

A STUDY ON SPIDERS AS PREDATORS IN THE AGRO ECOSYSTEMS

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ABSTRACT: Spiders are one of the most abundant predatory groups in the terrestrial ecosystems as they feed on insects and some other arthropods and thus, they can play important role in pest control. There are more than 3694 genera and 40462 spider species which have been recognized all over the World, out of which about 1066 species have been reported from India. Spiders play an important role in regulating insect pests in agricultural ecosystems but in India, studies on the population and abundance of the spider assemblages in agricultural crops are limited. A preliminary study was conducted to document the spider fauna from the agroecosystems (vegetable fields) of Pauni chak, Jammu, J & K. Pauni chak is known as the vegetable basket of Jammu District as it is just 40 kms from the Jammu city and yields a good amount of seasonal vegetables. The faunistic survey from the vegetable fields yielded 12 species under 9 genera. Araneidae was the most dominant family recording 5 species. On species level, *Cyclosa insulana* was the dominant species. Orb web weavers represented 70% of the total species collected.

KEY WORDS: Agro ecosystem, predatory role and spiders

Spiders are one of the most abundant predatory groups in the terrestrial ecosystems as they feed on insects and some other arthropods and thus, they can play important role in pest control. There are more than 3694 genera and 40462 spider species which have been recognized all over the World, out of which about 1066 species have been reported from India. Spiders play an important role in regulating insect pests in agricultural ecosystems but in India, studies on the population and abundance of the spider assemblages in agricultural crops are limited. Among the predators, spiders are the most familiar and obligate carnivores, which feed on different types of prey in different cropping systems. Spiders are predaceous arthropods which largely feed on insects, their larvae and arthropod eggs. This study analyses the potential of spiders as natural control agents of insect pests in vegetable agro ecosystems. Accordingly the composition, abundance, predatory activities, feeding niche could be the subject of several studies. Thus, Spiders serve as buffers that limit the exponential growth of pest populations in various ecosystems by virtue of their predatory potency. Although the agricultural literature was not specifically addressed in the reviews of Uetz (1991) and Wise (1993), a rich body of work has demonstrated that vegetation diversity of agro ecosystems provides some measure of plant protection (Risch et al., 1983; Andow, 1991a).

The studies presented in the paper were conducted in the vegetable fields at Pauni chak, Jammu, J & K. Vegetables are widely grown in this region. They are the major source of food for the locals. These vegetables are also grown commercially by the farmers for the handsome income they generate.

Jammu & Kashmir

Strategically located Jammu and Kashmir (J & K) State constitutes the northernmost extremity of India. The state is situated between 32° 17' to 37°

052' North latitude and 73° 262' to 83° 202' East longitudes and 81° East of Greenwich falling in the Western Himalayan Region of the country.

One of the largest states of the Indian union, Jammu and Kashmir state covers a total geographical area of 2,22,236 sq.km. The area comprises mainly of mountainous tract including valleys and river basins of which, 24 lakh hectares form agricultural lands. The state of Jammu and Kashmir has agro-ecologically three distinct zones viz. semi-arctic cold desert areas of Ladakh, temperate Kashmir valley and some parts of Jammu region and sub-tropical region of Jammu. There is a sharp rise of altitude from 1000 ft to 28,500 feet above sea level within state's four degree of altitude. The climate of state varies from tropical plains to semi-arctic cold in Ladakh with Kashmir and Jammu mountainous tracts having temperate climatic conditions. The annual rainfall also varies from region to region with 29.6mm in Leh, 650.5mm in Kashmir valley and 1115.9 mm in Jammu.

The studies presented in the paper were conducted in the Vegetable fields at Pauni chak, Jammu, J & K. Vegetables are widely grown in this region. They are the major source of food for the locals. These vegetables are also grown commercially by the farmers for the handsome income they generate (Table 1).

MATERIALS AND METHODS

Spiders were collected from the Pauni chak vegetable fields in September 2012. The collections were made by a visual searching method following the quadrat method. Each farm was divided into 2 quadrates of 5 X 5 feet dimensions. Plants in the quadrat were carefully searched for spiders. Spiders were collected by active visual search and hand picking. Smaller spiders were collected by leading them into vials containing alcohol with the help of a brush dipped in alcohol. Sedentary spiders found on the leaf blades, and those on the webs were caught in the jar by holding it open beneath them and by tapping the spiders into it with the lid. Running and vagabond species such as lycosids were caught by throwing a handkerchief over them and carefully holding them with the hand in the folds, then transferring them to the jars or directly with hands. The collected spiders were preserved in 70% Ethyl alcohol and glycerol. Adult males and females were identified upto species level whereas immature specimens were identified upto genus level only. The scientific names of spiders and their classification follow Platnick (2011). Voucher specimens are lying with the Museum of Deptt. Of Zoology, University Of Jammu, Jammu, Jammu & Kashmir.

During the Survey of vegetable fields at Pauni chak, the spiders collected are as table 2.

RESULTS AND DISCUSSION

Spiders representing 4 families, 9 genera and 12 species were recorded from Pauni chak during the study (Table 3). Araneidae is the dominant family constituting 5 species from 4 genera. On species level, *Cyclosa insulana* was the most dominant species. Guild structure analysis revealed three feeding guilds (Uetz et al., 1999). These are orb web weavers, Stalkers and ground runners. Orb web weavers constituted the dominant feeding guild representing 70% of the total collection. These spiders due to their different foraging habits were observed preying on different types of pests viz, lepidopteran larvae, beetles, bugs, and tangling many arthropods in their webs, thereby checking the pest populations.

Many salticids were also seen wandering in the field over the leaves but could not identified due to the rupturing of the specimens.

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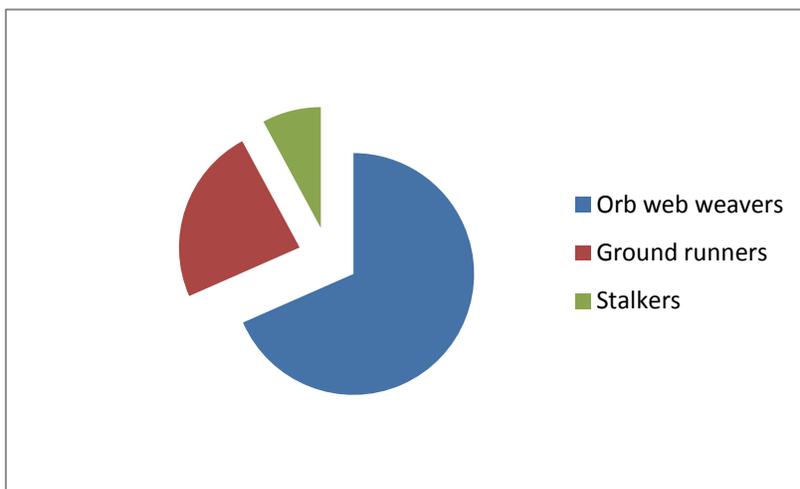


Figure 1. Showing the guild structure of spiders collected from Pauni chak vegetable fields, Jammu.

Table 1. The vegetables grown in the area during the survey period.

S.No.	Common/Vernacular name	Botanical name
1	Round melon	<i>Praectrullus fistulosuos</i>
2	Cabbage	<i>Brassica oleracea, variety - capitata</i>
3	Cauliflower	<i>Brassica oleracea, variety - botrytis</i>
4	Spinach	<i>Spinacia oleracea</i>
5	Karam - sag	<i>Brassica oleracea, variety - acephala</i>
6	Turnip	<i>Brassica rapa</i>

Table 2. Total number of families, genera, species and guilds of spiders reported from vegetable fields at Pauni, Jammu.

S.No.	Family	No. of Genera	No. of Species	Guild
1	Araneidae	4	5	Orb web weavers
2	Tetragnathidae	2	3	Orb web weavers
3	Lycosidae	2	3	Ground runners
4	Oxyopidae	1	1	Stalkers
Total		9	12	

Table 3. Checklist of spiders collected from Pauni chak vegetable fields.

S.No.	Family	Genus/ Species	No. of specimens collected
1.	Araneidae	<i>Araneus mitificus</i> Simon, 1886	10
		<i>Cyclosa insulana</i> Costa, 1834	29
		<i>Neoscona mukerjei</i> Tikader , 1980	21
		<i>Neoscona elliptica</i> Tikader & Bal, 1981	04
		<i>Poltys</i> sp. C.L.Koch, 1843	04
2.	Tetragnathidae	<i>Leucauge clebesiana</i> Walckenaer, 1841	17
		<i>Leucauge decorata</i> Blackwall, 1864	15
		<i>Tetragnatha javana</i> Thorell 1980	11
3.	Lycosidae	<i>Hipassa greenalliae</i> Blackwall, 1867 ♂	08
		<i>Hipassa greenalliae</i> Blackwall, 1867 ♀	15
		<i>Hipassa himalayensis</i> Gravely, 1924	05
		<i>Pardosa</i> C.L.Koch, 1847 sp.	04
4.	Oxyopidae	<i>Peucetia viridana</i> Stoliczka, 1869 ♀	12