## ABSTRACT

Spiders exhibit remarkable diversity and abundance across the terrestrial ecosystem, except for Polar Regions and oceans. Spiders have evolved into various forms in nature, which includes mimicking ants (e.g., *Myrmaplata*, *Mymarachne*), bird droppings (e.g., *Phrynarachne*, *Pasilobus*), lady-bird beetle (e.g., *Paraplectana*), tree bark (e.g., *Hersilia*, *Caersotris*, *Poltys*), crab spiders (*Thomisus*, *Camaricus*), and additionally some spiders have adapted to specific habitats such as fishing spider (e.g., *Nilus*) that live near water bodies and some on bark of a tree (*Hersilia*). They are strictly predatory in natures and exhibit varied food habits, ranging from tiniest insects to large terrestrial arthropods and vertebrates such as small lizards, frogs, fish, birds and even snakes at some instance. They exhibit varied ways of foraging, either by spinning orb webs, net-cast, single dragline snare, sticky blobs, trapdoors and ambushing. Taxonomists have identified 52,171 species all over the word. However, despite the new species continually identified, the ongoing discoveries emphasizes the need for continued exploration of diverse habitats around the word.

The present research endeavors to prepare inventory of spider species that occur in Jharbari Forest Range of Chirang Reserve Forest, including seasonal species richness, abundance and diversity in different habitats as well as information on peoples' perception on spiders. Chirang Reserve Forest falls within the Kokrajhar district of Assam and under the administrative control of Bodoland Territorial Region (BTR). The BTR region has three protected areas (PAs), namely, Manas National Park, Raimona National Park and Chakrashila Wildlife Sanctuary. Kokrajhar, one out of the five districts of BTR, lies on the foothills of Himalaya and is rich in biodiversity. The district have three forest divisions, namely, Haltugaon, Kachugaon and Parbathjhora Forest Divisions. Chirang Reserve Forest, one of the oldest Reserve Forest in Assam falls under Haltugaon Forest Division. These Reserve Forest is contiguous with Raimona National Park on the west. It has three forest ranges, namely, Ultapani Range, Jharbari Range and Gaurang range. The study was conducted in Jharbari Forest Range.

The main objectives for this study were to: 1. To know the overall status of spiders in the Jharbari Forest Range; 2. To prepare a checklist of spiders from the Jharbari Forest Range; 3. To study the abundance of spiders along with seasonal variation; 4. To study

the diversity and guild types of spiders in different microhabitats; 5. To study the perception of the local community towards spiders on fringe villages of Jharbari Forest Range.

Documentation of spider diversity to prepare a comprehensive checklist along with its guild composition, seasonal abundance and diversity across Jharbari Forest Range was carried out from December 2017 to November 2021. Belt transect method was used for sampling Total of six fixed trails, each of 1.5 km long X 30 meters were traverse to assess the assemblages of spider across eight habitats, namely, under rocks, grasses, forest litter, burrow, forest streams, herbs, shrubs and tree bark. The number of individuals and their occurrences on each habitats as well as seasons (winter, pre-monsoon, monsoon and post-monsoon) were recorded. Live habitus of each spiders was photographed at field. Individuals of spiders was collected and kept in 80% ethanol. The genitalia of the specimens was dissected and later studied under Leica stereo microscope, additionally habitus of the dissected specimens was also studied. It was then compared with available keys and literature for identification up to species level. Studied specimens was then deposited in Zoological Survey of India, Shillong for accession numbers. Taxonomy and nomenclature were followed according to the World Spider Catalog (2024). Taxonomic descriptions along with line drawings and photographic plates was prepared. Species accumulation curves was generated using Microsoft Excel 2011, significance tests was conducted using the Chi-square test in R Studio (V.2022.02.0+443) and Biodiversity indices ( Shannon-Wiener diversity index (H′), Pielou's evenness index (J/), and Simpson's dominance index ) was calculated using PAST version 4. For the perception study, interviewees' from six forest fringe villages were interviewed and data was analysed using excel sheet.

A total of 100 species belonging to 83 genera under 19 families was recorded during the study. Of the recorded species, six species was described as new to science and they are *Eriovixia kachugaonensis*, *Meotipa ultapani*, *Paraplectana mamoniae*, *Vailimia jharbari*, *Chinattus prabodhi* and *Gravelyia boro*. Additionally, the study revealed 11 new records, viz., *Hyllus diardi*, *Dexippus kleini*, *Phrynarachne decipiens*, *Cyrtarahcne nagasakiensis*, *Hygropoda higenaga*, *Dendrolycosa songi*, *Philoponella alata*, *Himalmartensus ausobskyi*, *Eriovixia pseudocentrodes, Poltys illepidus* and *Ariamnes*

*flagellum* from India. Of the total 100 species, 17 species are endemic to India and 76 species are new state records from Assam. Rediscovery after a century was also revealed in the study, where *Deixippus kleini* was rediscovered after 129 years and both sexes of genus *Vailimia* was discovered after 113 years. Out of the 62 families known from India, 19 families was recorded from Jharbari Forest Range. Araneidae was the dominant family with 33 species, followed by Salticidae (20).

Out of the four seasons, the highest number of species abundance was recorded during-pre-monsoon season with 80 species followed by monsoon (63). Araneidae was the highest in abundance among all the families, with Salticidae being the second most abundant. Both the families were frequently sighted throughout the four seasons. The overall species accumulation was asymptote at 100 species. The plateau in the curve shows that the sampling was almost finished and most specimens from the study area was collected.

Species richness and diversity was influenced by the structure of habitat in Jharbari Forest Range. Of the total eight habitats, the highest species richness and diversity was observed in Shrubs ($H' = 4.0$), followed by Herbs ($H' = 3.4$). The lowest diversity was recorded under rocks ($H' = 0.91$) and burrow habitats ($H' = 0.25$). Eight different guild types was recorded from the study area, namely, Ambush hunters, Ground hunters, Nocturnal ground hunters, Orb-web weavers, Other hunters, Sensing web weavers, Sheet web weavers and Space web weavers. Orb-weavers was the dominant guild type with 40 species, followed by Other hunters (30), and the least was Sheet web weavers (1) and Sensing web weavers (1). The species accumulation curve for each habitat reached plateau, representing that majority of specimens was collected from the habitat. Shrub habitat was highest in species richness with 63 species, followed by Herbs (34), and least being Under rocks (3) and Burrow (2).

The interviewees' perception on spiders varied widely. Out of the total 89 individuals, 94 % of them was able to recognize spiders, while 6% was unable to recognize. Majority of individuals showed no fear (43%) of spiders, while rest of 24% and 27 % showed fear and was not hesitant to kill one. Araneidae, the spiders from this family exhibiting its orb-web and colourful body patterns was the dominant family

sighted by the residents. Maximum number of spiders was sighted indoors, and the highest sighted season was during monsoon and pre-monsoon.

The study underscored the importance of vegetation structure in shaping the abundance, species richness and diversity of spiders in the Chirang Reserve Forest. These Reserve Forest have diverse habitats, ranging from dense forest to patches of grassland and perennial streams traversed acrossed the forest, providing suitable habitats for diverse fauna. However, the pristine habitat of these Reserve forest in under threat of various anthropogenic activities which was identified in the field, viz., deforestation, cattle grazing, livestock rearing, invasive species, forest burning. The present study represented the pioneering effort in understanding the diversity of spiders of Chirang Reserve Forest, providing baseline data for further works in the region, and will also aid the policy makers, conservationists, forest department along with local stake holders in implementing measures for effective conservation and sustainable management of the Chirang Reserve Forest, ensuring its ecological integrity along with socio economic benefits for the local communities.