A survey on ant diversity in two different areas of Thrissur district, Kerala

Gayathri G and Dr. J. Roopavathy
1. M.Sc., PG and Research Department of Zoology, Nirmala College for Women, Coimbatore -18
2. Assistant Professor, PG and Research Department of Zoology, Nirmala College for Women, Coimbatore-18
e-mail ID: jroopavathy27@gmail.com

ABSTRACT : A study was investigated to explore the distribution of ants in two different areas of Thrissur district, Kerala. These ant species belonging to 6 subfamilies, The Myrmicinae was the most dominant subfamily followed by Formicinae , Ponerinae , Pseudomyrmicinae Dolichoderinae and Dorylinae. During the present investigation comparatively high species diversity (number of species 19) was observed in agricultural area and minimum numbers of species diversity (number of species 12) were recorded in Industrial area.
Key Words: Formicinae, Ponerinae, Pseudomyrmicinae

I.INTRODUCTION

Ants are the most dominant components of the terrestrial ecosystem because of their universal distribution and thus constitute the greater part of biomass. Ants contribute a conspicuous component of terrestrial biodiversity and are the most divergent group among all social insects. These act as ecosystem engineers. They play a very important role in the ecosystem by improving the soil and assisting in the decomposition process and are considered as good biological indicators due to mutualistic behaviour with both flora and fauna. These eusocial insects lead to high level of interactive lives assisting each other to survive and are highly evolved hymenoptera polymorphism.

More than 12,500 of an estimated total of 22,000 species have been classified (Agosti and Johnson, 2003). A total of 828 valid species and subspecies names belonging to 100 generas are listed from India (Himmer 1927). The Western Ghats is India plus the whole island of Sri Lanka is considered one of 34 world biodiversity hotspots (Myers *et al*., 2000; Mackay 1981). Ants have been increasingly appreciated as an indicator group in some regions (Bestelmeyer and Wiens 2001; Anderson and *et al*., 2004). Ants may be excellent bio- indicators of land management practices and restoration effects because they are sensitive to habitat variation, respond quickly to changes in habitat quality and are easy to collect, straight forward to sort to species or morphospecies level. Ants clearly meet the criteria of taxon's ability as bio- indicator to reflect general ecological change, and relate to their abundance, diversity, functional importance and sensitive to disturbance.

The present work was aimed to explore the diversity and habitat preference of ant assemblage in a heterogeneous ecosystem in two different transects – Agricultural area of Nadavaramba region and Industrial area of Irinjalakuda region at Thrissur district in Kerala, India.

II. 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 (i) Agriculture area (Nadavaramba region at Thrissur district) Nadavaramba is a small village within Mukundapuram Taluk near Irinjalakuda Municipality in Thrissur district, Kerala. (ii) Industrial area (Irinjalakuda region at thrissur district). Irinjalakuda is a Municipal town in Thrissur district, Kerala. It is the headquarters of Mukundapuram Taluk.

2.2 DATA COLLECTION

The survey was carried for a period of 5 months from August 2018 to December 2018 to access maximum ant diversity of the specific regions.

2.3 METHODOLOGY OF SAMPLE COLLECTION

Ants were collected during morning and evening time using different methods described by Gadagar *et al.,* (1993). Four different methods were employed for the collection of ant samples (Fig: 5).

(i) Hand Collection, (ii) Pit-Fall Trap Method, (iii) Scented Trap Method (iv) All Out Search Method

2.4 PRESERVATION OF ANT SAMPLES

Samples mixed with debris were separated from debris and were washed with alcohol before preserving them. Immediately after collection, all the specimens were sorted out based upon similar groups. Sorting is one of the very basic thing, which needs to be done carefully. Most of the taxa can be sorted based on the colour, size and some basic morphological features. Then they were sorted based upon different species and each group was assigned names. Following that, each of the species were split into morphospecies and kept in separate vials with appropriate labels.

The collected ants were directly put into 70% alcohol. All the vials were labelled properly by making the details of the locality, date of collection, name of collector and information about the species habitat, whether it is arboreal or ground dwelling.

2.5 IDENTIFICATION OF ANT

The collected ants were identified up to genus and for few, species level identified up to genus and for few, species level identification was done with the help of keys given by Ali (1992); Bingham (1903); Bolton, B. (1994); Rastogi (1997); Tiwari (1999); Varghese *et al*., (2002&2003) Gokulakrishnan *et al*., (2014) (Plate: 1&2).

III. RESULT AND DISCUSSION

The present investigation was carried out in two different study areas (i) Agricultural area (Paddy field in Nadavaramba region at Thrissur District in Kerala), (ii) Industrial area (KPL Oil mill Irinjalakuda region at thrissur District in Kerala). Totally 31 species were observed belonging to 17 genera that spread over 5 subfamilies were recorded (Table: 1).

Collection of an ant fauna depends on the type of ant fauna (e.g. arboreal, ground dwelling, etc.) one would want to collect based on the needs of various investigations. Agosti *et al*., (2000) described the procedures for surveying the diversity of ground-dwelling ants. In the present study recorded 31 species of ants in 17 genera representing five subfamilies namely Myrmicinae, Formicinae, Ponerinae, Pseudomyrmicinae and Dolichoderinae. Out of these five subfamilies, Myrmicinae is the most abundant having 15 species in 8 genera including *solenopsis sp*. that firstly recorded. This subfamily is widely distributed in all geotropic regions. This correlate with the present study, because the highest number of species from Myrmicinae subfamily was recoded.

Maximum number were identified in agricultural area, totally 19 species were observed, they belong to 5 subfamilies and 15 genera were recorded. Maximum number of subfamilies were in Myrmicinae which hold 10 species followed by Formicinae hold 5 species, Ponerinae hold 2 species, Pseudomyrmicinae and Dolichoderinae hold only one species.

Minimum number were recorded in Industrial area, totally 12 species were observed, they belong to 4 subfamilies and 7 genera were recorded. Maximum number of subfamilies were observed in Myrmicinae and Formicinae, both subfamilies hold 5 species followed by Ponerinae and Psuedomyrmicinae hold only one species. No number of subfamilies Dolichoderinae were found .

Rajagopal *et al* (2005) recorded a total of 25 species of ants belonging to 14 genera distributed in six subfamilies. It included Formicinae (9 species) followed by Myrmicinae (8 Species), Pseudomyrmicinae (4 species), Ponerinae (2 species), Dorylinae/ Dolichoderinae (1 species).

Ward, (2001) reported further detailed investigations are essential to understand the dominance of taxonomic hierarchy. The high proportion of Myrmicinae species that typically comprise the bulk of the cryptic species found in South East Asian leaf litter can be seen as an indication that the community was sampled evenly Varghese *et al*., (2002&2003) Gokulakrishnan *et al*., (2014) (Plate: 1&2).

TABLE: 1 LIST OF IDENTIFIED ANT SPECIES COLLECTED FROM STUDY AREAS

SERIAL NO	COMMON NAME	SCIENTIFIC NAME	SUBFAMILY	HABITAT
1.	Short legged hunchback ant	*Myrmicaria brunnae*	Myrmicinae	Ground dweller
2.	Flower ant	*Monomorium indicum*	Myrmicinae	Ground dweller

3.	Destructive trailing ant	*Monomorium destructor*	Myrmicinae	Arboreal
4.	Little fire ant	*Monomorium dichorium*	Myrmicinae	Arboreal
5.	Little black ant	*Monomorium minimum*	Myrmicinae	Ground dweller
6.	Pharaoh ant	*Monomorium pharaonis*	Myrmicinae	Ground dweller
7.	Forel ant	*Tetramorium indicum*	Myrmicinae	Ground dweller
8.	Winged ant	*Tetramorium bicarnatum*	Myrmicinae	Ground dweller
9.	Silky shield ant	*Meranoplus bicolour*	Myrmicinae	Ground dweller
10.	Saint-valentine ant	*Crematogaster rogenhoferi*	Myrmicinae	Ground dweller
11.	Acrobat ant	*Crematogaster subnuda*	Myrmicinae	Ground dweller
12.	Fire ant	*Solenopsis geminate*	Myrmicinae	Ground dweller
13.	Big headed ant	*Pheidole megacephala*	Myrmicinae	Ground dweller
14.	Coastal brown ant	*Pheidole wroughtoni*	Myrmicinae	Ground dweller
15.	Marauder ant	*Pheidologeton affinis*	Myrmicinae	Ground dweller
16.	Weaver ant	*Oecophylla smaragdina*	Formicinae	Arboreal
17.	Yellow crazy ant	*Anoplolepis gracilipes*	Formicinae	Arboreal
18.	Longhorn crazy ant	*Paratrechina longicornis*	Formicinae	Arboreal
19.	Long-necked sugar ant	*Camponotus augusticollis*	Formicinae	Arboreal
20.	Godzilla ant	*Camponotus compressus*	Formicinae	Arboreal
21.	Black carpenter ant	*Camponotus mitis*	Formicinae	Arboreal
22.	Exploding ant	*Camponotus parius*	Formicinae	Arboreal
23.	Hawaiian carpenter ant	*Camponotus variegatus sommificers*	Formicinae	Arboreal
24.	Velvet sugar ant	*Camponotus rufoglocus*	Formicinae	Arboreal
25	Carpenter ant	*Camponotus species*	Formicinae	Arboreal
26.	Bornean queenless ant	*Diacamma rugossum*	Ponerinae	Ground dweller
27.	Procession ant	*Leptogenys assamensis*	Ponerinae	Ground dweller

28.	Trap jaw ant	*Odontomachus haematodus*	Ponerinae	Ground dweller
29.	Arboreal bicoloured ant	*Tetraponera rufonigra*	Pseudomyrmicinae	Arboreal
30.	Slender ant	*Tetraponera allaborans*	Pseudomyrmicinae	Arboreal
31	White footed ant	*Technomyrmex albipes*	Dolichoderinae	Arboreal

Ants perform much ecological function which is beneficial for mankind such as control of pest population, plant pollination and soil erosion. The present study reveals important information on and ant diversity of the study region will certainly be helpful for future researchers to study on the group.

CONCLUSION

The number of ant species in certain agricultural area were considerably increased because they get ideal conditions over their as nesting sites, food availability, open ground for foraging etc. so improving biodiversity is important. Reducing the usage of pesticides proper disposal of industrial waste and controlling of pollution can tremendously increase the biodiversity and species richness of ants.

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