

# Study On Diversity Of Spiders In Nagaon District, Assam, India

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**Abstract-** The study describes the identification of the spider assemblages with respect to their diversity and distribution in Nagaon district, Nagaon, Assam, India. During the study period families of spider- Araneidae, Oxyopidae, Pholcidae, Salticidae, Sparassidae, Linyphiidae, Tetragnathidae were came into observation.

**Keywords-** Spider, Araneidae, Oxyopidae, Pholcidae, Salticidae, Sparassidae, Linyphiidae and Tetragnathidae.

## I. INTRODUCTION

Spiders are well known mostly beneficial arthropods (Kazim *et al.*, 2014). North Eastern Region of India is one of the richest biodiversity hotspots of the world. The origin of spiders could be traced back nearly 400 million years to the Devonian period. The abundance and resemblance of the spiders to their modern descendents can be dated back to the early Tertiary period (almost 70 million years ago). Spiders have become a successful group due to the many and varied ways in their capability to use silk (Masterman G.F. 1888; Rainer Foelix, 1996). Spiders are obligate predators of herbivorous insects and they are capable of reducing insect populations that may not be limited by competition and food availability in some agro ecosystem. Spiders are more sensitive to the habitat changes such as habitat complexity, litter depth and microclimate characteristics (Downie, I.S. *et al.*, 1999).

## II. AIMS AND OBJECTIVE

1. To document the spider diversity in Nagaon district.
2. To quantify the spider diversity density.

## III. MATERIALS AND METHOD

### Study area:

The Nagaon district in the state of Assam, India occupies an area of 3831 sq. km (1,479 sq. mi) and has population of 28, 26,006 (as per 2011 Census). Nagaon district

of Assam extends from 25<sup>0</sup>45' to 26<sup>0</sup>45' N latitude 92<sup>0</sup>33' to 92<sup>0</sup>60' E longitude with total area 4435.3 sq km and is bounded by Sonitpur district and the river Brahmaputra in the north, West Karbi Anglong and North Cachar Hills in the south, East Karbi Anglong and Golaghat district in the east. The major rivers are the Brahmaputra, Sonai, Kalong, Kapili, Nonoi, Jamuna and Barpani. There are several beels, marshy lands and swamps are present which are in reality old abandoned channels of Kalong and Kapili rivers of Nagaon district. The elevation of the Nagaon district is 60.6 meters above mean sea level. Like rest of the Assam, the climate of Nagaon is characteristically monsoonal with a rhythm of changing season.

### Collection and survey:

Collection of spiders was done by the handpicking from the spider web as well as the sweeping net beating method nearby bushes in an inverted umbrella for arboreal specimens. For terrestrial and ground dwelling spider pitfall method was being used. Here in this method plastic bowl were filled with mixture of preservative which contains water, ethyl acetate and detergent in the ratio 69:30:1. Methodology also includes active searching at all layers from ground level to tree canopy layer which is easy for visual survey. Without harming the spiders photographs were taken with a SONY W710 digital camera of 16.1 mega pixel.

### Study time:

The study carried out from April 2015 to June 2015 between 9 am to 4 pm.

### Identification:

The captured images were identified with the help of "Handbook Indian Spiders" by B K Tikader, 1987.

### Statistical analysis:

Species richness index-  
Margalef Index:

$$R1 = \frac{S - 1}{\text{Log } N}$$

Menhinick Index:

$$R2 = \frac{S}{\sqrt{N}}$$

Where,

S= total number of species in a community

N= total number of individual observed

Shannon index:

$$H = - \sum_{i=1}^R pi \ln pi$$

H= Maximum diversity possible

pi= Number of individuals of species i/total number of samples

#### IV. RESULTS

Table1: List of identified spiders –

Sl No.	Families	Scientific name	Web pattern
1	Araneidae ( Simson,1895)	<i>Argiope aemulla</i> (Walckenaer,1842)	Orb web
2	Araneidae ( Simson,1895)	<i>Argiope pulchella</i> (Thorell,1881)	Orb web
3	Araneidae ( Simson,1895)	<i>Neoscona bengelensis</i> (Tikader and Bal,1981)	Orb web
4	Araneidae ( Simson,1895)	<i>Neoscona crucifera</i> (Lucas,1839)	Orb web
5	Araneidae ( Simson,1895)	<i>Neoscona sp.</i>	Orb web
6	Araneidae ( Simson,1895)	<i>Neoscona sp.</i>	Orb web
7	Araneidae ( Simson,1895)	<i>Neoscona nautical</i> (Koch,1875)	Orb web
8	Araneidae ( Simson,1895)	<i>Neoscona mukerjei</i> (Tikader,1980)	Orb web
9	Araneidae ( Simson,1895)	<i>Araneus mitificus</i> (Simon,1886)	Orb web
10	Araneidae ( Simson,1895)	<i>Cyclosa insulana</i> (Costa,1834)	Orb web
11	Araneidae ( Simson,1895)	<i>Cyclosa sp.</i>	Orb web
13	Araneidae ( Simson,1895)	<i>Eriovixia sp.</i>	Orb web
14	Araneidae ( Simson,1895)	<i>Gasteracantha</i>	Orb web

	Simson,1895)	<i>diadesmia</i> (Thorell,1887)	
15	Araneidae ( Simson,1895)	<i>Ordagarius sp.</i>	Orb web
16	Oxyopidae (Thorell,1870)	<i>Oxyopes naliniaae</i> (Gajbe,1999)	Plant dwelling
17	Oxyopidae (Thorell,1870)	<i>Oxyopes pankaji</i> (Gajbe and Gajbe,2000)	Plant dwelling
18	Oxyopidae (Thorell,1870)	<i>Oxyopes shweta</i> (Tikader,1970)	Plant dwelling
19	Oxyopidae (Thorell,1870)	<i>Oxyopes sitae</i> (Tikader,1970)	Plant dwelling
20	Oxyopidae (Thorell,1870)	<i>Oxyopes assamensis</i> (Tikader,1969)	Plant dwelling
21	Oxyopidae (Thorell,1870)	<i>Oxyopes birmanicus</i> (Thorell,1847)	Plant dwelling
22	Oxyopidae (Thorell,1870)	<i>Oxyopes javanus</i> (Thorell,1887)	Plant dwelling
23	Oxyopidae (Thorell,1870)	<i>Oxyopes sp.</i>	Plant dwelling
24	Oxyopidae (Thorell,1870)	<i>Oxyopes kamalae</i> (Gajbe, 1999)	Plant dwelling
25	Oxyopidae (Thorell,1870)	<i>Oxyopes kusumae</i> (Gajbe, 1999)	Plant dwelling
26	Pholcidae ( C.L. Koch,1851)	<i>Artema atlanta</i> (Walckanaer,1837)	Zunk web
27	Pholcidae ( C.L. Koch,1851)	<i>Crossopriza lyoni</i> (Blackwell,1867)	Zunk web
28	Pholcidae ( C.L. Koch,1851)	<i>Pholcus kapuri</i> (Tikader, 1977)	Zunk web
29	Pholcidae ( C.L. Koch,1851)	<i>Pholcus podophthalmus</i> (Simon, 1893)	Zunk web
30	Pholcidae ( C.L. Koch,1851)	<i>Pholcus phalangioides</i> (Fuessel, 1775)	Zunk web
31	Pholcidae ( C.L. Koch,1851)	<i>Pholcus fragillimus</i> (Strand, 1907)	Zunk web
32	Pholcidae ( C.L. Koch,1851)	<i>Belisana dobabetta</i> (Huber, 2005)	Zunk web
33	Pholcidae ( C.L. Koch,1851)	<i>Smerigiopes pallidulus</i> (Blackwall, 1858)	Zunk web

34	Pholcidae ( C.L. Koch,1851)	<i>Belisana marusiki</i> (Huber, 2005)	Zunk web	53	Sparassidae ( Bertkau,1872)	<i>Heteropoda venatoria</i> (Linnaeus,1767)	Wandering spiders
35	Pholcidae ( C.L. Koch,1851)	<i>Pholcus sp.</i>	Zunk web	54	Sparassidae ( Bertkau,1872)	<i>Heteropoda lentula</i> (Pocock, 1901)	Wandering spiders
36	Salticidae ( Blackwall,1841)	<i>Carrhotus sp.</i>	Jumping spider	55	Linyphiidae ( Blackwall,1859)	<i>Lepthyphantes bhudbari</i> (Tikader, 1970)	Sheet Web Spider
37	Salticidae ( Blackwall,1841)	<i>Chrysilla sp.</i>	Jumping spider	56	Linyphiidae ( Blackwall,1859)	<i>Lepthyphantes lingsoka</i> (Tikader, 1970)	Sheet Web Spider
38	Salticidae ( Blackwall,1841)	<i>Hyllus sp.</i>	Jumping spider	57	Linyphiidae ( Blackwall,1859)	<i>Emenista bisinuosa</i> (Simon, 1894)	Sheet Web Spider
39	Salticidae ( Blackwall,1841)	<i>Myrmarachne orientalis</i> (Tikader, 1973)	Jumping spider	58	Linyphiidae ( Blackwall,1859)	<i>Erigone rohtanensis</i> (Tikader, 1970)	Sheet Web Spider
40	Salticidae ( Blackwall,1841)	<i>Myrmarachne plataleoides</i> (O. Cambridge,1869)	Jumping spider	59	Linyphiidae ( Blackwall,1859)	<i>Collinsia crassipalpis</i> (Caporiacco, 1935)	Sheet Web Spider
41	Salticidae ( Blackwall,1841)	<i>Phintella vittata</i> (C.L. Koch,1846)	Jumping spider	60	Linyphiidae ( Blackwall,1859)	<i>Indophantes pallidus</i> (Saristo and Tanasevita, 2003)	Sheet Web Spider
42	Salticidae ( Blackwall,1841)	<i>Plexippus paykulli</i> (Audouin,1826)	Jumping spider	61	Linyphiidae ( Blackwall,1859)	<i>Labulla nepula</i> (Tikader, 1970)	Sheet Web Spider
43	Salticidae ( Blackwall,1841)	<i>Siler semiglaucus</i> (Simon,1901)	Jumping spider	62	Linyphiidae ( Blackwall,1859)	<i>Minicia vittata</i> (Caporiacco, 1935)	Sheet Web Spider
44	Salticidae ( Blackwall,1841)	<i>Telamonia dimidiata</i> (Simon,1899)	Jumping spider	63	Linyphiidae ( Blackwall,1859)	<i>Troxochorta kashmirica</i> (Caporiacco, 1935)	Sheet Web Spider
45	Salticidae ( Blackwall,1841)	<i>Hassarius adansoni</i> (Audouin,1826)	Jumping spider	64	Linyphiidae ( Blackwall,1859)	<i>Linyphiidae sp.</i>	Sheet Web Spider
46	Sparassidae ( Bertkau,1872)	<i>Heteropoda malitiosa</i> (Simon, 1906)	Wandering spiders	65	Tetragnathidae (Menge,1866)	<i>Leucauge culta</i> (O.P Cambridge, 1869)	Orb Web
47	Sparassidae ( Bertkau,1872)	<i>Heteropoda merkarensis</i> (Strand, 1907)	Wandering spiders	66	Tetragnathidae (Menge,1866)	<i>Leucauge celebesiana</i> (Walckenaer,1841)	Orb Web
48	Sparassidae ( Bertkau,1872)	<i>Heteropoda fabrei</i> (Simon, 1985)	Wandering spiders	67	Tetragnathidae (Menge,1866)	<i>Leucauge decorate</i> (Blackwell,1864)	Orb Web
49	Sparassidae ( Bertkau,1872)	<i>Heteropoda straminiosa</i> (Kundu, Biswas and Raychaudri, 1999)	Wandering spiders	68	Tetragnathidae (Menge,1866)	<i>Leucauge venusta</i> (Walckenaer,1842)	Orb Web
50	Sparassidae ( Bertkau,1872)	<i>Heteropoda veiliana</i> (Strand, 1907)	Wandering spiders	69	Tetragnathidae (Menge,1866)	<i>Leucauge tessellate</i> (Thorell, 1887)	Orb Web
51	Sparassidae ( Bertkau,1872)	<i>Heteropoda warthiana</i> (Strand, 1907)	Wandering spiders	70	Tetragnathidae (Menge,1866)	<i>Nephila clavara</i> (Koch, 1878)	Orb Web
52	Sparassidae ( Bertkau,1872)	<i>Heteropoda nirounensis</i> (Simon, 1903)	Wandering spiders				

71	Tetragnathidae (Menge,1866)	<i>Tetragnatha mandibulata</i> (Walckenaer,1841)	Orb Web
72	Tetragnathidae (Menge,1866)	<i>Tetragnatha maxillosa</i> (Thorell, 1895)	Orb Web
73	Tetragnathidae (Menge,1866)	<i>Tetragnatha sutherlandi</i> (Gravely, 1921)	Orb Web
74	Tetragnathidae (Menge,1866)	<i>Larinia joysankari</i> (Biswas, 1984)	Orb Web
75	Tetragnathidae (Menge,1866)	<i>Larinia phthisica</i> (Koch, 1877)	Orb Web
76	Tetragnathidae (Menge,1866)	<i>Herennia ornatissima</i> (Doleschall, 1859)	Orb Web

Table 2: Margalef index (R1) and Menhinic index (R2) on April 2015

Family	R1	R2
Aranidae	2.12	0.78
Oxyptidae	2.12	0.78
Pholcidae	1.41	0.58
Salticidae	2.12	0.78
Sparasidae	1.41	0.58
Linyphiidae	2.12	0.78
Tetragnathidae	2.12	0.78

Table 3: Margalef index (R1) and Menhinic index (R2) on May 2015

Family	R1	R2
Aranidae	4.24	1.37
Oxyptidae	1.41	0.58
Pholcidae	2.12	0.78
Salticidae	1.41	0.58
Sparasidae	1.41	0.58
Linyphiidae	1.41	0.58
Tetragnathidae	1.41	0.58

Table 4: Margalef index (R1) and Menhinic index (R2) on June 2015

Family	R1	R2
Aranidae	2.17	0.81
Oxyptidae	1.44	0.61
Pholcidae	1.44	0.61
Salticidae	1.44	0.61
Sparasidae	1.44	0.61
Linyphiidae	1.44	0.61
Tetragnathidae	2.89	1.02

Table 5: Shannon index

Family	Value
Aranidae	1.06
Oxyptidae	1.09
Pholcidae	1.09
Salticidae	1.09
Sparasidae	1.11
Linyphiidae	1.09
Tetragnathidae	1.09

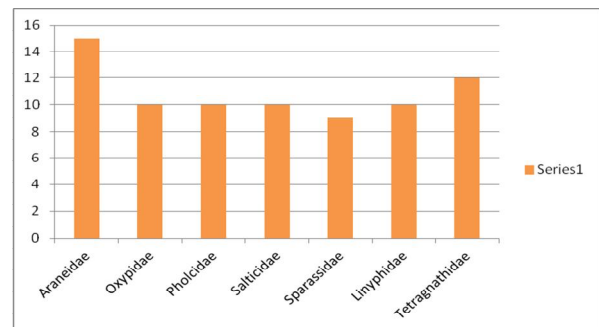


Fig 1: Graphical representation of density of family of spiders during the survey period in Nagaon district.

Some captured images of spider species during study period:



Fig 1. *Neoscona nautical*



Fig 2. *Neoscona crucifera*



Fig 3. *Neoscona bengelensis*



Fig 4. *Argiope aemulla*



Fig 5. *Argiope pulchella*



Fig 6. *Oxyopes* sp.



Fig 7. *Leucauge venusta*



Fig 10. *Pholcus phalangioides*



Fig 8. *Leucauge decorate*



Fig 13. *Plexippus paykulli*



Fig 9. *Heteropoda venatoria*

## V. DISCUSSION

During the study period seven families of spiders came into observation viz., Araneidae, Oxyopidae, Pholcidae, Salticidae, Sparassidae, Linyphiidae and Tetragnathidae. Araneidae and Tetragnathidae are orb weavers, Oxyopidae are plant dwellers, Pholcidae are zunk web weavers, Salticidae are jumping spiders, Sparassidae are wandering spider and Linyphiidae are sheet web weaver. Araneidae family spiders seen during morning hours whrereas Oxyopidae, Salticidae, Sparassidae, Linyphiidae and Tetragnathidae were seen during afternoon time and the Pholcidae family spiders seen anytime.

## VI. CONCLUSION

Spiders are an important contributor to the ecosystem. They act as both predator and prey. Spiders are cosmopolitan in nature. The current research is going on the benefits of spider venom to prevent arthritis. Moreover spider silk has proven to be one of the strongest natural materials. This is currently inspiring mechanical engineering to new heights.

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