

Spiders (Araneae) from Agricultural fields near foothill of Satpura Mountain ranges of Amravati District, Maharashtra, India.

Nandkishor E. Warghat¹, Anil J. Gaur², Navin R. Sharma¹, Sudhir G. Chirde¹, Mamta R. Chandrakar

1. Evolutionary biology group, Department of Zoology, Govt. Vidarbha Institute of Science & Humanities, Amravati-444604, Maharashtra-India. E mail: nanduwarghat@gmail.com
2. Department of Zoology, Barister RDIK collage, Badera.

Corresponding author: Mamta Chandrakar, Department of Zoology, Jankidevi Bajaj, College of Science, Wardha-442001, Maharashtra-India E mail: mamatachandra@rediffmail.com

Abstract:

This paper deals with the study of spider's distribution in agricultural fields adjoining Satpura Mountain Ranges of Amravati district. A total collected spider comprises 12 families, 37 genera and 76 species. Family Araneidae and Thomisidae were dominant, followed by Saltisidae from selected agricultural area. Lycosidae and Tetragnathidae also found in decreasing number of species which is due to their specific habitation. The analysis of guild structure revealed six feeding guilds. Orb web weavers and Ambushers constituted the dominant feeding guild representing 33% and 22% of the total collection respectively. Stalkers and ground runners represent 20% and 17% and foliage hunters and sheet web weavers represent 5% and 3% respectively. A new species of genus *Sassacus* (Beetle like spider), family Saltisidae was found first time in the Vidarbha region. Richness of spider's diversity marked the overall biodiversity which is useful indicator of species richness of agro-ecosystem.

Key words: Distribution, Spiders, Satpura and Vidarbha.

Introduction:

Spiders are one of the most diversified animals which are vital forms universally acknowledged. The spiders belong to order Aracnida, class Araneae, phylum Arthropoda. The spiders are world wide distributed and have an imperative position in global ecosystem. Spiders are ubiquitous in terrestrial ecosystems and abundant in both natural and agricultural habitats (Turnbull, 1973; Nyffeller & Benz 1987). They play an important role in regulating insect pests in agriculture ecosystems (Nyffeller et al. 1994). In India, studies on the population and abundance of the spider assemblages in agricultural crops are few (Sunderland, 1999). The agricultural ecosystem in Amravati district largely depends on rainy season. While small portion of agricultural land is also irrigated by canal, ponds and ditches. The fields are frequently disturbed by farming practices which pressured spider diversity. In this paper, we document the araneofauna of agricultural lands associated with the foothills of Satpura mountain ranges.

The Satpura Range is a range of hills in central India. The range rises in eastern Gujarat state near the Arabian Sea coast, running east through Maharashtra and Madhya Pradesh. The Satpura Range was formerly heavily forested; most of the forests have been destroyed and undergone agricultural usage due to urban civilization. The forest is tropical dry deciduous in nature; teak is the predominant tree species. The common associated floras are *Lagerstroemia parviflora*, *Lannea coromandelica*, *Emblica officinalis*, *Terminalia tomentosa*, *Anogeissus latifolia* and *Oujenia oojeinesis*. Bamboo (*Dendrocalamus strictus*) is wide spread. All these plants generally found in an agro ecosystem. The annual average rainfall in the district is 852.1mm and temperature recorded between 18°C to 46°C.

Materials and Methods:

The study has been carried out during the months of March to September 2010 in the agricultural field adjoining the foothills of Satpura Mountain ranges, which is 55 km from Amravati district of Maharashtra, India..The study area is located North-west at 21°24' and 12°57' north latitudes and 77°58' and 27°40' east longitudinal at 1322 ft. elevation near about 600 to 700 ha. From the study area three sites of agricultural fields selected i.e. (a) Cotton, Jowar plantation, (b) Citrus plantation and (c) soya plantation which is 180-220 hectars respectively.

Sampling was done in the agricultural Lands as following concept of Coddington et al. (1991) with some additional methods, i.e. pitfall trapping, sweep netting, cryptic searching, hand collection and vegetation beating. The collected spider specimens were preserved in 70% alcohol. Adult male and female were identified up to the species level using existing identification keys (Pocock, 1900; Tikader and Malhotra, 1980; Tikader, 1982, 1987). Adult spider specimens were observed under stereo zoom microscope Stemi DV4. Specimens were deposited in the Evolutionary biology Lab, Department of Zoology, Govt, Vidarbha Institute of Science and Humanities, Amravati, Maharashtra-India.

Result and Discussion:

Collected data representing 12 families, 37 genera and 76 species were recorded from agricultural lands adjoining to the foothills of Satpura mountains ranges. Family Araneidae and Thomisidae forms the dominant group (Table 1). i.e. 17 species in both families with 8 and 6 genera respectively. The large number of Thomisidae and Araneidae species found in this region

is due to the availability of flowering plants with the deep vegetation at the border of agricultural and forest area. The Saltisidae represent 9 species and 6 genera. Lycosidae and Tetragnathidae also found in decreasing species number which is due to their specific habitation. The analysis of guild structure (Uetz *et al.* 1999) revealed six feeding guilds i.e. orb web weavers, Foliage hunters, Sheet web weavers, Ground runners, Stalkers and Ambushers (Table 1). Orb web weavers and Ambushers constituted the dominant feeding guild representing 33% and 22% of the total collection respectively. Stalkers and ground runners represent 20% and 17% respectively.

The genus *Sassacus*, till unknown (beetle like spider) is first time collected and reported by us. The species belongs to genus *Sassacus*, family Saltisidae is first time observed in India. As agriculture fields frequently disturbed by the human activity and frequent use of insecticides become harmful to the species diversity. This study brought out the fact that agricultural fields adjoin to the forest has the potential to maintain the richness of spider diversity in the agricultural fields. This rich diversity of spiders indicate useful indicator for the species richness related to agro ecosystem (Noss, 1990).

References:

1. Coddington JA, Griswold CE, Silva D, Penaranda D, Larcher S. (1991). Designing and testing sampling protocols to estimate biodiversity in tropical ecosystems. In: EC Dudley (ed) Proceeding of the fourth international congress of systematic and evolutionary biology. The unit of evolutionary biology. Dioscorides Press, Portland
2. Noss RF. (1990). Indicators of monitoring biodiversity: a hierarchical approach. *Conservation Biology*. 4: 355-364.
3. Nyffeler M. and Benz G. (1987). Spiders in natural pest control: a review. *Journal of Applied Entomology*.103:321–329
4. Nyffeler M, Sterling WD and Dean DA. (1994). How spiders make a living. *Environmental Entomology*. 23:1357–1367
5. Pocock RI. (1900). The fauna of British India, Aracnida. Taylor & Francis, London, 279pp.
6. Sunderland KD, Greenstone MH and Symondson B. (1999). Spiders for pest control. *Pesticide Outlook*. 10, 82-85.
7. Tikader BK and Malhotra MS. (1980). Lycosidae (Wolf-spiders). *Fauna India (Araneae)*. 1:248-447.

8. Tikader BK. (1982). Family Araneidae (Aegiopidae), typical orb weavers. Fauna of India (Araneae). 2:1-293.
9. Tikader BK. (1987). Handbook of Indian spiders. Calcutta, Zoological Survey of India, 251pp.
10. Turnbull AL. (1973). Ecology of the true spiders (Araneomorphae). Annual Review of Entomology. 18:305–348.
11. Uetz GW, Halaj J, Cady AB. (1999). Guild structure of spiders in major corps. Journal of Arachnology.27:270-280.

Table 1.Total number of families, genera and species of spiders with their guild and habitat collected from agriculture lands of Amravati district, Maharashtra-India.

No.	Family	No. of genera	No. of species	Guild	Habitat
1.	Araneidae	8	17	Orb web weavers	Tropical forest Foliage, ground
2.	Clubionidae	1	2	Foliage hunters	Dry forest
3.	Eresidae	1	2	Sheet web weaver	Under stones
4.	Gnaphosidae	4	5	Ground runners	Tree trunk, under stones
5.	Hersiliidae	1	1	Foliage hunters	Under stones, sand dunes
6.	Lycosidae	5	8	Ground runners	Foliage
7.	Miturgidae	1	1	Foliage hunters	Tropical ecosystem
8.	Nephilidae	1	3	Orb web weavers	Grass land
9.	Oxyopidae	1	6	Stalkers	Tropical forest
10.	Saltisidae	7	12	Stalkers	Low vegetation
11.	Tetragnathidae	2	5	Orb web weavers	forest
12.	Thomisidae	6	17	Ambushers	Grass land, flowering plant
Total		37	76		

Table 2. Checklist of spiders collected from agriculture lands of Amravati district, Maharashtra-India.

Family	Genus/ Species
Araneidae	<i>Aranus mitifica</i> - male <i>Aranus cucurbitinus</i> - female <i>Argiope pradhani</i> -female <i>Argiope aemula</i> -Female <i>Cyclosa hexatubulata</i> - female <i>Cyclosa mooduesis</i> - female <i>Cyclosa spirifera</i> -Female <i>Cyclosa insulana</i> -Male <i>Cryptophora citricola</i> -female <i>Leucange decorate</i> -female <i>Neoscona theis</i> -female <i>Neoscona excelsus</i> -male <i>Neoscona mukergai</i> -male <i>Neoscona rumpfi</i> - Female <i>Neoscona nautica</i> –Male <i>Polys nagpurensis</i> –Tikader Female <i>Zygeilla indica</i> - female
Clubionidae	<i>Clubiona drassodes</i> Cambridge male <i>Clubiona tikaderi</i> female <i>Callilepis rukminiae</i> female
Eresidae	<i>Stegodyphus sangivani</i> -female <i>Stegodyphus mirandus</i> - Pocock Female
Gnaphosidae	<i>Gnaphosa pauriensis</i> Tikader female <i>Megamyrmecon ashae</i> Tikader female <i>Zelotes chandosiensis</i> Tikader female <i>Zelotes mandlaensis</i> Tikader female
Hersiliidae	<i>Hersilia savignyi</i> -female

<p>Lycosidae</p>	<p><i>Arctosa indicus</i> -Female. <i>Evippa shivajii</i> - Female. <i>Hippasa agelenoides</i> –Simon Female. <i>Hippasa olivacea</i> -Thorell Female. <i>Hippasa partita</i> -Cambridge Female. <i>Pardosa minutus</i> -Tikader Female. <i>Pardosa shyamae</i> (Tikader) Female <i>Pardosa amenta</i>-female</p>
<p>Miturgidae Nephilidae</p>	<p><i>Cheiracanthium danieli</i> -Tikader female <i>Nephila pilipes</i>-female <i>Nephila clavata</i> -Female. <i>Nephila robusta</i>- Tikader Female.</p>
<p>Oxyopidae</p>	<p><i>Oxyopes sweta</i>-female <i>Oxyopes dineshi</i>-male <i>Oxyopes salticus</i>-female <i>Oxyopes kamalae</i>- Gajbe Female.</p>
<p>Saltisidae</p>	<p><i>Euophrys chiriatapuensis</i> -Tikader Female. <i>Marpissa andamanensis</i> -Female. <i>Marpissa bengalensis</i> -Tikader Female. <i>Marpissa decorata</i> -Tikader Female. <i>Myrmarachne bengalensis</i> -Tikader Female. <i>Myrmarachne orientales</i>- Tikader Female. <i>Myrmarachne plataloiedes</i>- Cambridge male <i>Myrmarachne plataloiedes</i>- Cambridge Female <i>Phidippus indicus</i> -Tikader Female. <i>Rhene decoratus</i> -Tikader Female. <i>Salticus ranjitus</i> -Tikader Male. <i>Sassacus</i> sp.nov.-Female</p>
<p>Tetragnathidae</p>	<p><i>Tetragnath montana</i>-female <i>Tetragnatha mandibulata</i>-female <i>Tetragnatha extensa</i>-male <i>Leucauge decorata</i> -Blackwall Female. <i>Leucauge fastigata</i> -Simon Female.</p>
<p>Thomisidae</p>	<p><i>Xisticus minutes</i>– female <i>Thomisus spectabilis</i> (white) – female <i>Thomisus spectabilis</i> (brown colored face) female <i>Thomisus spectabilis</i> (yellow colored) – female <i>Thomisus andamanensis</i> Female. <i>Thomisus andamanensis</i> Male.</p>

	<p><i>Thomisus projectus</i> Tikader Female. <i>Thomisus projectus</i> Tikader Male. <i>Dieae evanida</i>-female <i>Diata octapoda</i>-male <i>Misumina vitae</i>- male <i>Misumina vitae</i>(green- female) <i>Misumena decorata</i> sp. nov. Female. <i>Misumenops kumaonensis</i> Tikader Female. <i>Misumena mridulai</i> Tikader Female. <i>Strigoplus</i> sp. -female <i>Rigillus</i> sp.- male</p>
--	---

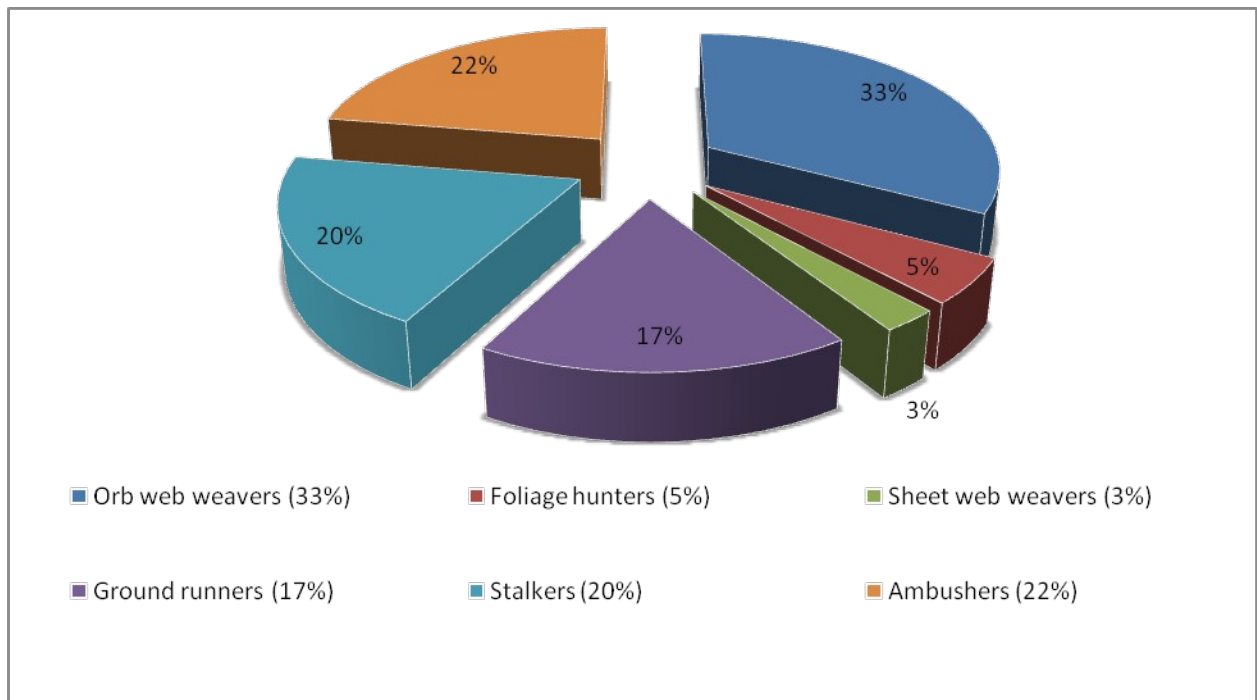


Fig.1. Guild structure of spiders collected from ecotone area of Amravati district, Maharashtra-India.