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FAUNAL DIVERSITY AND RECENT TRENDS in ANIMAL TAXONOMY

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Chapter 23

A PRELIMINARY CHECKLIST OF SPIDERS (ARANEAE) FROM WAYANAD WILDLIFE SANCTUARY, KERALA, INDIA

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ABSTRACT

The present study provides a basic inventory of spiders from Wayanad Wildlife Sanctuary, Kerala based on preliminary survey conducted from November 2014 to December 2015. The study resulted in the documentation of 174 species of spiders belonging to 97 genera and 24 families. The most dominant family was Salticidae which constitutes 21% of the total spider species collected. Guild structure analysis revealed seven feeding guilds, namely Stalkers, Orb web builders, Ambushers, Foliage runners, Space web builders, Ground runners and Wandering sheet weavers. Stalkers and Orb weavers were the dominant feeding guilds. As of yet, no work has been carried out on the spiders of Wayanad Wildlife Sanctuary. This study is relevant owing to the fact that this is the pioneering report on the diversity of spider fauna of this protected area.

Key words: Araneae, ecology, guild, Western Ghats, biodiversity hot spot

INTRODUCTION

Spiders are among the most abundant and diverse terrestrial predators on earth (Coddington & Levi, 1991). They rank seventh in total species diversity among all other groups of organisms. They belong to the order Araneae of class Arachnida of phylum Arthropoda. About 46,428 species of spiders belonging to 4,029 genera and 113 families are known to science (World Spider Catalog, 2017). Out of these a total of 1685 species of spiders belonging to 438 genera and 60 families have been listed from Indian region (Keswani et al., 2012). Spiders are clearly integral parts of the global biodiversity, since they play an important role in ecosystems as predators and source of food for other creatures. They primarily attack insects, but also eat other arthropods, including other Araneae. They are suitable biological indicators of ecosystem changes and habitat modifications due to their small body size, short generation time, high sensitivity to temperature and moisture changes (Kremen et al., 1993).

Spiders are the largest order of arachnids and are found worldwide on every continent except for Antarctica. Their study remains insufficiently investigated or undiscovered entirely even in forest areas. Protected areas, they offer a diverse set of habitats for plants, animals and micro-organisms. Consequently they hold the majority of the world's terrestrial species and as much half of the entire spider faunas. The present study was conducted in Wayanad Wildlife Sanctuary, which is the part of the Western Ghats and also the second largest Wildlife Sanctuary in Kerala. This wildlife area holds some of the rare and endangered species of both flora and fauna. The aim of this study was to compile the first checklist of spiders of the Wayanad

Wildlife Sanctuary and to determine the percentage of species protected. This was not an intensive study, it is only primary information of spider fauna inhabiting in this protected area.

MATERIALS AND METHODS

Study area: Wayanad Wildlife Sanctuary, situated in the Wayanad revenue district of Kerala, India falls under Nilgiri Biosphere Reserve on the Western Ghats. It is contiguous with the protected area network of Nagarhole and Bandipur National Parks of Karnataka on the North East and Mudumalai National Park of Tamilnadu on the South East. The total extent of the area is 344.4 Km^2 and is divided in to two discontinuous portions with revenue lands in between. The altitude ranges from 650 m to 1160 m, the highest point being Karottimala in Kurichiat Reserve (1158 m). The natural vegetation of this sanctuary can be broadly classified in to West-coast tropical semi-evergreen forests, Southern moist mixed deciduous forests and Southern dry mixed deciduous forests (Champion & Seth, 1968). Apart from the above mentioned vegetation types, certain edaphic types such as reed brakes, moist bamboo brakes and law altitude marshy grasslands are also present.

Sampling methods: Sampling was conducted for one year from November 2014 to December 2015. Two surveys were conducted per month at selected areas of the sanctuary. Most of the sampling was taken in morning section between 7.00 am to 11.30 am. Standard sampling techniques such as pitfall sampling and semi-quantitative sampling (Coddington, 1996) were employed for spider collection. The semi-quantitative methods include sweep netting, vial-tapping and aerial hand collections. Spider microhabitats like fallen logs and leaf litters were thoroughly checked for ground dwelling spiders while leaves of trees and visible webs were searched for arboreal spiders. Smaller spiders were collected by leading them in to tubes containing alcohol with the help of brush dipped in alcohol. Most of the spiders were photographed in the field itself with the help of SLR Camera Canon EOS 5D Mark-III. The collected mature specimens were transported to the laboratory for identification. Identification was done at the Centre for Animal Taxonomy and Ecology, Dept. of Zoology, Christ College, Irinjalakuda. The specimens were preserved in 70% alcohols with proper labeling of locality, date of collection and other notes of importance. The mature specimens were identified up to the species level with the help of stereo zoom microscope (Leica-MS5) and also with available literatures (Tikader, 1987; Barrion & Litsinger, 1992; Sebastian & Peter, 2009).

RESULTS

A total of 174 species belonging to 97 genera and 24 families were reported from Wayanad Wildlife Sanctuary. Salticidae was the most dominant family corresponding 37 species from 25 genera constituting 21 % of total spider population. The second dominant family was Araneidae represented by 31 species from 13 genera (18%). Collected specimens were preserved in 70% alcohol and are deposited in the reference collection of

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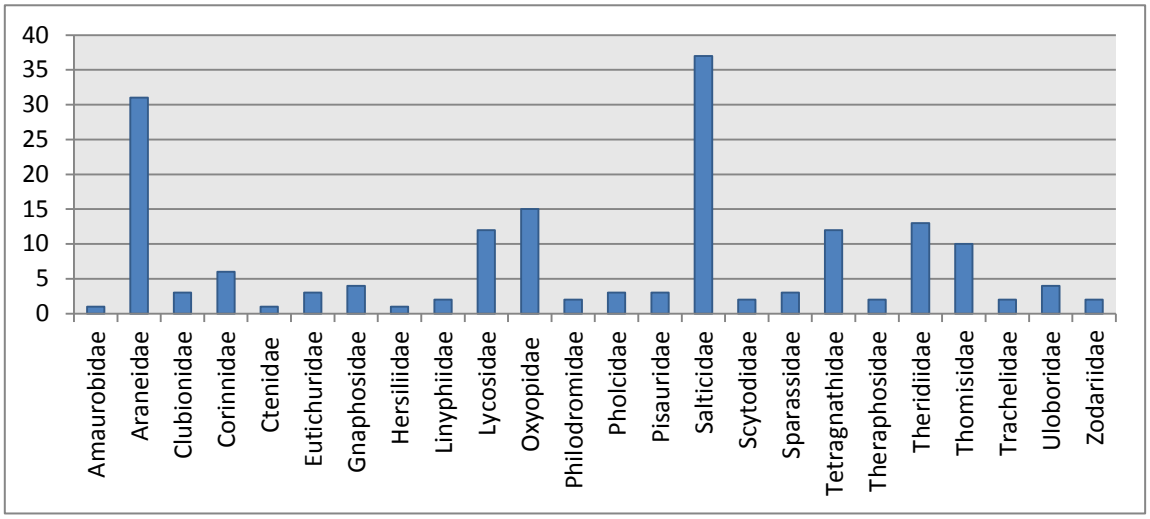
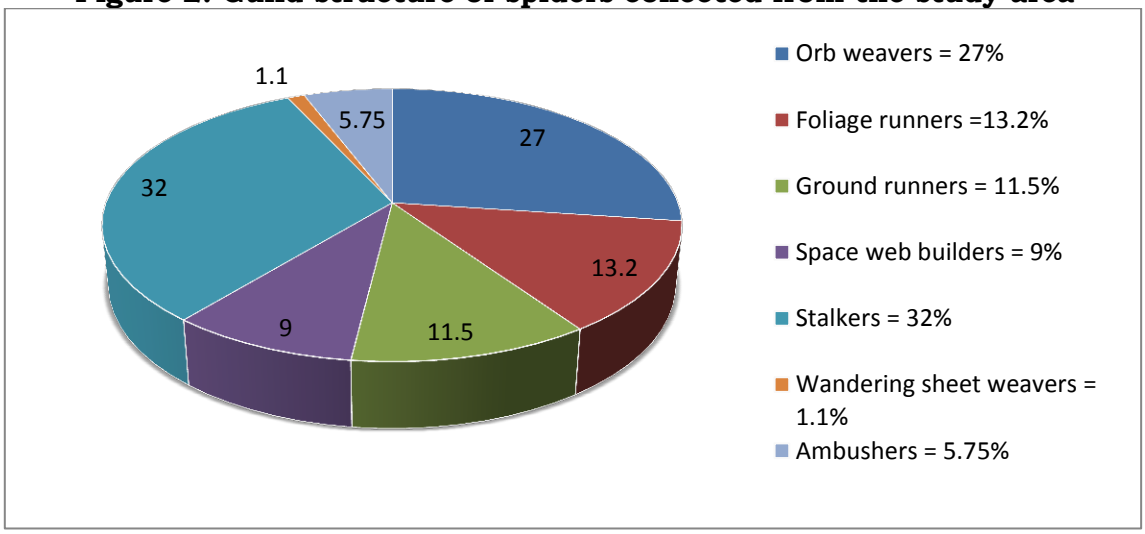
Figure 1. Species diversity in different families found in the study area



Functional groups: The identified specimens can be divided in to seven functional groups or guilds based on their foraging behavior in the field (Uetz, et al., 1999). The major functional groups found in the study area are Stalkers, Orb web builders, Ambushers, Foliage runners, Space web builders Ground runners and Wandering sheet weavers. The dominant group was stalkers that constitute 32% of the total population, which was followed by orb weavers with 27%, foliage runners 13.2%, ground runners with 11.5%, space web builders with 9%, ambushers with 5.75%, and wandering sheet weavers with 1.1% (Figure 2).

Figure 2. Guild structure of spiders collected from the study area



Family Diversity: Spider families representing a total of 24 from Wayanad wildlife sanctuary, which represent 40% compared to Indian continental region with 60 spider families. Salticidae was the most dominant family corresponding 37 species from 25 genera constituting 21% of total

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spider population. Second dominant family was Araneidae represented by 31 species from 13 genera constituting 18% of the total population. This was followed by Oxyopidae (8.6%), Theridiidae (7.5%), Lycosidae (6.9%), Tetrgnathidae (6.9), and Thomisidae (5.8%). The relative species abundance of various families recorded during the study can be represented as Salticidae > Araneidae > Oxyopidae > Theridiidae > Lycosidae = Tetrgnathidae > Thomisidae > Corrinidae > Gnaphosidae = Uloboridae > Clubionidae = Eutichurida = Pholcidae = Pisauridae = Sparassidae > Linyphidae = Philodromidae = Scytodidae = Theraphosidae = Trachelidae = Zodariidae > Amaurobidae = Ctenidae = Hersiliidae.

DISCUSSION

Forests, coral reefs and soil contain the majority of the world's known biodiversity (Connel, 1978) and almost half of the life forms are believed to dwell in the forest areas. Forests provide a wide range of resources and structurally heterogeneous habitats for arthropods especially the spider community. Unfortunately, a comprehensive data on spiders from undisturbed natural forests of Kerala is lacking. Sunil et al. 2008 reported 147 species of spiders from Parambikulam Wildlife Sanctuary of the Western Ghats, which is the highest number of species reported from any reserve forests in Kerala. The present work is a preliminary survey of spider fauna in Wayanad Wildlife Sanctuary. A total of 174 species of spiders belonging to 97 genera and 24 families were collected during the study period. It represents 10.3% of total species, 22.1 % generic and 40% family diversity reported from India (Keswani et al. 2012). The families Salticidae and Araneidae were found to be most diverse in terms of species diversity. The present study indicates that a high diversity of spiders distributed in this area. This region comprises reserve forests with splendid variety of flora and fauna especially insects. It may be the reason for better diversity. In the preliminary studies of spider fauna in Mannavan shola forest conducted by Sudhikumar et al. (2005), suggested that the species diversity of spiders in the forest region can be attributed to the high diversity of plants and insects. It can be assumed that a high floral diversity sustains a high faunal diversity by providing diverse microhabitat especially for invertebrates. Thick vegetation, less human interference and lack of other kinds of disturbances enhances the species diversity.

The studies on guild structures are mainly based on the ecological characteristics of the spider families collected during the study, which are classified according to their foraging manner, nature of web, prey species, microhabitat use and daily activity (Young & Edwards, 1990). The spiders collected from the sanctuary can be divided in to seven functional groups based on the classification system proposed by Uetz et al. (1999). The major functional groups found in the study area are Stalkers, Orb web builders, Ambushers, Foliage runners, Space web builders, Ground runners and Wandering sheet weavers.

There are many factors that determine species composition. This may be related to the changes in the vegetation structure of the habitat. The web building and plant wandering spiders rely on vegetation for some part of their lives, either for finding food, building retreats or for web buildings. The

structure of the vegetation is therefore expected to influence the diversity of spiders found in the habitat. Spiders have close relationship with their surrounding because they need attachment sites for their webs and their sensory organs can recognize the tactile vibrations of the substrate (Rovner & Barth, 1981). They have higher host finding ability and capacity to consume greater number of prey than other field inhabiting predators (Kamal et al, 1990). Oxyopids, Thomisids, Ulobrids and Salticids are some of the expert's silent predators. They can feed on aquatic larvae as well as the adult flying mosquitoes or insects. They maintain ecological equilibrium by suppressing insect population (Saini et al., 2012). Spiders are also utilized by ecologists in the form of conservation tools as ecological indicators of overall biodiversity in many terrestrial communities. They are extremely sensitive to small changes in the habitat structure, which make them ideal candidate for land conservation studies. The aim of the present study is to provide baseline information of spiders inhabiting in this area. Though the study of spiders from Wayanad Wildlife Sanctuary is still far from complete, the present study forms a foundation for further investigation on this group.

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