

Taxonomic Diversity and Relative Abundance of Spider Fauna (Arachnida) In A Terrestrial Habitat of Daman, India

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Abstract:

As cosmopolitan inhabitants of terrestrial ecosystems, spiders serve as significant biological proxies, reflecting the overall stability and health of the environment. A systematic ground survey was conducted from July 2022 to March 2023. A total of 14 species across six families were documented. The results were revealed that family Araneidae emerged as the most dominant taxon, comprising six species representing (43%) of the total species richness followed by Salticidae with four species (29%). The families Oxyopidae, Tetragnathidae, Pholcidae, and Theridiidae were represented by a single species, collectively accounting for the remaining (28%) of the recorded diversity (7%) each. The relative abundance of the families followed the hierarchy: Araneidae > Salticidae > Oxyopidae = Tetragnathidae = Pholcidae = Theridiidae. These findings underscore the structural diversity of ecosystem and highlight the role of these arachnids as vital bioindicators for monitoring the local environmental health of the Daman region.

INTRODUCTION

Spiders (Order: Araneae) represent one of the most diverse and successful groups of terrestrial arthropods, ranking seventh globally in terms of total species richness. As ubiquitous predators, they are integral components of almost every ecosystem, where they play a vital role in maintaining ecological balance by regulating insect populations. Their sensitivity to environmental changes, such as habitat fragmentation and urban land-use shifts, makes them excellent bioindicators for monitoring ecosystem health and quality (Platnick, 2011).

In India, spider diversity is remarkably high, with current records indicating approximately 1,968 species across 62 families (Dave and Trivedi, 2024). While extensive documentation has been conducted in biodiversity hotspots like the Western Ghats, many regional urban and semi-urban pockets remain under-explored (Palem et al. 2017) Specifically, in the Union Territory of Daman, baseline data on arachnid fauna is significantly lacking. Urban green spaces, such as college campuses, often act as essential refugia for local biodiversity, supporting varied microhabitats that range from manicured gardens to undisturbed terrestrial patches.

Understanding the assemblage structure and relative abundance of spiders in these localized environments is crucial for developing a comprehensive biodiversity database (Polchaninova et al. 2023). The present study was undertaken to provide a baseline inventory of spider diversity within a college campus in Daman. By utilizing photographic documentation and morphological analysis, this survey aims to characterize the taxonomic composition and

dominance patterns of the local spider community during a nine-month period from July 2022 to March 2023.

MATERIALS AND METHODS:

STUDY AREA: The terrestrial area of Government College Daman is located at latitude 20.423374° and longitude 72.849299° and the size of whole college area is spread over 27 acres with Library building, Hostel building, Administration Block, Biology block, Chemistry block etc. (Fig:1).

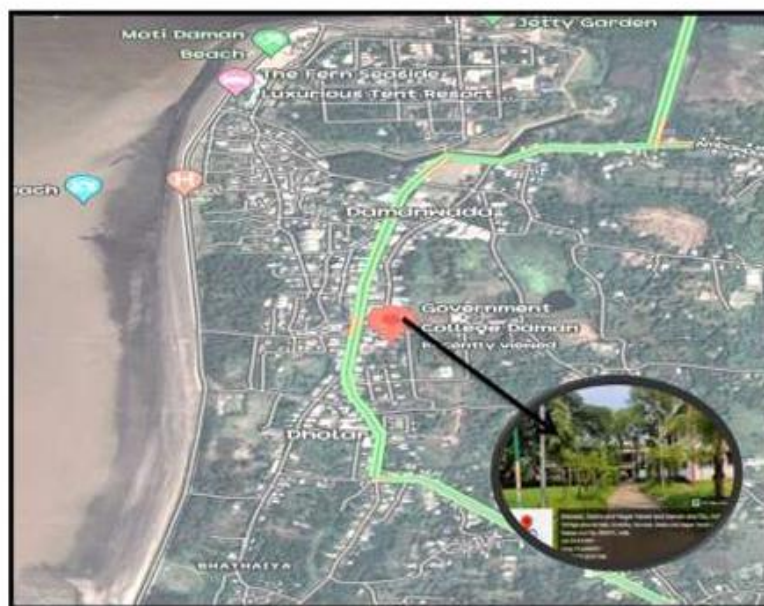


Fig. 1. Study area of Government College Daman.

METHODOLOGY: The random sampling was carried out from July 2022 to March 2023 by using trails and point observation from different areas of the College on regular interval during 8:00 am to 5:00 pm at Government College Daman employing through the “Pollard Walk” method with few modifications (Pollard, 1977; Pollard and Yates, 1993) and photographs were taken using camera for the identification following standard methods (Tikader, 1987).

- a) Hand-picking Method
- b) Kerchief Method
- c) Aerial hand Method
- d) Active-searching Method
- e) Visual-searching Method

IDENTIFICATION OF SPECIES: The collected photographed of specimens were identified with the help of standard keys followed by Tikader, 1987; Sebastian and Peter, 2009.

RESULTS AND DISCUSSION:

The results revealed a total 14 individuals of spiders were recorded, belonging to 6 families (Table: 1; Figure: 2 and 3).

A total of 14 species of spiders were representing to 6 families and 12 genera were recorded, during the study period. Families include Araneidae, Oxyopidae, Salticidae, Tetragnathidae, Pholcidae and Theridiidae. In which Araneidae is representing dominant family consisting of 6 species. The second dominant family is Salticidae comprising of 4 species. Followed by Oxyopidae with 1 species, Tetragnathidae with 1 species, Pholcidae with 1 species and Theridiidae with 1 species each were identified during the period of study.

Maximum species diversity was displayed by members of the family Araneidae. This was followed by Salticidae consisting of 4 species, followed by Oxyopidae, Tetragnathidae, Pholcidae and Theridiidae comprising one species each. The relative abundance of various families was reported from this study which can be described as Araneidae > Salticidae > Oxyopidae = Tetragnathidae = Pholcidae = Theridiidae. Similarly, result also revealed by Archana (2011) and Lawania et al., (2013) spiders of Toranmal Sanctuary, Maharashtra, India and Deeg (Bharatpur, Rajasthan), respectively and found family Araneidae to dominate in the agricultural fields. Maximum species richness of spiders in woodland due to dense canopy and availability of more prey. Our study also recorded the highest spider species richness in natural ecosystems, followed by agro-ecosystems, and this may reflect the degree of disturbance in these eco-system types (Saini et al., 2012).

Table: 1 Checklist of spider species recorded during the study period

S. No.	Class	Order	Family	Genus	Species
1	Arachnida	Araneae	Araneidae	<i>Argiope</i>	<i>anasuja</i>
2				<i>Argiope</i>	<i>keyserlingi</i>
3				<i>Araneus</i>	<i>mitificu</i>
4				<i>Neoscona</i>	<i>nautica</i>
5				<i>Cyrtophora</i>	<i>cicatrosa</i>
6				<i>Cyrtophora</i>	<i>citricola</i>
7			Pholcidae	<i>Pholcus</i>	<i>phalangioides</i>
8			Salticidae	<i>Telamonia</i>	<i>dimidiate</i>
9				<i>Colonus</i>	<i>puerperus</i>
10				<i>Hyllus</i>	<i>semicupresus</i>
11				<i>Plexippus</i>	<i>paykulli</i>

12			Tetragnathidae	<i>Leucauge</i>	<i>decorata</i>
13			Oxyopidae	<i>Oxyopes</i>	<i>salticus</i>
14			Theridiidae	<i>Steatoda</i>	<i>triangulosa</i>

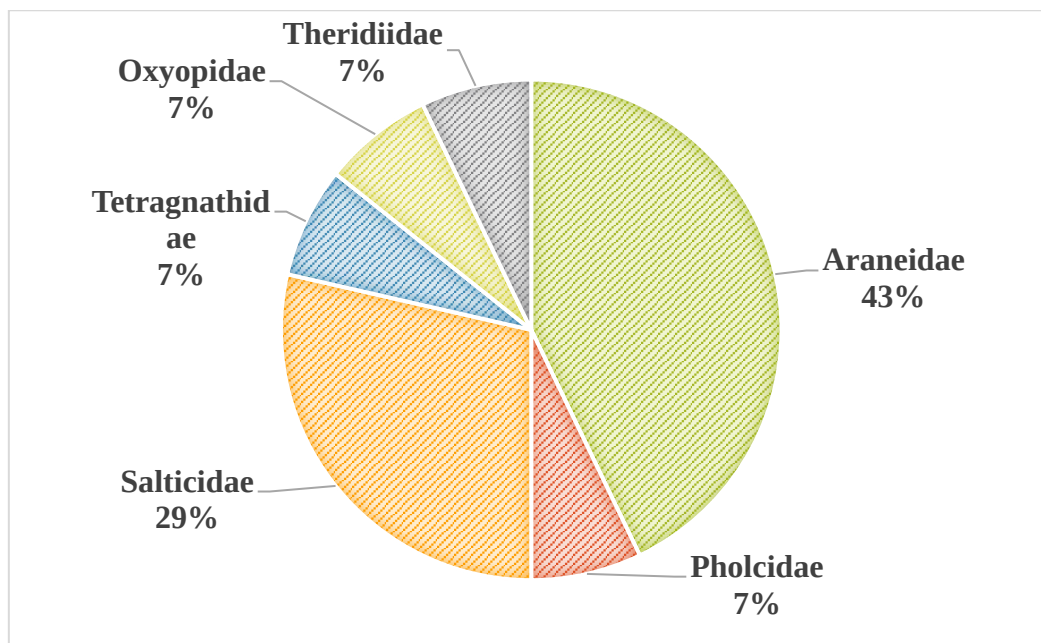


Fig: 2 Percentage wise occurrence of Spider Fauna



Fig: 1 *Argiope anasuja*



Fig: 2 *Argiope keyserlingi*



Fig: 3 *Araneus mitificus*



Fig: 4 *Neoscona nautical*



Fig: 5 *Cyrtophora cicatrosa*



Fig: 6 *Cyrtophora citricola*



Fig: 7 *Pholcus phalangioides*



Fog: 8 *Telamonia dimidiata*



Fig: 3 Qualitative diversities of Spider Fauna

CONCLUSION:

The spiders were abundant and almost spread in all around the world. They play major role as a component of the global diversity. Government College Daman is home to a wide variety of spiders; their survival is clearly under threat. We found that spiders are much more

common in quiet, natural spots than in areas frequently disturbed by people. It's evident that human activity and changes to the landscape are driving these numbers down. Since spiders play such a huge role in keeping our ecosystem in balance, we need to be more mindful of how we manage our campus green spaces. Protecting these small but vital predators isn't just about the spiders it's about preserving the natural health of our environment.

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