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Research Article

Predatory behaviour of *Langona tatarica* (Charitonov, 1946) in controlled condition in district Swabi, Pakistan

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Abstract:

The growth and reproduction of spiders are directly related to the energy intake rate. Availability of prey, capture ability, feeding and digesting time, silk and energy required to control prey are affected by this rate. The predatory behaviour of *Langona tartarica* (Charitonov, 1946) in controlled conditions was observed at the laboratory of the Department of Zoology, Women University, Swabi, Khyber Pakhtunkhwa, Pakistan. Live specimens of *L. tartarica* in a controlled environment were kept in an experimental display box covered with cover provided varied temperatures of 26 to 38 Celsius. It is first described that *L. tartarica* is an active predator like other Salticids species reported; it attacks prey and grasps with its four legs. It is also firstly observed that *Musca domestica, Papilio casi*, Psychoda spp., and *Reticulitermes flavipes* are their first preference over others like Coleoptera, Hoppers, and Crane fly if provided and avoid attacking or feeding on Oecobius and Oxyopes, (Araneae) in a controlled environment. Furthermore, *L. tartarica* builds a cocoon web in a controlled environment or, if displaced from its wild condition for rest and protection, mostly remains inside and frequently reconstructs the old web with a changed position.

Keywords: Jumping spiders, Growth of spider, Reproduction of spider, Active foragers, Diptera, Biological clock, Behaviour ecology, Feeding behaviour, Controlled environment.

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1. Introduction

Spiders are generalist predators due to predation on prey and other predators, and due to this, they slow their reproductive and aggregative response (Symondson, 2002). Spiders are supposed to be the major predators of insects due to their large number and mostly insectivorous feeding behaviour. Spiders have chelicerae used to inject venom into prey (Selden, 2016). Spiders comprise a variety of feeding behaviours; stenophagy, oligophagy, and autophagy exist within spiders. Most spiders are euryphagous (extensive amounts of invertebrate prey are consumed) (Nentwig & Benz, 1987).

Spiders use flesh and tissues as food for their prey. They will leave their prey's outer shell behind, which another organism uses as food. A limited number of spider species are oligophagous and capture specific prey groups. However, they also capture other types of prey to supplement their diet. Salticid *Portia* spp. It mostly captures and consumes another spider but is a sporadically predator on insect prey (Li *et al.*, 1997). A small number of species are stenophagous and feed on single prey groups. Zodarion species are only ants feeding (Pekár, 2004). Satisfaction has an extreme effect on the foraging process; in case of hunger during foraging, spiders are more willing to face the risk of predation than a gratified spider. Spiders change the selection of prey and movement patterns (Wallin & Ekbom, 1994), and change social arrangement patterns, which affect access to food.

Jumping spiders (Salticidae) have acute vision and complex vision-guided predatory behaviour, but some species are web-invading (Jackson & Pollard, 1996). Many species of this family are active hunters (Richman & Jackson, 1992). Salticids feed on a variety of food sources, including nectar, arthropods, eggs, and larvae (Nyffeler *et al.*, 2016). *Cosmophasis* females feed on butterfly eggs by grasping the egg with their fangs and can consume four eggs at a time as they remain in that location (Hill *et al.*, 2017). *Aellurilus logunovi* Azarkina, 2004 has a mix of feeding behaviours of insectivores and araneophagic or cannibalism, utilising their prey by either squeezing or partially engulfing. The handling time increases with an increased body mass of prey and decreases with an increased mass of predators and reduces the mass of prey (Ali *et al.*, 2018; Hidayat *et al.*, 2022).

The predatory procedure of *Evarcha culicivora* is unusual, as blood-carrying female mosquitoes are selected as its preferred prey. This spider indirectly feeds on vertebrate blood and actively captures Anopheles (all human malaria vectors belonging to specific mosquito genera are singled out by this spider (Ali *et al.*, 2016; Guseinov *et al.*, 2004; Lehane, 2005; Nelson & Jackson, 2006). The aim and objective of this study were to assess the behaviour of *L. tatarica* in controlled conditions and to understand the diversity and distribution of jumping spiders in Pakistan.

2. Materials and methods

A total of twenty-five live *Langona tatarica* specimens were collected from the nearest hills and the undisturbed areas in district Swabi. Specimens were shifted immediately in plastic vacuum vials and placed in a Transparent Display Box or raring cage with cover at room temperature, mostly ranging from 26 to 38 Celsius. We periodically provided different kinds of prey (Table-1 & 2) as food for observation. The data was mainly collected from 8:00 am to 3:00 pm daily. All the observations and specimens were kept at the Department of Zoology Women

University Swabi, Khyber Pakhtunkhwa, Pakistan.

3. Results

It is reported for the first time that *Langona tatarica* (Charitonov, 1946) is an active forager like other Salticids for searching and attaching prey, showed mixed strategies of insectivorous food supplying like Diptera, fruit flies and moths as in (Table-1) and partial feeding or second option if species of Diptera were not provided as given in (Table-2). The consumption of food was processed by two methods, either by sucking fluid or by totally or partially grinding the prey *L. tatarica* is diurnal i.e., they are active at daytime and inactive at night-time. Furthermore, *L. tatarica* avoids araneophagic patterns and other arthropods feeding predatory behaviour as in (Table-3).

Table-1: The *Langona tatarica* (Charitonov, 1946) consumed different species of arthropods

Species	Family
Musca domestica	Muscidae
Papilio casi	Papilionidae
Psychoda spp.	Psychodidae
Reticulitermes flavipes	Rhinotermitidae

Table-2: *Langona tatarica* (Charitonov, 1946) second choices feeding on species

Species	Family
Oecobius	Oecobiidae
Oxyopes	Oxyopidae
Coleoptera	(order Coleoptera)
Hoppers	Cicadellidae.
Crane fly	Tipulidae

Table-3: *Langona tatarica* (Charitonov, 1946) avoids feeding on species

Species	Family
Oecobius	Oecobiidae
Oxyopes	Oxyopidae

It is observed starving the Langona male and female, attacking or capturing food on the third day. It is also observed that by disturbing its habitat or shifting to another place (Laboratory), it remains inactive and immediately constructs webs for night or a safe home to protect itself from the enemy in control conditions. Furthermore, Langona regularly reconstructs/repairs its web; attacks mostly fly than others, so preference food is diptera species that others are in control of.

4. Discussion

Langona tatarica collection and transferring for study in control condition remained Inactive condition as earlier reported in Hidayat *et al.* (2022), as may be a disturbance in the wild habitat

or biological clock, capturing prey, not dependent on silk as reported as earlier reported in Richman and Jackson (1992), *L. tatarica* avoid feeding on oxyopes and *Oecobius* spiders, show frightened remain inside cocoon web. These findings have yet to be reported in any salticidae. *L. tatarica* specialist predators, like other Salticids, initially recognise prey and then attack, capture the prey in four legs, inject venom in prey and squeeze their body. Our result aligned with (Jackson & Pollard, 1996) *M. plataleoides* female, eject venom inside the prey. Puncture prey with their tusks and then suck nutrients out from the holes, preference for smaller prey than the larger size; like Laser and Unzicker (1978) reported *Tetragnatha laboriosa* preference to the prey, which can easily capture and eat partially.

5. Conclusion

The *Langona tatarica* is an active predator and feeds most frequently on insects; Diptera species: *Musca domestica*, *Papilio casi*, Psychoda spp., and *Reticulitermes flavipes*. If the dipteran species are absent, then hunt on members of Coleoptera, hoppers, and cranes and avoid feeding or attacking Oecobius and Oxyopes in a controlled environment. Furthermore, *L. tartarica* builds a cocoon web in a controlled environment or, if displaced from its wild condition for rest and protection, mostly remains inside and frequently reconstructs the old web with a changed position.

Declaration of conflict of interest

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