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STUDIES ON HABIT AND HABITAT, EXTERNAL MORPHOLOGY, FEEDING CAPACITY AND PREY PREFERENCE OF ANT SPIDER, *Myrmarachne* (MAC LEAY) *orientalis* (TIKADER)

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ABSTRACT

Laboratory experiments were carried out to investigate habit and habitat, external morphology, preying capacity and prey preference of ant spider, *Myrmarachne orientalis* collected from different places of U.P. India. The spider is small in size and ground dweller. The cephalothorax is reddish in colour and is longer than wide with a nearly complete transverse constriction at the cephalic and thoracic junction. These are found running over ground in association with ants. These are rarely found on the foliage of crop plants. These spiders do not weave web. These prey on small and medium sized insects by direct jumping.

KEYWORDS: *Myrmarachne orientalis*, Salticidae, Habit and Habitat, Morphology, Preying Capacity, Prey Preference, Bio-Control Agent

Jumping spiders are generally recognized by their eye pattern. All jumping spiders have four pairs of eyes with very large anterior median eyes. These are generally diurnal active hunters. Their well developed internal hydraulic system extends their limbs by altering the pressure of body fluid (haemolymph) within them. This enables the spiders to jump without having large muscular legs like a grasshopper. Most jumping spiders can jump several times the length of their body. When a jumping spider is moving from place to place, and especially just before it jumps, it tethers a filament of silk (or *dragline*) to whatever it is standing on. Should it fall for one reason or another, it climbs back up the silk tether.

Jumping spiders are active hunters which means they do not rely on a web to catch their prey. Instead, these spiders stalk their prey. They use their superior eyesight to distinguish and track their intended meals, often for several inches. Then they pounce, giving the insect little to no time to react before succumbing to the spider's venom.

Spiders are of major importance in ecosystems and are recognized as effective natural control agents in agro-ecology. They are classified into 106 families with about 40,000 species, but the actual number of species is expected to be many times higher. These are carnivorous arthropods and are found all over the world in almost every kind of habitat. They mainly prey on insects, although they may also feed on various other kinds of prey. The population densities and species abundance of spider communities in agricultural fields can be as high as in natural ecosystems (Tanaka, 1989).

Vijayalakshmi and Ahimaz (1993**)** have given a descriptive account of spiders. Gajbe (2004) has provided a detailed account of spiders of Jabalpur, Madhya Pradesh, Rao *et al*. (2005) have described arachnid fauna of Nallamalai region, Eastern Ghats Andhra Pradesh (India) and Majumder (2007) has given a detailed account of taxonomic studies of some spiders from Mangrove and Semi-Mangrove areas of Sunderban, studies on some spiders from Eastern Coastal region of India and various aspects of spiders of Sunderbans, West Bengal (India) respectively. Recently Chaubey and Mishra (2017) have reported *Eucta chamberlini* (Simon) and Chaubey and Yadav (2017) have reported *Plexippus paykuli* (Audeuin) from U.P. India. They have described habit and habitat, morphology, feeding capacity and prey preference of these spider species and also suggested for use of spiders as bio-control agents in controlling insect pests of crop fields.

From the review of literature, it appears that role of spiders as bio-control agents in agriculture, poultry as well as in controlling house-hold insects is being studied in various parts of the world, but unfortunately, no proper investigation, regarding role of these efficient bio-control agents in India is scanty.

In the present investigation, therefore, it has been to find out habit and habitat, external morphology, preying capacity and prey preference of ant spider *Myrmarachne orientalis* collected from various places of U.P. (India).

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MATERIALS AND METHODS

Collection of Spiders

Individuals of *Myrmarachne orientalis* were collected from walls, crop fields, orchards, ornamental and wild plants.

Mehods of Collection

Following techniques were used for collection of spiders:

Jarring

The foliage spider fauna was collected by jerking the plants on a cloth sheet from which the specimens were transferred alive in to plastic containers having pores in their corks for aeration and brought to the laboratory for studies.

Direct Hand Picking

Collection of most web building spiders was made by direct hand picking with the help of test tubes.

Inverted Umbrella

In this method an inverted umbrella was placed below flowering shoots and bushes and when the tree or branch was thoroughly shaken, spiders along with insects fallen to the inverted umbrella. After removing leaves, spiders were transferred into collecting tubes.

Preservation

Before the spiders were permanently preserved they were arranged properly. For this, collected specimens were transferred into petridish containing Isopropyl alcohol. It was kept covered undisturbed for about 2 or 3 hours in order to allow the relaxation of body muscles. The body parts like legs, abdomen, and palps were then arranged in a life like manner with the help of forceps and brush. Spiders were then kept in alcohol in a closed pair of petridish overnight before transferring to tubes for permanent preservation. The glass vial containing preserved specimens were stoppered by a rubber cork to prevent evaporation of alcohol. Alternatively, glass vials were plugged by cotton and group of these tubes were then placed in large bottle containing alcohol. This was the method used for preserving most specimens. Each collecting tube enclosed a label indicating the collection data. Collection data includes the name of the collector, place of collection, date of collection and habitat of collection.

Photography

Live photographs of all important spiders were taken with the help of Web Cam of 12 mega pixel attached to computer. For taking alive photographs, the spiders were anesthetized with mild doses of chloroform in specimen tubes. Generally, major diagnostic features such as dorsal view, ventral view, ocular area and side view were taken for the study. Natural photographs of spiders were taken while they were feeding on insects.

Identification

It was done on the basis of morphometric characters of various body parts. The help was mainly taken from the keys and catalogues provided by Biswas and Biswas (2003) and Plantik (2004), information and photographs available on internet and other relevant literature.

Study of Prey Choice

To study the prey choice of the collected spiders, adult house flies, rice moth, mosquitoes and their larvae and small insects were supplied to spiders which were kept under rearing chambers.

Each rearing chamber (9.5 cm height, 6.0 cm length and width) was consisted of transparent plastic containers. The lid of each container was provided with small holes for aeration. Since, spiders are highly cannibalistic, individual spiders were kept in separate chambers.

To study prey choice, spiders were kept starved for 24 h, then each spider was supplied with larvae and adults of moths, house flies and mosquitoes along with small insects collected from houses and surroundings (five individuals of each kind of prey in each rearing chamber). After 12h number of fed and live prey individuals were counted to find out preference of their prey. Attempts were also made to take live photographs while spiders were preying.

Study of Preying Potential

For this purpose spiders were kept starved for 24h and then each spider was supplied with various kinds of insect pests like adult moths, house flies and mosquitoes

(ten individuals of each type) separately in their individual rearing chambers. After 12h, dead, fed and live prey were counted.

Statistical Analyses

Each experiment was repeated ten times and student's t-test was applied for comparison between two sample means.

RESULTS

Classification

Phylum: Arthropoda, Class: Arachnida, Order:Araneae, Family: Salticideae, Genus: *Myrmarachne* (Mac Leay) Species: *orientalis* (Tikader)

Habit and Habitat

These are small in size and ground dwellers, run over the ground like mutilated wasp, sometimes they are found in association with ants, they rarely found on the foliage of leaves. They catch the prey by direct jumping upon the insects.

Morphometric Description

Cephalothorax reddish in colour, longer than wide, with a nearly complete transverse constriction at the cephalic and thoracic junction. Anterior row of eyes are slightly recurved, posterior row of eyes straight. Chelicerae as long as cephalothorax, outer margin provided with 4-5 slightly larger teeth, inner margin with small teeth. Maxillae and labium longer than wide. Legs thin and long. Abdomen elongatd, distinctly constricted, pedicel very long and prominent (Figure 1).

DISCUSSION

Myrmarachne orientalis (Ant spider) are small in size and ground dwellers, run over the ground like mutilated wasp, sometimes they are found in association with ants, they rarely found on the foliage of leaves. They catch the prey by direct jumping upon the insects as is also reported by Majumder (2007) from West Bengal. Present observation resembles the findings of Mishra (2012).

REMARK

This spider species is being reported here for the first time from U.P. (India). It fed actively on mosquitoes and other insect pests in the flower garden and paddy as well as vegetable fields acting as efficient bio-control agent.

Economic Importance

It feeds actively on mosquitoes (Figure 2) and other insect pests in the flower garden and paddy as well as vegetable fields (Table 1). It acts as an important biological control agent regulating insect populations in rice fields also.

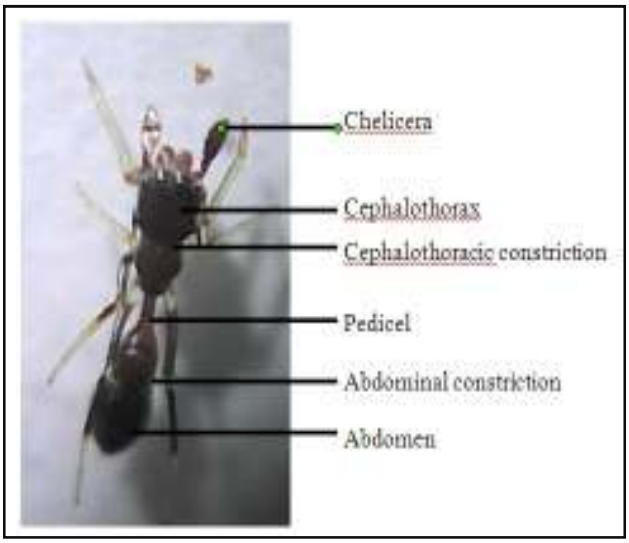

Figure 1: Dorsal view, *Myrmarachne orientalis*

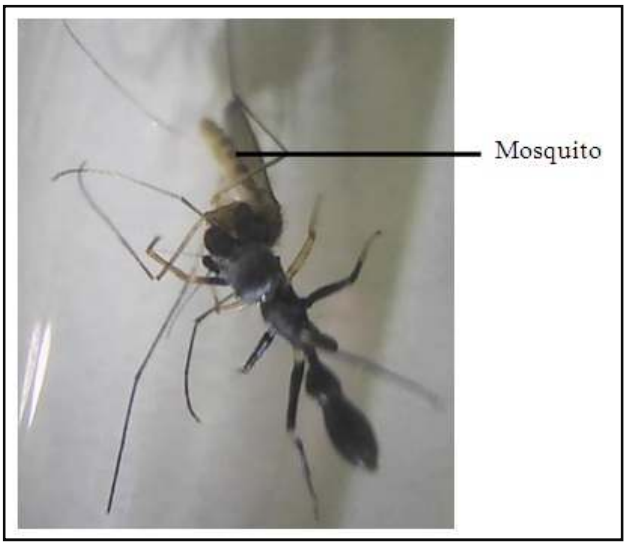

Figure 2: Feeding on Mosquito

Table 1: Feeding potential/ prey preference of *Myrmarachne orientalis*

Type/Number of prey consumed/24h / Spider (Mean ± S.D.)					
Sl. No.	Lepidoptera	Diptera	Homoptera	Orthoptera	Total
1	4	3	1	2	10
2	3	2	2	2	09
3	4	2	1	1	08
4	4	3	1	2	10
5	5	2	2	2	11
6	4	2	2	1	09
7	5	3	1	2	11
8	4	3	1	2	10
9	4	4	2	2	12
10	3	3	1	1	08
Mean±S.D.	4.00±0.63	2.70±0.64[b]	1.40±0.49[b]	1.70±0.46[*]	9.80±1.25[a]

Significance level [a]0.001, [b]0.01 and [*] not significant when compared with adjacent means

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