

DIVERSITY OF MOTHS IN KALABURAGI DISTRICT

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Abstract

The goal of the current study was to investigate the diversity of moths in the Kalaburagi district. The second-largest and most varied order is Lepidoptera. The initial work was completed between October 2024 and September 2025. A total number of 82 moth species representing 10 families were recorded. This study will provide insight into the variety of moths seen in the Kalaburagi district.

Keywords: Moths, Biodiversity, Diversity index

Introduction

Lepidoptera is the second-largest and most diverse order, then Coleoptera (Khan *et al.*, 2023). The order Lepidoptera, referring to "scaled wing" in Greek, includes both moths and butterflies, making insects the most powerful and most varied class. Heterocera, or moths, are among the most varied insect groups (Shukla, and Tiwari 2024; Variragade 2024; Sindhu 2023). According to recent estimates, there are more than 1,65,000 moth species worldwide, with over 12,000 of them being recorded in India (Vaghela *et al.*, 2023; Pradhan *et al.*, 2024). The largest and most often used organisms in aquatic evaluation and monitoring globally are aquatic larvae (Sarikar and Vijaykumar 2022). Lepidoptera that are genuinely aquatic include butterflies and moths (Sarikar and Vijaykumar 2023). Moths are highly reactive to environmental disturbances. They can be utilised to monitor changes in a region's ecology and are good markers of environmental degradation (Ahmed *et al.*, 2024). Ecosystems must strike an equilibrium between their sustainability and their surroundings, particularly when it comes to pollutants and human interference (Sarikar and Vijaykumar 2022). This study focuses on a checklist of moths in the Kalaburagi district.

Materials and Methods

Study area

The Indian state of Karnataka has the city of Kalaburagi. It serves as the district of Kalaburagi's administrative hub. It is located 623 kilometres north of Bangalore and was formerly a part of the Nizam's State of Hyderabad. A total size of 16.244 km², Kalaburagi district is situated in Northern Karnataka between latitudes 16° 11' and 17° 19' N and longitudes 76° 54' E (Sarikar *et al.*, 2024). Three sampling locations are used in this investigation (Figure 1).

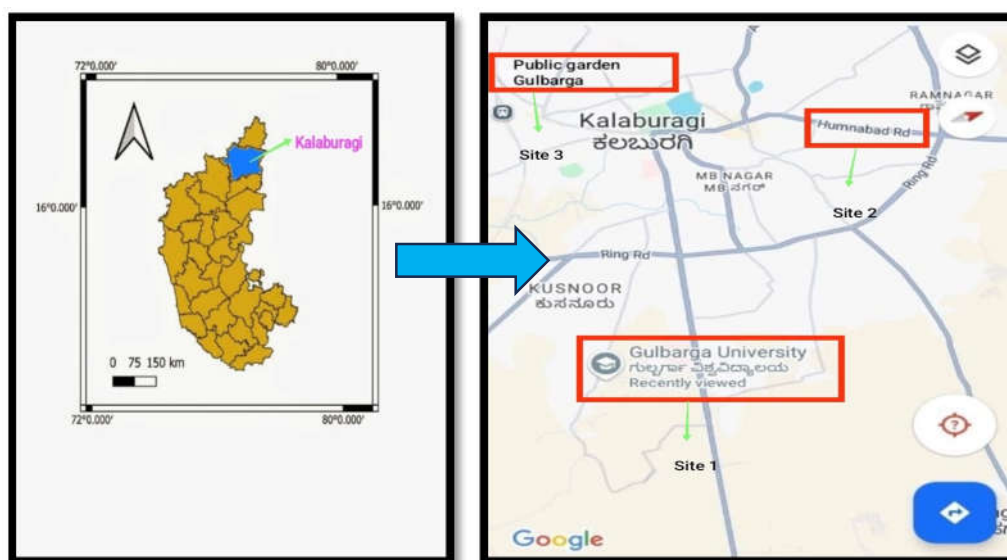


Fig.1 Map of Karnataka showing Kalaburagi District in Karnataka state

Methodology

The moth was trapped using the light trap method from 6:00 PM to 12:00 AM, and a Canon mirrorless camera was used to capture the moths. Identification was done taxonomy-wise by using taxonomic keys by (Holloway, 1984; Arora, 1990).

Diversity indices

1. Shannon-Wiener diversity index The Shannon index (H'), a gauge of species richness and abundance, was used to determine the variety of moth fauna. The following formula is used to determine the Shannon index:

$$H' = -\sum p_i \ln p_i$$

2. Simpson's diversity index

Simpson's Diversity Index (1/D) measures the probability that two randomly selected individuals from a sample will belong to the same species.

$$D = 1 - \frac{\sum n(n-1)}{N(N-1)}$$

3. The Margalef diversity index

The goal of the Margalef index is to take into consideration the tendency for species richness to rise when more individuals are sampled.

$$D = (S - 1) / \ln(N)$$

Result and Discussion

The present study was carried out on the diversity of the moth population in the Kalaburagi district from October 2024 to September 2025. Insect sampling was done by using light-trap method. The current study reveals a total of 8035 individuals were found in which comprised of 10 Families, and 82 different species. Erebidæ was most abundant family represented by 44 moth species followed by Sphingidae, Crambidae, and Geometridae contain 8, 12, and 9 with moderately recorded moth species and followed by Noctuidæ, Eupterotidae, Uraniidae contain 2 moth species followed by Lasiocampidae, and Saturniidae contain 1 moth species, with the least number of moth species. Farooqui *et al.* 2020, who recorded the Erebidæ family, represent the most extensive group of macro moths, with a total of 24569 species of moth belonging to 1760 genera in Uttar Pradesh. Simpson's reciprocal index value was 3.078, and Shannon-Weiner index value was 1.518, Margalef index was 2.048, hence, the values are found to be greater than 1, indicating good diversity of moth insect fauna in Kalaburagi district.

Table No. 1: Showing the list of moths of Kalaburagi district

Family	Species name	Common name
Erebidæ	<i>Amata passalis</i>	Sandalwood defoliator
	<i>Argina astrea</i>	Pod borer
	<i>Cyana peregrina</i>	Red masked moth
	<i>Spirma Helicina</i>	Common owlet moth
	<i>Digama hearseyana</i>	Karonda moth

<i>Cretonos interrupta</i>	Baphomet moth
<i>Achea janata</i>	Castor semilooper moth
<i>Bastilla torrida</i>	Jigsaw
<i>Hypena sp</i>	Snout moth
<i>Cyclopis caecutiens</i>	Fruit- piercing moth
<i>Pyrraharetia Isabella</i>	Tiger moth
<i>Spirma retorta</i>	Indian owlet-moth
<i>Erebus hieroglyphica</i>	White-barred owl moth
<i>Erebus macrops</i>	Common moth
<i>Ataborviza divisa</i>	Yellow stout oth
<i>Olene mendosa</i>	Brown tussock moth
<i>Artaxa sp</i>	Tussock moth
<i>Aloa lactinea</i>	Red costate tiger moth
<i>Lymantria incerta</i>	Spongy moth
<i>Eudocima homoena</i>	Fruit-piercing moth
<i>Eudocima materna</i>	Dot-underwing moth
<i>Eudocima phanolia</i>	Fruit-piercing moth
<i>Euproctis cf lunata</i>	Castor hairy moth
<i>Ascota caricae</i>	Tropical tiger moth
<i>Ascota ficus</i>	Fig leaf moth
<i>Ascota sericea</i>	Tropical tiger moth
<i>Artena dortata</i>	White-underwing moth
<i>Dichromia sagitta</i>	Dumvel
<i>Olepa ricini</i>	Castor silk moth
<i>Chalio mygdon</i>	Triangular-Striped moth
<i>Mocis frugalis</i>	Sugarcane looper
<i>Erechia cyllaria</i>	Cramer's moth
<i>Aemene sp</i>	Lichen tiger moth
<i>Nepita conferta</i>	Footman moth
<i>Orvasca subnotata</i>	Tussock moth
<i>Thyas coronata</i>	Yellow underwing
<i>Pamdesma robusta</i>	Robust Tabby moth

	<i>Pericyma umbrina</i>	Poinciana looper moth
	<i>Amata cyssea</i>	Handmaiden moth
	<i>Plecoptera sp</i>	Folded-wing moth
	<i>Eressa confinis</i>	Wasp moth
	<i>Magina argus</i>	Crotalaria pod borer
	<i>Orgyia postica</i>	Cocoa tussock moth
	<i>Anticarsia irrorata</i>	Velvet bean moth
Crambidae	<i>Maruca vitarta</i>	Bean pod porer
	<i>Spoladae recurvalis</i>	Beet webworm moth
	<i>Poliobotys ablactalis</i>	Pearl grey moth
	<i>Chabula acamassalis</i>	Brown and white spotted moth
	<i>Diaphania indica</i>	Cucumber moth
	<i>Pyrausta sp</i>	Mint moth
	<i>Scirpophaga incertulas</i>	Yellow stem borer
	<i>Rehimena phrynealis</i>	Yellow-margined moth
	<i>Glyphodes bivitalis</i>	Leafroller moth
	<i>Parotis marginata</i>	Emerald moth
	<i>Rivula sericealis</i>	Straw dot
	<i>Cnaphalocrocis medinalis</i>	Rice leaf roller
Geometridae	<i>Chiasma nora</i>	White-striped moth
	<i>Scopula sp</i>	Wave moth
	<i>Chiasmia emersaria</i>	Geometrid moth
	<i>Thalassodes quadraria</i>	Geometer moth
	<i>Traminda mundisima</i>	Emerald moth
	<i>Scopula pulchellata</i>	Geometer moth
	<i>Biston suppressaria</i>	Tea looper
	<i>Nemoria sp</i>	Emerald moth
	<i>Hypomecis sp</i>	Pale oak moth
Sphinigidae	<i>Daphis nerii</i>	Oleander moth
	<i>Acherontia styx</i>	Lesser death's head hawkmoth
	<i>Thetra nessus</i>	Yam hawkmoth
	<i>Agrius convolvuli</i>	Hornworm moth

	<i>Clanis sp</i>	Velvet hawkmoth
	<i>Psilogramma increta</i>	Plain grey hawkmoth
	<i>Macroglossum sp</i>	Hummingbird hawk-moth
	<i>Hippotion celerio</i>	Vine hawk- moth
Eupterotidae	<i>Eupterote undata</i>	Monkey moth
	<i>Eupterote testacea</i>	Monkey moth
Saturniidae	<i>Anthrea mylita</i>	Tasar silkworm moth
Uraniidae	<i>Phazaca theclata</i>	Cotton leaf roller
	<i>Micronia aculeata</i>	Grey swallowtail moth
Noctuidae	<i>Aegocera venulia</i>	Orange yellow moth
	<i>Spodoptera litura</i>	Cutworm moth
Lasiocampidae	<i>Streblote siva</i>	Jujube moth
Cossidae	<i>Zeuzera sp</i>	Leopard moth

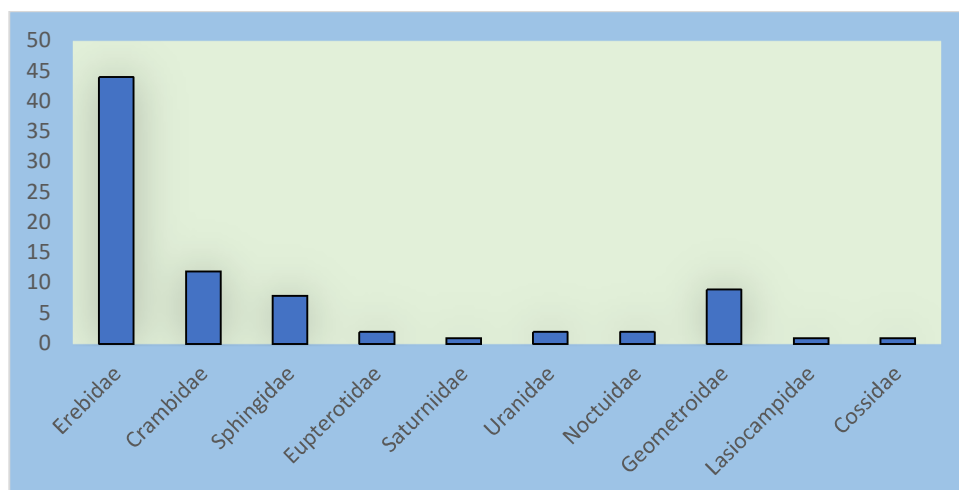


Figure 2. Family-wise distribution of moth species

Table 2. Showing the diversity indices of moth species in the Kalaburagi district

Number of individuals	8035
Simpson index	0.3249
Reciprocal Simpson index	3.078
Shannon-Weiner index	1.518
Marglef richness index	2.042

Conclusion

This preliminary study suggests that moth diversity is high in the Kalaburagi district. Moths are an important stabiliser to the environment, either as pollinators or as prey to predators, hence we need to focus on their conservation and restoration. Further study aims to investigate the effect and seasonal variation of moths to understand the seasonal abundance of moths.

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