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Moths of Jamtara Forest Division, Jamtara, Jharkhand, India

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Abstract

Moths are the butterflies of the night, more active during the night, feeding on the nectar of flowers, facilitating pollination, and consuming fruits. They belong to the largest phylum, Arthropoda, in the animal kingdom and the class Insecta. Their role in the food web maintains the ecological balance of the environment. They are indicators of a healthy forest. They are reared for silk and food all over the world, but some moths are also clinically studied due to their toxic sting, which causes hypersensitive reactions, inflammation, etc. in humans. Keeping the importance of moths in view, an attempt has been made to document the moth diversity in Jamtara Forest Division (JFD), Jharkhand, from May 2023 to October 2023. The present study revealed that 50 moth species under 43 genera in 12 different families are recorded. It was noted that family Erebidae being dominant followed by the family Crambidae. The present study highlights the importance of moths in pollination which is directly linked to our foods and ecological balance.

INTRODUCTION

Insecta are the largest class in the animal kingdom, belonging to the arthropod phylum. Insects are hexapod invertebrates with a chitinous exoskeleton, a three-part body, three pairs of jointed legs, one pair of compound eyes, and one pair of antennae. Moths belong to the class Insecta of the order Lepidoptera (Kumar et al. 2022). They are considered as

“Butterflies of the night” due to their nocturnal behaviour. Most moths are active during the night, but there are some that are crepuscular and diurnal. They are the most taxonomically and ecologically diverse insect taxon (Wagner et al. 2021). There are approximately 1,60,000 species of moths are reported and many have not been discovered yet, and they make up the vast majority of the order (Kawahara et al. 2019). They are totally different from butterflies, mainly in the aspect of the presence of thin antennae and small balls at the end of the antennae in butterflies and shorter and feathery antennae with no ball on the end in moths. Mostly, they are herbivores, feeding the plant parts of trees, shrubs, grass, fungus, lichen, and algae, but some moths are detritivores. Moths are significant contributors of insect biomass for insectivores as both caterpillars and adults are important dietary food sources for many animals like bats, birds, arachnids, rodents, lizards, etc. (Diaz and Long 2022; Figure 2). The caterpillars of moths are major agricultural pests and sometimes cause severe damage to fruit farms and crops. Some larvae of moth species eat clothes made of natural proteinaceous fibres like wool or silk. Some adult moths, like Luna, Atlas, and other large moths, do not have mouth parts, live off the food reserves of the caterpillar, and only live a short time as adults. Some moths, like *Bombyx mori* and other silk moths, are reared for their economic values. The larvae of some moths are an important food source and are sold not only in local markets but also shipped abroad (Wu et al. 2021). Some moths are of clinical significance as they can cause sting reactions, hypersensitivity reactions, inflammation, urticaria, etc. (Golman and Bragg 2022). Moths like butterflies and bees serve an essential role in pollinating flowering plants through flying from flower to flower to feed on nectar (Krenn 2010). Most nocturnal moth pollinators are overlooked and less frequently studied in comparison to the diurnal ones, as they actively pollinate at night. Moths show positive phototactic behaviour as they are frequently seen circling around artificial lights (Jagerband et al. 2023). However, the light pollution caused by the increasing use of different types of electrical lights is disrupting the nocturnal pollination and reproduction ecology of moths, leading to a decline in their population in some parts of the world (Altermatt and Ebert 2016). They are indicators of a healthy ecosystem as their population gets affected by sudden, degradable changes in the environment (Hill et al. 2021). Keeping the importance of moths in mind, a survey was conducted in Jamtara Forest Division, Jharkhand, India, to document the moth diversity of Jamtara Forest Division, Jharkhand and brings more attention to their conservation approaches.

METHODOLOGY

Field surveys were conducted in the four ranges of Jamtara Forest Division (JFD), Jharkhand, from May 2023 to October 2023 to explore the diversity of moths. The study area comprises four ranges, namely the Jamtara Range, Kundahit Range, Narayanpur Range, and Nala Range (Kumar and Devidas 2023). The survey was conducted both during the day and night. The photographs of moths were taken, sighted, and identified in the field as per their morphological characteristics with the help of available literature (Kumar et al. 2022). Some online sources, like Moths of India (<https://www.mothsofindia.org/>), India Biodiversity Portal (<https://indiabiodiversity.org/>), and iNaturalist (<https://www.inaturalist.org/>), were used in the identification. During the survey, none of the moths were harmed or killed.

RESULTS AND DISCUSSION

From the survey conducted in Jamtara Forest Division (JFD), Jharkhand, 50 moth species were identified (Plate 1). The identified species come under 43 genera of 12 different families (Table 1). Out of the 50 moth species, 1 moth species belongs to Family Cossidae, 13 moth species to Family Crambidae, 1 species to Family Drepanidae, 16 species to Family Erebidae, 1 species to Family Eupterotidae, 9 species to Family Geometridae, 2 species to Family Lasiocampidae, 3 species to Family Noctuidae, and 1 species each to Family Nolidae, Family Notodontidae, Family Sphingidae, and Family Uraniidae (Figure 1).

Table 1: Some common moth species of Jamtara Forest Division (JFD)

Scientific name	Common name	Family
<i>Achaea janata</i>	Castor semi-looper	Erebidae
<i>Agrius convolvuli</i>	Convolvulus hawk-moth	Sphingidae
<i>Agrotis segetum</i>	Turnip moth	Erebidae
<i>Aloa lactinea</i>	Red costate tiger moth	Erebidae
<i>Anisephyra ocularia</i>	NIL	Geometridae
<i>Anomis flava</i>	Cotton looper moth	Erebidae
<i>Antheua servula</i>	NIL	Notodontidae
<i>Argina astrea</i>	Crotalaria pod borer	Erebidae
<i>Artana dotata</i>	NIL	Erebidae
<i>Asota caricae</i>	Tropical tiger moth	Erebidae
<i>Bastilla arcuata</i>	NIL	Erebidae
<i>Bastilla crameri</i>	NIL	Erebidae
<i>Bastilla joviana</i>	NIL	Erebidae
<i>Biston suppressaria</i>	Tea looper	Geometridae
<i>Botyodes asialis</i>	NIL	Crambidae
<i>Botyodes caldusalis</i>	NIL	Crambidae
<i>Brunia antica</i>	NIL	Erebidae
<i>Carea angulata</i>	NIL	Nolidae
<i>Chalciope mygdon</i>	Triangular-striped moth	Noctuidae
<i>Chlorissa distinctaria</i>	NIL	Geometridae
<i>Cydalima laticostalis</i>	Pearl moth	Crambidae
<i>Diaphania indica</i>	Cucumber moth	Crambidae
<i>Episteme adulatrix</i>	Day flying moth	Noctuidae
<i>Erebus macrops</i>	Common owl-moth	Erebidae
<i>Eudocima materna</i>	Dot underwing moth	Erebidae
<i>Eupterote gardneri</i>	Monkey moth	Eupterotidae
<i>Gastropacha pardale nandina</i>	Brown lapped moth	Lasiocampidae
<i>Gesonia obeditalis</i>	NIL	Noctuidae
<i>Glyphodes bicolor</i>	Bicoloured pearl	Crambidae
<i>Glyphodes stolalis</i>	NIL	Crambidae
<i>Haritalodes derogata</i>	Cotton leaf roller	Crambidae

<i>Maruca vitrata</i>	Maruca pod borer	Crambidae
<i>Miconia aculeata</i>	Grey swallowtail moth	Uraniidae
<i>Nausinoe perspectata</i>	NIL	Crambidae
<i>Pingasa chlora</i>	White looper moth	Geometridae
<i>Pingasa ruginaria</i>	Bordered duster moth	Geometridae
<i>Polyphagozerra coffeae</i>	Red coffee borer	Cossidae
<i>Problepsis deliaria</i>	Eye looper moth	Geometridae
<i>Problepsis vulgaris</i>	NIL	Geometridae
<i>Pygospila tyres</i>	Spotted grass moth	Crambidae
<i>Pyrausta signatalis</i>	Raspberry pyrausta moth	Crambidae
<i>Scopula decorata</i>	Middle lace border	Geometridae
<i>Spirama helicina</i>	NIL	Erebidae
<i>Spirama retorta</i>	Indian owlet-moth	Erebidae
<i>Spoladea recurvalis</i>	Beet webworm moth	Crambidae
<i>Teldenia vestigiata</i>	NIL	Drepanidae
<i>Terastia meticulosalis</i>	Erythrina borer	Crambidae
<i>Thalassodes quadraria</i>	Grey greenish looper	Geometridae
<i>Trabala vishnou</i>	Rose-myrtle lappet moth	Lasiocampidae
<i>Trigonodes hyppasia</i>	Semi-looper	Erebidae

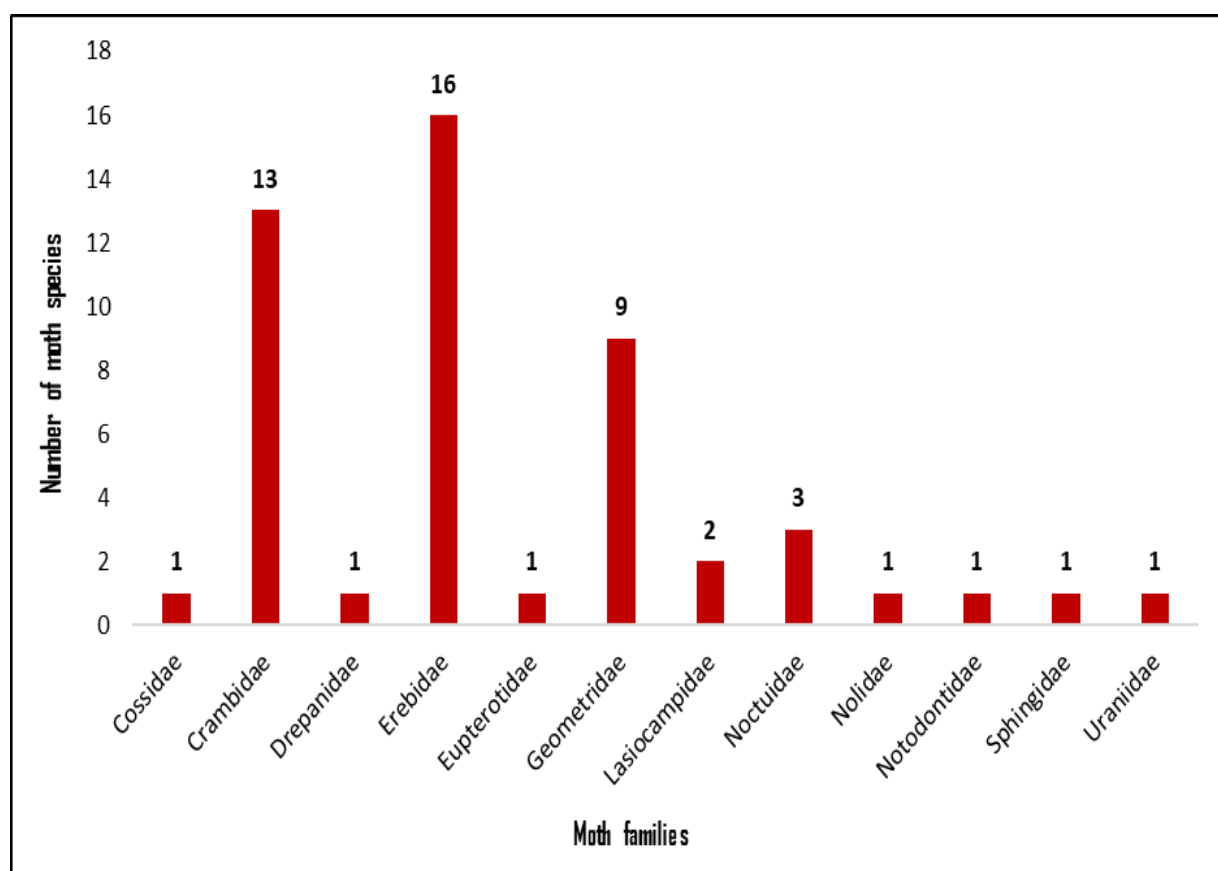


Figure 1: Moth diversity in Jamtara Forest Division, Jharkhand



Figure 2: Role of moths in the food web



Plate 1: Some common moths found in Jamtara Forest Division, Jharkhand; a) *Eupterote gardneri*, b) *Episteme adulatrix*, c) *Spirama retorta*, d) *Achaea janata*, e) *Scopula decorata*, f) *Micronia aculeata*

Other researchers have also reported moth diversity from Jharkhand state like Singh et al. (2017) identified 74 moth species under 66 genera of 15 different families from Topchanchi Wildlife Sanctuary, Jharkhand, during the survey period of September 2016 and October 2016. Singh et al. (2017) reported 81 species representing 70 genera of moths collected during October 2016 from the study sites Masanjor, Dumka, and Udhwa Bird Sanctuary, Sahibganj. They also reported 20 species for the first time from Jharkhand as well as from the Gangetic Plains. Singh et al. (2018) reported 140 species under 106 genera of moths from the Koderma district of Jharkhand state based on four surveys conducted in July 2012, August 2013, September 2014, and October 2015 and found that Family Erebidae was dominant among the studied 17 moth families. Husain et al. (2022) communicated a new record of *Chiasmia emersaria* (Walker, 1861), a geometrid moth from Jamshedpur, Jharkhand, with its systematic account, distribution, host plants, and natural control measures. Kaustubh et al. (2022) reported the occurrence of *Lymantria mathura* Moore, 1866, for the first time from Saranda Forest Division, Jharkhand, which is a pest species of *Shorea robusta* (Sal). The above discussion revealed that, less or no reports are available on moth diversity of Jamtara Forest Division, Jamtara, Jharkhand before present study.

CONCLUSION

Pollination is the lifeline of life on the earth. Due to anthropogenic activities and climatic changes, the population of pollinators is declining at an alarming rate. If not this time, humans could face their end with a smiling face in the near future. In this aspect, the present study brings attention to the study and conservation of pollinators like moths. In a preliminary survey, the authors documented 50 moths of Jamtara Forest Division, Jamtara, Jharkhand, which highlights the biodiversity of the division and creates awareness about the importance of moths through this article. Further exploration is needed to understand their behaviors and make strategies for their conservation efforts in the state.

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