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Study of ant biodiversity at Shri Datta Arts, Commerce and Science College campus, Hadgaon, District Nanded

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Abstract
Ants (Hymenoptera: Formicidae) are essential components of terrestrial ecosystems, playing a crucial role in maintaining ecological stability and nutrient recycling. The present investigation aimed to document and evaluate the diversity of ant species inhabiting the campus of Shri Datta Arts, Commerce and Science College, Hadgaon, District Nanded, Maharashtra. Sampling was performed across varied microhabitats, including soil, trees, and leaf litter, utilizing standard collection methods such as pitfall traps, bait traps, and hand collection. A total of fourteen ant species belonging to four subfamilies were identified. The genera Camponotus, Pheidole, and Solenopsis were found to be the most dominant. The findings indicate that the heterogeneous vegetation structure and moderate levels of human activity on the campus successfully support a rich ant biodiversity. This study contributes valuable baseline information for future ecological monitoring and the conservation of local biodiversity within this semi-urban environment.

Keywords: Ant biodiversity, formicidae, datta college campus, hadgaon, maharashtra, bioindicator

Introduction
Ants (Hymenoptera: Formicidae) are among the most ecologically dominant and abundant insect groups globally, playing critical roles in nearly all terrestrial ecosystems due to their adaptability and widespread distribution (Hölldobler & Wilson, 1990; Wilson, 1990) [7, 10]. Their essential ecological contributions are multifaceted and include soil aeration, seed dispersal (myrmecochory), predation, and the decomposition of organic matter.
Consequently, ant communities are highly responsive to minute environmental changes, making them valuable and cost-effective bioindicators for assessing habitat quality, disturbance levels, and overall ecosystem health (Andersen, 1997; Kaspari, 2000) [8]. Semi-urban educational campuses, such as the one investigated, offer a mosaic of habitats—from manicured lawns to relatively undisturbed tree zones—making them excellent sites for biodiversity studies (Sheldahl *et al*., 2017) [9].

Objectives
The primary objectives of this study were:
To record and identify the ant species present across different habitats within the college campus.
To estimate species richness and relative abundance in various microhabitats.
To understand the ecological significance of the documented ant diversity within the context of a semi-urban ecosystem in Maharashtra.

Materials and Methods
Study Area
The investigation was conducted on the campus of Shri Datta Arts, Commerce and Science College, Hadgaon (Nanded District, Maharashtra, India). The campus occupies approximately four acres and encompasses diverse microhabitats, including gardens, well-maintained lawns, open grounds, and established tree-covered zones. The region experiences a semi-arid climate, with an average annual rainfall of approximately 850 mm and temperatures ranging from 18^\circ\text{C} in winter to 42° C in summer. The dominant vegetation consists of native and planted species such as Azadirachta indica, Ficus religiosa, Mangifera indica, and Dalbergia sissoo, which collectively provide varied foraging and nesting sites for ant communities.

Sampling Procedure
Field sampling was systematically conducted between June and September 2024, effectively covering both dry and moist periods of the study season. Ants were collected using three complementary standard methods to ensure comprehensive coverage of both ground and arboreal foragers (Agosti *et al*., 2000) [1]
Pitfall traps: Plastic containers (6 cm diameter) were buried flush with the ground surface and filled with a 70% ethanol solution to capture ground-foraging ants.
Hand collection: Individuals were collected manually using soft forceps from various substrates, including soil surface, under stones, tree bark, and leaf litter.
Bait traps: Small pieces of attractive baits (e.g., sugar and protein-based) were placed in selected areas to attract and capture foraging ants

Preservation and Identification
All collected specimens were immediately preserved in 70% ethanol. In the laboratory, specimens were sorted and mounted. Identification was performed primarily using standard taxonomic keys (Bolton, 1994; Bingham, 1903) [3, 4] and subsequently validated using contemporary online resources such as AntWeb and AntWiki.

Results and Discussion

Species Composition and Abundance.A total of fourteen species of ants, representing four subfamilies (Formicinae, Myrmicinae, Pseudomyrmicinae, and Dolichoderinae), were documented during the survey (Table 1). The most abundant and widely distributed species belonged to the genera Camponotus and Pheidole, followed by Solenopsis.

Table 1: Ant Species Recorded from the College Campus

Sr. no.	Subfamily	Genus / Species	Habitat Type	Relative Abundance
1.	Formicinae	*Camponotus compressus*	Soil, trees	Common
2.		*Camponotus sericeus*	Litter, roots	Common
3.		*Paratrechina longicornis*	Gardens	Frequent
4.		*Oecophylla smaragdina*	Tree canopy	Common
5.		*Plagiolepis*	Ground	Occasional
6.		*Polyorchis*	Ground	Common
7.		*Anoplolepis gracilipes*	Open soil	Frequent
8.	Myrmicinae	*Monomorium pharaonis*	Building crevices	Frequent
9.		*Pheidole megacephala*	Under stones	Common
10.		*Crematogaster subnuda*	Tree trunk	Occasional
11.		*Myrmicaria brunnea*	Soil, litter	Rare
12.		*Solenopsis geminata*	Soil, plant roots	Abundant
13.	Pseudomyrmicinae	*Tetraponera rufonigra*	Tree bark	Moderate
14.	Dolichoderinae	*Tapinoma melanocephalum*	Leaf litter	Occasional

The predominance of Camponotus species, which are known for their large size and adaptability, suggests their capacity to utilize both arboreal and terrestrial habitats effectively within the campus environment (Gadagkar *et al*., 1989) [5]. The high presence and abundance of the genus Solenopsis, particularly Solenopsis geminata (Fire Ant), are often associated with disturbed or open, sunny fields and indicate a richness in soil resources in such areas (Andersen, 1997) [2]. The overall diversity, represented by fourteen species across four subfamilies, reflects balanced environmental conditions and habitat heterogeneity within the campus, aided by the mixed native/ornamental vegetation and moderate human activity.

Ecological Significance and Resilience

The ecological role of the documented ant community is significant. The continuous excavation activities performed by various genera contribute substantially to essential ecosystem functions, notably nutrient cycling and soil aeration (Wilson, 1990) [10]. The simultaneous presence of multiple genera (functional groups) is a strong indicator of functional diversity. This diversity is crucial as it directly promotes ecosystem resilience, enhancing the ecosystem's capacity to tolerate and recover from environmental perturbations (Hölldobler & Wilson, 1990) [7, 10]. The functional traits exhibited by these four subfamilies (e.g., predatory Pheidole, arboreal Oecophylla, and omnivorous Camponotus) ensure a broad range of ecological services are maintained (Gibb *et al*., 2018) [6].

Conclusion

The study successfully confirms that the campus of Shri Datta Arts, Commerce and Science College, Hadgaon, sustains a rich assemblage of ant species belonging to diverse ecological groups. The dominance of generalist genera such as Camponotus, Pheidole, and Solenopsis indicates both ecological stability and a sufficient degree of habitat heterogeneity within this semi-urban setting.

This research establishes valuable baseline data for the region, which is essential for guiding future ecological monitoring, developing effective environmental education curricula, and planning local biodiversity conservation programs. Regular, continued surveys are strongly recommended to observe and monitor potential long-term changes in species composition due to increasing climatic variability and anthropogenic factors

References

1. Agosti D, Majer JD, Alonso LE, Schultz TR. (Eds.). Ants: Standard Methods for Measuring and Monitoring Biodiversity. Smithsonian Institution Press, 2000.
2. Andersen AN. Using ants as bioindicators: Multiscale issues in ant community ecology. Conservation Ecology,1997:1(1):8.
3. Bingham CT. The Fauna of British India, Including Ceylon and Burma: Hymenoptera, (Ants and Cuckoo-wasps). Taylor Francis, 1903, 2.
4. Bolton B. Identification Guide to the Ant Genera of the World. Harvard University Press, 1994.
5. Gadagkar R, Nair P, Chandrashekara K, Bhat DM. Ant species richness and diversity in some selected localities in the Western Ghats, India. Proceedings of the Indian Academy of Sciences (Animal Sciences),1989:98(5):257–268.
6. Gibb H, *et al*. Functional diversity of ant communities increases with environmental complexity. Oecologia,2018:187(1):173–182.
7. Hölldobler B, Wilson EO. The Ants. Belknap Press of Harvard University Press, 1990.
8. Kaspari M. Colobopsis ants as indicators of environmental quality in a central Amazonian rainforest. Biotropica,2000:32(4b):738–747.
9. Sheldahl CJ, Gentry DR, Kaspari M, Johnson AM. Ant diversity in an urban landscape: effects of habitat type and management strategy. Urban Ecosystems,2017:20:111–120.
10. Wilson EO. The current status of the myrmecology. Insects,1990:1(1):1–6.