



Research Paper

Moths of Superfamily Pyraloidea (Insecta: Lepidoptera) of Gangau Wildlife Sanctuary, Panna district of Madhya Pradesh, Central India

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Abstract

The diversity of moth superfamily Pyraloidea in various localities of forest areas of Gangau Wildlife Sanctuary of Panna and Chhatarpur districts were studied during 2022 to 2024. About more than 880 moth specimens were collected to prepare inventory using light trap. A total of 46 species of two families Crambidae 42 (91.30%) and Pyralidae 4 (8.69%) in 6 different subfamilies were found. Among them, the subfamily Spilomelinae was found having highest species richness with 31 (67.39%) species followed by Acentropinae 5 (10.86%), Pyraustinae 5 (10.86%), Pyralinae 3 (6.52%), Phycitinae (2.17%) and Musotiminae 1 (2.17%). The moth community was dominated by the Crambidae family, which accounted for about 91.30% of the total species recorded in the region, while the remaining Pyralidae family accounted for only 8.69%. There are a few casual reports on a checklist of moths from the reserve forest and scattered records of moths in other conservation areas and other areas reported as forest, agricultural, and vegetable pests. The inventory of moths prepared in this study is the first of its kind in the Gangau Wildlife Sanctuary of Madhya Pradesh.

1. Introduction

The superfamily Pyraloidea Latreille, 1809 is the third largest group of moths in the order Lepidoptera after Noctuoidea and Geometroidea and comprises of two remarkable families of moths, viz., the Pyralidae and the Crambidae. This group includes about 16,000 described species worldwide, with greatest richness in the tropics (Solis, 2007 and Regier et al., 2012). Pyraloidea moths are found throughout the world and occupy a wide range of habitats, from forests to deserts, and from lowlands to high mountains (Lees & Zilli, 2019). They are commonly known as snout moths, and many of them are forestry agricultural and vegetable pests that can cause significant damage to crops (Butani & Jotwani, 1984; Sharma et al., 2008; Paunikar et al., 2021). They are often characterized by their elongated snouts, which extend from their heads, and their triangular forewings. Their hindwings are usually narrower and more rounded. Pyraloidea moths are important components of many ecosystems, serving as food for predators such as birds and bats, and playing important roles in pollination and decomposition (Kitching, et al., 2000). They are also important from an economic perspective, as some

species can cause significant damage to crops, while others are used as biological control agents (Riyaz & Ignacimuthu, 2023).

In India, Mathew (2006) reported 1646 species of Pyraloidea in his check list of Indian pyralids, of which 1369 species were documented in the Fauna of British India by Hampson (1896). The familial composition of the Pyraloidea has changed markedly over the past 30 years, with a general decrease in the number of families and currently with only two families, Pyralidae and Crambidae (Wagner 2025). Recently, Singh et al. (2022) compiled the catalogue 1,695 Indian Pyraloidea species in 509 genera. Of these, Pyralidae comprises 518 species in 182 genera, which represents 8.35% of the global Pyralidae diversity of 6,197 species. The family Crambidae are represented by 1,177 species in 327 genera, accounting for 11.29% of the global Crambidae diversity of 10,418 species. They have great economic importance as many species cause serious damage to and forestry and agricultural crops such as sugarcane, maize, tomato, brinjal, cabbage, cotton, oil seed and bamboo and also in forest ecosystems (Beeson 1941, Browne 1968, Nair 2007, Kumar et al., 2013; Murthy et al., 2015; Paunikar et al., 2023).

The caterpillars of most of the species feed on living plants either internally or externally as leaf rollers, leaf webbers, leaf miners, borers, root feeders, seed feeders (Ayyar 1940, Robinson et al., 1994) and some are adapted to life under water specially Acentropinae, and certain Phycitinae and Pyralinae are adapted to very dry environments and their larvae feed on stored food products. Others feed on animal detritus such as carrion and feces. Several species are known as serious forestry agricultural and vegetable pests (Lefroy 1906; Beeson, 1941, Atwal and Dhaliwal 2005; Nuss et al., 2003–2018). Hampson (1896) reported 1135 species belonging to 235 genera in 12 subfamilies from British India including Ceylon and Burma which deals with family Pyralidae (the present family is also included). Later, Beeson (1941) recorded some 1500 species of Pyralidae have been recorded many of which feed on forest trees. Gupta (1994) given the checklist of Indian Pyraustinae of India. Bhattacharya (1997) reported 72 species from West Bengal, India which gives us the rich diversity of this family in the area. Kirti and Sodhi (2001) reported the presence of 102 species of Pyraustinae in the state of Arunachal Pradesh, India. Mathew (2006) compiled extensively and made an inventory of Indian Pyralids and accounted 1646 species. Raha et al., (2017) made an inventory of Pyraloidea from Chhattisgarh and reported 49 species from superfamily Pyraloidea. Katewa and Pathania (2024) recorded 23 species belonging to 21 genera of family Crambidae, Superfamily Pyraloidea has been reported from Western ghats.

In Central Regions of India covering Madhya Pradesh and Chhattisgarh various researchers studied and reported the fauna of the family Pyralidae (including Crambidae). Cotes and Swinhoe (1889) and Hampson (1896) studied the Pyralid records from Central India in eighteen centuries after that no mentionable studies was conducted in the region till late twentieth century. Few Pyralid records can be found in scattered works on the moth fauna of a particular region or Protected Areas of Madhya Pradesh, such as Chandra and Nema (2007) provided an account of moths from Madhya Pradesh. Recently, Sambath and Nair (2024) and Paunikar and Nair (2024, 2025ab) documented Crambidae moth species under superfamily Pyraloidea of some conservation areas of Madhya Pradesh.

The state is endowed with a rich forest cover and faunal biodiversity. So far there is few studies made on the Pyraloidea moth fauna in different protected areas of the state. But, Gangau Wildlife Sanctuary except who has published superfamily Pyraloidea moth species from different protected areas. In the view of afore said background this study was undertaken.

2. Materials and Methods

2.1 Study Area

Gangau Wildlife Sanctuary (24° 09'51" N, 80° 09'27" E) is a protected area situated on the banks of the Ken River in Panna and Chhatarpur District of

Madhya Pradesh, India. The Sanctuary was established in 1975 and covers an area of approximately 69 square kilometers. The sanctuary comprises the territorial forests of the present North and South Panna Forest Division. These forests shed their leaves during certain seasons, and the trees found here have adapted to the region's dry and arid climate. Teak (*Tectona grandis*) is a prominent tree species (*Madhuca longifolia*) is another common tree species found in the It produces edible flowers and seeds that are essential food sources for several wildlife species Bamboo (*Bambusa arundinacea*) thickets are found in certain areas of the Gangau Wildlife Sanctuary. These fast-growing plants are vital for the survival of many animal species. Sal (*Shorea robusta*) forests are also found in some parts of the Sanctuary. Gangau Wildlife Sanctuary has grasslands that provide crucial feeding and breeding grounds for various herbivores and support the park's ecosystem. The sanctuary's water bodies and riverbanks are home to diverse riparian vegetation, including aquatic plants and shrubs that thrive in the areas. Gangau Wildlife Sanctuary is home to a diverse range of fauna, including a variety of Arthropods (Insects, Spider, Scorpion, and Crustacean) and other vertebrate's fauna.

2.2. Collection of Moths

Moth collection was carried out from light trap with 400 watts Mercury lamp using white moth cloth of size 1.5 x 5.5m. Collection was made between 6.00 pm to 6.00 am. The moths were collected by using killing bottles with ethyl acetate as killing agent and the collected moths were transferred individually into the butter paper covers to avoid the damage. Later the moths were properly pinned in the laboratory and identified by following the keys (Hampson 1892– 1896; Haruta 1992– 2000; Shubhalaxmi, 2018; Singh et al., 2024) and reference collection available in the Entomology Laboratory, Zoological Survey of India, Central Zone Regional Centre, Jabalpur, Madhya Pradesh. The scientific names have been updated as per Lepindex (Beccaloni, et al., 2003). (<http://www.nhm.ac.uk/entomology/lepindex>).

3. Result

During the study period total 46 species and 40 genera of Superfamily Pyraloidea under two family Crambidae and Pyralidae. The family Crambidae 42 (91.30%) and 36 (90%) genera in 4 subfamilies. The family Pyralidae 4 (8.69%) species and 4 (10%) genera in 2 different subfamilies were recorded in different forest ranges of the Sanctuary. Among them, the subfamily Spilomelinae was found having highest species richness with 31 (67.39%) species followed by Acentropinae 5 (10.86%), Pyraustinae 5 (10.86%), Pyralinae 3 (6.52%), Phycitinae (2.17%) and Musotiminae (2.17%) 1 species each respectively details in Table 1. The percent-wise distribution in different subfamilies and families presented in (Table-2, Fig-1 & plate).

The subfamily Spilomelinae is the most speciose group among the Pyraloidea with 3,500 species worldwide (Regier et al., 2012). Being most ecologically diverse group, the present study revealed the relative

Table 1: Superfamily Pyraloidea Moths from Gangau Wildlife Sanctuary of Madhya Pradesh

Sr. No.	Superfamily / Family	Subfamilies	Scientific Name	Authors/Year
1	Pyraloidea/ Crambidae Latreille, 1810	Acentropinae Stephens, 1836	<i>Eoophyla peribocalis</i>	Walker, 1859
2			<i>Paracymoriza vagalis</i>	(Walker, 1865)
3			<i>Parapoynx bilinealis</i>	(Snellen, 1876)
4			<i>Parapoynx diminutalis</i>	Snellen, 1880
5			<i>Parapoynx stagnalis</i>	Zeller, 1852
6		Musotiminae Meyrick, 1884	<i>Musotiminae</i> - genera spp.	
7		Spilomelinae Guenee, 1854	<i>Agrotera basinotata</i>	Hampson, 1891
8			<i>Agathodes ostentalis</i>	Geyer, 1837
9			<i>Antigastra catalaunalis</i>	(Duponchel, 1833)
10			<i>Cirrhochrista brizoalis</i>	Walker, 1859
11			<i>Cnaphalocrocis medinalis</i>	(Guenee, 1854)
12			<i>Cnaphalocrocis trebuisalis</i>	(Walker, [1859])
13			<i>Conogethes punctiferalis</i>	(Guenee, 1854)
14			<i>Cydalima laticostalis</i>	(Guenée, 1854)
15			<i>Diaphania indica</i>	Saunders, 1851
16			<i>Diasemia accalis</i>	(Walker, 1859)
17			<i>Glyphodes bicolor</i>	(Swainson, 1821)
18			<i>Haritalodes derogata</i>	(Fabricius, 1775)
19			<i>Herpetogramma licarsisalis</i>	Walker, 1859
20			<i>Herpetogramma basalis</i>	(Walker, [1866])
21			<i>Maruca vitrata</i>	(Fabricius, 1787)
22			<i>Metoea foedalis</i>	(Guenee, 1854)
23			<i>Notarcha aurolinalis</i>	(Zeller, 1852)
24			<i>Nausinoe perspectata</i>	(Fabricius, 1775)
25			<i>Omiodes indicata</i>	(Fabricius, 1775)
26			<i>Palpita vitrealis</i>	Rossi, 1794
27			<i>Parotis marginata</i>	(Hampson, 1893)
28			<i>Parotis pomonalis</i>	(Guenee, 1854)
29			<i>Patania balteata</i>	(Fabricius, 1798)
30			<i>Pygospila tyres</i>	(Cramer, 1779)
31			<i>Pagyda salvalis</i>	Walker, 1859
32			<i>Rehimena phrynealis</i>	(Walker, 1859)
33			<i>Sameodes cancellalis</i>	(Zeller, 1852)
34			<i>Spoladia recurvalis</i>	(Fabricius, 1775)
35			<i>Synclera traducalis</i>	Zeller, 1852
36			<i>Syngamia latimarginalis</i>	Walker, 1859
37			<i>Tyspanodes linealis</i>	Moore, 1867
38		Pyraustinae Meyrick, 1890	<i>Crypsitya coclesalis</i>	Walker, 1859)
39			<i>Enclasta defamatalis</i> (Walker, 1859)	Lederer, 1855
40			<i>Paliga machoeralis</i>	Walker, 1859
41			<i>Pyrausta panopealis</i>	Walker, 1859
42			<i>Pyrausta cf. signatalis</i>	(Walker, 1866)
43	Pyralidae Latreille, 1809	Pyralinae Latreille, 1809	<i>Endotricha consocia</i>	(Butler, 1879)
44			<i>Bostra indicator</i>	Walker, 1863
45			<i>Hypsopygia postflava</i>	Hampson, 1893
46		Phycitinae Zeller, 1839	<i>Nephoterix ochribasalis</i>	Hampson, 1896

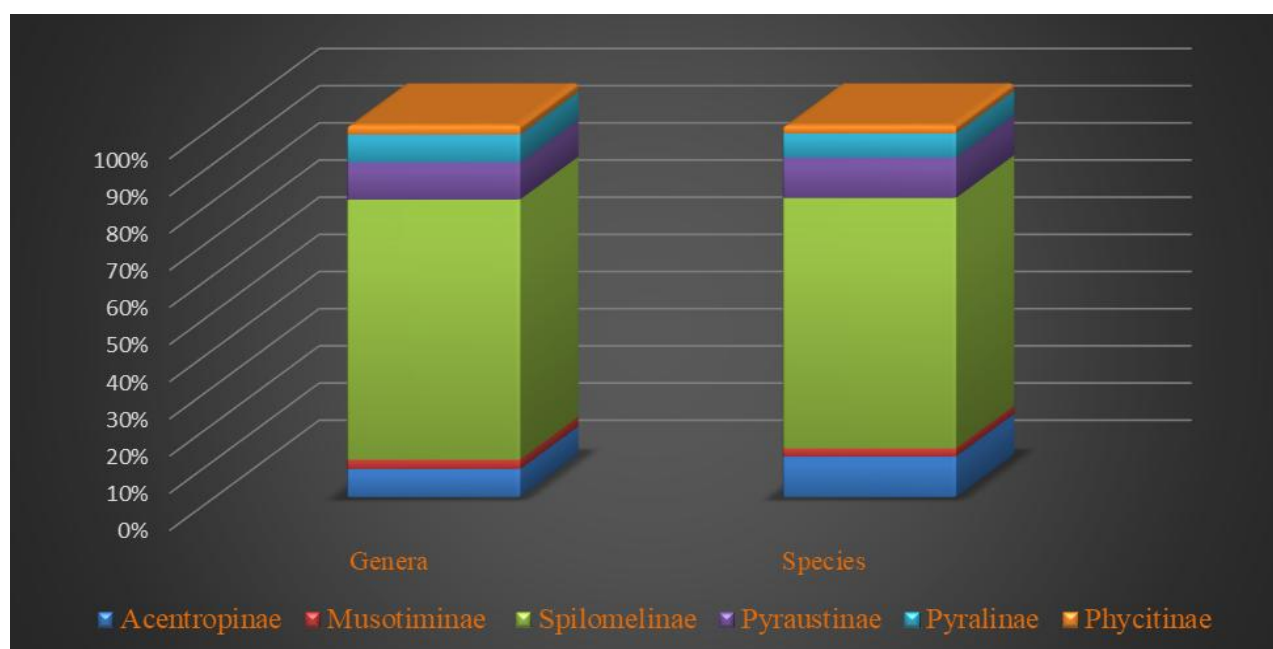
abundance of (31 species) from Spilomelinae when compared to other subfamilies. Notably, the moth diversity indices vary across different forest areas in the sanctuary with different vegetation and grassland species. This study aimed to assess the diversity of micro moth fauna, specifically the families Crambidae and Pyralidae in the study area of Madhya Pradesh. The

different forest trees species and other vegetation play a crucial role as a variable influencing moth population dynamic and distribution various forest range. It is also providing shelter and food to different species of moths.

4. Discussion

Table 2: Subfamilies-wise distribution of Genera and Species of Pyraloidea Moths from Gangau Wildlife Sanctuary of Madhya Pradesh

Sl. No.	Subfamilies	Genera & Species number	Percentage (%) in Genera & Species	Genera & Species in Family	Percentage (%) in Genera & Species
1	Acentropinae	(3 & 5)	(7.14 & 10.86)	Crambidae 36 (42)	(85.71 & 91.30)
2	Musotiminae	(1 & 1)	(2.38 & 2.17)		
3	Spilomelinae	(28 & 31)	(66.66 & 67.39)		
4	Pyraustinae	(4 & 5)	(9.52 & 10.86)		
5	Pyalinae	(3 & 3)	(7.14 & 6.52)	Pyralidae 4 (4)	(9.52 & 8.69)
6	Phycitinae	(1 & 1)	(2.38 & 2.17)		

Figure 1: Graph-wise Genera and Species in different subfamilies of Moth

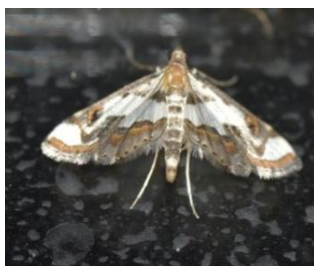
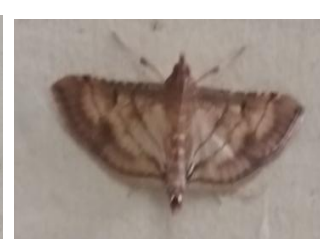
Some workers reported the superfamily Pyraloidea under families Crambidae and Pyralidae on forest and agro-ecosystem of Madhya Pradesh. Cotes and Swinhoe (1889) recorded 14 species from district Indore. Hampson (1896) reported 18 species from districts Indore, Jabalpur and Raipur. Singh and Rawat (1980) recorded 01 species from district Jabalpur. Mandal and Bhattacharya (1980) observed 02 species from Indore. Later, Bhattacharya (1997) observed 08 species from Gwalior, Indore, Jabalpur, Seoni districts. Kulkarni and Joshi (1998) have also studied 16 species from district Jabalpur alone. Arora (2002) recorded 01 species from Narsinghpur and Jabalpur districts. Recently, Chandra and Neema (2007) added 07 more species for the first time from Madhya Pradesh. Sambath and Chandra (2013) reported 13 species of Crambidae from Chhattisgarh.

Recent year, some Pyraloidea moth diversity reported from different conservation areas of Madhya Pradesh. Roshni et al. (2020) reported 11 species of moth with 11

genera and 2 subfamilies Spilomelinae and Pyraustinae. Spilomelinae was the dominated sub family. Sambath and Nair (2023) reported 19 species under 6 subfamilies in Pyraloidea superfamily of moth from Sanjay-Dubri National Park and Tiger reserves of Sidhi district of Madhya Pradesh. Paunikar et al. (2024) reported 24 moth species, 23 genera under 4 subfamilies from different localities Ratapani Wildlife Sanctuary and Tiger Reserve, Sehore and Raisen district of Madhya Pradesh. Paunikar and Nair (2025a) recorded 28 species, 24 genera, 5 subfamilies from Gandhisagar Wildlife Sanctuary, Mandsaur and Neemach district of Madhya Pradesh. Paunikar and Nair (2025b) reported 13 species, 13 genera and 3 subfamilies under Crambidae family from Ken-Gharial Wildlife Sanctuary of Madhya Pradesh. The study unveils the rich diversity of moths in the understudied and scarcely documented Gangau Wildlife Sanctuary area, emphasizing the need for longterm surveys to explore and discover new species.

5. Conclusion

This research not only enhances our understanding of

Plate: Moths of Superfamily Pyraloidea diversity of Gangau Wildlife Sanctuary of Madhya Pradesh*Sploaeda recurvals* Fab. 1775*Metoeca foedalis* (Guenee, 1854)*Diasemia accalis* (Walker, 1859)*Diaphanica indica* Sau., 1851*Eoophyla peribocalis* Walk., 1859*Parapoynx bilinealis* (Snell., 1876)*Musotiminae-genera spp**Agrotora basinotata* Hamp., 1891*Cnaphalocrocis trebiusalis* (Walk, 1859)*Parapoynx stagnalis* Zell., 1852*Diasemia accalis* (Walk., 1859)*Enclasta defamatalis* (Walk, 1859)*Maruca vitrata* Fab. 1787,*Paliga machoeralis* Wallk, 1859*Parotis marginata* (Hamp., 1893)*Cnaphalocrocis medinalis* (Gue, 1854)*Nephoterix ochribasalis* Hamp. 1896*Endotricha consocia* (Butl., 1879)*Bostra indicator* Walk., 1863*Hypsopygia postflava* Hamp., 1893

the underexplored the Sanctuary area but also underscores the necessity for a holistic conservation approach. Integrating scientific research, public awareness, and legal frameworks is crucial for the sustained protection of moth species in the region.

6. Statement of Declarations

Ethical Approval: Not applicable.

Conflict of Interest: The authors in this article declare that they have no known competing financial interests or personal relationship that could have appeared to influence the work reported in this article.

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