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**Spider fauna diversity (Arachnida: Araneae) across various Ecosystems in the Eastern Ghats of Southern Andhra Pradesh, India.**

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**Abstract: -**

Analysing the varieties and abundance of spider fauna in various habitats was one of our main goals. With a focus on four different ecosystems, this research delves deeper into the examination of ongoing condition of various spider species in Southern Andhra Pradesh's Eastern Ghats. We carried out extensive research in a few Andhra Pradesh locations: Papikondalu (which is located in the districts of YSR and Chittoor); Rapur Ghat forest (which is located in the district of Nellore); Sri Lankamalleswara Wildlife Sanctuary (which is located in the district of YSR); and Seshachalam Biosphere Reserve Forest (which is located in the districts of YSR, Chittoor, and Nellore). According to our studies, these different ecosystems are home to the 19, 25, 31, and 41 spider families. Acknowledging the imminent effects of climate change, these studies are essential for maintaining these species as well as creating an extensive database describing the biodiversity of the spider fauna in Southern Andhra Pradesh's Eastern Ghats. For the foreseeable future, this proactive strategy seeks to address environmental dynamics and support continuing conservation efforts for the spider fauna in Southern Andhra Pradesh.

**Keywords: -** Spider diversity, Eastern Ghats, Wildlife Sanctuary, ecosystems, arthropods.

**Introduction: -**

Being a highly varied nation abundant in both plants and animals. Understanding of these species' diversity one of the most varied groups of living things is the spider family. Even though spiders are among the more prevalent and various range of organisms in India, there has never been much focus on spider studies. Due to their lack of universal appeal

and the human predisposition to favour flavourful organisms over others of equal importance, they have been largely ignored. [1]

There are about 51,930 spider species in the world today, divided into 3642 genera and 112 families [1]. There are 1520 spider species in India, which are divided into 60 families and 377 genera. Our knowledge of the richness of spiders across the wide range of Indian environments is still severely lacking. Spiders are a significant but mainly unstudied group of arthropods that control the numbers of other invertebrates and insect pests in most environments. Even though they are common, important to the ecosystem, and abundant, spiders are rarely among the species that are surveyed for in-depth research and conservation. There are 90 species of spiders in all, grouped into 14 families, according to the Gazetteer of India's General Series on Fauna for the Southern Andhra Pradesh's Eastern Ghats. Thorough understanding of the species in diverse environments is necessary for significant and long-term conservation. [2]

There is no need to emphasise the importance of insects in ecology. Because they are the only predators in the ecosystem, Insect population control is another important function of spiders. Although both spiders and insects are Arthropods, there are some notable distinctions between the two groups. Arachnids, which include spiders, have eight legs, whereas insects only have six. This is a striking distinction. The spider is an insect; it has no antennae. The primary body parts of spiders differ from those of insects as well. The cephalothorax of the spider is a single structure made up of the head and thorax without the abdomen. Arachnids make up an estimated 8.3% of all arthropods, which make up the second largest class (7%) of all known arthropods. [3]

Thus, among arthropods, arachnids are ranked second. Spiders are members of the class Arachnida and order Araneae. Primitive spiders belong to the sub-orders mesothelae and orthognatha, while the most recent spiders are found in the sub-order labidognatha. Although most spider species are poisonous, only a small number are not dangerous enough to humans. Nonetheless, research on the pharmacology of the heart and neuromuscular system benefits from the use of some spider venom. There are plenty of spiders worldwide, but very few of them pose a serious threat to humans, even in India. Spiders come in a variety of colours, matched only by insects. Additionally, spiders can act as bio control agents [4]. Spiders have gotten scant attention despite the numerous applied values discussed above. "Charismatic" animal and bird species often get the most attention when it comes to conservation initiatives, in contrast, ecologically important groups such as spiders are frequently overlooked.

Due to their jointed appendages and chitinous exoskeleton, spiders are classified as members of the class Arachnida within the phylum Arthropoda. Two bodily areas that define members of the class Arachnida are the abdomen and the cephalothorax, which is attached to four pairs of segmented legs. Arachnids are not insects; they lack antennae. A thin stalk that connects the cephalothorax and abdomen is called a pedicel, and it is this feature that distinguishes spiders from other arachnids. In other arachnids, the two body segments are united to form a single entity. Another distinctive feature of spiders is their spinnerets, which are located close to the rear end of the abdomen and are used to spin silk.

**Literature review: -**

- Palem et al., (2017) It is described in "Diversity of spider fauna (Arachnida: Araneae) in different ecosystems, Eastern Ghats, Southern Andhra Pradesh, India." South Asian Journal of Life Sciences. (2017). The goal is to investigate the variety and abundance of spider life in various environments. Furthermore, information is provided about the distribution and present state of several spider species in four Eastern Ghat ecosystems in Andhra Pradesh Southern Regions. Specifically, the Papikondalu (YSR and Chittoor district), the Rapur Ghat forest (Nellore district), the Sri Lankamalleswara Wildlife Sanctuary (YSR district), and the Seshachalam Biosphere Reserve Forest were the four ecosystems in Andhra Pradesh where the primary goals of this study were to gather baseline data on spider distribution. In these four habitats, a total of 19, 25, 31, and 41 spider families were discovered throughout the investigation. For every research site, the statistical and diversity indexes were computed. These surveys are essential for the future creation of a biodiversity database of the spider fauna of the Eastern Ghats in Southern Andhra Pradesh, as well as for the survival of these species in the face of climate change. [5]
- Singh et al.,(2021) It is explained in "Faunal diversity of spitting spiders (Scytodidae: Araneomorphae: Araneae: Arachnida) in India." World Journal of Pharmaceutical & Life Sciences (2021). It talks about the faunal diversity of India's states and union territories when it comes to spitting spiders (Araneomorphae: Scytodidae: Araneae: Arachnida). It consists of 14 spider species (of which 5 are strictly endemic) distributed across 20 states and 4 union territories, classified under 2 genera. With twelve species, Scytodes Latreille, 1804, is the largest genus in India. Records showed that in 14 Indian states and union territories, Scytodesthoracica (Latreille, 1802) is the only species that is widely distributed. Up to seven of these species have been identified in Gujarat; the remaining

six have been found in Maharashtra, five in Madhya Pradesh and Kerala, and four in Tamil Nadu. In addition, there are three identified species in each of the following states: West Bengal, Karnataka, Meghalaya, Odisha, and Haryana. Comprehensive survey research on spitting spiders needs to be started in Andhra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Jharkhand, Nagaland, Sikkim, and Telangana because these states have no recorded spider records. None of the spitting spider species found in India are on the IUCN Red List, despite their importance in preserving the health of terrestrial ecosystems and acting as insect predators. [6]

- Sharma et al.,(2020) defined in "Faunal diversity of Linyphiidae (Araneomorphae: Araneae: Arachnida) in India." *Asian Journal of Conservation Biology* 9.2 (2020): 304-314. It discusses the diversity of fauna among the Linyphiidae family of spiders. 48 species of the Linyphiidae family are endemic to India, where they are distributed across 19 states, 3 union territories, and 94 species in 39 genera. With 17 species, *Oedothorax Bertkau*, 1883. It is the largest known genus in India. With 32 species, Jammu and Kashmir has the most of these spiders, followed by Uttarakhand, West Bengal, and Kerala, each with eighteen species. Twelve linyphiid species have been found in Meghalaya in northeastern India; no species have yet been found in Arunachal Pradesh, Nagaland, or Tripura. Interestingly, important central Indian states such as Meghalaya, Bihar, Haryana, Assam, Odisha, and Tamil Nadu have very little diversity of spiders, hence extensive spider surveys are needed. The IUCN Red List of Threatened Taxa does not list any linyphiid spider species as vulnerable or endangered. These species are all found in India. Thus, in order to preserve their preservation techniques, prompt conservation action is required. [7]
- Singhet al., (2022) elucidated in "Diversity of spider fauna (Arachnida: Araneae) in different districts of Andhra Pradesh, India." *Serket* 18.3 (2022). This is a current inventory of the diversity of spiders found in Andhra Pradesh. Records or descriptions of 192 different species of spiders, categorized into 33 families and 104 genera, have been found in all 13 districts of Andhra Pradesh. With eighty species, Kurnool has the most. Chittoor has sixty, YSR district has forty, Visakhapatnam has thirty, Prakasam has thirty, Anantapur and Nellore have twenty, Guntur has nineteen, Vizianagaram has sixteen, and Srikakulam has fifteen. There are fewer species of spiders in other districts. The 10 species that were collected and data from various Andhra Pradesh districts were only categorised at the general level, and it appears that fifteen species have been wrongly named. Araneidae (29 species) is the largest family in Andhra Pradesh, with Lycosidae

(22 species) and Salticidae (23 species) following closely behind. There are less than twenty species in the remaining families, while nine are represented by a single species. To accurately document the spider fauna, thorough surveys are still required in the state's wildlife sanctuaries, residential zones, forested areas, national parks, agricultural fields, and other locations.[8]

Table .1. Comparative table summarizing the following information:

<b>Author(s) Year</b>	<b>Findings/Results</b>
<b>Palem et al., 2017</b>	Investigated the variety and abundance of spider life in Southern Andhra Pradesh's Eastern Ghats. collected baseline data on spider distribution in the Seshachalam Biosphere Reserve, Papi Kondalu Hills, Rapur Ghat Forest, and Sri Lankamalleswara Wildlife Sanctuary. 19, 25, 31, and 41 spider families have been identified, in that order. computed diversity and statistical indices.
<b>Singh et al., 2021</b>	carried out a thorough investigation into the faunal diversity of India's spitting spiders. gave a current inventory of spitting spiders, emphasising their endemism and patterns of distribution. In 20 states and 4 union territories, 14 species have been identified.
<b>Sharma et al., 2020</b>	investigated the diversity of spider species in India's Linyphiidae family. 39 genera with 94 species identified highlight the underrepresentation of central India. emphasised the importance of the family's conservation efforts.
<b>Singh et al., 2022</b>	supplied an updated list of the diversity of spiders in Andhra Pradesh. Records covering all 13 districts of Andhra Pradesh revealed 192 spider species belonging to 33 families and 104 genera. showed how different species were distributed by district, with Kurnool having the greatest number. identified potential misidentifications and species up to the generic level. The largest family is Araneidae, followed by Salticidae and Lycosidae. called for thorough documentation of the state's spider fauna through rigorous and extensive surveys conducted in a variety of habitats.

## **Research Methodology: -**

### **National Statues**

Even though there are many spiders in the country, our knowledge of Indian spiders is quite limited. Arachnologists from India have conducted research on Indian spiders after several European researchers did so in the past. In the field of Indian spiders, Stoliczka (1869) and Karsch (1873) made two of the first contributions. Numerous species from the areas of Andaman & Nicobar Islands and the Himalayas were noted by Simon (1892). Karsch (1873) and Blackwell (1867) were the first researchers on Indian spiders. Numerous species from Sri Lanka, Burma, and India were described by them. Cambridge (1869a) conducted research in Minicoy, Sri Lanka, and India. Early knowledge of the spiders of the eastern and Indian regions comes from Simon's works on the region of Asia (1892), Indochina, and the Indian region of India.

Indian spiders were described by Tikader in 1980 and 1982. Tikader (1980) wrote a book on the 115 species, 25 genera, and 2 subfamilies of Thomisid spiders found in India. Twenty-three of these were novel to science. All species were described, illustrated, and their distributions were provided. There were keys available for the genera, species, and subfamilies. Tikader discussed the general taxonomic traits in relation to the Thomisidae. With descriptions and illustrations, 99 species, 47 genera, and 15 families from Calcutta and the adjacent areas were studied by Tikader and Biswas (1981). Indian spider research was the subject of multiple investigations during the 20th century, as reported by Patel and Reddy (1989). Pocock (1895–1901) enumerated 200 species from Ceylon, Burma, and India in his work "Fauna of British India, Araneae" (Pocock, 1900a). His publication provided the first enumeration and fresh descriptions of spiders found in British India, based on specimens of spiders held at the British Museum in London. Pocok (1895), (1899a), and (1900b) have the earliest records of Oriental Mygalomorphs, new species of Indian arachnids (Pocok, 1899b, 1901), and spiders from Lakshwadeep. They have also reported on these topics, worked hard on mygalomorph and mimicking spiders, and have provided more information on Indian spiders. Tikader released the first thorough list of Indian spiders in 1987. It contained 1067 species from 249 genera in 43 families. Sinha (1951) has also produced significant contributions to the Araneidae and Lycosidae families. Tikader and Biswas (1981) and, Biswas and Biswas (1992) described spiders from West Bengal. In their primary studies of the spider fauna of Gujarat, Patel and Vyas (2001), Srinivasulu (2000), Srinivasulu et al. (2004a), (2004b), &(2008) described spiders from Maharashtra and Andhra Pradesh. Tikadereluciated a large number of species from

all over India in the families Thomisidae, Philodromidae, Lycosidae, and Araneidae between 1980 and 1982. A 10-checklist with 186 species of spiders categorized into 69 taxa and 24 families was developed by Uniyal and Hore (2006), who also described a number of new spiders' species from the Madhya Pradesh and Chattisgarh regions. An introduction to spiders also provided in Vijayalakshmi and Ahimaz's 1993 book, "Spiders: An Introduction." Very little research has been done on spiders found in India's protected areas. A Study of the Diversity and Distribution of Garden Spider Species by H.Rama Subba Reddy and N.Raja Naik (2023). There are also poisonous spiders in the Nallamala forest of Andhra Pradesh, which are belongs to Theraphosidae family like: Poecilotheria is a genus of tarantulas native to India and Sri Lanka. It was first described by Eugène Louis Simon in 1885 and Pocock, R.I. (1899). The Chilobrachys fimbriatus Pocock, R. I. (1899). Hilobrachys hardwickii (Pocock) identified by Ferdinand Anton Franz Karsch in 1892. And they all are mentioned and detailed studied by Subba Reddy, H. R. (2016).

Most of the work in the Indravati Tiger Reserve was done by Gajbe (1995a), who records 13 species. Patel (2003) recorded five species from the Kanha Tiger Reserve in Madhya Pradesh, whereas Uniyal and Hore (2006) recorded fourteen. Patel and Vyas (2001) conducted investigations on varieties in the Hingolgarh Nature Education Sanctuary in Gujarat, describing 56 species of spiders categorized into 34 genera and 18 families. Patel (2003) described the 91 species (out of 53 genera) that can be found in the Parambikulam Wildlife Sanctuary in Kerala. Uniyal and Hore (2006) discovered ten families and a total of nineteen species of spiders in Ladakh. In the cotton agro ecosystem of Guindy National Park, researchers from Chennai's Centre for Indian Knowledge System have also looked at the ecological traits of spiders. In his management plan, De (2001) included a list of 19 spider species found in the Dudhwa Tiger Reserve. Uniyal (2004) investigated the use of spiders to monitor conservation in protected areas. Spider research is carried out in agro ecosystems, primarily on coffee and rice plantations (Sebastian and Peter, 2009; Kapoor, 2008). In the Terai Conservation Area (TCA), Hore and Uniyal (2008a) examined the diversity and makeup of spider assemblages in various plant species. Spiders were studied by Hore and Uniyal (2008a) as indicator species for tracking TCA habitat conditions. Additionally, Hore and Uniyal (2008a) investigated how fire affected spider assemblages in TCA. By providing thorough lists of recently found species from West Bengal and Manipur, Biswas and Biswas (2004) considerably boosted the diversity of spider species. While Biswas and Biswas (2004) reported 127 species of spiders from Uttarakhand state,

belonging to 49 genera under 17 families, Siliwal et al. (2005) created an updated checklist of Indian spiders and offered a taxonomic re-evaluation of identified species. In addition to providing a taxonomic reevaluation of described species and an updated inventory of Indian spiders, Siliwal et al. (2005) listed 1442 species that were found in the Indian Region and belonged to 361 genera and 59 families. 1002 species were unique to the Indian subcontinent out of the total number. Sebastian and Peter (2009) included details on 1520 species that are members of 361 genera and 61 families in their book "Spiders of India." The available data is far from complete, particularly from the Southern and sub-Tirumala foothill regions of India's Eastern Ghats. In the Eastern and Western Ghats, less is known about the variety and distribution of spiders in comparison to other locations. Consequently, research on the variety of spider species in the Eastern and Western Ghats is desperately needed, especially in the nation's higher altitude regions.

### Identification

Stereo zoom microscopes were used to observe spiders in order to study identification keys. [9]

### Design of Experiments and Sampling Techniques

Work on the Spider Inventory was done throughout Andhra Pradesh. India.

Table 2: The spider inventory studies were carried out at four Andhra Pradesh locations between January and December of 2022.

Study Sites	Geographical Location	Habitat type
Wildlife Sanctuary Sri Lankamalleswara (district of YSR)	17°50' - 17°55' N and 81°05' - 88°80' E	One uncommon species of bird is the Jerdon's Courser ( <i>Rhinoptilus bitorquatus</i> ) and endangered insects make Sri Lankamalleswara Wildlife Sanctuary their home.
Rapur Gat Forest (district of Nellore)	16°19' N -78°.50' E	The Rapur Gat forest is a group of hills in the Andhra Pradesh, a state in southern India that are a part of the Eastern Ghats. moist forests in the tropics and subtropics



Papikondalu hills in the district of YSR	15°22' - 13.41° N and 76°45' - 80.90° E	The Palkonda Hills are a group of hills in the state of Andhra Pradesh, southern India, that are a part of the Eastern Ghats. A superb combination of the dry mixed deciduous tropical southern types
The Biosphere Reserve of Seshachalam	13°50' - 13°52' N and 78°04' - 80°22' E	The Southern Eastern Ghats of the districts of Chittoor and YSR contain Seshachalam Hills, the state's first Biosphere Reserve. It is dispersed across 4755.99 km. The characteristic vegetation type 2 is made up of the mixed deciduous tropical southern types.
Nallamala Forest Region of Nandyala District	15020'-16031' N and 78030'- 80010' E	Nallamala is a group of low hill ranges in the central part of Eastern Ghats. The vegetation is typically of southern tropical dry deciduous and southern tropical moist deciduous forest types intermingled with shrub.

**The following standard sampling procedures were used to gather the spiders:**

- 1. Beating sheets:** Using a regular stick, woody shrubs and trees were beaten to release spiders that were then gathered on a sheet. In every quadrat, ten beats were used for each tree or shrub.
- 2. Sweep netting:** A standardised insect-collecting net was used to gather spiders from vegetation consisting of herbaceous shrubs and small trees.
- 3. Both manual selection and active searching:** This method was used to collect spiders from each of the strata. Using this strategy, spiders actively examined each quadrat for specimens hidden beneath rocks, logs, trash on the ground, loose dead tree bark, etc.

## Collection

The fauna of foliage spiders was gathered from plantations in forests. There were 2 methods available: jarring & direct hand picking; Here, just the direct hand-picking technique is applied.

Hand Picking Directly: - Most species that form webs were gathered in the early hours of the day. Weavers were not the only spiders that were manually removed from plants.

## Identification and Preservation of Specimens:

Dead specimens that had been collected (Table 3) were placed in 70% alcohol for identification at a later time. It was only possible to accurately identify the family, genus, and species level using the adult specimen. The 30 genitalia play a major role in the spider's identification. Because sexual characters are required for species level identification, it was deemed impracticable to identify immature spiders to the species level [10]. Additionally, morphometric characteristics of different body parts were used for identification and classification. Crucial traits including having a few pairs of book lungs, having paraxial or diaxial chelicerae, having either two or three claws, and having a cribellum or not were also utilized to identify the species. Based on the numerous keys and catalogues supplied by [1], [9], [11], and other pertinent literatures, a thorough taxonomic analysis was conducted.

**Size:** Spider sizes vary widely from species to species. With a body length of less than 0.37 mm (0.015 in), the Colombian Patudigua is the tiniest species. With body lengths of up to 91 mm (3.8 in) and limb spans of up to 255 mm (10.5 in), tarantulas are the largest and heaviest spider species.

Table 3: A comprehensive list of all spider observations made in ecosystems

Family	Scientific name	Guild
Araneidae	<i>Araneus bilunifer</i>	Orb-web constructors
	<i>Argiope anasuja</i>	Orb-web constructors
	<i>Argiope aemula</i>	Orb-web constructors
	<i>Argiope pulchella</i>	Orb-web constructors
	<i>Neoscona mokerjei</i>	Orb-web constructors
	<i>Neoscona theis</i>	Orb-web constructors
	<i>Cyclosa confrega</i>	Orb-web constructors
	<i>Cyrtophora citricola</i>	Orb-web constructors
	<i>Zygilla sp.</i>	Orb-web constructors

	<i>Neoscona nautical</i>	Orb-web constructors
<b>Clubionidae</b>	<i>Stegodyphus socialis</i>	Sheet-web
	<i>Chiracanthium saraswatii</i>	Ground runners
<b>Eresidae</b>	<i>Stegodyphus pacificus</i>	Sheet-web
<b>Gnaphosidae</b>	<i>Drassodespar videns</i>	Ground runners
<b>Sparassidae</b>	<i>Lycosa poonaensis</i>	Ground Hunter
<b>Lycosidae</b>	<i>Pardosa biramanica</i>	Ground runners
	<i>Hippasa pisaurina</i>	Ground Weaver
<b>Oxyopidae</b>	<i>Pholcus phalangioides</i>	Scattered line weavers
	<i>Oxyopes sp.</i>	Stalkers
<b>Pholcidae</b>	<i>Crossopriza layoni</i>	Scattered line weavers
	<i>Artema Atlanta</i>	Scattered line weavers
<b>Pisauridae</b>	<i>Pisaura sp.</i>	Ambushers
<b>Salticidae</b>	<i>Plexyppus payakullii</i>	Stalkers
	<i>Marpissa decorata</i>	Stalkers
	<i>Tetragnath listeri</i>	Orb-web constructors
<b>Tetragnathidae</b>	<i>Tetragnatha mandibulata</i>	Orb-web constructors
	<i>Tetragnath listeri</i>	Orb-web constructors
	<i>Leucauge decorate</i>	Orb-web constructors
<b>Therididae</b>	<i>Theridion tikaderi</i>	Ground runners
	<i>Cyllognatha surajbae</i>	Ground runners
<b>Thomisidae</b>	<i>Camaricus sp.</i>	Ambushers
	<i>Thomisus sp.</i>	Ambushers
<b>Uloboridae</b>	<i>Uloborus donolius</i>	Ground runners
	<i>Uloborus sp.</i>	Ground runners
<b>Theraphosidae</b>	<i>Poicelotheria regalis</i>	Megalomorphe spiders
	<i>Poicelotheria nallamalensis</i>	Megalomorphe spiders

### Silk Production

The only appendages on the abdomen are modified pairs of short, movable spinnerets that emit silk, ranging from one to four (usually three). Many spigots that were each attached to a single silk gland can be found on each spinneret. At least six different kinds of silk glands exist, and they all produce distinct kinds of silk. The main protein component of

silk and that of insect silk were quite comparable. Instead of being exposed to oxygen, the drawing out process changes the protein's structural structure, turning it from a liquid to a hard substance. It is far more elastic than nylon, which can only stretch so far before breaking or losing its shape. It is similar to biological materials like chitin and collagen in terms of tensile strength. Silk is used in many ways even by non web-building species: it can be used as a "safety rope," to build nests, as sperm and fertilized egg wraps, or even by the young of some species as "parachutes."

### **Coloration**

While other pigments have been found but not yet identified, In spiders, only three types of pigment have been identified: guanine, bilins, and osteochromes. It appears that there are no melanins, carotenoids, or pterins, which are highly prevalent in other animals. In several species, tanning changed the legs' and prosoma's exocuticle, making them brown. For instance, *Micrommata virescent* gets its green colour from the presence of bilins. *Araneus diadematus*, a European garden spider, has white markings that are caused by guanine. It was gathered in specialised cells known as granulocytes in numerous species. *Argyrodes*, *Tetragnatha*, *Leucauge*, and *Theridiosoma* are among the taxa whose silvery appearance is attributed to guanine. Although guanine is a by-product of protein metabolism, spiders have the ability to block its excretion, which increases the amount of guanine stored. Certain species exhibit structural colours as a result of light being diffraction, scattered, or interfered with—for instance, by scales or altered setae. *Argiope*'s white prosoma is caused by light-reflecting hairs; similarly, modified cuticle regions on *Josa* and *Lycosa* serve as light reflectors.

### **Life Cycle and Reproduction**

Spiders are a sexual species that reproduce sexually. Fertilisation occurs internally but indirectly, meaning that the sperm enters the female's body through an intermediary stage rather than the male genitalia. Unless the male is so much smaller than the female that he is not worth eating, spiders typically use complex courtship rituals to prevent the enormous females from devouring the tiny males before fertilisation. While many actively hunting spider species place more importance on patterns of touches on the female's body, web-weaving species' rituals depend on precise patterns of vibrations on the web. For jumping spiders, the male's motions and dances are crucial. Up to 3,000 eggs can be laid by females in one or more silk egg sacs, which keep their humidity level fairly constant. While females of few species carry the sacs in their chelicerae, attach them to their webs, conceal them in nests, or attach them to their spinnerets and drag them along,

other species' females use different strategies to safeguard the sacs. Within the egg, young spiders go through all of their larval stages before emerging as tiny, sexually immature spider-lings that resemble adult spiders in shape. Spiders' cuticle, or "skin," is unable to stretch, so they must molt in order to grow like other arthropods. In While some tarantulas can survive over 20 years in captivity, most spiders only live one to two years.

### **Spider Web Types**

In the wild, spiders can make a few different kinds of webs, and the webs they weave help to classify many different types of spiders. There are many distinct types of spider webs, including: Funnel webs: with classifications separated into modern and primitive.

- Spiral orb webs: mostly connected to the Tetragnathidae, Uloboridae, and Araneidae families.
- Tangle webs or cobwebs: allied with the Theridiidae family.
- Tubular webs: which run along the ground or up the bases of trees.
- Sheet webs: Depending on the kind of spider, a variety of silks, such as "sticky" and "fluffy" capture silks, can be used to construct webs. Webs can be positioned vertically (for most orb webs) or horizontally (for sheet webs) at any angle.

### **The function of spiders in ecosystems**

Although they are a little-studied group of arthropods, arachnids are significant because they control the population dynamics of other invertebrates in most ecosystems. Spider populations range from 60,000 to 170,000 species, with 42,055 described species worldwide. Among the most common groups of terrestrial macro invertebrate predators, they make up a significant fraction of the diversity of arthropods on land. (35–95%). [1],[2],[9].

They occupy a variety of temporal and spatial niches, respond to environmental change in taxa and guilds, and are extremely sensitive to even slight alterations in the structure of their habitat, particularly in terms of vegetation complexity and microclimate features. Furthermore, there are strong connections between species that capture prey without the usage of webs and plant architecture. Spider behaviour is distinctly impacted by variations in the litter's depth, structural complexity, and nutrient content. They use an astounding array of predation techniques. Since they are all-around predators, their capacity to reduce pest populations in agro ecosystems makes them extremely valuable to humanity economically. In agricultural fields, spider communities can have densities and species abundances comparable to those found in natural ecosystems. [12]

By controlling the number of decomposers in an ecosystem, spiders affect how well it functions. Due to their high biomass, they are also an essential resource for birds, small mammals, and larger forest predators like salamanders. Spiders are easily identifiable and respond differently to natural and man-made disturbances, making them useful biological indicators for evaluating the "health" of an ecosystem. A species must satisfy four main requirements in order to be considered an effective ecological indicator: it must be functionally significant, feasible and affordable to sample, able to respond to disturbances consistently, and easily and reliably identifiable. Spiders easily satisfy the first three requirements. They make for an excellent means of monitoring site variations due to their great relative abundance, ease of collection, & variety of choices for habitats and feeding strategies. [13]

### **Dangers and Preservation**

The effects of anthropogenic factors on the diversity of spiders are widely known. Spider populations are significantly impacted by a number of factors, such as pollution, pesticides, grazing practices, habitat loss and degradation, and habitat fragmentation. Through predation or habitat degradation, introduced exotic species pose a direct threat to spider populations. Collection for the pet trade has an additional effect on certain larger species. Spiders receive little attention from major conservation researchers and activists. The scientific community has paid little attention to spiders despite their high diversity, known ecological role in numerous ecosystems, and threats. The general disdain that the public has for spiders and the dearth of knowledge regarding their status and range contributed to this lack of attention. Furthermore, the majority of checklists omit the most important and practical habitat association information. These kinds of data are scarce for a large number of spider species, particularly those with mysterious habits. However, since these species may have special ecological needs or call for specific site selection and management procedures, it was crucial that they be included in conservation planning efforts. In order to preserve spider biodiversity and create more effective land management plans, it is imperative to comprehend the patterns of spider diversity at an appropriate regional scale. [14].

### **Justification of Study**

Southern Andhra Pradesh's Eastern Ghats have a diverse range of spider species (Table 3, Figure 1), but effective conservation has been hampered by a lack of taxonomic knowledge. In Southern Andhra Pradesh's Eastern Ghats Seshachalam Biosphere Reserve, not many thorough studies on spiders have been done. Therefore, it was

imperative to conserve spiders on a suitable regional scale. It has been suggested that the current study describe the biodiversity of spiders in Seshachalam Biosphere Reserve, taking into account their role in the ecosystem. Protecting spider biodiversity is also made clear by documenting species verities and emphasizing rare or endemic species found in Biosphere Reserves. An improved understanding of the biodiversity of Seshachalam spiders will result from this methodical approach, it will also facilitate the development of improvised long-term ecological monitoring systems that are able to pick up even the smallest environmental changes brought on by consumption, activity, and climate change.

## Spiders of Andhra Pradesh



1. *Hyllus semicupreus*



2. *Scytodes thoracica*



3. *Poecilotheria regalis*



4. *Aculeperia ceropegia*



5. *Poecilotheria nallamalensis*



6. *Poecilotheria metallica*



7. *Oxyopes kohensis*



8. *Nephila pilipes*

**Figure 1: Here are a few instances of Andhra Pradesh's spider fauna from various Indian and international spider families.**

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## **Conclusion: -**

In Southern Andhra Pradesh's Eastern Ghats, we investigate the diversity of spiders in three different ecosystems. The percentages of spider families found in the Rapur Ghat forest, the Papikondalu hills, and the Sri Lankamalleswara Wildlife Sanctuary indicate that the latter is a hotspot relative to the Indian mainland. In comparison to previous reports, this study identifies eighteen new families of spiders, of which Nephilidae is the only family found in the Sri Lankamalleswara Wildlife Sanctuary.

A significant 53.33% of spider families were recorded during a comparatively short one-year inventory, highlighting the necessity for in-depth, prolonged research to fully comprehend spider diversity in the Eastern Ghats. The Southern Tropical Thorn Forest's greater diversity of spider families highlights the forest's ecological importance, especially in light of the increasing anthropogenic disruptions to other ecosystems. Our study highlights the importance of protecting these ecosystems by advocating for a Biological Monitoring Programme (BMP) that uses spiders, acknowledging them as bio-indicators and contributors to insect pest control.

Our study serves as the foundation for a spider database, which is essential to comprehending the variety and distribution of spider species in the Eastern Ghats. Recognising their critical role in preserving ecological balance, we hope to support sustainable management techniques and biodiversity conservation in these important ecosystems as we carry out our initiatives.

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