



Research Article

A PRELIMINARY STUDY ON SPIDER DIVERSITY IN MATIA, GOALPARA DISTRICT, ASSAM, INDIA

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ABSTRACT

A preliminary study was conducted to document spider diversity in Matia, Goalpara District, Assam state in India. The study was conducted from January to May 2018. A total of 37 species of spiders belonging to 12 families were identified from the study area. The species were identified using keys for Indian spiders from Tikader 1987; Platnick 2011. The spiders impose natural check on insect pest populations. Methodology included active searching at all layers from ground level to tree canopy layer accessible easily for hand collecting and visual surveys. Randomly selected study sites and have taken 10 political areas and in each area's 3 plots were selected. Amongst the families, the Araneidae was the most abundant (14 species) with orb weavers being the dominant guild type. A guild structure analysis of the spiders revealed eight feeding guilds such as Orb weavers, Ground hunters, Ambusheus, Ground runners, Stalkers, Space web builders, Branch dwellers, Foliage hunters.

Keywords: Spider, Species diversity, Guild structure, Matia, Assam.

INTRODUCTION

Spiders are an ancient and functionally important invertebrate, resides in all types of habitats. Spiders included in class Arachnida, order Araneae under Phylum Arthropod, are an ancient and successful group of invertebrate animals. The members of the class Arachnida are generally characterized by two body regions, the cephalothoraxes having four pairs of segmented legs attached to it, and the abdomen. The abdomen is soft while the cephalothoraxes are harder. Most arachnids are carnivorous, typically preying on insects and other terrestrial organisms. Spiders have helped in biological control of insects; without spiders some insects would have reached pest proportions. Spiders can only consume liquids, as they lack chewing mouthparts. They use chelicerae, pointed appendages at the front of the cephalothorax, to grasp prey and inject venom.

Among animals spiders represent 18% of diversity. The order Araneae ranks seventh in total species diversity among all other groups of organisms. Spiders can play a

very important role in regulating the terrestrial arthropod populations. All spiders make silk which is squirted out of the spinnerets. Spiders have six spinnerets that make up to seven different kinds of silk (Candelas & Cintron, 1981). Silk is secreted in fluid form which solidifies as it comes in contact with air into strands of silken line. Silk is made up of a protein fiber which is the strongest natural made substance in the World (Gosline *et al.*, 1999). Spiders use silk in many ways: for draglines, for webs, for egg cases, for holding prey, for building nurseries, for transportation, as in ballooning, and for snaring prey (Tikader, 1987). All spiders have poison glands but few of them are dangerous to man (Gupta *et al.*, 2008). All spiders are venomous but only a few species are venomous enough to harm humans. There are some spiders which could be dangerous like the Black widow spider. The venom of brown recluse spider is harmful to humans. Spider venoms are very diverse in chemical composition and modes of action (Adams & Olivera, 1994; McCrone, 1969). Spider venom is mainly two types. Some spider venom is neurotoxic, i.e. it affects

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the human nervous system. The black widow venom is neurotoxic and other spider venom is necrotic and causes skin sores, ulcers etc. The venom of brown recluse spiders is necrotic.

MATERIALS AND METHODS

Description of Study site

Matia is a Town (Location: 25° 53' - 26° 30' N and 90° 07' - 91° 05' E) in Matia Tehsil in Goalpara District of Assam State, India. It is located 23 KM towards East from District

headquarters Goalpara (Figure 1). Matia is surrounded by Kuchdhowa Tehsil towards south, Krishnai Tehsil towards west, Goalpara Tehsil towards west, Rongjuli Tehsil towards south. Goalpara, Barpeta, Barpeta Road, Bongaigaon are the nearby cities to Matia. Goalpara district is situated on the South bank of river Brahmaputra. The district covers an area of 1,824 square kilometres and is bounded by West and East Garo Hill of Meghalaya on the South and Kamrup District on the East, Dhubri District on the west and river Brahmaputra all along the North. The geographical location of the district is between latitude 25° 53' - 26° 30' N and longitude 90° 07' - 91° 05' E.

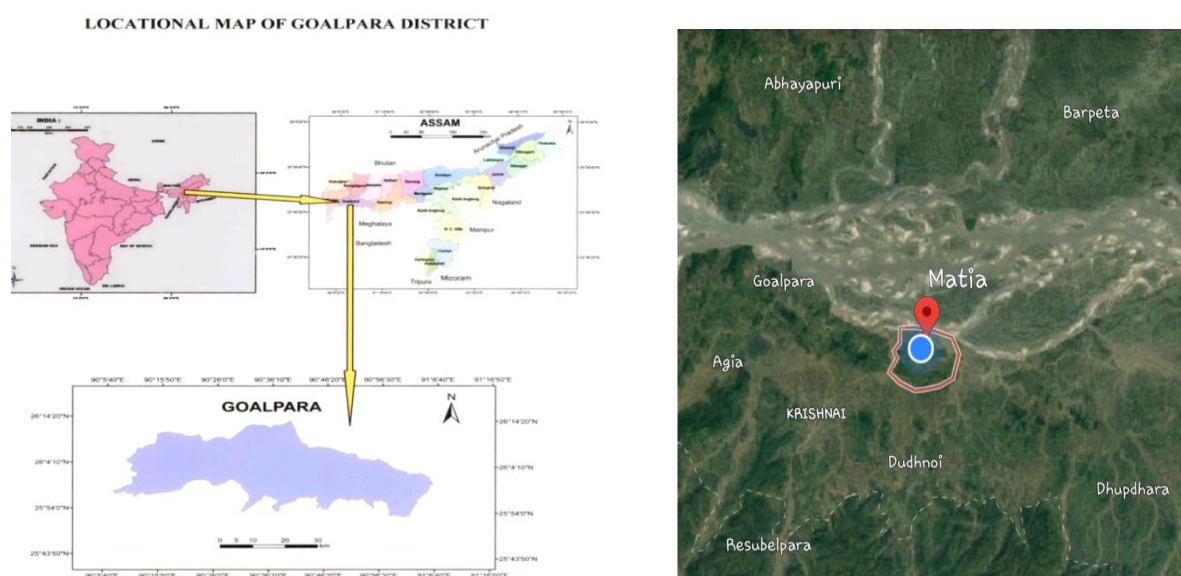


Figure 1. Study area Matia Tehsil in Goalpara District of Assam State.

Methodology

Visiting to the field and lines transect will be used to search the spider in different components. Transect will be chosen in random with semi quantitative sampling method to record the spider. Spiders were identified in different compartments and photos were taken. No spider will be collected.

Study Period

The study was carried out during January 2018 to May 2018. The year was divided into four seasons: winter (December to February), summer (March to May), monsoon (June to September) and post monsoon (October to November). The sampling was made between 9 am to 6 pm under suitable weather conditions for spider collection, temperature between 15-38°C.

Sampling

Visual search sampling method used by (Cordain *et al.*, 2005) was adopted in this study to sample the spider fauna from quadrants selected at random of selected study sites. The advantage of visual search sampling method is that

spiders remain undisturbed and can be censused repeatedly (Lubin *et al.*, 1980). Random sampling was done from the same selected study sites in all four seasons. A total of 36 hours was spent in each site across the four seasons. We have taken all 10 political areas and in each area's 3 plots were selected. As a whole, we have divided the whole area into 30 different plots. Each plot is again divided into 4 different types of habitat i.e. Grassland cum bushy, Marshy, Residential and agricultural area. Spiders were taken and photographed in the field as much as possible to document the natural history. Taxonomic identification of the specimens was done with the help of available literature 'Handbook of Spiders' by Biswas & Mantovani, (2010) and 'Spiders of India' by Sebastian & Peter (2009).

RESULTS AND DISCUSSIONS

The present study, conducted in Matia, Goalpara District of Assam, has made a significant contribution towards increasing knowledge of spider species distribution in this area. During the survey for 6 months in Matia, Goalpara District of Assam 37 species of spiders belonging to 12 families were found in the study area. No previous research

on spiders has been carry out in this area, so the study represents new distribution records for all species recorded. The difference in quantity and quality of spider fauna is related to the collection time, sampling method and other geographic features of the area. During the study period a total 37 species belonging to 12 families of spiders were identified (Table 1 & 2). Out of which highest number of species belonging to family Araneidae (14 species) followed by Tetragnathidae (5 species), Pholcidae (4 species), Salticidae (3 species), Thomisidae (2 species), Sparassidae (2 species), Nephilidae (2 species), Corinnidae (1 species), Hersiliidae (1 species), Lycosidae (1 species), Oxyopidae (1 species), Uloboridae (1 species).

Out of the ten sites of the study area, majority of spiders were recorded from semi- manipulated ecosystem where both garden and forest spiders were found. From the results and data, a preliminary status of spiders in Matia, Goalpara district is much clear. The study documented the highest of

Araneidae family (Figure 2) and density of spiders (Figure 2) The largest individuals collected were in summer season. The spider weaving orb webs are in majority among web weavers. There is an urgent need for updating the database. Exploration of species diversity understanding the habitat ecology, behavior, etc. culminating into a database for the Assam is an imperative. From the Figure 2, it was observed that the wild spiders are found in large scale than domestic spiders and a few numbers of marshy spiders are found in the district. From the study it was found that aerial collecting method of spider is more significant than all other trapping techniques. By aerial method, we have collected more than half of the sample spiders in our study. From the survey, it was found that maximum families and species were abundant during the summer season and least during monsoon and winter. Thus, clarifies that they are more active during summer. Thus, the study shows unique diversity of spiders in Northeast India.

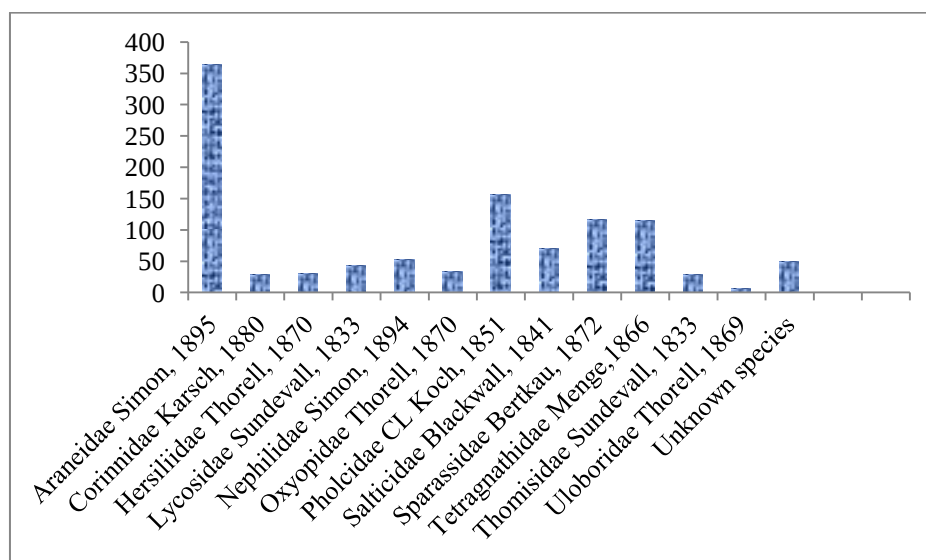
Table 1. Family and species list.

Family	Species	No. of Individuals	Guild type
Araneidae Simon, 1895	<i>Araneus mitificus</i> (Simon, 1886)	27	Orb weavers
	<i>Argiope aemula</i> (Walckenaer, 1842)	35	Orb weavers
	<i>Argiope anasuja</i> (Thorell, 1887)	38	Orb weavers
	<i>Argiope catenulate</i> (Doleschall, 1859)	25	Orb weavers
	<i>Argiope pulchella</i> (Thorell, 1881)	55	Orb weavers
	<i>Cyclosa bifida</i> (Doleschall, 1859)	16	Orb weavers
	<i>Cyclosa confragra</i> (Thorell, 1892)	24	Orb weavers
	<i>Cyrtophoraci catorosa</i> (Stoliczka, 1869)	22	Orb weavers
	<i>Cyrtophora citricola</i> (Forsskal, 1775)	24	Orb weavers
	<i>Gasteracan thahasselti</i> (Koch, 1837)	11	Orb weavers
	<i>Neoscona muckerjei</i> (Tikader, 1980)	28	Orb weavers
	<i>Neoscona nautical</i> (Koch, 1875)	31	Orb weavers
	<i>Neosco natheisi</i> (Walckenaer, 1841)	9	Orb weavers
	<i>Parawixia dehaani</i> (Doleschall, 1859)	19	Orb weavers
Corinnidae Karsch, 1880	<i>Castianeira zetes</i> (Simon, 1897)	29	Ground hunters
Hersiliidae Thorell, 1870	<i>Hersilia savignyi</i> (Lucas, 1836)	30	Ambushers
Lycosidae Sundevall, 1833	<i>Lycosamackenziei</i> (Gravely, 1924)	43	Ground runners
Nephilidae Simon, 1894	<i>Nephila kuhlii</i> (Doleschall, 1859)	27	Orb weavers
	<i>Nephil apilipes</i> (Fabricius, 1793)	25	Orb weavers
Oxyopidae Thorell, 1870	<i>Oxyopes shweta</i> (Tikader, 1970)	33	Stalkers
Pholcidae CL Koch, 1851	<i>Artemaat lanta</i> (Walckenaer, 1837)	46	Space web builders
	<i>Crossopri zalyoni</i> (Blackwall, 1867)	39	Space web builders
	<i>Pholcusphalan gioides</i> (Fuesslin, 1775)	32	Space web builders
	<i>Smeringopus pallidus</i> (Blackwall, 1858)	40	Space web builders
	<i>Hasarius dasoni</i> (Audouin, 1826)	21	Stalkers
	<i>Plexippus paykulli</i> (Audouin, 1826)	29	Branch dwellers
Salticidae Blackwall, 1841	<i>Plexippus petersi</i> (Karsch, 1878)	21	Stalkers

Sparassidae Bertkau, 1872	<i>Heteropoda nilgirina</i> (Pocock, 1901)	56	Foliage hunters
	<i>Heteropoda venatoria</i> (Linnaeus, 1767)	61	Foliage runners
Tetragnathidae Menge, 1866	<i>Leucauge decorate</i> (Blackwall, 1864)	43	Orb weavers
	<i>Leucauge pondae</i> (Tikader, 1970)	12	Orb weavers
	<i>Leucauge tessellate</i> (Thorell, 1887)	33	Orb web weavers
	<i>Opadometafastigata</i> (Simon, 1877)	20	Orb weavers
	<i>Tetragnathamandi bulata</i> (Walckenaer, 1842)	7	Orb web weavers
Thomisidae Sundevall, 1833	<i>Camarius fornicates</i> (Thorell, 1890)	17	Ambushers
	<i>Oxytatevirens</i> (Thorell, 1891)	11	Ambushers
Uloboridae Thorell, 1869	<i>Zosisgeni culata</i> (Olivier, 1789)	7	Orb weavers
Not Available	Unknown species	49	

Table 2. Total species of spiders.

Sl. No.	Families	Total number of species
1	Araneidae Simon, 1895	364
2	Corinnidae Karsch, 1880	29
3	Hersiliidae Thorell, 1870	30
4	Lycosidae Sundevall, 1833	43
5	Nephilidae Simon, 1894	52
6	Oxyopidae Thorell, 1870	33
7	Pholcidae CL Koch, 1851	157
8	Salticidae Blackwall, 1841	71
9	Sparassidae Bertkau, 1872	117
10	Tetragnathidae Menge, 1866	115
11	Thomisidae Sundevall, 1833	28
12	Uloboridae Thorell, 1869	7
13	Unknown species	49

**Figure 2.** Spiders and their numbers recorded during the study.

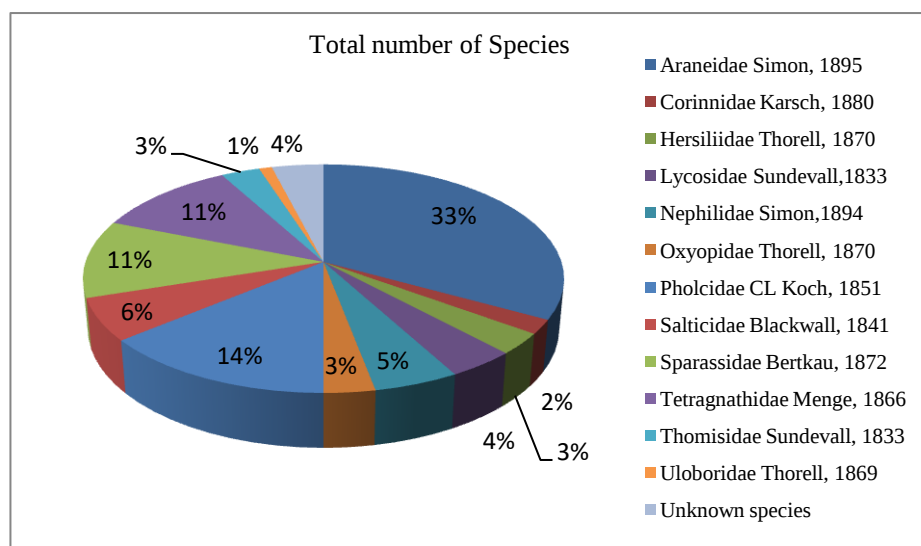


Figure 3. Comparative density (percentage) of spiders recorded during the study.

CONCLUSION

In the study it was found that orb weaver spider diversity is moderated in agro ecosystem of the area. The fauna of farmland is significantly poorer than of natural habitats because of frequent human impact as observed by (Thomas, 1990; Wolak, Mitchell, & Finkelhor, 2002) had shown that after insecticide application, spiders densities in the sprayed field were significantly lower than the unsprayed field. Vegetation structure is one of the essential factors for spiders. The growth of weeds promotes the migration of spiders from nearby habituated (Thomas, 1990), which we have observed. Variations in species composition can be explained by the habitat preferences resulting from behavioral and morphological characteristics of the spiders.

All spiders are predators, feeding almost entirely on others arthropods, especially insects. Some spiders are active hunters that chase and overpower their prey. These typically have a well-developed sense of touch or sight. Other spiders instead weave silk snares, or webs, to capture prey. Webs are instinctively constructed and effectively trap flying insects. Many spiders inject venom into their prey to kill it quickly, whereas others first use silk wrappings to immobilize their victims. In conservation efforts, often "charismatic" species like birds and mammals draw most attention and Ecological significant groups like spiders are often neglected. Ironically, the spider diversity in Assam is still not fully explored or understood (Manoranjan, 2009) has done a work on spider of Khasi and Jantia hills of Meghalaya, N.E. region in seventies of last century. (Tikader, 1970) and (Biswas *et al.*, 2012; Biswas & Mantovani, 2010) also collected some information on diversity of spiders of Northeastern states like Tripura, Meghalaya, Sikkim, Manipur, Arunachal Pradesh and Mizoram except Assam. As spiders species of Assam are poorly documented & no research has been done so far for the applied use of spider & its related product in this region.

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