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Short Communication

Web making activity in spiders in semi-arid zone

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Abstract

The Present study was conducted at. District Mehsana situated in the northern area of Gujarat state. The area under study is tropical arid to semi-arid, which is strongly periodical as well as seasonal. The area is strongly periodical and seasonal. Biological observation gives miracle information on life style of spiders. Many insects and spiders lead almost totally solitary lives with no overlap between the generations and precious little social contact of any kind though they learn like their parents. Such behaviour is known as Fixed Action Pattern (FAP). There are innumerable numbers of behavioural patterns in the entire animal kingdom that are transferred through genes, these acts are already preprogrammed in the central nervous systems through the genetic material. Construction of web by spider in this category. Web preparation is an imprinting behaviour. Orb-web and dome shaped web was observed in Areneidae family. Pholcidae and Theridiidae spiders did not prepare webs in artistic manner. Lycosidae group prepare sheet like expended web. Compact web was formed by Eresidae family group. Araneidae spiders prepare new web every night. Salticidae shows beautiful art to stalking their prey. Eresidae prefers Acacia tree for web construction.

Keywords: Behaviour, genus, species, miracle, spider.

Introduction

It was observed in spider that under various circumstances and in different species, the outward expression of learning varies[1]. We do a common practical to study learning in colleges. A spider is sitting in its web. While vibrating a point on its web, resembling the signal set up an insect gets trapped. For investigating the source of vibration, the spider runs out, incase nothing is found it goes back to its place in the middle of the web[2]. When the same type of neutral stimulus is incident upon several times, the spider do not rushes out for investigation[2]. It prefer to stay in the web center because its gets habituated towards such stimulus. Many insects and spiders lead almost totally solitary lives with no overlap between the generations and precious little social contact of any kind though they learn like their parents; such behaviour is known as Fixed Action Pattern (FAP).

Any account of behavioural development must include some consideration of genetic factors because genes constitute one source of information, which is preset from the very outset of life. While there can be no doubt that genes are involved in the development of behaviour, it is not usually a straightforward matter to investigate how they act. There are innumerable numbers of behavioural patterns in the entire animal kingdom that are transferred through genes; these acts are already preprogrammed in the central nervous systems through the genetic material. Construction of web by spider and parental care all fall into this category[3,4].

Study area: Gujarat state is a costal state situated on western part of India. It falls between latitude 10.1° N and 24.7°N and longitudes 68.4°E and 74.4°E (Figure-1). The main land is almost flat plain made up of alluvial soil, the northern land is a mixture of sandy and alluvial soil. North Gujarat has typically tropical climate as the tropic of cancer passes through North Gujarat. The location of the study area in Mahesana district lies between 23° 02' to 24° 09' North latitude and 71° 26' to 72° 51' East longitude, Four different sites were chosen for the collection of spiders aiming for collection with different habitate, urban area, forest and hilly area, agricultural area, open wasteland area. Here winter climate (Nov-Jan) is cold, Summer climate (Feb-June) is generally hot in northern district of Gujarat state. Monsoon season is experimented between June to October, occasionally with a heavy shrub.

Materials and methods

During field study and collection different types of webs and their preparations were observed. Video shooting was also made to study web construction. Photography was made, whenever it is possible, for different events. Food items were collected from spider's location and identified. Experimental work was also carried out whenever it was necessary for study. All these aspects observed in nature were documented through photographs. With the help of statistical analysis, conclusion was taken. Family wise observation was conducted for three years study.

Results and discussion

Web preparation: Table-1 record shows different categories of spiders on the bases of webs in different taxa in a study area. Out of 90 species, 29 species were observed as web-building spiders belonging to Araneidae, Eresidae, Oeicobidae and Theridiidae families. Major group belongs in Araneidae family. These observations are supported by Tikader[5], Patel[6] and Dhulia[7]. 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 (Figure-1). The orb-webs of the spiders of the genera Araneus, Argiope, Leacange and Gasteracantha are made within the branches (Figure-2) of low bushes or on small trees. Oecobidae spider makes small flat web on windowsills and over cracks on the walls of buildings. Eresidae family spine large sheet like webs. Spider is skillful in making web in accordance with the food and other related factors to it. It makes web at different places, vegetation, houses etc. Family wise observation was recordedin a Table-2. Orb-web or dome shaped web was prepared by Araneidae (Figure-3). Irregular webs were prepared by Pholcidae and Theridiidae groups. Lycosidae members prepare sheet like expanded webs (Figure-1)[8]. Eresidae members select mostly Acacia trees to prepare compact nest (Figure-4). They build their webs on leaves or branches of tree[9].

Table-1: Different categories of spiders in different taxa observed in a study area.

Group	Family	Genera	Species	Total
Hunting Spiders	Clubionidae Lycosidae Oxyopidae Pholcidae Salticidae	02 05 02 03 09	03 16 07 03 18	47
Web-building Spiders	Araneidae Eresidae Oeicobidae Theridiidae Uloboridae	08 01 01 03 01	21 02 01 03 02	29
Ambushing Spiders	Thomisidae	02	04	04
Miscellaneous Spiders	Amauroboridae Gnaphosidae Heteropoidae Pisauridae Scytodiidae Selenopidae Uroctedae	01 02 02 01 01 01 01	01 02 03 01 01 01 01	10
Total	18	46	90	90

Table-2: Web type and its preparation by spiders in different family groups.

Family	Web type	Place	Total observed events	Total web making activity observed	Special remark
Araneidae	Orb-web	Between two branches of plants	17	8	Repair damage web or prepare new web every night
	Dome shaped web	Upper parts of the plants	20	10	
Pholcidae	Irregular	Corner of houses and dark places	25	15	
Lycosidae	Sheet like expanded web	On the ground and bases of large trees	35	05	
Oxyopidae	-	-	-	07	
Salticidae	-	-	-	04	Beautiful art to stalking their prey
Theridiidae	Irregular web	On and under plants	07	03	
Heteropoidae	-	-	-	02	
Eresidae	Compact nest	On leaves and/or branches of tree	10	10	Mostly in Acacia trees

Inclination for web preparation: Species wise shape of the web differs at different places and time. Generally it is observed that they prepare webs at evening time. Even at 22:30 Hours spiders were found to be engaged in web preparation. If web is disturbed, spiders run to the corner and again restart to make web. While making insects enter the web, spider goes towards the insects for hunting. Size of the web depends on the body size of the spider also (Figure-5). Small webs are seen congested and take more time in formation then the bigger webs. Juvenile spiders build webs as regular as adult, they do not need to learn for that[10]. In bigger sized web large spaces are seen. Argiop species prepare attractive webs (Figure-8). Cryptophora species prepare umbrella shape web (Figure-3) which is seen upside down in position. Mostly female spiders have seen in such type webs. They prepare webs in small plants, like Losonia, Ornamental plants, Garden plants etc. Lycosidae family members select to prepare webs on a lump or slice of clay in the farmland, even at the skirt area of crop field also (Figure-1). They prepare funnel shaped web (Figure-1). In wasteland ecosystem webs are observed on Acacia tree in large number (Figure-7). About 60 to 70 spiders were observed in one web on Acacia tree prepared by members of Eresidae family (Figure-4). Pholcidae spiders prepare irregular shaped web at the corner of the houses. They prefer to construct web near tube light to collect nocturnal insects. Sometimes spiders construct the web between two supports, which have large gape. In such a position it secrets long threads[11]. It was observed that some spiders prepare their webs in an open well. To construct a web in a open well is a miracle art for spiders. Theridiidae spiders did not prepare webs in artistic manner. Web of the Eresidae group is very compact due to a sticky secretion of Cribeller Silk[4]. It is strongly protective to young once of the spider.

Figure-1: Sheet webs spread on the ground with a funnel retreat.

Figure-2: Webs between two plants.

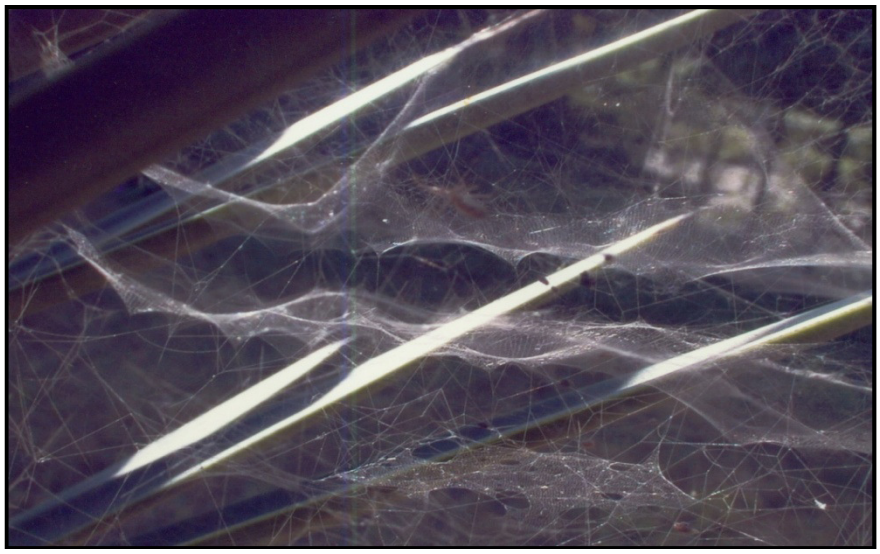

Figure-3: Dome shaped web (Cryptophoracitricola).

Figure-4: Compact web on Acacia tree.

Figure-5: Small sized web (Family: Araneidae).

Figure-6: Big sized web (Family: Araneidae).

Figure-7: Acacia trees as a preferable habitat in spiders.

Figure-8: Disturbed Orb – Web (Family: Araneidae).

Conclusion

Biological observation gives miracle information on life style of spiders. Hunting spiders are dominant in this area (47 species, out of 90 species). Ambushing type spiders were very less (only 4 species of the family Thomisidae). Web preparation is an imprinting behaviour in spiders. It is not monotonus in all species. Spiders of a family Araneidae is dominant with respect to prepare web. Selection of habitat also differ in different groups. Food catching is the principle criteria was seen in all. Some spiders are archtics but not all. This study indicates that creatures are wonderful even though they have small brain. Orb-web and dome shaped web was observed in Areneidae family. Pholcidae and Theridiidae spiders did not prepare webs in artistic manner. Lycosidae group prepare sheet like expended web. Compact web was formed by Eresidae family group. Araneidae spiders prepare new web every night. Salticidae shows beautiful art to stalking their prey. Eresidae prefers Acacia tree for web construction.

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