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Mohammad Abdur RazzakDepartment of Zoology,
Jahangirnagar University,
Savar, Dhaka-1342, Bangladesh**Shamim Mia**Department of Zoology,
Jahangirnagar University,
Savar, Dhaka-1342, Bangladesh**Rafiqul Islam**Department of Zoology,
Jahangirnagar University,
Savar, Dhaka-1342, Bangladesh**Rimu Islam**Department of Zoology,
Jahangirnagar University,
Savar, Dhaka-1342, Bangladesh**Khondoker Md. Zulfiker Rahman**Department of Zoology,
Jahangirnagar University,
Savar, Dhaka-1342, Bangladesh**Kabirul Bashar**Department of Zoology,
Jahangirnagar University,
Savar, Dhaka-1342, Bangladesh**ATM Fayeul Islam**Institute of Food and Radiation
Biology, Atomic Energy
Research Establishment, Atomic
Energy Commission (BAEC),
G.P.O Box-3787, Dhaka-1000,
Bangladesh**Corresponding Author:****Razzak MA**Department of Zoology,
Jahangirnagar University,
Savar, Dhaka-1342, Bangladesh

A preliminary checklist of moths (Lepidoptera: Heterocera) of Jahangirnagar University campus, Savar, Dhaka, Bangladesh

Mohammad Abdur Razzak, Shamim Mia, Rafiqul Islam, Rimu Islam, Khondoker Md. Zulfiker Rahman, Kabirul Bashar and ATM Fayeul Islam

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Abstract

Lepidopterans (moths and butterflies) are one of the most suitable, best known groups of insects to study diversity, abundance and species richness as they constitute a major share of living organisms on this earth. The present survey was conducted from February 2022 to June 2022 to explore the diversity of moth species in Jahangirnagar University campus, Savar, Dhaka, Bangladesh. Moths were collected using an 18W UV light trap powered by a 900 Watt generator. A total of 78 moth species under 50 genera and 9 families were recorded during the sampling period covering 60 trapping hours. The recorded moth families were Noctuidae, Erebidae, Pyralidae, Crambidae, Geometridae, Psychidae, Nolidae, Tortricidae and Cossidae. The highest number of species were recorded from the family Erebidae followed by Crambidae, Noctuidae and Geometridae. Only two species were identified from each of the family Pyralidae, Psychidae, Nolidae and Tortricidae, and a single genus from Cossidae. This is the first time report on moth fauna of Jahangirnagar University campus and amongst the reported 78 species, 61 species are new for the moth inventory of Bangladesh. Results of this study would be helpful to prepare a baseline data for the moth diversity of Jahangirnagar University campus.

Keywords: Moth, checklist, Bangladesh

Introduction

Moths and Butterflies fall into the order Lepidoptera, which represents one of the largest insect orders. The order Lepidoptera carries approximately 180,000 species under 126 families [2]. Amongst 180,000 species there are some 20,000 species of butterflies and the rest of the species are moths in the world [32]. Moths are the most taxonomically and ecologically diverse group as compared to those of butterflies [31]. Being good indicators of climate conditions as well as seasonal and vegetation changes, butterflies and moths provide an opportunity for research on climate change, population and community ecology. Moreover, they have a great potential in formulating strategies for pest management, faunistic analysis and conservation planning in local scale [13, 1, 18]. Moths' caterpillars and adults, a substantial component of the insect biomass available to hymenopteran parasitoids and insectivorous vertebrates, especially bats and songbirds [27, 30, 6], although, caterpillars of moths are considered as pests of many agricultural crops, forest trees and horticultural plants [24].

Increasing human activities in terms of deforestation, agricultural intensification, and climate change are considered as the principal stressors driving long-term losses of moth diversity. In addition, pesticide use, urbanization, invasive alien species, and others likely contributing to declines of lepidopteran population at local scales [31]. In the developed part of the world there is a growing environmental concern of natural conservation and activities which are devised accordingly such as the preservation of the wild environment, sanctuary of certain animals or animal groups. In Bangladesh, the environment is changing drastically due to excessive pressure of the fast growing population and industrialization. Up to now, we are unaware of the actual status of our butterfly and moth fauna. Even though, a good number of authors [14, 26, 28, 4, 5, 16, 20, 7, 8, 29] reported the species diversity and seasonal abundance of butterfly fauna of different parts in Bangladesh including Jahangirnagar University campus. In our country, very

few sporadic surveys have been conducted to record the species diversity of moths [17, 23, 22, 3]. The moth diversity of Jahangirnagar University (JU) campus is completely unexplored. Therefore, in the present study, we attempted to explore the moth species diversity of JU campus.

Materials and Methods

This study was conducted at JU campus from February 2022 to June 2022. Jahangirnagar University campus is an eye soothing semi-natural semi-urban area, composed of 282.29 hectares of land, is situated in between 23.8671°-23.8977°E and 90.2588°-90.2731°N, in Savar upazila of Dhaka district, Bangladesh, and 32 km north-west from the Dhaka city. Once, this campus area was an integrated part of the Madhupur Tract harbouring the major part of the deciduous 'Sal' (*Shorea robusta*) forest of this country. The original deciduous forest vegetation of this area has been almost replaced by a mixed type of secondary vegetation and plantation forests [19]. This study area comprises diverse natural ecological habitats, viz. open scrub jungles, grasslands, fallow lands, wetlands, gardens, agricultural lands, and woodlands including the scattered plantation forests and remnants of natural deciduous forest [19]. Four sites consisting of unique vegetation were selected for moth sampling from the southern part of the JU campus. The selected sites were (1) southern side of Bangbandhu Sheik Mujibur Rahman student residential hall (2) southern part of Insect Rearing and Experimental Station (IRES) (3) Botanical garden and (4) West side of Mir Mosharraf Hossain student residential hall. Moths were collected using a light trap consisting of two 18 W UV lights (OSRAM, Russia) and two pieces of white cloth (2 m × 2 m). One piece of cloth was hung vertically and another piece was used to cover the ground under the light trap. A generator (Proton 900, Walton, Bangladesh) was used as a power source for light traps. Light trap was set following sunset and continued for three hours each day. Tapping was not carried out during adverse weather events. Traps were set once a month on each collection site. So, there were 12 trapping hours in each month. Moths attracted to the light trap were collected using a plastic jar containing tissue paper soaked with chloroform or carbon tetrachloride. Collected specimens preserved in a plastic box were brought to the entomology laboratory and kept in the refrigerator. On the following day, specimens were stretched on the insect stretching board and kept in a woven for 7 to 10 days at 40°C with an aim to remove the moisture from the specimens. Finally woven dried specimens were taken out from the stretching board and preserved in an insect storage box (18 inch × 4 inch). Naphthalene balls and silica gel were put in the storage box to deter ants and other insects, and maintain dry condition inside the box, respectively. Collected moth specimens were identified according to moth specimen books

[15, 21, 9, 10, 11, 12, 13] and online taxonomy resources. Photographs were taken using a digital camera (Sony Alpha A64 with 56mm f1.4 prime lens) and photographs of the adults are provided (Plate 1 to Plate 7).

Results and Discussion

During the study period a total of 1053 moths were collected belonging to 78 species under 50 genera and 9 families (Table-1). The recorded moth families were Noctuidae, Erebidae, Pyralidae, Crambidae, Geometridae, Psychidae, Nolidae, Totrichidae and Cossidae. Number of species were highest (30; Plate 1, 2, 3) under the family Erebidae followed by Crambidae (20; Plate 5, 6), Noctuidae (16; Plate 3, 4), Geometridae (3). Only two species were identified from each of the family Pyralidae, Psychidae, Nolidae and Totrichidae (Plate 7). A single individual under the genus *Phragmataecia* was collected from the family Cossidae. In Bangladesh, 153 moth species under 14 families were reported [17], sampling conducted at Atomic Energy Research Establishment (AERE) campus, Savar, which is only seven miles north to JU campus. Previously, 151 moth species under 17 families were reported from five districts of Bangladesh [23], even though the list of species is unavailable. A species of bagworm moth, *Mahasena corbetti* documented from Patuakhali, Bangladesh [25]. Recently, [22] reported a checklist of moth fauna of Rajshahi University campus with 29 species under 8 families. Only four species of moth from four families; Saturniidae, Noctuidae, Geometridae and Crambidae were recorded from a forest of Bangladesh [3]. Compared to all of these reports 17 moth species were common to our findings and rest of the species are new for the moth inventory of Bangladesh. In this checklist, we have reported 78 species and many collected individuals are yet to be identified. Moth sampling in the same study area is being continued and we anticipate that year round sampling covering more sites will yield a higher number species than the species reported in the previous study carried out in Bangladesh.

Knowledge regarding species diversity, richness and seasonal abundance in relation to ecological status is required to understand ecosystem functioning as well as in managing and planning of biodiversity conservation, and sustainable use of ecosystems. Data of the present study are not sufficient to determine species richness and their relation to ecological parameters. This study represents the preliminary data of our moth diversity exploration project. Therefore, further studies are required to evaluate the species diversity indices and population status in relation to their environment, and variations of moth populations in accordance with the changes of environmental and vegetation conditions due to natural and anthropogenic interference. Overall, results of this study will help us to develop a baseline data of moth species in JU campus and Bangladesh as well.

Table 1: A list of moth species with their respective family and subfamily recorded from JU campus.

SL. No.	Family	Subfamily	Scientific name & Author
1	Erebidae	Lymantriinae	<i>Lymantria marginata</i> Walker, 1855
2	Erebidae	Lymantriinae	<i>Lymantria</i> sp.
3	Erebidae	Lymantriinae	<i>Euproctis latifascia</i> Walker, 1855
4	Erebidae	Lymantriinae	<i>Euproctis chrysorrhoea</i> (Linnaeus, 1758)
5	Erebidae	Lymantriinae	<i>Euproctis pulverea</i> (Leech, 1888)
6	Erebidae	Lymantriinae	<i>Euproctis lutea</i> (Fabricius, 1775)
7	Erebidae	Lymantriinae	<i>Euproctis</i> sp. (1) (Fabricius, 1775)
8	Erebidae	Lymantriinae	<i>Somena scintillans</i> (Walker, 1856)
9	Erebidae	Lymantriinae	<i>Orvasca subnotata</i> Walker, 1865

10	Erebidae	Lymantriinae	<i>Sphrageidus xanthorrhoea</i> (Kollar, 1848)
11	Erebidae	Lymantriinae	<i>Sphrageidus simlensis</i> (Gupta, 1986)
12	Erebidae	Lymantriinae	<i>Leucoma</i> sp. (1)
13	Erebidae	Lymantriinae	<i>Leucoma</i> sp. (2)
14	Erebidae	Lymantriinae	<i>Leucoma</i> sp. (3)
15	Erebidae	Arctiinae	<i>Spilarctia</i> sp.
16	Erebidae	Arctiinae	<i>Cretonotos transiens</i> (Walker, 1855)
17	Erebidae	Arctiinae	<i>Cretonotos gangis-interrupta complex</i> (Linnaeus, 1763)
18	Erebidae	Arctiinae	<i>Cretonotos</i> sp.
19	Erebidae	Arctiinae	<i>Cretonotos gangis</i> (Linnaeus, 1763).
20	Erebidae	Arctiinae	<i>Nishada rotundipennis</i> (Walker, 1862)
21	Erebidae	Arctiinae	<i>Nishada flabrifera</i> Flabrifera, 1878
22	Erebidae	Arctiinae	<i>Tigrioides dimidiata</i> Matsumura, 1927
23	Erebidae	Arctiinae	<i>Miltochrista calamine</i> Butler, 1877
24	Erebidae	Arctiinae	<i>Eilema sororcula</i> (Hufnagel, 1766)
25	Erebidae	Arctiinae	<i>Eilema lurideola</i> (Zincken, 1817)
26	Erebidae	Arctiinae	<i>Brunia antica</i> (Walker, 1854)
27	Erebidae	Arctiinae	<i>Barsine</i> sp.
28	Erebidae	Arctiinae	<i>Eressa conifinis</i> (Walker, 1854)
29	Erebidae	Arctiinae	<i>Syntomoides imaon</i> (Cramer, [1779])
30	Erebidae	Arctiinae	<i>Euproctis</i> sp. (2)
1	Noctuidae	Noctuinae	<i>Argotis ipsilon</i> (Hufnagel, 1766)
2	Noctuidae	Pantheinae	<i>Plecoptera reflexa</i> Guenee, 1852
3	Noctuidae	Heliiothinae	<i>Helicoverpa zea</i> (Boddie, 1850)
4	Noctuidae	Noctuinae	<i>Atheitis satelliatia</i> (Hampson, 1902)
5	Noctuidae	Noctuinae	<i>Atheitis funesta</i> (Staudinger, 1888)
6	Noctuidae	Noctuinae	<i>Mythimna unipuncta</i> (Haworth, 1809)
7	Noctuidae	Noctuinae	<i>Mythimna</i> sp.
8	Noctuidae	Noctuinae	<i>Spodoptera litura</i> (Fabricius, 1775)
9	Noctuidae	Noctuinae	<i>Spodoptera mauritia</i> (Boisduval, 1833)
10	Noctuidae	Noctuinae	<i>Spodoptera pectin</i> Guenee, 1852
11	Noctuidae	Noctuinae	<i>Spodoptera cilium</i> Guenee, 1852
12	Noctuidae	Noctuinae	<i>Leucania compta</i> Moore, 1881
13	Noctuidae	Noctuinae	<i>Leucania</i> sp. Moore, 1881
14	Noctuidae	Erebinae	<i>Elwesia diplostigma</i> Hampson, 1894
15	Noctuidae	Plussinae	<i>Chrysodeixis eriosoma</i> (Doubleday, 1843)
16	Noctuidae	Hypeninae	<i>Hypena laceratalis</i> Walker, 1859
1	Crambidae	Pyraustinae	<i>Diaphania indica</i> (Saunders, 1851)
2	Crambidae	Pyraustinae	<i>Spoladea recurvalis</i> (Fabricius, 1775)
3	Crambidae	Pyraustinae	<i>Hymenia perspectalis</i> (Hubner, 1796)
4	Crambidae	Pyraustinae	<i>Sameodes cancellalis</i> (Zeller, 1892)
5	Crambidae	Pyraustinae	<i>Sinibotys obliquilinealis</i> Inoue, 1982
6	Crambidae	Crambinae	<i>Chilo luteellus</i> (Motschulsky, 1886)
7	Crambidae	Crambinae	<i>Chilo pulverosellus</i> Ragonot, 1895
8	Crambidae	Crambinae	<i>Orocrambus vulgaris</i> (Butler, 1877)
9	Crambidae	Schoenobiinae	<i>Scirpophaga incertulus</i> (Walker, 1863)
10	Crambidae	Schoenobiinae	<i>Scirpophaga nivella</i> (Fabricius, 1794)
11	Crambidae	Acentropinae	<i>Parponyx diminutalis</i> Snellen, 1880
12	Crambidae	Acentropinae	<i>Parponyx crisonalis</i> (Walker, 1859)
13	Crambidae	Acentropinae	<i>Nymphula</i> sp.
14	Crambidae	Spilomelinae	<i>Herpetogramma fuscescens</i> (Warren, 1892)
15	Crambidae	Spilomelinae	<i>Herpetogramma stultalis</i> (Walker, 1859)
16	Crambidae	Spilomelinae	<i>Piletocera sodalis</i> (Leech, 1889)
17	Crambidae	Spilomelinae	<i>Tatobotys biannulalis</i> (Walker, 1866)
18	Crambidae	Spilomelinae	<i>Patania chlorophanta</i> (Butler, 1878).
19	Crambidae	Spilomelinae	<i>Cnaphalocrocis medinalis</i> (Guenee, 1854)
20	Crambidae	Spilomelinae	<i>Glyphodes caesalis</i> (Walker, 1859)
1	Geometridae	Ennominae	<i>Hyposidra talaca</i> (Walker, 1860)
2	Geometridae	Geometrinae	<i>Thalassodes veraria</i> Guenee 857
3	Geometridae	Geometrinae	<i>Hemithea aquamarina</i> Hampson, 1895
1	Pyalidae	Pyalinae	<i>Bostra indicator</i> (Walker, 1864)
2	Pyalidae	Pyalinae	<i>Arippara disticha</i> (Turner, 1904)
1	Nolidae	Chloephorinae	<i>Xanthodes intercepta</i> Guenee, 1852
2	Nolidae	Chloephorinae	<i>Xanthodes congenita</i> (Hampson, 1912)
1	Psychidae	-	<i>Clania tertia</i> (Templeton, 1847)

2	Psychidae	-	<i>Clania ignobilis</i> Grote, 173
1	Tortricidae	Olethreutinae	<i>Eucosma</i> sp. (Lienig & Zeller, 1846)
2	Tortricidae	Olethreutinae	<i>Cryptophlebia</i> sp. (Lower, 1898)
1	Cossidae	-	<i>Phragmataecia</i> sp.

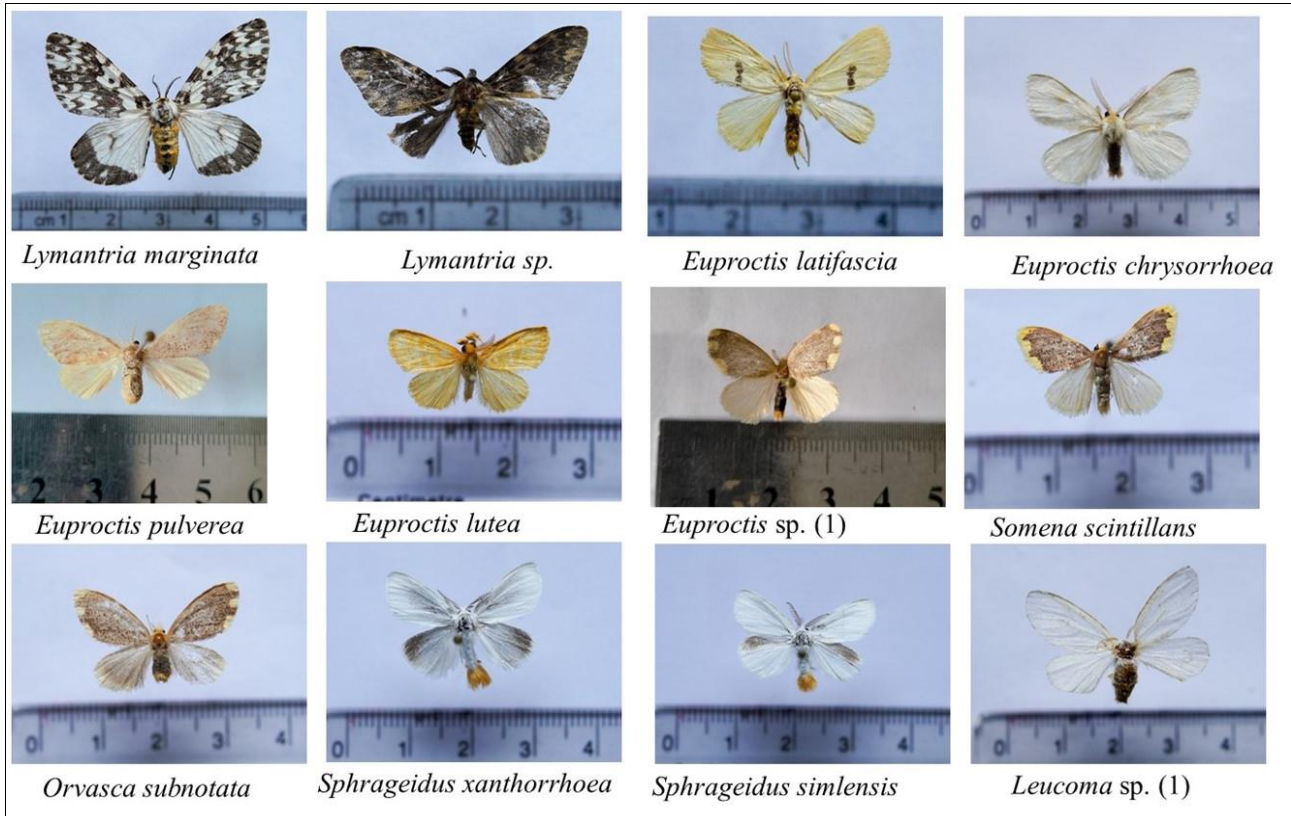


Plate 1

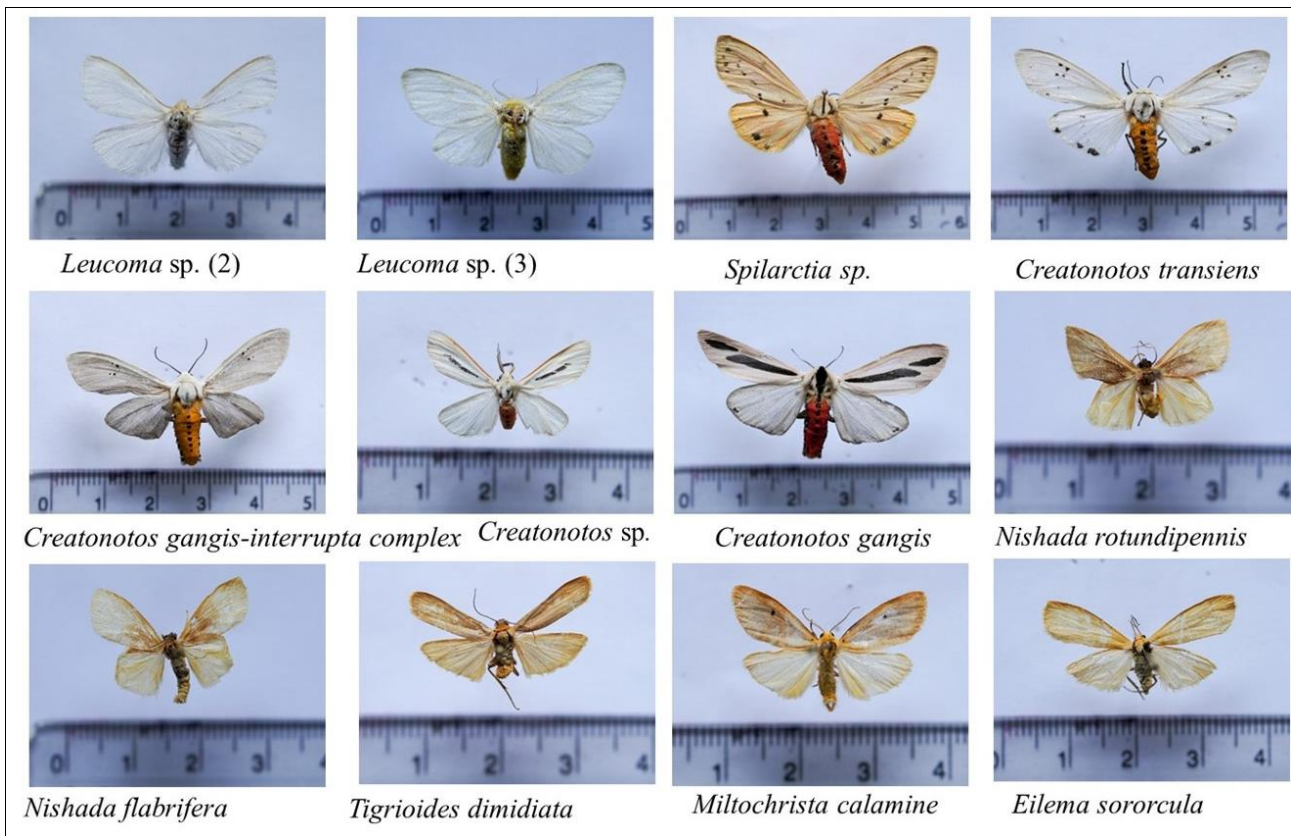


Plate 2

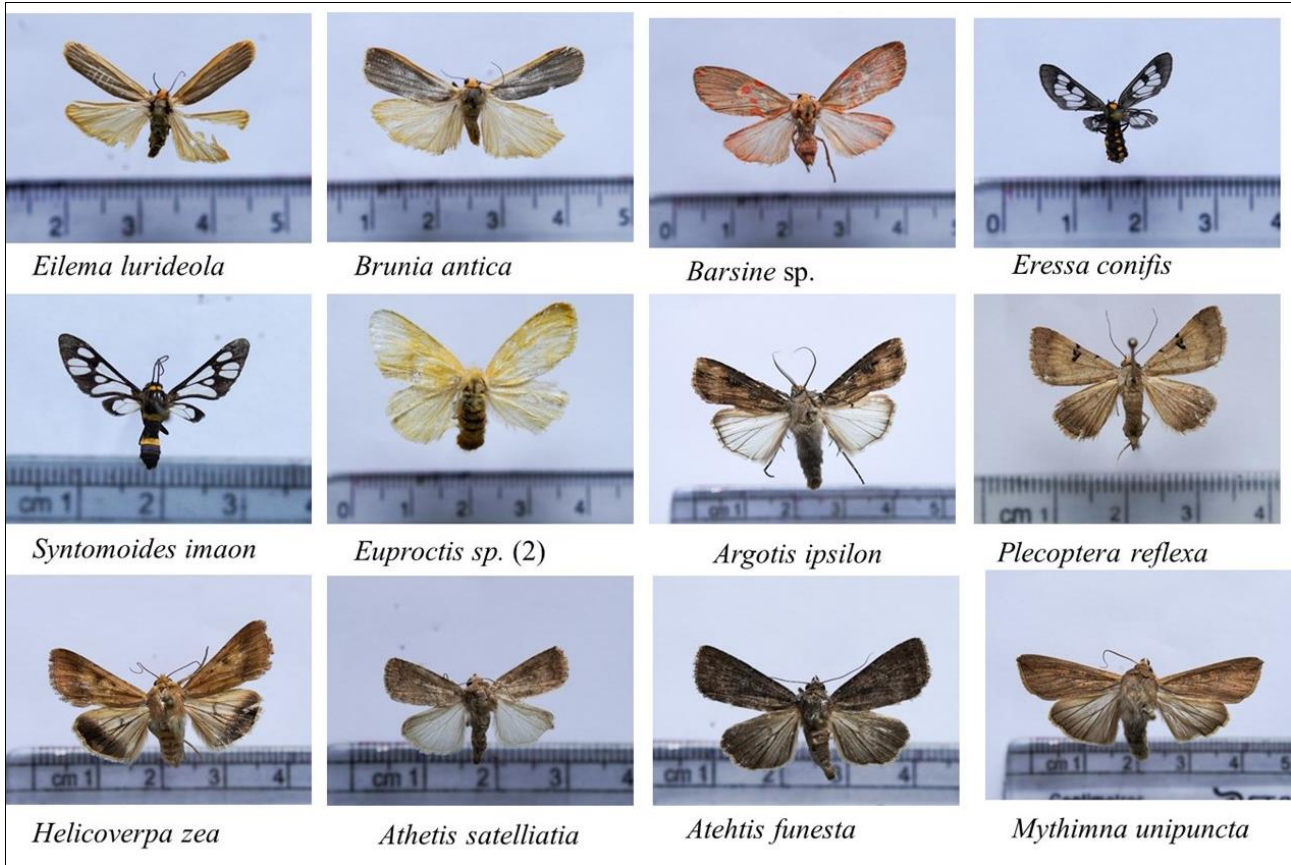


Plate 3

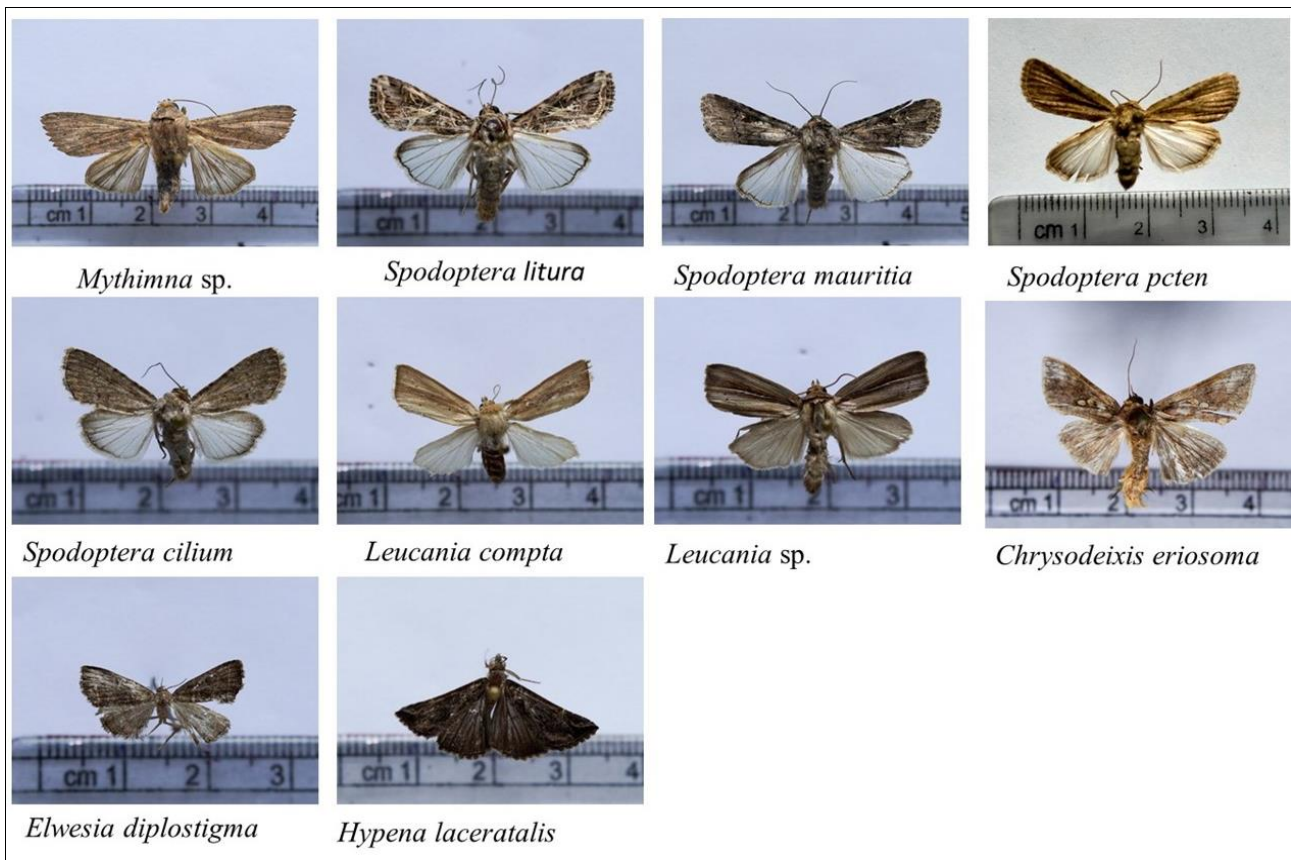


Plate 4

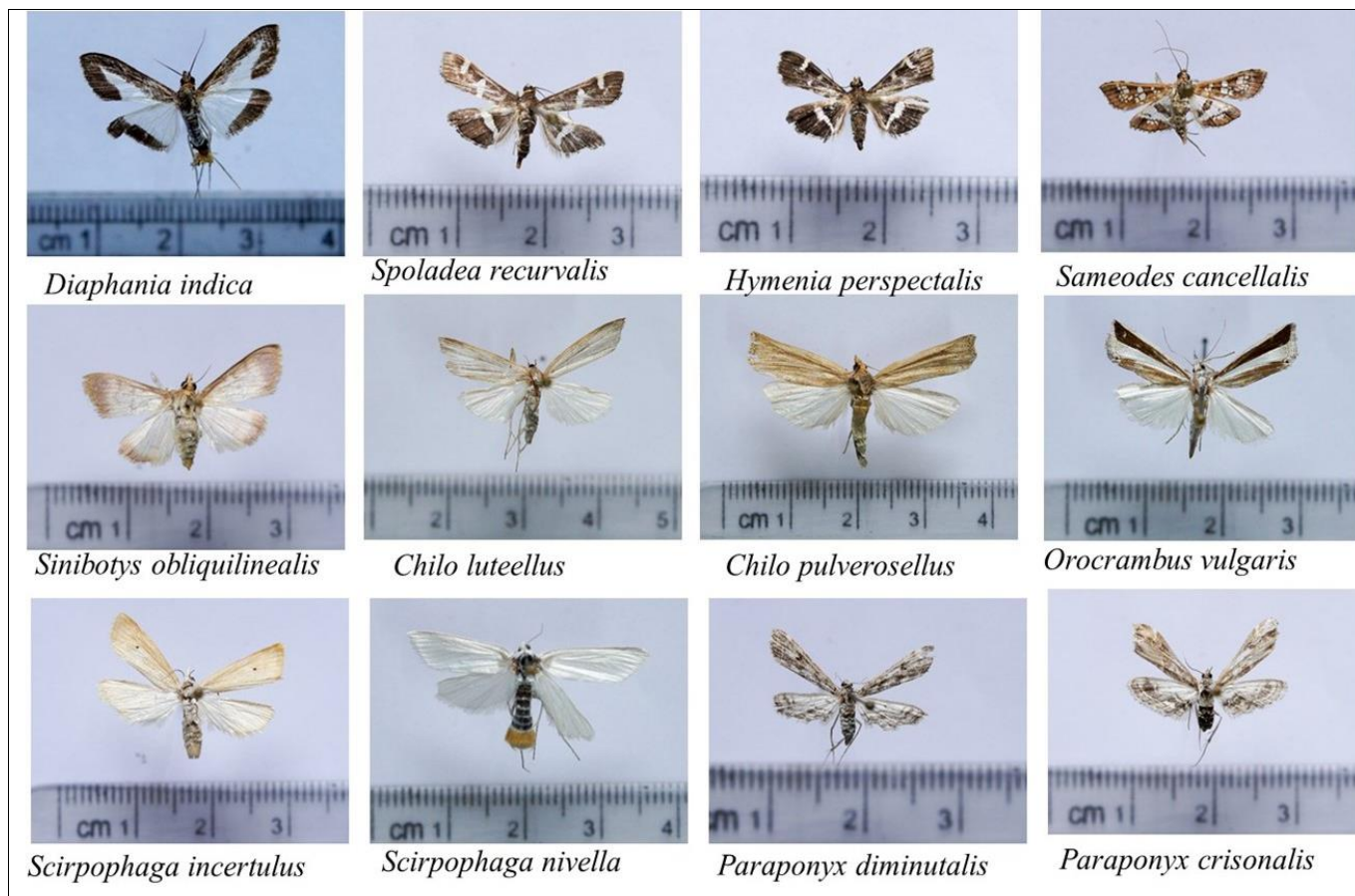


Plate 5

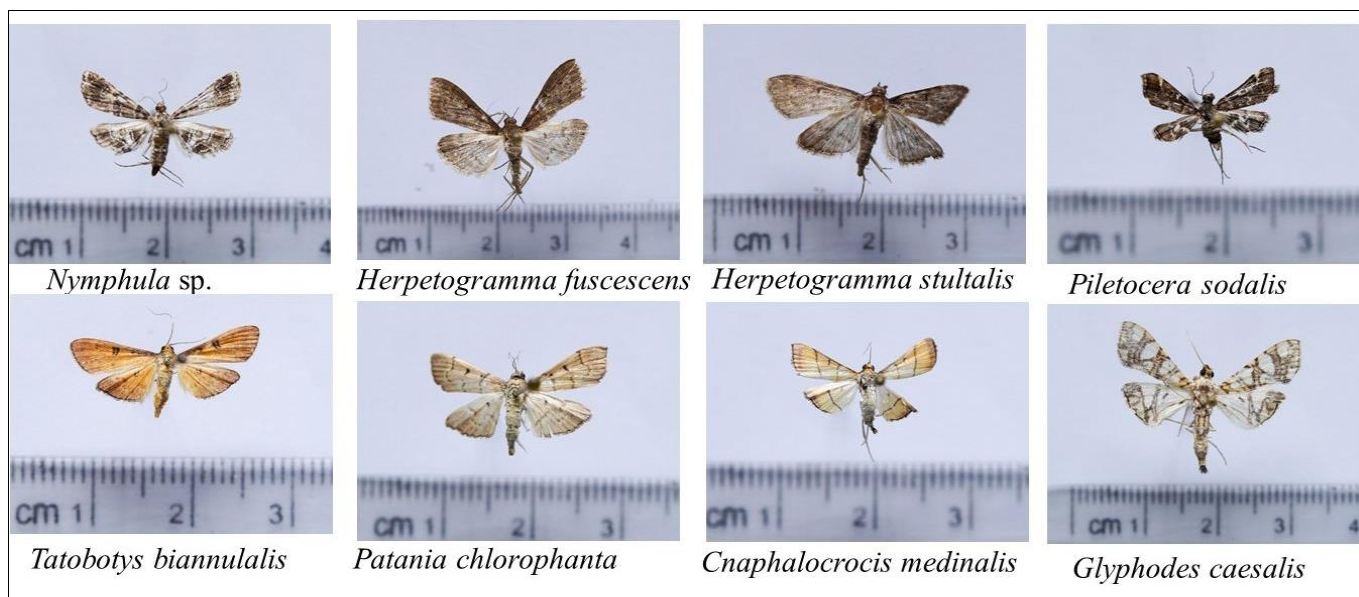


Plate 6

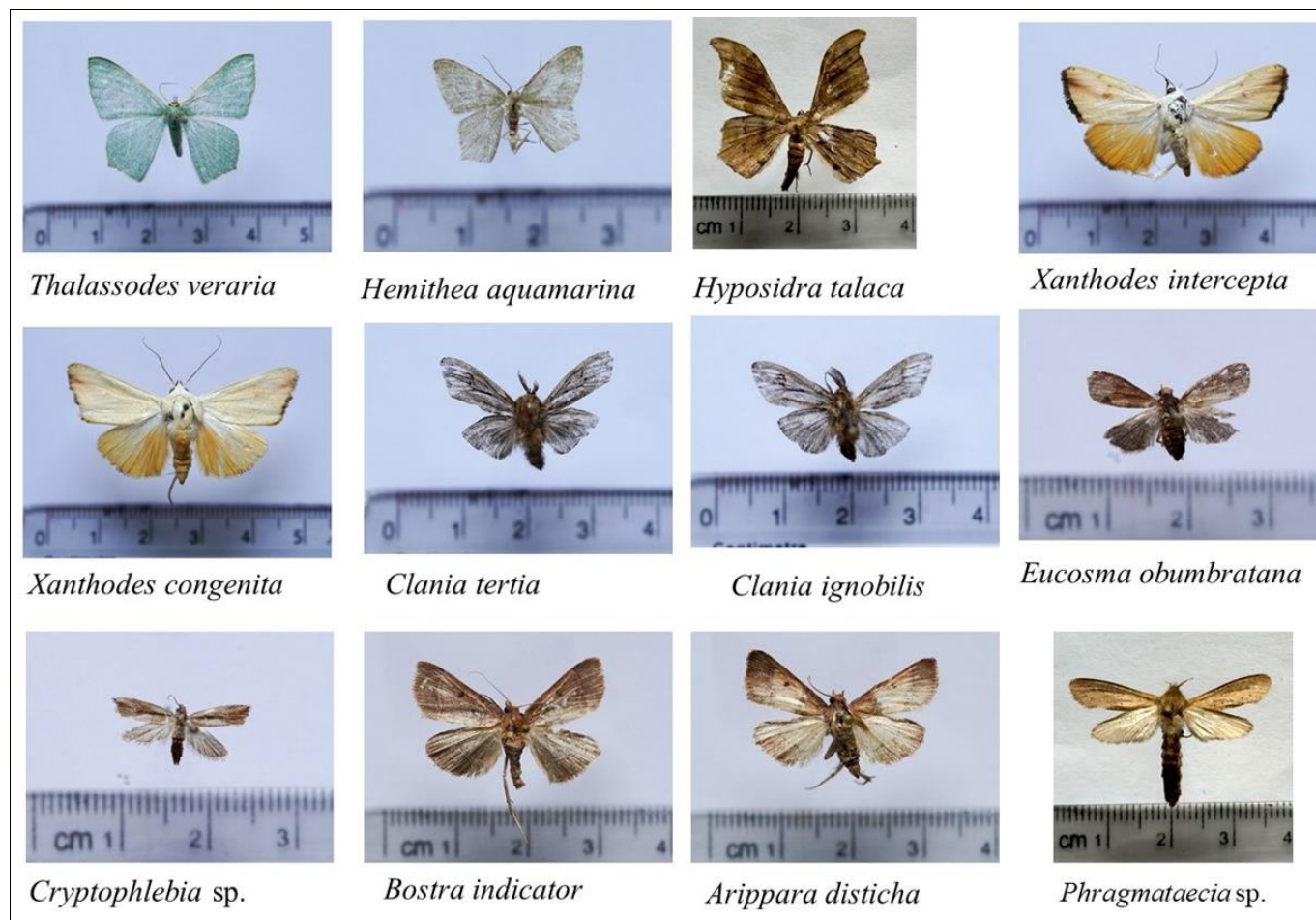


Plate 7

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