



Checklist of the superfamily Noctuoidea (Insecta, Lepidoptera) from Tamil Nadu, Western Ghats, India

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Abstract

A checklist of the superfamily Noctuoidea (Erebidae, Noctuidae, Euteliidae, and Nolidae) from Nilgiris Biosphere Reserve and Kodaikanal Hills in Western Ghats, Tamil Nadu is presented. We collected noctuid moths monthly from June 2010 to December 2014. We collected 9095 individuals (5242 males and 3853 females) belonging to 188 species, 106 genera, 5 subtribes, 25 tribes, 26 subfamilies and 4 families. The most species-rich families were Erebidae (106 species) and Noctuidae (51 species). The Erebininae was found to be the richest subfamily with 64 species. Additional sampling might reveal 2–3 times more species.

Key words

Lepidoptera; Noctuoidea; light trapping; Western Ghats; fauna.

Academic editor: Ivan Bolotov | Received: 25 October 2016 | Accepted 9 September 2017 | Published 22 December 2017

Citation: Sivasankaran K, Anand S, Pratheesh Mathew, Ignacimuthu S (2017) Checklist of the superfamily Noctuoidea (Insecta, Lepidoptera) from Tamil Nadu, Western Ghats, India. *Check List* 13 (6): 1101–1120. <https://doi.org/10.15560/13.6.1101>

Introduction

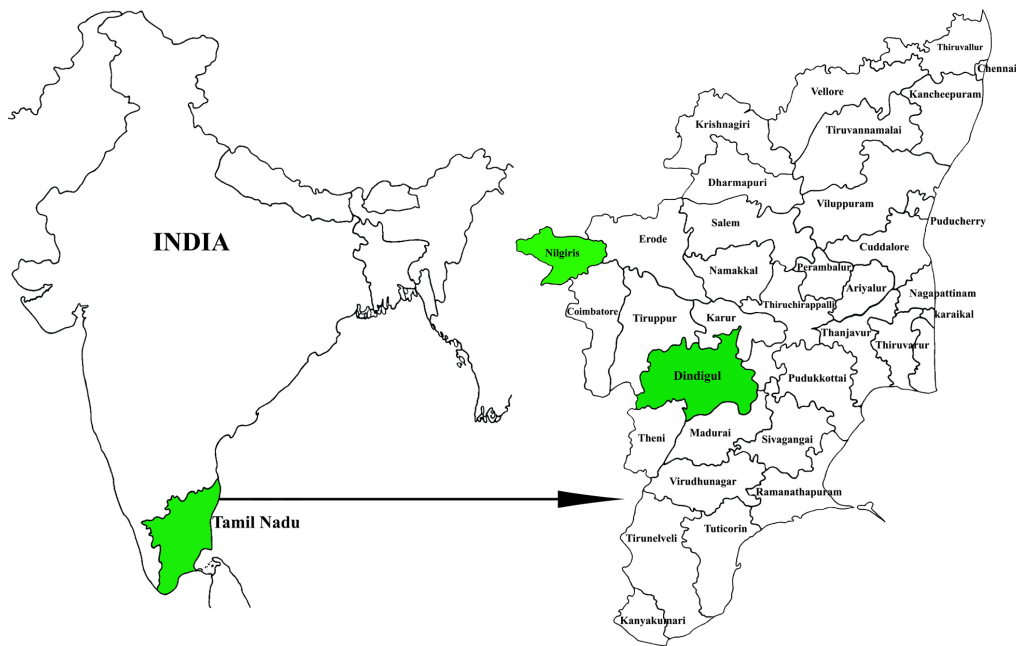
Moths belonging to the order Lepidoptera are probably the largest group of phytophagous insects (Scoble 1992). They are one of the most-studied groups of organisms (Kristensen et al. 2007). The superfamily Noctuoidea (order Lepidoptera) comprises 43,000 described species which are classified into 3800 genera (Nieuwerkerken et al. 2011), but there are still many undescribed species, mostly from tropical regions. The superfamily encompasses the families Oenosandridae, Notodontidae, Erebidae, Noctuidae, Euteliidae, and Nolidae. The larvae of many noctuids are pests, typically associated with higher vascular plants, and collectively have a massive commercial impact annually (Kitching 1984), and adults of many noctuid genera damage fruit crops by piercing the skins of fruits to suck juice (Banziger 1982).

Approximately 6000 noctuid species are known to be commercially important (Zang 1994). Noctuids are well represented in all the major zoogeographic regions and in a wide variety of habitats. Entomologists believe that approximately 100,000 species may exist world wide, with over 70,000 species described and recorded so far (Kitching and Rawlins 1998).

India has diverse ecosystems and hosts 3 biodiversity hotspots, the Western Ghats, the Himalayas, and Indo-Burma region. The Nilgiri Biosphere Reserve, in the Western Ghats of South India, is one of the 18 biodiversity hotspots in the world. The Indian subcontinent has an abundant moth fauna, with 4438 species recorded by Cotes and Swinhoe (1887–1889) and 5277 species recorded by Hampson (1892–1896). Herein, we provide a checklist of species of noctuid moths from the Western Ghats.

Table 1. Sampling locations in the Nilgiri Biosphere, with geographic coordinates and elevation.

No.	Locality	Latitude (N)	Longitude (E)	Elevation (m)
1	Ooty Botanical Garden	11°41'75"	076°71'04"	2228
2	Benchmark Tea Estate	11°41'18"	076°72'07"	2389
3	Doddabetta	11°40'11"	076°73'58"	2624
4	Ooty Lake	11°40'45"	076°69'09"	2221
5	Coonoor Municipal Building	11°33'91"	076°80'17"	1686
6	Sim's Park	11°35'48"	076°80'03"	1855
7	Ketti	11°38'21"	076°73'74"	2137
8	Ithalar	11°34'27"	076°63'56"	2112
9	Emerald Dam	11°32'63"	076°61'99"	2009
10	Avalanche	11°30'01"	076°59'08"	2005
11	Kothagiri Pandian Park	11°42'15"	076°85'00"	1897

**Figure 1.** Maps showing locations of Nilgiri and Dindigul District in Tamil Nadu, India. Not to scale.

Methods

Study areas. The Nilgiri Hills, also known as the Blue Mountains, lie in the district of Nilgiris, Tamil Nadu, India. The Nilgiri Hills are between 2280 and 2623 m. Coonoor is the second largest hill station in the Nilgiris with an elevation of 1,858 m above sea level. Kodaikanal hill station is situated in the Dindigul district, Tamil Nadu on the eastern side of the Western Ghats with an elevation of 2130 meters.

The noctuid moths were collected using sweep nets from 25 different localities. The Ooty Botanical Garden, Benchmark Tea Estate, Doddabetta, Ooty Lake, Coonoor Municipal Building, Sim's Park, Ketti, Ithalar, Emerald Dam, Avalanche, and Kothagiri Pandian Park are located in the Nilgiri Biosphere Reserve (Table 1, Fig. 1) and Kodaikanal Bus Terminus, Perumalmalai (Site 1 and Site 2), Observatory, Poomparai, Pallangi, Matupatti, Moonjikal, Bear Shola, Bryant Park, Coaker's Walk, Senbaganur, Vattakanal, and Vellagavi are located in the Kodaikanal area (Table 2, Fig. 2).

Sample collection and analysis. Specimens of noctuid moths were collected from the Nilgiri Biosphere

Reserve and Kodaikanal Hills from June 2010 to December 2014. We sampled in the morning (between 05:00 and 06:00 h) and in the night time (between 18:30 and 22:00 h) at each site for 5 consecutive days each month. Specimens were collected using sweep nets and a mercury vapour light trap (220/200 W light source). Except a few specimens for taxonomic studies, moths were released in the field. Moths were least abundant during December and January.

The specimens collected for taxonomic study were rinsed in ethyl acetate and mounted. They were subsequently vouchered in Entomology Research Institute, Loyola College, Chennai, India.

The nomenclature used followed Kononenko and Pinratana (2005, 2013) and Lafontaine and Schmidt (2010), except for the Catocalinae, which was based on the classification of Kitching (1984).

Results

In this study, 9095 individual moths (5242 males and 3853 females) of the superfamily Noctuoidea were collected. Included in this number are 188 species belonging

Table 2. Sampling locations in the Kodaikanal Hills, with geographic coordinates and elevation.

No.	Locality	Latitude (N)	Longitude (E)	Elevation (m)
1	Kodaikanal Bus terminus	10°23'53"	077°49'29"	2130
2	Perumal malai (site 1)	10°26'40"	077°53'36"	1563
3	Perumal malai (site 2)	10°27'04"	077°53'36"	1504
4	Observatory	10°22'91"	077°45'95"	2295
5	Poomparai	10°24'70"	077°40'04"	1926
6	Pallangi	10°27'32"	077°45'23"	1665
7	Mattupatti	10°27'37"	077°45'54"	1680
8	Moonjikal	10°23'91"	077°49'077"	2030
9	Bear Shola	10°24'00"	077°48'02"	2106
10	Bryant Park	10°23'09"	077°49'44"	2130
11	Coaker's walk	10°23'09"	077°49'44"	2130
12	Senbaganur	10°23'17"	077°50'03"	1798
13	Vattakanal	10° 21'52"	077° 48'52"	2080
14	Vellagavi	10° 19'70"	077°49'91"	1343

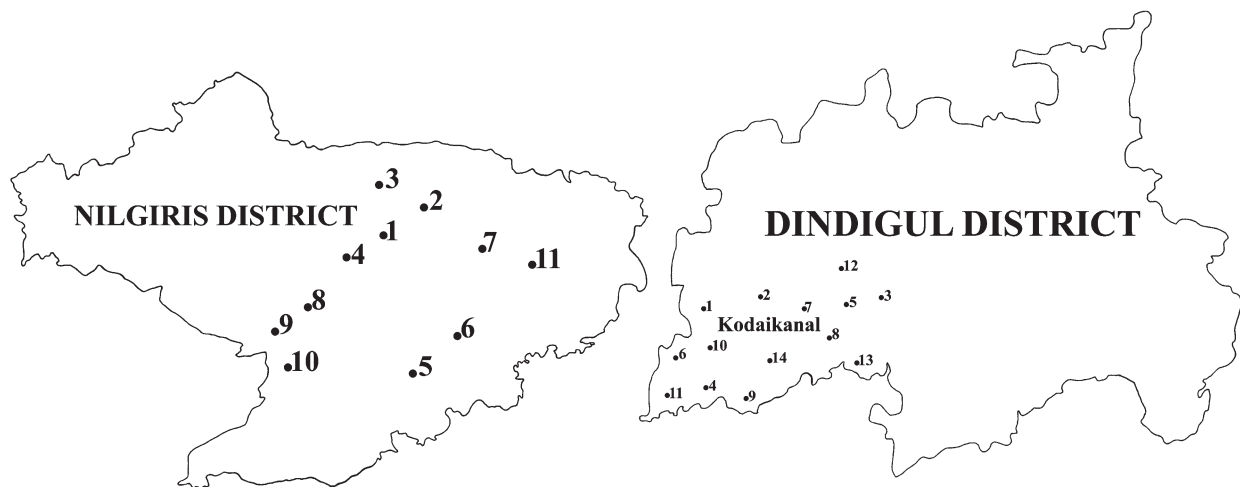


Figure 2. Maps showing the collection locations in Nilgiri and Kodaikanal (Dindigul District). Not to scale.

to 4 families, 26 subfamilies, 106 genera, 25 tribes, and 5 subtribes (Table 3).

We report here a preliminary checklist of Noctuoidea from Nilgiri Biosphere Reserve and Kodaikanal Hills in the Western Ghats, based on almost 5 years of study according to our analysis based on the body of literature (Holloway 1984, 1985, Park 2001, Holloway 2005, Kononenko and Pinratana 2005, 2013).

The most species-rich families were Erebiidae (106 species; 56%), and Noctuidae (51 species; 27%) (Fig. 3). Erebiinae was the most species-rich subfamily (66 species; 35.3%) followed by Calpinae (14 species 7.5%), Hadeninae (13 species; 7%), and Amphipyriinae (10 species; 5.3%). The genera of subfamily Catocalinae with the most species were: *Eudocima* (9 species), *Hypena* (8 species), *Mythimna* (6 species), *Hypocala* (6 species), *Bastilla* (5 species), *Penicillaria* (5 species), and *Blenina* (5 species). The most abundant species was *Oxyodes scrobiculata* (Fabricius, 1775) (1426 individuals), which constituted 15.7% of all samples. *Lacera noctilio* (Fabricius, 1794) was the second most abundant species (381 individuals), which constituted 4.1% of all samples. Both *O. scrobiculata* and *L. noctilio* were abundant throughout most of the study period. Greater numbers of noctuoids

were recorded during April to May, and during September to November. It might be that the temperature during the monsoon season is more suitable for the development of noctuid moths. *Savara pallidapex* Holloway, 2005 was recorded for the first time in the Western Ghats.

***Aegilia describens* (Walker, [1858])**

Lophoptera xylinata Walker, 1865: 920.

Stictoptera anisoptera Snellen, 1880: 88.

Stictoptera anca Swinhoe, 1919: 120.

Material examined. Table 3; Figure 54.

Remarks. This species was recorded by Holloway (2005) on the basis of survey from Borneo. This species is differentiated from other taxa mainly by characters of male and female genitalia. Externally it is similar to *A. sundascribens*.

***Aegilia sundascribens* Holloway, 1976**

Material examined. Table 3.

Remarks. It can be distinguished from *A. describens* based on sinuous forewing fasciae, and whitish submarginal line at the tornus.

***Gonitis mesogona* (Walker, 1858)**

Gonitis mesogona Walker 1858: 1002.

Anomis mesogona Walker—Holloway 1976: 37.

Table 3. Noctuid moths collected from the Western Ghats, Tamil Nadu from June 2010 to December 2014. *First time record in Nilgiri Biosphere.

Taxon	No. of individuals			Taxon	No. of individuals		
	M	F	Total		M	F	Total
Division Trifine				Genus <i>Conservula</i> Grote, 1874			
Family Noctuidae Latreille, 1809				<i>Conservula indica</i> (Moore, 1867)	78	25	103
Subfamily Noctuinae Latreille, 1809				Genus <i>Spodoptera</i> Guenée, 1852			
Tribe Agrotini Rambur, 1848				<i>Spodoptera litura</i> (Fabricius, 1775)	241	167	408
Subtribe Agrotina Rambur, 1848				<i>Spodoptera mauritia</i> (Boisduval, 1833)	9	20	29
Genus <i>Agrotis</i> Ochsenheimer, 1816				Subfamily Heliiothinae Boisduval, 1828			
<i>Agrotis segetum</i> ([Dannis & Schiffermuller], 1775)	49	63	112	Genus <i>Helicoverpa</i> Hardwick, 1965			
<i>Agrotis ipsilon</i> (Hufnagel, 1776)	24	17	41	<i>Helicoverpa armigera</i> (Hübner, [1808])	128	61	189
Genus <i>Protexarnis</i> McDunnough, 1929				Subfamily Bagisarinae Crumb, 1956			
<i>Protexarnis photophila</i> (Guenée, 1852)	5	13	18	Genus <i>Chasmina</i> Walker, 1856			
Genus <i>Polytela</i> Guenée, 1852				<i>Chasmina candida</i> (Walker, 1865)	54	32	86
<i>Polytela florigera</i> Guenée, 1852	69	41	110	Genus <i>Raghuva</i> Moore, 1881			
Subtribe Austrandesina Angulo & Olivares, 1960				<i>Raghuva</i> sp.	2	4	6
Genus <i>Peridroma</i> Hübner, 1821				Subfamily Dyopsinae Guenée, 1852			
<i>Peridroma saucia</i> (Hübner, [1808])	18	7	25	Genus <i>Arcte</i> Kollar, [1844]			
Genus <i>Xestia</i> Hübner, 1818				<i>Arcte coerulea</i> (Guenée, 1852)	13	19	32
<i>Xestia c-nigrum</i> (Linnaeus, 1758)	63	47	110	Subfamily Plusiinae Boisduval, 1829			
Subfamily Acontiinae Guenée, 1841				Tribe Argyrogrammatini (Eichlin & Cunningham, 1976)			
Genus <i>Eustrotia</i> Hübner, 1821				Genus <i>Agrappa</i> Hübner, [1821]			
<i>Eustrotia marginata</i> (Walker, 1866)	2	6	8	<i>Agrappa albostrigata</i> (Bremer & Grey, 1853)	40	27	67
Genus <i>Erastroides</i> Hampson, 1893				<i>Agrappa (Agrappa) agnata</i> Staudinger, 1892	19	10	29
<i>Erastroides</i> sp.	2	2	4	<i>Agrappa (Agrappa) limbirena</i> Guenée, 1852	74	39	113
Subfamily Hadeninae Guenée, 1852				Genus <i>Ctenoplusia</i> Dufay, 1970			
Genus <i>Aletia</i> Hübner, 1821				<i>Ctenoplusia aeneofusa</i> Hampson, 1894	37	67	104
<i>Aletia consanguis</i> (Guenée, 1842)	20	8	28	<i>Ctenoplusia</i> sp.	9	4	13
Genus <i>Polia</i> Boisduval, 1828				Genus <i>Autoplusia</i> McDunnough, 1944			
<i>Polia mediana</i> (Moore, 1881)	5	7	12	<i>Autoplusia</i> sp.	3	1	4
Genus <i>Trachea</i> Ochsenheimer, 1816				Genus <i>Trichoplusia</i> McDunnough, 1944			
<i>Trachea auriplena</i> (Walker, 1857)	18	13	31	<i>Trichoplusia orichalcea</i> Fabricius, 1775	89	56	145
Tribe Leucanini Guenée, 1841				<i>Trichoplusia dubae</i> Boisduval, 1840	24	17	41
Genus <i>Mythimna</i> Ochsenheimer, 1816				Genus <i>Syngrapha</i> Hübner, [1821]			
<i>Mythimna compta</i> Moore, 1884	10	16	26	<i>Syngrapha circumflexa</i> Linnaeus, 1767	3	1	4
<i>Mythimna irregularis</i> Walker, 1857	11	8	19	Genus <i>Odontodes</i> Guenée, 1852			
<i>Mythimna unipuncta</i> Hawker, 1803	36	57	93	<i>Odontodes aleuca</i> Guenée, 1852	32	19	51
<i>Mythimna sinuosa</i> (Moore, 1882)	7	3	10	Genus <i>Lophotera</i> Guenée, 1852			
<i>Mythimna l-album</i> Linnaeus, 1776	28	43	71	<i>Lophotera squammigera</i> Guenée, 1852	14	12	26
<i>Mythimna loreyi</i> (Dupnochel, 1827)	8	8	16	<i>Lophotera squammilinea</i> Guenée, 1852	15	12	27
Genus <i>Tiracola</i> Moore, 1881				Genus <i>Stictoptera</i> Guenée, 1852			
<i>Tiracola aureata</i> Holloway, 1989	4	9	13	<i>Stictoptera cuculoides</i> Guenée, 1852	16	12	28
<i>Tiracola plagiata</i> Walker, 1857	5	12	17	<i>Stictoptera signifera</i> (Walker, [1858] 1857)	14	12	26
Subfamily Acronictinae Heineman, 1859				Genus <i>Aegilia</i> Walker, [1858]			
Tribe Craniophorini Beck, 1996				<i>Aegilia describens</i> (Walker, [1858] 1857)	16	12	28
Genus <i>Craniophora</i> Snellen, 1867				<i>Aegilia sundascribens</i> Holloway, 1976	19	7	26
<i>Craniophora fasciata</i> (Moore, 1887)	22	13	35	Family Erebidae Leach, [1815]			
Genus <i>Cryphia</i> Hübner, 1818				Subfamily Scoliopteryginae Herrich-schaffer, [1851]			
<i>Cryphia lichenea</i> Hampson, 1893	5	2	7	Tribe Anomini Grote, 1882			
Subfamily Amphipyriinae Guenée, 1838				Genus <i>Anomis</i> Hübner, [1821]			
Tribe Actinotiini Beck, 1996				<i>Gonitis mesogona</i> (Walker [1858])	34	17	51
Genus <i>Actinotia</i> Hübner, 1821				<i>Ruscada privata</i> (Walker, 1865)	42	23	65
<i>Actinotia polyodon</i> (Clerk, 1759)	43	29	72	<i>Anomis flava</i> (Fabricius, 1775)	24	12	36
Genus <i>Callopietria</i> Walker, 1858				<i>Gonitis involuta</i> (Walker, [1858])	27	32	59
<i>Callopietria repleta</i> (Walker, [1858] 1857)	9	12	21	Subfamily Calpinae Boisduval, 1840			
<i>Callopietria rivularis</i> (Walker, [1858] 1857)	3	2	5	Tribe Calpini Boisduval, 1840			
<i>Callopietria maillardi</i> (Guenée, 1862)	1	4	5	Genus <i>Plusiodonta</i> Guenée, 1852			
Genus <i>Sasunaga</i> Holloway, 1985				<i>Plusiodonta coelonota</i> (Kollar, [1844])	48	20	68
<i>Sasunaga tenebrosa</i> (Moore, 1867)	52	38	90	Genus <i>Calyptra</i> Ochsenheimer, 1816			
<i>Sasunaga longiplaga</i> Warren, 1912	19	17	36	<i>Calyptra miniticornis</i> (Guenée, 1852)	79	48	127
<i>Sasunaga leucorina</i> (Hampson, 1894)	12	3	15	Genus <i>Oraesia</i> Guenée in Boisduval & Guenée, 1852			
				<i>Oraesia emarginata</i> Fabricius, 1794	49	34	83

Table 3. Continued.

Taxon	No. of individuals			Taxon	No. of individuals		
	M	F	Total		M	F	Total
Tribe Ophiderini Guenée, 1852				Tribe Euclidiini Guenée, 1852			
Genus <i>Eudocima</i> Billberg, 1820				Genus <i>Trigonodes</i> Guenée, 1852			
<i>Eudocima materna</i> (Linnaeus, 1767)	33	23	56	<i>Trigonodes hyppasia</i> (Cramer, 1779)	8	10	18
<i>Eudocima phalonia</i> (Linnaeus, 1766)	42	16	58	Genus <i>Mocis</i> Hübner, 1823			
<i>Eudocima sikhimensis</i> (Butler, 1895)	23	11	34	<i>Mocis frugalis</i> (Fabricius, 1775)	48	20	68
<i>Eudocima homanea</i> (Hübner, [1823])	21	17	38	<i>Mocis undata</i> (Fabricius, 1775)	39	14	53
<i>Eudocima salaminia</i> (Cramer, 1777)	22	14	36	Tribe Ercheiini Berio, 1992			
<i>Eudocima aurantia</i> Moore, 1877	8	6	14	Genus <i>Ercheia</i> Walker, [1858]			
<i>Eudocima cajeta</i> (Cramer, 1779)	3	7	10	<i>Ercheia cyllaria</i> (Cramer, 1779)	68	18	86
<i>Eudocima hypermnestra</i> (Stoll, 1780)	13	8	21	<i>Ercheia niveostrigata</i> Warren, 1930	2	6	8
<i>Eudocima cocalus</i> (Cramer, 1777)	11	5	16	Tribe Pandesmini			
Tribe Phylloidiini Guenée, 1852				Genus <i>Pandesma</i> Guenée in Boisduval & Guenée, 1852			
Genus <i>Phylloides</i> Boisduval, 1832				<i>Pandesma quanavadi</i> Guenée, 1852	45	23	68
<i>Phylloides consobrina</i> Westwood, 1848	2	-	2	Genus <i>Ortopla</i> Walker, 1859			
Genus <i>Ramadasa</i> Moore, 1877				<i>Ortopla lindsayi</i> (Hampson, 1891)	40	11	51
<i>Ramadasa pavo</i> (Walker, 1856)	19	14	33	<i>Ortopla boarmoides</i> Guenée, 1852	34	22	56
Genus <i>Savara</i> Walker, 1862				Tribe Hulodini			
<i>Savara pallidapex</i> Holloway, 2005*	-	1	1	Genus <i>Lacera</i> Guenée, 1852			
Subfamily Hypocalinae Guenée, 1852				<i>Lacera noctilio</i> (Fabricius, 1794)	219	162	381
Tribe Hypocalini Guenée, 1852				Genus <i>Hulodes</i> Guenée, 1858			
Genus <i>Hypocala</i> Guenée, 1852				<i>Hulodes caranea</i> (Cramer, 1780)	45	23	68
<i>Hypocala deflorata</i> (Fabricius, 1794)	67	41	108	Genus <i>Ericeia</i> Walker, (1858)			
<i>Hypocala biarcuata</i> Walker, 1858	48	23	71	<i>Ericeia inangulata</i> (Guenée, 1852)	19	24	43
<i>Hypocala rostrata</i> (Fabricius, 1794)	31	24	55	<i>Ericeia eriophora</i> (Guenée, 1852)	6	12	18
<i>Hypocala guttiventris</i> (Walker [1858])	9	16	25	<i>Ericeia korintijiens</i> Prout 1928	13	26	39
<i>Hypocala subsatura</i> (Guenée, 1852)	15	12	27	Tribe Ophiusini Guenée, 1837			
<i>Hypocala violacea</i> (Butler, 1879)	36	123	159	Genus <i>Ophiusa</i> Hüber, 1806			
Subfamily Tinoliinae				<i>Ophiusa olista</i> (Swinhoe, 1893)	20	11	31
Tribe Tinoliini Moore, [1885]				<i>Ophiusa trapezium</i> (Guenée, 1852)	24	17	41
Genus <i>Calesia</i> Guenée, 1852				<i>Ophiusa discriminans</i> (Walker, 1858)	19	12	31
<i>Calesia stillifera</i> Felder & Rogenhofer, 1874	16	5	21	<i>Ophiusa triphaenoides</i> (Walker, 1858)	28	16	44
Subfamily Erebininae Leach, [1815]				<i>Ophiusa tirhaca</i> (Cramer, 1777)	14	9	23
Tribe Toxocampini Guenée, 1852				Genus <i>Artena</i> Walker, 1858			
Genus <i>Lygephila</i> Billberg, 1821				<i>Artena inversa</i> (Walker, 1858)	3	6	9
<i>Lygephila dorsigera</i> (Walker, 1865)	13	7	20	<i>Artena dotata</i> (Fabricius, 1794)	53	37	90
Tribe Acantholipini Fibiger & Lafontaine, 2005				Genus <i>Hamodes</i> Guenée, 1852			
Genus <i>Hyospila</i> Guenée, 1852				<i>Hamodes propitia</i> (Boisduval, 1832)	3	1	4
<i>Hyospila bolinoides</i> Guenée, 1852	6	9	15	Genus <i>Thyas</i> Fabricius, 1775			
Tribe Erebinini Leach, [1815]				<i>Thyas coronata</i> (Fabricius, 1775)	52	37	89
Genus <i>Erebus</i> Latreille, 1810				<i>Thyas junio</i> (Dalman, 1823)	5	3	8
<i>Erebus macrops</i> (Linnaeus, 1768)	43	15	58	Tribe Poaphilini Guenée, 1852			
<i>Erebus ephesperis</i> (Hübner, [1823])	12	5	17	Genus <i>Achaea</i> Hübner, 1833			
<i>Erebus hieroglyphica</i> (Drury, 1773)	17	8	25	<i>Achaea janata</i> (Linnaeus, 1758)	186	108	294
Genus <i>Lygniodes</i> Guenée, 1890				<i>Achaea serva</i> (Fabricius, 1775)	67	35	102
<i>Lygniodes schoenbergi</i> Pagenstcher, 1890	6	-	6	<i>Achaea mezentia</i> (Stoll, 1780)	32	15	47
<i>Lygniodes reducens</i> Fabricius, 1794	4	1	5	Subtribe Dysgonidae Moore, 1885			
<i>Lygniodes hypoleuca</i> Guenée, 1852	9	2	11	Genus <i>Parallelia</i> Hübner, 1818			
Genus <i>Sympis</i> Guenée, 1852				<i>Parallelia rigidistria</i> (Guenée, 1852)	6	3	9
<i>Sympis rufibasis</i> Guenée, 1852	5	3	8	Genus <i>Dysgonia</i> (Hübner, 1823)			
Tribe Catocalini Boisduval, [1828]				<i>Dysgonia maturata</i> Walker, 1858	3	8	11
Genus <i>Ulotrichopus</i> Wallengren, 1860				Genus <i>Bastilla</i> Swinhoe, 1918			
<i>Ulotrichopus macula</i> Hampson, 1891	46	10	56	<i>Bastilla crameri</i> (Moore, [1885])	8	3	11
<i>Ulotrichopus</i> sp.	2	-	2	<i>Bastilla joviana</i> (Stoll, 1782)	1	4	5
Tribe Cocytiini				<i>Bastilla amygdalis</i> Moore, [1885]	34	27	61
Genus <i>Serrodus</i> Guenée, 1852				<i>Bastilla stuposa</i> Fabricius, 1794	9	6	15
<i>Serrodus campana</i> Guenée, 1852	39	35	74	<i>Bastilla absentimacula</i> (Guenée, 1852)	11	7	18
<i>Serrodus mediopallens</i> Prout, 1924	12	3	15	Genus <i>Pindara</i> Moore, [1885]			
Genus <i>Avatha</i> Walker, 1858				<i>Pindara illibata</i> (Fabricius, 1775)	39	16	55
<i>Avatha noctuoides</i> (Guenée, 1852)	53	19	72	Genus <i>Grammodes</i> Guenée, 1852			
<i>Avatha bubo</i> (Geyer, 1832)	4	2	6	<i>Grammodes geometrica</i> (Fabricius, 1775)	26	17	43

Table 3. Continued.

Taxon	No. of individuals			Taxon	No. of individuals		
	M	F	Total		M	F	Total
Genus <i>Chalciope</i> Hübner, 1806				<i>Sphingomorpha chlorea</i> Cramer, 1777	74	38	112
<i>Chalciope mygdon</i> (Cramer, 1777)	23	10	33	Genus <i>Psimada</i> Walker, 1858	-	2	2
Genus <i>Oxyodes</i> Guenée, 1852				<i>Psimada quadripennis</i> Walker, 1858			
<i>Oxyodes scrobiculata</i> (Fabricius, 1775)	733	693	1426	Erebidae unplaced to subfamily			
Tribe Catephiini				Genus <i>Hyperlopha</i> Hampson, 1895			
Genus <i>Nagia</i> Walker, 1858				<i>Hyperlopha cristifera</i> (Walker, 1865)	4	-	4
<i>Nagia linteola</i> (Guenée, 1852)	3	6	9	Family Euteliidae Grote, 1882			
Tribe Hypopyrini				Subfamily Euteliinae, Grote, 1882			
Genus <i>Spirama</i> Guenée, 1852				Genus <i>Eutelia</i> Hübner, 1818			
<i>Spirama retorta</i> (Clerck, 1759)	81	-	81	<i>Eutelia dicistriga</i> Walker, 1865	2	7	9
<i>Spirama helicina</i> (Hübner, 1831)	-	62	62	<i>Eutelia adulatricoides</i> (Mell, 1943)	51	33	84
Genus <i>Hypopyra</i> Guenée, 1852				Genus <i>Penicillaria</i> Guenée, 1852			
<i>Hypopyra vespertilio</i> (Fabricius, 1775)	7	5	12	<i>Penicillaria jocosatrix</i> Guenée, 1852	17	9	26
Genus <i>Speiredonia</i> Hübner, [1823]				<i>Penicillaria maculata</i> Butler, 1889	3	9	12
<i>Speiredonia mutabilis</i> (Fabricius, 1794)	8	7	15	<i>Penicillaria</i> sp. 1	2	5	7
<i>Speiredonia alix</i> Guenée, 1852	10	13	23	<i>Penicillaria</i> sp. 2	2	2	4
Tribe Ommatophoridae Guenée, 1852				Genus <i>Targalla</i> Walker, [1858]			
Genus <i>Ommatophora</i> Guenée, 1852				<i>Targalla atripars</i> (Hampson, 1912)	9	8	17
<i>Ommatophora</i> sp.	2	14	16	<i>Targalla delatrix</i> Guenée, 1879	9	5	14
Genus <i>Dinumma</i> Walker, 1858				Genus <i>Paectes</i> Hübner, 1818			
<i>Dinumma</i> sp.	1	4	5	<i>Paectes cristatrix</i> (Guenée, 1852)	21	7	28
Genus <i>Anticarsia</i> Hübner, 1818				Subfamily Pangraptinae Grote, 1882			
<i>Anticarsia irrorata</i> (Fabricius, 1781)	4	11	15	Genus <i>Lopharthrum</i> Hampson, 1894			
Genus <i>Chrysopera</i> Hampson, 1894				<i>Lopharthrum comprimens</i> (Hampson, 1894)	7	13	20
<i>Chrysopera combinans</i> (Walker, 1858)	43	18	61	Subfamily Gonopterinae			
Genus <i>Pericyma</i> Herrich-Schäffer, 1851				Genus <i>Carea</i> Walker, 1856			
<i>Pericyma glaucinans</i> (Guenée, 1852)	24	15	39	<i>Carea obsolescens</i> Moore, 1884	6	7	13
Genus <i>Anisoneura</i> Guenée, 1852				Subfamily Eubleminae Forbes, 1954			
<i>Anisoneura aluco</i> (Fabricius, 1775)	3	7	10	Genus <i>Eublemma</i> Hübner, 1829			
Genus <i>Platyja</i> Hübner, [1823]				<i>Eublemma parva</i> (Hübner, [1808])	2	2	4
<i>Platyja umminia</i> (Cramer, 1780)	3	1	4	Subfamily Pantheinae Smith, 1898			
Genus <i>Chilkasa</i> Swinhoe, 1885				Genus <i>Trichosea</i> Grote, 1875			
<i>Chilkasa falcata</i> Swinhoe, 1885	15	3	18	<i>Trichosea champa</i> (Moore, 1879)	19	8	27
Subfamily Herminiinae Herrich-Schäffer, 1845				Subfamily Aganainae			
Genus <i>Simplicia</i> Guenée, 1854				Genus <i>Asota</i> Hübner, [1819]			
<i>Simplicia robustalis</i> Guenée, 1854	10	6	16	<i>Asota caricae</i> (Fabricius, 1775)	17	22	39
Genus <i>Hydrillodes</i> Guenée, 1854				Family Nolidae Bruand, 1846			
<i>Hydrillodes abavalis</i> (Walker, [1859])	4	3	7	Genus <i>Westermannia</i> Hübner, [1821]			
Genus <i>Hyblaea</i> Fabricius, 1794				<i>Westermannia superba</i> Hübner, 1823	14	5	19
<i>Hyblaea puera</i> Cramer, 1797	48	25	73	<i>Westermannia argentea</i> Hampson, 1891	3	2	5
Subfamily Hypeninae Herrich-Schäffer, 1845				Genus <i>Callyna</i> Guenée, 1852			
Genus <i>Hypena</i> Schrank, 1802				<i>Callyna costiplaga</i> Moore, [1885]	26	12	38
<i>Hypena rectilinea</i> Moore, 1879	6	4	10	Subfamily Sarrothripinae Hampson, 1894			
<i>Hypena lividalis</i> Hübner, 1796	3	6	9	Genus <i>Blenina</i> Walker, 1857			
<i>Hypena occata</i> Moore, 1882	3	3	6	<i>Blenina quinaria</i> Moore, 1882	22	12	34
<i>Hypena elongalis</i> Fabricius, 1794	5	4	9	<i>Blenina angulipennis</i> (Moore, 1882)	13	11	24
<i>Hypena sagitta</i> (Fabricius, 1775)	18	15	33	<i>Blenina</i> sp. 1	16	5	21
<i>Hypena pullata</i> (Moore, [1885])	9	12	21	<i>Blenina</i> sp. 2	2	7	9
<i>Hypena</i> sp. 1	1	3	4	<i>Blenina</i> sp. 3	5	18	23
<i>Hypena</i> sp. 2	2	4	6	Genus <i>Eligma</i> Hübner, 1819			
Subfamily Focillinae				<i>Eligma narcissus</i> (Cramer, 1775)	1	-	1
Genus <i>Mecodina</i> Guenée, 1852				Subfamily Risobinae Mell, 1943			
<i>Mecodina praecipua</i> (Walker, 1865)	7	9	16	Genus <i>Risoba</i> Moore, 1881			
Genus <i>Avitta</i> Walker, 1852				<i>Risoba obstructa</i> Moore, 1881	6	7	13
<i>Avitta quardrillinea</i> Walker, [1863]	43	21	64	<i>Risoba</i> sp.	6	10	16
Erebinae unplaced to tribe				Subfamily Stictopterinae Hampson, 1894			
Genus <i>Ischyja</i> Hübner, 1818				Genus <i>Pterogonia</i> Swinhoe, 1891			
<i>Ischyja manlia</i> (Cramer, 1766)	34	12	46	<i>Pterogonia episcopalis</i> Swinhoe, 1891	1	2	3
<i>Ischyja hemiphaea</i> (Hampson, 1926)	5	7	12	<i>Pterogonia nubes</i> (Hampson, 1893)	3	6	9
Genus <i>Sphingomorpha</i> Guenée, 1852							
				Total	5242	3853	9095



Figures 3–8. Noctuid moths of Western Ghats. **3.** *Hypocala deflorata* (Hypocalinae). **4.** *Hypocala subsatura* (Hypocalinae). **5.** *Hypocala guttiventris* (Hypocalinae). **6.** *Hypocala violacea* (Hypocalinae). **7.** *Mocis frugalis* (Erebinae). **8.** *Mocis undata* (Erebinae).

Material examined. Table 3.

Remarks. *Anomis mesogona* was revised as *Gonitis mesogona* by Holloway (2005). Hampson distinguished this species by the excised forewing at the outer margin up to vein M3, where it is produced. There are 2 black spots at end of the forewing's cell.

***Rusicada privata* (Walker, 1865)**

Gonitis commoda Butler 1878: 203.

Rusicada subfulvida Warren 1913: 360.

Rusicada griseolineata Warren 1913: 360.

Anomis fulvida Guenée 1852: 397—Moore 1882: 155.

Material examined. Table 3; Figure 10.

Remarks. *Anomis privata* (Walker, 1865) was revised as *Rusicada privata* by Holloway (2005). *Anomis commoda* was synonymized with *Anomis privata* by Sugi et al. (1992). Forewing with a wavy postmedial line from the costa to vein M2, curved to lower angle of the cell

and wavy to inner margin. In male genitalia, the uncus is stout, curved, and broadly sword-shaped.

***Anomis flava* (Fabricius, 1775)**

Noctua stigmatizans Fabricius 1775: 601.

Xanthia fimbriago Stephens 1829: 67.

Cosmophila xanthindyma Boisduval 1833: 242.

Cosmophila auragoides Guenée 1852: 397.

Cosmophila indica Guenée 1852: 396.

Cirroedia variolosa Walker, 1857: 150.

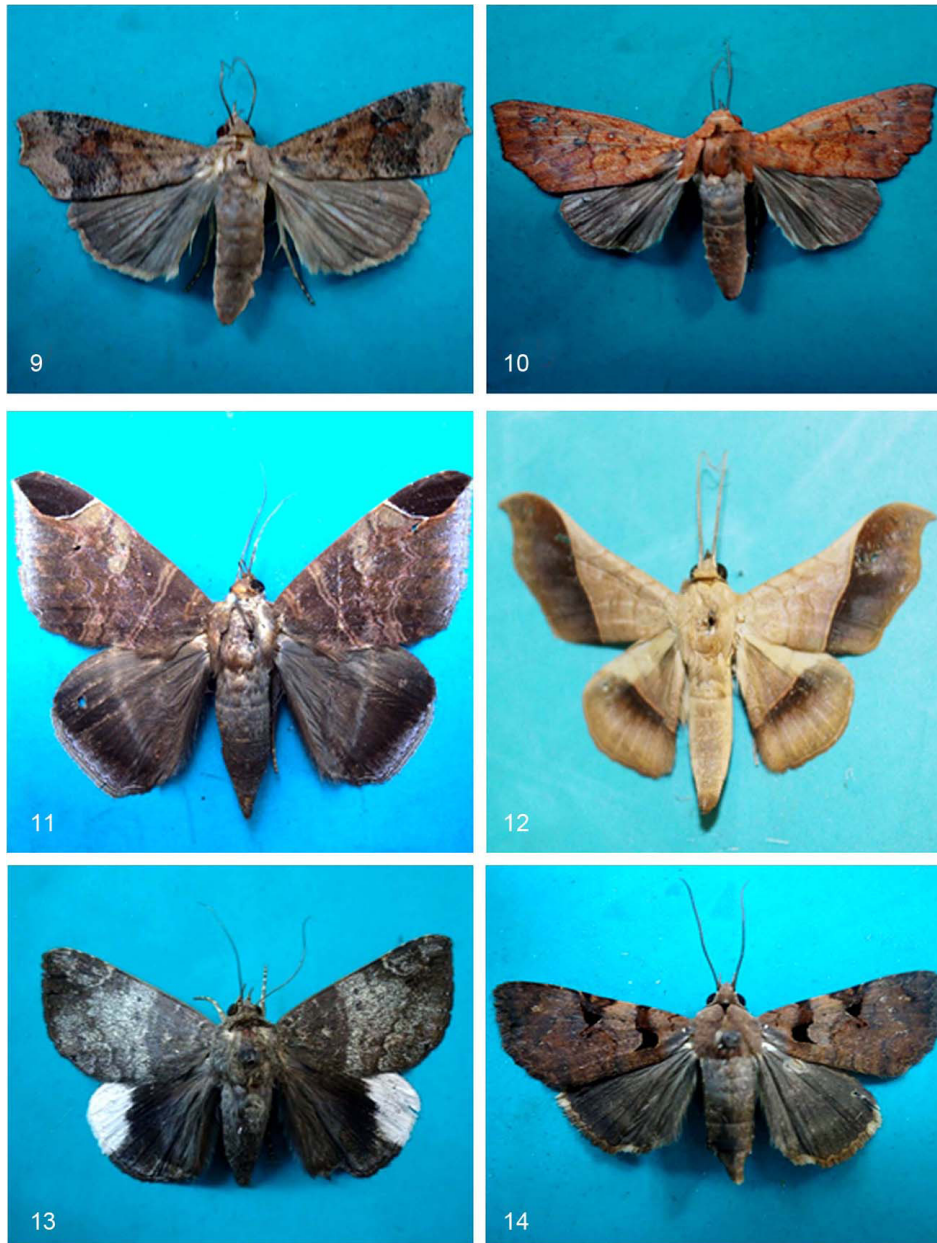
Cirroedia edentata Walker, 1857: 150.

Cosmophila aurantiaca Prittwitz 1867: 277.

Anomis serrata Barnes & McDunnough 1913: 169.

Material examined. Table 3.

Remarks. *Cosmophila auragoides* is a synonym of *Anomis flava* according to Poole (1989). It is smaller than other *Anomis* species. Forewing with a large reniform spot at end of the cell.



Figures 9–14. Noctuid moths of Western Ghats. **9.** *Gonitis involuta* (Erebinae). **10.** *Rusicada privata* (Erebinae). **11.** *Pindara illibata* (Erebinae). **12.** *Chilkasa falcata* (Erebinae). **13.** *Achaea mezentia* (Erebinae). **14.** *Avatha noctuoides* (Erebinae).

***Gonitis involuta* (Walker, [1858])**

Gonitis involuta Walker [1858]:1003.
Gonitis basalis Walker [1858]: 1004.
Tiridata colligata Walker 1857: 870.
Gonitis vitiensis Butler 1886: 408.
Gonitis basalis Butler 1886: 408.
Cosmophila dona Swinhoe 1919: 313.
Anomis brima Swinhoe 1920: 255.

Material examined. Table 3; Figure 9

Remarks. *Gonitis involuta* was revised by Holloway (2005). This species is distinguished from other *Gonitis* species by its small and diffused forewings markings.

***Eudocima materna* (Linnaeus, 1767)**

Noctua hybrida Fabricius 1775: 593.
Ophideres apta Walker 1858: 1221.
Ophideres chalcogramma Walker 1865: 937.

Material examined. Table 3; Figures 25, 26.

Remarks. This is an Old World species. The diagnos-

tic features of *E. materna* are as follows: forewing with 3 rufous spots at end of the cell in both sexes. Hindwing with a black spot on the costa.

***Eudocima phalonia* (Linnaeus, 1763)**

Phalaena (Noctua) phalonia Linnaeus 1763: 28.
Phalaena fullonia Clerck [1764]: 48.
Phalaena (Attacus) fullonica Linnaeus 1767: 812.
Noctua dioscoreae Fabricius 1775: 593.
Phalaena (Noctua) pomona Cramer [1775]: 122.
Ophideres princeps Boisduval 1832: 245.
Ophideres obliterans Walker 1857: 1229.
Othreis fullonia Clerck—Holloway 1976: 36.

Material examined. Table 3.

Remarks. *Eudocima phalonia* is a senior synonym of *E. fullonia* reinstated by Zill and Hogenes (2002). The species name *E. fullonia* was misspelled as *E. fullonica* by Linnaeus, 1767. Sexes are dimorphic. Males with usually lineated forewings and females with much more variable



Figures 15–20. Noctuid moths of Western Ghats. **15.** *Lygniodes schosenbergi* (Erebinae). **16.** *Nagia linteola* (Erebinae). **17.** *Oraesia emarginata* (Calpinae). **18.** *Ischyja manlia*. **19.** *Erebus macrops* (Erebinae). **20.** *Erebus hieroglyphica* (Erebinae).

marks and red-brown specks. Female is having the triangular white mark usually present on the postmedial line.

***Eudocima sikhimensis* (Butler, 1895)**

Adris sikhimensis Butler 1895: 1260.

Othreis abathyglypta Prout 1928: 264.

Material examined. Table 3; Figures 29, 30.

Remarks. *Othreis abathyglypta* was synonymized with *Eudocima sikhimensis* by Banziger (1985). A strongly sexually dimorphic species. The forewings resembles a green leaf and apex produced; an oblique black midrib line running from centre of the dorsum to the apex.

***Eudocima homanea* (Hübner, [1823])**

Othreis homaena Hübner [1827]: 264.

Phalaena (Noctua) ancilla Cramer 1777: 84.

Phalaena strigata Donovan, [1804]:54

Ophideres bilineosa Walker [1858]: 1227.

Othreis ancilla formosana Okano 1964: 43.

Othreis homaena Hübner—Holloway 1976: 36.

Material examined. Table 3; Figure 27, 28

Remarks. This is an oriental zone species with sexual dimorphism pattern in forewing. Male with forewing is having a variegated and transversely rippled purplish brown, with a sigmoid postmedial and straight antemedial and female with similar ground colour.

***Eudocima salaminia* (Cramer, 1777)**

Noctua salaminia Cramer [1777]: 117.

Eudocima salaminia Cramer- Holloway 1976: 36.

Material examined. Table 3; Figure 24

Remarks. This species was recorded from Oriental region by Hampson (1894). The diagnostic characters of the species: forewing is suffused golden green colour; the hindwing with black border and narrow.



Figures 21–26. Noctuid moths of Western Ghats. **21.** *Ophiusa triphaenoides* (Erebinae). **22.** *Ophiusa discriminans* (Erebinae). **23.** *Ophiusa tirhaca* (Erebinae). **24.** *Eudocima salaminia* (Calpinae). **25.** *Eudocima materna* ♀ (Calpinae). **26.** *Eudocima materna* ♂ (Calpinae).

***Eudocima aurantia* (Moore, 1877)**

Adris rutilus Moore 1881: 700.

Material examined. Table 3; Figure 31

Remarks. It can be identified on the forewing colour as browner with dark striae slight purple brown. Hindwing orange much broad, with a large black lunule beyond lower angle of the forewing's cell.

***Eudocima cajeta* (Cramer, 1779)**

Ophideres multiscripta Walker 1857: 1226.

Material examined. Table 3; Figure 32

Remarks. Classification adapted from Kononenko and Pinratana (2005). Two light in colour antemedial and medial lines of the forewing.

***Eudocima hypermnestra* (Stoll, 1780)**

Material examined. Table 3.

Remarks. It can be differentiated from the other spe-

cies based on hindwing with a black spot at lower angle of the cell and another one above anal angle.

***Eudocima cocalus* (Cramer, 1777)**

Material examined. Table 3.

Remarks. This species differs from *E. hypermnestra* in not having black spot on hindwing, the black marginal band with nearly even inner edge and extending to anal angle.

***Phyllodes consobrina* Westwood, 1848**

Phyllodes perspicillator Guenée 1852: 120.

Phyllodes maligera Butler 1883: 138.

Phyllodes roseigera Butler 1883: 164.

Material examined. Table 3; Figure 38

Remarks. *P. perspicillator*, *P. maligera*, and *P. roseigera* were synonymized with *P. consobrina*. It was described from oriental region. This species can be easily differentiated from *P. eyndhovii* based on forewings and



Figures 27–32. Noctuid moths of Western Ghats. **27.** *Eudocima homaena* ♂ (Calpinae). **28.** *Eudocima homaena* ♀ (Calpinae). **29.** *Eudocima sikhimensis* ♀ (Calpinae). **30.** *Eudocima sikhimensis* ♂ (Calpinae). **31.** *Eudocima aurantia* (Calpinae). **32.** *Eudocima cajeta* (Calpinae).

hind wings patterns. Forewing with an S-shaped brown mark on discocellulars. Hindwing with a large crimson patch with white centre at anal angle.

***Ramadasa pavo* (Walker, 1856)**

Chasmina pavo Walker 1856: 147

Material examined. Table 3; Figure 37

Remarks. Forewing with costa is having five blue-black spots and oblique medial line vinous suffusion on its outer edge. A black striga from costa to the reniform and a blue-black beyond it from the costa to vein 6 where it is bent outwards to the margin as a streak.

***Savara pallidapex* Holloway, 2005**

Material examined. Table 3; Figure 40

Remarks. This species was described as a new species by Holloway (2005) from Borneo. This species also occurs in N.E. Himalaya and New Guinea. A voucher

specimen is in the USNM. We have recorded as new in Western Ghats Tamil Nadu, India.

***Hypocala deflorata* (Fabricius, 1794)**

Hypocala angulipalpis Guenée 1852: 75.

Hypocala moorei Butler 1892: 21.

Hypocala australiae Butler 1892: 21.

Material examined. Table 3; Figure 3

Remarks. The listing of the name is valid based on Holloway (2005) and Kononenko and Pinratana (2005) classifications. This species differs from *Hypocala subsatura* based on the head, thorax and forewing paler colour. Hindwing with larger orange area.

***Hypocala biarcuata* Walker, 1858**

Material examined. Table 3.

Remarks. This species can be differentiated from other species based on the forewing and hind wing



Figures 33–38. Noctuid moths of Western Ghats. **33.** *Hypopyra vespertilio* (Erebinae). **34.** *Artena dotata* (Erebinae). **35.** *Bastilla joviana* (Erebinae). **36.** *Bastilla crameri* (Erebinae). **37.** *Ramadasa pavo* (Erebinae). **38.** *Phyllodes consobrina* (Erebinae).

markings. Forewing with a submarginal black line in the form of two curves touching the margin at apex, centre and outer angle. Hindwing orange with marginal black band broad at costa and narrowing to anal angle.

***Hypocala rostrata* (Fabricius, 1794)**

Hyblaea plumicornis Guenée, 1852: 75.

Hyblaea efflorescens Guenée, 1852: 77.

Hyblaea genuiai Wallengren, 1856: 66.

Hyblaea bohemani Wallengren, 1856: 67.

Material examined. Table 3.

Remarks. This species was superficially similar to *H. subsatura*. It can be distinguished by head and thorax being paler. Hindwing orange not conjoined to a large spot in end of cell and with marginal orange spot near anal angle.

***Hypocala guttiventris* (Walker, [1858])**

Hypocala lattivitta Walker 1865: 929.

Hypocala triphaenina Felder & Rogenhofer, 1874: 20.

Material examined. Table 3; Figure 5

Remarks. This species differs from *H. biarcuata* and synonym of *H. lattivitta*. The forewing is darker with large patches of grey suffusion on inner area and on costa before apex. Hindwing with a black cell-spot prominent on underside. The male genitalia with uncus broad fringed with hairs composed of a curved terminal lobe and having a subapical beak-like part.

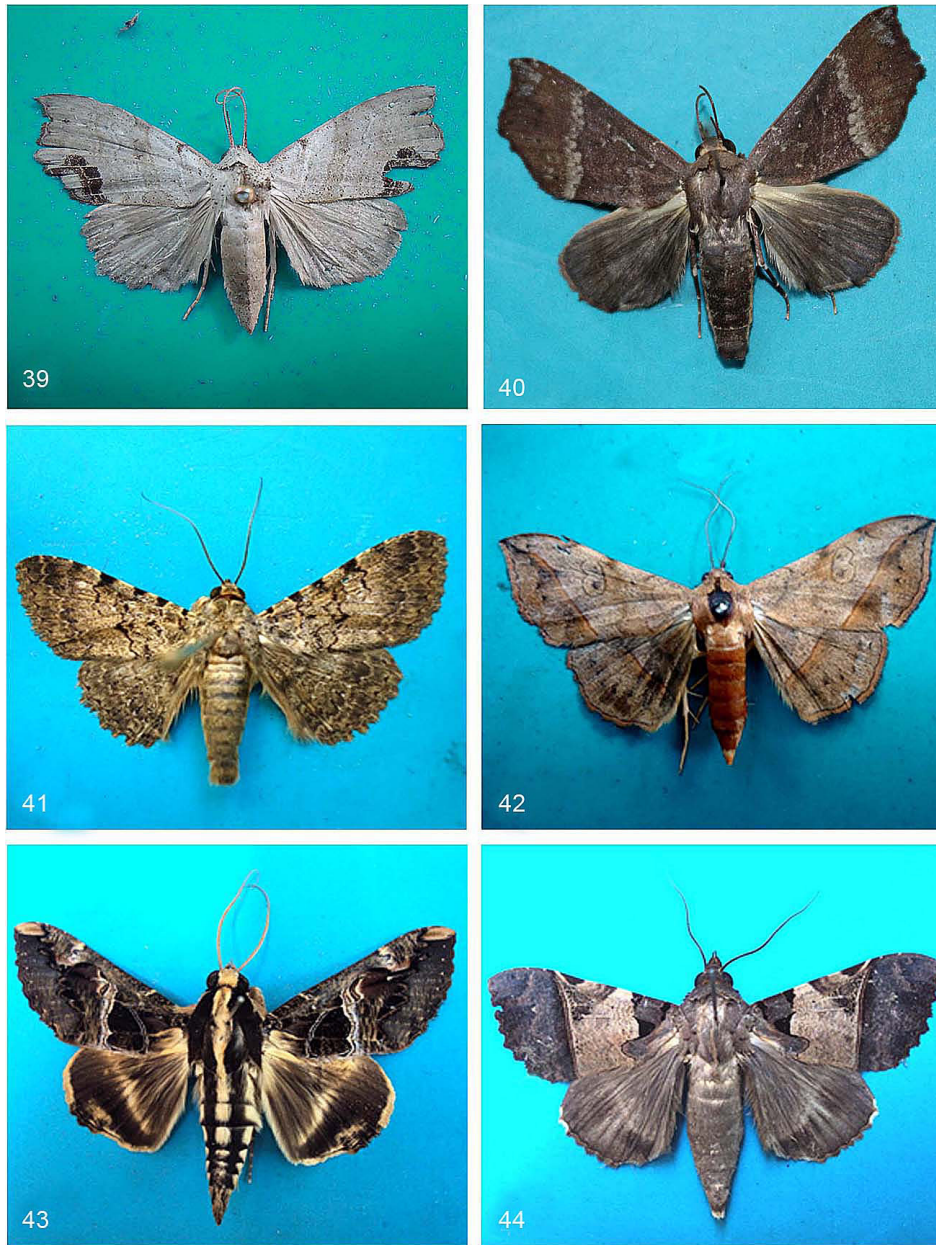
***Hypocala subsatura* (Guenée, 1852)**

Hypocala aspera Butler, 1883: 164.

Hypocala limbata Butler, 1889: 76.

Material examined. Table 3; Figure 4

Remarks. The classification was followed based on



Figures 39–44. Noctuid moths of Western Ghats. **39.** *Hyperlopha cristifera*. **40.** *Savara pallidapex* (Erebinae). **41.** *Ortopla boarmoides* (Erebinae). **42.** *Ortopla lindsayi* (Euteliinae). **43.** *Sphingomorpha chlorea*. **44.** *Serodes campana* (Erebinae).

Holloway (2005) and Kononenko and Pinratana (2005). The species occurs in Oriental region to Sundaland, the forewings are variable and with a distinct form that has an undulating red-brown border to the dorsum.

***Hypocala violacea* (Butler, 1879)**

Hypocala violacea Butler 1879: 6—Holloway, 1976: 35.

Hypocala clarissima Butler 1892: 21.

Hypocala kebeae Bethune-Baker 1906: 249.

Material examined. Table 3; Figure 6

Remarks. This species differs from *H. subsatura* its forewings which are uniform rufous and violet brown irrorated with dark specks. The forewing underside with black markings are reduced. The hindwing underside is broadly pale brown over the anterior half, with dark striae.

***Erebus macrops* (Linnaeus, 1768)**

Noctua bubo Fabricius 1775: 591.

Patula boopis Guenée, 1852: 178.

Material examined. Table 3; Figure 19

Remarks. The identification was followed by Holloway (2005). It can be distinguished from other species of group by its fulvous ocellus mark of the forewing which is very large and it is surrounded distally by three blue streaks and specks on it.

***Erebus ephesperis* (Hübner, [1823])**

Nyctipao laetitia Butler 1879: 9.

Erebus niasana Swinhoe 1918: 85.

Erebus malanga Swinhoe 1918: 86.

Material examined. Table 3.

Remarks. This species sexes are limited different, both sexes having an equally mottled brown pattern to the wings. However the males tend to be somewhat more intensely variegated with a deep buff distal edging to the medial line.



Figures 45–50. Noctuid moths of Western Ghats. **45.** *Chrysopera combinans* (Erebinae). **46.** *Avitta quadrilinea* (Focillinae). **47.** *Westermania superba* (Nolinae). **48.** *Chasmina candida* (Bagisarinae). **49.** *Callyna costiplaga* (Palindinae). **50.** *Trichosea champa* (Pantheinae).

***Erebus hieroglyphica* (Drury, 1773)**

Noctua harmonia Cramer [1777]: 119.

Noctua mygdonia Cramer [1777]: 119.

Noctua ulula Fabricius 1781: 211.

Bocana lunaris Walker 1866: 57.

Argiva hieroglyphica celebensis Hopffer 1874: 46.

Nyctipao hieroglyphica tenebrata Prout 1919: 170.

Material examined. Table 3.

Remarks. This species shows a strong sexual dimorphism. In male species both hindwing are reduced. Female forewing with oblique white bar on sub costal, a postmedial whitish band on forewing above vein 3.

***Avatha noctuoides* (Guenée, 1852)**

Hypaetra noctuoides Guenée 1852: 259.

Athyra ptocha Prout 1925: 402.

Material examined. Table 3; Figure 14

Remarks. This species is often mistaken for a form of *Avatha discolor*. *Athyra ptocha* is a new synonym of

A. noctuoides of Holloway (2005). Antemedial black area subdorsally connected with smaller black flecks on the costa of the forewing.

***Mocis frugalis* (Fabricius, 1775)**

Noctua frugalis Fabricius 1775: 601.

Chalciope lycopodia Geyer 1837: 25.

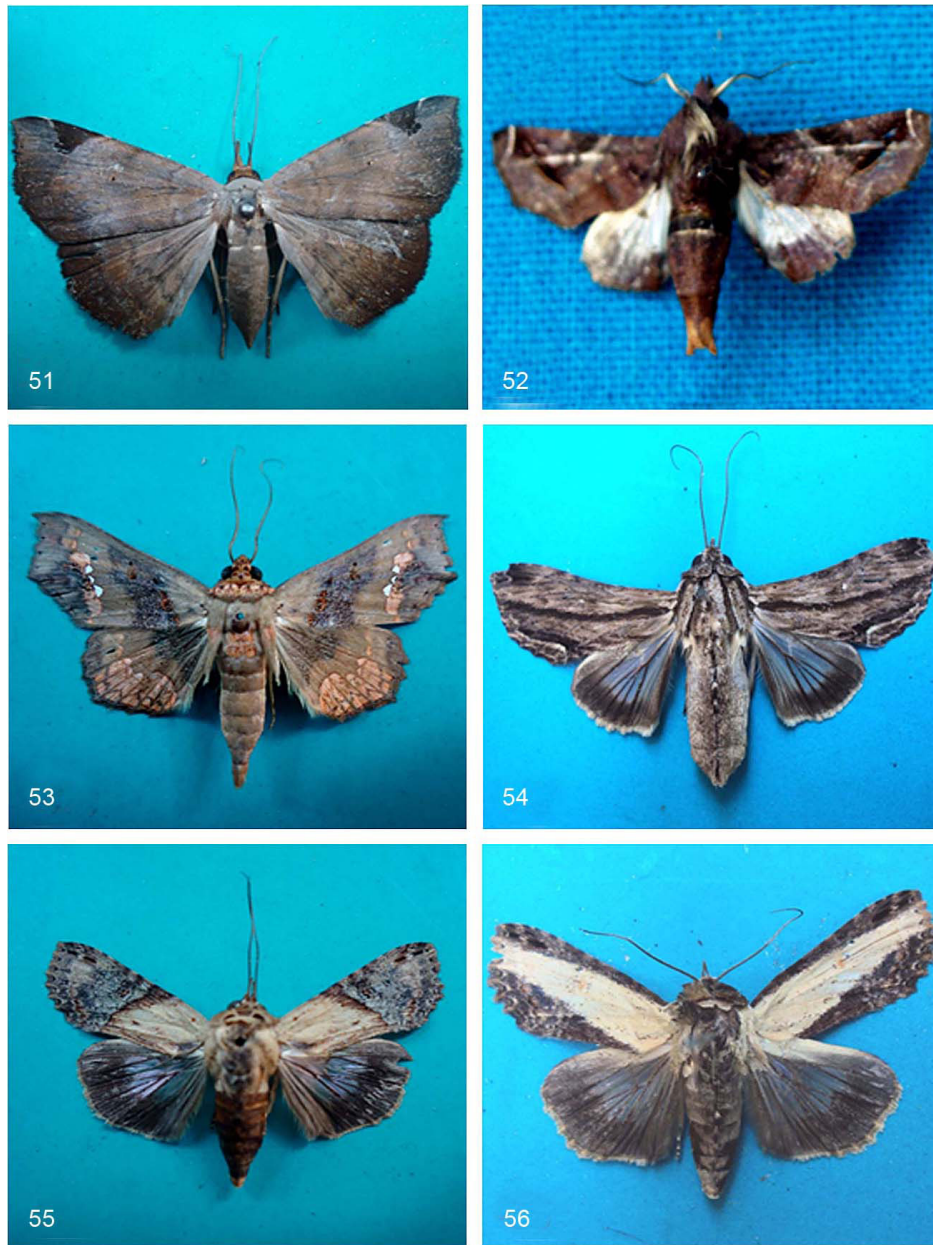
Remigia translata Walker 1865: 1015.

Remigia nigripunctata Warren 1913: 333.

Mocis frugalis Fabricius—Holloway 1976: 31; Kobes 1985: 49.

Material examined. Table 3; Figure 7

Remarks. This taxon was treated as two distinct species: Afrotropical *M. proverai* Zilli (2000); Indo-Australian *M. frugalis* and recognized the old concept of *M. frugalis* by Zilli (200b). The pale ochreous brown colour of both wings similar in *Trigonodes hyppasia* whereas lacking the black triangles. Male genitalia with uncus broad, harpe well developed.



Figures 51–56. Noctuid moths of Western Ghats. **51.** *Macodina pracipua* (Fociliinae). **52.** *Penicillaria jocosatrix* (Euteliinae). **53.** *Lopharthrum comprimens* (Focillinae). **54.** *Aegila describens* (Stictopterinae). **55.** *Stictoptera signifera* (Stictopterinae). **56.** *Stictoptera cuculloides* (Stictopterinae).

***Mocis undata* (Fabricius, 1775)**

Noctua undata Fabricius 1775: 600.
Phalaena archesia Cramer [1780]: 145.
Phalaena virbia Cramer [1780]: 146.
Remigia gregalis Guenée 1852: 320.
Ophisma velata Walker [1863]: 180.
Remigia bifasciata Walker 1865: 1014.
Cauninda bifasciata Warren 1913: 333.
Mocis undata Fabricius—Holloway 1976: 31; Kobes, 1985: 48.

Material examined. Table 3; Figure 8

Remarks. Forewing with anal of the antemedial containing a black spot in males. On the basis of variability in genital characters differ from *M. frugalis* based on male genitalia with uncus short and slender and harpe is not well developed.

***Ortopla lindsayi* (Hampson, 1891)**

Material examined. Table 3; Figure 42

Remarks. The species can be differentiated by male genitalia dissection. The uncus was short apically bifurcated. Valvae symmetrical in *Polydesma boarmoides*. Forewing with subbasal and antemedial lines are blackish.

***Ortopla boarmoides* Guenée, 1852**

Polydesma boarmoides Guenée 1852: 441.
Polydesma mastrucata Felder & Rogenhofer 1874: 111.

Material examined. Table 3; Figure 41

Remarks. This species is distinguished from *Ortopla lindsayi* based on male genitalia; the uncus was long and slender. Symmetrical of valve shape, the corona long and well developed sword-like.

***Ophiusa trapezium* (Guenée, 1852)**

Ophisma circumferens Walker 1865: 956.
Ophisma cognata Walker 1865: 958.
Ophiodes adusta Moore 1882: 169.

Ophiusa kebea Bethune-Baker 1906: 255.
Ophiusa trapezium Guenée—Kobes, 1985: 35.

Material examined. Table 3.

Remarks. Forewing fuscous grey irrorated with dark scales. A double prominent straight submarginal line and the area beyond it reddish suffused with purple with a dentate marginal line.

***Ophiusa discriminans* (Walker, 1858)**

Anua pygospila Snellen 1880: 98.
Anua intacta Hampson 1913: 437.
Anua discriminans Walker—Holloway 1976: 29.

Material examined. Table 3; Figure 22

Remarks. This species is similar to *Ophiusa disjunctus* but abdomen orange with a black dorsal patch near extremity. Hindwing with black band broad in *O. disjunctus* and narrow in *O. discriminans*.

***Ophiusa triphaenoides* (Walker, 1858)**

Ophiodes cuprea Moore, 1867: 74.
Ophiusa triphaenoides Walker—Kobes, 1985: 36.

Remarks. Material examined. Table 3; Figure 21

This species is similar to *Ophiusa trapezium* but smaller. Forewing with submarginal sinuous line pale angled outwards at vein 6, the angle filled in with black and with black above it.

***Ophiusa tirhaca* (Cramer, 1777)**

Noctua tirrhaca Fabricius 1781: 213.
Phalaena Noctua vesta Esper 1789: 445.
Noctua olivacea de Villers 1789: 65.
Noctua auricularis Hubner [1803]: 321.
Ophiodes hottentota Guenée 1852: 229.

Material examined. Table 3; Figure 23

Remarks. Forewing is greenish yellow and reniform brown. An irregularly dentate submarginal line with two black subapical lunules on it.

***Artena dotata* (Fabricius, 1794)**

Noctua dotata Fabricius 1794: 55.
Artena dotata Fabricius—Holloway, 1976: 29.

Material examined. Table 3; Figure 34

Remarks. This species was described from India, Sri Lanka and Burma. Forewing is having oblique postmedial and antemedial lines. Hindwing with a blue band in the center is strongly curved compared to other species.

***Thyas coronata* (Fabricius, 1775)**

Noctua leonina Fabricius 1775: 596.
Noctua ancilla Fabricius 1794: 17.
Corycia magica Hübner 1827: 32.
Ophiusa coronata Fabricius—Kobes, 1985: 36.

Material examined. Table 3.

Remarks. This species is transferred to genus *Thyas* by Holloway (2005). This species can be easily distinguish by its yellow hind wings with two black bands and black tinged yellow abdomen. Forewing is having reniform black or obscure.

***Thyas junio* (Dalman, 1823)**

Ophideres elegans Hoven 1840: 280.
Lagoptera multicolor Guenée 1852: 226.
Thyas bella Bremer & Grey 1853: 66.
Dermaleipa junio f. *renalis* Bryk 1948: 120.

Material examined. Table 3.

Remarks. This species is unique with crimson colour abdomen and hind wings. There is a submarginal broad black area.

***Achaea janata* (Linnaeus, 1758)**

Noctua melicerta Drury [1773]: 46.
Noctua tigrina Fabricius 1781: 218.
Catocala traversii Fereday 1877: 457.
Ophiusa ekeikei Bethune-Baker 1906: 256.
Achaea janata Linnaeus—Kobes, 1985: 39.

Material examined. Table 3.

Remarks. This species is slightly smaller than *Achaea serva* and *Achaea mezentia*. Hindwing with white medial band broader. Male genital structure the uncus is long and sickle shaped and valvae symmetrical.

***Achaea serva* (Fabricius, 1775)**

Noctua serva Fabricius 1775: 593.
Achaea fasciculipes Walker 1858: 1400.
Achaea serva fuscossuffusa Gaede 1938: 480.
Achaea serva Fabricius—Holloway 1976: 30, 1982: 235; Kobes 1985: 40.

Material examined. Table 3.

Remarks. This species forewing is usually more uniform pale brick-red, with marking indistinct. Male genitalia the uncus is broad not sickle shaped and valvae asymmetrical.

***Achaea mezentia* (Stoll, 1780)**

Achaea reversa Walker, 1858: 1399 .
Achaea lugens Walker 1865: 938.

Material examined. Table 3; Figure 13

Remarks. *Achaea reversa* is a synonym of *A. mezentia* according to Walker (1858). Hindwing is having black slightly shot with blue and with a large apical white patch.

***Bastilla crameri* (Moore, [1885])**

Dysgonia crameri Moore 1885: 177.
Phalaena (Noctua) achatina Cramer [1780]: 171.
Dysgonia discalis Moore 1885: 177.
Parallelia crameri Moore—Kobes, 1985: 45.

Material examined. Table 3; Figure 36

Remarks. Morphologically is very complicated group. Forewing with postmedial line having the white band reduced to a line and being slightly outlined with purplish grey from the angle to inner margin.

***Bastilla joviana* (Stoll, 1782)**

Noctua joviana Stoll 1782: 237.
Noctua sinuata Fabricius 1781: 507.
Parallelia joviana Stoll—Holloway 1976: 30.
Ophiusa myops Guenée 1852: 265.
Ophiusa affinis Guenée 1852: 265.

Material examined. Table 3; Figure 35

Remarks. This species slightly differs from *Bastilla arcuata*. Postmedial line with a wavy indented between the anal and inner margin and with some specks beyond it instead of dentate line.

***Bastilla amygdalis* Moore, [1885]**

Dysgonia amygdalis Moore [1885] 1884–1887: 551.
Parallelia amygdalis Moore—Kobes, 1985: 93.

Material examined. Table 3.

Remarks. Forewing with an antemedial line curved outwards below the cell and the apical streak with its outer edge sinuate, having three white specks on the costa before apex.

***Bastilla absentimacula* (Guenée, 1852)**

Parallela silvestris Strand 1920: 125.

Material examined. Table 3

Remarks. The forewing is much uniform in colour than *B. amygdalis* and *B. joviana*, and usually a violet brownish grey. The medial and postmedial lines are slightly darker and rather narrow, the peak in the postmedial at medial being rather thick.

***Pindara illibata* (Fabricius, 1775)**

Noctua illibata Fabricius 1775: 592.

Hemeroblemma peropaca Hübner 1825: 33.

Ophisma laetabilis Guenée 1852: 241.

Pindara illibata Fabricius—Holloway 1976: 30; Kobes 1985: 41.

Material examined. Table 3; Figure 11

Remarks. This taxon was reinstated as a valid species by Holloway (2005). A single species has been described from genus *Pindara*. The forewing has a large white edged semicircular, dark brown trapezoidal mark subapically at the costa.

***Chrysopera combinans* (Walker, 1858)**

Achaea combinans Walker 1857: 1399.

Achaea quadrilunata Pagenstecher 1890: 109.

Material examined. Table 3; Figure 45

Remarks. This name is original illustration because the species was synonymized with *Achaea quadrilunata*. The forewing has an apical ferruginous semicircular patch and hind wing having a large bright yellow apical patch.

***Chilkasa falcata* Swinhoe, 1885**

Pleuona perhamata Hampson 1894: 549.

Acygonia difformis Roepke 1948: 226.

Chilkasa falcata Swinhoe—Holloway, 1976: 38.

Material examined. Table 3; Figure 12

Remarks. The name is based on the description of the adult forewings. This species differs from *Pleuona falcata* based on morphology. The male forewing apex which is more produced and acute. Outer margin of hind wing is angled in the female, but not in the male.

***Hyperlopha cristifera* (Walker, 1865)**

Hyperlopha cristifera Walker sensu Holloway 1976: 38.

Material examined. Table 3; Figure 39

Remarks. This species resembles *Hyperlopha crucifera* in general fascia, even though is slightly larger. *H. crucifera* was described as a new species by Holloway (2005). He differentiated *H. cristifera* from *H. crucifera* based on the male genitalia. We have collected only female specimen of *H. cristifera*. More research is needed for this species.

Discussion

This study updates our knowledge of the moth fauna of the Western Ghats (Tamil Nadu, India) by providing

new records of Noctuoidea. In India, exhaustive works on the Noctuidae were carried out by Hampson (1894) and Swinhoe (1885). Hampson (1894, 1895) included 166 species in his classic works. Recently, Francy (2000) recorded 163 species from Kerala.

In our study area, the Erebidae is the most species-rich family, with 106 species belonging to 6 subfamilies. The Noctuidae is the second-most species-rich family, with 51 species belonging to 9 subfamilies. *Oxyodes scrobiculata* and *Lacera noctilio* were the erebid species with most records in the Western Ghats. The possible occurrence of *Hyperlopha cristifera* in our study should be investigated because this is a species that is typical to Sri Lanka.

The superfamily Noctuoidea encompasses the families Oenosandridae, Notodontidae, Erebidae, Noctuidae, Eutelidae, and Nolidae. The Western Ghats in Tamil Nadu support a higher number of taxa belonging to the family Erebidae compared to a checklist of moths of the state of Maharashtra, India (Sachin Gurule et al. 2011). This suggests that the Western Ghats in Tamil Nadu may favour high species diversity. This rich moth diversity in the Western Ghats highlights the need of protected areas, such as the Nilgiri Biosphere Reserve, in conserving the regional fauna.

Studies on the Noctuoidea of the southern part of the Western Ghats are very scanty. Given the variety of agro-forest ecosystems and environmental gradients found in the Western Ghats, we expect more species will be found with more fieldwork.

Acknowledgements

We are grateful to the Entomology Research Institute of Loyola College (Chennai, India) for financial support. We also thank Mr Kasthuri Rangan (Municipal Corporation of Kodaikanal) for the collection permit and Mr Thangaraj, a trekking guide, for his valuable help during insect collecting. We would like to extend our sincere gratitude to Dr Vernon Antoine Brou Jr (Abita Springs, Louisiana, USA) for his critical review of the first draft of the paper.

Authors' Contributions

KS collected and identified the specimens, made the analysis, and wrote the text; PM and SA were associated with KS in collecting the specimens; SI oversaw the draft manuscript and supervised the work.

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