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A preliminary checklist of moths (Insecta: Lepidoptera: Heterocera) fauna from around aurangabad hill ranges, Maharashtra, India

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Abstract
The study was carried out to investigate the occurrence of moths in agriculture, grassland, and forest hill areas, moths collected from the Aurangabad district from January 2023 to March 2024. The moths were randomly collected from the selected sites in Aurangabad. A total number of 30 moth specimens were collected using the light trap method with the help of a vertical sheet light trap. The identification process focused on family-level classification. A total of 30 moth specimens were collected, representing families such as Erebidae, Noctuidae, Geometridae, Sphingdae, Crambidae, Metarbelidae, Nolidae and Lasiocampidae. The study contributes to our understanding of moth biodiversity in this region and highlights their role as bioindicators of environmental health.

Keywords: Noctudiea, lepidoptera, fauna, moth taxonomy, Aurangabad

Introduction

Lepidoptera is a group of insects which consist of many large and showy species. Moths form the majority of this order. There are thought to be 150,000 to 250,000 different species of moths (about ten times the number of butterfly species), with thousands of species yet to be described. thousands of species yet to be described (1. 1892). In 1997 V.K. Chey, *et al*. Diversity of moths in forest plantations and natural forests in Sabah on micromoths in the various fast-growing exotic tree, biogeographic study due to high diversity and geographical coverage. (V.K. Chey1 1997) [12]. K. Sivasankaran, et. al. in 2010 a total of 4,679 individuals of 140 species of noctuid moths belonging to 83 genera and 23 subfamilies were collected in the Tamil Nadu part of the Western Ghats of south India. (K. Sivasankaran 2011) [4]. A total of 245 species classified,177 genera, and 20 families are reported in Northern Maharashtra. (Nikam 2013) [8]. A list of the total 282 species of moths recorded in 2018, Agasthyamalai Biosphere Reserve in the Southern Western Ghats.14 species were new records for Kerla,1 new record for India, and a new species. (Yash Sondhi 2018) [13]. More than half of the world's known animal species are insects Lepidoptera is the second largest and the most diverse order of the class Insecta (C. Kathirvelu 2019) [2]. Insects belonging to the order Lepidoptera include moths, comprising approximately 1, 60,000 species that act as a major crop pest of the world. The moth fauna of India is poorly known. There have been very few surveys carried out before the 20th century in British administration, especially in Maharashtra state (Ravindra Fakirrao Pathre* Sharad Devidasrao Jadhav 2019) [9]. A total of 64 moth species were recorded from Karanja, Wardha, Maharashtra. (Lokesh N Wankhade1 2021) [6]. A great deal of research work has been done on the biology, taxonomy, ecology, and conservation of lepidopterans from different parts of the world, including the Indian subcontinent. (S.S. Jadhav, Dr.R.F. Pathre, Y.R. Kaynde, M.G. Rathod. 2024) [10]. Many insects play as hosts to different microbes by forming close mutualistic relationships. (Monika Gulabrao Rathod 2023) [3]. Most of the vertically transmit the endosymbiotic microorganisms, which can affect the host in various parameters like fitness, reproduction, and genetic diversity. (Monika Gulabrao Rathod 2023) [3] Moths are the cousins of butterflies, both of them belonging to the order Lepidoptera. Documenting the diversity of moth fauna can help lead to new evolutionary insights and a first step in developing conservation goals for the lepidopteron insects. Hence, in the present study, an attempt has been made to study the diversity of moths from in and around Aurangabad city, Maharashtra, which is still not investigated. The main purpose was to study the moth's fauna, collect them, identify the moth diversity, and study their occurrence. The study was carried out from January 2023 to March 2024. The Aurangabad region has a rich flora and fauna of tropical, agricultural, forest deciduous, shrub and semi-evergreen plant species of mesophytic nature. Moth collection was carried out from evening onwards till morning on the next day by using a Light Trap. Bell and Scott (1937). The present study reveals a total of 30 species from 8 subfamilies have been identified from selected sampling stations in Aurangabad city, of which, the members of the family Erebidae outnumber the other moth families. Noctuidae, Geometridae, Sphingdae, Crambidae, Metarbelidae, Nolidae and Lasiocampidae.

Study Area

Moths were collected from selected sampling stations from hill ranges of Aurangabad city. Three ecological habitats, agriculture, grassland forest, and fruit orchards were chosen for sampling. The study was carried out from January 2023 to March 2024. Aurangabad city has many hill ranges like Goga Baba Hill, Hanuman Hill, Sai Hill, Himayat Bag Hill, Mhaismal Hill, Satara Hill Aurangabad. Aurangabad has a very large forest area, so we get a large variety of moths. The climate is moderately stable. The temperature ranges between 17° and 33° C as per season. The area receives rain from both the northeast and southwest monsoons. This area has a tropical climate, specifically a tropical wet and dry climate under the Koppen climate classification.

Material and Methods

Collection and Identification of Moths

The moth's samples were collected from various localities in the Aurangabad City of Maharashtra, India. The collection of moths was carried out from evening time onwards till morning on the next day by using the Light Trap method. And daytime moths were collected with the help of hand nets. The collected moth specimens were killed by Chloroform and later pinned using entomological pins, spread using a spreading board and dried in the oven at about 80-100°C for 2-4 hours. All specimens were preserved in an airtight insect box, having naphthalene balls as a fumigant. Each specimen was provided with a label ID indicating the area and date of collection.

The identification of moths was carried out in a laboratory at the JES College Jalna, India. With the help of identified specimens and literature by Hampson (1892, 1894, 1895 and 1896) [1]. And other published literature. Moore (1882), Barlow (1982), Holloway (1983– 2011) [], Sanjay Sondhi *et al*., (2016). Gurule *et al*., 2010-2013) [8]. Pathre *et al*., (2019) [9]. The identified species recorded during the survey were identified in the relevant literature. The subfamilies, genera and species are listed alphabetically within their respective families.

Table 1: Preliminary list of moth species recorded selected sites from Aurangabad district.

Sr.	Scientific Name	Family	Subfamily
	Utethesia Lotrix, Cramer, 1777.	Erebidae	Arctiinae
	Eressa Confinis, Francis Walker, 1854.	Erebidae	Arctiinae
	Spilisoma Eldorado, Rothschild, 1910.	Erebidae	Arctiinae
	Aloa Lactinea, Pieter Cramer, 1777.	Erebidae	Arctiinae
	Euproctis Lunata, Francis Walker, 1855.	*Erebidae*	• *Noctuinae*
	Lymantria Incerta, Francis Walker, 1855.	• *Erebidae*	• *Noctuinae*
	Creatonotos Gangis, Carl Linnaeus, 1763.	Erebidae	Arctiinae
	Catephia Alchymista, Denis and Schiffermüller, 1775.	• *Erebidae*	• *Noctuinae*
	Amata Cyssea, Caspar Stoll, 1782.	*Erebidae*	*Arctiinae*
	Olepa Ricini, Johan Chistian Fabricius, 1775.	*Erebidae*	*Arctiinae*
	Utetheisa Pulchelloides, George Hampson, 1907.	*Erebidae*	*Arctiinae*
	Acantholipes Trajecta, Francis Walker, 1865.	*Erebidae*	*Arctiinae*
	Nygmia Icilia, Caspar Stoll, 1790.	Erebidae	Lymantriinae
	Dysgonia Stuposa, Fabricius, 1794.	Erebidae	Lymantriinae
	Aedia Acronyctoides, Guenée, 1852.	*Noctuidae*	*Noctuinae*
	Spodoptera Furgifeda Smith, 1797.	Noctuidae	Amphipyrinae
	Spodoptera Litura, Fabricus, 1775.	Noctuidae	Xyleninae
	Helicoverpa Armigera, Hubner, 1808.	Noctuidae	Heliothinae
	Aegocera Venulia, Pieter Cramer, 1777.	*Noctuidae*	*Arctiinae*
	Hyposidra Talaca, Francis Walker, 1860.	• *Geometridae*	• *Geometrinae*
	Nemoria Subsequence, Jacob Hübner, 1818.	• Geometridae	Geometrinae
	Biston Suppressaria, Guenée, 1857.	Geometridae	Lymantriinae
	Acherontia. Styx, Westwood, 1847.	Sphingidae	• *Acherontiina*
	Polyptychus Dentatus, Cramer, 1777.	*Sphingidae*	*Smerinthinae*
	Hippotion Celerio, Linnaeus, 1758.	Sphingidae	Macroglossinae
	Hippotion Rosetta, Swinhoe, 1892.	Sphingidae	Macroglossinae
	Rupela Albino, Becker & Solis, 1990.	Crambidae	*Schoenobiinae*
	Indarbela, Thomas Bainbrigge Fletcher, 1922.	Metarbelidae	*Schoenobiinae*
	Earias Cupreoviridis, Francis Walker, 1862.	*Nolidae*	*Schoenobiinae*
	Gastropacha Pardale, Walker 1855.	Lasiocampidae	Macroglossinae

Comparison of Dominating families recorded from Aurangabad district, Maharashtra

Results and discussion

In the present study, A total of 30 moth species were recorded during the present study a total of eight families were identified from the selected sampling station Aurangabad. Among eight families' moths belonging to the family Erebidae were common and outnumbered the other moth families Noctuidae, Geometridae, Sphingdae, Crambidae, Metarbelidae, Nolidae and Lasiocampidae. Of all the families Erebidae was found to be the dominating family with 10 species (45%) followed by the family Noctuidae with 5 species and Sphingdae with 4 species (16%).

Family: Erebidae

1. Utethesia Lotrix

2. Eressa Confinis

3. Spilisoma Eldorado

4. Aloa Lactinea




5. Euproctis Lunata *6. Lymantria Incerta* *7. Creatonotos Gangis* *8. Catephia Alchymista*




9. Amata Cyssea *10. Olepa Ricini* *11. Utetheisa Pulchelloides* *12. Acantholipes*


13. Acantholipes Trajecta *14. Dysgonia Stuposa*

Family: Noctuidae




15. Aedia Acronyctoides *16. Spodoptera Furgifeda* *17. Spodoptera Litura* *18. Helicoverpa Armiger*

Family: Geometridae



19. Aegocera Venulia *20. Nemoria Subsequence* *21. Biston Suppressaria*

Family: Sphingidae




22. Acherontia. Styx *23. Polyptychus Dentatus* *24. Hippotion Celer* *25. Hippotion Rosetta*

Family: Crambidae **Family: Metarbelidae** **Family: *Nolidae*** ***Family:*** **Lasiocampidae**




27. Rupela Albino *28. Indarbela* *29. Earias Cupreoviridis* *30. Gastropacha Pardale*

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