

INSECT AND SPIDER DIVERSITY AT DNYANDWEEP, VIDYA PRASARAK MANDAL'S CAMPUS AT THANE (MS), INDIA.

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ABSTRACT

The present study was aimed at understanding the diversity of Class-Insecta and Class-Arachnida of VPM's Campus Thane. Total 133 insect species belonging to the 8 orders and 21 spider species from 7 families belonging to a single order Araneae have been recorded. Among insects, order Lepidoptera was found to be dominant which might be due to the presence of a variety of nectar and food plants. In the case of spiders, Family Salticidae was found to be dominant whereas the least number of spiders was represented by Family Sparassidae. Comparatively, it has been observed that insects were much diverse than spiders in the VPM's Campus, Thane.

KEYWORDS: Diversity, VPM, Thane, insects, spiders, nectar plants.

INTRODUCTION

Biodiversity is the variability among living creatures which includes microorganisms, plants, animals, and their co-existence. Right from the unicellular simple microbes to multi-cellular complex organisms, every biotic component has multiple roles to play in any ecosystem. Among all the phyla; phylum Arthropoda is known to be the most diverse group of animals that include crustaceans, millipedes, centipedes, insects and spiders. Of the planet's currently estimated 1.9 million animal species, greater than 60% of the species belong to the phylum Arthropoda (Forschler, 2010) which contributes significant biomass. Representatives of the Phylum Arthropoda are omnipresent occupying almost every continent. Class Insecta and Arachnida together make a major contribution to phylum Arthropoda. Insects are of great significance as they take part in multiple and significant ecological interactions. Spiders are the diverse group of organisms belonging to the order Araneae of class Arachnida. Spiders stand in the seventh position among all the animal species on the earth (Ayyar, 1964). The health of an ecosystem is dependent upon the interactive roles of organisms that are present at different trophic levels. Insect populations are particularly suited for use in ecological assessments because of their high

species diversity, ever-present occurrence, and valuable contribution to the functioning of natural ecosystems (Rosenberg *et al.*, 1986). The process of pollination is majorly aided by the insects, constitutes an ecosystem that is of global importance as it delivers significant economic, aesthetic benefits along with vital ecological processes in the terrestrial ecosystem (Gill *et al.*, 2016). Class Insecta and Arachnida especially spiders, together act as indicator taxa of existing environmental scenarios and play a significant role in maintaining environmental balance. Even a slight change in the diversity and population of insects and arachnids; can create an imbalance in the ecosystem. Thus, it is essential to study the diversity of these mini-creatures. The paper represents the insect and spider diversity documented at the Dnyandweep Campus, Thane.

MATERIAL AND METHODS

STUDY AREA: The study was carried out at the “Dnyandweep” – Campus of Vidya Prasarak Mandal (VPM) a premier educational institute in Thane, (19°11'19°N and 72°58'47°E), which includes about 5 institutes located on the bank of Thane creek at an elevation of 7 m MSL. The campus is enriched with varied flora and associated fauna. The campus is bordered by the thane creek along with the belt of mangrove vegetation. Besides, a butterfly garden having various host and nectar plants has been created for the conservation of butterflies. The overall campus area is about 13.5 acres.

METHODOLOGY:

The study was conducted for 2 years (2017-2019) The study involved field visits to the entire Dnyandweep Vidya Prasarak Mandal's Campus. The sampling was carried out using-all out search sampling method for the insects and spiders under leaf litter, stones, crevices, along the bark of trees, below the leaves, as far distinct vision is possible. The survey was carried out from 8:00 am to 11:00 am. The species of insects and spiders encountered during sampling were documented by taking photos with the help of a digital camera- Canon D1300, Nikon D5600, and Nikon D3400- 18-55 mm and 70-300mm. Since the data collected was photo-documented, species were identified till genus and sometimes up-to species level, wherever possible using following available literature: 1. Dhamorikar A. (2016), A Field Guide to Insects & Spiders of Kanha Tiger Reserve, Resurrect Books publication.

2. Sebastian P. A. and K. V. Peter (2009), Spiders of India. Universities Press (India) Publication,1-14,121-388.

RESULTS

The study revealed the presence of 133 insect varieties belonging to 8 orders and 21 spider types from 7 families and one order i.e. Araneae. Insect orders include: Coleoptera (beetles), Diptera (flies), Hymenoptera (wasp, bees, and ants), Mantodea (mantis), Hemiptera (bugs), Orthoptera (grasshoppers and crickets), Odonata (dragonflies and damselflies), Lepidoptera (butterflies and moths) whereas; spiders were represented by following families Araneidae Thomisidae, Salticidae, Oxyopidae, Tetragnathidae, Hersiliidae, and Sparassidae.

Table 1: Percentage (%) wise composition of Insect orders

Sr. No.	Insect Order	Total number of species	Percentage (%)
1	Coleoptera	8	6.015037594
2	Diptera	3	2.255639098
3	Hymenoptera	3	2.255639098
4	Mantodea	1	0.751879699
5	Hemiptera	6	4.511278195
6	Orthoptera	2	1.503759398
7	Odonata	15	11.27819549
8	Lepidoptera	95	71.42857143
	Total	133	

Table 2: Percentage (%) wise composition of Spider

Sr. No.	Family	Total Number of Species	Percentage
1	Araneidae	2	9.523809524
2	Salticidae	1	52.38095238
3	Thomisidae	3	14.28571429
4	Oxyopidae	2	9.523809524
5	Sparassidae	1	4.761904762
6	Tetragnathidae	1	4.761904762
7	Hersiliidae	1	4.761904762
	Total	21	

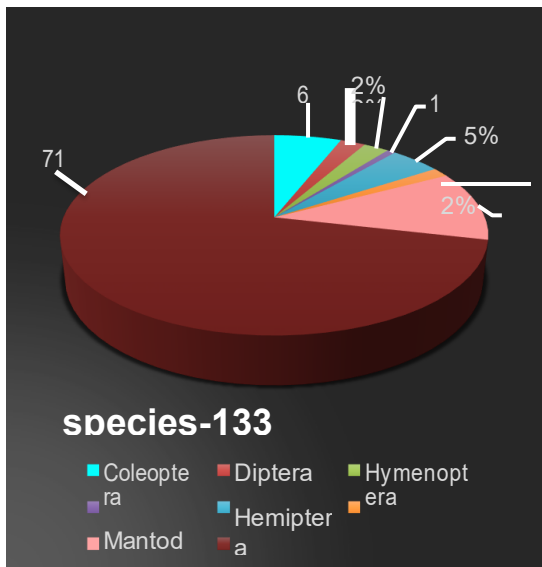


Fig 1: Percentage (%) wise composition of Insect order

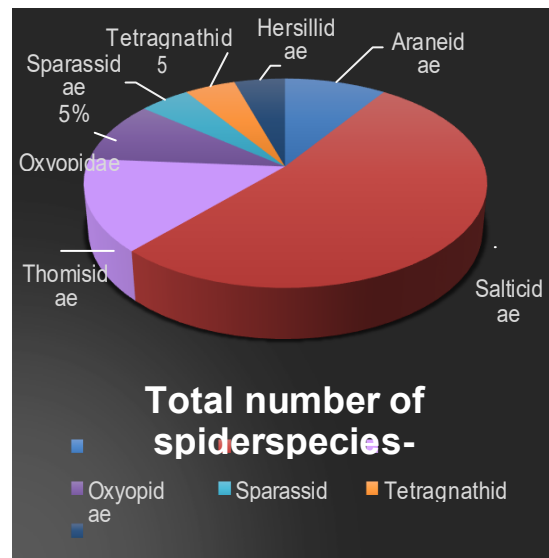


Fig. 2: Percentage (%) wise composition of Spider Families

From the above data, it can be said that Insects show greater diversity as compared to spiders. Among insects relatively, order Lepidoptera contributes the highest number (71%). Whereas, in the case of spiders, members of the family Salticidae are maximum (52%) than the other six families.

DISCUSSION

The Indian region is recognized as one of the megadiverse countries in the world. Being cosmopolitan in distribution, insects serve as a source of food for many organisms such as spiders, amphibians, reptiles. The VPM's Campus, Thane has a diverse flora which is supporting this invertebrate fauna by providing ideal habitat, food and shelter. 27 species are serving as larval food plants and nectar plants. (Kurve *et al.*, 2013). In the present study, reasonably the diversity of Lepidoptera (Moths and butterflies) order is greater. A good number of butterflies and moths can be attributed to the availability of larval food plants like *Polyalthia longifolia*, *Michelia champaca*, *Citrus spp.*, *Bryophyllum spp.* among many others. The nectar plant species include *Lantana camara*, *Tridax spp.*, *Verbena spp.*, *Vernonia spp.*, *Stachytarpheta spp.* (Kurve *et al.*, 2013).

A total of 21 spider species belonging to seven families were recorded during the study period. In VPM's Campus Thane, Family Salticidae consisting of jumping spiders was found to be dominant representing 11 species of a total 21 spider species. The reason for more jumping spiders could be due to their size (which ranges from about 3 mm to 20 mm) (Sebastian *et al.*, 2009). They can easily escape from the predator; also they can approach any desired place quickly in search of prey by hopping. All spiders are carnivorous and they feed

almost exclusively on living prey. Their prey consists chiefly of insects, but they also feed on other spiders (Sebastian *et al.*, 2009). Spiders play an important role as stabilizing agents or regulators of insect populations in agricultural fields, forests, and other terrestrial ecosystems. They generally are predators, can kill a large number of insects per unit time, and hence are of great importance in reducing insect pests in agriculture (Jeyaparvathi, 2013). Some are known to be feeding on plant sap as well (Nyffeler *et al.*, 2016).

The observed variety of insects and spiders are forming a micro-ecosystem and contributing their roles in environmental balance and the presence of diversity can be attributed to an efficient maintenance of rich vegetation of the VPM's campus.

CONCLUSION

The current documentation of diversity of spiders and insects is an attempt to gather primary data that can be used to study the sustainability of the ecosystem; the conservation of such creatures of the micro-environment has been of vital importance; since they reflect the environmental health of the area under study.

ACKNOWLEDGMENT

The authors are thankful to the Vidya Prasarak Mandal, Thane for providing facilities during the present study. We also would like to thank our college colleagues for their valuable inputs during the study.

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Order- Odonata



Pygmy Dartlet

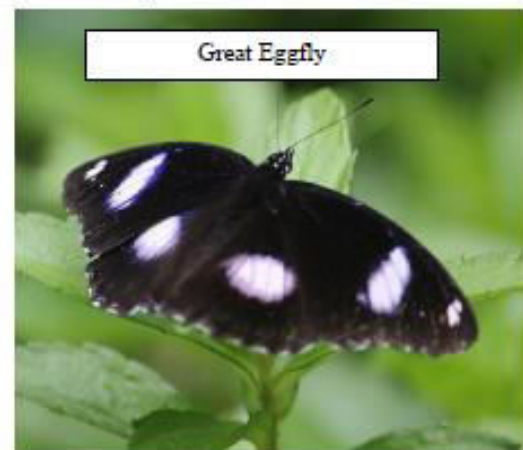


Asiatic Blood tail

Order- Lepidoptera



Palm fly



Great Eggfly

Order- Coleoptera



Leaf Beetles



Tortoiseshell Beetle

Order- Orthoptera



Order- Hymenoptera



Order- Diptera



Order- Mantodea



Order- Hemiptera

