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Srivari Illam, No. 61, Karthik Nagar, 10th Street, Saravanampatti, Coimbatore, Tamil Nadu 641035, India
Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India
Ph: +91 9385339863 | www.threatenedtaxa.org
Email: sanjay@threatenedtaxa.org

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Cover: Freshly emerged Footman Moth *Nepita conferta* from the cocoon on a brightly painted wall in the Nilgiris. Digital art on Procreate. © Aakanksha Komanduri.

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COMMUNICATION

Checklist of moths (Lepidoptera: Heterocera) of Lumami campus, Nagaland University, India

Keneisano Yhoshii [1] & **Lobeno Mozhui** [2]

[1,2] Department of Zoology, Nagaland University, Lumami, Nagaland 798627, India.
[1] keneisano_rs2024@nagalanduniversity.ac.in, [2] lobenomozhui@nagalanduniversity.ac.in (corresponding author)

Abstract: The present study was carried out to document the moth fauna of Lumami campus between February 2024 to April 2024 using the light trapping method with a 100 W LED bulb. A total of 106 species belonging to 83 genera under 12 families and seven superfamilies were recorded. The family Erebidae dominated with 46 species (43%), followed by Geometridae with 32 species (30%), Notodontidae with five species (4%), Crambidae and Saturniidae with four species each (4%), Drepanidae, Lasiocampidae, and Sphingidae with three species (3% each), Euteliidae and Nolidae with two species each (2%), and Zygaenidae and Noctuidae with one species each (1% each). Of the 106 moth species, 36 species are first reports from Nagaland; of which Geometridae dominates with 18 genera (e.g., *Amblychia* sp., *Hypomecis seperata*), followed by Erebidae with 13 genera (e.g., *Asota heliconia*, *Dierna strigata*, *Ommatophora* sp.), Euteliidae with two genera (e.g., *Targalla apcifascia*, *Eutelia discistriga*), and Nolidae with two genera (e.g., *Westermannia superba*, *Xenochroa* sp.). Species such as *Acosmeryx naga* are potential pollinators, and *Chadisra bipartita* is an indicator of forest health, as their decline suggests detrimental environmental changes such as increased pesticide use or habitat degradation. This study thereby offers baseline data for future studies on moth fauna as well as for the creation of sustainable forest development and conservation strategies.

Keywords: Biodiversity, conservation, diversity, environmental change, first record, habitat degradation, light trap, moth fauna, northeastern India, Zunheboto.

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Author details: Keneisano Yhoshii is a research scholar in the Department of Zoology, Nagaland University, Lumami. Her research focuses on moth diversity and their distribution patterns. Lobeno Mozhui is an assistant professor in the Department of Zoology, Nagaland University, Lumami. She specializes in insect taxonomy, entomology, ecology, and nutritional biochemistry.

Author contributions: KY: field survey, sample collection, preservation, photography, data compilation, data analysis, writing. LM: conceptualization, research design, data analysis, taxonomic assessment, manuscript drafting, reviewing, editing, supervision.

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INTRODUCTION

With almost 180,000 species described, Lepidoptera is the second largest and most diverse order of insects (Khan et al. 2023). As biologically, economically, and aesthetically highly significant groups of insects, moths (Heterocera) are phytophagous, cosmopolitan, potential pollinators and important bioindicators as well (Devoto et al. 2011; LeCroy et al. 2013; Dey et al. 2015). Although moths account for roughly 88% of the Lepidopteran diversity, they have received less scientific attention in comparison to the butterflies due to their cryptic colouration and mostly nocturnal activity, which makes them less visible. Moths can survive in an incredibly diverse range of habitats, from frozen Arctic tundra (Kumar et al. 2019) to high-altitude mountain slopes to humid rainforests excluding Antarctica. Perhaps, it is this adaptability to change morphologically, physiologically, and behaviourally that has allowed Lepidoptera to endure on the earth for the past millions of years (Kaur et al. 2024).

Moths are a notable group of insects in the terrestrial ecosystem as they serve as important pollinators. Recent studies have revealed that nocturnal moths visit more plant species than day-active bees do, given the super-pollinator status of bees, stressing their relevance to pollen transport and having wide-ranging tastes in flowers (Wagner 2025). Moths serve as important indicator taxa due to their sensitivity to changes in their environment, including changes in climate, habitat, anthropogenic activities, vegetational changes, and their response to successional processes (Thomas 2005; Hilt & Fiedler 2006; Dey et al. 2015). Their diversity, abundance, functional significance, high capability for reproduction, short generation time, sensitivity to disturbance, and simplicity of sampling make them significant indicator species that can be used to track environmental change and assess its effectiveness (Andersen et al. 2004). Due to their significant conservation importance and use as model organisms in scientific study (Regier et al. 2009), this group of insects has currently gained prominence.

Numerous studies have documented a global decline in moth ranges and abundance across a variety of ecosystems (Wagner 2012; Maes et al. 2024). Over the past decades, many habitats and continents have been strongly affected by the changing climate (Walther et al. 2002). Over the same period, many landscapes have also changed because of the intensification of agriculture, deforestation or urbanization (Warren et al. 2001; Thomas et al. 2004). Urbanization significantly affects community assemblages by altering landscapes, which include habitat destruction, fragmentation, heightened pollution levels, and altered hydrology (Grimm et al. 2008). The main factors causing the long-term loss of moth diversity are climate change, habitat deterioration, and human activities such as industrialized and agricultural landscapes (Fox 2013). Moths are negatively affected by climate change and are therefore well suited for uncovering patterns in the effects of climate change on ecosystems as this group of insects demonstrates how organismal (genetics, physiology, behaviour, morphology), phenological (host synchrony, voltinism), population-level (geographic ranges), and community-level (trophic interactions, e.g., parasitoid–herbivore) processes interact and respond to change. Changes in the temperature not only reduce their abundance but also create conflict between morphological characteristics, including body and wing size, and ecological factors like dispersal (Hill et al. 2021).

The northeastern region of India is one of the ten biogeographic regions of the nation and has significant importance for determining the biodiversity space of India. Northeastern India is one of the major and important hotspots among the 35 biodiversity hotspots of the world, which is known for “endemism” (Kumar et al. 2016). Due to the unique climatic conditions and varied topography, northeastern India occupies a distinct and diversified ecosystem, and it has become the natural abode for Lepidopterans. The most recent research lists 3,265 moth species from 1,519 genera spread across 60 families of 24 superfamilies under five clades from the northeastern biogeographic zone of India. With 716 species within the superfamily Noctuoidea, Erebidae is the most prevalent family (Joshi et al. 2021). In Nagaland, about 855 species belonging to 24 families have also been reported by Joshi et al. (2021). No research has been conducted on moth diversity at Lumami Campus, Nagaland University; therefore, the current study seeks to investigate the various moth species present on the campus.

MATERIALS AND METHODS

Study area

The present study was carried out in Lumami (Figure 1), a village in Zunheboto District located at 26.202° N & 94.471° E and 942 m. It is situated 8 km away from the sub-district headquarters in Akuluto and 40 km away from the district headquarters in Zunheboto. Owing to the high altitude, the district enjoys a monsoon climate almost throughout the year with cold winters and hot

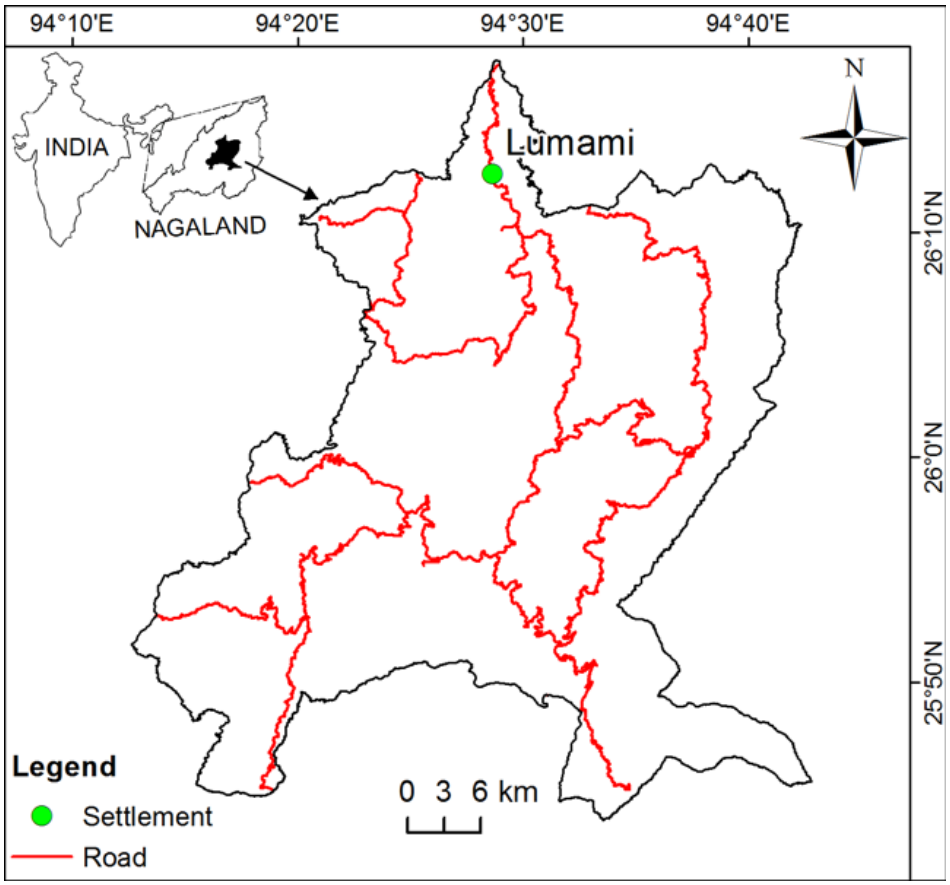

Figure 1. Location of Lumami (Zunheboto District), Nagaland (Source: Survey of India Toposheets).

summers. The average rainfall is about 200 cm (https://snwc.nagaland.gov.in). The area is dominated by *Abroma augusta* (L.) L.f., *Bauhinia variegata* (L.) Benth, *Callicarpa arborea* Roxb, *Duabanga grandiflora* (Roxb. ex DC.) Walpers, *Ficus racemosa* L., *Lagerstroemia speciosa* (L.) Pers., Oak trees (*Quercus griffithii* Hook.f. & Thomson ex Miq. and *Quercus serrata* (Murray)), *Prunus cerasoides* Buch.-Ham. ex D.Don, *Schima wallichii* (DC.) Korth. and *Terminalia myriocarpa* van Heurck & Müll. Arg (Mozhui et al. 2020).

Methodology

The study was conducted in 2024 between February and April. The specimens were collected by light trapping using a 100 W LED bulb and handpicking from areas near light sources. The sites were sampled for one to two hours every day (1800–2000 h); the majority of the samples were collected at night; some were also collected during the day. Following that, ethyl acetate was used in killing jars to kill moths, then they were fastened to the board using entomological pins. Using a Canon EOS700D DSLR camera, the observed moths were photographed, recorded, and brought to the laboratory for further taxonomic studies. The moths were identified with the help of relevant literature (Hampson 1892–1896; Haruta 1992–2000; Sondhi & Sondhi 2016; Chettri et al. 2021; Joshi et al. 2021). Experts were consulted, and references from https://www.mothsofindia.org and https://www.inaturalist.org were used to identify species. The taxonomic classification and arrangement by Nieukerken et al. (2011) was followed.

RESULT AND DISCUSSION

In the present study, a total of 106 species of moths belonging to 83 genera under 12 families and seven superfamilies were documented (Table 1 & Images 1–4). The family Erebidae represented the maximum number with 46 species (43%), followed by Geometridae with 32 species (30%), Notodontidae with five species (4%), Crambidae, and Saturniidae with four species each (4% each), Drepanidae, Lasiocampidae, and Sphingidae with three species each (3% each), Euteliidae and Nolidae

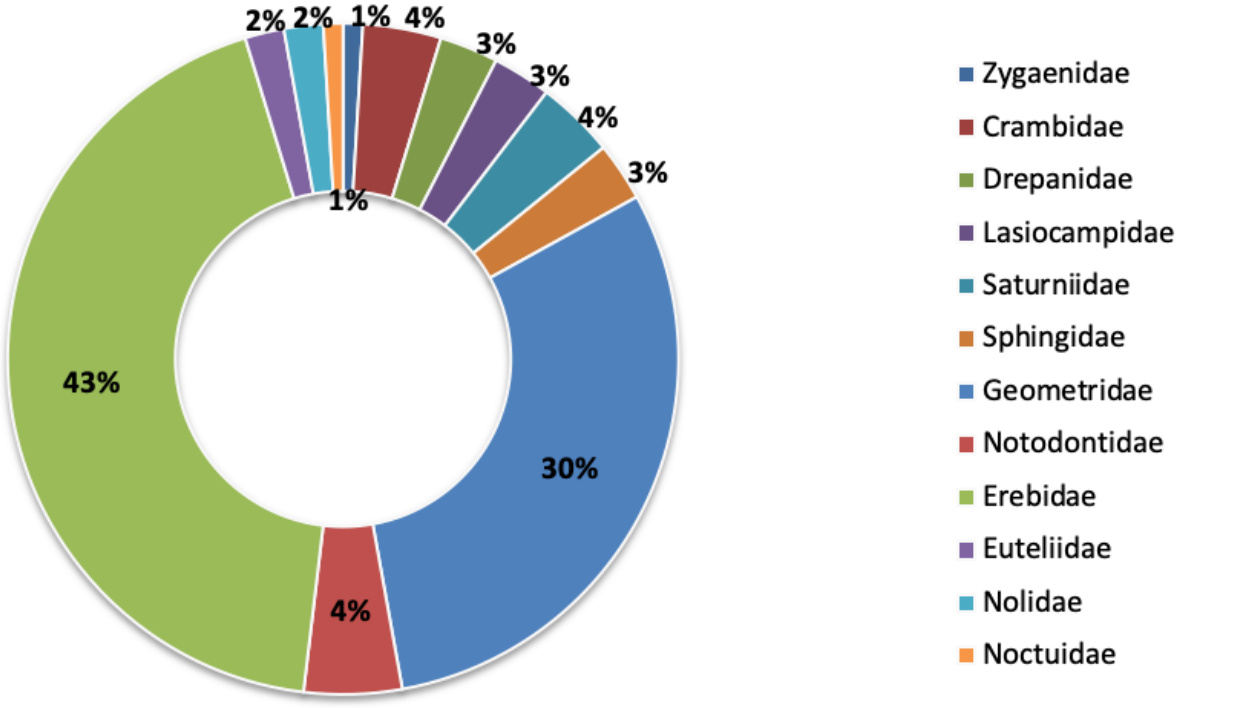

Figure 2. Percentage contribution of different families to moth fauna of Nagaland (calculated by counting the total number of moth species representing each family).

with two species each (2% each), and Zyganidae and Noctuidae with one species each (1% each) (Figure 2). The percentage contribution of the families was calculated by counting the total number of moth species representing each family. Among the 106 documented species, 36 moth species represent first records for the state, thus contributing to the moth diversity of Nagaland as per Joshi et al. (2021). List of some first reported species includes *Macrocilix maia, Amblychia* sp., *Cleora fraterna*, *Fascellina plagiata*, *Hypomecis transcissa*, *Krananda semihyalina*, *Lassaba albidaria*, *Maxates thetydaria*, *Ophthalmitis xanthypochlora*, and *Asota heliconia*.

Due to their domestication for the production of silk, moths such as *Bombyx mori*, *Antheraea pernyi*, *Antheraea assamensis*, *Hyalophora cecropia*, and *Samia cynthia*, among others, have a significant economic impact on the ecology (Zethner et al. 2015). Many animals also depend on moths (such as *Attacus atlas*, *Biston betularia*, and *Plodia interpunctella*) as a source of vital nutrients. Certain moth species can seriously harm plants during their larval stage (Nneji et al. 2020). For example, the Potato Tuber Moth *Phthorimaea operculella* is a significant pest of potatoes. In addition to being one of the most taxonomically tractable and speciose families of insects, Lepidoptera play crucial functions in forests as pollinators, detritivores, selective herbivores, and prey for migratory passerines (Schowalter et al. 1986). Moths are crucial to the ecosystem as potential pollinators since certain insects are essential to the pollination of food sources and the overall health of an ecosystem. With little knowledge of what occurs at night, the majority of pollination study focuses on insects that fly during the day. A significant component of the natural ecosystem and an essential component of many ecological communities are pollinating insects. Moths are becoming more significant and helping to pollinate more types of plant pollen as wild day pollinating insects like bees and butterflies are becoming less common. According to recent research, moths pollinate more quickly at night and are more effective pollinators than bees and other day-flying pollinators (Anderson et al. 2023).

Lepidoptera demonstrate potential as surrogates for several insect species, including Hymenoptera (Kerr et al. 2000), and serve as indicators of forest health. Consequently, a vital group for tackling concerns associated with forest biodiversity and spatial dimensions is the Lepidoptera. Kitching et al. (2000) indicate that specific moth families and subfamilies, including Arctiinae, Catocalinae, Heliothinae, Noctuinae, Herminiidae, and Phycitinae, exhibit positive responses

Table 1. Moth species observed at Lumami Campus during the study.

	Taxa	Author, year	Distribution in northeastern India	Distribution in Indian States and elsewhere
Superfamily: Zygaenoidea Family: Zygaenidae Subfamily: Chalcosiinae Tribe: Chalcosiini				
1	*Eterusia aedea*	(Linnaeus, 1763)	AS, ML, NL	SR, NP, TW, JPN, CN, MH
Superfamily: Pyraloidea Family: Crambidae Subfamily: Pyralinae Tribe: Pyralini				
2	*Heortia vitessoides*	(Moore, [1885])	ML, TR	CN, SR, TH, MY, FJ, AU
Subfamily: Spilomelinae Tribe: Margaroniini				
3	*Terastia egialealis*	(Walker, 1859)	NL	MH, AP, AR
Subfamily: Pyraustinae Tribe: Portentomorphini				
4	*Hyalobathra* sp.		NE	AU, SR, TW, JPN, MM, UK
Subfamily: Crambinae				
5	*Eoophyla* sp.		NE	MH, AP, AR
Superfamily: Drepanoidea Family: Drepanidae Subfamily: Drepaninae Tribe: Drepanini				
6	*Canucha specularis*	(Moore, 1879)	AS	SR, CN, SK
7	**Macrocilix maia*	(Leech, 1888)	ML, AS	JPN, TW, KR, CN, BOR, MY
8	*Tridrepana lunulata*	(Butler, 1887)	NE	MM, CN, SR, TH, MY, ID, NP, BT, AU, WB, UK
Superfamily: Lasiocampoidea Family: Lasiocampidae Subfamily: Lasiocampinae Tribe: Odonestini				
9	*Odonestis bheroba*	Moore, 1859	AS	SR, NP, TH, CN, MM, TW
Tribe: Pinarini				
10	*Lebeda nobilis nobilis*	Walker, 1855	MN, ML, NL	CN, NP, MM, TW, NL, ML, JK, UK, MH, WB, SK
Tribe: Trabalini				
11	*Trabala vishnou*	(Lefebvre, 1827)	AS, MN	SR, MM, MY, TH, ID, CN, TW, MP, BR
Superfamily: Bombycoidea Family: Saturniidae Subfamily: Saturniinae Tribe: Saturniini				
12	*Actias maenas*	Doubleday, 1847	NE	KL, KA
13	*Antheraea assamensis*	Helfer, 1837	AS, MN, ML, NL, MZ	NP, ID, MM, SR
14	*Loepa* cf. *katinka*	Westwood, 1848	AS, ML, MN, NL	SEA
15	*Rinaca cidosa*	(Moore, 1865)	NE	NP, BT, MM, TH, HP, JK, UK
Family: Sphingidae Subfamily: Macroglossinae Tribe: Macroglossini				
16	*Acosmeryx naga*	(Moore, [1858])	ML	SR, NP, BT, MM, TH, MY
Subfamily: Smerinthinae Tribe: Ambulycini				
17	**Ambulyx moorei*	(Moore, [1858])	AS	SR, NP, BT, MM, TH, MY, KA
Subfamily: Sphinginae Tribe: Sphingini				
18	*Meganoton analis*	(Felder, 1874)	ML	SEA, JK, UK, AR
Superfamily: Geometroidea Family: Geometridae Subfamily: Ennominae				
19	**Metapercnia ductaria*	(Walker, 1862)	MN, MZ	TH, WB

	Taxa	Author, year	Distribution in northeastern India	Distribution in Indian States and elsewhere
Subfamily: Ennominae Tribe: Abraxini				
20	*Abraxas* sp.		NE	SEA
Subfamily: Ennominae Tribe: Boarmiini				
21	*Alcis* sp. 1		NE	SEA, WB
22	*Alcis* sp. 2		NE	SEA, WB
23	**Amblychia* sp.		AS	SR, NP, MY, ID, KR, JPN, AU, UK
24	*Amraica recursaria*	(Walker, 1860)	ML	WB, TN
25	*Coremecis nigrovittata*	(Moore, 1868)	ML, NL	MY, NP, AR, SK
26	**Cleora fraterna*	(Moore, 1888)	NE	CN, TW, NP, BT, HP, BR, MH, WB, UP, TN
27	*Cleora* sp. 1		NE	CN, TW, NP, BT, HP, BR, MH, WB, UP, TN
28	*Cleora* sp. 2		NE	CN, TW, NP, BT, HP, BR, MH, WB, UP, TN
29	**Gasterocome pannosaria*	(Moore, 1868)	ML	NP, BT, CN, TW
30	**Harutaea flavizona*	Sato, 2000	NE	NP, TW,TH, MY, ID, AR
31	**Hypomecis separata*	(Walker, 1860)	ML	SR, BOR, TN, WB, MP, UK, KL
32	**Hypomecis transcissa*	(Walker, 1860)	AS, MR	SR, BOR, TN, WB, MP, UK, KL
33	**Krananda semihyalina*	(Moore, [1868])	ML, MR	JPN, MY, TW, CN, KR, WB
34	**Lassaba albidaria*	(Walker, 1866)	ML	JK, WB, UK
35	**Ophthalmitis xanthypochlora*	(Wehrli, 1924)	NE	CN, TH
Tribe: Hypochrosini				
36	**Fascellina plagiata*	Walker, 1866	NE	SEA
37	**Hypochrosis* sp.		NE	SEA
Tribe: Plutodini				
38	*Plutodes costatus*	Butler, 1886	ML	CN, NP, TH, MM, MY, ID, WB
39	**Plutodes flavescens*	Butler, 1880	AS	SEA, WB
Tribe: Ourapterygini				
40	**Ourapteryx* sp.		NE	NE- INDIA
Subfamily: Sterrhinae Tribe: Scopulini				
41	**Scopula vicina*	(Thierry Mieg, 1907)	NE	CN, MY, SR, MH, HP
42	*Scopula* sp.		NE	SR, SEA, AU
Subfamily: Geometrinae Tribe: Nemoriini				
43	**Eucyclodes textilis*	(Butler, 1880)	NL	SR, MM, MH
Tribe: Hemitheini				
44	*Hemithea* sp. 1		NE	NP
45	*Hemithea* sp. 2		NE	NP
46	**Maxates thetydaria*	(Guenée, 1857)	AS, MR	BD
47	*Pelagodes* sp. 1		NE	SR, FJ, MY, AU, WB, KR
48	*Pelagodes* sp. 2		NE	SR, FJ, MY, AU, WB, KR
49	*Pelagodes* sp. 3		NE	SR, FJ, MY, AU, WB, KR
Tribe: Pseudoterpnini				
50	*Pingasa rubicunda*	(Warren, 1894)	ML, NL	AR, PH
Superfamily: Noctuoidea Family: Notodontidae Subfamily: Phalerinae				
51	*Phalera grotei*	Moore, 1860	AS, NL	SR, CN, KR, MM, BT, ID, MH, KR, KL, TN

	Taxa	Author, year	Distribution in northeastern India	Distribution in Indian States and elsewhere
Subfamily: Notodontinae Tribe: Netrini				
52	*Netria* sp. 1		NE	CN, SR, NP, MM, TH, UK, MH
53	*Netria* sp. 2		NE	CN, SR, NP, MM, TH, UK, MH
Tribe: Notodontini				
54	*Formofentonia orbifer*	(Hampson, [1892])	NE	TW
55	*Chadisra bipartita*	Matsumura, 1925	NE	MM, NP, PK, SR, MH
Family: Erebidae Subfamily: Arctiinae Tribe: Arctiini				
56	*Aglaomorpha plagiata*	(Walker, 1855)	AS, ML	CN, NP, MM, KK, HP, UK
57	*Areas galactina*	(van der Hoeven, 1840)	ML. NL	CN, TW, NP, BT, UK, HP, WB
58	*Creatonotos transiens*	(Walker, 1855)	AS, MN, ML, NL, TR	SEA
59	**Nyctemera arctata*	Walker, 1856	NE	CN, NP, BT, MM, TW, ID, WB, CG
60	*Nyctemera adversata*	(Schaller, 1788)	AS, NL, MN, TR, MR	CN, JPN, MM, TH, ID, NP
61	*Spilarctia obliqua*	Walker, 1855	AS, NL, MN, TR, MR	PK, BT, MM, BD
62	*Spilarctia* sp.		NE	PK, BT, MM, BD
Tribe: Syntomini				
63	*Amata divisa*	(Walker, 1854)	AS, ML, NL	CN, NP, MM
64	*Eressa confinis*	(Walker, 1854)	AS, ML, NL	BT, SR, MM, TW, CN, UK, TN, AP, KA, MP
65	*Syntomoides imaon*	(Cramer, [1779])	MN, ML, NL	SR, TH, MM, NP, CN, BD, TN, KL
Tribe: Lithosinii				
66	*Ammatho cuneonotatus*	Walker, 1855	AS	CN, NP, TH, MY, TN, KL, KR
67	**Barsine linga*	(Moore, 1859)	AS, ML, MR	WB, SK, AR
68	**Brunia* sp.		NE	SR, CN
69	**Brunia sarawaca*	(Butler, 1877)	NE	MY, BOR
70	*Cyana peregrina*	(Walker, 1854)	AS, MN, ML, MR, NL, TR	AF, SEA, AU, HP, UK, WB
71	**Macrobrochis gigas*	(Walker, 1854)	AS	CN, BT, NP, ID, TH, TW, MH, KR, MP, WB, KL
72	**Miltochrista undulosa*	(Walker, 1854)	NE	NP, MM, CN
Subfamily: Aganainae				
73	*Asota caricae*	(Fabricius, 1775)	AS, MN, ML, MR, NL, TR	SR, MY
74	**Asota heliconia*	(Linnaeus, 1758)	NE	SR, MM, AU
Subfamily: Calpinae Tribe: Phyllodini				
75	**Phyllodes eyndhovii*	Vollenhoven, 1858	AS	SR, TW, TH
Tribe: Calpini				
76	**Dierna strigata*	(Moore, 1867)	ML	MM, SR, HP, UK, AR
Subfamily: Erebinae				
77	**Fodina oriolus*	Guenée, 1852	AS, ML	SR, BT
Tribe: Erebini				
78	*Erebus caprimulgus*	(Fabricius, 1781)	AS, MN, ML, MR, NL, TR	SR, MM, MY, BOR, KL, MH, KR, TN
79	*Erebus macrops*	(Linnaeus, 1768)	AS, MN, ML, MR, NL, TR	SR, MM, KL
Tribe: Ommatophorini				
80	**Ommatophora* sp.		NE	TW, SEA
Tribe: Hulodini				
81	*Ericeia eriophora*	(Guenée, 1852)	NE	SR, TH, MY, TN
82	*Speiredonia mutabilis*	(Fabricius, 1794)	NE	SR, MM, AU

	Taxa	Author, year	Distribution in northeastern India	Distribution in Indian States and elsewhere
Tribe: Ophiusini				
83	*Dysgonia* sp.		NE	CN, ID, JPN, CN, KR, TN, UK
84	**Ophiusa trapezium*	(Guenee, 1852)	AS	SR, NP
Tribe: Sypnini				
85	*Daddala* sp.		NE	TH, TW, JPN
Subfamily: Hypocalinae Tribe: Hypocalini				
86	*Hypocala* sp. 1		NE	SR, AF, AU, TN, UK, AP, KR, MP
87	*Hypocala* sp. 2		NE	SR, AF, AU, TN, UK, AP, KR, MP
Subfamily: Lymantriinae Tribe: Lymantriini				
88	*Lymantria* cf. *bivittata*	Hübner, [1819]	MN, ML, NL	TW, TH
89	**Lymantria lepcha*	(Moore, 1879)	ML	JPN, SR, MM
90	*Lymantria mathura*	Moore, [1866]	MN, ML, NL	CN, NP, JPN, KR, MP, MH, AR
91	*Lymantria* sp.		NE	CN, NP, JPN, KR, MP, MH, AR
Tribe: Leucomini				
92	*Perina nuda*	(Fabricius, 1787)	AS, MN, ML, MR, NL, TR	CN, TH
93	*Arna bipunctapex*	(Hampson, 1892)	ML, NL	TW, TH
94	*Euproctis fraterna*	Moore, 1883	AS, MN, ML, MR, NL, TR	SR
95	*Euproctis* sp.		NE	SR
96	*Somena scintillans*	Walker, 1856	AS, MN, ML, MR, NL, TR	SR, MM, SEA
Tribe: Orgyiini				
97	**Calliteara angulata*	Hampson, 1895	ML	NP, SEA
98	*Calliteara grotei*	(Moore, 1859)	NE	SEA
99	*Calliteara* sp.		NE	SEA
100	*Dasychira* sp.		NE	AF, AU
101	*Ilema cf. chloroptera*	(Hampson, [1893])	ML, NL	HP, AR
Family: Euteliidae Subfamily: Euteliinae				
102	**Targalla apicifascia*	Hampson, 1894	NE	SR, MM, TN, HP, MH, WB
103	**Eutelia discistriga*	Walker, 1865	NE	SR
Family: Nolidae Subfamily: Westermanniinae				
104	**Westermannia superba*	Hübner, 1823	NE	SR, AU, TN, KL, KR
Subfamily: Chloephorinae Tribe: Careini				
105	*Xenochroa* sp.		NE	BT, SR, BOR, TN, KL, MH
Family: Noctuidae Subfamily: Acronictinae				
106	*Acronicta* sp.		NE	CN, KR, JPN

* indicates first report from Nagaland.

AF—Africa | AP—Andhra Pradesh | AR—Arunachal Pradesh | AS—Assam | AU—Australia | BD—Bangladesh | BOR—Borneo | BT—Bhutan | CG—Chhattisgarh | FJ—Fiji | HP—Himachal Pradesh | ID—Indonesia | JK—Jammu & Kashmir | JPN—Japan | KA—Karnataka | KL—Kerela | KR—Korea | MH—Maharashtra | ML—Meghalaya | MM—Myanmar | MN—Manipur | MP—Madhya Pradesh | MR—Mizoram | MY—Malaysia | NE—North-east | NL—Nagaland | NP—Nepal | PK—Pakistan | SEA—southeastern Asia | SR—Sri Lanka | TH—Thailand | TN—Tamil Nadu | TR—Tripura | TW—Taiwan | UK—Uttarakhand | WB—West Bengal.

to disturbances, while others, such as Ennominae, Geometrinae, Epipaschiinae, Lymantriidae, and Anthelidae, demonstrate negative responses. A multitude of nocturnal moth species have specific distributional boundaries associated with their host plants and climatic constraints, rendering them effective indicators of changing climate conditions in both local and regional contexts. Moths serve as effective biological indicators of climate change impacts due to their variable maturation rates in response to annual temperature fluctuations (Highland et al. 2013). This often indicates that the ecosystem is a conducive habitat and teeming with diverse fauna. Pūrerehua, especially moths, are essential for nitrogen and carbon cycling due to their capacity to decompose coarse organic matter and rejuvenate soils (Merien 2021). The decline in moth populations, given their pivotal role in food webs and their significance as a food source for mammals, songbirds, and other insects, would consequently influence the entire ecosystem and affect all other animals (Peralta et al. 2014).

Consequently, if comprehensive research is conducted in this domain and other locations are included, a greater diversity of species may be documented compared to the recent study. In Nagaland, research is limited, and advancement has been sluggish due to a dearth of literature. Despite the study area indicating a substantial population of moths, further exploration is necessary for comprehensive research on moths. Nagaland possesses significant biodiversity; nonetheless, many regions remain unexamined for moth research. This study, not exhaustive, seeks to elucidate the moth variety of Lumami, Nagaland, and its adjacent regions. The current findings, despite temporal limitations, establish a basis for future long-term, comprehensive, and targeted moth surveys. Additionally, the results of this study can inform judgments about the conservation of natural resource management, particularly concerning moth biodiversity. Consequently, a comprehensive survey accompanied by long-term monitoring programs will facilitate the assessment of species status and may potentially result in additional discoveries within these insect groups.

CONCLUSION

This study found a rich and diverse assemblage of moths, reflecting variations in species richness, variety, and familial representation. Enhanced comprehension of biodiversity and ecosystem health, along with comprehensive research and monitoring of moth habitat alterations due to pollution, climate change, and anthropogenic activities, might yield more insights into ecosystem health. Moreover, examining the effects of climate change can be achieved by understanding species distribution, population dynamics, the impact of urbanization, and their direct effects on the dependent fauna and flora. This work enhances the comprehension of moth ecology in Lumami by broadening the catalogue of known moth species and elucidating their ecological functions within local ecosystems.

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Image 1. 1—*Eterusia aedea* | 2—*Heortia vitessoides* | 3—*Terastia egialealis* | 4—*Hyalobathra* sp. | 5—*Eoophyla* sp. | 6. *Canucha specularis* | 7—*Macrocilix maia* | 8—*Tridrepana lunulata* | 9—*Odonestis bheroba* | 10—*Lebeda nobilis nobilis* | 11—*Trabala vishnou* | 12—*Actias maenas* | 13—*Antheraea assamensis* | 14—*Loepa* cf. *katinka* | 15—*Rinaca cidosa* | 16—*Acosmeryx naga* | 17—*Ambulyx moorei* | 18—*Meganoton analis* | 19—*Abraxas* sp. | 20—*Metapercnia ductaria* | 21—*Alcis* sp. 1. | 22—*Alcis* sp. 2. | 23—*Amblychia* sp. | 24—*Amraica recursaria* | 25—*Coremecis nigrovittata*. © Keneisano Yhoshii.

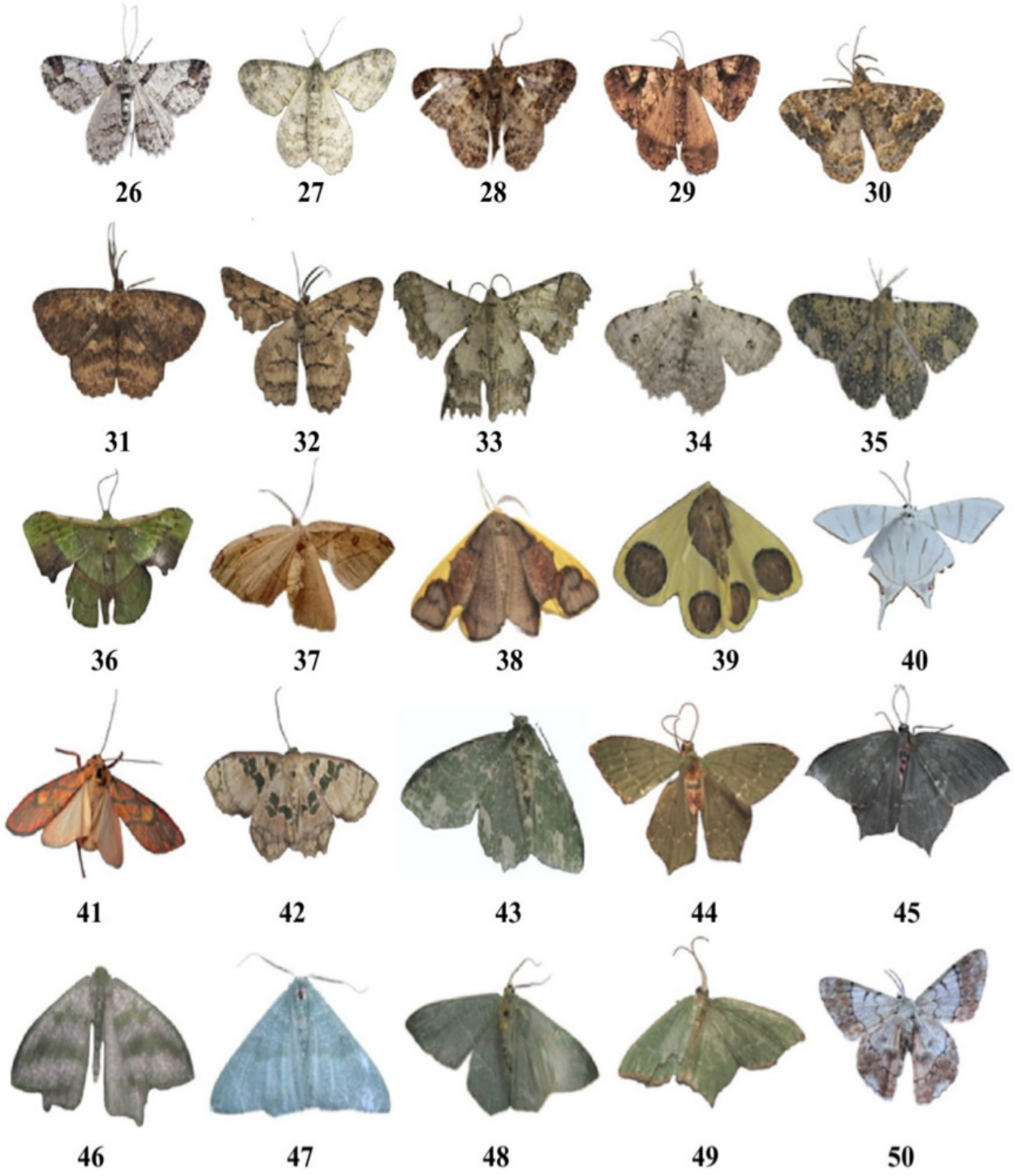

Image 2. 26—*Cleora fraterna* | 27—*Cleora* sp.1 | 28—*Cleora* sp.2 | 29—*Gasterocome pannasaria* | 30—*Harutaea flavizona* | 31—*Hypomecis separata* | 32—*Hypomecis transcissa* | 33—*Krananda semihyalina* | 34—*Lassaba albidaria* | 35—*Ophthalmitis xanthypochlora* | 36—*Fascellina plagiata* | 37—*Hypochrosis* sp.| 38—*Plutodes costatus* | 39—*Plutodes flavescens* | 40—*Ourapteryx* sp.| 41—*Ammatho cuneonotatus* | 42—*Scopula vicina* | 43—*Eucyclodes textilis* | 44—*Hemithea* sp.1 | 45—*Hemithea* sp.2 | 46—*Maxates thetydaria* | 47—*Pelagodes* sp.1 | 48—*Pelagodes* sp.2 | 49—*Pelagodes* sp.3 | 50—*Pingasa rubicunda*.

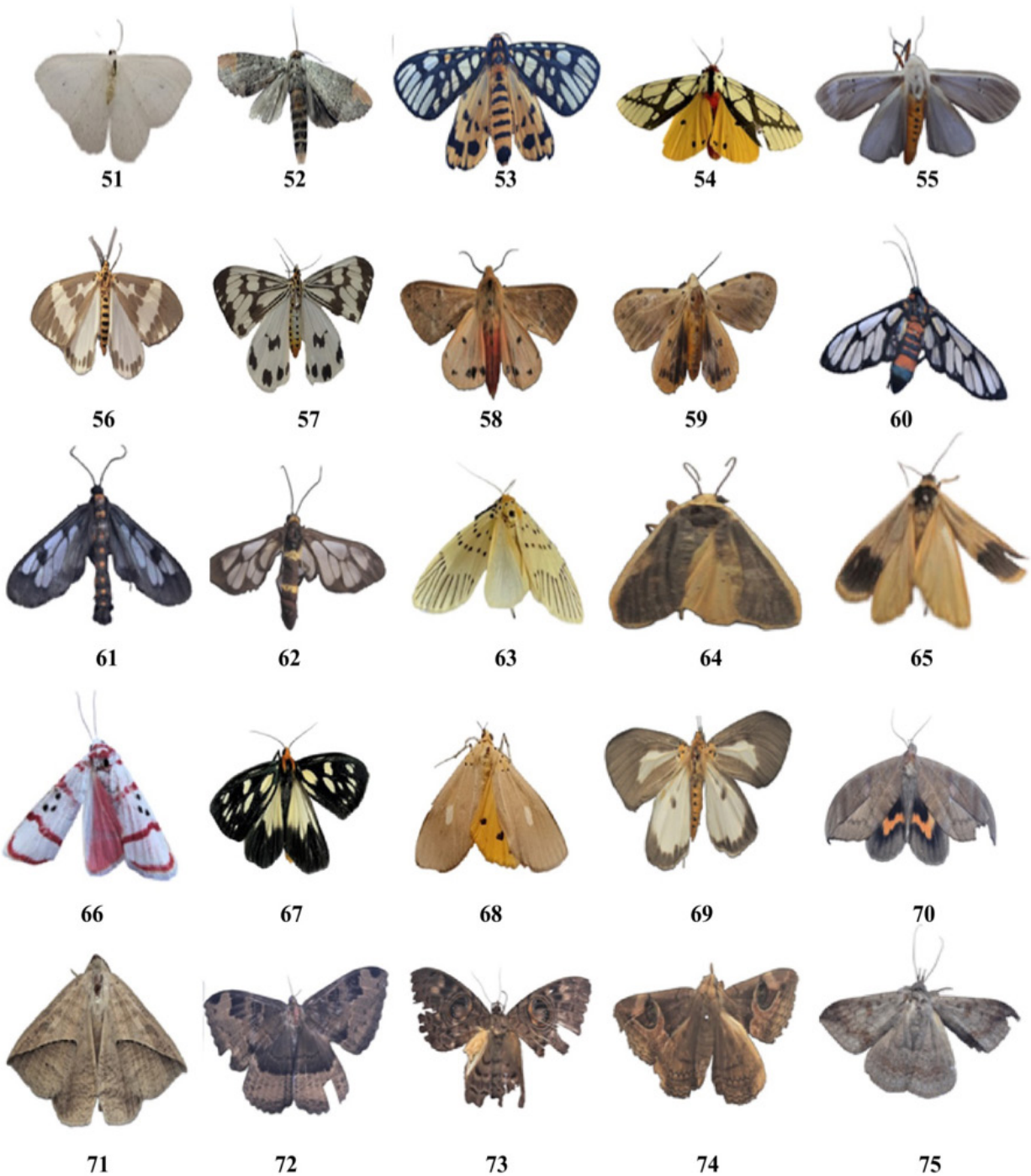

Image 3. 51—*Scopula* sp. | 52—*Phalera grotei* | 53—*Aglaomorpha plagiata* | 54—*Areas galactina* | 55—*Creatonotos transiens* | 56—*Nyctemera arctata* | 57—*Nyctemera adversata* | 58—*Spilarctia obliqua* | 59—*Spilarctia* sp. | 60—*Amata divisa* | 61—*Eressa confinis* | 62—*Syntomoides imaon* | 63—**Barsine linga* | 64—*Brunia* sp. | 65—*Brunia sarawaca* | 66—*Cyana peregrine* | 67—*Macrobrochis gigas* | 68—*Asota caricae* | 69—*Asota heliconia* | 70—*Phyllodes eyndhovii* | 71—*Dierna strigata* | 72—*Erebus caprimulgus* | 73—*Erebus macrops* | 74—*Ommatophora* sp. | 75—*Ericeia eriophora*. © Keneisano Yhoshii.

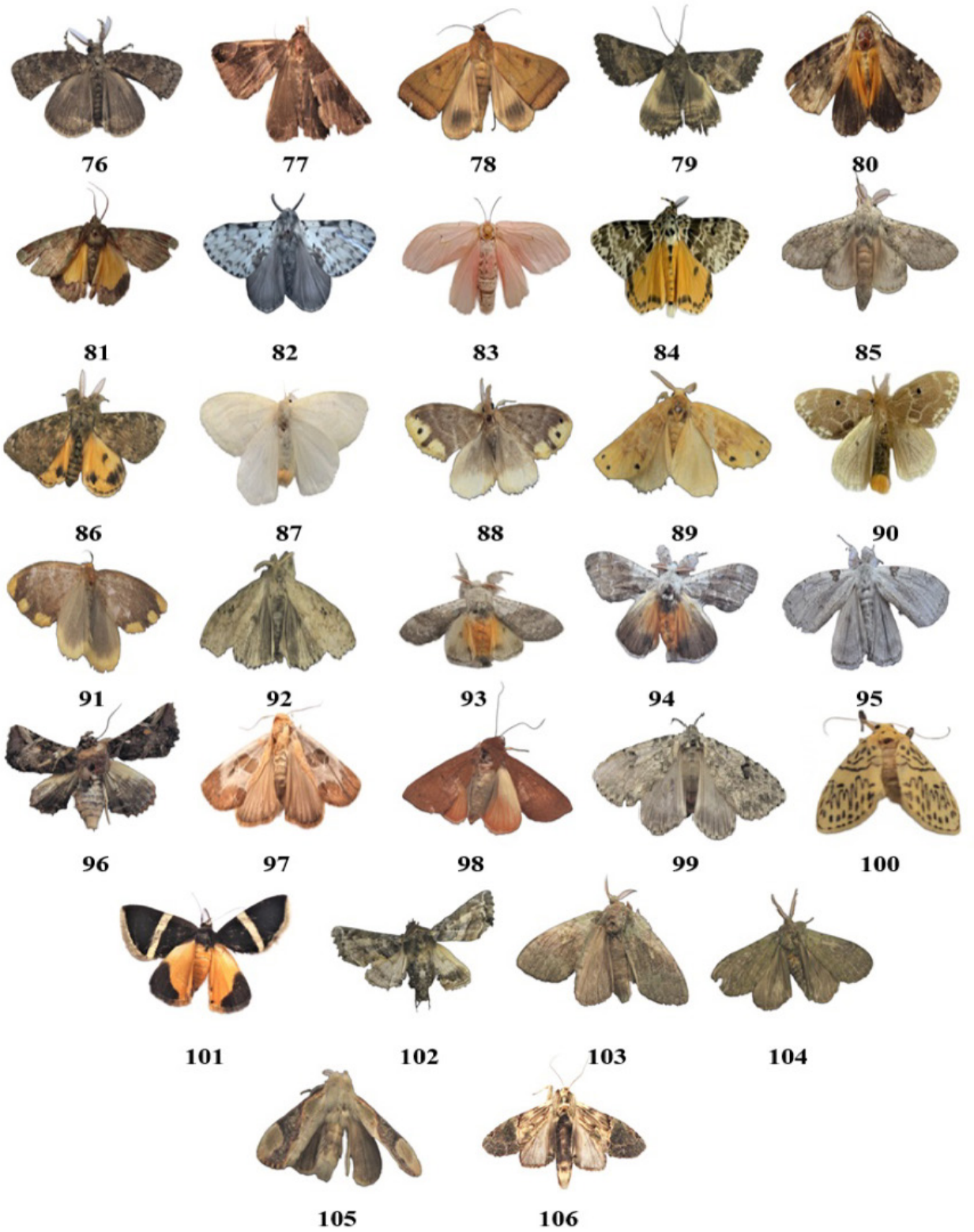

Image 4. 76—*Speiredonia mutabilis* | 77—*Dysgonia* sp. | 78—*Ophiusa trapezium* | 79—*Daddala* sp. | 80—*Hypocala* sp.1 | 81—*Hypocala* sp.2 | 82—*Lymantria* cf. *bivittata* | 83—*Lymantria Lepcha* | 84—*Lymantria Mathura* | 85—*Lymantria* sp. | 86—*Ilema* cf. *chloroptera* | 87—*Perina nuda* | 88—*Arna bipunctapex* | 89—*Euproctis fraterna* | 90—*Euproctis* sp. | 91—*Somena scintillans* | 92—*Calliteara angulata* | 93—*Calliteara grotei* | 94—*Calliteara* sp. | 95—*Dasychira* sp. | 96—*Targalla apicifascias* | 97—*Westermannia superba* | 98—*Xenochroa* sp. | 99—*Acronicta* sp. | 100—*Miltochrista undulosa* | 101—*Fodina oriolus* | 102—*Eutelia dicistriga* | 103—*Netria* sp.1 | 104—*Netria* sp.2 | 105—*Formofentonia orbifer* | 106—*Chadisra bipartite.* © Keneisano Yhoshii.

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