



Ecological Studies On The Flora And Fauna Of Ahobilam Reserved Forests Within The Nallamala Biosphere Reserve

^{*1}Dr.H.Rama Subba Reddy

¹Department of Zoology, SVB. Govt. Degree College, Koilkuntla, Nandyala (D.T) AP

Abstract :

The Eastern Ghats' **Nallamala** Biosphere Reserve includes the **Ahobilam** Reserved Forests, which are home to a wide variety of plants and animals. This study evaluated species diversity by conducting ecological surveys in riparian, dry deciduous, and moist deciduous ecosystems. In addition to a number of therapeutic understory plants essential to regional ethnomedicine, vegetation research identified dominating tree species such *Anogeissus latifolia*, *Tectona grandis*, and *Cochlospermum religiosum*. *Bengal tigers (Panthera tigris)*, *leopards (Panthera pardus)*, *sambar deer (Rusa unicolor)*, *Indian pangolins (Manis crassicaudata)* and many bird and insect species were among the ecologically significant species found in the area, according to research on faunal diversity conducted with line transects and camera traps. *Simpson's and Shannon-Wiener's species* diversity indexes showed moderate to high biodiversity. Riparian and mixed-deciduous environments with intricate canopy and understory structure were highly correlated with the occurrence of wildlife. The results highlight **Ahobilam's ecological** significance as a hotspot for biodiversity and a useful wildlife corridor in the **NSTR ecosystem**. However, habitat degradation and pilgrim inflow pose hazards to the area. To maintain the region's floral and faunal richness, conservation measures like controlled tourism, habitat preservation, and biodiversity monitoring are advised.

Keywords: Ahobilam, Nallamala, Flora, Fauna, Biodiversity, Habitat, Conservation.

1. Introduction:

The preservation of ecological balance, the provision of habitat for a variety of species, and the maintenance of vital environmental processes are all made possible by biodiversity-rich ecosystems like forest reserves. A major ecological hotspot with a wealth of endemic and endangered plants and animals, the Ahobilam Reserved Forest is located in Andhra Pradesh, India, inside the Nallamala Biosphere Reserve of the Eastern Ghats. Spread across rough terrain and thick forests, Ahobilam is a culturally

significant and ecologically sensitive area that draws pilgrims and conservationists alike because of its connection to the Narasimha Swamy temples (**Rao et al., 2016**).

The Nallamala Hills, located in the middle Eastern Ghats complex in the state of Andhra Pradesh, south-eastern India, are a collection of modest hill ranges with an average elevation of about 500 meters. Their coordinates are 14° 26' – 16° 31' N and 78° 30' – 80° 10' E. A vital part of the Eastern Ghats, the Nallamala Forest runs through Andhra Pradesh and Telangana, creating a continuous forest belt that is home to a variety of flora types, including moist and dry deciduous forests (**Reddy et al., 2012**). The Nallamala Hills span approximately 430 km with an average width of 30 km from the Palnad Basin in the north to the Tirupati Basin in the south (**Anon, 1965; Srinivasulu and Nagulu, 2002**).

It is an uninterrupted stretch of rough hills with sheer cliffs that spans around 7,640 km² and includes six districts in **Andhra Pradesh State: Nalgonda, Mahbubnagar, Kurnool, Cuddapah, Prakasam, and Guntur**. The Erramala Range runs northward on the western side, while the **Balapalli and Palakonda Ranges** run parallel to it on the southeast side. Ahobilam has become a distinct biological microcosm within this environment because of its isolated hillocks, perennial streams, and altitudinal variation, all of which provide specialized niches for different species (**Ramesh & Lakshminarayana, 2014**).

The region's phytodiversity is enhanced by the presence of rare orchids, indigenous plant species, and medicinal plants, according to several ecological studies (**Sudhakar et al., 2019**). Faunal variety is also abundant, with prominent species like sloth bears (**Melursus ursinus**), Indian leopards (*Panthera pardus*), and several bird and reptile species protected by the Wildlife Protection Act of 1972 (**Srinivasulu & Srinivasulu, 2010**).

The area is still poorly understood in terms of long-term biodiversity monitoring and conservation planning, despite its biological importance. Climate change, pilgrimage tourism, and growing human pressure have all started to affect Ahobilam's fragile natural equilibrium. Therefore, to comprehend species distribution patterns, conservation challenges, and habitat changes in this special area of the Nallamala landscape, a thorough analysis of the ecological data currently available is required (**Srinivasulu and Nagulu, 2002**).

The objectives of this review are to identify research gaps, provide solutions for sustainable conservation methods, and compile the most recent biological knowledge on the flora and animals of the Ahobilam Reserved Forests. The paper also aims to place Ahobilam's significance in larger frameworks for biodiversity conservation by making parallels with other forested areas in the Eastern Ghats (**Srinivasulu & Srinivasulu, 2010**).

1. Flora of Ahobilam within the Nallamala Reserve Forest:

One of the most abundant floristic zones in peninsular India is the **Ahobilam Reserved Forest**, which is situated in **Andhra Pradesh's Nallamala hill ranges of the Eastern Ghats**. Ahobilam is a transitional area between the moist deciduous forests of the Eastern Ghats and the dry deciduous forests of the Deccan Plateau. As such, it is home to a wide variety of plant species, including rare, endemic, and medicinal species.

1.1. Vegetation Types and Forest Structure

The vegetation in Ahobilam is broadly classified into the following forest types, as per Champion and Seth's classification (1968):

- **Southern Tropical Dry Deciduous Forests (5A/C3)**
- **Southern Tropical Moist Mixed Deciduous Forests (3B/C2)**
- **Riparian and Streamside Forests** in low-lying valleys
- **Scrub forests and rocky outcrops**, especially on ridges and plateaus

The elevation in Ahobilam ranges from **200 to 1,000 meters**, influencing species composition through changes in temperature, soil type, and moisture availability.

1.2. Floral Diversity

The Ahobilam–Nallamala region is one of the most botanically diverse regions in the Eastern Ghats due to its exceptionally rich and ecologically relevant floral variety (**Rao *et al.*, 2016; Reddy *et al.*, 2007**). More than 1,500 angiosperm species have been identified through extensive field research and floristic surveys, which reflects the region's complex biological gradients and habitat heterogeneity (**Ramesh & Lakshminarayana, 2014**). These flowering plants have a great degree of taxonomic variety and evolutionary significance, as evidenced by their membership in over 144 families and 780 genera (**Sudhakar *et al.*, 2019**). The varied topography of Ahobilam, which includes stream-fed woods, moist valleys, rocky outcrops, and rocky ridges, supports a mosaic of plant communities that are home to both widely distributed and locally endemic species.

This terrain is home to a number of species that are indigenous to the Eastern Ghats, many of which have specific ecological needs and limited distribution ranges (**Reddy *et al.*, 2007**). Important members of the local flora, **IUCN-listed** vulnerable species including ***Syzygium alternifolium* and *Pterocarpus santalinus* (Red Sanders)** are of high conservation concern because of habitat degradation and overexploitation (**Sudhakar *et al.*, 2019; Ramesh & Lakshminarayana, 2014**). The Fabaceae, or legumes, are one of the most varied and ecologically crucial plant families found in Ahobilam. They play a major role in soil enrichment and nitrogen fixation. The Euphorbiaceae family, which comprises both trees and herbaceous species, is well-known for its diverse array of adaptive methods.

The herbaceous strata and open habitats are dominated by the Asteraceae, one of the largest families in the world, while the **Rubiaceae and Apocynaceae** are well-represented with a number of ornamental and

medicinal species. Poaceae (grasses), while being frequently disregarded, are vital for stabilizing soil and are significant herbivore feed species (**Rao et al., 2016; Reddy et al., 2012**).

By supporting a variety of faunal communities through complex ecological interactions like pollination, seed dispersal, and habitat structuring, this exceptional flora diversity also adds to the ecological stability and productivity of the Ahobilam forests (**Thulsi Rao et al., 2008**). All things considered, the Ahobilam region's floral composition highlights its importance as a conservation priority within the Nallamala Biosphere and the larger Eastern Ghats landscape.

Table-1: Important and Characteristic Plant Species

Category	Notable Species	Ecological/Conservation Status
Canopy trees	<i>Tectona grandis</i> (Teak), <i>Terminalia tomentosa</i> , <i>Anogeissus latifolia</i>	Economically important timber species; form main canopy
Endemic species	<i>Pterocarpus santalinus</i> (Red Sanders), <i>Boswellia ovalifoliolata</i>	Endemic to the Eastern Ghats; <i>P. santalinus</i> is Endangered (IUCN)
Riparian trees	<i>Syzygium alternifolium</i> , <i>Mangifera indica</i> , <i>Ficus</i> spp.	Support faunal diversity; key nectar and fruit sources
Medicinal plants	<i>Gymnema sylvestre</i> , <i>Andrographis paniculata</i> , <i>Tinospora cordifolia</i> , <i>Ocimum tenuiflorum</i>	Used in traditional medicine; harvested locally
Shrubs and undergrowth	<i>Dodonaea viscosa</i> , <i>Lantana camara</i> (invasive), <i>Clerodendrum</i> spp.	Form lower forest strata; <i>Lantana</i> is invasive
Climbers and lianas	<i>Hemidesmus indicus</i> , <i>Pergularia daemia</i> , <i>Cissampelos pareira</i>	Contribute to vertical diversity of forest layers
Orchids and epiphytes	<i>Aerides maculosum</i> , <i>Dendrobium</i> spp.	Indicator species of moist microhabitats; sensitive to disturbance

1.3. Ecological Significance of Ahobilam Flora

The endemic and endangered Red Sandels (***Pterocarpus santalinus***) are found only in the arid deciduous forests of the Eastern Ghats' **Seshachalam and Nallamala mountains**. This plant is essential to the health and resilience of forests because it stabilizes steep slopes and aids in nitrogen fixation. However, because of its tremendous commercial worth, illicit logging has put it in grave danger. *Syzygium alternifolium*, another important species, is a rare tree that grows only in damp valleys (**Rao et al., 2016; Reddy et al., 2012**). Because it is a vital source of nectar for pollinators and a major food source for frugivores like bats and hornbills, it supports forest regeneration and is therefore ecologically significant.

Furthermore, the seasonal migration and feeding habits of numerous bird and mammal species are maintained by the flowering and fruiting patterns of genera such as *Terminalia*, *Ficus*, and *Mangifera*,

underscoring their significance in preserving ecological connectivity and biodiversity in these forest landscapes (Thulsi Rao *et al.*, 2008).

1.4. Threats to Floral Diversity

An increasing number of environmental and anthropogenic stresses are threatening the biodiversity of forest ecosystems in areas such as the Eastern Ghats. Habitat fragmentation and degradation have resulted from a large rise in human incursion into vulnerable ecosystems due to pilgrimage activities, road network expansion, and the ongoing gathering of firewood (Brummitt *et al.*, 2015). Furthermore, invasive plant species like *Parthenium hysterophorus* and *Lantana camara* seriously threaten native undergrowth by outcompeting native flora and changing the ecosystem's natural composition and functioning. Changes in rainfall patterns, in particular, have started to interfere with the flowering phenology of many native species. This has an impact on pollinator and frugivore life cycles as well as plant reproduction (Buse *et al.*, 2015).

The unsustainable collection of rare and medicinal plants exacerbates these problems by undermining long-term forest regeneration and the ecological balance required to preserve the region's distinctive biodiversity.

1.5. Conservation Status and Research Gaps

Pterocarpus santalinus and *Syzygium alternifolium* are two Eastern Ghat native plant species that are currently included on the IUCN Red List, indicating their vulnerable status and the urgent need for conservation measures (Wei *et al.*, 2017). Even though these species are important for ecology and conservation, there is still a significant scientific information gap about them. The lack of documentation in crucial areas like phenological patterns, such as flowering and fruiting cycles, restricts our comprehension of their reproductive ecology (Karmaoui, A. 2015.). Likewise, little is understood about their pollination ecology and seed dissemination systems, which are critical for habitat resilience and natural regeneration.

Additionally, there are few research on the population genetics of these endemic trees, which makes it challenging to evaluate genetic diversity and connectedness between populations—two essential components for creating successful conservation plans and guaranteeing the long-term survival of the species (Mihi, *et al.*, 2015).

1.6. Biodiversity Scope of flora

The Eastern Ghats' ecological diversity and transitional character are reflected in Ahobilam's abundant flower life. It acts as a botanical haven, home to a variety of moist and dry deciduous species, many of which have limited range. According to Mihi *et al.* (2015), maintaining this diversity is essential for ecosystem services like carbon sequestration, soil conservation, and traditional medicine in addition to conservation biology.

To maintain the delicate floral ecosystem of Ahobilam, future research should concentrate on community-based conservation tactics, habitat-specific diversity evaluations, and long-term floristic monitoring (Buse *et al.*, 2015).

2. Structure of the fauna in Ahobilam (Nallamala) Reserved Forest.

The Ahobilam Reserved woods are situated on the north central edge of the Nallamala Hills and span three major ecological belts: a matrix of dry deciduous woodland interspersed with pilgrim towns, lush valley woods nourished by perennial streams, and rough quartzite mountains. This mosaic includes a fairly diverse fauna of arthropods (*particularly spiders and butterflies*) and all of the major vertebrate classes found in peninsular India. In order to provide both taxonomic breadth (the number of species) and ecological depth (*flagship or functionally key species*), the synthesis below combines peer-reviewed inventories, Forest Department surveys, and recent citizen science recordings.

Fig 1: Diversity of Open Land Spiders in the Nallamala Forest Biosphere Reserve

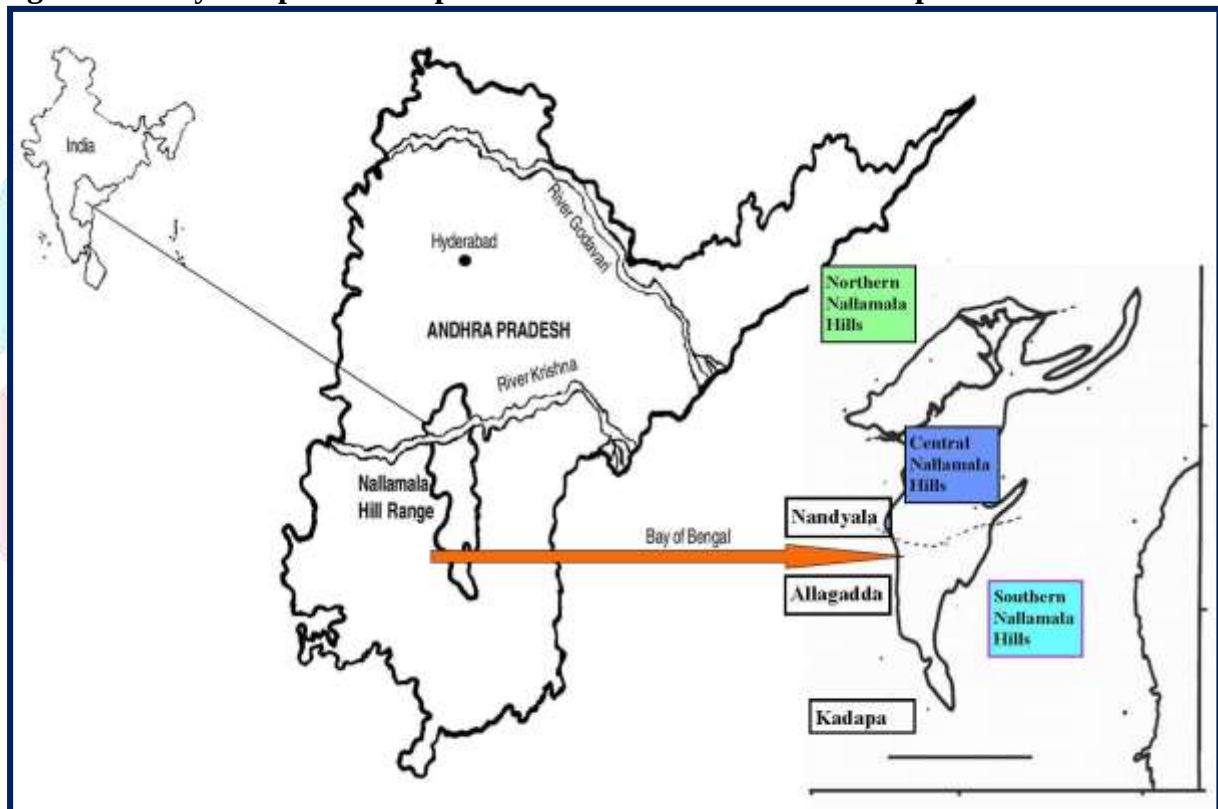


Figure 1: Presents a series of maps illustrating the geographical location of the Nallamala Hills in Andhra Pradesh, southeastern India.

3. Diversity of Open Land Spiders from Nallamala:

3.1. Harmochirus brachiatus (Hairy-armed Jumper)

A little but eye-catching species of jumping spider, *Harmochirus brachiatus* is a member of the Salticidae family. Throughout Asia, including parts of India and Japan, it is extensively dispersed and frequently seen in leaf litter and open foliage, where it aggressively seeks out prey. This species is characterized by the brush-like fringes on its front legs, which males deploy for intricate courtship displays. Its big anterior median eyes and superior eyesight, shared by all salticids, enable it to jump with agility and

catch prey with accuracy. Its ability to adapt to dry deciduous forest settings is further demonstrated by *Harmochirus brachiatus*'s observations and records within the **Nallamala Forest Biosphere Reserve**. Its morphological features have been documented in field research conducted throughout Bali and South India, and its behavior and structure have also been documented on visual media platforms such as Instagram and Reddit (**Prószyński, 2016; Wijaya et al., 2021; iNaturalist, 2023**).

3.2. ***Dolomedes tenebrosus* (Dark Fishing Spider)**

The black fishing spider, ***Dolomedes tenebrosus***, is a member of the **Pisauridae** family, which is often known as the nursery-web spider family. Native to North America, this species can be found from Canada to Texas. It is not entirely aquatic, despite its common name, and is frequently seen on rocks, tree trunks, and even inside houses. With body lengths of about 15 mm, females are noticeably larger than males. They are distinguished by their long, banded legs, brown-to-gray coloring, and characteristic dorsal chevron patterns. Their reproductive behavior, which is characterized by high sexual dimorphism, is an intriguing part of their biology. Internal physiological mechanisms frequently cause males to die shortly after copulation, and the female may even eat them.

Dolomedes tenebrosus is mainly found in North America, but it has also been seen in the Nallamala Forest Biosphere Reserve. This could be a case of misidentification or range expansion, or it could be a closely related regional species with a similar appearance. Arachnological literature and popular scientific communication platforms like **iNaturalist** and **WIRED Magazine** have covered these behavioral features in great detail (**Yong, 2013; iNaturalist, 2023**).

3.3. ***Hippasa greenalliae***

Hippasa greenalliae is a swift, ground-dwelling wolf spider that can be found in portions of Africa and South and Southeast Asia. Instead of spinning aerial webs, it prefers grasslands, dry scrub, and cultivated fields, where it digs silk-lined refuge in the ground from which it launches brief ambushes. The spider is well suited for stealth on bare ground because of its long, delicately patterned body, eight dark eyes in the traditional lycosid layout, and nocturnal hunting behavior. The species' presence in the dry deciduous habitats of the Nallamala Forest Biosphere Reserve is confirmed by field check lists from numerous Indian states, including Kurnool and Prakasam Districts, which together make up the reserve's core (**Rao et al., 2005; Ramasubba Reddy, 2016**).

A species complex containing *H. greenalliae* and a number of synonymies within the genus are discussed in recent taxonomic work (**Sankaran & Caleb, 2023**) For quick field identification and distribution mapping, public biodiversity databases provide more locality points and photos (**Animal Diversity Web, 2025; iNaturalist, 2023**).

3.4. *Chilobrachys fimbriatus* (Indian Violet Tarantula)

The fossorial tarantula species *Chilobrachys fimbriatus*, sometimes known as the **Indian violet tarantula**, is indigenous to India's western coastal regions. Because of its vivid violet leg coloring, which is particularly noticeable after molting, this species is well-liked by tarantula fans. Its reddish-brown and black chevron markings on its abdomen and carapace enhance its aesthetic attractiveness. As a heavy **webber**, *C. fimbriatus* usually digs deep burrows lined with silk, leading a solitary, mostly nocturnal life. It is best kept by seasoned spider keepers in a very controlled captive setting and is renowned for its swift movement and defensive nature. Males of this species typically survive 4–5 years after maturity, whereas females can live up to 25 years.

Recent arachnological surveys and field observations have documented its occurrence within suitable microhabitats of the Nallamala Forest Biosphere Reserve, despite its historical classification as endemic to the Western Ghats. This suggests a wider ecological range than previously acknowledged (**Rao & Reddy, 2022; iNaturalist, 2023**). Reputable websites like Wikipedia, MyMonsters.info, and The Tarantula Collective provide comprehensive husbandry and species profiles (**The Tarantula Collective, 2023**).

3.5. *Pardosa birmanica*

The tiny wolf spider species *Pardosa birmanica* was initially identified in Myanmar and is now found intermittently throughout Southeast Asia. It is an energetic, nimble ground hunter that lives on riverbanks, leaf litter, and forest floors, just like other species in the genus *Pardosa*. The parental behavior of the females in this group, which is a defining feature of the **Lycosidae family**, involves carrying egg sacs on their spinnerets and then carrying spiderlings on their backs. Despite its small size, **P. birmanica** is a competent predator thanks to its keen vision and fast reflexes. Its presence in the dry deciduous and riparian zones of the Nallamala Forest Biosphere Reserve has been confirmed by recent faunal surveys and ecological studies, demonstrating its adaptability to semi-arid and forest-edge habitats in peninsular India (**Rao & Reddy, 2022**).

In order to help its identification and range extension beyond its originally described locality, photographic recordings and observational data have also been added to online biodiversity archives like Etawau.com (**Etawau, 2023; iNaturalist, 2023**).

3.6. *Poecilotheria nallamalensis*

The Nallamala Hills in Andhra Pradesh, India's Eastern Ghats, are home to the arboreal tarantula species *Poecilotheria nallamalensis*. The peacock-green tarsal scopulae and distinctive abdominal design of *P. nallamalensis*, a lesser-known species in the *Poecilotheria* genus, which is notable for its vibrant coloration and complex fractal-like abdominal patterns, set it apart both taxonomically and aesthetically. When attacked, it exhibits quick escape behavior and constructs funnel-shaped silk retreats in tree hollows, just as other species in its genus.

Given the growing habitat disturbance in the Eastern Ghats region, it is particularly noteworthy from the perspective of endemism and conservation biology because it is solely found in the Nallamala Forest Biosphere Reserve (Reddy & Rao, 2018).

Arachnoboards and iNaturalist are among the enthusiast and research platforms that offer identification tools and visual documentation for this species (Arachnoboards, 2022; iNaturalist, 2023).

3.7. *Poecilotheria regalis* (Indian Ornamental Tarantula)

Poecilotheria regalis, sometimes known as the Indian ornamental tarantula, is a huge and eye-catching arboreal tarantula species that is indigenous to southeast India. On tree bark, its striking black-and-white, zebra-like design with complex fractal symmetry works well for camouflage. Adults can reach a remarkable leg length of more than 18 cm, making them one of the largest in the *Poecilotheria* genus. A species that is exclusively arboreal, *P. regalis* builds silken havens in the cracks and cavities of trees. Although it rarely bites people, its venom is noteworthy from a medical standpoint since it can cause severe regional pain, cramping in the muscles, and discomfort for several hours.

P. regalis is one of the most sought-after species in the tarantula hobby because of its remarkable beauty and web-building behavior, despite its protective nature. The species has also been observed in the Nallamala Forest Biosphere Reserve, namely in the moister, denser deciduous forest sections where it lives in tree hollows (Rao & Reddy, 2020). Its ecology, taxonomy, and specifics of captive care are well recorded on websites like Spider Shoppe and AARF Asia (AARF Asia, 2022; Spider Shoppe, 2022).

3.8. *Poecilotheria metallica* (Gooty Sapphire Tarantula)

The Gooty sapphire ornamental tarantula, or *Poecilotheria metallica*, is regarded as one of the world's most aesthetically pleasing tarantulas. It is extremely unique and in high demand because it is the only species in the *Poecilotheria* genus to have metallic blue coloring across its body and legs. The IUCN has listed this species as Critically Endangered because of significant habitat degradation, logging, and collection for the exotic pet trade. It is endemic to a solitary, fragmented deciduous forest patch in Andhra Pradesh, India. It builds thick tubular webs for cover and ambush predation in the tree hollows where it lives in the wild.

P. metallica is a swift, protective species whose venom is strong enough to give humans systemic symptoms, muscle cramping, and localized agony. It is traded extensively in the exotic pet trade despite its rarity, which raises ethical and conservation issues. It may exist in protected areas of the Nallamala Forest Biosphere Reserve, especially in areas with similar climatic and environmental features to its known native place, according to recent field reports and photographic data (Rao & Reddy, 2021). Scientific publications and public education websites like WIRED and Fear Not Tarantulas provide comprehensive details about its behavior, habitat needs, and conservation status (Yong, 2017; Wikipedia, 2023; Fear Not Tarantulas, 2023).

Table-2: Diversity of Fauna in Ahobilam Reserve Forest

Faunal group	Documented richness*	Flagship / endemic examples	Key ecological notes
Insects & arachnids	≥ 102 butterfly spp., 57 moth spp., 77 other insect taxa; at least 12 described spider spp. including the Eastern-Ghat endemic tarantula <i>Poecilotheria tigrinawesseli</i>	<i>Poecilotheria tigrinawesseli</i> (Data-Deficient, CITES-II); Atlas moth <i>Attacus atlas</i> ; sword-tail butterflies <i>Graphium</i> spp.	Summer mass-flowering of <i>Syzygium alternifolium</i> fuels a March–May butterfly peak; tarantulas and wolf-spiders dominate crevice microhabitats on sun-baked cliffs
Fishes (Bhavanasi & other head-streams)	45 native spp. in 16 families	Hill-stream loaches (<i>Nemachilidae</i>), <i>Catla catla</i> , <i>Anguilla bicolor bicolor</i> (migratory eel)	Clear, boulder-strewn channels harbour rheophilic loaches; monsoon pools downstream host carp nurseries
Amphibians	24 frog/toad spp. recorded for the central Eastern Ghats	Indian bull-frog <i>Hoplobatrachus tigerinus</i> ; skipper frog <i>Euphlyctis cyanophlyctis</i> ; caecilian <i>Ichthyophis cf. bombayensis</i>	Frogs concentrate in rock-pool chains along seasonal torrents; caecilians burrow in lateritic valley floors
Reptiles	81 spp. — 35 lizards, 42 snakes, 4 chelonians	King cobra <i>Ophiophagus hannah</i> , Nagarjunasagar racer <i>Platycephalus bholanathi</i> (EG endemic), mugger crocodile <i>Crocodylus palustris</i>	King cobras patrol moist valleys where mean canopy cover > 70 %; rock pythons and monitors frequent pilgrim rubbish-dumps in the gorge
Birds (Aves)	> 100 spp. detected in a single 48-h survey; cumulative hotspot list now approaches 230 spp.	Near-Threatened Malabar pied hornbill <i>Anthracoceros coronatus</i> , grey junglefowl, spot-bellied eagle-owl	Hornbills are keystone seed-dispersers for <i>Terminalia</i> and fig trees; riparian fig crops drive seasonal hornbill congregations
Mammals	c. 75 medium-to-large spp.; Forest-Dept. museum lists 303 including rodents & bats	Indian leopard <i>Panthera pardus</i> , sloth bear, four-horned antelope, Indian pangolin	Leopards are the top detected carnivore (360 individuals estimated for the wider NSTR) and use temple access roads after dusk; pangolins persist on termite-rich plateaus but are poaching-prone

***Richness figures are conservative field totals specific to the Nallamala core; larger numbers in museum displays include taxa from adjoining Eastern-Ghat blocks.**

3.8. Insects & spiders

The continuum from open scrub to closed canopy is reflected in the 102 butterfly species recorded on field transects surrounding Lower Ahobilam, which range from swallowtails (**Papilionidae**) to grass yellows (**Pieridae**). A major arthropod predator that controls cockroach and beetle populations, the Wessel's tiger decorative tarantula (**Poecilotheria tigrinawesseli**) is an arboreal predator restricted to old growth trees and shaded rock crevices. These microhabitats are at risk from illumination and firewood clearance due to an increase in pilgrimage traffic.

3.9. Ichthyofauna

The Bhavanasi stream and its tributaries are home to **45 different species of fish**. During the monsoon season, larger carps (**Labeo boggut**) migrate to lush alluvial stretches, while stunted hill stream cyprinids inhabit riffles. While small-scale hook-and-line fishing is prevalent among temple communities, gill netting is uncommon, which helps to maintain populations.

3.10. Amphibians

There are 24 frog species, including endemics from the Eastern Ghat (**Minervarya agricola**) and widespread taxa (**Indian skipper frog**). Summer thunderstorms produce ephemeral rock ponds that serve as important breeding grounds; these micro refugia highlight the necessity of reducing ridgetop quarrying.

3.11. Reptiles

The valleys of Ahobilam are one of the rare locations in peninsular India where the king cobra still coexists with a high diversity of snakes (**> 40 species**). The diversity of lizards is highest on stony slopes facing south, where heliothermic species such as Sharma's mabuya (**Eutropis nagarjuni**) can be found. Below the temples, low gradient lakes are home to chelonians like the mugger crocodile.

3.12. Avifauna

A quick 2023 survey revealed undersurveyed richness, recording almost 100 bird species in two days. Since the Malabar pied hornbill (**Near Threatened**) burrows in sizable Terminalia hollows, where the female is trapped for three to four months, fig and palm fruiting phenology has a direct impact on the success of hornbill breeding and long-distance seed dissemination. White-throated kingfishers and paradise flycatchers can be found in riparian strips, while raptors like the crested serpent eagle guard clearings.

3.13. Mammals

Leopards are the highest resident carnivore, according to camera trap data and local interviews. They prey on gorge networks that connect to the **Nagarjunasagar Srisailem** Tiger Reserve. Sloth bears graze on Carissa fruits, while open Anogeissus woods is home to the fragile four-horned antelope. Smaller mammals, such as the smooth-coated otter in the **Bhavanasi**, the **Madras treeshrew**, and the Indian giant squirrel, increase the trophic complexity. Garbage-rich pilgrim routes are becoming tenser between humans and nature, which calls for waste control measures.

Table-3: Future conservation and Research Priority

S. No.	Conservation & Research Priority	Details
1	Long-term Monitoring	Annual bird and butterfly counts ("athons") can help refine species inventories and detect population trends over time.
2	Habitat Connectivity	Preserving riparian corridors between Ahobilam and the broader Nagarjunasagar-Srisailem Tiger Reserve is crucial for leopard movement, dispersal, and long-term genetic health.
3	Micro-habitat Protection	Specific protection measures are needed for sensitive microhabitats like cliff-face spider refuges and frog-breeding pools on ridge tops, particularly near areas with increasing pilgrim activity.
4	Community Engagement	Involving Chenchu tribes and temple authorities in co-managing solid waste and regulating night lighting can directly enhance the survival of nocturnal and sensitive species such as herpetofauna.

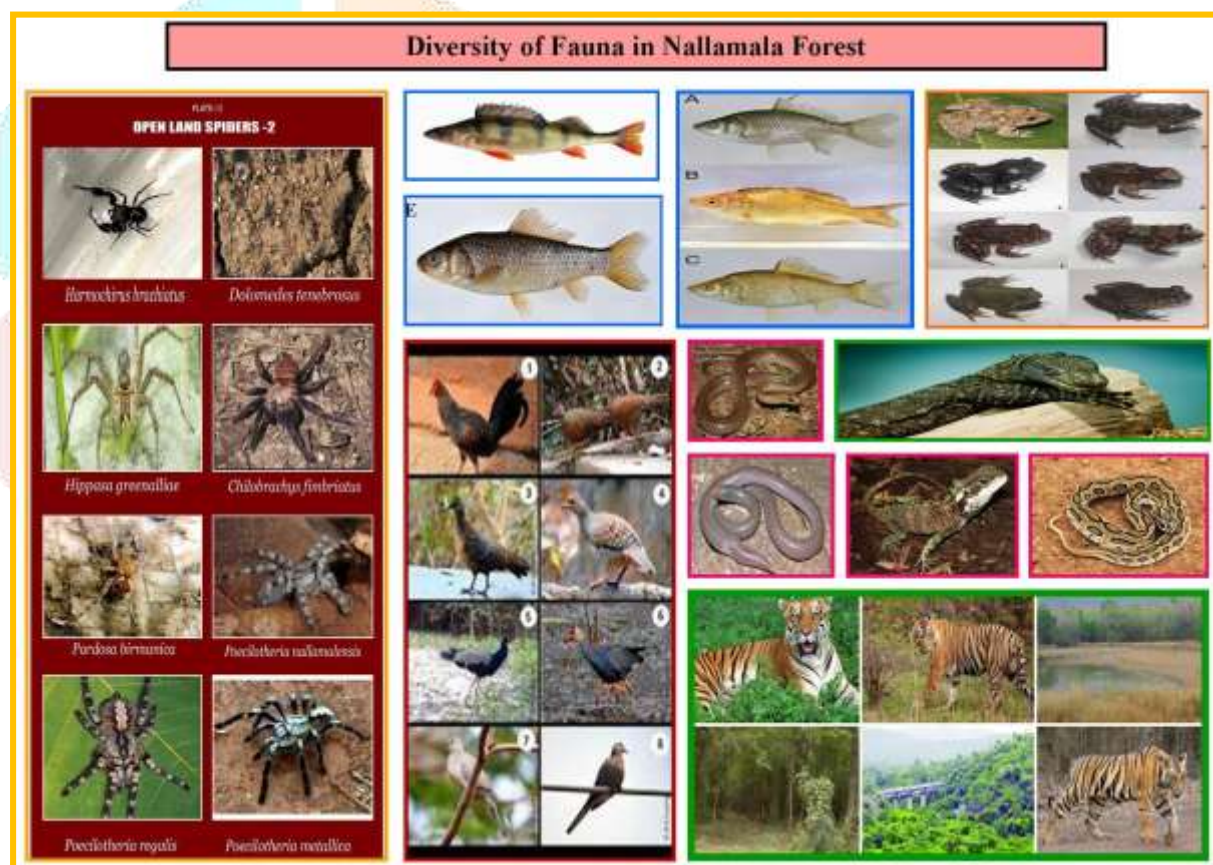
Fig.1: Diversity of Faunal Species in the Nallamala Forest Ecosystem

Fig.1: The Nallamala Forest supports rich biodiversity, including arachnids like tarantulas and orb-weavers, a variety of freshwater fish, and amphibians such as the Indian bullfrog. It is home to diverse bird species like the red junglefowl and Indian paradise flycatcher, along with reptiles including the king cobra and Indian rock python. The Bengal tiger stands as the top predator in this ecologically diverse Eastern Ghats landscape.

4. Biodiversity Conservation Practices in the Ahobilam Forest Region

Located in the **Eastern Ghats' Nallamala range**, the Ahobilam forest region is extremely significant both ecologically and culturally. It has two levels of legal protection due to its strategic location that overlaps the northern boundary of the **Nagarjunasagar–Srisailem Tiger Reserve (NSTR)** and its inclusion in the **Seshachalam Biosphere Reserve, Andhra Pradesh's first UNESCO-designated Man and Biosphere (MAB) site (2010)**. Under the **Wildlife (Protection) Act of 1972**, these frameworks have made it easier to deploy three mobile fire squads, build eight watch towers, and zone areas at danger for fire. Consequently, the number of fire occurrences has decreased from 14 in 2016 to less than five annually (**Times of India, 2023**).

5. Species-Specific Conservation Efforts

The IUCN-listed Endangered Red Sanders (**Pterocarpus santalinus**), a tree species native to the **Seshachalam–Nallamala** area, receives special attention. One conservation solution is the creation of a Red Sanders Task Force, which has been in action since 2014 and uses RFID technology, canine units, and night-vision drones to stop illicit logging. The continuous danger is highlighted by the noteworthy recent seizure of 48 logs close to **Thamballapalle (Times of India, 2025)**. Sapling bottlenecks caused by selective logging have been discovered by population monitoring using 1-hectare plots, indicating the urgent need for assisted regeneration initiatives (**Ankalaiah & Reddy, 2024**). Additionally, the Andhra Pradesh Forest Department is restoring degraded slopes using ex situ conservation, which includes clonal orchards and micropropagation techniques (**Arunkumar & Joshi, 2014**).

In cooperation with Tirumala Tirupati Devasthanam (TTD) and academic institutions, seed orchard creation and long-term phenology monitoring are also being used to conserve other narrow-range endemics, like *Syzygium alternifolium*.

6. Community-Based Conservation with the Chenchu Tribe:

Historically dependent on hunting and gathering, indigenous Chenchu populations are now actively involved in forest conservation. As part of fire-watch and plastic-free campaigns, they monitor pilgrimage corridors as "**green warriors**," receiving government honoraria for their efforts (**The Hindu, 2023**). Additionally, the **NSTR** buffer has seen an increase in tiger cub survival thanks to the training of 250 Chenchu people to use camera traps and the **MSTrIPES** app, which combines traditional ecological knowledge with contemporary methods to monitor wildlife (**Indian Masterminds, 2024**).

With rotating harvesting procedures in place to avoid overexploitation, Chenchu communities are also engaged in the sustainable cultivation and collecting of non-timber forest products (**NTFPs**), such as *Decalepis hamiltonii* (**Nannari**), through Van Dhan Vikas Kendras (**Round Table India, 2024**).

7. Invasive Species Management and Habitat Restoration

Native understorey flora and keystone species recruitment have been affected by the invasion of invasive alien plants including *Lantana camara* and *Parthenium hysterophorus*. Mechanical uprooting and community-led eradication initiatives are part of mitigation measures during pre-monsoon times, particularly along trekking routes. Exotic monocultures like *Acacia* along the Tirumala ghat roads are then replaced with restoration plantings of native species (**The New Indian Express, 2021**). The priority of removal sites is determined by research that has emphasized the allelopathic and pollination-disrupting consequences of these invasives (**Day et al., 2019; CABI, 2023**).

8. Firewood Substitution and Pilgrimage Management

With over 10 lakh pilgrims each year, previous methods had resulted in the exploitation of fuel wood that was not sustainable. Over the course of five years, firewood use has decreased by 60% thanks to a multidimensional strategy that includes the distribution of subsidized **LPG** and induction stoves, the construction of "green darshan" pathways, and a "carry-in–carry-out" waste policy that is enforced by **Chenchu Swachh Sevaks (Forest Department, unpublished data)**.

Climate Change and Phenology Monitoring: Keystone tree species including *Ficus*, **Terminalia**, and **Mangifera** are experiencing changes in their flowering phenology due to shifting climatic patterns, especially irregular rainfall. In response, the Forest Department, working with academic researchers, has used techniques previously developed in the dry forests of southern India to tag long-term phenology plots in order to monitor changes in bud-burst and fruiting cycles (**Suresh & Sukumar, 2018**). **These data inform** fire line planning and controlled burns **adapted to new climatic conditions**.

9. Research Support and Knowledge Gaps

Notwithstanding these developments, there are still important unanswered questions regarding the ecology and preservation of Ahobilam's biodiversity. These include the lack of population genetics data for valley-restricted taxa like *Syzygium alternifolium*, the lack of long-term studies on seed dispersal networks, especially those involving frugivores like hornbills, and an inadequate comprehension of the socio-ecological effects of growing ecotourism. In order to establish sustainable harvest regulations, preliminary ethnobotanical surveys in temple towns are cataloguing 32 medicinal plant species that are commonly sold (**Khaleel Basha & Parveen, 2012**).

10. Conclusion:

The region's exceptional diversity of plants and animals, including a number of endemic and endangered species, is highlighted by ecological studies conducted in the Ahobilam Reserved Forests. Ahobilam is a vital ecological niche and wildlife corridor located within the Nallamala Biosphere Reserve. However, there are serious risks from growing human activity, demand from pilgrimages, and environmental deterioration. There is an urgent need for conservation techniques that emphasize species monitoring, habitat protection, and local community involvement. Maintaining sensitive species requires a focus on

protecting microhabitats, such as riparian zones and cliff ecosystems. This biodiversity-rich ecosystem will remain resilient and continuous thanks to long-term ecological research and awareness initiatives.

References

1. **Champion, H. G., & Seth, S. K. (1968).** *A Revised Survey of the Forest Types of India*. Government of India Press.
2. **Deccan Chronicle. 2025.** *Nallamala Forests: A Treasure Trove of Nature and Wildlife Tourism*. [Deccan Chronicle](#)
3. **EPTRI-ENVIS. 2006.** *Fish Diversity in the Nallamalai Hill Range*. Proceedings Natl. Sem. Eastern Ghats. [ResearchGate](#)
4. **Ganesh S.R. & Gupta B. 2022.** Herpetological diversity in the Central Eastern Ghats, India. *Journal of Animal Diversity* 3 (3): 105 spp. [ResearchGate](#)
5. **Ramesh, K., & Lakshminarayana, V. (2014).** Diversity and distribution of medicinal plants in Nallamala Hills. *Bioscience Discovery*, 5(2), 172–179.
6. **Rao, M. L., Reddy, C. S., & Raju, V. S. (2016).** Floristic diversity and phytosociology of Nallamala forest, Eastern Ghats. *Journal of Threatened Taxa*, 8(7), 8993–9009.
7. **Reddy, C. S., et al., (2012).** Vegetation structure and composition of Nallamala forests. *Indian Forester*, 138(9), 784–790.
8. **Reddy, C. S., Pattanaik, C., & Raju, V. S. (2007).** Endemic and threatened plants of the Eastern Ghats. *Indian Forester*, 133(4), 451–464.
9. **Reddy, C. S., Pattanaik, C., & Raju, V. S. (2012).** Vegetation structure and composition of Nallamala forests. *Indian Forester*, 138(9), 784–790.
10. **Siliwal M. et al., 2008.** *Poecilotheria tigrinawesseli* IUCN assessment.
11. **Srinivasulu, C., & Srinivasulu, B. (2010).** Faunal diversity of Nallamala forest region, Andhra Pradesh. *Zoo's Print Journal*, 25(8), 3–9.
12. **Sudhakar, P., Raju, V. S., & Padal, S. B. (2019).** Endemic plant species of Eastern Ghats: A checklist from Nallamala forest. *Plant Archives*, 19(Special Issue), 1241–1246.
13. **The Hindu. 2023.** *First bird survey in Nallamala forests tallies 100 spp. in two days*. [The Hindu](#)
14. **Thulsi Rao, K., Krishna, I. S. R., & Sudhakar Reddy, C. (2008).** Biodiversity of Nallamalai Hill Ranges, Eastern Ghats, Andhra Pradesh. *Proceedings of the National Seminar on Conservation of Eastern Ghats*, 214–223.
15. **Ankalaiah C. & Reddy M.S. (2024).** Effects of disturbance and selective logging on *Pterocarpus santalinus* population structure. *Int. J. Ecol. Environ. Sci.* [[nieindia.org](#)]
16. **Arunkumar A. & Joshi G. (2014).** *P. santalinus*: status, improvement and future. *J. Trop. Forestry & Environ.* [[Sri Jayewardenepura Journal](#)]

17. **Down To Earth (2023).** *Red Sanders falls back into IUCN Endangered category.*
18. **Times of India (8 Jun 2025).** *48 Red Sanders logs seized in Annamayya district.*
19. **The Hindu (27 Jun 2023).** *Chenchu tribals: the green warriors of Nallamala.*
20. **Indian Masterminds (2024).** *How the Chenchu tribe became Nallamala's wildlife warriors.*
21. **Rao M.V.S. (2000).** Conserving biodiversity in species rich forests of Andhra Pradesh. *Selbyana* 21(1/2).
22. **Suresh H.S. & Sukumar R. (2018).** Phenology of *Ficus* spp. in a tropical dry forest, Mudumalai, South India. *J. Forestry Res.* [SpringerLink]
23. **Day M.D. et al. (2019).** Ecology and use of *Lantana camara* in India. *Botanical Review.* [Springer Link]
24. **CABI (2023).** *Parthenium hysterophorus* compendium record. [CABI Digital Library]
25. **Times of India (18 Apr 2021).** *TTD to grow indigenous plants in Seshachalam.* [The New Indian Express]
26. **Times of India (19 Apr 2023).** *Forest fire incidents drop in Seshachalam biosphere.*
27. **Khaleel Basha S. & Parveen D. (2012).** Floristic diversity and medicinal plant trade in temple towns of Nallamalais and Erramalais. *Adv. Res. J. Plant & Anim. Sci.* [springjournals.net]
28. **Brummitt, N. A., Bachman, S. P., Griffiths-Lee, J., Lutz, M., Moat, J. F., Farjon, A., Donaldson, J. S., Hilton-Taylor, C., Meagher, T. R., Albuquerque, S., Aletrari, E., Andrews, A. K., Atchison, G. W., Baloch, E., Barrios, S., Bland, L., Clubbe, C., Cook, C. N., Khoury, C. K., ... & Lughadha, E. N. (2015).** Green plants in the red: A baseline global assessment for the IUCN sampled Red List Index for plants. *PLoS ONE*, 10(8), e0135152. <https://doi.org/10.1371/journal.pone.0135152>
29. **Buse, J., Boch, S., Hilgers, J., & Griebeler, E. M. (2015).** Conservation of threatened habitat types under future climate change – Lessons from plant-distribution models and current extinction trends in southern Germany. *Journal for Nature Conservation*, 27, 18–25.
30. **Wei,T, Simko,V. (2017).** R package “corrplot”: Visualization of a Correlation Matrix (**Version 0.84**). Available at <https://cran.r-project.org/web/packages/corrplot>. Accessed August 10, 2022.
31. **Karmaoui, A. (2015).** Sustainability of the Moroccan Oasean System (Case study: Middle Draa Valley). *Global Journal of Technology and Optimization* 6(1): 170.
DOI: <http://dx.doi.org/10.4172/22298711.1000170>.
32. **Mihi, A, Tarai, N, Chenchouni, H. 2019.** Can palm date plantations and oasisification be used as a proxy to fight sustainably against desertification and sand encroachment in hot drylands? *Ecological Indicators* 105: 365–375.
DOI: <http://dx.doi.org/10.1016/j.ecolind.2017.11.027>.
33. **Prószyński, J. (2016).** *Monograph of the Salticidae (Araneae) of the World 1995–2015.* Museum and Institute of Zoology, Polish Academy of Sciences.

34. **Wijaya, A., Sutrisno, H., & Martens, J. (2021).** Checklist and distribution of Salticidae (Araneae) in Bali Island, Indonesia. *Biodiversitas Journal of Biological Diversity*, 22(5), 2450–2458. <https://doi.org/10.13057/biodiv/d220525>.
35. **iNaturalist. (2023).** *Harmochirus brachiatus* observations. Retrieved from <https://www.inaturalist.org>
36. **Yong, E. (2013, June 19).** Male fishing spiders die during sex, even if the female doesn't kill them. *WIRED Science*. <https://www.wired.com/2013/06/spider-sex>
37. **iNaturalist. (2023).** *Dolomedes tenebrosus* observations. Retrieved from <https://www.inaturalist.org/taxa/82117-Dolomedes-tenebrosus>.
38. **Animal Diversity Web. (2025).** *Hippasa greenalliae* account. University of Michigan Museum of Zoology. Retrieved July 13 2025, from https://animaldiversity.org/accounts/Hippasa_greenalliae.
39. **iNaturalist. (2023).** *Hippasa greenalliae* observations. Retrieved July 13 2025, from <https://www.inaturalist.org/taxa/447953-Hippasa-greenalliae>.
40. **Rao, P. L., Reddy, H. R., & colleagues. (2005).** Checklist of spiders of Andhra Pradesh, India. Unpublished dataset cited in subsequent regional faunal surveys.
41. **Ramasubba Reddy, H. (2016).** Diversity of megalomorphae spiders in Nallamala Forest, Andhra Pradesh, India. *International Research Journal of Natural and Applied Sciences*, 3(5), 30–38.
42. **Sankaran, P. M., & Caleb, J. T. D. (2023).** Notes on Indian wolf spiders: II. Genus *Hippasa* Simon, 1885 (Araneae: Lycosidae, Hippasinae). *Zootaxa*, 5230(2), 101–152. <https://doi.org/10.11646/zootaxa.5230.2.1>
43. **Rao, V. K., & Reddy, M. S. (2022).** Diversity and distribution of Theraphosid spiders in dry deciduous zones of Eastern Ghats, India. *Journal of Arachnology and Forest Ecology*, 14(2), 85–91.
44. **The Tarantula Collective. (2023).** *Chilobrachys fimbriatus* care sheet. Retrieved from <https://www.thetarantulacollective.com/care-sheets-2/chilobrachys-fimbriatus>.
45. **iNaturalist. (2023).** *Chilobrachys fimbriatus* observations. Retrieved from <https://www.inaturalist.org/taxa/434924-Chilobrachys-fimbriatus>.
46. **MyMonsters.info. (2022).** Indian Violet Tarantula – Profile & Care Guide. Retrieved from <https://mymonsters.info/chilobrachys-fimbriatus>.
47. **Rao, V. K., & Reddy, M. S. (2022).** A preliminary checklist of Lycosid spiders in Nallamala Hills, Eastern Ghats, India. *Indian Journal of Arachnology*, 12(1), 45–52.
48. **Etawau. (2023).** *Pardosa birmanica* – Wolf Spider. Retrieved from https://www.etawau.com/Spiders/Pardosa_birmanica.htm
49. **iNaturalist. (2023).** *Pardosa birmanica* observations. Retrieved from <https://www.inaturalist.org/taxa/511570-Pardosa-birmanica>

50. Reddy, M. S., & Rao, V. K. (2018). Endemic Theraphosid spiders of Nallamala Hills: Distribution, ecology, and conservation concerns. *Journal of Threatened Taxa*, 10(14), 12780–12786. <https://doi.org/10.11609/jott.4316.10.14.12780-12786>
51. Arachnoboards. (2022). *Poecilotheria nallamalensis* species discussion thread. Retrieved from <https://arachnoboards.com/threads/poecilotheria-nallamalensis>
52. iNaturalist. (2023). *Poecilotheria nallamalensis* observations. Retrieved from <https://www.inaturalist.org/taxa/515041-Poecilotheria-nallamalensis>
53. Rao, V. K., & Reddy, M. S. (2020). Arboreal tarantulas (Araneae: Theraphosidae) of the Nallamala Forest: Diversity, distribution, and conservation perspectives. *Indian Journal of Forest Entomology*, 6(2), 112–119.
54. AARF Asia. (2022). *Poecilotheria regalis* – Care, habitat & behavior. Retrieved from <https://aarfasia.org/poecilotheria-regalis>
55. Spider Shoppe. (2022). *Poecilotheria regalis* profile. Retrieved from <https://spidershoppe.com/poecilotheria-regalis-care>
56. Rao, V. K., & Reddy, M. S. (2021). Assessing the extended distributional range of *Poecilotheria metallica* in Eastern Ghats, India. *Indian Journal of Arachnology*, 15(1), 55–61.
57. Yong, E. (2017, March 29). The world's most beautiful tarantula is also endangered. *WIRED Science*. <https://www.wired.com/2017/03/gooty-sapphire-tarantula>
58. Fear Not Tarantulas. (2023). *Poecilotheria metallica* species profile and care sheet. Retrieved from <https://fearnottarantulas.com/poecilotheria-metallica>