

A study of moth diversity in medicinal garden of Indira Institute of Pharmacy in Devrukh tehsil district of Ratnagiri

Rohit Raj¹, Amol Khade^{2*}, Vipul Sansare³, Darshana Vikhare⁴, Nimisha Baing⁴

¹ Department of Pharmacognosy, Indira Institute of Pharmacy, Sadavali, Devrukh, Maharashtra, India

² Department of Pharmaceutical Chemistry, Indira Institute of Pharmacy, Sadavali, Devrukh, Maharashtra, India

³ Department of Pharmaceutics, Dnyandeep College of Pharmacy, Boraj, Khed, Maharashtra, India

⁴ Department of Pharmacy, Indira Institute of Pharmacy, Sadavali, Devrukh, Maharashtra, India

Abstract

Moths are a diverse group of insects in the order Lepidoptera, closely related to butterflies. Moths undergo complete metamorphosis, with four stages: egg, larva (caterpillar), pupa (cocoon), and adult. Many moth species lay their eggs on specific host plants, which the caterpillars will later feed on. Moths play a significant and multi-faceted role in ecosystems, contributing to biodiversity and maintaining ecological balance. Thus, present study was started with aim to assess diversities of moth in medicinal plant garden of Indira Institute of Pharmacy, Sadavali situated in Sangameshwar taluka, Ratnagiri district of Maharashtra.

Keywords: Diversity, Ratnagiri District, Sadavali, medicinal plant garden

Introduction

Moths are a diverse group of insects in the order Lepidoptera, closely related to butterflies. They are typically nocturnal and are known for their scaly wings, which vary in color, size, and shape depending on the species [1]. Moths range from tiny, delicate varieties to large, vibrant species with wingspans of up to 12 inches, like the Atlas moth [2]. Moths undergo complete metamorphosis, with four stages: egg, larva (caterpillar), pupa (cocoon), and adult. Many moth species lay their eggs on specific host plants, which the caterpillars will later feed on [3].

Though closely related, moths and butterflies have some key differences [4]. Moths generally have thicker, hairier bodies and feathery antennae, while butterflies have slender bodies and clubbed antennae. Moths are typically nocturnal, whereas butterflies are usually active during the day [5].

Moths play a significant and multi-faceted role in ecosystems, contributing to biodiversity and maintaining ecological balance [6]. Many moths are nocturnal pollinators, visiting flowers at night and transferring pollen. Some plants, especially those with night-blooming flowers, rely on moths for reproduction, making them essential for plant biodiversity [7]. Moths serve as a vital food source for a range of species, including birds, bats, reptiles, amphibians, and small mammals [8]. Their larvae, or caterpillars, are also critical for insectivorous birds, especially during the

breeding season when extra protein is needed. Moth larvae often feed on decaying plant material, helping in the breakdown and decomposition of organic matter, which recycles nutrients into the soil and supports plant growth [9]. Due to their sensitivity to habitat changes, moth populations reflect the health of their environments. Monitoring moth populations can provide valuable information on ecosystem health, biodiversity, and the impact of pollution or climate change [4].

Materials and methods

Sadavali is village situated between the Devrukh Sangameshwar Maharashtra State highway. The village is located at 17.0883°N 73.6085°E. It has an average elevation of 125 metres. The most of the region of the village has surrounded by mountainous [2].

The survey on moth diversity was carried out for the period of five months from June and October 2024. The survey was carried from 7:00 pm to 11:00 pm. For the survey, the street lights were spotted inside the college campus and corridor lights were kept switched on to attract the different moth toward it. During the survey, photographs of the moth were captured using camera (Canon Rebel T6, 50 mm lens was mounted on camera body in reverse direction to get macro effect) for identification purpose [10]. Figure 1 highlight map of study area.



Fig 1: Satellite map highlighting study area in circle

Identification of moth species

The captured photographs of moth were used for the identification moth species. Shape, design, colour and size were used as parameters for the identification of the moth species with the help of expert.





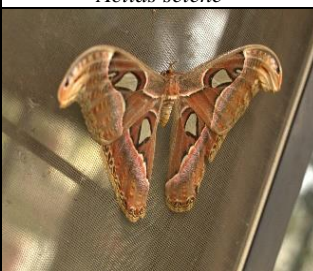

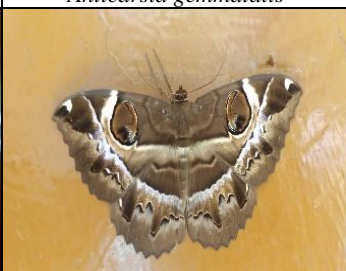














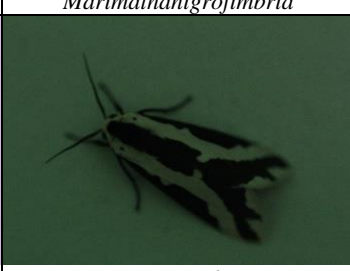


Results and discussion

The list of the observed moth of each family is highlighted in table 1 and 2. Total 55 species of moth belong were found at study area. The moth of Erebidae family was the richest amongst families that comprised (25.45%) of the total species of moth.

Table 1: Details of moth found at selected study area

S.no	Common Name	Scientific name	Family	Host Plant	
1.	Tiger moth	<i>Cyana petegrina</i>	Arctiidae		
2.		<i>Digama marchalii</i>			
3.		<i>Glycythyma chrysorycta</i>			
4.	Hawaiian Beet Webworm Moth	<i>Spoladea recurvalis</i>	Crambidae	<i>Phalaena margaritaria</i>	
5.		<i>Tyspanodes linealis</i>		<i>Chenopodium album</i>	
6.	Leaf folder	<i>Pycnarmon cribrata</i>		<i>Bombax ceiba</i>	
7.	Rice caseworm	<i>Parapoynx stagnalis</i>		<i>Vitex negundo</i>	
8.		<i>Spoladea recurvalis</i>		<i>Oryza sativa</i>	
9.		<i>Parapoynx votalis</i>		<i>Chenopodium album</i>	
10.	Coral Tree Moth	<i>Agathodes ostentalis</i>		<i>Cleistanthus sp.</i>	
11.		<i>Nymphicula blandialis</i>		<i>Erythrina suberosa</i>	
12.	False Tiger moth	<i>Dysphani amilitaris</i>		Geometridae	<i>Carallia brachiata</i>
13.		<i>Cyclophora albipunctata</i>			<i>Betula pubescens</i>
14.		<i>Cyclotheadis juncta</i>			
15.		<i>Eumeleaspp. Duncan</i>	Geometridae	<i>Macaranga spp.</i>	
16.	Blue tiger moth	<i>Dysphania percota</i>		<i>Carallia brachiata</i>	
17.		<i>Pelagodes antiquadraria</i>		<i>Mangifera indica</i>	
18.		<i>Comostola laesaria</i>		<i>Terminalia carolinensis</i>	
19.	Golden-winged Palyas Moth	<i>Phrygonis auriferaria</i>			
20.		<i>Scopula pulchellata</i>		<i>Plumbago auriculata</i>	
21.		<i>Antheusaservula Drury</i>	Notodontidae	<i>Vigna radiata</i>	
22.	Black-bordered Lemon Moth	<i>Marimatha nigrofimbria</i>	Noctuidae	<i>Digitaria ischaemum</i>	
23.		<i>Maliattha signifera</i>		<i>Oryza sativa</i>	
24.	Triangular striped Moth	<i>Chalciopie mygdon</i>		<i>Phyllanthus niruri</i>	
25.		<i>Artena dotata</i>		<i>Terminalia tomentosa</i>	
26.		<i>Leucania commoides</i>		<i>Dactylis glomerata</i>	
27.	Owl moth	<i>Brahmaea wallichii</i>	Brahmaeidae	<i>Ligustrum robustum</i>	
28.		<i>Eupterote mollifera</i>	Eupterotidae	<i>Elettaria cardamomum</i>	
29.		<i>Eupterote undata</i>		<i>Ricinus communis</i>	
30.	Monkey moth	<i>Eupterote primularis</i>		<i>Camellia sinensis</i>	
31.		<i>Marumba indicus</i>	Sphingidae	<i>Bombax spp.</i>	
32.		<i>Leucophlebia lineata</i>		<i>Saccharum officinarum</i>	
33.	Oleander hawk moth	<i>Daphnis nerii</i>		<i>Holarrhena pubescens</i>	
34.	Brown-banded Hunter Hawkmoth	<i>Theretra silhetensis</i>			
35.	Grey banded Hunter Moth	<i>Theretra lyceus</i>			
36.		<i>Agnosia orneus</i>		<i>Grewia asiatica</i>	
37.		<i>Meganola major</i>	Nolidae	<i>Terminalia chebula</i>	
38.		<i>Miresa walker</i>	Limacodinae	<i>Acacia mangium</i>	
39.	Small mocis	<i>Mocis latipes</i>	Erebidae	<i>Oryza sativa</i>	
40.		<i>Grammodes stolida</i>		<i>Quercus Alba</i>	
41.		<i>Hadennia moore</i>			
42.		<i>Miltochrista spp.</i>			
43.		<i>Nannoarctia dentata</i>			
44.	Castor Semi-looper	<i>Achaea Janata</i>		<i>Citrus medica</i>	
45.		<i>Chusaris spp. Walker</i>			
46.		<i>Eudocima homaena</i>		<i>Tiliacora racemosa</i>	
47.	Leaf moth	<i>Anticarsia irrorate</i>		<i>Cyamopsis tetragonoloba</i>	
48.		<i>Leucoma salicis</i>		<i>Populusnigra</i>	
49.		<i>Erebus ephesperis</i>		<i>Smilax setosa</i>	
50.		<i>Olepa ricini</i>		<i>Camellia sinensis</i>	
51.		<i>Tephriopsis divulsa</i>		<i>Petrocarpus marsupian</i>	
52.	Lichen moth	<i>Lithosiini genera spp</i>			
53.	Bright Golden Emperor Moth	<i>Loepa schintlmeisteri</i>	Saturniidae	<i>Salix caprea</i>	
54.	Atlas moth	<i>Attacus atlas</i>		<i>Cinnamomum zeylanicum</i>	
55.	Moon moth	<i>Actias selene</i>		<i>Zanthoxylum acanthopodium</i>	

Table 2: Photographic representation of moth

			
<i>Actias selene</i>	<i>Agnosia orneus</i>	<i>Anticarsia gemmatalis</i>	<i>Artena dotata</i>
			
<i>Attacus atlas</i>	<i>Eupterote mollifera</i>	<i>Erebus ephesperis</i>	<i>Cyclophora albipunctata</i>
			
<i>Loepa schintmeisteri</i>	<i>Chusaris spp</i>	<i>Cyana petegrina</i>	<i>Leucania commoides</i>
			
<i>Leucoma salicis</i>	<i>Eupterote undata</i>	<i>Glycythyma chrysorycta</i>	<i>Grammodes stolidia</i>
			
<i>Maliattha signifera</i>	<i>Marimathani grofimbria</i>	<i>Meganola major</i>	<i>Miltchrista spp</i>
			
<i>Mocis latipes</i>	<i>Nannoarctia dentata</i>	<i>Parapoynx votalis</i>	<i>Pycnarmon cribrata</i>



Conclusion

The major outcome of present study is highlighting the importance of medicinal garden of the institute as a preferred habitat for moth. Total 55 species of moth are found during the study. Thus, selected study showed presence of healthy ecosystem. Deforestation due to urbanization is the major cause for the destruction of host plant. Which eventually affects the lifecycle of moth as they are very specific for their host plant. The little steps like making garden can contribute in potentiating moth population.

Acknowledgement

Author would like to thank Mr. Alankar Surve, Mr. Deepesh Patil and Mr. Yuvraj Gharat for their valuable assistance.

References

- Alex CJ, Soumya KC, Sajeev TV. A report on the moth (Lepidoptera: Heterocera) diversity of Kavvai River basin in Kerala, India. J Threat Taxa,2021;13(2):17753–79.
- Raj R, Khade A, Sansare V, Patel PP. A study of butterfly diversity in medicinal garden of Indira institute of pharmacy in devrukh tehsil district of Ratnagiri. International Journal of Entomology Research [Internet],2023;8(2):18–21. Available from: www.entomologyjournals.com
- Sondhi Y, Sondhi S, Rajendra Pathour S, Kunte K. Moth diversity (Lepidoptera: Heterocera) of Shendurney and Ponmudi in Agastyamalai Biosphere Reserve, Kerala, India, with notes on new records,2018;28(2):66–89.
- Mishra SB, Kencharaddi RN, Devagiri GM, Kumar Khaple A. Natural Resource Management: Ecological Perspectives A Preliminary Study on the Moth Diversity of Kodagu District in Central Western Ghats of Karnataka, India [Internet]. Available from: https://cabidigitallibrary.org
- Pattanaik N, Satapathy A, Priyadarshini D. Moth (Lepidoptera: Heterocera) diversity of bhubaneswar, odisha, india: A preliminary study. Not Sci Biol, 2021, 13(3).
- Wankhade LN, Kadwe MM, Bhonde RS, Bidwai PA. A study on the moth (Insects: Lepidoptera: Heterocera) diversity during rainy season from Tirora, District Gondia, Maharashtra. ~ 93 ~ Journal of Entomology and Zoology Studies [Internet], 2021, 9(6). Available from: http://www.entomoljournal.com
- Ahmad Dar A, Jamal K, Alhazmi A, El-Sharnouby M, Salah M, Sayed S. Moth diversity, species composition, and distributional pattern in Aravalli Hill Range of Rajasthan, India. Saudi J Biol Sci,2021;28(9):4884–90.
- Khan. Members of Phylum Arthropoda play a pivotal role in ecological services [Internet]. Rathore and Jasrai, 2006. Available from: https://academicjournal.ijraw.com
- Phadtare S, Ragade VR, Gaikwad R, Takawane P. Study the Diversity of Nocturnal Moths in Agricultural Field of Western Maharashtra Region. Int J Res Appl Sci Eng Technol,2024;12(2):1134–9.
- Ahmed G, Das AN, Borah L, Ahmed R. Moth Diversity in the Mahamaya Reserve Forest, Kokrajhar, Assam. Indian Journal of Entomology, 2024, 1–5.