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A study on the status and diversity of spiders in shanthukadu sacred grove, Nagapuzha

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Abstract
Sacred groves are community-based repositories of biological diversity. They are landscape with typical geographical features and are protected based on religious practices and faith. This study aims to analyze the spider species abundance in Santhukadu sacred grove, at Nagapuzha village. Spiders were collected during the winter season from the sacred groove during December 2017-February 2018. Specimens were collected twice in a month. Different collection methods used for the study were opportunistic observation and quadrat sampling method. A total of 30 species of spiders coming under 26 genera belonging to 11 families were sighted from Santhukadu sacred grove. The identified families were Aranaeidae, Lycosidae, Oxyopidae, Salticidae, Tetragnathidae, Theridiidae, Thomisidae, Hersiliidae, Sparassidae, Pholcidae, Corinnidae. Spider diversity was remarkably low in the winter season than rainy season. In the rainy season the species richness is remarkably high, but in the summer season the species diversity lower than the winter season. The webs are different in each family. The study highlights the winter season diversity and role of the spiders in the sacred groves.

Keywords: sacred grove, repositories, quadrat sampling, opportunistic observation, species richness

Introduction
Spiders are the largest group of arachnids in the order of araneae. It is divided into two suborders, the mesothalae and the opisthothalae. It splits into two infraorders: mygalomorphae (earliest spiders), and araneomorphae (existing spiders). The segmented spiders are distinguished by interactions on the top of the abdomen, by the evidence of spiders they ancestry with scorpions (Culin *et al*. 2014) [1]. Spiders differs from other arthropods because of their body parts are combined into two tagmata. A cylindrical pedicel is connected between the cephalothorax and abdomen (Wise1993) [5].
Arachnids are one of the important orders and rank seventh in total species diversity. Spiders are lived worldwide, except from Antarctic continent, and they have been reported from almost every habitat without of air and sea settlement. around 45,700 spider species, and 113 families are recorded by taxonomists as of November 2015. There is still some controversy over their family classification (Druba 2016) [2].

Methodology
Study area
This study aims to record and analyze the diversity of spiders in Shanthukadu sacred grove situated in Nagappuzha. Nagapuzha village is coming under Muvattupuzha Taluk in Ernakulam District of Kerala State, India. It comes under Kalloorkad Panchayath. It belongs to Central Kerala Division. It is located at 12 Km from Muvattupuzha. Nagapuzha is surrounded by Thodupuzha Taluk towards south Muvattupuzha Taluk towards west, This Place is in the border of the Ernakulam District and Idukki District. Shanthukadu sacred grove has great conservation significance and is conserved under the combined effort of native people and Forest Department of Kerala from 2010. During ancient time Shanthukadu sacred grove, which is associated with Sree Durga Bhadra Temple, Nagappuzha, Kalloorkkad was a forest area. Due to anthropogenic activities, there has been a reduction in biodiversity of the area over the years. It is now under the ownership of Travancore Devasam Board. The Kerala Forest and Wildlife Department initiated a programmed to conserve biodiversity in sacred grove. The aim of the programmer is to restore the biodiversity of the degraded sacred grove and creating awareness among people. Sacred groves are any grove of trees protecting by religious importance to some peculiar culture. Shanthukadu sacred grove covers an area of 2 acres 85 cent with survey number 906/2. The average summer temperature is 30.5 °C (87 °F) and average winter temperature is 23 °C (75.2 °F).

Sampling of spider
Study was conducted during December 2017 -February 2018. Observations were carried out in the morning between 9-11am. Specimens were collected twice in a month. Collection was mainly by the hand-picking method by gently knocking the specimen by hand and transferred it into a transparent plastic bottle. Collected specimens were preserved in 70% Isopropyl alcohol. Collected spiders were observed under dissection microscope and identified using identification keys. also, the identification of specimens was made by using standard textbooks such as “SPIDERS OF INDIA” (Sebastian and Peter 2009) [3]. Identification was confirmed with the assistance of experts.

Results and Discussion
In the present study conducted in Shanthukadu sacred grove revealed the presence of 534 individuals of spiders comprising of 30 species which belong to 26 genera and 11 families. The identified families were Araneidae, Lycosidae, Oxyopidae, Salticidae, Tetragnathidae, Theridiidae, Thomisidae, Herisillidae, Sparassidae, Pholcidae, Corinnidae (Table 1). Among the spiders observed the highest number of individuals was contributed by the

species *Plexippus petersi* (48 individuals). The species recognised as least abundant were *Gea spinipes* and *Phaecius malayensis* both is represented total 12 individuals (Table 2). Among the identified species of spiders were recorded from the sacred grove, one of the species was very rare, three species coming under rare, and nine species were found to be occasional, ten were common and seven species were very common (out of total number of the species observed) in the study area. During the present study, the most abundant spider families were recorded as Salticidae (194 individuals), followed by Araneidae (99 individuals) and Oxyopidae (68 individuals). corinnidae with nine representative individuals was the least members family (Table 3). Greatest abundance of families is observed during the month of December. Interaction of seasons on spider populations and its diversity is so significant. Increase in spider population and variety are tied to the favorable climatic condition and feeding availability. Starting of the winter period the species diversity is high but with the onset of dry period the diversity decreased (Figure 3).

Some families can have the seasonal adaptation characteristics in their lifetime. In the starting of the winter season, spider eggs are more hatched. the baby spiders situated in the web as a cluster. But ending of the winter season the temperature slightly increased.at that time they like to hide in the small holes of the tree barks, stones etc. many of the male and female spiders also like to rest on this winter season (like *Nephila pilipes*). They also get disappear during in the summer.

The shedding of the leaves in the ground may help the salticidae and corinidae family to secure their habitat. But in the case of orb weavers, they get more affected during this season, high falling of leaves may get disrupted the habitat and ruin their webs. sacred groves are the protected places under religion base. It is biodiversity rich areas. This study shows many of the spider families are situated in this sacred grove. In addition, these places contain wild variety of tree species and rare medicinal plants. This study shows there is a need to protect the Sacred groves under any aspect.

Table 1: Checklist of spider observed from Shanthukadu sacred grove.

Sl. no.	Family	Common name	Scientific name
1	Araneidae	Orb -weaver spiders	*Argiopae anasuja* *Argiopae catenulate* *Nephila pilipes* *Gasteracantha geminate* *Anepsion maritatum* *Gea spinipes*
2	Lycosidae	Wolf spiders	*Pardosa sp* *Hippasa aglenoides* *Hippasa holmerae*
3	Oxyopidae	Lynx spiders	*Oxyopes salticus* *Oxyopes birmanicus* *Oxyopes sunandae*
4	Salticidae	Jumping spiders	*Brettus cingulatus* *Hasarius adansoni* *phintella vittatta* *Chrysilla volupe* *Telamonia dimidiate* *Plexippus petersi* *Plexippus paykulli* *Thiania bhamoensis* *Phaecius malayensis*
5	Tetragnathidae	Long jawed spiders	*Opadometa fastigata* *Tylorida ventralis*
6	Theridiidae	Tangle web spiders	*Theridion manjithar*
7	Thomisidae	Crab spiders	*Camaricus formoses* *Thomisus pugilis*
8	Hersilidae	Tree trunk spiders	*Hersilia savigyni*
9	Sparassidae	Hunts man spiders	*Heteropoda vanatoria*
10	pholicidae	Cellar spiders	*Smeringopus pallidus*
11	Corinnidae	Ground sac spiders	*Castianeira zetes*

Table 2: Abundance of spiders in Shanthukadu sacred grove

Sl. no.	Scientific name	Abundance	Status
1	*Argiopae anasuja*	32	C
2	*Argiopae catenulata*	20	C
3	*Nephila pilipes*	14	O
4	*Gasteracantha geminata*	16	C
5	*Anepsion maritatum*	12	C
6	*Gea spinipes*	5	R
7	*Pardosa sp*	15	O
8	*Hippasa aglenoides*	18	O
9	*Hippasa holmerae*	21	R
10	*Oxyopes salticus*	19	VC

11	*Oxyopes birmanicus*	38	VC
12	*Oxyopes sunandae*	11	C
13	*Brettus cingulatus*	13	O
14	*Hasarius adansoni*	14	R
15	*phintella vittatta*	13	C
16	*Chrysilla volupe*	16	O
17	*Telamonia dimidiata*	25	VC
18	*Plexippus petersi*	48	VC
19	*Plexippus paykulli*	41	VC
20	*Thiania bhamoensis*	12	O
21	*Phaecius malayensis*	7	VR
22	*Opadometa fastigata*	16	C
23	*Tylorida ventralis*	14	C
24	*Theridion manjithar*	18	C
25	*Camaricus formoses*	10	VC
26	*Thomisus pugilis*	12	O
27	*Hersilia savigyni*	17	C
28	*Heteropoda vanatoria*	13	VC
29	*Smeringopus pallidus*	15	O
30	*Castianeira zetes*	9	O

(Abbreviations are Common-C, Very Common -VC, Occasional- O, Rare- R, Very Rare- VR)

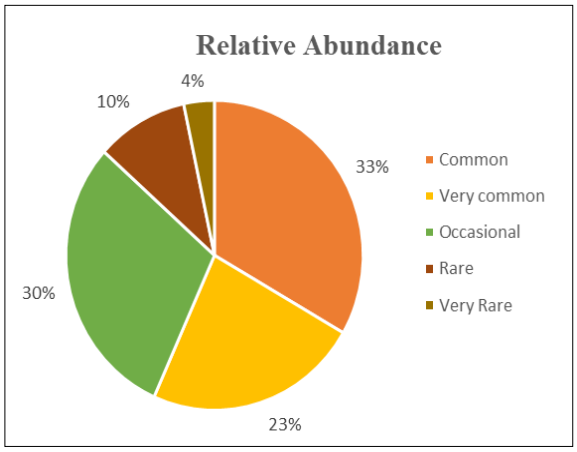


Fig 1: Status of spiders observed in Shanthukadu sacred grove

Table 3: Family-level abundance of spiders recorded during the three consecutive months of sampling in Shanthukadu sacred grove.

Sl. no.	Family	December	January	February
1.	Araneidae	52	29	18
2.	Lycosidae	28	17	9
3.	Oxyopidae	34	23	11
4.	Salticidae	93	66	30
5.	Tetragnathidae	16	8	6
6.	Theridiidae	9	6	3
7.	Thomisidae	11	7	4
8.	Hersillidae	10	4	3
9.	Sparassidae	9	3	1
10.	Pholcidae	7	6	2
11.	Corinnidae	6	3	0
Total		275	172	87

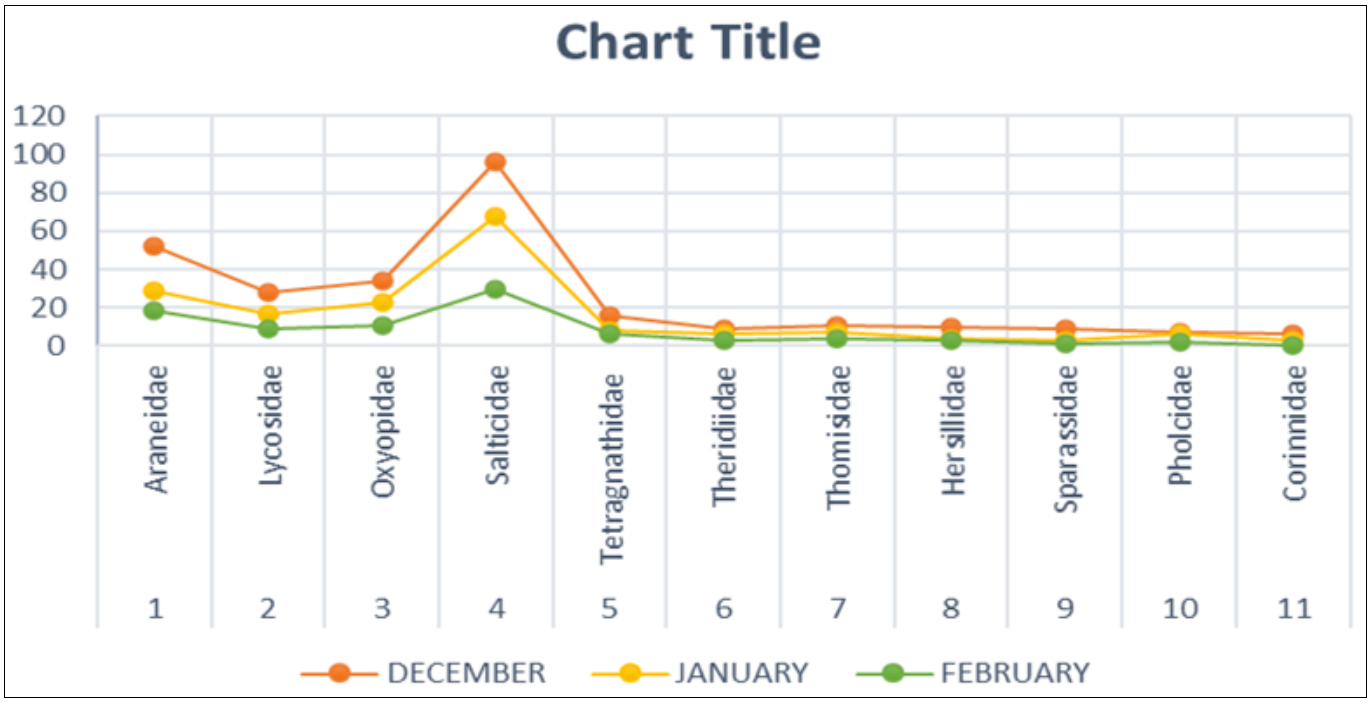


Fig 2: Family abundance of spiders during month

Spiders observed in shanthukadu sacred grove


1.*Argiopae anasuja*


2. *Argiopae catenulata*


3. *Nephila pilipes*


4.*Gasteracantha geminata*


5. *Anepsion maritatum*

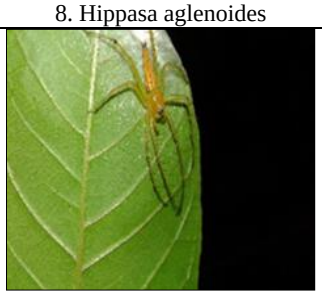

6. *Gea spinipes*


7. *ardosa sp*


8. Hippasa aglenoides


9. *Hippasa holmerae*


10.*Oxyopes salticus*


11. *Oxyopes birmanicus*


12. *Oxyopes sunandae*


13. *Brettus cingulatus*


14.*Hasarius adansoni*


15. *phintella vittatta*


16. *Chrysilla volupe*


17.*Telamonia dimidiata*


18.*Plexippus petersi*

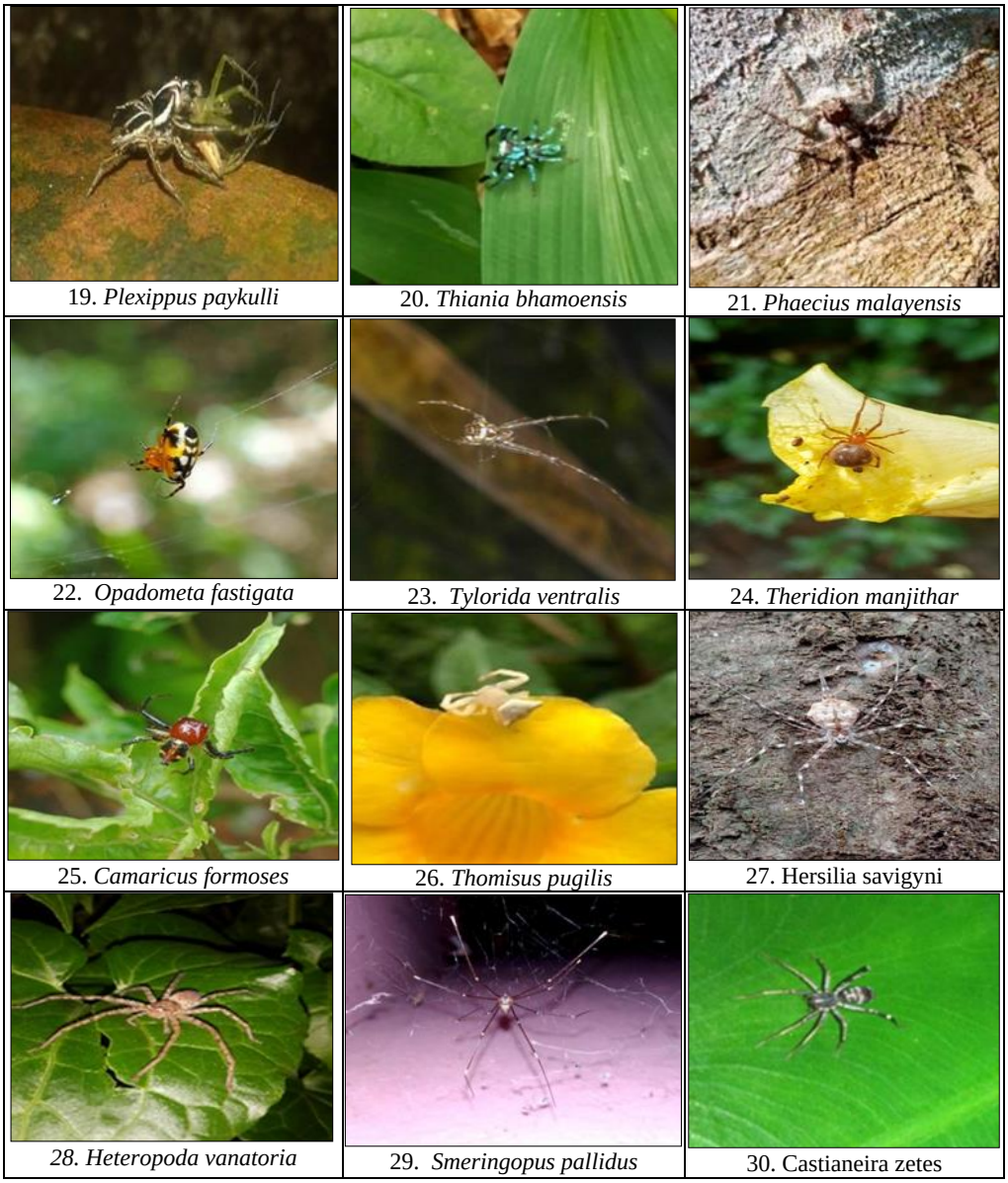


Fig 3: Photographs of the spiders observed in shanthukad sacred grove

Conclusion

The present study attempted to record and analyzes the diversity and status of spiders in Shanthukadu sacred grove situated in Nagappuzha panchayath, Kalloorkad, Ernakulam District. A total of 534 individuals of spiders comprising of 30 species which belong to 26 genera and 11 families were identified from the study area. The identified families were Araneidae, Lycosidae, Oxyopidae, Salticidae Tetragnathidae, Theridiidae, Thomisidae, Hersillidae, Sparassidae, Pholcidae, and Corinnidae, Among the spiders observed the highest number of individuals was contributed by the species *Plexippus petersi*. The family found to dominate during the sampling period in terms of number of genera and species was Salticidae. Spider diversity was remarkably low with the onset of summer season. The present study enlightens on the urgent conservation of sacred groves and the prevailing spider diversity.

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References

1. Culin J, Levi Lorna R, Levi Herbert W. Spider Encyclopedia Britannica, 2014. https://www.britannica.com/animal/spider-arachnid.
2. Druba CD, Sureshan PM, Chandra K. Diversity, and Distribution of Indian Primitive Spiders. World scientific news. WSN,2016:37:88-100.
3. Sebastian PA, Peter KV. Spiders of India. University Press Pvt. Ltd. Hyderabad, India, 2009.
4. Sebastian PA, Mathew MT, Joseph J, Biju CR. The spider fauna of the irrigated rice ecosystem in central Kerala India. The Journal of Arachnology,2005:33:247-255.
5. Wise DH. Spiders in ecological webs. Cambridge University press, 1993, 328.