Gurukul International Multidisciplinary Research Journal (GIMRJ)*with* International Impact Factor 8.357
Peer Reviewed Journal
https://doi.org/10.69758/GIMRJ/2505I5VXIIIP0030

e-ISSN No. 2394-8426
Monthly Issue
MAY-2025
Issue–V, Volume–XIII

Study of web patterns in spiders of the Akola region, Maharashtra

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Abstract: - Spiders secrete silk for many purposes- to protect their young ones, catch food, make houses, and move around. Spider silk is an elastic and sometimes adhesive material. Silk is secreted as a fluid, which hardens as itoozes out of the silk spinning organs or spinnerets that are mobile finger-like projections. Webs (a characteristicfeature of spiders) built out of silk are used to catch insects, making web-building spiders efficient predatorsand even biological control agents. It is concluded that variability in web pattern is relatedto different families of web-building spiders. These observations illustrate how web pattern enables the identification of otherwise taxonomically ambiguous specimens, such as juveniles or whatever may be the condition of specimens.

Keyword: Spider, Web, Juvenile, Silk.

Introduction: -

Spiders secrete silk for many purposes- to protect their young ones, catch food, make houses and move around. Spider silk is an elastic and sometimes adhesivematerial. Silk is secreted as a fluid, which hardens as itoozes out of the silk spinning organs or spinnerets that are mobile finger like projections. Webs (a characteristic feature of spiders) built out of silk are used to catch insects, making web building spiders efficient predators and even biological control agents (Riechert, 1999 and Symondson *et al.,* 2002). In a typical field survey, the majority of spiders collected cannot be identified to species level because of being juveniles (Brennan *et al.,* 2004). Web building spider communities can be assessed and identified on the basis of characteristics of their web architecture (Gollan *et al*., 2009). The evolution of the web is itself has been studied extensively (Benjamin andZschokke, 2004 and Gan *et al.,* 2015). A number of efforts have been made to trace the history and relationship of species of relationship of species by means of web-resemblances under the assumption that a more "Primitive", simple and irregular web was the forerunnerof the more elaborate patter.

Material and methods: -

Web building is very sensitive to disturbance, especially during the early stages of web building (Zschokke, 1996), because of this, we selected particularly non- disturbing sites in experimental regionto study and observe the webs. Web study was undertaken in Katepurna region. Since spider web-threads are very thin (0.5 to 5 µm), so taking the pictures of webs

requires the clear visibility of threads. To increase the thread visibility, we used a highly resolving camera (Nikon). The recordof every photograph was maintained in laboratory notebook.

The main requirements to capture highly clearphotographs of spider-webs are bright light from the sidesand a very dark background, in this order; we applied ablack sheet of rigid paper as dark background putting just behind the web threads. During web observations, a few numbers of egg sacs and spiderlings were also foundentangled in webs of some spider species. These egg sacs and spiderlings were also collected in plastic jars separately and were subjected to be reared in laboratory studying the biology and feeding efficacy of these species. The webs observed from study area were examined, identified and discussed on the basis of matching the architecture and photographs of webs with the description of webs given by Witt *et al.* (1968) and Sebestian and Peter (2009).

Results and Discussion: -

Orb- webs:

The characteristic feature of an orb web is that the central portion consists of a series of radiating lines of dry and inelastic silk that support a thread of viscid and elastic silk. Orb webs vary in structure, shape and size according to the families and genera of the spiders. In the more symmetrical types of orb webs, the viscid lines extend throughout the major part of its length as a spiral line. Webs of the families Araneidae, Tetragnathid and Uloboridae were found as good examples of orb webs (Fig. 1).

Fig.1: Orb-webs

Sheet web:

In this type of web, the principal part of the web consists of a closely woven sheet extended in a single plane but the threads are extended in all directions. Spiders of the families Linyphidae and Pholcidae construct this type of web (Fig. 2).

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Fig.2: Sheet Web

(Zig-Zag)-web:

Popularly known as "signature spider". This spider shows unique decoration of stabilimentum, which are called as signature. Argiope changes its stabilimentum shape from zig-zag to round shape. The species which was collected changes its stabilimentum design after 2-3 days (Fig. 3).

Fig. 3 Zig –Zag Web

Funnel web:

The common grass spiders of the genera Agelena (Agelenidae) and Hippasa (Lycosidae) were found building to this type of web. The principal part of a funnel web is sheet like in structure, but webs of this type differ from the true sheet webs in having a tube extending from one edge. This tube leads to the retreat of the spiders. Usually, a very loose, irregular net is spun above the sheet of a funnel web that obstructs the flight of insects and causes them to fall on the sheet where the spider, charging from its retreat, can capture them (Fig. 4).

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Fig 4: Funnel Web

The triangular web :

This type of web, shaped like a triangle, had been observed in some members of family Uloboridae (Fig.5a, and b).

(a)

(b)

Irregular web:

In this Types of Web thread extend in all directions as an irregular shape. Most members of the family Theridiidae were found spinning irregular webs (Fig. 6)

Fig. 6 irregular web

The single-line thread web:

The web of *Uloborus* sp. (Uloboridae) was found as a single horizontal line, generally attached at both ends to branches that stretch about four feet across open spaces in the forest. These spiders have developed a marvelous trapping device for catching prey with the help of a single line web (Fig. 7).

Fig. 7 The single line thread web

Conclusion: - It is concluded that variability in web pattern is related to different families of web-building spiders. These observations illustrate how web pattern enables the identification of otherwise taxonomically ambiguous specimens, such as juveniles or whatever may be the condition of a specimen.

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