# UTTAR PRADESH JOURNAL OF ZOOLOGY

43(17): 91-95, 2022 ISSN: 0256-971X (P)



# A CHECKLIST ON THE MOTH DIVERSITY (LEPIDOPTERA: HETEROCERA) AT MADRAS CHRISTIAN COLLEGE CAMPUS, TAMBARAM EAST, CHENNAI

# S. MERCY METILDA <sup>ao</sup> AND ANANTHI RACHEL LIVINGSTONE <sup>a\*o</sup>

<sup>a</sup> Department of Zoology, Madras Christian College, Tambaram, Chennai – 600059, India.

#### AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

#### Article Information

DOI: 10.56557/UPJOZ/2022/v43i173159

Editor(s):

(1) Dr. Md. Aminur Rahman, Jashore University of Science and Technology, Bangladesh. *Reviewers:* 

(1) Sarah Zaidan, University of Pancasila, Indonesia.

(2) Sawsan Sabry Moawad, Ain Shams University, Egypt.

(3) Subin K. Jose, Christ College (Autonomous), India.

(4) Vidhi Bapna Kumath, Gujarat Ayurved University, India.

Received: 08 July 2022 Accepted: 12 September 2022 Published: 19 September 2022

**Original Research Article** 

# ABSTRACT

Moths are diverse group of insects belonging to the order Lepidoptera and suborder Heterocera.

They are regarded as one of the indicators of a healthy environment. This study deals with the first checklist of moth species in Madras Christian College campus, Tambaram. The study was carried out from December 2018 to September 2019. In total, 32 species of moths were identified from 29 genera falling under 9 families. The Moths identified belonged to the families of Erebidae, Noctuidae, Crambidae, Sphingidae, Eupterotidae, Uraniidae, Geometridae and Tineidae of which, family Erebidae was found to be the superior family. The results of this preliminary study sheds light on the unknown biodiversity of moth, which needs to be strengthened through comprehensive future surveys. The objective of this study is to document moth diversity in Madras Christian College, Tambaram.

Keywords: Diversity; checklist; lepidoptera; moths; erebidae.

# **1. INTRODUCTION**

"Arthropods are considered as the most successful animal group which consists of more than two-third of all animal species on earth. Class Insecta comprise about 90% of tropical forest biomass" [1]. "Order Lepidoptera is the most diverse and second largest in class Insecta" [2]. "Moths constitute the sub-order

<sup>&</sup>quot;Assistant Professor of Zoology;

<sup>\*</sup>Corresponding author: Email: rachel.tingid@mcc.edu.in, rachel.tingid@gmail.com, ananthirachel@mcc.edu.in;

"Most of the lepidopterans are moths with approximately species 160.000 worldwide (Smithsonian Institution, 2012), many of which are yet to be described. In India, estimated moth species were 11,300" according to Peter Smetacek [4]. "Most of the species of moths are nocturnal, but there are also crepuscular as well as diurnal species. They play important roles throughout their life cycle, as herbivores during their larval stage, as pollinators during their adult stage as well as food for predators and parasitoids throughout their life cycle" [5]. "Lepidoptera is one of the most quantitative comparisons between insect fauna to be valid, especially their abundance, response to the vegetation as well as climate, species richness and relative advanced taxonomy" [6] (Holloway, 1985). "Moth diversity studies are beneficial as moths are used as bioindicators on tropical islands" [6] and in Australian rainforest [7] "The larvae of moths are active devourers of the tender parts of host plants hence, they are often recognized as pests of variety of crops, vegetables and forest plantations. Therefore, they are treated as economically important insects" [8]. "Only a little information is available on the Lepidoptera because of the preference of researchers to work on less diverse taxa" [9]. "The deficiency of knowledge of systematics of insect fauna is a problem in assessing insect diversity which is due in part to lesser conservation efforts for invertebrates over larger vertebrates and plants" [10]. The present study is the first documentation on the moth species of Madras Christian College campus. The present preliminary study aims to make an inventory as a baseline for future studies on the moths of the Madras Christian College Campus, to enable conservation efforts and ecological studies of these insects. Monitoring their number and ranges can enable us to give the vital clues to changes in our own environment, such as the effects of new farming practices, climate change and air pollution, etc.

# 2. MATERIALS AND METHODS

# 2.1 Study Area

The present study has been carried out at Madras Christian College Campus, Tambaram, Chennai which serves as a biodiversity rich source. It is the second largest scrub jungle in Asia. The campus has lush green vegetation having large trees, bushy shrubs and long grasses that provide shelter to the moths. Madras Christian College has actively supported the diversity of flora and fauna on campus. The campus is known for its flora and fauna, notably spotted deer and rare trees. The study area Madras Christian College is located at 80°7' E, 12°55' N. The approximate area of MCC campus is 320 acres. The elevation is about 30 MSL (Mean Sea Level). The soil is Red Laterine soil. Average minimum temperature is 20°C to 22°C during November to December. Average maximum temperature is 40°C to 42°C during May to June. Average annual rain fall is 130 cm. Rainfall is maximum during October to November due to the activity of the North-East monsoon. The highest part is a shallow central ridge running north to South. From this ridge, the land slopes eastwards to the Selaiyur Lake and Westwards to the Irumbuliyur Lake. The campus is an important part of catchment areas for these two lakes. From the highest to the lowest point on the campus, there is a fall of around 9 meters. The site is breezy due to slightly elevated position and the wind is strong during the summer months. The campus is originally formed from a part of Selaiyur reserve forest. The vegetation is a true Scrub Jungle with a few Palmyras scattered here and there. The forest is a typical Tropical Dry Evergreen Forest, fragmented by human interventions. The study has been carried out in different places of the campus were enormous flora and faunal diversity are seen. The campus consists of an irrigation tank and a farm where there is thick vegetation. The present survey was aimed to prepare a checklist of the moths found in and around the MCC campus.

# 2.2 Sampling and Collection

"The findings presented here are based on random surveys carried out from December 2018 to September 2019. Collection of insects was carried out using the Hand-picking method, net sweeping method and tree beating method" Jonathan [11], Arora [12] and Ghosh [13]. The light trap was operated twice a week in the locality. Single specimens from each species were collected and identified in the field. The location of the light trap was changed from time to time within the ecosystem. Photographs were taken with a digital camera, model Canon EOS 1300D, with 18 mega pixels.

#### **2.3 Identification**

The collected moths were classified according to the key characters of Hampson [14] and Holloway (1989), Bell and Scott [15], Holloway [6], Arora and Gupta [12], Barlow and D'Abrera [16], Shubhalaxmi and Chaturvedi [17], Kendrick [18], Pratheesh et al. (2018), Yash Sondhi [19]. With help of Entomological Research Institute and Zoological Survey of India, the identification process was confirmed [20-24].

#### **3. RESULTS**

A total of 32 species of moths under 9 families and 29 genera were observed and recorded in Madras Christian College campus. The family Erebidae (12) was recorded as the most dominant family in terms of

number of species, followed by Noctuidae (5) Crambidae (5) Sphingidae (2) Eupterotidae (2) Uraniidae (2), Saturnidae (2), Geometridae (1) and Tineidae (1). The abundance of Moth was represented according to their family wise in the study area using a pie chart and bar diagram.



Fig 1. Pie chart of moth diversity



Fig. 2. Status of moth species dominance in MCC campus using bar diagram representation

Sl. No.	Family name	Species name
1.	Erebidae	Amata passalis
		Aseta Egriças
		Calunna Bava
		Erebus hieroglyphica
		Erecia inangulata
		Eudesima materna
		Eudesima phalonia
		Qlena vicini
		Qphiusa alista
		Qrvasca sukurtas
		Spirama retorta
		Utetheisa letix
2.	Noctuidae	Actonicio Bruinger
		Ruszenia terida
		Qraesia emaxzinan
		Sasunaza tenebresa.
		Thyas carenata
3	Crambidae	Achura nudalis
		Cuaphalesresis medinali
		Dianhania indica
		Nausings geometralis
		Spoladera resurvalis
4.	Sphingidae	Cephonodes bylas
		Therera silhetensis.
5.	Eupterotidae	Euntereis undata
		Eurterete bifasciata
6.	Uraniidae	Mierania aculeata
		Phazaca leucocera
7.	Saturniidae	Antheraea paphia
		Antheraea mylitta
8.	Geometridae	Nemoria mimosaria
9.	Tineidae	Tineola bisselliela

Table 1. An initial checklist of moth fauna in MCC campus

#### 4. DISCUSSION AND CONCLUSION

This study is a preliminary step to explore the diversity of moth fauna in Madras Christian College. Surveying and documenting this fauna, will indispensably contribute to many scientific studies and conservation programs. This study helped to document the moth diversity in this region and to establish baseline data. Comprehensive studies of moths in future, will shed light on the hidden diversity of moth fauna. As MCC is a scrub jungle which has a rich, varied and diverse ecosystem, it hosts a large number of insects of various orders. Therefore, this study helps to create a preliminary checklist of moth diversity. A total of 32 species under 9 Families and 29 genera, were observed and recorded.

Erebidae (12) was recorded as the dominant family in terms of number of species, followed by Noctuidae (5), Crambidae (5), Sphingidae (2), Eupterotidae (2), Uraniidae (2), Saturniidae (2), Geometridae (1) and Tineidae (1). This work was an attempt to describe diversity of moth fauna.

Thus, by creating awareness on biodiversity conservation, the moth diversity in our ecosystem can be conserved.

### ACKNOWLEDGEMENT

The authors are grateful to the Head of the Department of Zoology, Madras Christian College and the University of Madras to which it is affiliated for enabling us to produce a Checklist of Moth diversity.

#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

Metilda and Livingstone; UPJOZ, 43(17): 91-95, 2022

#### REFERENCES

- 1. Fatimah A, Catherine AK. The larger moths (*Lepidoptera: Heterocera*) of the crocker range national park, sabah: A preliminary checklist. ASEAN Review of Biodiversity and Environmental Conservation. 2002;18: 1-14.
- Benton TG. Biodiversity and biogeography of henderson island insects. Biol. J Linn. Soc. 1995; 56(1-2):245-259.
- 3. Sivasankaran K, Anand S, Pratheesh M, Ignacimuthu S. Checklist of superfamily *Noctuoidea (Insecta, Lepidoptera)* from Tamil Nadu, Western Ghats, India. Check List. 2017;13(6):1101-1120.

Available:https://doi.org/10.155 60/13.6.1101

- 4. Peter Smetacek. Review of indian *Lepidoptera* collections and their significance in conservation. ENVIS Bulletin: Arthropods and their conservation in India (Insects & Spiders). Processes. In: Chadwick AC, Sutton SL. British Ecological Society et al. (Eds) Tropical rain-forest: The leeds symposium. Leeds Philosophical and Literary Society. Leeds, U.K. 2011;14(1):135-139.
- Scoble MJ. The *Lepidoptera*: form, function, and diversity Oxford University Press. Oxford; New York; 1992.
- 6. Holloway JD. Moths as indicator organisms for categorizing rain-forest and monitoring changes and regeneration; 1984.
- Kitching RL, Orr AG, Thalib L. et al. Moth assemblages as indicators of environmental quality in remnants of upland australian rain forest. Journal of Applied Ecology. 2000;37:284-297.
- 8. Shah Kr. S, Mitra B Moth (*Insecta: Lepidoptera*) fauna and their Insect predators associated with the tea gardens and the surrounding natural ecosystem environs in Northern West Bengal, India; 2015.
- Sachin A Gurule, Santosh M Nikam. The moths (*Lepidoptera: Heterocera*) of northern Maharashtra: a preliminary checklist. Journal of Threatened Taxa. 2013;5(12): 4693-4713.
- Mahajan DR. Rare, endangered and endemic plants in Nashik District. Proceedings of National Conference of Plant Diversity & Biotechnology, Dhule. 2004; 25-30.

- Jonathan JK. Collection and preservation of animals (*Hymenoptera*). Zoo. Surv. India, Calcutta. 1990;147-150.
- Arora GS. Collection and preservation of animals (*Lepidoptera*). Zool. Surv.lnd., Calcutta. 1990;131-138.
- Ghosh AK.Collection and preservation of animals. Zool. Surv. India, Calcutta. 1990; 71-80.
- Hampson GF. The fauna of british India including ceylon and burma. Moths. Vols. I-V, London; 1894
- 15. Bell, Scott.Moth of bandhavgarh national park, Madhya Pradesh. 1937;108(2):95-110,2008.
- Barlow HS. An introduction to the moths of South East Asia. Kuala Lumpur: The author; 1982.
- 17. Chaturvedi Naresh, V. Shubhalaxmi. Mass feeding of Baronet butterfly *Symphoendra nais* foster on honey dewdrops. J. Bombay Nat. Hist. Soc. Mumbai. 1999;96(2):342.
- Kendrick. Inventory of moth fauna (*Lepidoptera: Heterocera*) of the northern western ghats Maharashtra, India. Journal of the Bombay Natural History Society. 2004;108-203.
- Sondhi Yash, Sondhi, Sanjay R, Shashank Kunte, Krushnamegh. Moth diversity (*Lepidoptera: Heterocera*) of shendurney and ponmudi in agastyamalai biosphere reserve, Kerala, India, with notes on new records. 2018;28:66-89. DOI:10.5281/zenodo.2027709
- 20. Dey Pritha. Diversity of moths and their potential role as conservation tool from different protected areas of Uttarakhand, Western Himalaya, India; 2016. DOI:10.13140/RG.2.2.36049.53600
- Chandra K, Sambath S. Moth diversity of Tawang district, Arunachal Pradesh, India. Journal of Threatened Taxa. 2013;5(1):3565-3570.
- 22. Giles-Lal D, Livingstone C. Campus flora of Madras Christian College; 1978.
- 23. Gillespie RG. Naivete and novel perturbations: Conservation of native spiders on an oceanic island system. Journal of Insect Conservation. 1999;3:263-272.
- 24. Shafeeq, Sajjad Shahzad, Mirza imran Abid, Sobia Hashim, Saima Hussain, Tariq Javed, Aqib Saif, Iqra Sial, Nuzhat. Diversity and Abundance of Moths. Wulfenia. 2017;24.

© Copyright MB International Media and Publishing House. All rights reserved.