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Biodiversity of spiders aranea in V.V.V college campus in Virudhunagar district, Tamil Nadu, south India

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Abstract
Spiders are major playing a vital role in the forest ecosystem is the spider. A study was conducted to analyze the diversity of spiders in v.v.vanniaperumal college campus, virudhunagar, Tamil Nadu, South India. A total of 217 species and 5 families of spiders were collected from August 2017 to February 2018. The collections of spiders and identification up to species level taxonomic position, habitats and behaviour of spiders have been studied. The family Araneidae (27.65) harboured highest population followed by two famiies Pholcidae (24.42), Herisilindae (17.51) and the least number of spiders recorded under the family Oxypoidae (15.67) and Tetragnathidae (14.75). The richnesss of the spider species based on the fluctuation in different months may be the seasonal variation and claimate change in the study area. The Population of spiders was abundant species richness and diversity was high during the month of Augest 2017 to September.

Keywords: spiders, V.V.V. college, diversity, morphometry

Introduction
Biodiversity is the total sum of variety of the living organisms which includes genetic diversity and their assemblage (Walker, 1992) [17]. Spiders are indicators of overall species richness and health of terrestrial Communities. They are known to play an important role in the regulation of ecological balance (Foelix, 1996) [3]. Spiders develop a great variety of life histories, behaviour, morphological, physiological and ecological adaptations (Turnbull, 1973, wise, 1993, Foelix, 1996) [15, 18, 3]. Spiders are one among the important predators of insect's pests in the ecosystem. They are one of the major groups of generalist predators that are needed in the development of efficient sustainable, low in put agricultural system (Ekschmitt *et al*; 1997) [2]. First detailed account of Indian spiders was provided by (Pocock, 1900) [7] which lists 216 spider species under 17 families. Recent works on Indian spiders have been reviewed by (Sebastian and peter 2009) [13]. Many spiders often rely on a distinct complex of environmental habitat factors with respect to species specific ecological demands. Several studies depict that climate factors significantly influence the diversity of spider (Rypstra 1986 & Bonte *et al;* 2002) [11, 1]. The variety of life and its process of spider communities includes a variety of living organisms and the genetic difference among the spiders are confined to the ecosystem in which they occur, besides the ecological and evolutionary processes keep them functions, yet ever changing and adapting (Ried and miller, 1989; Noss and cooperrider, 1994) [10, 6]. Still there exists a major gap in the knowledge of biodiversity of spiders in many parts of the country. Taking the above points into consideration in the present work an attempt was made to document the diversity of araneae in v.v.v. college campus, Virudhunagar District, Tamil Nadu, South India.

Materials and Methods
The study area was located in v.v.vanniaperumal college campus, virudhunagar district, Tamil Nadu, South Inidia located at 10.^{3} longitute and 7.5^o altitude. This city is located 182 meter above sea level. This is a warm, humid region and the seasonal variation in the temperature range from 30^{O}c-38^{o}c. Humidity is also showing seasonal fluctuation. The investigation was carried out for a period of seven months from August 2017 to February 2018. Morphometry pertaining to total length, carapace, and abdomen was carried out. The collected spiders were preserved in 70% alcoholaid they were identified with the help of key to Indian spiders provided by (Tikader 1987) [14].

Result and Discussion
The population dynamic of spider collection yielded 217 Species belonging to five families. Among the families Araneidae (27.65%), Pholcidae (24.42%), Herisilindae (17.51%). The sub family oxypoidae (15.67%) and Tetragnathidae least Number of species (14.75%). Morphometric characters were used up to describe the individual species systematically up to species level as listed in Tabel-1, Table-2 and figure-6.
All the analyzed spiders have hairs throughout the body. The colour of the body is varied from black to white. More over combination of body colour was also observed in the study. The Number of eyes varied from 6 to 8 among the web spinners. The webs are higher spherical shape or irregular

shape. Spiders considered as biological predators in nature. According to a recent study there are at least 200 species of spiders in the Western Ghats and the dominant families of spiders reported are Argiopidae, Salticidae, Thomisidae, Oxyopidae, Lyniphidae and Hersilidae (Rajashekar and Reghavendra, 2001). Spider has been considered among the best friend of man because they eat insects most of which are harmful to mankind. There are no specific prey for which the spiders seem to have fancy, they kill and eat whatever insects are available. However, the eat grass hoppers and locusts which destroy agricultural crops. Some large spiders have been reported to eat animals such as mice, birds, lizards, frogs and fishes (Wallace, 1980; Savory, 1928) [16, 12]. The density of spider in the land area depends on the various factors whereas; the species richness depends on the type of vegetation. These observations were in close agreement with the reports of (Richert and Lockley, 1984 and Harwood *et al*., 2001) [4] had suggested that the variation in the density of spider depends on the prey density. This response may be in the form of aggregation, increase reproduction or both, In addition the spiders have exhibited both aggregative and reproductive response to prey number (Richert and Lockley, 1984 and Marc, 1999). The spider's fauna of agro ecosystem is least studied in India barring a few works of Sadana *et.al.* And Baldev Prasad *et. al*. Many studies have been carried out to evaluate spiders as biological control agents and presenting effective methods of using spiders to reduction of pest population. The present investigation is an attempt to study the biodiversity and the relative abundance of spiders in v.v.vanniaperumal college campus for a period seven months from August 2017 to February 2018. This study clearly indicated that the Araneidae, Herisilindae and pholcidae fauna of this area is rich and diversified.

Table 1: Spiders collecte /acre monthly from August 2017 to February 2018 in v.v.v.college campus in virudhunagar

Family	Months								
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total	%
Araneidae (Argiope pulchella)	18	12	10	7	8	3	2	60	27.65
Pholcidae (Crossopriza Lyoni)	14	10	11	8	5	3	2	53	24.42
Herisilindae (*Herisilia Savingnyi)*	10	11	4	5	4	2	2	38	17.51
Oxyopidae (Oxyopes sp.)	8	9	7	4	3	1	2	34	15.67
Teragnathidae (Nephila Kuhlii)	9	8	5	3	3	2	2	32	14.75
Total	59	50	37	27	23	11	10	217	100

Fig 1: Araneidae *(Argiope Pulchella)*

Fig 2: Herisilindae *(Herisilia Savingnyi)*

Fig 3: Pholcidae *(Crossopriza Lyoni)*

Fig 4: Oxyopidae *(Oxyopes Sp)*

Fig 5: Teragnathidae *(Naphila Kuhlii)*

Table 2: Showing the systematic and morphometry of spiders in v.v.v college campus

Species	Family	Key Characters	Morphometry
Argiope pulchella (Thorell)	Araneidae	Carapace flat, chelicerae small and week. Legs long and strong anterior. Edge of epigynal (vulva) with thin and in conspicuous lip; epigynal pentagonal, banded alternatively with brown and yellow.	Total length 15.00mm carapace 5.00mm long, 4.00mmwide, abdomen 11.00mm long 10.00mm wide.
Crossopriza lyoni (Black wall)	Pholcidae	Carapace flat, sub circular with fover and cephalic grows clypeus very high mouth parts suctorial legs exceeding long and slender.	Total length 4.60mm carapace 1.00mm long, 2.00mm wide abdomen3.20mm wide.
Herisilia Savignyi	Herisilindae	Posterior spinnerets enormously long, leg long, often seen on the surface of barks with spread out legs concealing its	Total length including spinnerets 11.5mm cephalothorax 2.3mm long and 3.7mm wide,

(Lucas)		presence, eight eyes closely grouped.	abdomen 4.7mm wide, spinnerets 4.5mmlong.
Oxyopes sp. (Tikader)	Oxyopidae	Cepalothorax and legs brownish green abdomen dirty white cephalic region slightly high, abdomen narrowing behind, clothed with fine and some spatulate hair ventral side uniform dirty white.	Total length 10.00mm carapace 3.50mm long 3.00mmwide, abdomen 7.00mm long 4.00mm wide.
Nephila Kuhlii (Doleshall)	Tetragnathidae	The cephalothorax is thin and flat with the cephalous raised at the rear of the cephalus. There are two short horn like projections the edge of the web and is very smaller than the female.	Female 50-60mm Male5-6mm the legs are very long and red in colour the abdomen black in colours.

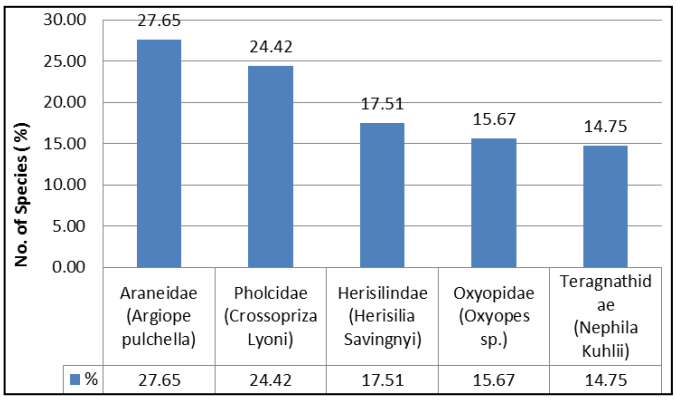

Fig 6: Showing the diversity of Spider species (%) in v.v.v college campus

This major component of the spider population found in this campus was the family Araneidae mainly of *Argiope pulchella*, Herisilindae composed mainly *Herisila savignyi*, Pholcidae composed mainly of *Crossopriza lyoni*, Oxypoidae composed mainly of *Oxyopes sp* and Tetragnathidae composed mainly of *Nephila kuhlii* were higher during August and September and lowered during February. 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. The non-web eaving spiders were belonging to the following Oxypoidae, Herisilindae, pholcidae. The reasons for the fluctuation in different months may be due to seasonal variation and harvesting in the nearby field to search the new niche. The reasons for the fluctuation in different months may be due to drought, flood, Natural climates and disturbance by students.

Conclusion

The study show infermation related to the species distribution in a particular habitat with response to environment, disturbance, and availability of food. The spiders such as *Argiope pulchella*, *Herisila savignyi* were the predominant species of spiders in the study area. The increase in the population of spiders suggests that spider population is influenced by the increase in prey population in this regard we conclude that the spider like *Argiope pulchella* and *Herisila savingnyi* are the predominant species of biological controlling agents.

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