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Biodiversity of ants in and around Salekasa tehsil Gondia Maharshtra India

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Research Article

Keywords: ,biodiversity.

Posted Date: October 8th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11258067/v1

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Additional Declarations: The authors declare no competing interests.

Abstract

Ants (Family: Formicidae) are among the most dominant and ecologically significant organisms on Earth, playing essential roles in maintaining ecosystem balance through nutrient cycling, soil aeration, and biological control. Despite their small size, their complex social structures, communication systems, and adaptability have enabled them to colonize nearly every terrestrial habitat. The present study, conducted in Badtola Hamlet under Darbada Gram Panchayat of Salekasa Tahsil, Gondia District, focuses on exploring the diversity, distribution, and ecological roles of ant species inhabiting the region's varied landscapes. Salekasa's mixed terrain of forest, agricultural land, and human settlements provides diverse habitats that support a wide range of ant species.

Field observations and specimen collection were carried out to identify dominant ant species, including *Camponotus compressus*, *Camponotus sericeus*, and *Monomorium pharaonis*. Each species exhibits unique adaptations in behavior, morphology, and nesting preferences, reflecting the ecological richness of the area. The study emphasizes the importance of ants as bioindicators of environmental health and as key contributors to ecosystem functioning. Moreover, it highlights the urgent need for conservation measures to preserve these minute yet powerful organisms, which are often overlooked despite their immense ecological valueTthis project aims to enhance understanding of local biodiversity, promote awareness about insect conservation, and provide a baseline reference for future ecological and environmental monitoring programs in the Salekasa region.

INTRODUCTION

Ants, often overlooked but vital components of terrestrial ecosystems, exhibit remarkable diversity in behavior, morphology, and ecological roles. They are found in almost every environment on Earth, except the polar regions, and contribute significantly to soil aeration, nutrient cycling, and the regulation of other insect populations. These small yet complex insects form the backbone of many ecological interactions, influencing both flora and fauna in subtle yet powerful ways (Hölldobler & Wilson, 1990). Exploring their incredible variety offers valuable insights into ecosystem health, species interactions, and evolutionary adaptations that have enabled them to become one of the most successful animal groups on the planet (Peeters & Ito, 2015).

Ants are often referred to as nature's unsung heroes because of their enormous ecological significance despite their small size. The diversity within the Formicidae family is immense, with more than 14,000 described species worldwide, exhibiting vast differences in size, color, nesting behavior, and diet (AntWeb, 2023). Their societies are characterized by complex division of labor, communication through pheromones, and cooperative behaviors that rival the organization of higher animals. Through this project, the aim is to uncover the intricacies of ant diversity, exploring how their evolutionary adaptations and ecological functions shape the health and balance of natural environments (Wilson, 2003).

In the intricate tapestry of life, ants emerge as key architects of ecological stability. They are integral to various biological processes such as seed dispersal (myrmecochory), decomposition, and soil mixing,

thereby influencing vegetation patterns and nutrient distribution. This project, undertaken in Badtola Hamlet under Darbada Gram Panchayat of Salekasa Tahsil, seeks to document and analyze the diversity of ant species found within this region. The selected study site represents a microcosm of rich biodiversity due to its mixture of forest, agricultural land, and human habitation, providing a diverse range of habitats for ant communities (Gadagkar et al., 1989).

Salekasa, with its varied landscapes ranging from gently undulating plains and fertile river valleys to forested hills and rocky uplands, presents a diverse geographical setting that supports both agriculture and natural vegetation, holds a wealth of biodiversity that has not yet been extensively documented. Within these ecosystems, ants function as ecological engineers,

shaping the environment through nest-building activities, organic matter recycling, and predation on pest species. The project aims not merely to catalog species but also to understand the underlying ecological roles and relationships that link ants to other components of the ecosystem (Bharti et al., 2016).

Understanding these patterns contributes to both biodiversity assessment and the management of local natural resources.

Ants, with their ability to thrive in diverse environmental conditions, act as bioindicators of ecological health. Their population dynamics and species composition respond sensitively to habitat disturbance, pollution, and climate change (Andersen, 1997). By studying their diversity, researchers can infer the level of habitat stability and environmental stress in a given area. Thus, this project not only focuses on the identification and classification of ant species but also explores how these insects can serve as early warning systems for environmental degradation (Ellison, 2012).

Beyond their ecological roles, ants influence agricultural productivity and human welfare. Certain species aid in pest control by preying on harmful insects, while others engage in mutualistic relationships with plants, contributing to pollination and seed dispersal. Conversely, some species may become pests, invading human dwellings or agricultural fields. Understanding these complex interactions is essential for sustainable ecosystem management and biodiversity conservation (Lach, Parr & Abbott, 2010).

As global ecosystems face unprecedented challenges from deforestation, habitat fragmentation, and climate change, understanding the resilience and vulnerability of ant communities becomes increasingly urgent. By documenting and analyzing the ant diversity of Salekasa Tahsil, this study aims to contribute valuable baseline data for future ecological monitoring and conservation initiatives. Ants, being among the most abundant and functionally diverse insects, are vital indicators of environmental balance and resilience. Therefore, this research highlights not just the importance of these tiny architects but also the broader message of conservation—protecting the smallest organisms to sustain the health of the planet (Kaspari & Weiser, 2000).

OBJECTIVES

1. **Taxonomic Documentation**: Identify and document the various ant species present in Badtola Hamlet, located under the Darbada Gram Panchayat of Salekasa Tahsil, Gondia District, Maharashtra. 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.
4. **Conservation Significance**: Assess the importance of ants as bioindicators for monitoring ecosystem health and biodiversity conservation within the study region.

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.

MATERIALS AND METHODS

The present study, conducted in Badtola Hamlet under Darbada Gram Panchayat of Salekasa Tahsil, Gondia District, focuses on exploring the diversity, distribution, and ecological roles of ant species inhabiting the region's varied landscapes. Salekasa's mixed terrain of forest, agricultural land, and human settlements provides diverse habitats that support a wide range of ant species.

STUDY AREA

The study area is Badtola Hamlet under Darbada Gram Panchayat of Salekasa Tahsil, Gondia District, Maharashtra. The Gram Panchayat has a total area of 397 sqm. The data were collected for the period of nine months from July 2025 to March 2026.

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

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.

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.

RESULT

The present study documented a diverse assemblage of ant species belonging to **three major subfamilies of the family Formicidae**, namely **Formicinae, Myrmicinae, and Ponerinae**, based on field

observations, live photography, and morphological identification from the study area of Badtola Hamlet under Darbada Gram Panchayat, Salekasa Tahsil, Gondia District. The ants were recorded from multiple habitats including ground surfaces, cemented areas, wooden structures, walls, soil, and food sources, indicating a wide distribution across both natural and human-influenced environments.

Among the recorded groups, the subfamily Formicinae was found to be the most abundant and widely distributed, as evident from the large number of photographs showing different Formicinae ants. These ants exhibited considerable variation in size and coloration, ranging from very small, pale-colored ants moving along walls to medium and large black ants actively foraging on the ground and wooden logs. Formicinae ants were commonly observed forming trails towards sugary or carbohydrate-rich food sources, nesting in wood, soil, cracks in walls, and cement gaps, and displaying fast-moving or orderly foraging behavior depending on the species. The presence of a single-segmented waist and absence of a sting, along with characteristic foraging patterns, confirmed their classification. Species belonging to this subfamily were frequently encountered in human settlements and outdoor areas, making them ecologically and economically significant in the study region.

The subfamily Myrmicinae was also well represented in the study area and was primarily observed as small, reddish-brown ants engaging in mass recruitment and clustered feeding behavior. These ants were commonly found on ground surfaces, pavements, and near food items, where they quickly assembled in large numbers. The presence of a distinct two-segmented waist (petiole and post-petiole) was a key feature used for their identification. Myrmicinae ants showed strong social organization, with workers following defined pheromone trails. Their nesting habits included soil, cracks in cemented surfaces, and areas close to human dwellings. Due to their constant foraging activity and attraction to exposed food, these ants were frequently encountered throughout the study period, indicating their adaptability and dominance at ground level.

The subfamily Ponerinae was comparatively less abundant and represented by larger, robust ants observed mostly as solitary individuals rather than groups. These ants were characterized by a single thick waist node, powerful mandibles, and slow, deliberate movement, distinguishing

them from the other two subfamilies. Ponerinae ants were primarily recorded from outdoor environments, such as soil and natural substrates, and their behavior suggested a predatory lifestyle, feeding on other small invertebrates rather than scavenging on human food. The low number of individuals and lack of mass recruitment observed in the photographs indicate that this subfamily maintains small colony sizes and limited foraging activity, which explains their lower visibility in human-dominated habitats.

Overall, the results of the present study reveal that the ant fauna of the study area is structurally diverse and ecologically well-distributed, with Formicinae dominating in abundance and habitat range, Myrmicinae showing strong ground-level foraging and recruitment behavior, and Ponerinae occurring as solitary predators in natural microhabitats. The coexistence of these three subfamilies reflects the ecological complexity of the region and highlights the role of varied habitats in supporting ant diversity.

The findings clearly demonstrate that Badtola Hamlet supports a rich ant community, contributing significantly to local ecosystem functioning through scavenging, predation, and nutrient recycling.

Table 1
Number of Genus & Species Recorded in Each Subfamily

Sr.No.	Subfamily	Genus	Species
1	Formininae	05	05
2	Myrmicinae	02	02
3	Ponerinae	01	01
Total	**03**	**08**	**08**

Table 2
checklist of ants recorded from the study area

Sr.No.	Subfamily	Species
1	Formininae	*C. compressus*
2	Formininae	*C. sericeus*
3	Formininae	*T. melanocephalum*
4	Formininae	*P. longicornis*
5	Formininae	*Camponotus sp.*
6	Myrmicinae	*M. pharaonic*
7	Myrmicinae	*M. indicum*
8	Ponerinae	*Pachycondyla sp.*

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 ants belonging to the subfamily Formicinae, as observed in the previously uploaded photographs, display a wide range of body sizes, colors, and behaviors, yet share several clearly recognizable traits. In the images, these ants consistently show a single-segmented waist (one petiole node) between the thorax and abdomen, an important feature that distinguishes them from Myrmicinae ants, which possess two waist segments. The Formicinae ants appear both small and very active, such as the pale ghost ants moving along walls, and medium to large, such as black carpenter ants and crazy ants seen foraging on the ground, walls, and wooden surfaces. Their bodies are generally slender with long legs and antennae, and they lack a visible sting, instead relying on chemical defense using formic acid, a defining characteristic of this subfamily. In several photos, these ants are attracted strongly to sweet or carbohydrate-rich food sources, forming loose to organized trails, which reflects their dependence on sugars, nectar, honeydew, and household food residues. Some species are clearly adapted to wood-associated habitats, where large numbers gather on logs and wooden structures, indicating nesting inside or beneath the wood, while others move rapidly across cement and soil, showing their adaptability to both natural and human-made environments.

1. **Large Black Carpenter Ant (Camponotus compressus)**

- **Local Name**: Kali Cheenti / Badi Cheenti (□□□□ □□□□□ □)
- **Scientific Name**: *Camponotus compressus* (Fabricius, 1787)
- Classification:
    - Kingdom: Animalia
    - Phylum: Arthropoda
    - Class: Insecta
    - Order: Hymenoptera
    - Family: Formicidae
    - Subfamily: Formicinae
    - Genus: *Camponotus*
    - Species: *C. compressus*

Expanded Brief Details:

This is one of the most commonly seen large ants in India. They are shiny black in color and can grow up to 12–14 mm in length. Known as Carpenter Ants, they prefer nesting in damp wood, cracks, or soil near human settlements. Although they do not feed on wood like termites, they excavate galleries inside wood to make their nests, which can sometimes cause structural damage. They are nocturnal foragers, often moving in long trails inside homes in search of sweets, oily food, or dead insects. They communicate using pheromone trails and play an ecological role as decomposers and scavengers. When threatened, they bite and may spray formic acid, causing a burning sensation on the skin.

2. Red-Black Carpenter Ant (Camponotus sericeus)

- **Local Name**: Lal-Kali Cheenti (□□□-□□□□ □□□□□ □)
- **Scientific Name**: *Camponotus sericeus* (Fabricius, 1798)
- Classification:
    - Kingdom: Animalia
    - Phylum: Arthropoda
    - Class: Insecta
    - Order: Hymenoptera
    - Family: Formicidae
    - Subfamily: Formicinae
    - Genus: *Camponotus*
    - Species: *C. sericeus*

Expanded Brief Details:

This species is medium to large-sized, with a reddish-brown thorax and black head and abdomen, making it easily recognizable. They are arboreal and terrestrial ants, often found on trees, walls, and even open ground. These ants are aggressive defenders of their nests, biting intruders with strong mandibles. They are known for their ability to form long foraging trails, mostly active during the day. Like other carpenter ants, they hollow out wood or soil for nesting but do not consume wood. They feed on sugary secretions from aphids (honeydew), plant exudates, and occasionally dead insects. Ecologically, they act as both predators and scavengers, contributing to nutrient cycling. They also help in controlling certain insect pests but can become household nuisances when they invade for food.

3. Ant – Ghost Ant / Pale Household Ant

- **Local Name**: Peeli Chhoti Cheenti / Bhoot Cheenti (□□□□ □□□□ □□□□□ □ / □□□ □□□□□ □)
- **Scientific Name**: Tapinoma melanocephalum (Fabricius, 1793)
- Classification:
    - Kingdom: Animalia
    - Phylum: Arthropoda
    - Class: Insecta
    - Order: Hymenoptera
    - Family: Formicidae
    - Subfamily: Formicinae
    - Genus: Tapinoma
    - Species: T. melanocephalum

Expanded Brief Details:

The ants in the photo are very small (about 1.5–2 mm long) and appear pale yellow to light tan, making them difficult to notice against light-colored surfaces. The head and thorax are light, while the gaster is slightly darker and translucent, giving rise to the common name “Ghost Ant.” They have long legs and antennae and a single, reduced waist node, typical of ants in the Formicinae subfamily.

Tapinoma melanocephalum is a common household ant in tropical and subtropical regions, including Maharashtra and much of India. These ants are frequently seen moving along walls, floors, and corners, especially inside homes. They form loosely organized foraging trails and can easily pass through very small cracks and crevices.

They prefer warm, humid environments and often nest in wall gaps, under tiles, behind cupboards, potted plants, or electrical switch boxes. Colonies usually contain multiple queens, which allows rapid spread and makes control difficult.

Ghost ants are omnivorous, feeding primarily on sugary substances, syrups, fruits, sweets, and occasionally small insects. They do not sting, but their presence is considered a nuisance pest, especially in kitchens, food-storage areas, and hospitals, where they may contaminate food and surfaces.

4. Ant – Black Crazy Ant

- **Local Name**: Tez Chalne Wali Kali Cheenti / Pagal Cheenti (□□□□ □□□□ □□□□ □□□□ □□□□□ □ /

□□□□ □□□□□ □)

- **Scientific Name**: Paratrechina longicornis (Latreille, 1802)
- Classification:
    - Kingdom: Animalia
    - Phylum: Arthropoda
    - Class: Insecta
    - Order: Hymenoptera
    - Family: Formicidae
    - Subfamily: Formicinae
    - Genus: Paratrechina
    - Species: P. longicornis

Expanded Brief Details:

The ants in the image are small to medium-sized (approximately 2.5–4 mm long) and dark brown to black, with a notably slender body, very long legs, and long antennae that extend well beyond the head. The single, narrow petiole node confirms placement in the Formicinae subfamily. Their scattered and irregular movement pattern, visible in the photo, is a key trait that gives them the name “crazy ant.”

Paratrechina longicornis is a cosmopolitan species and one of the most common ants in India, widely distributed in urban, semi-urban, and rural environments. These ants are extremely adaptable and are frequently found on soil surfaces, pavement, walls, tree trunks, and inside buildings.

They are omnivorous scavengers, feeding on sugary substances, kitchen scraps, honeydew from aphids, small insects, and organic debris. Colonies are often large and contain multiple queens, allowing rapid spread and making them persistent once established.

Black crazy ants do not sting, but they can bite mildly. They are considered nuisance pests due to their speed, large numbers, and tendency to invade homes, food areas, electrical fittings, and storage spaces. Ecologically, they also play a role as scavengers, helping break down organic matter.

5. Yellow–Brown Carpenter Ant (Wood-Nesting Ant)

- **Local Name**: Lakdi Ki Peeli Cheenti / Ped Ki Cheenti (□□□□ □□ □□□□ □□□□□ □ / □□□ □□ □□□□□ □)
- **Scientific Name**: *Camponotus* sp. (Species-level identification requires close microscopic examination)
- Classification:
    - Kingdom: Animalia
    - Phylum: Arthropoda
    - Class: Insecta
    - Order: Hymenoptera
    - Family: Formicidae
    - Subfamily: Formicinae
    - Genus: Camponotus
    - Species: Camponotus sp.

Expanded Brief Details:

The ants visible in the image are small to medium-sized workers (approximately 3–6 mm) with a light yellow-brown to pale brown coloration, densely covering and moving across a wooden surface. The presence of a single, clearly defined petiole (waist node) and the absence of a sting confirm their placement in the Formicinae subfamily.

These ants are carpenter ants, which means they do not eat wood but excavate galleries inside wood to create nesting chambers. In the photo, the very high number of ants and their concentration along cracks and grain lines of the wood strongly indicate a nest located inside or just beneath the wooden structure.

Camponotus species are common throughout India, including Maharashtra, and are frequently found in logs, wooden beams, tree trunks, fence posts, and occasionally wooden parts of houses. Colonies can become very large, with thousands of workers and a single queen. Different worker sizes (minor and major workers) may occur within the same colony. They are omnivorous, feeding on sugary substances, plant secretions, honeydew from aphids, dead insects, and kitchen scraps. Workers forage extensively and may form visible trails when food sources are abundant. Carpenter ants do not sting, but they can deliver a strong bite and may release formic acid as a defensive chemical. They are considered structural pests when nesting inside wooden buildings, though ecologically they play an important role in wood decomposition and nutrient cycling in natural environments.

SUBFAMILY: MYRMICINAE

The ants belonging to the subfamily Myrmicinae, as seen in the previously uploaded photographs, are mostly small-sized, reddish-brown to dark brown ants that commonly form dense groups around food

sources, especially cooked food, vegetables, and sugary materials. A key feature clearly visible in these ants is the two-segmented waist, consisting of a petiole and a post-petiole, which distinctly separates them from Formicinae ants. In the images, Myrmicinae ants show strong mass-recruitment behavior, quickly assembling in large numbers once food is discovered, resulting in clustered feeding activity on ground or cemented surfaces. Their movements are generally organized rather than erratic, and workers often follow well-defined pheromone trails. These ants are highly adaptable scavengers, nesting in soil, cracks in cement, under stones, and near building foundations, allowing them to thrive close to human settlements. They are omnivorous, feeding on sugars, oils, seeds, and small insects, and although they do not

usually sting, some species may bite mildly when disturbed. Overall, the Myrmicinae ants observed in the photos represent a highly successful group that dominates household and outdoor environments through efficient recruitment, flexible nesting habits, and constant foraging activity.

1. **Small Sugar Ant (Pharaoh Ant type) (Monomorium pharaonis)**

- **Local Name**: Chhoti Cheenti (□□□□ □□□□□ □)
- **Scientific Name**: *Monomorium pharaonis* (Linnaeus, 1758)
- Classification:
    - Kingdom: Animalia
    - Phylum: Arthropoda
    - Class: Insecta
    - Order: Hymenoptera
    - Family: Formicidae
    - Subfamily: Myrmicinae
    - Genus: *Monomorium*
    - Species: *M. pharaonis*

Expanded Brief Details:

These ants are very small, usually 2–3 mm in size, and are light brown to blackish in color. Commonly known as Pharaoh Ants, they are notorious indoor pests, often seen foraging on sugar, sweets, and food crumbs. They form large colonies with multiple queens, making their eradication very difficult since even a small group can start a new colony. They prefer warm, moist environments and are often found in kitchens, bathrooms, hospitals, and food storage areas. Pharaoh ants are omnivorous, feeding on sugary foods, grease, and dead insects. They are considered unhygienic pests as they contaminate food and surfaces, and in hospitals, they may transmit pathogens mechanically. Their strong trail-following behavior allows them to form visible lines of ants when food is discovered.

2. Small Indian Red Ant (Food-Foraging Ant)

- **Local Name**: Indian Red Ant / Tramp Ant
- **Scientific Name**: *Monomorium indicum* Forel, 1902
- Classification:
    - Kingdom: Animalia
    - Phylum: Arthropoda
    - Class: Insecta
    - Order: Hymenoptera
    - Family: Formicidae
    - Subfamily: Myrmicinae
    - Genus: Monomorium
    - Species: M. indicum

Expanded Brief Details:

These ants are very small (about 2–3 mm long) and reddish-brown to dark brown in color. In the photo, they are clearly observed mass-foraging on food items, forming dense clusters and trails. The presence of a two-segmented waist (petiole and post-petiole) confirms their placement in the Myrmicinae subfamily.

Monomorium indicum is one of the most common household and outdoor ants in India, especially in warm regions such as Maharashtra. They are highly opportunistic feeders, attracted to cooked food, sweets, oily materials, vegetables, and dead insects. Their strong pheromone-based trail system enables rapid recruitment of workers once food is discovered.

These ants commonly nest in soil, wall cracks, under stones, floor crevices, and cement gaps. Colonies often contain multiple queens, allowing rapid population growth and frequent re-infestation. Although they do not sting, they can bite mildly and are considered nuisance pests due to food contamination.

SUBFAMILY: PONERINAE

The ants belonging to the subfamily Ponerinae, as observed in the uploaded photographs, present a striking contrast to the smaller, highly social ants of other subfamilies, displaying a larger, more robust body form and a distinctly solitary or low-recruitment lifestyle. In the images, these ants are immediately recognizable by their powerful build, thick single-segmented waist, and large head equipped with strong mandibles, features that are closely associated with their predatory nature. Unlike the mass-foraging Myrmicinae ants, Ponerinae ants are seen moving alone or in very small numbers, indicating a foraging strategy that relies more on individual hunting skill than cooperative food gathering. Their movement appears slow, deliberate, and purposeful, suggesting careful exploration and prey detection rather than the rapid trail-following behavior seen in other ant groups. The coloration, often a combination of

reddish-brown and black, enhances their intimidating appearance and reflects the morphological diversity within the subfamily. Ponerinae ants typically inhabit less-disturbed environments, nesting in soil, under stones, within leaf litter, or in rotting wood, and their presence in the photographs suggests a preference for outdoor habitats rather than continuous indoor activity. These ants are primarily predators, feeding on a variety of small insects and arthropods, and their strong mandibles allow them to capture and subdue prey effectively. Because of their predatory lifestyle, Ponerinae ants play a crucial ecological role in regulating populations of other insects, contributing to natural biological control in soil and forest-edge ecosystems. Their colonies are generally small and simple in structure, often containing fewer workers than Myrmicinae or Formicinae colonies, reflecting their more primitive evolutionary status. Although they are not commonly regarded as household pests, Ponerinae ants can deliver painful bites and, in some species, functional stings, making them defensive when threatened or handled. This combination of physical strength, predatory behavior, and potent defense mechanisms makes them ecologically significant despite their low visibility in human environments. The ants seen in the images clearly illustrate the defining characteristics of the Ponerinae subfamily—strength over numbers, solitary hunting over mass recruitment, and a close association with natural substrates—highlighting their role as one of the most ancient and behaviorally distinct lineages within the ant family.

1. Red-and-Black Predatory Ant

- **Local Name**: Badi Daant Wali Cheenti / Kathor Cheenti (□□□ □□□□□ □□□□ □□□□□ □ / □□□□ □□□□□ □)
- **Scientific Name**: *Pachycondyla* sp. (often treated as *Bothroponera* sp. in modern taxonomy)
- Classification:
    - Kingdom: Animalia
    - Phylum: Arthropoda
    - Class: Insecta
    - Order: Hymenoptera
    - Family: Formicidae
    - Subfamily: Ponerinae
    - Genus: Pachycondyla
    - Species: Pachycondyla sp.

(species-level ID requires close examination)

Expanded Brief Details:

This ant is a medium-to-large sized ant (approximately 8–12 mm long) with a robust, muscular body. The image clearly shows a reddish-brown head and thorax, contrasting with a dark black gaster, a color pattern typical of many Ponerinae ants found in India.

The ant has a single thick waist node (one-segmented petiole) and a large head with strong mandibles, both key diagnostic features of the subfamily Ponerinae. These ants are predatory by nature, unlike sugar-feeding household ants. They hunt small insects, larvae, termites, and other arthropods rather than forming large foraging trails.

Pachycondyla ants are usually solitary foragers, moving slowly and deliberately, as seen in the photo. They typically nest in soil, under stones, leaf litter, rotting wood, or near tree roots, mostly outdoors. Colonies are small compared to household ants and generally contain a single queen. These ants are not major household pests, but they can become noticeable when nests are close to homes or paths. They can deliver a painful bite and sometimes a mild sting if handled or threatened, due to their strong mandibles and defensive venom.

Ecologically, they are beneficial predators, helping control populations of other insects in gardens, agricultural fields, and forest edges.

DICUSSION

The present study highlights the rich ant diversity of Badtola Hamlet under Darbada Gram Panchayat, Salekasa Tahsil, Gondia District, where ants belonging to three major subfamilies—Formicinae, Myrmicinae, and Ponerinae—were recorded. The occurrence of these groups reflects the heterogeneous nature of the study area, which includes forest patches, agricultural lands, and human settlements. Such environmental complexity provides a variety of nesting substrates and food resources, enabling ants with different ecological requirements to coexist. The extended survey period covering multiple seasons further facilitated the detection of both commonly occurring and less frequently encountered ant groups.

Formicinae emerged as the most dominant subfamily in the study area, likely due to their high ecological adaptability and wide habitat tolerance. These ants were observed occupying diverse microhabitats such as soil, wooden structures, walls, and food sources, indicating their ability to thrive in both natural and human-modified environments. Their strong attraction to sugary and carbohydrate-rich materials, combined with efficient foraging and trail formation, allows them to exploit resources associated with human activities. The presence of carpenter ants nesting in wood further suggests the availability of suitable nesting material. The abundance of Formicinae underscores their role as important scavengers and contributors to nutrient cycling, although some species may act as nuisance or minor structural pests in household settings.

Myrmicinae ants formed another significant component of the ant community and were mainly observed at ground level and around exposed food items. Their small size and well-developed mass-recruitment behavior enable rapid exploitation of available resources, resulting in dense aggregations. These ants commonly nest in soil, cracks, and beneath stones, making them well suited to both natural and disturbed habitats. In contrast, Ponerinae ants were recorded infrequently, which corresponds with their solitary foraging behavior, smaller colony size, and predatory lifestyle. Although less abundant, their role as predators is ecologically important, helping regulate populations of other invertebrates. Overall, the

observed variation among the three subfamilies demonstrates clear niche differentiation and indicates a stable and functionally diverse ant community within the study area.

CONCLUSION

The present study conducted in Badtola Hamlet under Darbada Gram Panchayat, Salekasa Tahsil, Gondia District, provides a meaningful insight into the diversity, distribution, and ecological roles of ants inhabiting a semi-rural landscape. The identification of ant species belonging to three major subfamilies —Formicinae, Myrmicinae, and Ponerinae—clearly demonstrates the ecological heterogeneity and environmental suitability of the study area for sustaining diverse ant communities. The coexistence of these subfamilies reflects the availability of varied habitats such as forest edges, agricultural fields, soil surfaces, wooden structures, and human dwellings.

The dominance of **Formicinae** ants highlights their high adaptability and success in both natural and human-modified environments. Their widespread presence across different substrates and strong foraging activity emphasize their importance as scavengers and nutrient recyclers. The significant representation of **Myrmicinae** ants, particularly at ground level and around food sources, indicates their efficiency in mass recruitment and resource utilization, while also underlining their contribution to organic matter decomposition. Although **Ponerinae** ants were recorded in lower numbers, their presence is ecologically significant, as they represent predatory ants that play an important role in controlling populations of other small invertebrates.

Overall, the study confirms that ants serve as reliable indicators of ecosystem health and functional diversity. Despite human influence, the study area supports a well-structured ant community with clear niche differentiation and ecological balance. The findings emphasize the importance of conserving semi-rural landscapes like Badtola Hamlet, as they harbor diverse insect fauna crucial for ecosystem functioning. Further long-term studies incorporating quantitative sampling methods and seasonal comparisons would enhance understanding of ant diversity patterns and their responses to environmental changes.

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Figures



Figure 1

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Figure 2

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Figure 3

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Figure 4

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Figure 5

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Figure 6

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Figure 7

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Figure 8

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