Original Research Article

Crisis Triggered Web Spinning in *Plexippus petersi (*Karsch,1878)(jump/zebra spider) of Chennai, India

Abstract

Plexippus petersi, common jump/zebra spider of Chennai households, belongs to the family of *Salticidae*. Though spinning of a web is considered to be an inbuilt feature of almost all the spiders, certain spiders do not spin typical webs, and *Plexippus petersi* is one of them. The present study was undertaken, to investigate if this species of spiders can build a web when exposed to any sort of calamity. In this regard, male and female spiders were carefully handpicked, identified and maintained under laboratory condition for a period of four days. After the experimental period, the spiders were relived from captivity and were individually photographed. During the experimental period, it was quite fascinating to observe that the female of this species, secreted silk threads from her abdominal glands, and were woven in to a sheet web. The silk of the web, was sticky in nature, white in color and was able to be molded in to long filamentous structure. This web spinning behavior was only observed in the female and not in male spiders. The results of this study precisely illustrate the fact that, when triggered under the pressure of a disaster, the female spiders can weave a web and evade any uncertainty This amusing observational study, gives a deeper acumen not only about the behavioral aspect, but also explains, the probable success of these tiny arachnids, in evolution which may be probably attributed to their jumping behavior and web building strategy of the females. The female spiders, seem to weave the web, not only to escape from adversaries at times, but may

also utilize it to perpetuate their race, as they are known to lay and protect their egg cases in these loosely braided webs.

Key words*: . Plexippus petersi,* jump/ zebra spiders, Sheet web, *Salticidae.* arachnids, Chennai

Introduction

Spiders belong to arachnida of phylum arthropoda of invertebrates. *Plexippus petersi* is commonly known as the jumping or zebra spider, belongs to the family of *Salticidae* and are quite frequent in India, particularly in Chennai households. The male and females spiders of this species, measure approximately between 6mm-10mm in size, non poisonous, in nature and are frequently found on the walls and floors. As they jump when disturbed, they are often known as jump spiders. These spiders, possess abdominal silk producing glands (Karl Von Frisch, 1978), which help in spinning the web. They move freely on the floor and on the roof, capturing the prey, by sending out their silk thread secretions which almost dangle in the air to capture the prey. (Chauby 2017).As *Plexippus petersi c*aptures the prey using floating silk threads, a typical conventional web may not be necessary for them. However, the females, seem to weave a loose web, more like a retreat or to rest during night, and might later use the same to lay the eggs (Carryn Manicom *et. al* 2008**)**. Jump spiders are grouped under the category of spiders, which don't establish webs. (Chloe Tenn, 2021). On the contrary there are many other spider species, which spin webs, to perform distinct tasks, such as capturing of prey, securing their off springs from dangers, and also as a safe rescue from predators (Romer,2008). Depending upon the functionality determined, the web is designed and built. All webs which are spinned by the spiders are not similar, in size or in shape and they can be of different types, such as, orb webs, cob webs, sheet like webs etc (Jason Bittel, 2019). Apart from these, routine types, few other,

intriguing categories of webs have also been identified *viz*: gum foot webs, platform webs, juvenile webs, and horizontal line webs (Mike Gray, 2018). Web spinning is an in built characteristic feature, of most of the spiders, be it for, prey capture or for defense, or for laying of eggs. However there are certain bizarre instances, where in webs were spinned, when there was water flooding (Ben Cost, 2021) and also when the spiders sense any danger (Kate Latham, 2022). Therefore it is quite evident from these studies, that spiders are capable of spinning webs, for discrete functions, and also may spin webs, when sense any kind of peril. In this regard, the present study was attempted to determine, if the common, jump spider, *Plexippus petersi,* which is not a conventional web spinner, unlike other spiders, can actually spin a web when in jeopardy, to avoid any adversity.

Material and Method

Male and female Spiders were observed and identified using identification catalogues of Biswas and Biswas (2003), Nentwig *et al.* (2003) and Plantik (2007). Female, and male spiders of the species, *Plexippus petersi* were carefully picked using a glass slide and then transferred to two separate glass jars and the lids were closed. They were maintained under laboratory conditions for a period of four days. The lids were provided with two small tiny holes, such that the spiders were able to breathe. After the experimental period, of 4 days, the male and female spiders were photographed using, **Mega pixel camera of the make Sanyo 24 mega pixel (VPCS1275)** and were later set free.

Results

The present study was an observational analysis, where male and female spiders were separately maintained in different containers. After a period , of four days .it was found that the female

spinned a visible dense sheet like web (Fig V.).This behavior was not observed in the container were the male spider was maintained. This observation indicates that may be only the female can spin the web in captivity. The web was white in color, sheet like in appearance and sticky in texture. When the web was removed it was able to be molded in to long strand as presented in the Fig: X. The male spider was identified with typical zebra type stripes on the dorsal surface. Both the dorsal view and frontal view of the spiders are depicted in Fig, I and II.

The female spider was brown in color, and did not show, the zebra pattern on the dorsal surface. The female was found devouring the prey as shown in fig IV after being released from captivity. Figs V, VI, and VII clearly depict the matted, or sheet like appearance of the web spinned by the female of *Plexippus petersi*. Fig-VIII, depicts the loose web sheet web, which was spinned by the female on the roof, when she was free. Fig IX, depicts, the white and sticky web. Fig X, shows, the web which can be molded in to a filamentous structure.

Fig-I (Male Dorsal View)

Fig-II (Male - Frontal View)

Fig-III Female (Dorsal View)

Fig-IV female devouring the prey

Fig-V- Female spining the web

Fig-VI- Sheet like Web

Fig-VII female inside a web in captivity

Fig-VIII Natural web by the female

Fig- IX Natural web, when removed was white in color **Fig-X Sticky web, molded as a thread/fibre**

Discussion

The present study, is an observational analysis, where in the behavior of male and female spiders of the species *Plexippus petersi* was studied under a simulated impasse i.e. captivity. The male and female spiders were maintained in captivity for four days. The study, presented an interesting result. The female spider alone, spinned a web around it, and males did not show this behavior. The spinned web was made of silk, white in color and sticky in texture. When the appearance of the web was analyzed, it had a sheet like appearance which seemed to be similar to the webs of spiders belonging to the family *Lyniphidae.*(Jasson Bittel,2019) The silk threads of the web, when removed were able to be molded in to a thin filament like structure as mentioned earlier. This study, presented an intriguing observation, where in the female was able to spin a web, in captivity, supporting the fact that spiders can spin long continuous webs, when they become vulnerable (Ben Cost, 2021). In recent times, there was an instance, where in different species of spiders when exposed to flood waters have woven continuous long sheets of webs, which helped the spiders to move within the web, without actually being touched by waters. This bizarre observation was reported in June 2021, (Carolyn Crossley, 2021) in

Gippsland, of Victoria in Australia. It was reported that, next day after heavy rains, the spiders in this region, reportedly indulged in a unique survival strategy known as "Ballooning", where the spiders weaved long veil like webs, from end of the tree to another. These webs were massive and some extended up to one kilometer and were sheet like in appearance. This ballooning phenomenon, played to the spiders advantage, as they could move along these webs, without absolutely being drenched in the waters. Similarly in the present observational study, it was seen that, when the females *Plexippus petersi* was in captivity, the hair sensors, or the eyes of the spider may have sensed the crisis and triggered the spinnerets to produce silk, which was weaved into a sheet like web. This sheet like web, seems to have provided a safe guard for the spider from unexpected, deadly mishaps. It is quite admirable to note that the jump spiders, which are in actuality not conventional web spinners, were able to weave a sheet like web, when there was an endangerment. Web spinning trait of *Plexippus petersi* seems to be restricted only to the females, probably because they are liable as the perpetuators of their own clan. Males, on the other hand, which were held in captivity, were unable to spin such a web, and don't seem to possess a visible escape strategy. In summary it may be said that. the females of *Plexippus petersi* seem to be better adapted to evade any crises, as they are bestowed with the capability to spin web whenever there is an urgency.

Conclusion This observational study, gives a deeper insight in to the lives of *Plexippus petersi*. the common jump spiders of Chennai households. The success of these tiny arachnids in evolution may be attributed to their jumping trait, which enables them, to avoid danger and also the web spinning property as a effective game plan to evade any catastrophes .

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