

SOME INTERESTING HABITAT AND FEEDING ECOLOGY OF SPIDERS OF KHANDWA (M.P.)

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ABSTRACT : Spiders are occurring almost everywhere on or near water, inside or on the ground and from seashore to the tops of the high mountains. They are distributed extensively in the fields, thick forest floors, as well as in human habitation and mostly in deserted buildings, under stones, logs and tree trunks etc. The present study has resulted in the identification of 75 species belonging to 38 genera spread in over 13 families. The faunal status, occurrence and abundance of spiders are found rich in Khandwa district of Madhya Pradesh.

Key words : Habitat ecology, Feeding ecology, Spiders.

INTRODUCTION

The spiders are cosmopolitan and are among the dominating predators of any terrestrial community. In this age of insects, the spiders follow insects wherever they reach. Spiders being natural predators play very important role in control of insect pests (Wheeler,1973; Turnball,1973;Tanaka,1989 and David & Singh,2010).

Spiders are collected from fields, hedges, shrubs, bushes and trees, they have also been found in the fields of paddy, wheat, rice, cotton, sugar cane and other crops, fruit trees (including citrus), vegetables and ornamental plants, stored food grains etc. Spider is skillful in making web in accordance with the food and other related environmental factors, they makes web at different places, vegetation, houses etc. The types of webs vary from the simplest to the most elaborate or intensified forms, in accordance with their species, size, habits and strategy of trapping the prey. Web-building spiders expend considerable amounts of energy and time on building their webs, rather than in moving about in search of prey. Some of the spiders are true orb-web weavers, others make irregular webs or umbrella-shaped inverted webs or sheet webs spread on the ground with a funnel retreat. The weavers make the snares to trap insects for food, while the non weavers hunt the prey by chasing or by staking. By their structure these traps are identified as tube webs, purse webs, sheet webs, tangled web and orb webs. For some spiders just a few loose handling threads or slight webs are enough.

All spiders are carnivorous, they are heterotrophs with respect to its feeding habits. Spider does not use dead body as its prey. After making the food soft on by its saliva, food is converted into semi pest. It is carnivore in nature hence, it gets more protein from the food and the web-thread it secretes, is also full of protein. Its predatory guilds are to catch moving prey and their prey are chiefly insects. They also feed on other spiders, if the situation permits and even on weaker members of their own species (Tikader,1987).

MATERIAL AND METHODS

The district Khandwa is found to be very rich in having variety of habitats such as forests, uncultivated waste land (hills, hillocks etc), grasslands, cultivated lands and other habitats, where the curious creatures like spiders can thrive the best livelihood with their magnitude.

The following two sites differs significantly in the abundance of both the species as well as individuals of the weavers and non weavers categories.

A. Forest area and crop fields (Natural habitats)

B. Urban and Rural area (Residential area)

The description of collections includes both place and time of collection, synonyms of species and key to families. In the web-weaving category, the highest value of species was obtained for the spiders collected from the gardens *i.e.* Jheelon Udyan, Krashinagar garden, Tulsi estate garden, St. Merry church garden, Tagore garden etc. The lowest collection amongst the sites was recorded from the crop fields of Agriculture college, Ahmedpur, Rudhi village, Sargaon Joshi, Chegaon Makhan village

etc. The spider of the families Thomisidae, Gnaphosidae, Oxyopidae, Lycosidae and Araneidae were practically unknown from Madhya Pradesh before Tikader (1960). The members of Araneidae and Uloboridae prepared characteristics orb-web, while irregular triangle or sheet webs were made by members of families Pholcidae, Eresidae, Scytodidae etc.

Spiders were collected mostly by hand and were put into the container having 70% alcohol. Searching was done by jerking the twigs of trees and bushes with the help of stick of forceps, keeping inverted open umbrella below to collect fallen spiders. Spiders were kept separately in plastic tubes (5 cm x 2 cm) containing 70% ethanol with a slip indicating place, date etc. The Sweeping method was employed for collections from tall grasses, weeds, crop fields and plane regions. The sweeping net (50 cm long and 27 cm wide) was operated at crop fields, farms, on ground and tall grasses. Spiders from net were collected and preserved in the containers.

RESULTS AND DISCUSSION

The present work includes the taxonomical position, body characters, sexual characteristics and list of diversified species. The study has resulted in the identification of 75 species belonging to 38 genera spread in over 13 families. The major families were Araneidae, Clubionidae, Gnaphosidae, Lycosidae, Pholcidae, Salticidae, Theridiidae, Thomisidae etc. (Table.1).

Table. 1 Families wise numerical of genera and species.

S.	Spider families	No. of examined genera	No. of examined species
1.	Araneidae	08	21
2.	Clubionidae	02	02
3.	Eresidae	01	02
4.	Gnaphosidae	04	05
5.	Heteropodidae	01	02
6.	Lycosidae	04	11
7.	Oxyopidae	02	05
8.	Pholcidae	03	03
9.	Salticidae	05	10
10.	Scytodidae	01	01
11.	Theridiidae	03	05
12.	Thomisidae	03	06
13.	Uloboridae	01	02
	Total	38	75

The seasonal variation of spider population from different sites has also been observed. In the crop field area, maximum web-weaving individuals had been found in the winter months, while less number of individuals was recorded during rainy season, while abundant presence of all genera of different spider families of residential area were maximum, only in rainy season, while in winter, their presence is moderate and has very low density in summer (Table.2).

Table. 2 Seasonal variation of spider fauna of Khandwa (M.P.).

S.	Spider family	Rainy season	Winter season	Summer season
1.	Araneidae	All 8 genera	<i>Araneus</i> <i>Argiope</i> <i>Neoscona</i> <i>Zygeilla</i>	<i>Araneus</i> <i>Neoscona</i>
2.	Clubionidae	All 2 genera	<i>Clubiona</i>	Nil
3.	Gnaphosidae	All 4 genera	<i>Eilica</i>	<i>Sergiolus</i>
4.	Lycosidae	All 4 genera	<i>Hippasa</i> <i>Lycosa</i> <i>Pardosa</i>	<i>Hippasa</i> <i>Pardosa</i> Nil
5.	Pholcidae	All 3 genera	<i>Pholcus</i>	Nil
6.	Salticidae	All 5 genera	<i>Marpissa</i> <i>Phidippus</i>	Nil
7.	Thomisidae	All 3 genera	<i>Thomisus</i> <i>Xysticus</i>	<i>Thomisus</i>

Remark: Except all above spider fauna of seven families, the individual of other families have been mostly reported only in rainy season.

Out of 75 observed species, web-building spiders were belonging to Araneidae, Eresidae and Theridiidae families. Major group belongs to Araneidae family, these observations were also supported by Tikader (1987) and Patel (2000). Other spiders that prepare no such web to catch their insects prey for food (hunting spiders). Such types are pre-dominant in this area, as the spiders of the family Lycosidae, Gnaphosidae, Clubionidae, Heteropodidae, Salticidae, Oxyopidae and Thomisidae belong to this group. According to feeding guilds in spiders, they can be classified main three classes viz. Hunting spiders, Webbuilding spiders and Ambushing spiders. As per family record Clubionidae, Lycosidae, Oxyopidae, Pholcidae, Salticidae families have hunting spider group. Web-building spiders are included in Araneidae, Eresidae, Theridiidae and Uloboridae families. Family Thomisidae belonging into Ambushing spiders group. Miscellaneous spiders belong to the families like Gnaphosidae, Heteropodidae and Scytodiidae (Table.3).

Table. 3 Different categories of spiders in different taxa observed in Khandwa (M.P.).

S.	Group	Spider family	Genera	Species
1.	Hunting spiders	Clubionidae	02	02
		Lycosidae	04	11
		Oxyopidae	02	05
		Pholcidae	03	03
		Salticidae	05	10
2.	Web building spiders	Araneidae	08	21
		Eresidae	01	02
		Theridiidae	03	05
		Uloboridae	01	02
3	Ambushing spiders	Thomisidae	03	06
4	Miscellaneous spiders	Gnaphosidae	04	05
		Heteropodidae	01	02
		Scytodiidae	01	01

In the present study the family Lycosidae was represented by eleven species belonging to four genera. Almost the hunting genus *Hippasa* is well known to prepare expanded sheets like webs was collected from the abandoned and overgrazed field of residential and crop field area with funnel retreats for hiding. *Lycosa* species was the most frequently met species in the garden. The other hunting spiders of families Gnaphosidae, Clubionidae and Heteropodidae come out of their hiding places to chase their prey.

The orb-webs or dome shaped web was prepared by *Araneus* and *Argiope* of Araneidae on the branches of low bushes or on small trees. Irregular webs were prepared by spiders of Pholcidae and Theridiidae groups. Lycosidae and Eresidae members spins large sheet like expanded webs, while Eresidae members mostly select *Acacia* tree to prepare compact nest, they build their webs on leaves or branches of tree. These *Acacia* tree in large number are observed in wasteland of Khandwa (M.P.), where about 60 to 80 spiders were observed in one web. Silk is used in many spiders to construct various types of webs, where they perform life activities as feeding, resting and brooding. The size of the web depends on the body size of the spider also, small webs are seen congested and take more time in formation than the bigger webs. *Argiope* species prepare attractive webs in small plants, ornamental plants, garden plants etc.

The spiders of the family Lycosidae prepare sheet like expanded web on bases of large trees. They also select to prepare webs, on a lump or slice of clay in the farmland, even at the skirt area of crop field. Lycosidae spiders prepare funnel shaped web and use ant, small insects and black ant as food. Pholcidae spiders prepare irregular shaped web at the corner of the houses, prefer to construct web near tube light to collect nocturnal insects. Sometimes spiders construct the web between two supports, which have large gap, in such a position it secretes long threads. They use mosquito, housefly and small insects as food. It was observed that some spiders also prepare their webs on tree trunk. Theridiidae spiders did not prepare webs in artistic manner. They prepare irregular web on and under plants and use to prey on small insects. The Eresidae members prepared compact nest on leaves and branches of *Acacia* trees due to a sticky secretion of Cribeller silk. It is strongly protective for the young once of the spider. They generally catch flying and jumping insects.

The spiders of the family Oxyopidae use to prey small butterfly, moth and small insects. The spiders of the family Salticidae use mosquito, ant, black ant and small insects, usually flies as food. They show beautiful art to stalking their prey. The spiders of the family Heteropodidae use small butterfly, moth and small insects as their food. Generally it was, observed that spiders of Khandwa region take food whatever was available to them and they have no special preference. It is certain that small sized spiders prefer soft body of the insects, where as large sized group take any part of the body of insect. When small as well as large sized prey stick to the web, spider attracts towards small size insects and not towards large insects. It takes a spread after hunting in the center of the web, while it attracts on other insects whenever possible in its web.

In the matter of reproduction spiders are considered to be the most successful animal. Its courtship behaviour is remarkable. It is also known for its parental care. It forms peculiar type of brood pouch in which young ones grow. Male and female spiders giving food, shelter and protection to their offspring is a parental behaviour. Preparation of brood pouch was observed in Pholcidae, Oxyopidae and Lycosidae families. They have different modes to carry brood pouch. During field study it was seen that different specific spiders carry their brood pouch in different positions. Spiders of Oxyopidae hold the brood pouch with the sternum. Lycosidae group hold it by spinnerets and spider of Pholcidae family hold it in their mouth. Large number of young once is rearing in egg sac by females.

Camouflaging coloration is the harmony of colour, tone and shade of the body of an animal with its surrounding. Many spiders have such mimic ability. Even many spiders do not only possess body colour like their surrounding but are having a peculiar body form resembling inanimate objects. Some spiders resemble other animals because of these mimics; the ant like species is most common, in family Salticidae. Spiders of family Lycosidae mimic with surrounding colour of either stone or soil.

The spiders operate within the balance of nature and their role in nature's plan is beneficial to man who must live on what he grows. Spiders are found almost everywhere in enormous number., the natural enemies of insects, keep hard for Agricultural pest as well as destructive for disease carrying insects, under positive control. On account of their vast numbers, they destroy a far greater number of insects, than do birds or other insectivores. All spiders have venom, which is secreted by a poison gland and injected into through a fang. However, this venom is mainly used to kill the large number of insects and mites on which they feed daily.

The spider faunal status, occurrence and abundance are found rich in Khandwa district of Madhya Pradesh.

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