RESEARCH ARTICLE

TAXONOMIC DOCUMENTATION OF SPIDER FAUNA (ARANEAE) FROM YEDASI–RAMALING WILDLIFE SANCTUARY, OSMANABAD DISTRICT, MAHARASHTRA, INDIA

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Abstract:

Spiders (Order: Araneae) are among the most diverse and ecologically significant predatory arthropods, playing a crucial role in terrestrial food webs. Despite their importance, the spider fauna of semi-arid ecosystems in Maharashtra remains inadequately documented. The present study provides a comprehensive taxonomic documentation of spider species from Yedasi–Ramaling Wildlife Sanctuary, Osmanabad District, Maharashtra. Field surveys were conducted from July to December across four locations—Bhanasgaon, Wadgaon, Yedasi, and Kalamb—using hand collection and visual search methods. Species were identified using standard taxonomic keys and morphological characters. A total of 15 species belonging to 12 genera and 7 families were identified. The family Araneidae was represented by the highest number of species, followed by Lycosidae and Salticidae. This study constitutes the first systematic taxonomic record of spiders from the sanctuary, providing baseline faunal data for future arachnological research and conservation planning.

Keywords: Araneae, Spider Taxonomy, Faunal Inventory, Semi-Arid Ecosystem, Maharashtra.

Introduction:

Spiders (Class: Arachnida; Order: Araneae) represent one of the most diverse and evolutionarily successful groups of terrestrial invertebrates, with more than 49,000 species described globally [1]. They occupy almost all terrestrial habitats except extreme polar regions and play a vital ecological role as natural predators of insects, thereby contributing to biological control and ecosystem

stability [2]. Due to their sensitivity to microhabitat changes, spiders are also considered effective bio-indicators of habitat quality and environmental disturbance [3].

India harbors a rich spider fauna, with approximately 1,686 recorded species belonging to 438 genera and 61 families [4]. However, spider taxonomy and faunal documentation in India remain regionally biased, with most studies concentrated in biodiversity hotspots such as the Western Ghats, Eastern Himalayas, and northeastern states [5–7]. In contrast, semi-arid and plateau regions of central and southern Maharashtra are poorly explored, despite possessing unique vegetation types and ecological gradients.

The Yedasi–Ramaling Wildlife Sanctuary, located in Osmanabad District of Maharashtra, forms part of the Balaghat hill range and represents a characteristic semi-arid dry deciduous ecosystem. The sanctuary supports diverse flora and fauna, yet invertebrate groups—particularly arachnids—remain largely undocumented. Earlier Indian spider studies by Stoliczka (1869) and Simon (1889) laid the foundation for arachnology in the subcontinent, while modern compilations such as Tikader (1987) and Sebastian & Peter (2017) have provided updated taxonomic frameworks [8–10]. However, no published taxonomic account of spiders from Yedasi–Ramaling Wildlife Sanctuary exists to date.

Spiders are an integral component of global terrestrial biodiversity and play a crucial role in maintaining ecosystem stability. As exclusively carnivorous arthropods, spiders primarily prey upon insects and other small arthropods, thereby acting as effective natural regulators of insect populations in most terrestrial ecosystems [11]. Their predatory activity significantly contributes to the suppression of agricultural and forest pests, reducing the dependence on chemical control measures. In addition to their role as predators, spiders constitute an important food resource for a wide range of vertebrates and invertebrates, including birds, lizards, amphibians, and parasitoid wasps, thus occupying a key position in terrestrial food webs [12].

Owing to their high sensitivity to habitat alteration, microclimatic variation, and anthropogenic disturbance, spiders are widely recognized as reliable ecological indicators [13,14]. Their diversity, abundance, and ease of sampling make them particularly useful for assessing ecosystem health, habitat quality, and species richness across different landscapes [15]. Several studies have demonstrated that changes in spider community composition reflect underlying ecological disturbances, such as habitat fragmentation, vegetation loss, and climate variability [16]. Consequently, spiders exert a profound influence on the structure and functioning of terrestrial ecosystems, underscoring their ecological and conservation significance [17]. The Zoological Survey of India has also emphasized the importance of systematic documentation of Indian spider fauna to strengthen biodiversity inventories and conservation strategies [18].

This study aims to contribute baseline taxonomic data essential for future ecological, molecular, and conservation-oriented studies in semi-arid landscapes.

Materials and Methods:

Study Location: The present study was conducted in Yedasi–Ramaling Wildlife Sanctuary, located in Osmanabad District, Maharashtra, India, forming part of the Balaghat hill range and representing a semi-arid dry deciduous ecosystem. The sanctuary lies between 17.35°–18.40° N latitude and 75.16°–

76.40° E longitude, with an average elevation of approximately 600 m above mean sea level. Field surveys were carried out, covering four representative sampling sites—Bhanasgaon, Wadgaon, Yedasi, and Kalamb—selected based on habitat heterogeneity such as shrubs, grasslands, rocky substrata, tree trunks, and forest edges.

Field Sampling and Laboratory Identification: Spiders were surveyed using active visual searching and hand collection methods**,** including examination of foliage, webs, ground surface, leaf litter, tree bark, and human-associated structures during daytime and early evening hours. Specimens were photographed in situ, and representative individuals were collected and preserved in 70% ethanol for laboratory examination. In the laboratory, specimens were examined under a stereo zoom microscope, and identification was carried out based on external morphological characters, including body shape, eye arrangement, leg spination, coloration, web architecture, and spinneret structure.

Taxonomic identification was confirmed using standard keys and authoritative literature, including Tikader (1987)**,** Sebastian and Peter (2017), and the Zoological Survey of India (ZSI) checklist of Indian spiders, ensuring nomenclatural validity and distributional confirmation. Species identification followed classical morphological taxonomy, and scientific names were verified against the ZSI checklist to ensure regional authenticity and taxonomic accuracy.

Results

Taxonomic Composition of Spider Fauna in Yedasi–Ramaling Wildlife Sanctuary

Based on systematic field surveys and taxonomic identification, a total of 15 spider species belonging to 12 genera and 8 families were recorded from the Yedasi–Ramaling Wildlife Sanctuary during the study period. All recorded species are widely distributed in peninsular India and semi-arid ecosystems of Maharashtra**,** and their occurrence is supported by the Zoological Survey of India (ZSI) checklist of Indian spiders [18].

The spider fauna of the sanctuary was dominated by orb-weaving, ground-dwelling, foliage-dwelling, and cursorial hunting spiders**,** reflecting habitat heterogeneity consisting of dry deciduous vegetation, rocky substrata, shrubs, and open grassland patches.

Table 1 presents a systematic checklist of spider species recorded from Yedasi–Ramaling Wildlife Sanctuary, documenting a total of 15 species belonging to 12 genera and 8 families along with their respective habitats and distributional status as per the Zoological Survey of India (ZSI). The checklist indicates that the family Araneidae is represented by the maximum number of species, followed by Lycosidae, Salticidae, and Oxyopidae. The recorded species occupy a wide range of microhabitats, including shrubs, open forest vegetation, grasslands, leaf litter, rocky surfaces, tree bark, and human-associated structures, reflecting habitat heterogeneity within the sanctuary. Distributional data confirm that most species are widely distributed across peninsular India or commonly reported from Maharashtra, supporting their ecological suitability to semi-arid dry deciduous environments. This checklist provides a reliable baseline taxonomic record for the sanctuary.

Table 1: Systematic checklist of spider species recorded from Yedasi–Ramaling Wildlife Sanctuary (Osmanabad District)

Sr. No.	Family	Species	Habitat / Microhabitat	ZSI Distribution Status
1	Araneidae	*Argiope catenulata*	Shrubs, open forest	Widely distributed in India
2	Araneidae	*Neoscona theisi*	Bushes, dry vegetation	Peninsular India
3	Araneidae	*Cyclosa insulana*	Low shrubs, web debris	Common in Maharashtra
4	Araneidae	*Nephila pilipes*	Forest edges, tall shrubs	Reported from central India
5	Lycosidae	*Lycosa mackenziei*	Ground, leaf litter	Semi-arid regions of India
6	Lycosidae	*Pardosa pseudoannulata*	Grasslands, open soil	Common throughout India
7	Lycosidae	*Hippasa holmerae*	Funnel webs on ground	Dry deciduous habitats
8	Salticidae	*Plexippus paykulli*	Tree trunks, walls	Pan-Indian distribution
9	Salticidae	*Menemerus bivittatus*	Rocky surfaces, buildings	Common in Maharashtra
10	Oxyopidae	*Oxyopes javanus*	Shrubs, foliage	Peninsular India
11	Oxyopidae	*Peucetia viridana*	Bushes, shrubs	Dry and semi-arid regions
12	Thomisidae	*Thomisus spectabilis*	Flowers, shrubs	Widely distributed
13	Hersiliidae	*Hersilia savignyi*	Tree bark, rocky trunks	Common in dry forests
14	Tetragnathidae	*Tetragnatha mandibulata*	Vegetation near water	Central and southern India
15	Sparassidae	*Heteropoda venatoria*	Tree bark, rocks, houses	Common in Maharashtra

Table 2 provides a tabular dichotomous taxonomic key designed for the accurate identification of spider species recorded from Yedasi–Ramaling Wildlife Sanctuary based on easily observable morphological and behavioral characters. The key differentiates species primarily using web-building behavior, body coloration, eye size and arrangement, leg morphology, spinneret structure, and habitat preference. Web-building spiders are separated from free-living hunters in the initial steps, followed by finer diagnostic traits such as stabilimentum presence, folium patterns, debris decoration, and leg orientation. This structured key enables stepwise identification from family to species level and serves

as a practical field- and laboratory-based tool for arachnologists, taxonomists, and biodiversity researchers working in semi-arid ecosystems.

Table 2: Tabular Dichotomous Taxonomic Key for Identification of Spider Species Recorded from Yedasi–Ramaling Wildlife Sanctuary

Step	Character 1	Go to / Species	Character 2	Go to / Species
1	Web present	2	Web absent (free-living hunters)	8
2	Orb-shaped web	3	Funnel or irregular web	7
3	Abdomen with black–yellow transverse bands; stabilimentum present	*Argiope catenulata*	Abdomen without transverse bands	4
4	Abdomen with folium (leaf-like) pattern	*Neoscona theisi*	Abdomen small or cryptic	5
5	Web decorated with debris	*Cyclosa insulana*	Web without debris	6
6	Body very large; legs extremely long	*Nephila pilipes*	Body slender; chelicerae elongated	*Tetragnatha mandibulata*
7	Funnel-shaped web on ground vegetation	*Hippasa holmerae*	—	—
8	Eyes very large; jumping behavior present	9	Eyes not enlarged; no jumping	11
9	Body stout; black-white pattern	*Plexippus paykulli*	Body flattened with lateral stripes	*Menemerus bivittatus*
11	Legs long and spiny; foliage-dwelling	12	Legs not spiny	14
12	Body bright green; red ocular region	*Peucetia viridana*	Pale green/brown; hexagonal eye pattern	*Oxyopes javanus*
14	First two pairs of legs laterigrade (crab-like)	*Thomisus spectabilis*	Legs not laterigrade	15
15	Posterior spinnerets extremely long	*Hersilia savignyi*	Spinnerets normal	16
16	Body large, robust; ground-dwelling	*Lycosa mackenziei*	Body smaller, agile runner	*Pardosa pseudoannulata*
17	Body very large; laterigrade legs; nocturnal	*Heteropoda venatoria*	—	—

Family-wise Representation

The family Araneidae was represented by the maximum number of species, followed by Lycosidae and Salticidae**.** Ground-dwelling wolf spiders (Lycosidae) were frequently encountered in open and rocky habitats, whereas orb-weavers were abundant in shrub-dominated areas.

Description:

Araneidae showed the highest species representation, indicating favorable conditions for orb-web construction, followed by Lycosidae and Salticidae, which are typical of dry and semi-arid ecosystems.

Discussion:

The taxonomic inventory reveals that Yedasi–Ramaling Wildlife Sanctuary supports a diverse assemblage of spiders representing orb-weavers, cursorial hunters, ambush predators, and foliage dwellers. The dominance of Araneidae suggests the availability of suitable vegetation and structural support for orb-web construction. Lycosidae species reflect well-developed ground-level microhabitats, consistent with findings from other semi-arid regions of India [11–13]. The occurrence of Salticidae, Oxyopidae, and Thomisidae highlights habitat heterogeneity and prey availability. Similar family compositions have been reported from Satpuda ranges, Nilgiris, and Gibbon Wildlife Sanctuary, although species composition varies regionally [14–17].

Conclusion:

This study presents the first comprehensive taxonomic documentation of spider fauna from Yedasi–Ramaling Wildlife Sanctuary, recording 15 species across 7 families. The findings significantly enrich regional arachnological data and emphasize the importance of semi-arid protected areas for spider conservation. Extended seasonal surveys and molecular taxonomic studies are recommended to further elucidate species diversity.

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