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

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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 Sheikh 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, Tortricidae 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 Tortricidae (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 similensis</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>Spilartia</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 flabrifer</i> Flabrifer, 1878                     |
| 22 | Erebidae    | Arctiinae     | <i>Tigrioides dimidiata</i> Matsumura, 1927                  |
| 23 | Erebidae    | Arctiinae     | <i>Mitochrista 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   | Heliothinae   | <i>Helicoverpa zea</i> (Boddie, 1850)                        |
| 4  | Noctuidae   | Noctuinae     | <i>Aethis satellitia</i> (Hampson, 1902)                     |
| 5  | Noctuidae   | Noctuinae     | <i>Aethis 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 ciliu</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>Paraponyx diminutalis</i> Snellen, 1880                   |
| 12 | Crambidae   | Acentropinae  | <i>Paraponyx 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>Pileocera 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>Aripara disticha</i> (Turner, 1904)                       |
| 1  | Nolidae     | Chloephorinae | <i>Xanthodes intercepa</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.                   |

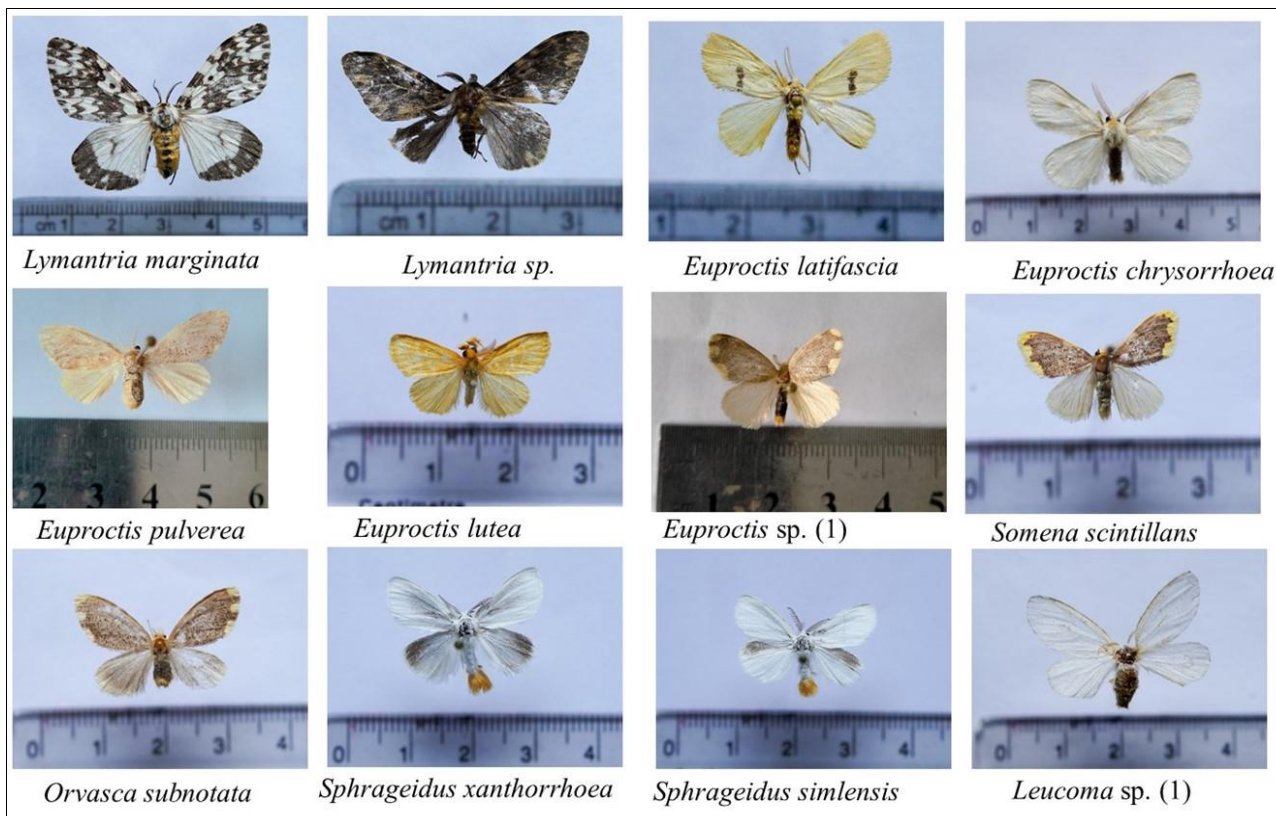


Plate 1

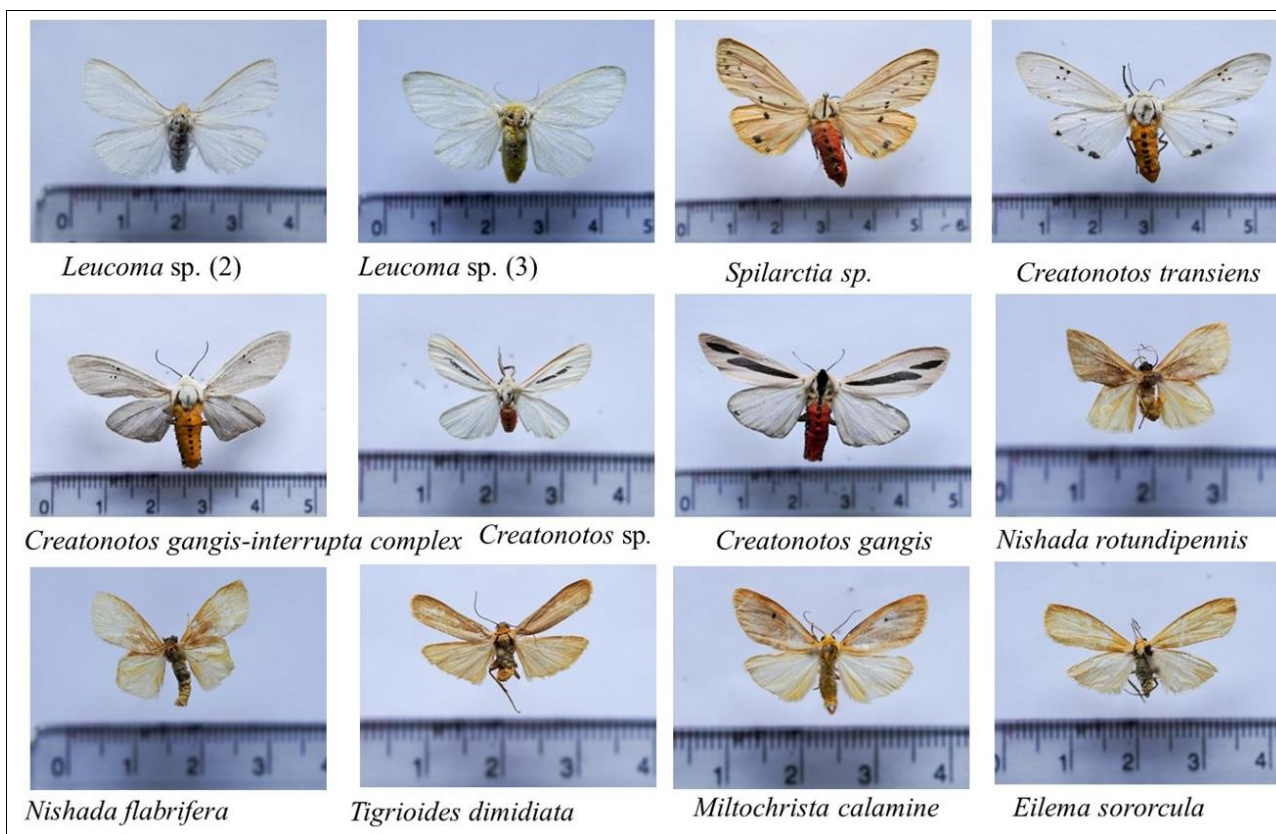


Plate 2

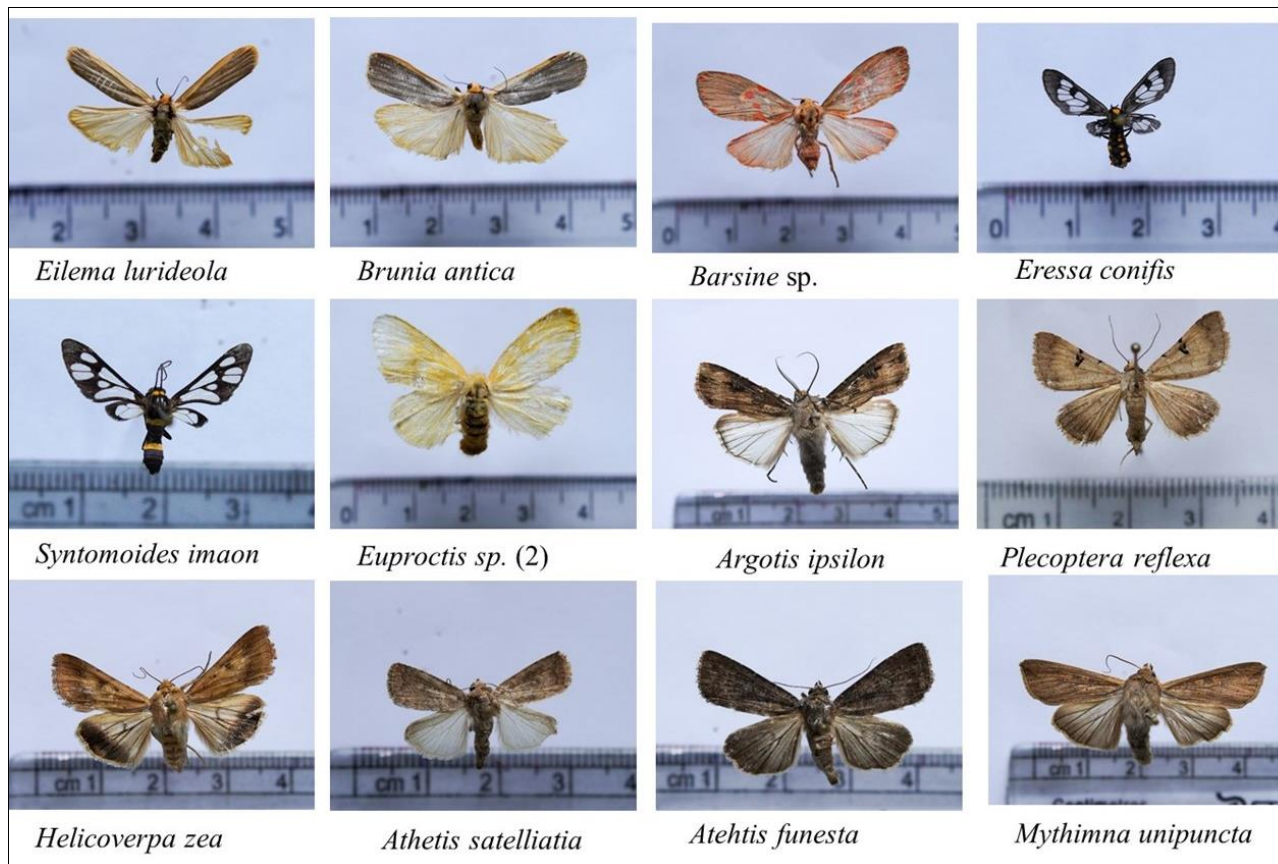


Plate 3

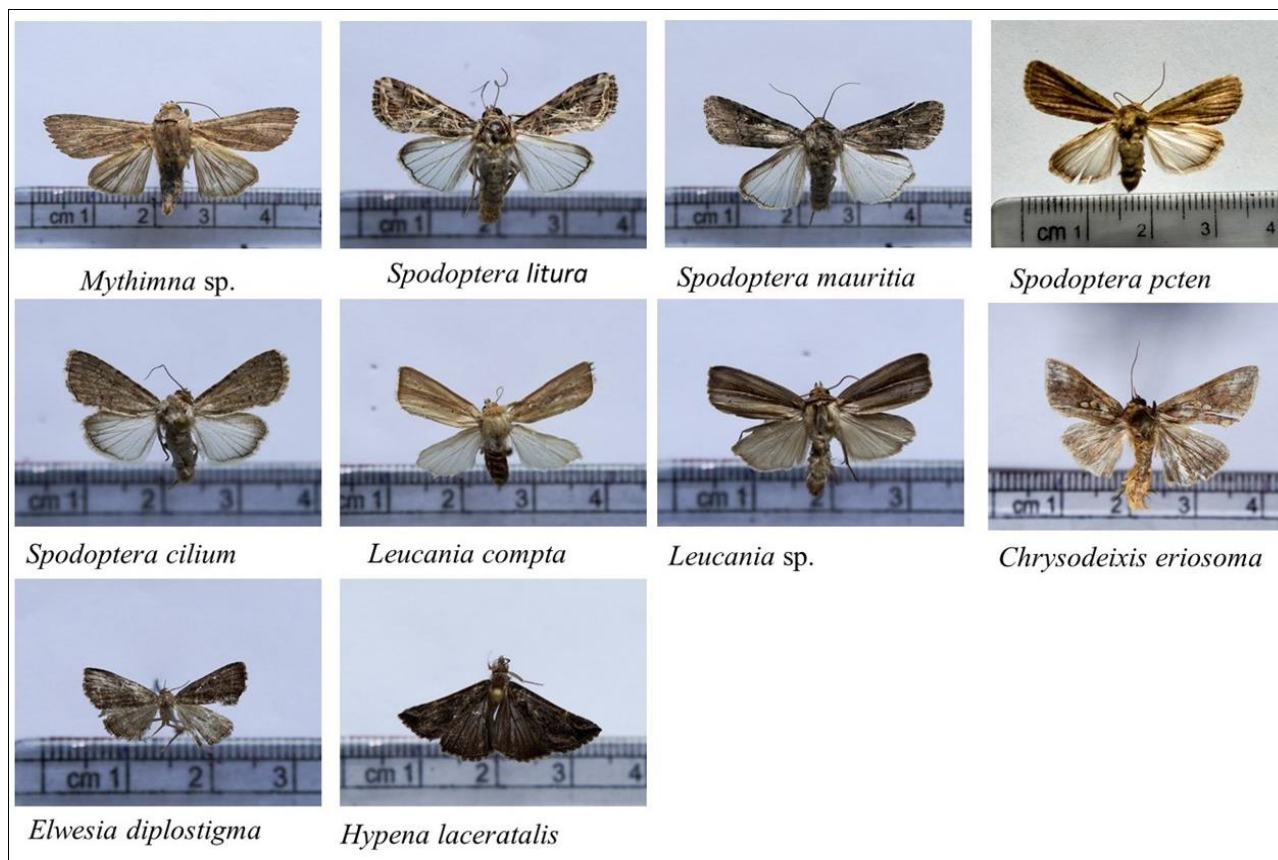


Plate 4



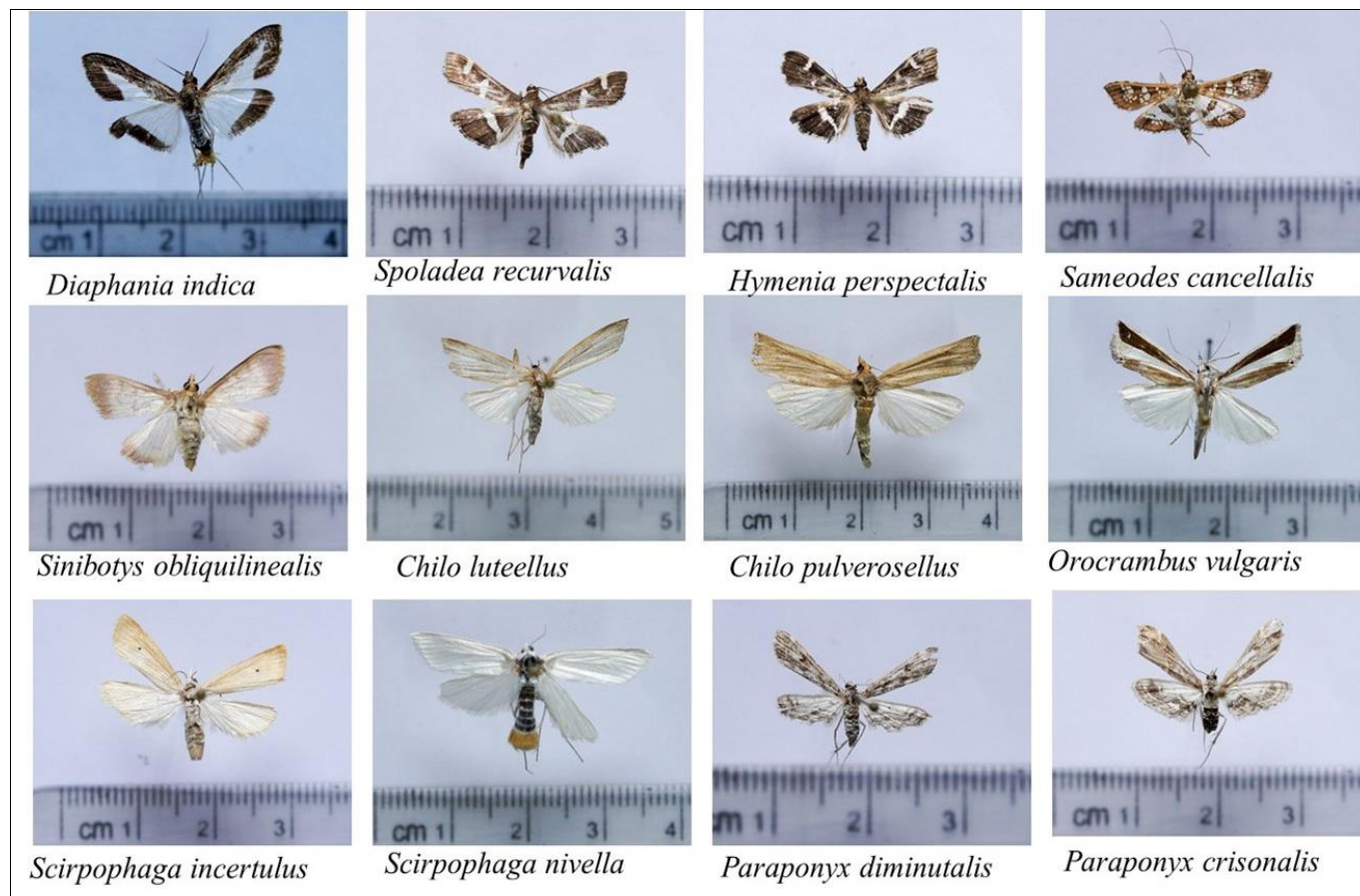


Plate 5

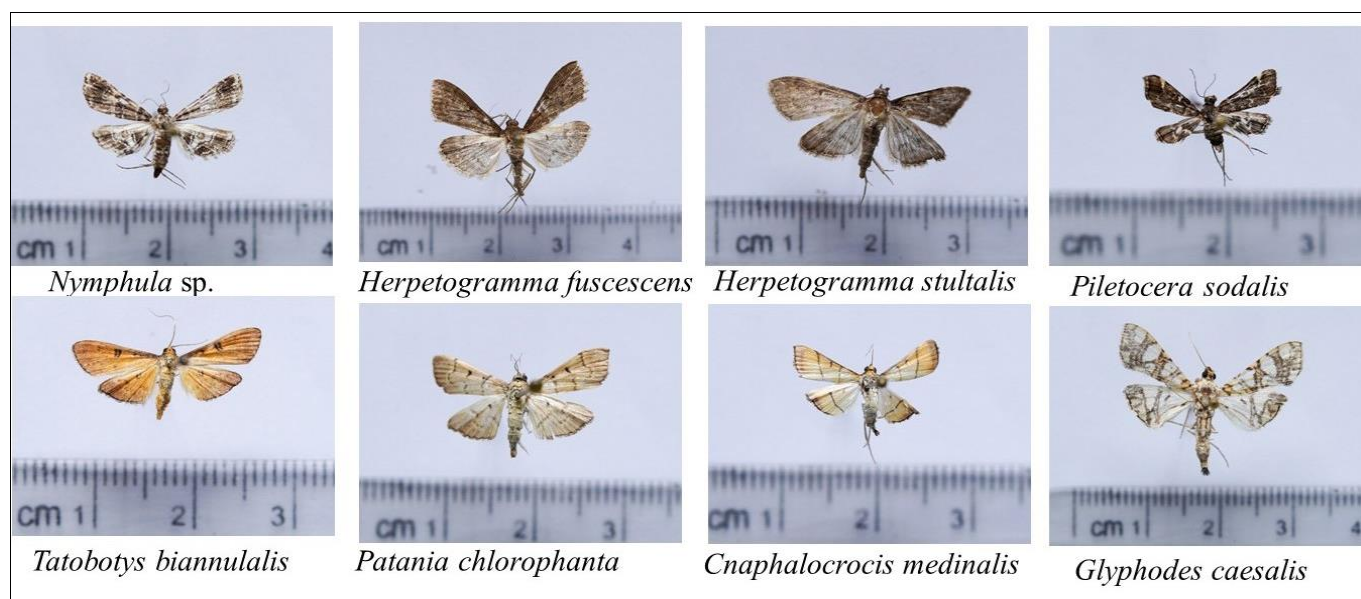


Plate 6

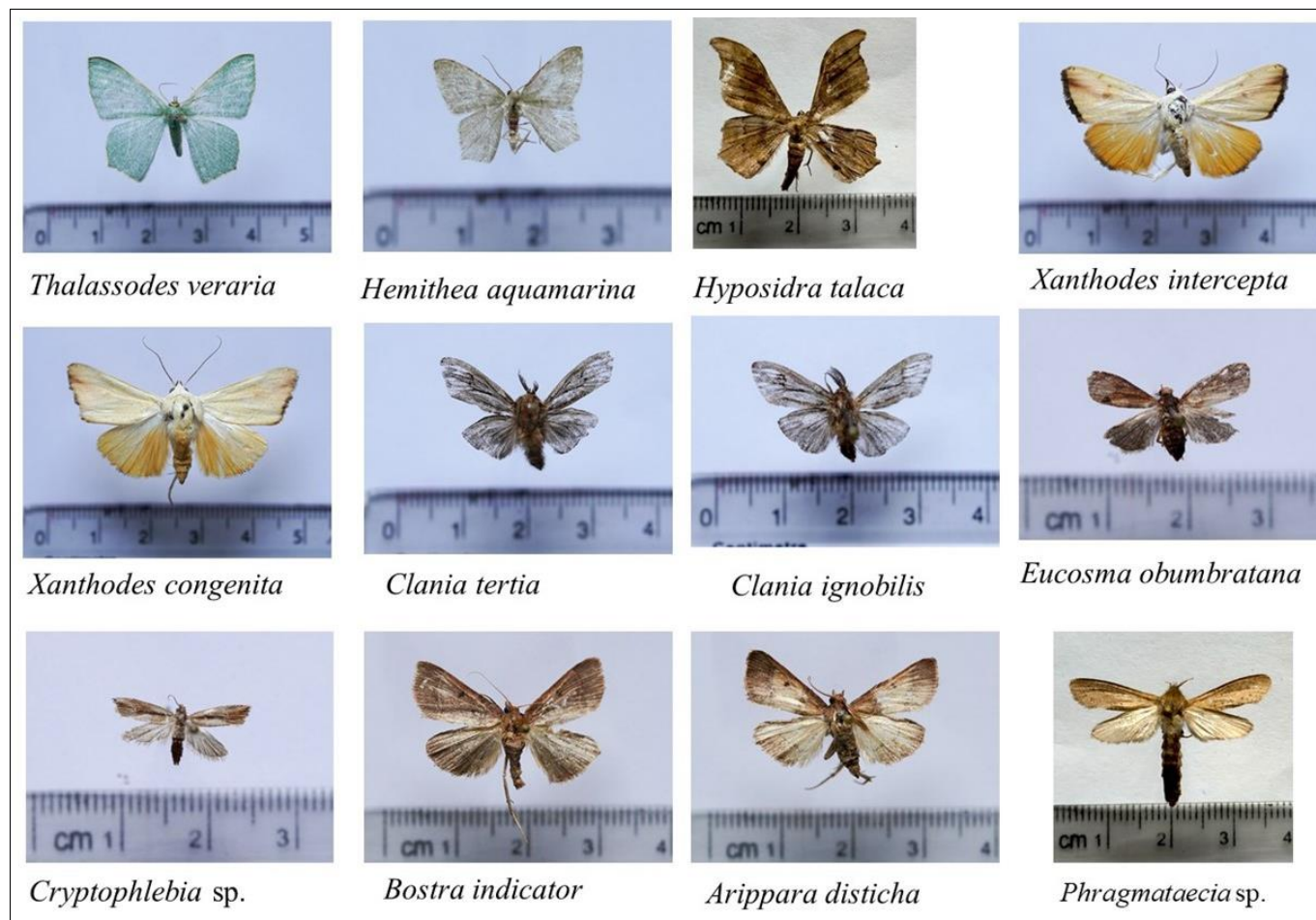


Plate 7

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