



Checklist of spiders from pigeon pea crop field, Chincholi Wildlife Sanctuary, Kalaburagi district, Karnataka, India

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Abstract

Spiders are one of the most widespread insectivore predators in the Terrestrial ecology. Spiders are ubiquitous and diversified predators in terrestrial arthropod assemblages. Spiders are among the most diverse animal groupings in the world. Spiders are essential stabilising agents or controllers of insect populations in agro, forest and other terrestrial environments. Thus, their presence in an ecosystem may well affect the population dynamics of other arthropods found. Spiders are helpful for controlling insect pests and do not disrupt the agroecosystem. The survey in the pigeon pea field revealed total 15 spider species under 13 genera and 6 families. Salticidae was the richest with 4 species followed by Araneidae and Oxyopidae with (3 species each), Lycosidae, Thomisidae and Tetragnathidae (2 species each), Thomisidae with 1 species. Spiders are beneficial bio-control agent of insect pest in agro-ecosystems. Increased usage of biopesticide and organic manure can lead to growth of spider population in diverse habitats. This article discusses mass production, importance in pest management and conservation of spiders.

Keywords: Spiders, pigeon pea, species diversity, agroecosystem, biological control

Introduction

Pigeon pea (*Cajanus cajan*) is an important pulse crop of tropical and subtropical countries and has special importance in South Asian agriculture. It is a key source of nutritional protein, and also is utilised as animal feed and fuelwood (Shanower *et al.*, 1999) [16]. India is the world's greatest producer of pigeon pea with production of 4.34 million tonnes from 5.05 million hectares during 2023–24 with average productivity of 859 kg per hectare (Angrau, 2023). India was the source of 77.61% of the world's pigeon pea production (Tridge, 2023) [17]. The global Red gram market was valued at 13.3 million tonnes in 2022 (FMI, 2023) [1]. The market is anticipated to reach 23.6 million tonnes in 2027 at a CAGR of 9.51% during the period 2022–2027.

Spiders rank among the most diverse animals in terrestrial settings. These arthropods show great variation in size, behaviour and adaptations (Foelix, 2011; Mammola *et al.*, 2017) [6, 7]. Many spiders disperse over vast distances in the air utilising a special mechanism called ballooning, which uses air currents and electric fields (Cardosa, 2025). There are 4,525 genera and 54,125 species belong to the 143 families (World Spider Catalog 2026).

Spiders are so well adapted that they can live in just about any land ecosystem on Earth. Despite being widespread, many species are declining in numbers and are threatened with extinction through a variety of factors including habitat loss, invasive species, pollution, climate change and overexploitation (Seppälä *et al.*, 2018; Branco & Cardoso, 2020) [4, 15]. Spiders have been proved to function as biological control agents in several agricultural settings. (Nyffeler & Sunderland, 2003) [9] reviewed the literature on the communities of spiders in agro ecosystems and found that spiders can be quite abundant in crop fields and that they eat many insect pests. Crop structure, climate and

agricultural methods can influence the abundance and community composition of spiders.

More recently, a worldwide meta-analysis of 58 research revealed that spiders reduced agricultural insect pests in 79% of the cases analysed, with generally higher spider abundance related with more effective pest suppression and better crop production (Michalko *et al.*, 2019) [8]. These results imply that conservation of spider communities may be a useful supplement to conventional pest-management tactics. Benamu (2020) claimed that the research on spider diversity in agro ecosystem are increasing and they have capacity to be exploited as biological control agents in IPM and it can reduce the mass use of pesticides.

Spiders are particularly sensitive to changes in abiotic parameters. Pitilin *et al.* (2019) [11] found that spiders influence pest populations in the field, and these are also influenced by meteorological factors.

Material and Methods

The present study deals with the investigation of different species of spiders from various localities of the Chincholi Wildlife Sanctuary in the Kalaburagi District, Karnataka, India. Field observations were conducted twice a month to collect spiders. The investigation was conducted in several seasons from January 2025 to January 2026. Several methods have been used for the collection of spiders, such as handpicking method, inverted umbrella method, karchief method and sweep net method. The specimens were preserved in 90% ethanol and examined under a stereo microscope for certain characters and specimen were identified by arachnologists, also identified with the help of field guides.

Study Area

There is a dry land wildlife reserve designated as Chincholi Wildlife Sanctuary. This sanctuary is important from the

point of view of biodiversity, as it is the sole location in the Kalyan-Karnataka region that has features of the Western Ghats. This is vital for the conservation of biodiversity. The forest is 134.88 square kilometres in area and has teak, rosewood and nallamadri trees. It is located at (Lat 17.531522, Long 77.466279). It is fifty percent of the Chincholi taluk and is 84 kilometres away from the Kalaburagi district in Karnataka, India. The forests are home to a diverse range of flora and wildlife, including medicinal herbs.

The forest has both dry and wet deciduous trees, and on its periphery are plantations of acacia and teak. The forest is rich in ecological systems. The preserve is renowned for its variety of species, such as the black buck, the common fox, the four-horned antelope, fruit bats, hyenas, Indian wolves, panthers, dholes and wild boars. There are also around 35 different species of birds living in the territory, including the black drongo, black-winged kite, blossom-headed parakeet, blue pigeon, black-headed oriole and grey partridge. All these birds are present in this region.

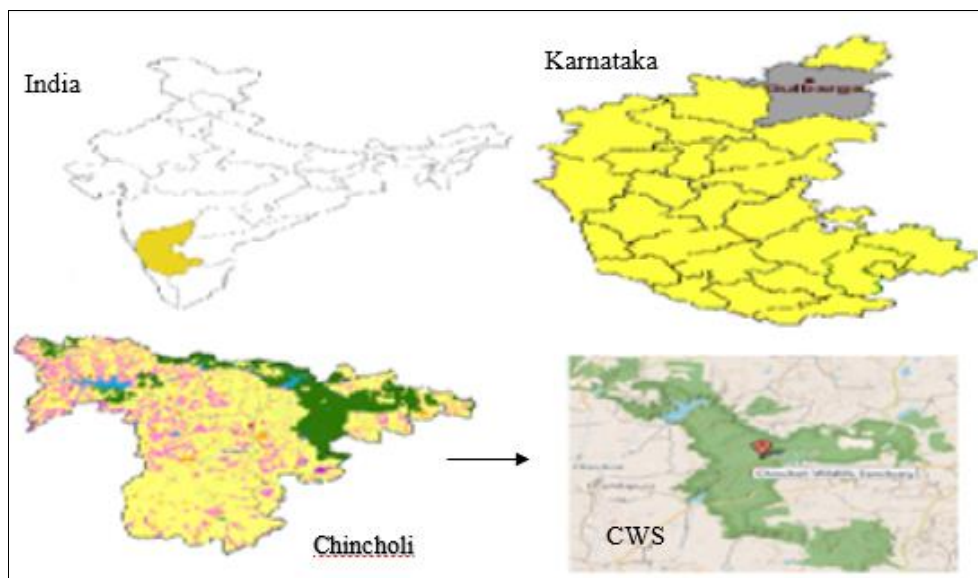


Fig 1: The Chincholi Wildlife Sanctuary (CWS) is depicted on this map

Results and Discussion

The study conducted from January 2025 to January 2026 in the pigeon pea field revealed a total of 15 spider species under 14 genera and 06 families; Salticidae was the richest with 4 species followed by Araneidae and Oxyopidae with (3 species each), Lycosidae, Thomisidae and Tetragnathidae (2 species each), Thomisidae with 1 species (Table 1). These spiders due to their different foraging habits were observed preying on different types of pests viz, lepdopteran larvae, beetles, bugs, and tangling many arthropods in their webs, thereby checking the pest populations.

Table1: Showing the checklist of spiders found in pigeon pea crop field

Sl. No	Family	Genus and species
01	Araneidae	<i>Araneus mitificus</i>
		<i>Cyclosa sp</i>
		<i>Neoscona sp</i>
02	Lycosidae	<i>Eviropa sp</i>
		<i>Hippasa agelenoides</i>
03	Oxyopidae	<i>Oxyopes javanus</i>
		<i>Oxyopes sp</i>
		<i>Peucetia viridans</i>
04	Salticidae	<i>Chrysilla valupe</i>
		<i>Phintella vittata</i>
		<i>Staelenurillus sp</i>
		<i>Telamonia dimidiata</i>
05	Tetragnathidae	<i>Tetragnatha sp</i>
		<i>Leucauge decorata</i>
06	Thomisidae	<i>Xysticus sp</i>

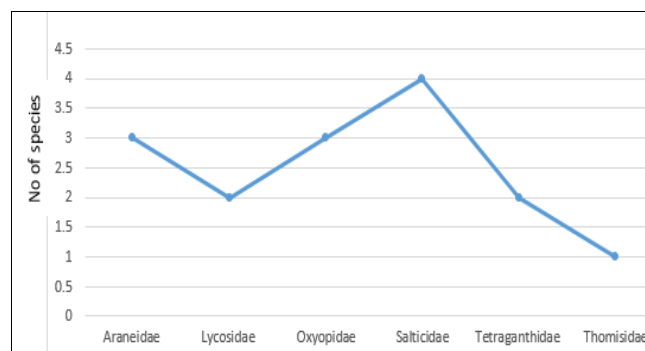


Fig 2: Showing abundance of spider species for each family

The present study reveals the presence of a diversified spider assemblage in the pigeon pea (*Cajanus cajan*) agroecosystem demonstrating that pigeon pea fields offer acceptable living environments and feeding supplies to different types of spiders. Spiders are ecologically significant in crop fields since most species are generalist predators that can prey on a wide range of insects and other arthropods. The importance of spiders as biological-control agents was highlighted by Riechert and Lockley (1984)^[13]. Spiders are particularly important natural adversaries in agricultural settings. Spiders eat a lot of arthropod prey all over the world. Nyffeler and Birkhofer (2017)^[10] estimate that the worldwide spider population consumes between 400 and 800 million metric tonnes of prey each year, with insects and collembolans making up more than 90% of the prey caught.

Conclusion

Our results empirically demonstrate that spiders are a predator group with a complex response to local factors and the surrounding landscape (Birkhofer *et al.*, 2013; Schmidt *et al.*, 2008) [3, 14], and that multiple vegetation elements and strata should be used, both at the plot scale (e.g., vegetation edges, herbaceous plants, added plants, crop density) and landscape scale (e.g., forest proximity and surface area or connectivity) to promote functionally diverse spider communities in agro landscapes. Among these families, Salticidae was observed to be the most dominant family as it contributed 4 of the total species reported.

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Conflicts of Interest

The authors have no conflict of interest for the publishing of this research.

Author's contribution

AK: Contributed to fieldwork, methodology, data collection, investigation, computational biology and writing original draft. Dr. KV: Contributed to conceptualization, project administration, supervision, writing and editing final approval.

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