

# Diversity of Spiders in a Semi-Urban College Campus Area

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**Abstract:** *Spiders serve as important ecological indicators because of their predatory role in terrestrial ecosystems. The present study examines the diversity and distribution of spider species within a semi-urban environment located at Sahakar Maharshi Bhausaheb Santuji Thorat College, Sangamner. Field surveys were carried out over a period of five months, from November to March, covering different habitat types such as gardens, shrub vegetation, buildings, water-adjacent zones, and hostel surroundings. A total of six spider species belonging to different families were recorded during the study. The identified species include Araneus gemmoides, Plexippus paykulli, Steatoda triangulosa, Argiope anasuja, Pholcus phalangioides, and Cheiracanthium species. Variation in population abundance was observed across different months, with the highest activity recorded during February and March, likely due to favorable climatic conditions and increased prey availability. Habitat preference differed among species, indicating their adaptability to specific environmental conditions. Vegetation-rich areas such as gardens and shrubs supported higher diversity, whereas built environments favored synanthropic species. The study highlights the significance of semi-urban ecosystems in maintaining biodiversity and supporting ecological balance. This investigation provides baseline data on spider diversity in a semi-urban college campus and emphasizes the ecological importance of microhabitats in determining species distribution. The findings contribute to a better understanding of urban ecology and support the need for biodiversity conservation in rapidly urbanizing regions..*

**Keywords:** Spider diversity, Semi-urban ecosystem, Species distribution, Habitat preference ,Ecological indicators ,Urban biodiversity ,Microhabitat variation

## I. INTRODUCTION

Biodiversity refers to the variety of living organisms present on Earth, including diversity at genetic, species, and ecosystem levels. It plays a crucial role in maintaining ecological stability and environmental sustainability. Every ecosystem depends on interactions among organisms such as producers, consumers, decomposers, and predators. Among these, invertebrates contribute significantly to ecosystem functioning. Arthropods represent the most diverse group and are involved in essential ecological processes like pollination, decomposition, nutrient cycling, and biological control.

Spiders, belonging to Phylum Arthropoda, Class Arachnida, and Order Araneae, are one of the most important predatory groups in terrestrial ecosystems. More than 50,000 species have been described worldwide, and many remain undiscovered. Spiders possess a distinct body divided into cephalothorax and abdomen, along with eight legs, chelicerae, pedipalps, and spinnerets. They lack antennae and wings, which distinguishes them from insects. One of the most unique characteristics of spiders is their ability to produce silk. This silk is a strong protein fiber used for various purposes such as web construction, prey capture, egg protection, shelter formation, and dispersal. Due to their



carnivorous feeding habit, spiders play an essential role in controlling insect populations. They consume pests such as mosquitoes, flies, and agricultural insects, making them beneficial organisms in ecosystems.

Ecologically, spiders act as both predators and prey. They regulate insect populations and are also consumed by birds, reptiles, and amphibians. This places them at an important position in food webs. Additionally, spiders are considered bioindicators because their diversity and abundance reflect environmental conditions and habitat quality. In ecological studies, spiders are often classified into guilds based on their hunting strategies rather than taxonomy. These guilds include orb-web weavers, ground runners, foliage runners, stalkers, and ambushers. Guild classification helps in understanding resource utilization and ecological interactions within habitats.

Semi-urban ecosystems are transitional zones between rural and urban areas, characterized by mixed land use patterns such as buildings, gardens, open spaces, and roads. These areas provide diverse microhabitats that support a wide range of organisms. College campuses in such regions often serve as biodiversity hotspots due to the presence of vegetation and reduced disturbance compared to highly urbanized areas. Studying spider diversity in college campuses is important for several reasons. It helps in documenting local biodiversity, understanding the impact of urbanization, and promoting conservation awareness among students. Despite their ecological importance, limited studies have been conducted on spider diversity in semi-urban educational campuses, especially in Maharashtra. Rapid urbanization has led to habitat loss, pollution, and changes in land use patterns, which negatively affect arthropod diversity. Therefore, systematic studies are necessary to assess biodiversity and develop conservation strategies. The present study aims to document spider diversity and analyze their distribution in a semi-urban college campus ecosystem.

## **II. MATERIAL AND METHOD**

The study was conducted at Sahakar Maharshi Bhausaheb Santuji Thorat College, Sangamner, located in a semi-urban region of Maharashtra. The campus covers approximately five hectares and consists of diverse habitats such as buildings, gardens, lawns, open grounds, and shrub vegetation. The study was carried out over a period of five months, from November to March, covering different seasonal conditions. The climate of the region is tropical, with moderate temperature variation and seasonal rainfall. During the study period, conditions were relatively dry and suitable for spider activity.

Sampling was performed in multiple habitat types including gardens, shrub areas, buildings, hostel surroundings, and areas near water sources. Various methods were used for spider collection. The visual search method was employed during morning and evening hours to locate spiders in different habitats. Sweep netting was used in grassy and vegetated areas to collect foliage-dwelling species. Pitfall traps were installed in the soil to capture ground-dwelling spiders. Hand collection using forceps was also carried out carefully. Collected specimens were preserved in 70% ethanol and labeled with relevant details such as date, location, and habitat type. Identification was done using standard taxonomic keys and reference materials up to species level wherever possible.

Data obtained from the study were analyzed to determine species richness and distribution patterns across habitats and seasons.

## **III. RESULT AND DISCUSSION**

The study recorded six spider species belonging to different families across various habitats. Species distribution varied with habitat type and seasonal conditions. Gardens and shrub areas showed higher diversity due to vegetation complexity and prey availability. Buildings supported species adapted to human environments.

Seasonal variation was evident, with spider abundance increasing from January to March. Some species showed consistent presence, while others fluctuated depending on environmental conditions.

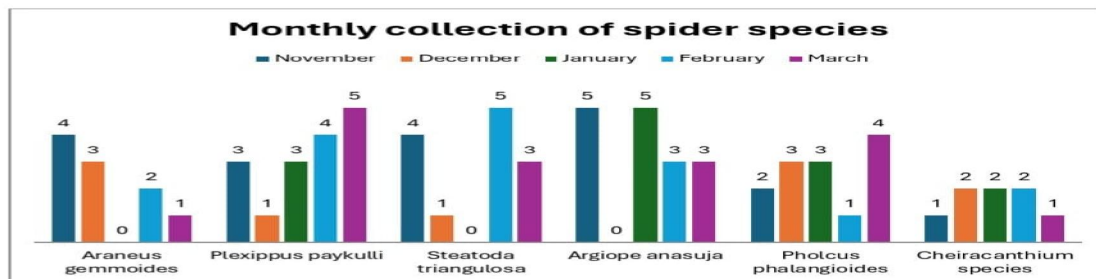
Overall, habitat heterogeneity and climatic factors significantly influenced spider diversity and distribution. The findings indicate that semi-urban ecosystems provide suitable conditions for sustaining diverse spider communities.



**RESULTS AND OBSERVATIONS**

Sr. No	Months of Observation		November	December	January	February	March
	Scientific Name	Common Name					
	No. of Individuals						
1	<i>Araneus gemmoides</i>	Cat faced spider	4	3	0	2	1
2	<i>Plexippus paykulli</i>	Jumping spider	3	1	3	4	5
3	<i>Steatoda triangulosa</i>	Triangulate cobweb spider	4	1	0	5	3
4	<i>Argiope anasuja</i>	Signature spider	5	0	5	3	3
5	<i>Pholcus phalangioides</i>	Long bodied cellar spider	2	3	3	1	4
6	<i>Cheiracanthium</i> species	Yellow Sac Spider	1	2	2	2	1

Table-1 Monthly collection of spider species



**IV. CONCLUSION**

The present study highlights the diversity and ecological importance of spiders in a semi-urban college campus ecosystem. A total of six species were recorded, each showing distinct habitat preferences and seasonal variations. Vegetation-rich areas such as gardens and shrublands supported higher species diversity due to availability of food resources and suitable environmental conditions. In contrast, built-up areas supported fewer but highly adaptable species capable of surviving in human-modified habitats.

Seasonal changes significantly influenced spider populations. Lower abundance was observed during colder months, while higher activity was recorded during warmer months, particularly February and March. This indicates that temperature and prey availability are key factors affecting spider distribution. Spiders play a vital role as natural predators, helping in the control of insect populations and maintaining ecological balance. Their presence also reflects environmental health, making them useful bioindicators.

The study emphasizes the importance of conserving green spaces within semi-urban areas to maintain biodiversity. Protecting such habitats will support not only spider populations but also overall ecosystem stability. Further long-term research is recommended to understand species interactions, ecological roles, and the impact of urbanization on biodiversity.

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