



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 8, Issue, 8, pp. 19277-19281, August, 2017

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

PRELIMINARY STUDY OF SPIDERS (ARANEAE: ARACHNIDA) IN GUDAVI BIRD SANCTUARY, SHIVAMOGGA, KARNATAKA

Prashanthakumara S.M* and Venkateshwarlu M

Department of Post Graduation Studies and Research in Applied Zoology, Jnanasahyadri, Kuvempu University, Shankaraghatta-577451, Shivamogga, Karnataka, India

DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0808.0660>

ARTICLE INFO

Article History:

Received 05th May, 2017

Received in revised form 21st June, 2017

Accepted 06th July, 2017

Published online 28th August, 2017

Key Words:

Spiders study, Gudavi bird sanctuary, Araneae, Karnataka.

ABSTRACT

A preliminary study was conducted to document spider diversity in Gudvi bird Sanctuary, Shivamogga District, Karnataka, India. The study was conducted from January 2015 to December 2015. A total of 71 species of spiders belonging to 58 genera from 18 families were identified in the sanctuary. This accounted for 4.21% of Indian spider species, 13.24% of Indian spider genera and 30% of the spider families of India. The dominant families was Salticidae (17 species), Araneidae (16 sp.) and Theridiidae (9 sp.). A guild structure analysis of the spiders revealed, eight different feeding guilds were observed. Among these stalkers are most dominant (28%) group followed by orb web weavers (25%), ground runner (23%), and space web spiders (13%). The other groups like foliage runners (4%), sheet web spiders (3%), Ambushers (3%) and Burrowers (1%) are have very less number of species.

Copyright © Prashanthakumara S.M and Venkateshwarlu M, 2017, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Spiders are clearly an integral part of global biodiversity since they play many important roles in ecosystems as predators and sources of food for other creatures. Spiders possess the characteristics of predators that can contribute to density-independent limitation of prey, including self-damping, high levels of polyphagy, and life cycles that are asynchronous to those of prey species (Riechert and Bishop, 1990). Additionally spiders are an important food source for birds, lizard, wasps and other animals. In a study of trunk arthropod, spiders provided a relatively constant food source throughout the year for bark-gleaning birds (Peterson *et al.*, 1989). Also spider silk is important to bird species for nest building (Hansel, 1993).

Recent research has paid more attention to incorporate the requirements of invertebrates, including spiders, into forest management strategies (Humphrey *et al.*, 1999; Oliver *et al.*, 2000). Spiders are abundant in most terrestrial ecosystems and are affected by change in vegetation structure (Uetz, 1991). They also have the advantage of being efficiently sampled and relatively easily identified compared to other invertebrate groups. Spiders occupy a strategic functional position in terrestrial food webs as they are important in the regulation of invertebrate populations and as a food source for higher

organisms. Spider communities are ubiquitous in forest ecosystems, being present from the litter layers to the canopy (Uetz, 1979, Halaj *et al.*, 2000), and hence are ideal for study in forest environments. In this study emphasis was focus on specify the diversity of spiders in Gudavi Birds Sanctuary, Shivamogga, Karnataka, India. In general, taxonomic studies on spiders and invertebrates of this region are very rare. No specific extensive studies on spider faunal diversity in this region were done and published. This study focuses on the spiders as a representative invertebrate fauna from this ecosystem. Data thus collected may facilitate future initiatives of biodiversity database of these species in the region.

Some of the recent published works on spider diversity of the Western Ghats are as follows: Sebastian *et al.*, (2005) reported 51 species from Mangalavanam Bird Sanctuary, Jose *et al.*, (2008) documented 147 species from Parambikulam Tiger Reserve, Nalini Bai G, Ravindranatha (2012) documented 40 species from IISc. Bangalore, Adarsh & Nameer (2015) reported 86 species from the Kerala Agricultural University campus, Thrisur, Kerala, Prashanthakumara, *et al.*, (2015) documented 17 species from Jnana Sahyadri campus, Shivamogga, Karnataka, Ashwini Deshpande, Ravindra Paul, (2016) reported 25 species from Gulbarga, Karnataka, Adarsha and Nameer, (2016) reported 101 species from Chinnar

*Corresponding author: **Prashanthakumara S.M**

Department of Post Graduation Studies and Research in Applied Zoology, Jnanasahyadri, Kuvempu University, Shankaraghatta-577451, Shivamogga, Karnataka, India

Wildlife Sanctuary, Western Ghats, India, while Prajapati *et al.*, (2016) recorded 77 species from Gujarat University campus Ahmadabad, India.

MATERIALS AND METHODS

Study area

The Gudavi Bird Sanctuary is located in Soraba Taluk of Shimoga District, Karnataka and is one of the most picturesque and well-known bird sanctuaries of India. It is situated 13 Km away from Soraba town and about 0.50 Km from Gudavi village. The total notified geographical area of the Gudavi Bird Sanctuary is 73.68 ha, of which the sanctuary possesses the water spread area of about 33 ha and is surrounded by moist deciduous forest, interspersed with grassy patches. Gudavi bird sanctuary lies between North Latitude 14° 25' 59" to 14° 26' 41" and East Longitude 75° 6'43" to 75° 25' 28" (Fig. 1). In this sanctuary, there are two ponds separated by an earthen bund, which are called as Vaddakere and Gudavi ponds. The catchment area for this sanctuary is mainly agriculture land and other wooded areas (Dayananda G.Y, 2009).

were preserved in 70% alcohol and adult specimens were identified up to species level, sub adults and juveniles were identified up to genus level by using the keys in world spider catalog (Platnic, 2017).

RESULT AND DISCUSSION

During the present study we were recorded 71 species belongs to 58 genera of 18 families (Table 1&2). A total of 1686 species belonging to 438 genera of 60 families were recorded in India (Keswani *et al.*, 2012). This accounts for 4.21% of the total spider species and 30% of the total spider families recorded in Gudavi bird sanctuary, Shivamogga, Karnataka. Out of these families, Salticidae (17 sp.) was the most dominant family followed by Araneidae (16 sp.), Theridiidae (9 sp.), Lycosidae (4sp.), Oxyopidae, Sparassidae (3sp. each), Gnaphosidae, Hersiliidae, Linyphiidae, Scytodidae, Tetragnathidae, Thomisidae, Zodariidae (2sp. each) and families like Corinidae, Ctenidae, Dipluridae, Filistatidae and Idiopidae having single species each (Table 1).

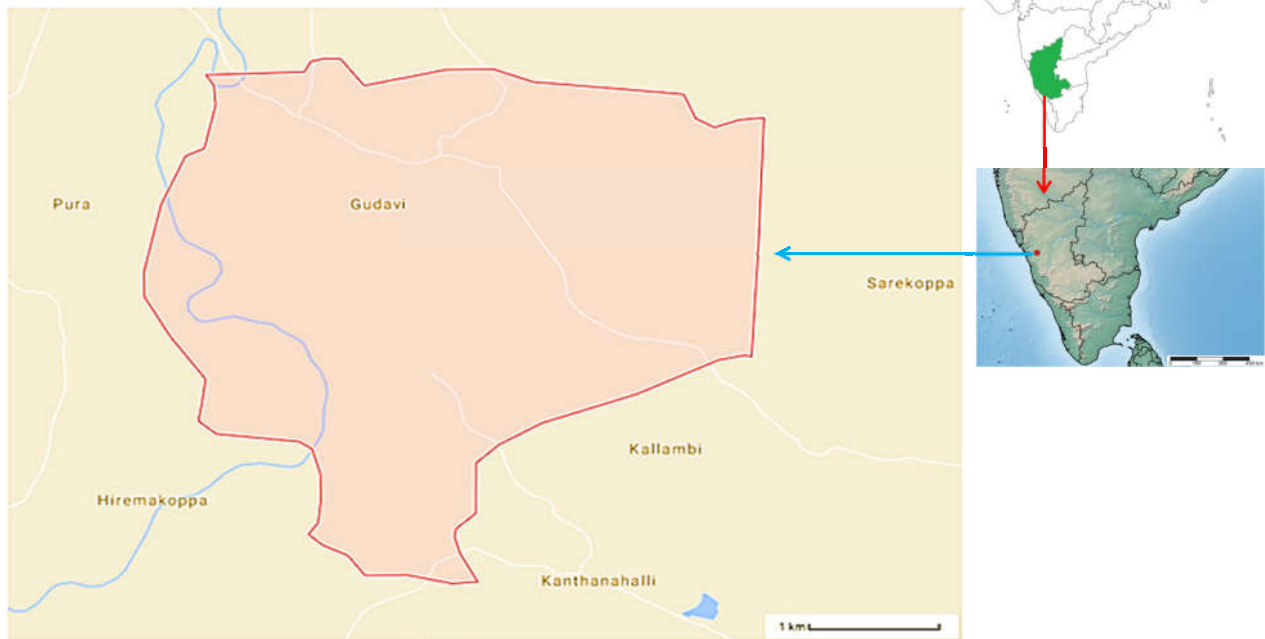


Figure 1 Map of Gudavi Bird Sanctuary, Karnataka, India.

Sampling

The spiders were collected along 50m X 10m transects, with 5 transects were placed randomly within study area. Sampling process will be conducted once in a month (Upamanyu and Uniyal 2008) from January 2015 to December 2015. Spiders were searched for maximum two hours in each transect (either 09-11AM or 3-5PM). Spiders were collected from webs, leaf litter, tree bark, under the stones and also the green leaves of the trees by visual or active searching, inverted umbrella or beating method and sweep net techniques. Habitat type, web pattern and collection date were recorded. The collected spiders

Among these families, Dipluridae and Idiopidae are belonging to the suborder Mygalomorphae, the remaining families are belong to the suborder Araneomorphae (Table 1).

Designation of spider guilds was based on ecological characteristics known for the family, or for a key species representing each family (Gertsch & Riechert 1976; Post & Riechert 1977; Gertsch 1979; Young & Edwards 1990; Nyffeler & Benz 1987; Nyffeler *et al.* 1992; Uetz *et al.*, 1999). The spiders of Gudavi bird Sanctuary can be grouped into eight feeding guilds based on the foraging behaviour (Uetz *et al.*, 1999).

Table 1 Total number of families, genera, species with guilds structure of spiders in Gudavi bird Sanctuary

Sl. No.	Family	No. Genera	No. of species	Guild structure
1	Araneidae	12	16	Orb web weaver
2	Corinnidae	1	1	Ground runner
3	Ctenidae	1	1	Ground runner
4	Dipluridae	1	1	Ground runner
5	Filistatidae	1	1	Foliage runner
6	Gnaphosidae	2	2	Ground runner
7	Hersillidae	1	2	Foliage runner
8	Idiopidae	1	1	Burrower spider
9	Linyphiidae	2	2	Sheet web builder
10	Lycosidae	4	4	Ground runner
11	Oxyopidae	2	3	Stalkers
12	Salticidae	13	17	Stalkers
13	Scytodidae	2	2	Ground runner
14	Sparassidae	3	3	Ground runner
15	Tetragnathidae	1	2	Orb web weaver
16	Theridiidae	7	9	Space web builder
17	Thomisidae	2	2	Ambushers
18	Zodariidae	2	2	Ground runner
	Total	58	71	

They are the orb web weavers (Araneidae and Tetragnathidae), ground runners (Corinnidae, Ctenidae, dipluridae, Gnaphosidae, Lycosidae, Scytodidae and Zodariidae), space web builders (Theridiidae), ambushers (Thomisidae), sheet web builders (Linyphiidae), stalkers or jumping spiders (Oxyopidae and Salticidae), foliage runners (Filistatidae, Hersilidae, Sparassidae) and burrower (Idiopidae). Among these, the stalkers or jumping spiders are the dominant group with 28% of species, followed by orb web weavers (25%), ground runners (23%), space web builders (13%), foliage runner (4%), ambushers and sheet web spiders (3%), and burrowers (1%) (Fig. 2) (Uetz et al., 1999).

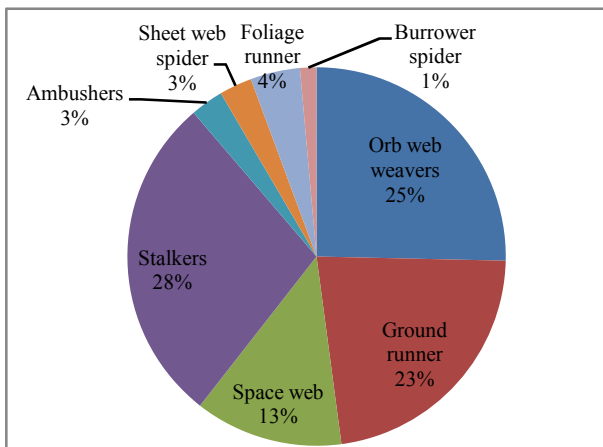


Figure 2 Guild structure of spiders recorded from Gudavi bird Sanctuary.

The spiders preferred different habitats to live, species belonging to families Thomisidae, Salticidae, Tetragnathidae, Oxyopidae, Theridiidae, were mainly found in vegetation. Oxyopids were mainly found on the grasses while Thomisid spiders were found on flowering plants and grasses. The species *Cyrtophora citricola* was found on the three dimensional web on small herbs, the same result was obtained by Nalini Bai et al., (2012) and *Parawixia dehaani* was built a triangular shaped single lined broken type of web between the two trees and spider hide at the one end of the web,

Table 2 Checklist of spiders in Gudavi bird Sanctuary

Sl. No.	Family /species
Araneidae	
1.	<i>Arachnura angora</i> (Tikader, 1970)
2.	<i>Araneus sp.</i>
3.	<i>Argiope anasuja</i> (Thorell, 1887)
4.	<i>Argiope pulchella</i> (Thorell, 1881)
5.	<i>Chorizopes sp.</i>
6.	<i>Cyclosa insulana</i> (Costa, 1834)
7.	<i>Cyclosa moonduensis</i> (Tikader, 1963)
8.	<i>Cyclosa sp.</i>
9.	<i>Cyrtophora citricola</i> (Stoliczka, 1869)
10.	<i>Gasteracantha geminate</i> (Fabricius, 1798)
11.	<i>Gea spinipes</i> (C. L. Koch, 1843)
12.	<i>Neoscona nautica</i> (L. Koch, 1875)
13.	<i>Neoscona mokerjei</i> (Tikader, 1980)
14.	<i>Parawixia dehaani</i> (Doleschall, 1859)
15.	<i>Nephila pilipes</i> (Fabricius, 1793)
16.	<i>Nephilengys malabarensis</i> (Walckenaer, 1841)
Corinnidae	
17.	<i>Castianeira zetes</i> (Simon, 1897)
Ctenidae	
18.	<i>Ctenus sp.</i>
Dipluridae	
19.	<i>Indothele sp.</i>
Filistatidae	
20.	<i>Pritha sp.</i>
Gnaphosidae	
21.	<i>Aphantaulax trifasciata</i> (O. Pickard-Cambridge, 1872)
22.	<i>Gnaphosa sticta</i> (Kulczynski, 1908)
Hersillidae	
23.	<i>Hersilia aadi</i> (Pravalikha, Srinivasulu & Srinivasulu, 2014)
24.	<i>Hersilia savignyi</i> (Lucas, 1836)
Idiopidae	
25.	<i>Idiops sp.</i>
Linyphiidae	
26.	<i>Linyphia hortensis</i> (Sundevall, 1830)
27.	<i>Neriere macella</i> (Thorell, 1898)
Lycosidae	
28.	<i>Hippasa agelenoides</i> (Simon, 1884)
29.	<i>Lycosa sp.</i>
30.	<i>Paradosa pseudoannulata</i> (Bosenberg & Strand, 1906)
31.	<i>Paradosa sp.</i>
Oxyopidae	
32.	<i>Hamataliwa sp.</i>
33.	<i>Oxyopes javanus</i> (Thorell, 1887)
34.	<i>Oxyopes birmanicus</i> (Thorell, 1887)
Salticidae	
35.	<i>Aelurillus kronestedti</i> (Azarkina, 2004)
36.	<i>Chrysis lauta</i> (Thorell, 1887)
37.	<i>Cyrba ocellata</i> (Kroneberg, 1875)
38.	<i>Epeus indicus</i> (Proszynski, 1992)
39.	<i>Epeus tener</i> (Simon, 1877)
40.	<i>Harmochirus brachiatus</i> (Thorell, 1877)
41.	<i>Hyllus pudicus</i> (Thorell, 1895)
42.	<i>Hyllus semicupreus</i> (Simon, 1885)
43.	<i>Menemerus bivittatus</i> (Dufour, 1831)
44.	<i>Menemerus sp.</i>
45.	<i>Onomostes sp.</i>
46.	<i>Phintella vittata</i> (C. L. Koch, 1846)
47.	<i>Phintella diatreta</i> (Simon, 1902)
48.	<i>Nepalicius nepalicus</i> (Andreeva, Heciak & Proszynski, 1984)
49.	<i>Stenaelurillus albus</i> (Sebastian, Sankaran, Malamel & Joseph, 2015)
50.	<i>Telamonia dimidiata</i> (Simon, 1899)
51.	<i>Thyenula sp.</i>
Scytodidae	
52.	<i>Dictis sp.</i>
53.	<i>Scytodes fusca</i> (Walckenaer, 1837)
Sparassidae	

54.	<i>Heteropoda venatoria</i> (Linnaeus, 1767)
55.	<i>Olios</i> sp.
56.	<i>Parapalystes</i> sp.
Tetragnathidae	
57.	<i>Leucauge decorata</i> (Blackwall, 1864)
58.	<i>Leucauge celebesiana</i> (Walckenaer, 1841)
Theridiidae	
59.	<i>Achaearanea</i> sp.
60.	<i>Ariamnes colubrinus</i> (Keyserling, 1890)
61.	<i>Chikunia nigra</i> (O. Pickard-Cambridge, 1880)
62.	<i>Chikunia</i> sp.
63.	<i>Chrysso</i> sp.
64.	<i>Phylloneta impressa</i> (L. Koch, 1881)
65.	<i>Steatoda</i> sp.
66.	<i>Theridion manjithar</i> (Tikader, 1970)
67.	<i>Theridion</i> sp.
Thomisidae	
68.	<i>Amyciaea</i> sp.
69.	<i>Misumenoides</i> sp.
Zodariidae	
70.	<i>Mallinella</i> sp.
71.	<i>Tropizodium kalami</i> (Prajapati et al.)

the species *Nephila pilipes* is one of the biggest spider, its built a large sized orb web between the trees at 10-15 feet of height, it was sited only at rainy and winter but not in summer season. *Arachnura angora* is a scorpion tailed, very rare spider, found out in the centre of the web and it is mimic dead leaves, twig and litter. *Argiope* species are found on the small orb web with X shaped structure. *Hersilia savignyi* was found on the tree barks and it is very fast runner. Lycosids, Ctenids and some Salticids were located between dry leaves on the ground. *Chrysilla lauta* having an attractive colour, it was found out at the jumping leaf to leaf in the plants. *Hippasa agelenoides* is a very active spider found in webs with a funnel like retreat over holes in the ground at the base of tree trunks. *Linyphia hortensis* and *Neriene macella* are Linyphiid spider these are found at the irregular sheet web between branches of the small tree web.

Summary

Spider sampling was conducted in Gudavi bird Sanctuary, Shivamogga, Karnataka from January 2015 to December 2015. A total of 71 species were identified representing the 58 genera and 18 families. Out of these, Salticidae was the most dominant family having 17 species followed by Araneidae 16 species, Theridiidae 9 species. Based on the foraging behaviour collected spiders were grouped in to nine feeding guilds. Out of these the stalkers/ jumping spiders are the most abundant which is having 28% of the total species. This was the basic study of spider diversity in the Gudavi bird sanctuary at the first time.

Acknowledgement

We are thankful to the authorities, Department of Applied Zoology, Kuvempu University for providing all the facilities for completion of this work. Also thankful to Dr. Sebastian P.A. Head of the Department, Division of Arachnology, Sacred Heart College, Thevera, Cochin for providing the facilities for identification of the spider species.

References

1. Adarsh, C.K. & P.O. Nameer. 2015. A preliminary checklist of spiders (Araneae: Arachnida) in Chinnar

- Wildlife Sanctuary, Western Ghats, India. *Journal of Threatened Taxa* 8(4): 8703-87.
2. Adarsh, C.K. & P.O. Nameer. 2015. Spiders of Kerala Agricultural University Campus, Thrissur, Kerala, India. *Journal of Threatened Taxa* 7(15): 8288-8295.
3. Ashwini Deshpande, Ravindra Paul. 2016. Preliminary Study on spiders of Gulbarga, Karnataka State. *International Journal of Environment, Agriculture and Biotechnology (IJEAB)* 1 (4): 680-686.
4. Dayananda G.Y., 2009. Avifaunal Diversity of Gudavi Bird Sanctuary, Sorab, Shimoga, Karnataka, *Our Nature* 7: 100-109.
5. Dhruv A. Prajapati, Krunal R. Patel, Sandeep B. Munjpara, Shiva S. Chettiar & Devendrasinh D. Jhala, 2016. Spiders (Arachnida: Araneae) of Gujarat University Campus, Ahmedabad, India with additional description of *Eilica tikaderi*. *Journal of Threatened Taxa* 8(11): 9327-9333.
6. George W. Uetz, 1999. Guild structure of spider in major crops. *The Journal of Arachnology* 27:270-280,
7. Gertsch, W.J. 1979. American Spiders. *Van Nostrand*, New York.
8. Gertsch, W.J. and S.E. Reichert. 1976. The spatial and temporal partitioning of a desert spider community, with description of new species. *Amer. Mus. Novitates*, No. 2604. 25pp.
9. Halaj, J., R. Ross and R. Moldenke. 2000. Importance of habitat structure to the arthropod food-web in Douglas-fir canopies. *Oikos*, 90: 139-152.
10. Hansel M. 1993. Second hand silk. *Nat. Hist.*, 102: 40-46.
11. Humphrey J., C. Hawes, A. Pearce, R. Ferris-Kaan and M. Jukes. 1999. Relationships between insect diversity and habitat characteristics in plantation forests. *For. Ecol. Manage.*, 113:11-21.
12. Humphries, C.J., P.H. Wilson and R.I. Vane-Wright. 1995. Measuring biodiversity value for conservation. *Ann. Rev. Col. And Syst.* 26: 93-111.
13. Jose, S.K., A.V. Sudhikumar, S. Davis & P.A. Sebastian. 2008. Preliminary studies on the spider fauna (Arachnida: Araneae) in Parambikulam Wildlife Sanctuary in Western Ghats, Kerala, India. *Journal of the Bombay Natural History Society* 105(3): 264-273.
14. Keswani, S, P. Hadole and A. Rajoria, 2012. Checklist of spiders (Arachnida : Araneae) from India-2012, *Indian Society of Arachnology* 1 (1),1-129.
15. Nalini Bai G, Ravindranatha B.P. 2012. Spider diversity in IISc. Bangalore, India. *Indian Journal of Arachnology*, 1(2) 50-58.
16. Nyffeler, M. & G. Benz. 1987. Spiders in natural pest control: A review. *J. Appl. Entomol.*, 103: 321-339.
17. Nyffeler, M., D.A. Dean & W.L. Sterling. 1992. Diets, feeding specialization, and predatory role of two lynx spiders, *Oxyopes salticus* and *Peucetia viridans* (Araneae: Oxyopidae), in a Texas cotton agroecosystem. *Environ. Entomol.*, 21: 1457-1465.
18. Oliver, I., R. Mac Nally and A. York. 2000. Identifying performance indicators of the effects of forest management on ground-active arthropod biodiversity using hierarchical partitioning and partial canonical

- correspondence analysis. *For. Ecol. Manage*, 212: 171-183.
19. Peterson T.N., D.R. Osborne and D.H. Taylor. 1989. Tree trunk arthropod faunas as food resources for birds. *Ohio J. Sci.*, 89(1): 23-25.
 20. Post, W.M. & S.E. Riechert. 1977. Initial investigation into the structure of spider communities. *J. Anim. Ecol.*, 46:729-749.
 21. Prashanthakumara, S.M., B.S. Nijagal and M. Venkateshwarlu. Study on diversity of spider fauna in Jnana sahyadri campus, Shimoga, Karnataka. *Bulletin of Pure and Applied Sciences*. Vol.34 A (Zoology), Issue (No.1-2) 2015:P.1-9.
 22. Riechert S. E. and Bishop, 1990. Prey control by an assemblage of generalist predators: Spiders in garden test systems. *Ecology*, 71: 1441-1450.
 23. Sebastian, P.A., S. Murugesan, M.J. Mathew, A.V. Sudhikumar & E. Sunish 2005. Spiders in Mangalavanam, an ecosensitive mangrove forest in Cochin, Kerala, India (Araneae). *European Arachnology* (Suppl. No. 1): 315-318.
 24. Uetz, G.W. 1979. The influence of variation in litter habitats on spider communities. *Oecologia*, 40: 29-42.
 25. Uetz, G.W. 1991. Habitat structure and spider foraging. In: McCoy, E.D., S.A. Bell, H.R. Mushinsky (eds). Habitat structure; the physical arrangement of objects in space. *Chapman and Hall*, London. Pp. 325-348.
 26. Uetz, G.W., J. Halaj & A.B. Cady, 1999. Guild structure of spiders in major crops. *Journal of Arachnology* 27: 270-280.
 27. Upamanyu Hore and V.P. Uniyal, 2008. Diversity and composition of spider assemblages in five vegetation types of the Terai Conservation Area, India. *Journal of Arachnology*, 36(2):251-258.
 28. World Spider Catalog (2017) Natural History Museum Bern, online at <http://wsc.nmbe.ch>, version 16.5 (accessed 12.VIII.2017).
 29. Young, O.P. and G.B. Edwards. 1990. Spiders in United States field crops and their potential effect on crop pests. *J. Arachnology*, 18: 1-27.

How to cite this article:

Prashanthakumara S.M and Venkateshwarlu M.2017, Preliminary Study of Spiders (Araneae: Arachnida) In Gudavi Bird Sanctuary, Shivamogga, Karnataka. *Int J Recent Sci Res*. 8(8), pp. 19277-19281.
DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0808.0660>
