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Population dynamics of spiders in Ayya Nadar Janaki Ammal College Campus, Sivakasi, Virudhunagar District, Tamil Nadu, India

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Abstract

Spiders play an important role in regulating insect pests in the agricultural ecosystem. There are a large number of species, many of them with high population densities. A survey was conducted in the Ayya Nadar Janaki Ammal College campus from January, 2011 - March, 2011. 29 individuals were collected representing 11 families and 21 genera. From these, 25 species were present throughout the campus; however, only 5 of these were taken in the ground, they are the ground dwellers. *Peucea viridana* (Stolizcka), *Oxyopes hindostanicus* (Tikader), *Lycosa pseudoannulata* (Bosenberg) and *Plexippus petersi*, were common. *P. viridana* was the dominant species followed by *O. hindostanicus*, *L. pseudoannulata*, *P. petersi* and *G. poonaensis* respectively. *P. viridana* comprised 75% of the fauna in these respective areas.

Keywords: spider, diversity, spider fauna, *P. viridana*

1. Introduction

Biodiversity is not only an issue of curiosity but stands firm on the political agenda as a resource for humanity (Kamal NQ *et al.* ^[8]). Spiders are predaceous arthropods which largely feed on insects, their larvae and arthropod eggs (Barnes and Barnes ^[2]; Mansour *et al.*, 1980, 1981, Bartos ^[3]; Nyffeler ^[11]). Being generalist predators spiders feed on a variety of small sized prey relative to their own size (Riechert and Lockley ^[12]; Wise ^[16]). In most of the spiders, consumption is not only limited to the adults but larvae and nymphs are preyed upon as well (Whitcomb and Eason ^[15]; Sunderland ^[14]). On account of these attributes spiders are rated as important biological agents for controlling insect pests in the cotton and farmlands. Before attempting to assess the role of spiders in suppressing pest populations in a given agricultural situation, there must be available sufficient information on their taxonomic diversity and abundance habitat preferences in space and time, hunting strategy, body size of species, predators and prey items and the rate of their consumption, and reproduction. Information on these aspects is essential for the formulations of ecological concepts and conclusions (Horner and Starks ^[6]). The potential of spiders as natural control agents of insect pests in different agroecosystems has been studied by a number of workers (Jennings ^[7]; Nyffeler and Benz ^[10]; Sunderland and Samu ^[13]).

2. Materials and Methods

2.1 Study Area

Ayya Nadar Janaki Ammal College is located in Vadapatti, Sivakasi, Virudhunagar district, Tamil Nadu, India. Sivakasi is located at 9.5' longitude and 7.8' altitude. This city is located 157 meter above sea level. Sivakasi belongs to Virudhunagar District of Tamil Nadu State of India. This is a warm, humid region and the seasonal variation in the temperature ranges from 30 °C – 38 °C. Humidity is also showing seasonal fluctuation.

2.2 Study Period

The investigation was carried out for a period of three months from December 2010 to August 2011. Sampling was conducted in three months at the randomly selected 5 sites.

2.3 Sampling

Sampling was done every month from quadrates. Spiders were collected from 5 quadrates (1sq. m × 1sq.

m) placed at four corners and one centre of 10 sq. m × 10 sq. m area by visual search method between 9.00 – 11.30 hours. A sufficient core area was left to avoid edge effects. All five quadrates were searched. Spiders were collected from the ground stratum and from the terminals of plants.

3. Results

3.1 Taxonomical Characters

The collection yielded twenty nine species belonging to twenty three genera and nine families. Among the nine sub-families, Salticidae (34.48 %) and Araneidae (20.69 %) represented maximum number of species followed by, Oxyopidae (13.79 %), Lycosidae (10.34 %), and Sparassidae (06.89 %). The sub-family, Gnaphosidae, Thomisidae, Tetragnathidae, Pisauridae and Thomisidae yielded the least number of species (03.45 % each) (Table 1).

Table 1: Taxonomical diversity of spiders collected from Ayya Nadar Janaki Ammal College campus

Sub-family	No. of genera	No. of species	% of species
Oxyopidae	2	4	13.79
Lycosidae	3	3	10.34
Araneidae	4	6	20.69
Salticidae	8	10	34.48
Gnaphosidae	1	1	03.45
Thomisidae	1	1	03.45
Sparassidae	1	2	06.89
Pisauridae	1	1	03.45
Tetragnathidae	1	1	03.45
Total	22	29	

Spiders considered as biological predators in nature. Many studies have been carried out to evaluate spiders as biological control agents and present an effective method of using spiders to reduction of pest population. Most of the studies were limited to the identification of spiders, and to investigate the dominant spider species, their regional distribution and seasonal fluctuations. Hence, the present investigation is an attempt to study the biodiversity and the relative abundance of spiders in College campus, Virudhunagar district for a period of three months from December 2010 to August 2011. This study clearly indicated that the Araneidae fauna of this area is rich and diversified. The major component of the spider population found in this ecosystem was the family Araneidae composed mainly of *A. anasuja*, *C. cicastroa* and Oxyopidae mainly composed of *P. viridana*.

4. Discussion

In the present study, twenty nine (29) species of spiders belonging to nine families in college campus were collected and identified. These spiders belonging to the family Salticidae, Oxyopidae, Araneidae, Lycosidae, Pisauridae, Thomisidae, Gnaphosidae, Tetragnathidae and Sparassidae. In this study two species of spiders were observed, one is web weaver and another one is non – web weaver. The web weaving spiders were belonging to the family Araneidae and Lycosidae. The non web weaving spiders were belonging to the family Salticidae, Oxyopidae, Thomisidae, Gnaphosidae, Tetragnathidae and Sparassidae.

The reasons for the fluctuation in different months may be due to seasonal variation and harvesting in the nearby fields to search the new niche (Table 2). The

reasons for the fluctuation in different months may be due to drought, flood, natural calamities, and

disturbance by other animals, and manmade disturbance.

Table: Population dynamics of spiders in College campus, December, 2010.

S. No	Spiders	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	August
1	<i>P. viridana</i>	4.6	4.0	3.8	2.6	4.8	1.8	2.0	2.4	3.6
2	<i>O. hindostanicus</i>	5.8	5.6	4.5	4.8	4.6	1.0	0.8	1.8	4.4
3	<i>O. rufisternum</i>	4.6	4.1	4.6	3.6	3.0	2.4	2.2	2.0	3.8
4	<i>P. latikae</i>	1.0	0.8	1.2	1.0	2.8	3.0	3.2	3.8	3.4
5	<i>L. pseudoannulata</i>	1.6	1.0	1.2	1.2	3.6	3.0	3.6	3.0	4.0
6	<i>H. olivacea</i>	0.8	1.6	0.8	0	2.6	1.0	2.0	2.4	3.2
7	<i>N. lugubris</i>	0.8	0.4	0.4	2.4	3.8	0.8	1.0	1.5	2.4
8	<i>N. bihumbi</i>	2.0	1.0	0.8	3.2	3.0	0.4	0.6	1.0	1.8
9	<i>P. indicus</i>	1.2	0.8	0.6	1.2	1.4	0.8	0.6	0.8	2.0
10	<i>M. decorata</i>	2.0	0.6	1.0	1.0	0.8	0.8	0.8	0.8	1.8
11	<i>M. thakuriensis</i>	0.6	0.4	0.4	0	1.0	0.4	0.2	0.4	2.0
12	<i>O. punctipus</i>	3.8	4.2	3.8	0	1.2	0.2	0	0.4	0.8
13	<i>T. albosinectus</i>	0.2	0.8	0.4	2.4	3.2	0.4	0.2	0.8	1.4
14	<i>H. adansoni</i>	0.4	0.6	0.4	0	0.2	0	0.2	2.0	2.2
15	<i>M. bivittatus</i>	1.8	1.0	1.0	0	0.8	0.2	0.4	1.0	1.6
16	<i>P. paykulli</i>	0.2	0.2	0.4	4.0	4.2	1.2	1.2	1.0	3.8
17	<i>P. petersi</i>	2.0	0.6	0.4	4.8	4.4	0.6	0.4	1.4	3.2
18	<i>P. fimbriata</i>	0.4	0.8	0.6	0	0	0	0.4	0.4	0.8
19	<i>T. dimidiatta</i>	1.0	1.0	1.0	3.2	3.6	0	0.2	1.2	1.8
20	<i>T. phamoniansis</i>	2.8	2.2	2.0	0	0.8	0	0.2	0.2	1.2
21	<i>O. milleti</i>	1.4	2.6	1.8	1.0	0.2	0	0	0.2	1.8
22	<i>Thomisus</i> sp.	0.4	0.6	0.6	0	0	0	0.2	0.2	1.2
23	<i>C. moluccansis</i>	3.2	1.8	1.0	1.4	1.8	1.0	2.8	3.2	6.2
24	<i>A. anasuja</i>	5.6	5.0	5.2	4.2	5.0	1.2	3.0	3.0	4.0
25	<i>C. cicastrorsa</i>	6.2	5.4	6.2	5.2	5.4	1.4	1.6	1.8	4.8
26	<i>G. unquifera</i>	0.2	0.2	0.2	0	2.0	0	0	0.4	0.2
27	<i>G. poonaensis</i>	2.4	1.0	1.0	0	1.0	0	0.2	0.4	1.2

The spider diversity was higher in January (2011) than other months. Twenty nine species of spiders were observed. From the observation it was clear that the numerical superiority of *A. anasuja*, *C. cicastrorsa* and *P. viridana*, were more in the habitat area. Among some of the dominant species was effective predator on variety of pests. This effective predation is due to their very active and excellent vision when compared to the other spiders. The jumping spiders do not build any web (Baldev Prashad^[1]).

The study reveals that maximum number of spiders recorded was Araneidae and Oxyopidae having very good reproducing capacity may have contributed for the higher number of spiders. Kavitha *et al.*^[3] have also made similar observation in cotton field. Moreover Patel (1987) reported the occurrence of five species of Oxyopidae in cotton too. The species richness value was greater in the cultivated rice fields of Coimbatore

than in Aliyarnagar in Tamil nadu and Karaikal in Puduchery (Ganesh Kumar and Velusamy^[4]).

5. Conclusion

It is concluded that the family, Oxyopidae, Araneidae, Salticidae harboured more number of species than other families. *P. viridana* is the most predominant species in the College campus. Due to the very hot climatic condition, the population of spider was decreased during the summer seasons.

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