ponerinae.

al. 2017, Aswathi and Dhivya 2021). In the present study, the genus *Tetramorium* was the most abundant genera in the subfamily followed by *Cardiocondyla*, *Crematogaster*, *Myrmecaria*. (Fig. 2). *Tetramorium* Mayr is one of the largest ant genera with 600 extant species (Bolton 2016). Formicinae is a large and successful group distributed globally across a wide range of terrestrial habitats comprising about 3030 described species. This subfamily comprises well known taxa like wood ants (formica), carpenter ants (Camponotus), weaver ants (*Oecophylla*) honey pot ants (*Myrmecocystus*) and about fifty other genera (Ward *et al.* 2016). In the study area, *Oecophylla* was the dominant genera followed by *Paratrechina*, *Camponotus* and *Anoplolepis* (Fig. 3). Ponerinae subfamily was specific in their niche requirements and food habits. *Odontomachus* was the dominant genera in the study area followed by *Diacamma* and *Leptogenys* (Fig. 4).

CONCLUSION

Ants constitute an important fraction of animal biomass in the terrestrial ecosystem (Bharti *et al.* 2016). Functional characteristics as well as species composition of ant communities strongly influence ecosystem properties and they act as ecosystem engineers and environmental indicators. The present study showed that ant communities in Kuthuparamba region consists of three subfamilies. Relative abundance of individuals of subfamilies Formicinae and Myrmecinae could be due to their varied feeding habits and availability of micro-habitats (Manikandan *et al.* 2018). Since ant communities respond quickly to stress and disturbances in their habitats, an inves-

tigation on the existing ant fauna in a region helps to assess the ecological status.

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