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Diversity of praying Mantids (Insecta: Mantodea) from various ecosystems of south Gujarat, India

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Abstract

A study on biodiversity of Praying Mantids (Insecta: Mantodea) was carried out at N. M. College of Agriculture, Navsari Agricultural University campus, Navsari, Gujarat, India were carried out during 2016-17. A total 21 species of mantids were recorded belonging to 15 genera and 5 families from different ecosystems *i.e.*, paddy, pond, grassland, mango and banana. Mantodea was found to be the dominant family followed by Empusidae and Toxoderidae. Maximum diversity of Mantids were recorded from grassland ecosystem followed by paddy, mango, banana and pond ecosystems.

Keywords: Praying Mantids, biodiversity, species, ecosystem

Introduction

Mantids (Insecta: Mantodea), usually known as Praying Mantis, hold significant place in the ecosystem as predators, mainly feed on grasshoppers, moths, butterflies, flies, beetles and they are well adapted in camouflage and mimicry^[1]. Mantids have attained their common popular name from the way they raise their two fore legs in a posture of prayer. They are often found waiting still for hours together for their prey with their heads rotating 180°^[2]. They are diurnal and are attracted to lights at night^[3]. They are weak flies and are generally seen sitting on herbs, shrubs and trees^[4]. There are around 2300 species of mantids under 434 genera all over the world^[5]. From India 162 species of mantids under 68 genera belonging to six families were reported^[6]. Research on mantids in India was further propelled by several researchers in India^[7-12]. So far 4 species and 4 genera of mantids have been recorded from all over Gujarat^[6]. The present study aims at making a Mantid inventory through recording Mantid species from the different ecosystem. Mantids are considered to be of economic value to farmers as they play valuable role in pest management by consuming large number of prey in the agriculture fields. Therefore, there is a great need to know their ecosystem wise diversity which will gives us exact picture of the most important group of Insect.

2. Materials and Methods

Study site

A study on biodiversity of mantids were carried out at Department of Agricultural Entomology, N. M. College of Agriculture, Navsari Agricultural University, Navsari (Gujarat) during August 2016 to July 2017. Navsari is situated at coastal region of western India. Geographically, it is situated at 20°57' N latitude and 72°54' E longitude with an altitude of 11.98 meters above the mean sea level.

Collection, Preservation and Identification of mantids

Adult, free flying mantids was collected from the different ecosystems *i.e.* grassland ecosystem followed by paddy, mango, banana and pond by using standard insect collecting swap net attached to a ring with a handle of 1.00 m length, 0.3m hoop ring diameter. The soft nylon net with 1.00 m depth sewed on the hoop ring. All the collected specimens were preserved in 70 per cent ethyl alcohol with proper labeling, indicating locality, date and name of collector. Mostly, spot observation were followed by collection and photography from the different areas for their identification.

For identification mantid specimens were killed in killing jar and spread and pinned properly. The initial identification, of the praying mantids was done with the help of the keys of state fauna services of Zoological Survey of India, Kolkata. The final confirmation had been be

done with the help of expert by sending specimens and personal visit.

3. Results and Discussion

During the present study, total 21 species of mantids were recorded from different ecosystem, which belong to five families. Among them 57.14 per cent species belongs to family Mantidae, 14.28 per cent from Empusidae, 14.28 per cent species belongs to family Toxoderidae, 9.52 per cent species represents Hymenopodidae, and remaining 4.76 per cent species from family Liturgusidae (Table 1 and Figure 1). Dwari and Mondal [13] in a study also reported a total 10 species of mantids belonging to 9 genera under 3 families viz. Mantidae, Hymenopodidae and Liturgusidae. Under the present study Mantidae was the most dominant family comprises of 8 genera and 12 species with 57.14 per cent species distribution. This may be more or less in accordance with the earlier work.

Looking to the ecosystem wise distribution of mantids, grassland ecosystem ranked first position with 21 species (100%). The paddy ecosystem constituted 14 species (66.67%), followed by mango ecosystem which constituted 10 species (47.61%). While, banana and pond ecosystem have

7 species (33.33%) (Table 2). The variation in species of mantids might be due to diverse kind of habitat, vegetation, food availability and agricultural practices.

Jadhav [14] while studying the mantid diversity of Nasik district and forest areas of the district which closely support the present findings.

4. Conclusion

Total 21 species of mantids were recorded belonging to 15 genera and 5 families from different ecosystems i.e., grassland, paddy, mango, banana and pond at Navsari, Gujarat, India. Among them almost all the species were present in grassland ecosystem.

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Table 1: Family and Species distribution of mantids

Order	Family	Genera	No.of species	% Species
Mantodea	Mantidae	8	12	57.14
	Hymenopodidae	2	2	9.52
	Liturgusidae	1	1	4.76
	Empusidae	2	3	14.28
	Toxoderidae	2	3	14.28
TOTAL	5	15	21	100

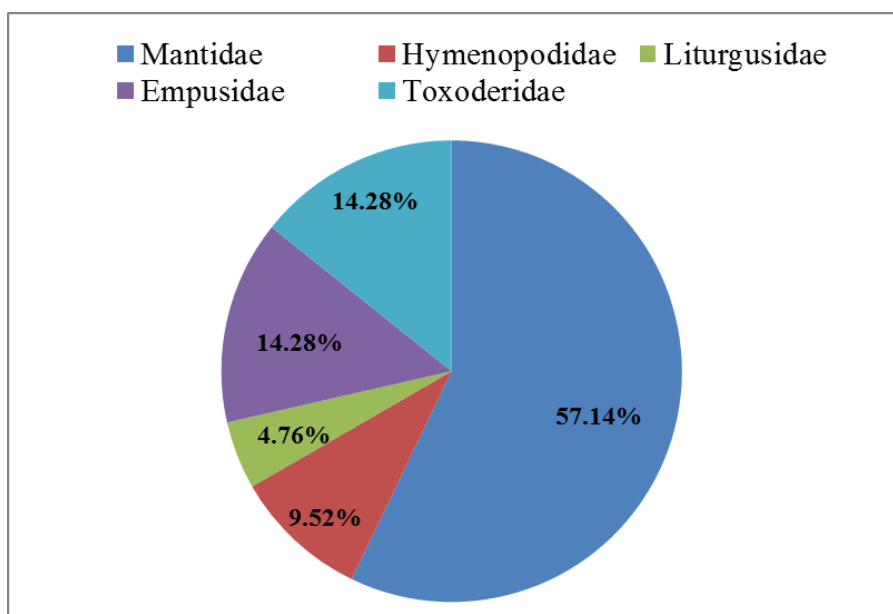


Fig 1: Distribution of Mantodea in different families

Table 2: Species diversity of Mantids from different ecosystems

Sr. No.	Habitats	Number of observed species	% distribution
1	Paddy ecosystem	14	66.67
2	Mango ecosystem	10	47.61
3	Pond ecosystem	7	33.33
4	Grassland ecosystem	21	100
5	Banana ecosystem	7	33.33
	Total	21	100

Table 3: List of mantids from different ecosystems

S.no	Scientific Name	Ecosystems				
		Paddy Ecosystem	Mango Ecosystem	Pond Ecosystem	Grassland Ecosystem	Banana Ecosystem
1	<i>Ameles fasciipennis</i> (Kaltenbach, 1963)*	A	A	A	P	A
2	<i>Humbertiella ceylonica</i> (Saussure, 1869)	P	A	A	P	A
3	<i>Gongylus gongylodes</i> (Linnaeus, 1758)	P	A	A	P	A
4	<i>Tenodera sinensis</i> (Nurseryman, 1962)*	P	A	P	P	P
5	<i>Mantis religiosa</i> (Burmeister, 1838)	P	P	P	P	P
6	<i>Hierodula viridis</i> (Burmeister, 1838)*	P	P	P	P	P
7	<i>Creobroter apicalis</i> (Westwood, 1889)*	P	A	A	P	A
8	<i>Hierodula keralensis</i> (Vyjayandi, 1995)*	P	A	A	P	A
9	<i>Aethalochroa ashmoleana</i> (Westwood, 1841)*	A	P	A	P	P
10	<i>Statilia maculata</i> (Zheng, 1987)*	A	P	A	P	A
11	<i>Hierodula coarctata</i> (Saussure, 1869)*	P	A	A	P	A
12	<i>Empusa guttula</i> (Thunberg, 1815)*	A	A	A	P	A
13	<i>Gongylus Trachelophyllus</i> (Burmeister, 1838)*	A	A	A	P	A
14	<i>Archimantis latistyla</i> (Serville, 1838)*	P	A	A	P	A
15	<i>Hierodula grandis</i> (Saussure, 1869)*	P	P	P	P	A
16	<i>Tropidoa guttatipennis</i> (Stal, 1877)*	A	P	A	P	A
17	<i>Hierodula membranacea</i> (Burmeister, 1838)*	P	P	A	P	A
18	<i>Schizocephala bicornis</i> (Linnaeus, 1758)*	P	A	A	P	A
19	<i>Aethalochroa insignis</i> (Wood-Mason, 1878)*	A	P	P	P	P
20	<i>Hierodula venosa</i> (Olivier, 1792)*	P	P	P	P	P
21	<i>Toxoderopsis spinigera</i> (Wood-Mason, 1889)*	A	P	A	P	P

P- present, A- absent, *First time recorded in Gujarat

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