

Diversity And Distribution Of Spiders In The Agroecosystems Of Umarched, District Yavatmal (M.S.) India

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Abstract:

Spiders have been the most critical organisms in the diversity of different terrestrial ecosystems. Spiders are generalist predators and the quality of feeding on different insect pests in the agroecosystem make them biological control agents of insect pests in the agroecosystems. Agroecosystems are not well for maintaining the diversity of organisms like insects and arachnids, as they are disturbed time to time. Cultivation practices in the agroecosystems make them vulnerable for decreasing the diversity in the ecosystems. The use of pesticides and the effect of pesticides on human health is an urge for using Integrated pest management systems (IPM). We investigated the agroecosystems of Umarched, the diverse agroecosystems and allied area responsible for the distribution of different spider families in the particular ecosystems. Collections were done in agricultural area near Painganga river and Marsul dam of Umarched. Survey was conducted from October 2022 to March 2023 and found that the most disturbed agroecosystems show less diversity but the diversity of spiders was more in non-disturbed farms such as citrus and sapodilla. 67 individuals belonging to 14 species and 7 families were collected, studied and identified.

Keywords: Spiders, diversity, Umarched, Agroecosystems, Painganga.

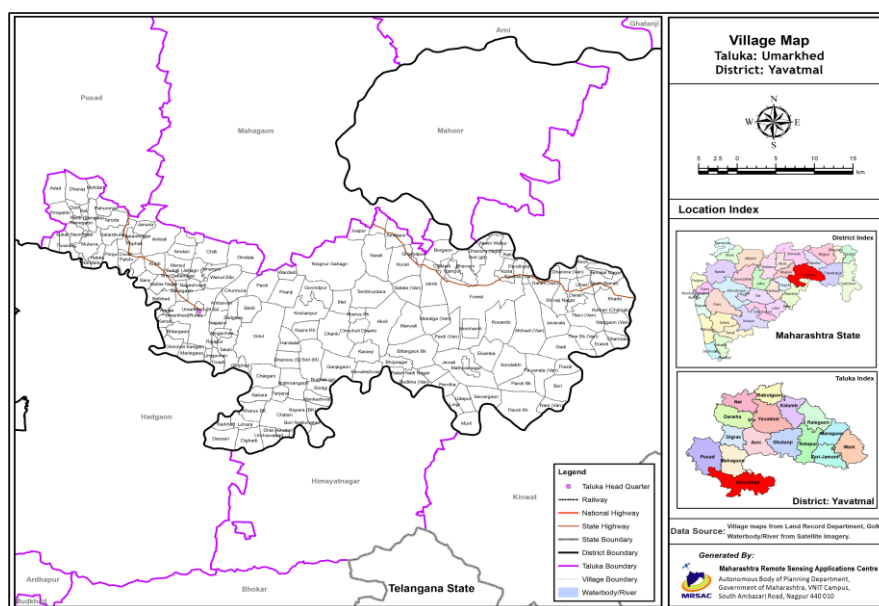
Introduction:

Spider diversity is important in many aspects for the ecosystem. Spiders ability to kill and predate on diverse kinds of insects is crucial for any healthy ecosystem. Agroecosystems are most disturbed ecosystems as cultivation becomes the primary practice for production of different crops. It is also hypothesized that spiders are playing an essential role in maintaining food chain and ecological equilibrium owing to their high abundance and exclusive insectivorous feeding habits (Whitcomb, 1974; Gertsch, 1979; Łuczak, 1979; Young and Edwards, 1990; Wise, 1993; Nyffeler et al. 1994). Spiders are the most common creature on land, constitute an essential portion of the predatory arthropods in several ecosystems. Spiders are known to occupying most of the terrestrial habitats. They are generalist predator and are biological controller of insect pests as they feed and predate on many types of insects. which can act against a broader range of insect pests. Sunderland K. and Samu F. (2000). But the decrease in spider diversity also effect on the diversity of other organisms in the particular habitat and ecosystem. There are many environmental factors like seasonality, spatial heterogeneity, competition, predation, habitat type, environmental stability and productivity that can affect species diversity (Riechert, Bishop 1990). Kharif and rabbi are the major crops cultivated in Maharashtra, whereas, fruit production such as citrus and sapodilla is common in some farms of Umarched, Yavatmal. Yavatmal district is not well researched in the area of diversity, as this study will become the pioneer for rest of the upcoming studies.

Materials and methods:

Study area:

The present study was carried out in the agroecosystems of Umarched, it is located at 19.6°N 77.7°E. It has an average elevation of 416meters (1364feet). Umarched is a municipal town near the Painganga river. It is tehsil place. It is situated 110km from Yavatmal and 72 km from Nanded. Umarched falls in Yavatmal district. It is surrounded by mountains and Ghats from three sides and a plane surface on one of its sides. During the monsoon, one can experience real treasure of nature.



Map of Umarkhed Sampling and Collection:

Sampling was done every 15 days after transplantation (DAT) from quadrates. Spiders were collected from 4 quadrates (1m × 1m) placed at four corners of 10m × 10m area by following methods, between 9.30 – 11.30 hours. A sufficient core area was left to avoid edge effects. All 4 quadrates were searched for a total of one hour. Seven visits were made per site per season. A total of 28 quadrates were studied in each season per site.

Sampling methods:

1. Sweep net: Spiders from herbaceous-shrub small tree vegetation was collected using standardized insect-collecting net. This method is used to collect the foliage spider by this method from herbs and shrubs.
2. Beating sheets: Spiders from trees and woody shrubs were dislodged and collected on a sheet by beating trees and shrubs with a standard stick. 10 beats per tree or shrub were employed in each quadrat.
3. Active searching and hand picking: Spiders from the different agricultural farms were collected using this method. In this method spider specimens were actively searched for 30 minutes per quadrat for searching under rocks, logs, ground debris, and loose dead barks of trees etc.

Identification of Spiders: The adult spiders were identified on species level and others on genus or family level using available literature (Tikader 1987, Barrion, Litsinger 1995). Species were identified and returned to their natural habitat.

Sr. No.	Spider families	Genus/ Species	Number of individuals
1.	<i>Aranidae</i>	<i>Araneus mitificus</i> (Simon 1886)	8
		<i>Argiope aemulla</i> (Walckenaer, 1842)	5
		<i>Argiope pulchella</i> (Thorell, 1881)	6
2.	<i>Lycosidae</i>	<i>Hippasa</i> sp.	4
		<i>Lycosa mackenziei</i> (Gravely, 1924)	3
		<i>Lycosa</i> sp.1	4
3.	<i>Oxyopidae</i>	<i>Oxiopes</i> sp.1	6
		<i>Oxiopes</i> sp.2	6
4.	<i>Salticidae</i>	<i>Plexippus petersi</i> (karsch, 1878)	7
		<i>Hyllus</i> sp.	8
		<i>Plexippus paykulli</i> (Audouin, 1826)	6
5.	<i>Therididae</i>	<i>Argyrodes</i> sp.	2
6.	<i>Tetragnathidae</i>	<i>Tetragnatha mandibulata</i> (Walckenaer, 1842)	1
7.	<i>Thomisidae</i>	<i>Strigoplus</i> sp.	1

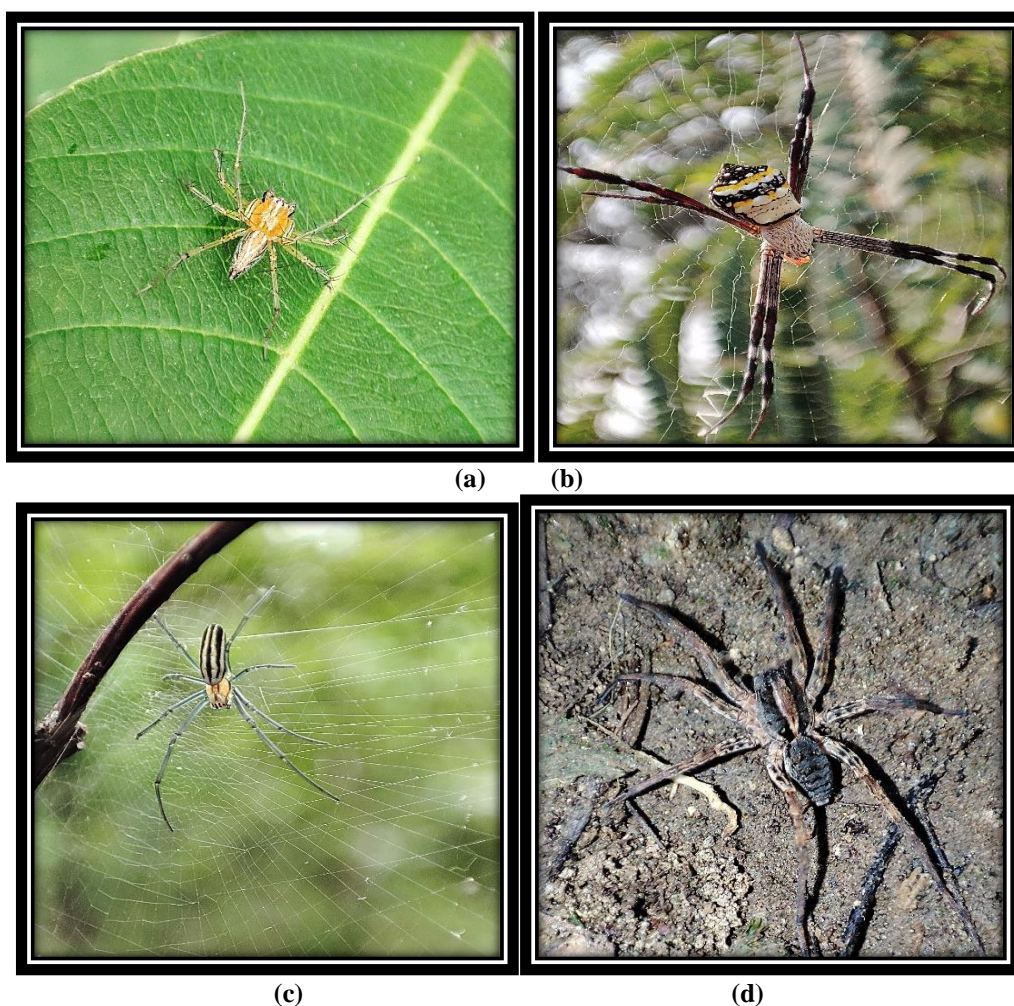


Fig: (a) *Oxyopes salticus* (b) *Argiope anasuja* (c) *Leucauge* sp. (d) *Hippasa* sp.

Results and discussion:

In the present study, we have found 65 spider individuals belonging to the 14 different spider species. In this extensive survey, we have observed that, *Salticidae* (21), *Aranidae* (19), *Oxyopidae* (12) and *Lycosidae* (11) are most common families found in the citrus and sapodilla agroecosystems. Whereas, *Therididae* (2), *Tetragnathidae* (1) and *Thomisidae* (1) are those spider families and species were found in the frequently disturbed farms near Painganga river.

Conclusion:

Spiders are one of the most diverse organisms on earth. Their importance in the ecosystem is because of their feeding behaviour. Extensive knowledge of the biology of spiders shows that although they are indeed polyphagous potential predators, their hunting strategies and localisation in the environment means that each species is in fact a fairly specialised predator (Patrick Marc et.al. 1999). Hence in the different kinds of agroecosystems, the presence of spiders can be the key to prevent the pest from damaging the crop. It has been concluded that, diverse spider species can feed on diverse insect pests and it is useful for the agriculture.

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