

A Preliminary Report on the Ant (Hymenoptera: Formicidae) Faunal Diversity of Ramakrishna Mission Vivekananda Centenary College and Boys' Home Campus, Rahara

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Abstract

Altogether, 22 valid ant species belonging to 16 genera under 5 subfamilies are studied from Ramakrishna Mission Vivekananda Centenary (RKMVC) College and Ramakrishna Mission (RKM) Boys' Home Campus, Rahara. Of these, the most speciose subfamily is Myrmicinae (8 species) followed by Formicinae (6 species) and Ponerinae (5 species), Dolichoderinae (2 species) and Pseudomyrmecinae (1 species) and the genus *Camponotus* has the maximum number of species (3). This study provides an inventory of the ant species from these two areas. Also, prolonged survey of the area may result in the addition of a few more species in the list as the dynamic nature of the habitat and microhabitats in the area can be said to be an abode for ants and other insects.

Key Words: Ants, RKMVC College Campus, RKM Boys' Home, Rahara, Inventory

1. Introduction

Ants are among the most successful organisms on earth, strongly influencing many ecosystems they inhabit. They are distributed worldwide and have colonized nearly every habitat on land, from urban spaces to the canopy of rain forests. Major portion of animal biomass in most terrestrial community comprises of ants (Tschinke *et al.*, 2012). Total of 828 valid species and subspecies name belonging to 100 genera are listed from India (Bharti *et al.*, 2016). West Bengal has highest number of species (382) belonging to 65 genera (Bharti *et al.*, 2016). Ants perform range of ecosystem functions (Folgarait 1998, Del Toro *et al.*, 2012). Ants play critical role in every terrestrial ecosystem: recycling nutrients, dispersing seeds, engaging in mutualistic associations with other organisms and serving as predators & scavengers. (Frouz and Jilková, 2008). They perform major ecological functions (predators,

scavengers, soil turners, nutrient cyclers, pollinators) and are also responsible for dispersal of numerous plant species (Lach *et al.*, 2010, Toro *et al.*, 2012, Guénard, 2013). Ants constitute fraction of the animal biomass in terrestrial ecosystems (Hölldobler and Wilson, 1990; Andersen, 2008). Ants are placed in a single family, Formicidae (Latreille, 1809). A key characteristic of the family is the possession of a metapleural gland just below the coxa of the metathoracic leg on the alitrunk (Yek and Mueller, 2010). This gland is not present in any other insect but in ants. An exception is however the ants of subfamily Formicinae. Another important features of the family an easily distinguishable waist like segments that connects the gaster to the mesosoma. This segment is unique to the ants and is called the petiole (Tepe *et al.*, 2006). It is a key body part for identifying ants. Keeping in view, the study was conducted for the first time in Ramakrishna Mission Vivekananda Centenary College and Ramakrishna Mission Boys' home campus to report the different ant species. Throughout the study we got 22 species of ants belonging to 16 genera under 5 subfamilies.

2. Materials and Methods

Study Area

The study was conducted at 2 localities: Ramakrishna Mission Vivekananda Centenary College Campus and Ramakrishna Mission Boy's Home Campus. From these 2 stations, total 9 sites are selected for laying pitfall traps based on various ecological conditions. From RKM Boy's Home, 7 sites were selected and from RKMVCC Campus, 2 sites are taken as shown in the map (Fig. 1).

Table 1: Study Sites and Coordinates

Sl. No.	Study Site Name	Habitat Sites (Fig. 2)	Coordinates
1.	Small Garden	1(a)	22°43'33.15"N, 88°22'51.58"E
2.	Mango Tree	1(b)	22°43'35.63"N, 88°22'53.98"E
3.	Flower Garden	2(a)	22°43'44.27"N, 88°23'0.81"E
4.	Tree Garden	2(b)	22°43'40.82"N, 88°23'0.43"E
5.	Volleyball Court	2(c)	22°43'40.00"N, 88°23'3.16"E
6.	Wood log Area	2(d)	22°43'39.79"N, 88°23'3.85"E
7.	Pond Side Area	2(e)	22°43'41.25"N, 88°23'6.08"E
8.	Cow Farm	2(f)	22°43'40.47"N, 88°23'7.27"E
9.	Field Area	2(g)	22°43'37.63"N, 88°23'4.16"E

Hand picking (Room, 1975), modified pitfall traps (Radawiec and Aleksandrowicz, 2013) and random sampling were used to collect ants from our study site. The collected ants were preserved in 70% alcohol. The collected samples were identified in laboratory by using microscope. We observed the diversity of diurnal ant species from 8am to 4pm. The collected ant specimens were identified by the experts of Zoological Survey of India (ZSI), Kolkata.

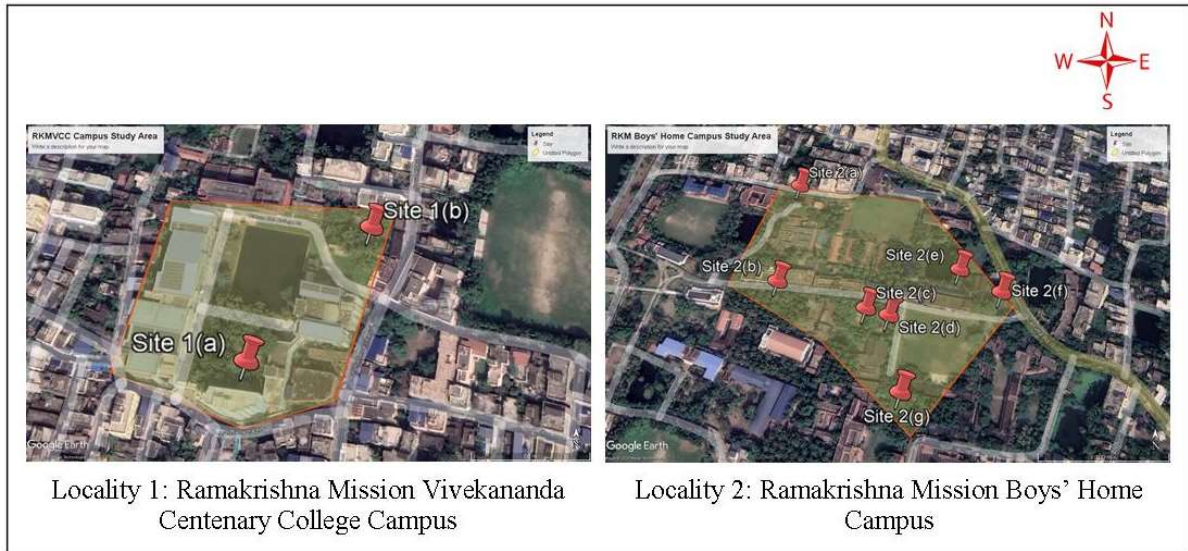


Fig. 1. Study Area



Fig. 2. Different Study Sites

3. Results

Table 2: List of Ant species collected from RKMVC College and RKM Boys' Home Campus

Sl. No.	Taxa	Habitat Sites
	Family: Formicidae Latreille, 1809 Subfamily: Formicinae Latreille, 1809	
1.	<i>Camponotus compressus</i> (Fabricius, 1787)	1(a), 2(a), 2(b), 2(d), 2(e), 2(f)

		&2(g)
2.	<i>Camponotus parius</i> (Emery, 1889)	1(a), 2(b), 2(e) & 2(f)
3.	<i>Camponotus mitis</i> (Smith, 1858)	2(b) & 2(e)
4.	<i>Paratrechina longicornis</i> (Latreille, 1802)	1(a), 1(b), 2(a), 2(b), 2(c), 2(d), 2(e), 2(f) & 2(g)
5.	<i>Oecophylla smaragdina</i> (Fabricius, 1775)	1(b)
6.	<i>Plagiolepis jerdonii</i> (Forel, 1894)	2(d)
	Subfamily: Dolichoderinae Forel, 1878	
7.	<i>Tapinoma melanocephalum</i> (Fabricius, 1793)	2(a) & 2(e)
8.	<i>Tapinoma indicum</i> (Forel, 1895)	2(a)
	Subfamily: Ponerinae Lepeletier de Saint-Fargeau, 1835	
9.	<i>Diacamma indicum</i> (Santschi, 1920)	1(a) & 2(e)
10.	<i>Diacamma rugosum</i> (Le Guillou, 1842)	2(d)
11.	<i>Leptogenys chinensis</i> (Mayr, 1870)	2(b), 2(f) & 2(g)
12.	<i>Leptogenys processionalis</i> (Jerdon, 1851)	2(b) & 2(g)
13.	<i>Pseudoneoponera rufipes</i> (Jerdon, 1851)	2(g)
	Subfamily: Myrmicinae Lepeletier de Saint-Fargeau, 1835	
14.	<i>Solenopsis geminata</i> (Fabricius, 1804)	2(d) & 2(g)
15.	<i>Aphaenogaster feae</i> (Emery, 1889)	2(c) & 2(d)
16.	<i>Pheidole indica</i> (Mayr, 1879)	2(d)
17.	<i>Pheidole megacephala</i> (Fabricius, 1793)	2(a) & 2(b)
18.	<i>Meranoplus bicolor</i> (Guerin-Meneville, 1844)	2(a), 2(f) & 2(g)
19.	<i>Lophomyrmex birmanus</i> (Emery, 1893)	2(a) & 2(e)
20.	<i>Monomorium pharaonis</i> (Mayr, 1855)	2(b) & 2(e)
21.	<i>Tetramorium smithi</i> Mayr, 1879	2(c)
	Subfamily: Pseudomyrmecinae Smith, M.R., 1952	
22.	<i>Tetraoponera rufonigra</i> (Jerdon, 1851)	2(g)

ABB Used:1(a): Small Garden, 1(b): Mango Tree, 2(a): Flower Garden, 2(b): Tree Garden, 2(c): Volleyball Court, 2(d): Wood log Area, 2(e): Pond Side Area, 2(f): Cow Farm, 2(g): Field Area

4. Discussion

The species are collected from the campus of RKM Boy’s Home and RKMVC College, Rahara that has diverse topographical landscapes, from dry sandy areas to wet grassy fields and a rich floral diversity from large trees to flower gardens and from clean fields to garbage dumping grounds which naturally makes it a very interesting site for studying insects. As such, the floral biodiversity supports the presence of rich insect variety, especially ants. The rich ant diversity is supported by the availability of floral diversity (Mango tree, Coconut tree, Betel Nut, Deodar Cedar, Neem tree, Palm tree, Banana tree, Grape fruit, Marigold, Rose, Periwinkle, Tulsi, Milk Weed, Bougainvillea, Jackfruit, China rose and Jungle Geranium etc.) and the ample variation of topographical landscapes. Ants have an upper hand in such conditions because of their amazing communication skills and the ability to withstand harsh conditions. These qualities make ants common in almost every nook and corner of the world. Also ants are social insects and devise “division of labour” in their colonies which also contributes to their survival.

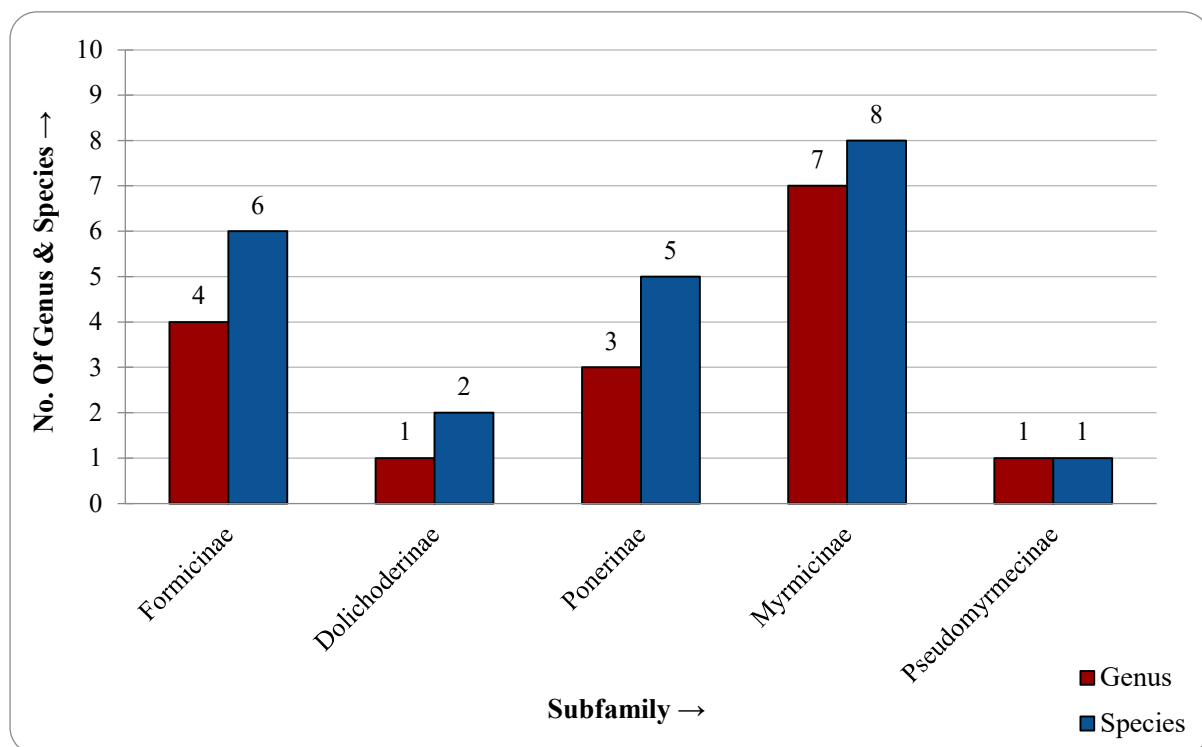
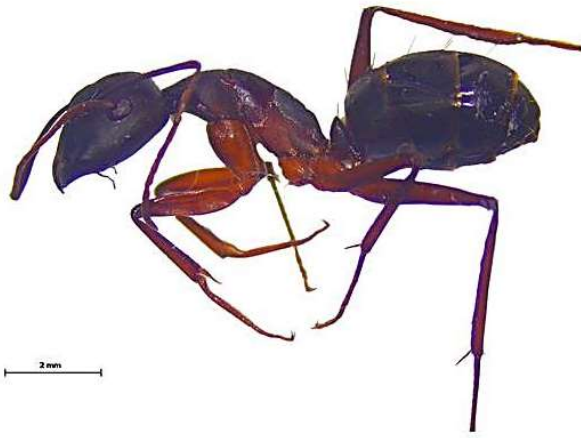


Fig. 3. Graph showing total no. of Genera & Species under respective Subfamilies

In this study, a total of 22 species of ants were identified from the 9 study sites (**Table 2**). Of these 22 species, there are 16 genera belonging to 5 subfamilies which are Formicinae, Dolichoderinae, Ponerinae and Myrmicinae (**Fig. 3**). Among these subfamilies, the maximum number of species was found under Myrmicinae which is represented by 8 species belonging to 7 genera. The least number of species were found under the subfamily Pseudomyrmecinae, which is represented by 1 species under 1 genus. This study gives the first record of the ant species from RKMVCC and RKM Boys' Home campus. *Camponotus compressus* and *Paratrechina longicornis* was the most common ant from the 9 sites (**Table 2**) and were high in abundance compared to other species. Some of the species were available only on specific habitats such as *Oecophylla smaragdina* was dominant on mango trees and its surrounding areas, *Tetraponera rufonigra* and *Pseudoneoponera rufipes* was found only around Field Area. *Tapinoma indicum* was only present in Flower Garden and its surroundings. *Tetramorium smithi* was found from Volleyball Court. *Plagiolepis jerdonii*, *Diacamma rugosum* and *Pheidole indica* were only available around Wood log Area. (**Table 2**)

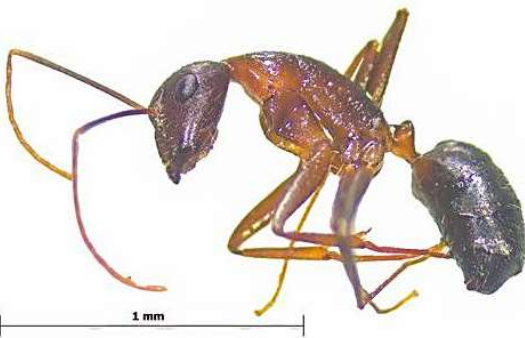
The area under consideration was unchecked in regards to the diversity of ants and this is the first attempt to produce a checklist for ants in this area. During the study period (October, 2022 – March, 2023), pitfalls were laid in various sites and data was collected. Since ants act as bio indicators in various ways, so a more detailed study is required to be conducted to gain further knowledge of ants in this particular area. However, prolonged and vigorous searching may yield more variation in the species composition of ants of this changing habitat. The list presented above provides a waypoint for further studies of diversity and distribution of ants in the mentioned areas.



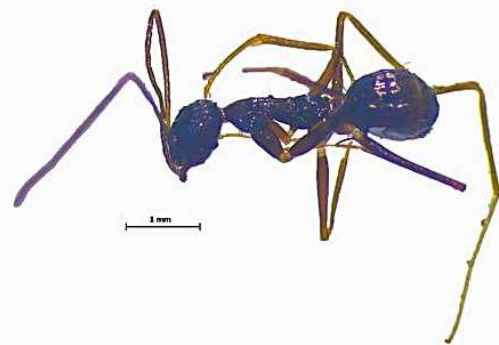
Camponotus compressus



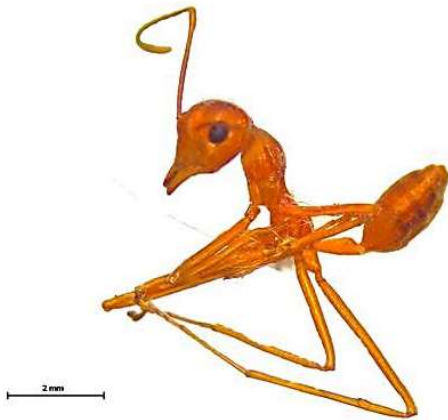
Camponotus parius



Camponotus mitis



Paratrechina longicornis



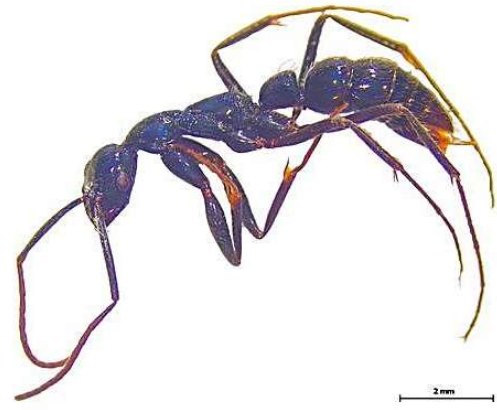
Oecophylla smaragdina



Tapinoma melanocephalum



Diacamma indicum



Leptogenys chinensis



Leptogenys processionalis



Pseudoneoponera rufipes



Solenopsis geminata



Pheidole megacephala



Meranoplus bicolor



Monomorium pharaonis



Tetramorium smithi



Tetraponera rufonigra

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6. Conflict of interest

The authors declare no conflict of interest over research and publication of this document.

7. Author's contribution

Each author has equal contribution in preparing the manuscript. The fourth author has supervised this research work.

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