

DIVERSITY OF ANT SPECIES (HYMENOPTERA: FORMICIDAE) IN THE CAMPUS OF KONGUNADU ARTS AND SCIENCE COLLEGE, COIMBATORE DISTRICT, TAMIL NADU

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Abstract

The study examined the diversity of ants in the, Kongu nadu arts and science college campus, Coimbatore District, Tamil Nadu, as there is no adequate information pertaining on ant diversity of this region. The present study was carried out during October 2018 to December 2018. We have sampled ants by employing intensive all out search method. The sampled specimens representing 10 species belonged to 5 genera and three subfamilies. The most diverse subfamily was Formicinae (2 genera with 3 species), followed by Myrmicinae (2 genera with 5 species), followed by Dolichoderinae (1 genera with 2 species). The Pseudomyrmicinae and Ponerinae family were absent. Among the sampled genera, the highest number of species representation was Camponotus species. Few ant genera as Crematogaster and Monomorium of Myrmicinae and Camponotus of Formicinae were mostly found everywhere.

Keyword: Key words: Ants, Myrmicinae, Formicinae

1.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 asocial [1]. Ant species can be used in monitoring environmental impacts, ecosystem funding, and tools in ecological studies [2, 6, 7]. Ant species are used as excellent indicators of land management practices and restoration efforts [5, 6]. Sabu [8] estimated the diversity of forest litter inhabiting ants along elevations in the

Wayanad region of the Western Ghats. Bharti and Sharma [6] carried preliminary investigations on diversity and abundance of ants along an elevational gradient in Jammu-Kashmir Himalaya. The food of ants consists of insects, terrestrial arthropods, excretion from plants, honey dew excreted by aphids and mealy bugs, secretion of the caterpillars of the family Lycaenidae, seeds of plants etc [1].

Ants are ubiquitous in distribution and occupy almost all terrestrial ecosystems. There are about 15000 species of ants (7); only 11,769 species have been described (8). The family Formicidae contains 21 subfamilies, 283 genera and about 15000 living ant species of which 633 ant species belonging to 82 genera, 13 subfamilies are reported from India. About 226 species of ants belonging to 63 genera and 11 subfamilies are estimated from Karnataka state (9).

The main aim of the present study was to conduct survey, to document the ant species diversity in the campus of Kongunadu arts and science college, Coimbatore and prepare a partial checklist of ants in the study area.

2.MATERIALS AND METHODS

2.1. study area

Study was conducted in Kongunadu college of arts and science campus which is surrounded by diverse habitat. Campus is located at G.N.Mills, Coimbatore district surrounded by a mosaic of concrete buildings. It is blessed with lush green vegetation having large trees, shrubs, herbs and long grasses which serves as shelter to the butterflies. Core area of observation was a plant garden which is located in the campus. Study area

experiences tropical climate with hot summers (Temperature range: 26.3 C). Area received major portion of its rainfall from the south-west monsoon between June and September. The mean annual rainfall is 618 mm with mean number of rainy days per year. The findings presented here are based on the random survey conducted from October 2018 to December 2018

2.2. All out search Method

We employed all out search method for the collection of ants in October 2018 to December 2018. Ants were collected using a brush and forceps during day time in between 11am to 2 pm twice in every month. Ant's species were preserved in 70% ethanol in plastic vials at the Department of Zoology, Kongunadu College of arts and science. The stored ant specimens were then counted and identified up to genus level (some to species level) using microscope. Species identification was carried out under the help of the keys of "Ants identification guide" [10], collected ants were identified up to the genus level by using based on literature (11, 12, 13, and 14). Identified specimens will be kept in the air tight insect wooden box. Ant species were listed and each species was counted to calculate and compared composition, richness, species diversity, trees association, habitat type and identification of ants.

3.RESULT

Ant diversity in the campus of Kongu nadu arts and Science College, Tamil Nadu has been analyzed in this study. During this study a total of 50 sampled specimens were captured in the study area. The 10 ant species are belonging to 5 genera and three subfamilies. These are follows, the Myrmicinae were represented 5 species followed by Formicinae 3 species and two genera. In subfamily Dolicoderinae represented 2 species and 1 genus. The Ponerinae and Pseudomyrmicinae subfamilies were absent in our college campus. Mostly *Monomorium*, *Crematogaster* and *Camponotus* species founded everywhere.

Among this study *Monomorium Minimum* was high compared with other species like *Tapinoma sessile* and *Paratrechina longicornis*. The species of *Crematogaster* were dominant on tree trunk which nested on trees.

The table 1 and 2 (figure 1 and 2) represented distribution of diversity of ants species in our college. A

number of ants species diversity differ from various factor like food, habitat, nesting behavior etc. the Myrmicinae subfamily family highly represented 2 genera (*Monomorium*, *Crematogaster*) and 5 species (*Minimum*, *Pharaonis*, *Destructor* and *Subnuda*)in our study area. Followed by subfamily Formicinae 2 genera (*Camponotus* and *Paratrechina*) and 3 species (*Radiates*, *Compressus* and *Longicornis*) and Dolichoderinae subfamily 1 genera *Tapinoma* and 2 species (*Indicum* and *Sessile*) rarely found the study area.

Table 1 Showing the list of identified ant Species and their distribution in Kongu Nadu arts and science college, Coimbatore District

S.No	Genera	Species	Common Name
Subfamily: Formicinae			
1.	<i>Camponotus</i>	<i>Radiates</i> Forel,1892	Carpenter ant
2.	<i>Camponotus</i>	<i>Compressus</i> (Fabricius,1787)	Common Godzilla ant
3.	<i>Paratrechina</i>	<i>Longicornis</i> (Latreille, 1802)	Crazy ant
Subfamily: Myrmicinae			
4.	<i>Monomorium</i>	<i>Minimum</i> (Buckley, 1867)	Little black ant
5.	<i>Monomorium</i>	<i>Pharaonis</i> (Linnaeus, 1758)	Pharaoh ant

6.	<i>Monomorium</i>	<i>Destructor</i> (Jerdon,)	carpenter ant
7.	<i>Crematogaster</i>	<i>Spe</i>	Acrobat ant
8.	<i>Crematogaster</i>	<i>Subnuda</i> (Mayr,1879)	Carpenter ant
Subfamily: Dolichoderinae			
9.	<i>Tapinoma</i>	<i>Indicum</i> (Forel, 1895)	Ghost ant
10.	<i>Tapinoma</i>	<i>Sessile</i> (Say, 1836)	Odour ant

Figure 1 showing subfamily wise distribution of ants found at KASC College

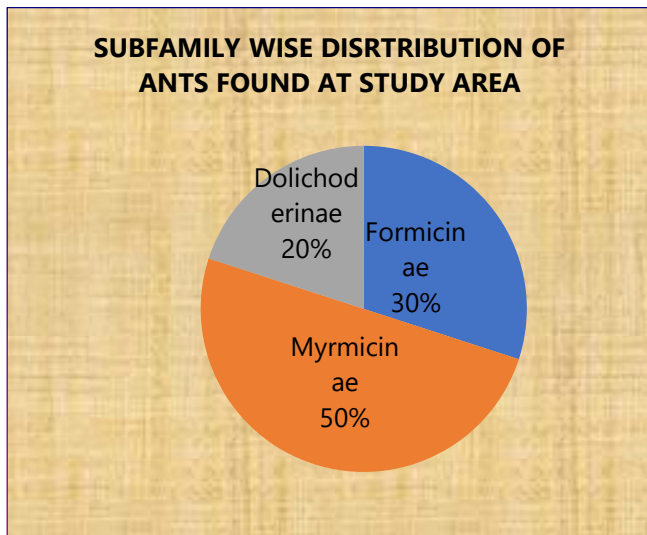


Table 2: Summary of ant species collected from sampling site.

Subfamily	Genera	Species found	Relative abundance
			%
Formicinae	Camponotus	2	20%
	<i>Paratrechina</i>	1	10%
Myrmicinae	Monomorium	3	30%
	Crematogaster	2	20%
Dolichoderinae	Tapinoma	2	20%
Total	5	10	

Figure 2 Showing Diversity of ants representing with genera.

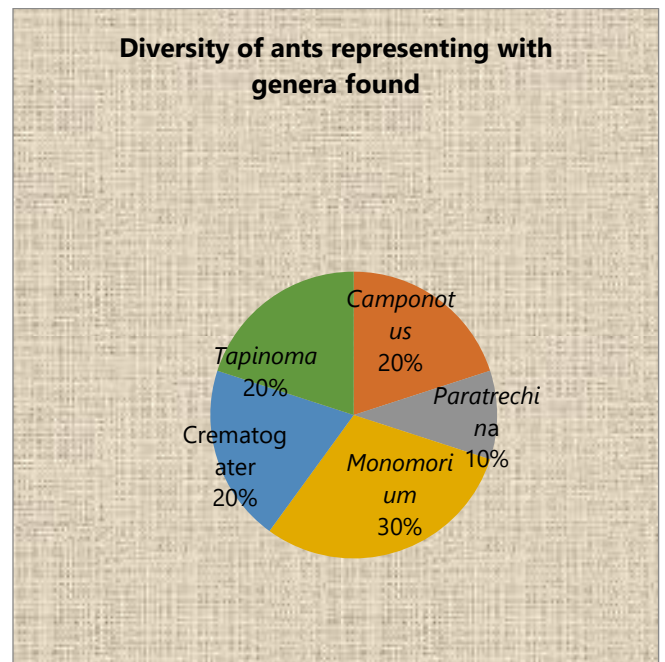


Figure 2 showing genera *Monomorium* species (n=3) followed by 30% most abundant in our study area. Followed by the genera *Crematogaster*, *Tapinoma* and *Camponotus* (n=2), 20% rich in species. The genera *Paratrechina* rare species (*Longicornis*) in our study area.

4.DISCUSSION

In the present study, 10 species of ants in 5 genera representing three subfamilies namely Formicinae, Myrmicinae and Dolichoderinae were recorded. Out of the three subfamily, Myrmicinae is the most abundant having 5 species in two genera. This subfamily is widely distributed in all geographic regions. The Formicinae and Myrmicinae are the largest ant subfamilies in the world and the dominant groups in most terrestrial habitats. The prevalence of these subfamilies has been reported to increase with increasing aridity [15, 16]. The Formicinae were the most abundant in the study area. The extreme dominance exhibited by Formicinae sub family with seven species in this study. Formicinae show a significant difference between the seasons. Humidity may influence the nest building. The genus *Camponotus* were record of four species. *Camponotus* was a frequently occurring species in everywhere. The *Camponotus* had the greatest individual numbers. These ants are called as carpenter ants because of their "Nesting behaviours" [17].

The subfamily Formicinae, having 3 species in two genera, subfamily Dolichoderinae were recorded only 1 genera and 2 species founded. The subfamily Ponerinae and Pseudomyrmicinae were absent in our study area. Genera *Camponotus* of Formicinae and *Trichomyrmex* of Dolichoderinae were commonly found in all the area and more localities. The genus *Pheidole* and *Camponotus* were dominant in the cultivated and Riverine area [18]. Palanichamy [19] also reported that black ant *Camponotus* sp. plays a major role in pollination of some flowering plants. Sunilkumar [20] reported that ant species richness generally increased with increase in vegetation.

A total of 3 subfamilies, 5 genera and 10 species of ants were recorded from the campus of KASC College, Coimbatore. The majority of species were in the Myrmicinae (50%) and Formicinae (30%) followed by Dolichoderinae (20%). At the genus level *Monomorium*,

Crematogaster, *Camponotus*, *Anoploopsis* and *Tapinoma* were the most speciose genera in this study with 3,2,2,1 and 2 respectively. The myrmicinae subfamily was most abundant in the numbers of ants and the most diverse group (5 species) in this study area. These ants were more specific due to availability of food and nesting sites. *Monomorium minimum* and *crematogaster* mostly found everywhere because of climatic condition of our college. This family showed a significant difference between seasons [21] as recorded by other elsewhere. The genera *tapinoma* species were founded at food availability areas. Food sources may have been important [21].

Ants exhibit a greater resistance to pollutants in comparison to other invertebrates [22 and 23] even to industrial pollutants [24]. The rich diversity of ants documented during this study may be because adequate nesting sites and availability of food as well foraging. Figure 2 showing genera *Monomorium* species (n=3) followed by 30% most abundant in our study area. Followed by the genera *Crematogaster*, *Tapinoma* and *Camponotus* (n=2), 20% rich in species. The genera *Paratrechina* rare species (*Longicornis*) in our study area. It is the first ants diversity study in our college. During compression of all species *Monomorium minimum* and *Crematogaster subunuda* and *Camponotus compressus* were rich in abundance and *Tapinoma indicum*, *Tapinoma sessile* and *Anoploopsis gracillipsis* were rare founded in our study area.

5.CONCLUSION

The present investigation on diversity of ants in the Kongunadu arts and science college campus, Coimbatore clearly shows the richness of ants fauna in the study area. We have recorded 10 species of ants belonging under the 3 subfamilies and five genera of ants species and also large amount of *Monomorium*, *Crematogaster* and *Camponotus* genera were observed in KASC College campus. It is the first investigation study on diversity of ants species in our college.

REFERENCES

[1] Gadagkar R, Nair P, Bhat D.M. 1993. Ant species richness and diversity in some selected localities in Western Ghats, India. *Hexapoda*. 5(2):79-94.

- [2] Andersen AN. 1988. Immediate and longer-term effects of fire on seed predation by ants in sclerophyllous vegetation in Southeastern Australia. *Australian Journal of Ecology*; 13:285-293.
- [3] Andersen AN. 1990. The use of ant communities to evaluate change in Australian terrestrial ecosystems: A review and a recipe. *Proceedings of the Ecological Society of Australia*; 16:347-357.
- [4] Ramesh T, Jahir Hussain K. 2010. Diversity, Distribution and Species Composition of Ants fauna at Department of Atomic Energy (DAE) Campus Kalpakkam, South India. *World Journal of Zoology*, 5(1):56-65.
- [5] Sabu T.K, Vinesh P.J, Vinod K.V. 2008. Diversity of forest litter inhabiting ants along elevation in the Wayanad region of the Western Ghats. *Journal of Insect Science*.8:69.
- [6] Bharti H, Sharma YP. 2009. Diversity and abundance of ants (Hymenoptera: Formicidae) along an elevational gradient in Jammu-Kashmir Himalaya-1. *Halteres*. 1:10-19.
- [7] Andrade, T. 2007. Diversity of ground dwelling ants in Cerrado: An Analysis of temporal variations and distinctive Physiognomies of vegetation Formicidae: Hymenoptera. 50.
- [8] Agosti, D, Majer, J, Alonso, L. and Schultz, T. 2000. Litter ant communities of the Brazilian Atlantic Rain forest region.
- [9] Varghese, T. 2009. A Review of Extant Subfamilies, Tribes and Ant Genera in India. 81-89.
- [10] Bayer. 2010. An ant identification guide, Bayer environmental science,
- [11] Mathew R, Tiwari RN. 2000. Insecta: Hymenoptera: Formicidae. *Zool. Surv. India Fauna of Meghalaya, State Fauna Series*, 4.
- [12] Bolton B. 1995b. A new general catalogue of the ants 0. (The world, Cambridge, Mass: Harvard University Press, 11-504.
- [13] Bingham CT. 1903. The Fauna of British India including Ceylon and Burma Hymenoptera, Ants and Cuckoowasps London Taylor and Francis. 2:1-506.
- [14] Holldobler B, Wilson EO. 1990. *The Ants*. Harvard University Press Cambridge, Massachusetts.
- [15] Marsh AC. 1986. Ant species richness along a climatic gradient in the Namib Desert *Journal of Arid Environments*, 11: 235-241.
- [16] Lindsey PA, Skinner JD. 2001. Ant composition and activity patterns as determined by pitfall trapping and other methods in three habitats in the semi-arid Karoo *Journal of Arid Environments*. 48:551-568.
- [17] Chavhan A, Pawar SS. 2011. Distribution and Diversity of ant species in and around Amravati city of Maharashtra, India. 395-400.
- [18] Aravind Chavhan, Pawar SS. 2011. Distribution and diversity of Ant Species (Hymenoptera: Formicidae) in and Around Amravati City of Maharashtra, India. *World Journal of Zoology*. 6(4):395-400.
- [19] Palanisamy P, Baskaran S, Mohandoss A. 1995. Insect pollination of Moringa plant. *Moringa concanensis inimmo Linn*". *Environmental Ecology*. 13(1):4751.
- [20] Sunilkumar M, Srihari KT, Nair P, Varghese T, Gadagkar R. 1997. Ant Species richness in selected localities of Bangalore. *Insect Environment*. 3(1):3-5.
- [21] Watanasit, S. and Bickel, T.O. 2000. Diversity of Ants from Ton Nga Chang Wildlife Sanctuary, Songkhla, Thailand. 187-194.
- [22] Torossian, C. and Causse, R., 1968. E ets des radiations gamma sur la fertilité et la longévité des colonies de *Dolichoderus quadripunctatus*. *Compte rendu du Colloque Isotopes and radiation in entomology*. International Atomic Energy Agency, Vienna. 155-164.
- [23] Le Masne, G. and Bonavita-Cougourdan, 1972. A. Premiers résultats d'une irradiation prolongée au césium sur les populations de fourmis en Haute-Provence. *Ekologia Polska* 20: 129-144.
- [24] Petal, J., Jakubczyk, H., Chmielewski, K. and Tatur, A. 1975. Response of ants to environmental pollution. In *Progress in Soil Zoology* J. Vabek, ed. 363-373.