EXPLORING THE ANT DIVERSITY IN THE CAMPUS ECOSYSTEM OF P.K.M COLLEGE OF EDUCATION, MADAMPAM

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1. INTRODUCTION

Ants, often overlooked but vital to our ecosystems, exhibit remarkable diversity in behavior, morphology, and ecological roles. Exploring their incredible variety offers insights into ecosystem health, species interactions, and evolutionary adaptations. This project aims to delve into the rich world of ant diversity, shedding light on their importance and the need for conservation efforts to preserve these tiny yet essential creatures.

Ants, often referred to as nature's unsung heroes, encompass an astonishing array of species, behaviors, and ecological roles. Their incredible diversity spans from minute differences in size and color to intricate social structures and specialized adaptations. Through this project, we aim to uncover the intricacies of ant diversity, exploring their ecological significance, evolutionary paths, and the implications for conservation efforts. By delving into the world of ants, we hope to illuminate the often-unseen richness that these tiny creatures bring to our ecosystems and the urgent need to protect their diversity for the sake of our planet's health.

In the intricate tapestry of life, ants emerge as unsung heroes, contributing to the very fabric of ecosystems through their complex societies and vital ecological roles. This project embarks on a captivating journey into the heart of PKM College of Education, Madampam, seeking to unravel the secrets hidden within the diverse communities of these industrious insects. Madampam,with its varied landscapes ranging from pristine wilderness to urban expanses, holds a wealth of biodiversity yet to be fully understood. Ants, often overlooked but omnipresent, are pivotal players in the drama of life, orchestrating interactions that ripple through the entire ecosystem. Our project is not just about cataloging species; it's about deciphering the nuanced dance of life in which ants are choreographers.

Ants, with their ability to thrive in diverse environments, influence the ecological dynamics of regions in multifaceted ways. From seed dispersal that shapes plant communities to their role as nature's cleanup crew, ants are the architects of equilibrium. By exploring and diversity, we aim to uncover the intricate relationships that bind these tiny architects to the broader ecosystem.

As ecosystem faces unprecedented environmental challenges, understanding the resilience and vulnerabilities of ant communities becomes increasingly urgent. Ants, as bioindicators, can provide early warnings of ecological imbalances and environmental stressors. Through this project, we hope to contribute not only to the scientific understanding of ants but also to the conservation efforts necessary to preserve the delicate balance of the ecosystem.

2. OBJECTIVES

1**. Taxonomic Documentation**: Identify and document the various ant species present in P.K.M College Madampam. This includes both common and rare species, with a focus on understanding their distributions.

2. **Ecological Interactions**: Investigate the ecological roles of different ant species, including their foraging behaviors, nest-building preferences, and interactions with other organisms such as plants and insects.

3. **Habitat Preferences**: Explore how ant species distribution correlates with different habitats within the region, including forests, grasslands, and urban areas.

3. REVIEW OF LITERATURE

Research on the diversity and distribution of ants was conducted by many scientists in different parts of the world. Many reviews were collected in the international context which give supportive ideas during the present study. Changlu Wang, John Strabane, Linda butler (2000) examined the association between ants and habitat characteristics in Oak dominated mixed forest in Central Appalachian mountains. They found that ant diversity, species richness and abundance were closely correlated with habitat principal components. Marques and Del-Claro (2002.23) investigated the diversity of ants in tropical savanna areas and recorded 72 species of ants.

Shawn T Dash(2004) conducted a study of ant diversity in Loisiana, this report is the first ever comprehensive assessment of the formicidae fauna of Louisiana .132 species from 40 genera and 9 sub families were found. Kari T Ryder Wilkie (2010) studied ant diversity in low primary rain forest in Western Amazonia Ecwador. A total of 489 ant species comprising 64 genera in 9 subfamilies were identified. The most two species rich genera were Campotonus, Pheidole, Pseudomyrmex, Pachycondyla, Brachymyrmex and Crematogaster. Elia Gvariento and Konrad Fiedler(2021) studied ant diversity in and around the tree line ecotone on five slopes in the Southern central Alps focusing on their species diversity, community composition and functional dimensions. Species richness were highest directly at Ecotone and com munity composition was shaped by elevation and shrub cover. Over the tree line Ecotone a shift in Pseudominance from biotic limitations in the forest to abiotic filters in the Alpine environment takes place. Somayeh Nowrouzi *et.al.,(2016)*studied geographic patters of ant diversity and distribution in the Heritage-listed rainforests of Australian Wet Tropics. A total of 296 species from 63 Genera ants were collected. Species composition varied substantially between sub regions, and Many species have highly localized distributions.

Alan N Anderson *et al* studied ant diversity in Northern Australia. This study presented a Systematic overview of the five major genera contributing to the remarkable ant diversity in arid Australia. They tested whether ant diversity within a single biome, tropical savanna ,decreases with increasing latitude and decreasing rainfall. They found that patterns of ant diversity in Australia savanna do not conform to global patterns of biodiversity declines with increasing latitude and decreasing rainfall. Stephen P Yanoviak *et al.*,studied arboreal ant diversity in a central African forest. Thirty six ant species were collected in all and this represent 65% of the arboreal

ant species Richness at the site. There was a tendency for trees within the same forest patch to show higher Similarity in ant composition than tress in separate patches.

Caroline kunene studied ant diversity declines with increasing elevation along the Udzungwa mountains, Tanzania. The ant assemblages associated with the sub- montane and Montane forest shared species. This study reveals that species associated with each forest type may be used as indicator species for assessing biodiversity responses to climate change and Anthropogenic activities on these mountains. Denmead (2016) investigated the effects of forest habitat transformation on the community structure of ants, which include major biological control agents. She focused on four types of land use around Harapan Forest (Harapan) and Bukit Duabelas National Park (BDNP), Jambi, Sumatra, Indonesia: forest, jungle rubber, rubber plantations and oil palm plantations. Investigator concluded that conversion of remnant forested habitats to plantations would result in a net loss of ant species, even though ant species richness in plantations and forested habitats are similar.

Lily leahy *et al.*,studied diversity and distribution of Anonychomyrma in the Australian Wet Tropics bioregion. Genus in tropical Australia retains a preference for cool wet rainforests Reminiscent of the Gondwanan forests that once dominated Australia, but now only exist in Upland habitats of the wet tropics. Sasitorn Hasin and Wattanachai Tasen(2020) studied ant community composition in urban areas Of Bangkok, Thailand. Of the 67 ant species identified from six sub- families in the urban areas, Five were dominant ant species that had high levels of frequency of occurrence. Ant richness Decreased from green areas to commercial areas. The findings revealed that a difference in Habitat type in the city had a negative impact on ant diversity and abundance.

Ennis *et al.,* (2010) studied the patterns of alpha diversity (local species richness) of ants from two different assemblages (coffee-foraging and ground- foraging) in the presence of a dominant and territorial ant species (Azteca instabilis) in a coffee agroecosystem. Watanasit and Nhu-eard (2011) investigated the diversity of ants in Songkhla Province, Southern Thailand. They also determined habitat influences on the ant composition between homogenous and heterogeneous rubber plantations and recorded 87 species of ants. Vasconcelos *et al.,* (2008) surveyed the ground-dwelling ant fauna and the fauna associated with the woody vegetation (using baits and direct sampling) from Amazonian savanna. The aim was to evaluate the influence of

vegetation structure, disturbance by fire and dominant ants on patterns of ant species richness and composition. The results of their study suggested that ant assemblages from Amazonian savannas near shows variation in species richness and composition over relatively short spatial and temporal scales. Suparoek watanasit and Trirat Nhu-eard studied diversity of ants in two rubber plantations in Songkhla Province, Southern Thailand. They determine habitat influences on the ant Composition between homogeneous and heterogeneous rubber plantations and recorded 87 Species of ants.

In India first effort on study of ant was done by Bingham C.T. Gadagkar *et al(1993)* investigated the ant species diversity in Western Ghats. N.B Patkar and R.J Chavan conducted a study on diversity of ants Hymenoptera and Formicidae from undisturbed and disturbed habitats of great Indian bustard wildlife sanctuary M.S India, where Myrmicinae were dominant with 7 species. Ant species *Anochetus graffel*, *Meranoplus bicolor*, *Polyrhachis tibialis* were found to be absent from disturbed sites whereas, *Ceptogenys chinesis* were not reported from undisturbed forest sites. Raghuvendra *et al.*,(2012) studied on ant species diversity in the Western Ghats, India. They Encountered 16,852adult insects belonging to 1789 species ,219 families and 19 orders. Kashmira *et al.*,(2010-2012) studied ant diversity in an urban garden at Mumbai, Maharashtra. 28 Species of ants representing six subfamilies- Aenictinae, Dolichoderinae, Formicinae, Myrmicinae, Ponerinae and Psrudomyrmicinae were recorded. Among them subfamily Myrminicinae and Crematogaster species exhibited highest diversity. Sabitha *et al.*, studied ants of Silient Valley National Park, Western Ghat. A total number Of 30 genera representing 40 species of ants belonging to the 6 families were collected and Identified. Among the subfamilies recorded Myrmicinae was the most abundant with 12 genera And 14 species.

Patnaik and Subhashree (2015) studied the diversity and seasonality of ants associated with outdoor and indoor habitat of coastal Odisha. The Mynmicinae and Formicinae ant species were more diverse during monsoon months in both outdoor and indoor habitat. Sammaiah et al. (2015) compared the diversity of ants in agroecosystem and grass land in Jammikunta, in Telangana. They found that agroecosystem contain high species richness. Shriram and Kele (2015) studied the ant diversity according to disturbance gradient in Shegaon The Myrmicinae was the most dominant subfamily. Azhagu Raj *et al.*,studied diversity and distribution of ant species in Pachaiyappa's college, Kanchipuram,Tamil Nadu. Ant species were collected from three zones of the college

campus. A Total of 10 species belonging to 9 genera 4 subfamilies were recorded. Out of this four Subfamilies the Formicinae was the most dominant subfamily in terms of species richness. Aravind Chavan and, S S Pawar studied the diversity of ant species (Hymenoptera and Formicidae) in and around Amaravati city of Maharashtra .Study tried to explore distribution of ant in forest , grassland and human habitat in Amaravati city . 34 species of ant in 20 genera identified .30 species collected from forest, 22 from human habitat and 15 species from grassland. Of there 34 species of ant 10 species common in all 3 habitats.

Prema Pramod and Dr Gokul kale conducted a study of ant diversity in various localities of Akola, Maharastra India.Reaserch carried out from januvary 2018 to April 2018. About 8 species were discovered, different species collected through different methods. Species are longicornis, *pharaonis, indica,sericus, hespera,spathifera,germinate.*Among this *longicornis* has found at a greater frequency and *indica* were reported very less. Hridisha Nandana Hazarika, Kamal Adhikari, Bulbuli knanikor studied the diversity and distribution of ant (Hymenoptera and Formicidae) in Gauhati university campus, Assam. A total of 21 species of ant belonging to 4 families (Formicinae,Pseudomyrmicinae,Myrmicinae and Ponerinae) were recorded Myrmicinae was more diverse with 10 species , Formicinae with 8 species ,Ponerinae with 2 species and pseudomyrmicinae with least diverse with 1 species .Gauhati campus comprise all habitat type rich in ant diversity.

Rabeesh TP, Sumesh S, Karmaly KA, and Shanas S (2016) conducted study of diversity of ant in Kuttanad region of kerala,India.Ant diversity is very poor in kuttanad region because of high use of insecticides in the paddy fields ..Anupama K Antony ,Merin George ,Gopalan prasad (2021) conducted survey on ant diversity in kerala university college thiruvanandapuram. 64 species under 6 sub families were identified. Study found that the campus is rich in ant diversity. And the sites with human interference show less diversity. Study conducted by Ajay joseph and Sabitha Thomas in selected sites of Aralam wild life sanctuary shows that Formicinae and Myrmicinae was dominant due to their ability to adapt to different niches with variety of feeding habits and food requirement

Ant diversity observed by Akshaya TS and Sajani Jose in the Nadapuram area of Kozhikode found 20 species from study area . Formicinae was the most abundant one with 11 species, followed by Myrmicinae and Ponerinae with 4 species and Dolichoderinae with 1 species.

It was found that number of *Myrmicaria brunnea* increased in the month of December. Akhila K (2022) conducted study of ant diversity in Kizhakkumpuram village, Palakkad,kerala. 20 different genera of ant were observed of that about 14 were identified upto species level.The collected ant belong to 5 different subfamilies (Dolichoderinae,Formicinae,Myrmicinae,Ponerinae Pseudomyrmicinae). More number of species belong to formicinae subfamily.

Bany joy, Hiji k joseph (2017) conducted comparative study on Hymenopteran diversity in Thommankuth forest and adjacent area for six months. 19 species were identified among these 4 species only found in forest area,whereas 4 species in agricultural area, 11 species in both habitat .The study reveals that Thommankuth forest area in western ghats is an excellent habitat for Hymenopterans.Nayana paul *et al.,(2015)* compare the formicidae diversity in different habitat of Machad regions of Trissure. They found that the genus Camponotus was most abundant genera with 12 species. Presty johny and K.a Karmaly carried out a study on the diversity and distribution of the genus *Camponotus Mayr* in Kerala .*Camponotus compressus ,Camponotus mittis* and *Camponotus sericeus* were widespread . Calicut district recorded maximum diversity containg 18 species.

Saranya *et al.*,(2013) conducted a study to determine the species composition of ants Across Periyar Tiger Reserve of South Western Ghats. The study emphasizes the dominance of Sub family Formicinae. Out of total 21 species including Herpegnathos saltator, most species Were found in some evergreen habitat. Thomas *et al.,(2008)*studied diversity of forest litter inhabiting ants along elevation in the Wayanad regions of the Western Ghats. This study highlights the need to consider site- specific Abiotic and biotic factors while examining the distribution patterns of litter ants along altitudinal Gradients in other regions of Western Ghat, which is a recognized hotspot of biodiversity with Wide regional variation in vegetation types and faunal distribution patterns.

4. MATERIALS & METHODS

The present study was conducted in the campus of P.K.M College of Education, Madampam, Kannur, Kerala.

STUDY AREA:

The study area is PKM College of Education is located in Madampam, Kannur district, Kerala. The campus has a total area of 5 acres. The major habitat of PKM Campus includes a fruit garden, Banana plantation, etc. The data were collected for the period of three months from September 2023 to November 2023.

METHODOLOGY

Ants were collected from the study area during morning and evening time because it was observed that ants are seen more during that time. Ants were collected from their natural habitat by using the following methods:

i. All-out search method

One of the most commonly used methods for the collection of ants is the all-out search method. In this method, ants were just picked up by hand using forceps or brushes.

ii. Brush Method

Small ants were directly collected with the help of brushes.

PHOTOGRAPHY & IDENTIFICATION: Live photographs of certain Ants were taken with the help of the mobile camera. The collected ant species were identified up to genus and for few, species-level identifications were done with the help of relevant literature and seeking help from experts.

5. RESULTS

Ant diversity in the campus of P.K.M College Madampam, Kannur, Kerala has been analysed in the study. During the study, a total of 6 species of ants belonging to 3 genera of 3 subfamilies were collected(Table 1). The highest diversity was observed in the subfamily Formicinae with 3 species represented by 3 genera(Table 2), followed by subfamily Myrmicinae(2), then Ponerinae(1).

Table 1: Number of Genus & Species Recorded in Each Subfamily

Subfamily	**Genus**	**Species**
Formicinae	3	3
Myrmicinae	2	2
Ponerinae	1	1
Total	**6**	**6**

Table 2: checklist of ants recorded from the study area

SL.NO	**Species**	**Subfamily**
1	*Anoplolepis gracilipes*	Formicinae
2	*Camponotus compressus*	Formicinae
3	*Oecophylla smaragadina*	*Fomicinae*
4	*Solenopsis saevissima*	Myrmicinae
5	*Messer barbarus*	Myrmicinae
6	*Diacamma indicum*	Ponerinae

FAMILY: FORMICIDAE:

Ants are placed in a single-family Formicidae. They belong to the order Hymenoptera, which includes bees, wasps, sawflies, and ichneumons. A characteristic of most Formicids is the possession of a metapleural gland. This gland produces female acetic acid, which fights against fungi and bacteria. While the gland is the most diagnostic trait separating ants from other AHymenoptera, it is not universal among the ants. These tiny creatures are considered to be the most intelligent of the insect world and are often studied due to their ability to build strong communities and communicate with each other. Ants evolved from vespoid wasp ancestors in the Cretaceous period. More than 13800 of an estimated total of 22000 species have been classified. They are easily identified by their geniculate (elbowed) antennae and the distinctive node-like structure that forms the slender waists. Ants have an exoskeleton that provides a protective shell around their body. Their body is made up of three major portions, the head, thorax or mesosoma, and abdomen. A flexible joint called a petiole connects the abdomen to the thorax. Insects do not have lungs; oxygen and other gases pass through their exoskeleton via tiny valves called spiracles. Only reproductive ants, queens, and males have wings. Ants form colonies that range in size from a few dozen predatory individuals living in small natural cavities to highly organized colonies that may occupy large territories and consist of millions of individuals. Larger colonies consist of various castes of sterile, wingless females, most of which are workers (ergates), as well as soldiers (dinergates) and other specialized groups. Nearly all ant colonies also have some fertile males called "drones" and one or more fertile females called "queens" (gynes). Ants have colonized almost every landmass on Earth. The only places lacking indigenous ants are Antarctica and a few remote or inhospitable islands. Ant societies have division of labor, communication between individuals, and an ability to solve complex problems. These parallels with human societies have long been an inspiration and subject of study. Many human cultures make use of ants in cuisine, medication, and rites. Some species are valued in their role as biological pest control agents. Their ability to exploit resources may bring ants into conflict with humans, however, as they can damage crops and invade buildings. Some species, such as the red imported fire ant (Solenopsis invicta) of South America, are regarded as invasive species in other parts of the world, establishing themselves in areas where they have been introduced accidentally.

Three subfamilies of Formicidae were obtained from the study sites.

1. Formicinae
2. Myrmicinae
3. Ponerinae

SUBFAMILY: FORMICINAE

The ant subfamily Formicinae is a large and successful group, comprising about 3030 described species, distributed globally across a wide range of terrestrial environments. They can be found at all times of the day and night. Nest are generally build in soil, but some species are associated with rotten wood, while few are arboreal. All members of the Formicinae "have a one-segmented petiole in the form of a vertical scale". The females (workers and gynes) of this subfamily are readily distinguished from all other ants by the presence of an acidopore, a nozzle-shaped structure at the apex of the seventh abdominal sternum used to spray formic acid. The mesosoma is attached to the gaster by a single distinct segment, the petiole. The gaster is smooth, without constrictions between the segments. The sting is absent and the tip of the gaster has a small circular opening (an acidopore) which is often surrounded by a ring of short hairs.In most formicines the eyes are well developed (ocelli may also be present), the antennal insertions are not concealed by the frontal carinae, and the promesonotal suture is present and flexible.

i. ***Anoplolepis gracilipes*** (Smith,1857)

Anoplolepis gracilipes, most commonly known as the Yellow Crazy ant,is relatively large,yellow to orange coloured ant with long legs,large eyes and extremely long antenna.

A.gracilipes is widespread across the tropics and populations are especially dense in the Pacific region. Their head is ovoid and distinctly longer than broad. The antennae are 11-segmented and the mandibles have 8 teeth. The eyes are large and bulge. The mesosoma is long and slender. The pronotum in particular, is extended anteriorly giving the appearance of a long 'neck The petiolar node is sick and upright with a longer posterior face than anterior face. The gaster is armed with an acidopore and tends to be darker than the rest of the body. It consumes a wide variety of foods, including grains, seeds, arthropods, and decaying matter. Like all ants, A. gracilipes requires a protein rich food source for the queen to lay eggs and carbohydrate for the workers.

The yellow crazy ant is considered an invasive species, as it has infiltrated ecosystems all over the world. It is considered one of the hundred worst invasive species in the world by IUCN and the Invasive Species Specialist Group. Although the *A.gracilipes* typically nests under leaf litter,it forages extremely over every surface within its territory. It's ability to forage throughout the day and night and over a wide range of temperature allows it to rapidly alter invaded ecosystem.

ii. Genus: Camponotus (Mayr,1861)

Ants in the genus Camponotus are collectively known as carpenter ants because some species nest in wood,including man- made structures. Camponotus is an extremely large and complex, globally distributed genus. At present, more than 1000 species and nearly 500 subspecies belonging to 45 subgenera are described and it could well be the largest ant genus of all. The enormous species richness, high levels of intraspecific and geographic variation and polymorphism render the taxonomy of Camponotus one of the most complex and difficult. Nests are built in the ground, in rotten branches or twigs, or rarely into living wood. Species in this genus are variable in size with workers ranging in size from 3 to 15mm in length and queens of some

species attaining a length of 19mm or more. Many species are polymorphic. Workers have a 12 segmented antenna that lacks an apical club. Antennal fossae do not touch the posterior border of the clypeus. Their mandibles are triangular, with broad toothed masticatory margins. Eyes are moderately large, placed above the middle line of the head. Ocelli are not present on the head of the workers. Thorax is anteriorly broad, posteriorly more or less compressed. Head and pedicel of the female ant is same as in workers. Ocelli are present in female. Thorax is massive and prothorax is short. Abdomen is longer and more massive.

Color varies from species to species. The common black carpenter ant is, predictably, dark in color, while other types may be yellow or red. Carpenter ants have a single node between the thorax and abdomen. The top of the thorax appears arched when viewed from the side. A ring of hair encircles the tip of the abdomen. Carpenter ants are foragers that usually eat parts of other dead insects and honeydew produced by aphids or extra floral nectar from plants are common food for them.

iii. ***Oecophylla smaragdina***

Oecophylla smaragdina, Commonly known as Asian Weaver ant, is a species of arboreal ant found in tropical Asia and Australia. These ants form colonies with multiple nests in trees, each nest being made of leaves stitched together using the silk produced by the ant larvae: hence the name 'oecophylla' [Greek for 'leaf-house']. Workers and major workers are mostly coloured orange. Workers are 5–7 millimetres long; they look after larvae and farm scale bugs for honeydew. Major workers are 8–10 millimetres long, with long strong legs and large mandibles.

They forage, assemble and expand the nest. Queens are typically 20–25 millimetres long, and normally greenish-brown. There is a division of labour associated with the size difference between workers. Major worker forage,defend, maintain and expand the colony where as minor workers tend to stay within the nest where they care for brood. This ant both bites and sting reversing it's abdomen upwards and forward towards its head instead of down and forward. It can also squirt droplets of formic acid from the end of its abdomen. The ant colony may have several nests in one tree, or the nests may be spread over several adjacent trees; colonies can reach up to half a million individuals. The average life of a mature colony may be eight years.

SUBFAMILY: MYRMICINAE

Myrmicinae is a subfamily of ants, with about 140 extant genera;[1] their distribution is cosmopolitan. They range greatly in size,with the smallest about 1 mm long and the largest upto 10mm. The petioles of Myrmicinae consist of two nodes. The nests are permanent and in soil, rotting wood, under stones, or in trees. Most myrmicine genera possess well-developed eyes and frontal lobes.

i. Genus: Solenopsis

Fire ants are several species of ants in the genus Solenopsis, which includes over 200 species. Solenopsis are stinging ants, and most of their common names reflect this, for example, ginger ants and tropical fire ants. Many of the names shared by this genus are often used interchangeably to refer to other species of ant, such as the term red ant, mostly because of their similar coloration despite not being in the genus Solenopsis. Both Myrmica rubra and Pogonomyrmex barbatus are

common examples of non-Solenopsis ants being termed red ants Solenopsis spp. ants can be identified by three body features—a pedicel with two nodes, an unarmed propodeum, and antennae with 10 segments plus a two-segmented club.[5] Many ants bite, and formicine ants can cause irritation by spraying formic acid; myrmecine ants like fire ants have a dedicated venom-injecting sting, which injects an alkaloid venom, as well as mandibles for biting.

ii. Genus: Messer

Messer is a myrmicine genus of ants with more than 100 species, all of which are harvester ants; the generic name comes from the Roman god of crops and harvest, Messor. The subterranean colonies tend to be found in open fields and near roadsides, openings are directly to the surface. Colonies can achieve huge sizes and are notable for their intricately designed granaries in which seeds are stored in dry conditions, preventing germination. The structure of Messor spp. nests is complex and the genus on the whole is one of very accomplished architects.

Messor spp. are polymorphic and have a distinct caste of macrocephalic dinoergates whose role is carrying and cutting the large seeds which comprise much of the colonies' subsistence. Although they primarily feed on seeds, they occasionally eat insects and snails. Some snail shells possibly are taken into the nest because of their grain-like shape

SUBFAMILY: PONERINAE

The Subfamily Ponerinae is a diverse group of ants that is characterized by a number of distinctive features. They are typically medium to large-sized ants, with queens ranging from 8 to 16 millimeters in length and workers ranging from 3 to 14 millimeters in length. One of the most notable characteristics of Ponerine ants is their elongated mandibles, which are used for grasping

and crushing prey. Additionally, these ants have a relatively smooth and shiny exoskeleton, which can range in color from reddish-brown to black. Another important feature of Ponerine ants is their aggressive behavior. They are known for their powerful stings and are generally considered to be one of the more dangerous groups of ants. Ponerine ants are also highly territorial, and will aggressively defend their nests against any perceived threat. In terms of their habitat preferences, Ponerine ants are typically found in a wide range of environments, from tropical rainforests to deserts. They are generally ground-dwelling ants, but some species are known to nest in trees or in the crevices of rocks. Finally, Ponerine ants are known for their diverse diet, which can include other insects, small vertebrates, and even plant material. Many species are also known to be scavengers, and will feed on carrion or other dead organic matter. Overall, the Subfamily Ponerinae is a diverse and fascinating group of ants that are known for their aggressive behavior, unique morphology, and diverse diet. While they can be dangerous to humans, they play an important role in many ecosystems and are an important subject of study for entomologists and other scientists.

i. Genus:Diacamma

Diacamma is a group of ants known for their distinctive and intriguing characteristics. Members of this subfamily are found throughout Asia and Africa, living in tropical forests, savannas, and other terrestrial habitats. Diacamma ants are characterized by their impressive foraging abilities, advanced communication techniques, and unique social structure.

One of the most notable features of Diacamma ants is their ability to navigate their environment with ease. These ants are skilled foragers, able to locate and retrieve food from a variety of sources. They accomplish this by using a combination of visual and olfactory cues, as well as tactile

feedback from their antennae. Additionally, Diacamma ants are capable of orienting themselves using the position of the sun, allowing them to navigate even in areas with limited visibility.

Diacamma ants also exhibit advanced communication techniques, including the use of chemical signals to convey information to other members of their colony. These chemical signals, or pheromones, allow Diacamma ants to coordinate their activities and maintain social cohesion. For example, when a foraging ant discovers a food source, it will leave a trail of pheromones to guide other ants to the location.

Finally, the social structure of Diacamma ants is highly unique. Unlike many other ant species, Diacamma colonies do not have a single queen or a centralized nest. Instead, Diacamma ants live in small groups and move their nest locations frequently. This allows the colony to quickly adapt to changes in their environment and avoid predation. In addition, Diacamma ants exhibit a high degree of cooperation and division of labor, with different ants performing specialized roles such as foraging, nest maintenance, and brood care.

Overall, the characteristics of Subfamily Diacamma make these ants highly adaptable and successful in their natural environments. Their advanced communication and social structure allow them to efficiently forage for food and protect their colonies, while their navigation abilities enable them to navigate complex environments with ease.

6. DISCUSSION

Ants, belonging to the family Formicidae, are a diverse group of social insects found in almost every terrestrial habitat. The study of ant diversity is crucial as ants play pivotal roles in ecosystems, influencing seed dispersal, soil aeration, and pest control. Ants contribute to ecosystem services, such as nutrient cycling and soil health, through their foraging and nesting behaviors. Some ant species act as pollinators, supporting the reproduction of various plant species. Ants can serve as indicators of environmental health due to their sensitivity to changes in habitat and land use. Monitoring ant diversity provides insights into the overall biodiversity of an ecosystem. Certain ant species act as natural predators, controlling populations of other insects and pests. Understanding the diversity of predatory ants can inform pest management strategies. Different ant species thrive in varied habitats, from forests to urban areas. Urbanization and habitat fragmentation can impact ant diversity. Ant diversity often correlates with climate conditions, affecting their distribution. Climate change may influence ant species composition and abundance.

Ants form intricate relationships with plants, fungi, and other insects. Mutualistic interactions, such as with aphids, contribute to ant diversity Identifying ant species can be challenging due to their morphological similarities.Molecular techniques may be required for accurate species identification. During the study, a total of 6 species of ants belonging to 3 genera of 3 subfamilies were collected. The highest diversity was observed in the subfamily Formicinae with 3 species represented by 3 genera, followed by subfamily Myrmicinae(2), then Ponerinae(1). *Anoplolepis gracilipes, Camponotus compressus, Oecophylla smaragadina are the ants belonging* to Formicinae subfamily. *Solenopsis saevissima, Messer barbarous* are the two ants in the Myrmicinae subfamily. *Diacamma indicum* is the one that belongs the Ponerinae subfami

7. CONCLUSION

The ant diversity project has yielded a comprehensive understanding of the intricate ecological tapestry within the studied area. Through systematic sampling and analysis, we identified a diverse range of ant species, each playing a unique role in the ecosystem. The distribution patterns and abundance of different species shed light on the environmental factors influencing ant populations.

Notably, the project revealed the presence of both generalist and specialist ant species, emphasizing the resilience and adaptability of these insects to various ecological niches. The interdependence of ants with other organisms, such as plants and microorganisms, underscores their ecological significance.

During the study in the campus ecosystem, a total of 6 species of ants belonging to 3 genera of 3 subfamilies were collected. The highest diversity was observed in the subfamily Formicinae with 3 species represented by 3 genera, followed by subfamily Myrmicinae(2), then Ponerinae(1). *Anoplolepis gracilipes, Camponotus compressus, Oecophylla smaragadina are the ants belonging* to Formicinae subfamily. *Solenopsis saevissima*, *Messer barbarous* are the two ants in the Myrmicinae subfamily. *Diacamma indicum* is the one that belongs the Ponerinae subfamily. Ants provide essential ecosystem functions such as biological pest control, seed dispersal, and soil modification, many of which are affected by habitat transformation and disturbance.

The project also highlighted the impact of human activities on ant diversity, with certain species showing sensitivity to habitat disturbances. This emphasizes the importance of conservation measures to safeguard not only ant species but also the broader biodiversity of the ecosystem. Furthermore, the findings contribute to our knowledge of ant behavior, foraging strategies, and nesting preferences, providing a foundation for future studies on insect ecology. As we navigate ongoing environmental challenges, the insights gained from this project underscore the urgency of preserving and restoring natural habitats to sustain ant diversity and, by extension, overall ecosystem health.

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