



A PARTIAL CHECKLIST OF MOTHS (LEPIDOPTERA) OF DEHRADUN, MUSSOORIE AND DEVALSARI IN GARHWAL, UTTARAKHAND, INDIA

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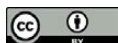
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Abstract: Two-hundred-and-forty-eight species of moths were recorded during surveys conducted over 40 nights in Dehradun and Mussoorie in Dehradun District and Devalsari in Tehri Garhwal District in Uttarakhand.

Keywords: Biodiversity, Erebiidae, Geometridae, range extension, western Himalaya.

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Author Contribution: YS conducted the initial field work, primarily in 2011 and 2012, surveyed and identified the moths, wrote the manuscript and prepared the tables, plates and figures. SS in addition to assisting in the initial surveys also conducted surveys in 2013 and 2014, identified the moths and reviewed the manuscript.

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INTRODUCTION

The moth diversity of Uttarakhand is poorly studied. Although Smetacek (1994, 2008, 2009, 2011) has studied moths in the Nainital District in Kumaon for more than 30 years, studies in Garhwal are limited. Roonwal et al. (1963) listed the Lepidoptera fauna in the entomological collection of the Forest Research Institute, which has numerous moth species collected from Garhwal. Arora et al. (1977) collected moths during a Swiss Expedition and listed 45 moth species. Arora (1997) also reported on moth surveys from Nanda Devi Biosphere Reserve. More recently, Sanyal et al. (2013) and Uniyal et al. (2013) studied the entomofauna of the Gangotri landscape, listing 468 moth species. The present study, conducted in Dehradun, Mussoorie and the surrounding areas, over a four-year period through systematic and opportunistic surveys, seeks to build further on the meagre published information of the moths of the Garhwal region.

MATERIALS AND METHODS

The partial checklist of moths presented in this paper is based on both systematic and opportunistic surveys that were conducted primarily in Dehradun, Mussoorie, and Devalsari over a period of four years, 2011–2014, with forty nights of survey covering all months except January and April (Table 2). Moths were not collected but were primarily identified using digital colour photographs.

The study sites (Table 1) for the systematic surveys were Malsi Range Colony, Danda Lokhand, Dhoran Khas and Welham Girls' School, in and around Dehradun City. In addition, moths were opportunistically surveyed within Rajaji National Park at the following sites: Chilla, Rasulpur and Asarodi. In Mussoorie, moths were surveyed at the Padmini Nivas Hotel, Jabberkhet and Bata Ghat near Woodstock School. All these locations are in the Dehradun District, Uttarakhand. Devalsari Reserved Forest, which is 50km from Mussoorie in Tehri Garhwal District, was also surveyed for moths. Other than Jabberkhet and Bata Ghat in Mussoorie, which were surveyed exclusively by day, all other localities were surveyed primarily at night using a 160W mercury vapour bulb and a white cloth screen, although there are several records from random sampling during the day from these locations. The study sites are shown in Fig. 1.

Available literature was used to identify moths, which included Moore (1882), Hampson (1892–1896), Bell & Scott (1937), Barlow (1982), Holloway (1983–

Table 1. Overview of survey sites

Study site	GPS coordinates	Altitude (m)
Dehradun		
Dhoran Khas	30°21'39.10"N & 78°4'58.67"E	794
Danda Lokhand	30°21'33.84"N & 78°5'32.28"E	802
Malsi	30°22'42.26"N & 78°4'5.00"E	824
Welham Girls School	30°18'55.40"N & 78°3'22.27"E	673
Rajaji		
Chilla	29°58'16.02"N & 78°12'40.11"E	328
Rasulpur	30°2'31.17"N & 77°57'47.06"E	333
Asarodi	30°14'19.24"N & 77°57'57.79"E	760
Mussoorie		
Padmini Nivas Hotel	30°27'32.16"N & 78°4'4.64"E	1989
Jabberkhet	30°27'14.19"N & 78°6'40.03"E	2105
Bata Ghat	30°27'18.86"N & 78°5'59.42"E	2060
Devalsari Reserved Forest	30°32'43.92"N & 78°11'34.44"E	1725

Table 2. Overview of survey effort and species identified

Area	Seasons	No. survey nights	Number of moth species identified
Dhoran Khas	February, March, May, June, July, August, September, December	20	103
Danda Lokhand	June, July	4	58
Malsi	July	4	71
Welham Girls	July, November	5	13
Rajaji	March, October, November	3	36
Mussoorie	July, September	2	63
Devalsari	October	2	17
Total		40	248

2011), Haruta (1992–2000), Pinratana & Lampe (1990), Robinson et al. (1994), Inoue et al. (1996), Allen (1993), Kendrick (2002), Kononenko & Pinratana (2005), Zolotuhin & Pinratana (2005), Schintlmeister & Pinratana (2007), and Pinratana & Cerny (2009). The classification system used by van Nieukerken et al. (2011) has been followed. Many moth species need examination of genitalia for confirmation of their identity; hence species identities that could not be confirmed only through photographs, have been provisionally identified.

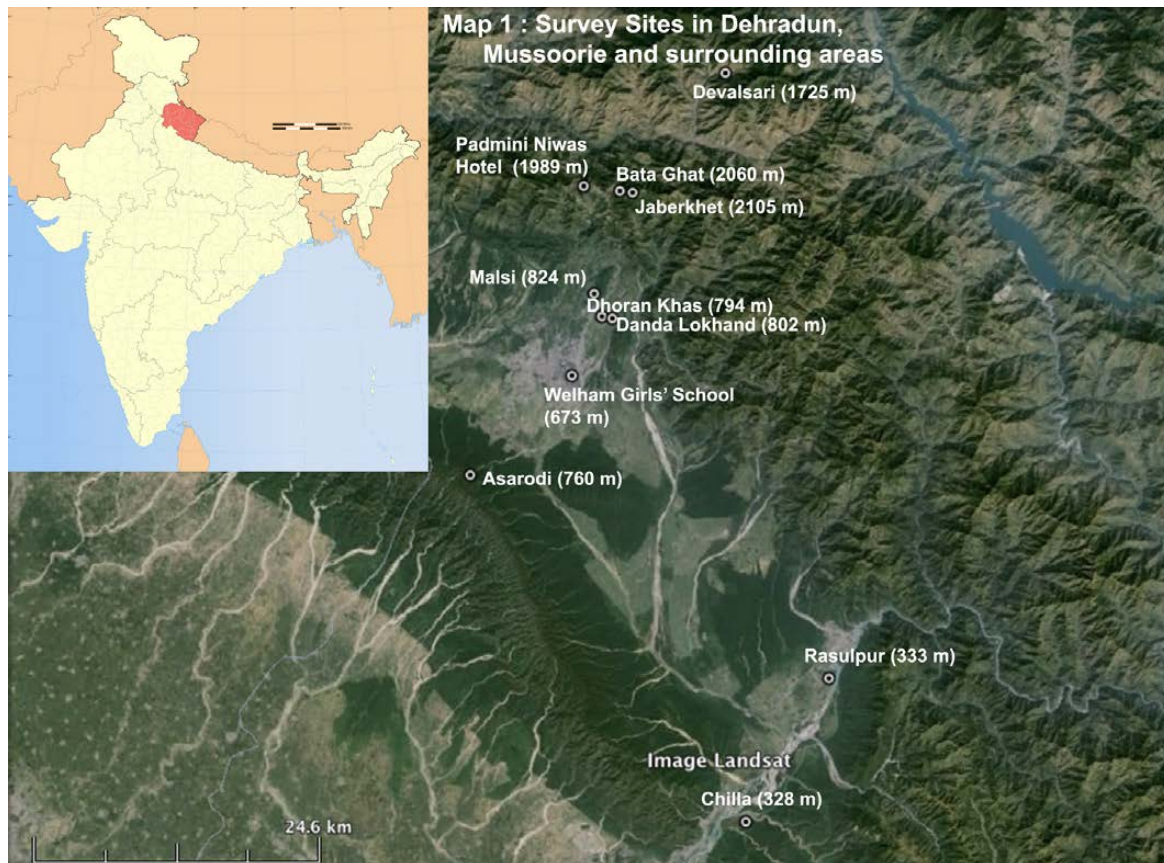


Figure 1. Study sites and surrounding areas

RESULTS AND DISCUSSION

During the study, 215 moth species were identified to the species level and another 33 to genus level (Table 3, Images 1–250). All moths in the checklist are illustrated in Images 1–250. All the photographs were taken by the two authors. Moths from the families Geometridae, Erebidae and Crambidae were the most numerous (Table 4). Some interesting records made during the survey, which are range extensions, are discussed below.

YS recorded the sphingid, *Theretra griseomarginata* (Hampson, 1898), from Malsi, Dehradun on 1 July 2011. The known distribution of this species is Kumaon eastwards through Nepal and northeast India (Bell 1937; Allen 1993; Smetacek 2008). There is no record of this species from Garhwal Himalaya in the Forest Research Institute collection (Roonwal et al. 1963). This represents the westernmost record for this species, extending its known range by over 200km, and is the first record from Garhwal Himalaya.

On 2 October 2014, SS recorded *Corymica deducta caustolomaria* form *wirthi* (Walker, 1866) at Devalsari Forest Rest House. This form was described from Kumaon

(Smetacek 2004). This species extends eastwards to eastern Himalaya (Sikkim) and hills of northeast India (Khasi Hills, Meghalaya). It has also been recorded from Kerala (Hampson 1895). This is the first record of this species and form from Garhwal Himalaya.

YS recorded a male *Macotasa tortricoides* (Walker, 1862) from Malsi on 22 June 2011. SS recorded the same species from Rajaji on 1 November 2011. The male is very different from other species in the genus. *M. costalis* is the only species known from this region (Pinratana & Cerny 2009). Originally a Bornean endemic, this is the second published record for India, the only other record being from Goa (Singh et al. 2013).

YS recorded *Teulisna protuberans* (Moore, 1878) on 29 June 2011 from Danda Lokhand. The current Indian distribution is Sikkim, Arunachal Pradesh and West Bengal (Singh et al. 2014); it is also known from Bhutan and Thailand (Pinratana & Cerny 2009). Previously, the only known species of this genus from northern India was *T. nebulosa*, which has very different forewing markings. This is the first record of this moth from western Himalaya and is a significant range extension.

SS recorded *Anaplectoides* cf. *tamsi* (Boursin, 1955)

Table 3. Partial checklist of moths recorded

	Family	Subfamily	Scientific name	Author & Year of description	¹ Location	² Months observed
1	Eupterotidae	Eupterotinae	<i>Eupterote bifasciata</i>	Kishida, 1994	DL	vii
2	Eupterotidae	Eupterotinae	<i>Eupterote undata</i> form <i>sinuata</i>	Blanchard, 1844	DK,DL,MA,WG	vi,vii
3	Eupterotidae	Eupterotinae	<i>Ganisa plana</i>	Walker, 1855	DK,MA	vi-vii
4	Brahmaeidae	-	<i>Brahmaea hearseyi</i>	White, 1861	DL	vi
5	Saturniidae	-	<i>Actias selene</i>	Hübner, 1807	DK	iii
6	Saturniidae	-	<i>Loepa katinka</i>	Westwood, 1848	DL	vii
7	Saturniidae	-	<i>Samia canningi</i>	Hutton, 1859	DK	vii
8	Sphingidae	Macroglossinae	<i>Eupanacra mydon</i>	Walker, 1856	DK	x
9	Sphingidae	Macroglossinae	<i>Hippotion celerio</i>	Linnaeus, 1758	DK	v
10	Sphingidae	Macroglossinae	<i>Macroglossum belis</i>	Linnaeus, 1758	DK	viii
11	Sphingidae	Macroglossinae	<i>Nephele hespera</i>	Fabricius, 1775	DK	v,vii
12	Sphingidae	Macroglossinae	<i>Rhagastis castor</i>	Walker, 1856	MU	viii
13	Sphingidae	Macroglossinae	<i>Theretra alecto</i>	Linnaeus, 1758	DK	v
14	Sphingidae	Macroglossinae	<i>Theretra griseomarginata*</i>	Hampson, 1898	MA	vii
15	Sphingidae	Smerinthinae	<i>Ambulyx liturata</i>	Butler, 1875	DL	vii
16	Sphingidae	Smerinthinae	<i>Cypa pallens</i>	Jordan, 1926	DK	v
17	Sphingidae	Sphinginae	<i>Agrius convolvuli</i>	Linnaeus, 1758	DK	v
18	Callidulidae	-	<i>Callidula erycinoides</i>	Felder, 1874	MU	x
19	Cossidae	-	<i>Zeuzera coffeae</i>	Nietner, 1861	RA	iii
20	Drepanidae	Drepaninae	<i>Auzata semipavonaria</i>	Walker, 1862	DV	x
21	Drepanidae	Drepaninae	<i>Deroca</i> cf. <i>hyalina</i>	Walker, 1855	DV,MU	viii-ix
22	Drepanidae	Drepaninae	<i>Deroca</i> cf. <i>hidda bifida</i>	Watson, 1957	DV,MU	x
23	Drepanidae	Drepaninae	<i>Macrocilix mysticata</i>	Walker 1863	MU	viii
24	Drepanidae	Drepaninae	<i>Nordstromia lilacina</i>	Moore, 1888	MU	viii
25	Drepanidae	Drepaninae	<i>Oreta extensa suffusa</i>	Walker, 1855	DV	x
26	Drepanidae	Drepaninae	<i>Oreta vatama</i>	Moore, 1866	DV	x
27	Drepanidae	Drepaninae	<i>Teldenia vestigiata</i>	Butler, 1880	MU	viii
28	Drepanidae	Drepaninae	<i>Tridrepana</i> cf. <i>albonotata</i>	Moore, 1879	RA	xi
29	Drepanidae	Thyatirinae	<i>Euparyphasma cinereofusca</i>	Prout, 1921	MU	vii
30	Drepanidae	Thyatirinae	<i>Thyatira batis</i>	Linnaeus, 1758	MU	viii
31	Geometridae	Ennominae	<i>Anonychia diversilinea</i>	Warren, 1897	DV	x
32	Geometridae	Ennominae	<i>Biston</i> sp.		DK	vii
33	Geometridae	Ennominae	<i>Biston suppressaria</i>	Guenée, 1858	DK,RA	iii,vi
34	Geometridae	Ennominae	<i>Boarmia</i> sp.		MA	vii
35	Geometridae	Ennominae	<i>Cassyma deletaria</i>	Moore, 1888	MU	viii
36	Geometridae	Ennominae	<i>Chiasmia</i> cf. <i>nora</i>	Walker, 1861	DL,MA	vi-vii
37	Geometridae	Ennominae	<i>Chiasmia</i> cf. <i>xanthonora</i>	Walker, 1861	DL	vi-vii
38	Geometridae	Ennominae	<i>Chiasmia eleonora</i>	Hübner, 1818	DK,DL,MA	vii
39	Geometridae	Ennominae	<i>Corymica deducta caustolomaria</i> form <i>wirthi*</i>	Walker, 1860	DV	x
40	Geometridae	Ennominae	<i>Dalima patularia</i>	Walker, 1860	DV,MU	viii-ix
41	Geometridae	Ennominae	<i>Ectropidia shoreae</i>	Prout, 1934	DK,DL	vi-vii
42	Geometridae	Ennominae	<i>Fascellina chromataria</i>	Walker, 1860	MA,MU	vii
43	Geometridae	Ennominae	<i>Fascellina plagiata</i>	Walker, 1860	DV	x
44	Geometridae	Ennominae	<i>Gasterocome pannosaria</i>	Moore, 1867	MU	vii

	Family	Subfamily	Scientific name	Author & Year of description	¹ Location	² Months observed
45	Geometridae	Ennominae	<i>Heterolochoa</i> sp.		MU	ix
46	Geometridae	Ennominae	<i>Heterostegane</i> cf. <i>urbica urbica</i>	Swinhoe, 1895	DK,DL,MA	vi-viii
47	Geometridae	Ennominae	<i>Heterostegane subtessellata</i>	Walker, 1863	DK	vii
48	Geometridae	Ennominae	<i>Hyperythra lutea</i>	Stoll, 1781	DL,MU	vii
49	Geometridae	Ennominae	<i>Hypomecis transcissa</i>	Walker, 1866	DK	v
50	Geometridae	Ennominae	<i>Hyposidra talaca</i>	Walker, 1860	DK,DL,MA,WG	vi-vii
51	Geometridae	Ennominae	<i>Krananda semihyalina</i>	Walker, 1868	DV	x
52	Geometridae	Ennominae	<i>Leptomiza calcearia</i>	Walker, 1860	MU	ix
53	Geometridae	Ennominae	<i>Medasina</i> cf. <i>albidaria</i>	Walker, 1866	MU	viii
54	Geometridae	Ennominae	<i>Menophra subplagiata</i>	Walker, 1860	MU	viii
55	Geometridae	Ennominae	<i>Myrioblephara albibasis</i>	Hampson, 1895	MU	viii
56	Geometridae	Ennominae	<i>Opisthograptis</i> cf. <i>mimulina</i>	Butler, 1886	DV	x
57	Geometridae	Ennominae	<i>Opisthograptis moelleri</i>	Warren, 1893	DV	x
58	Geometridae	Ennominae	<i>Ourapteryx clara</i>	Matsumura, 1910	MU	vii
59	Geometridae	Ennominae	<i>Ozola sinuicosta</i>	Prout, 1910	DL	vii
60	Geometridae	Ennominae	<i>Pachyodes</i> cf. <i>erionoma</i>	Swinhoe, 1893	MU	viii
61	Geometridae	Ennominae	<i>Parapholodes fuliginea</i>	Hampson, 1891	DK	x
62	Geometridae	Ennominae	<i>Percnia belluaria</i>	Guenée, 1858	DV	x
63	Geometridae	Ennominae	<i>Percnia maculata</i>	Moore, 1867	DV	x
64	Geometridae	Ennominae	<i>Petelia</i> cf. <i>immaculata</i>	Hampson, 1893	DK	vii
65	Geometridae	Ennominae	<i>Pingasa</i> cf. <i>pseudoterpnaria</i>	Guenée, 1858	DK	vi
66	Geometridae	Ennominae	<i>Psyra angulifera</i>	Walker, 1867	DV	x
67	Geometridae	Ennominae	<i>Thinopteryx crocoptera</i>	Kollar, 1844	MU	vii
68	Geometridae	Ennominae	<i>Thinopteryx nebulosa</i>	Butler, 1883	MU	viii
69	Geometridae	Ennominae	<i>Xandrames dholaria</i>	Moore, 1868	DV	x
70	Geometridae	Ennominae	<i>Zamarada</i> sp.		DL,DK,MU,RA	vi-viii,xi
71	Geometridae	Geometrinae	<i>Comibaena cassidara</i>	Guenée, 1857	DK	v
72	Geometridae	Geometrinae	<i>Hemithea</i> cf. <i>constipunctata</i>	Moore, 1867	DK,DV, MA	vi-vii,x
73	Geometridae	Geometrinae	<i>Hemithea ochrolauta</i>	Warren, 1894	MU	viii
74	Geometridae	Geometrinae	<i>Mixochlora vittata</i>	Moore, 1867	MU	x
75	Geometridae	Geometrinae	<i>Ornithospila avicularia</i>	Guenée, 1857	RA,DK, MA	vi,xi
76	Geometridae	Geometrinae	<i>Prasinocyma near delicata</i>	Warren, 1912	MA	vi
77	Geometridae	Geometrinae	<i>Protulioenemis biplagiata</i>	Moore, 1887	DK	vii
78	Geometridae	Geometrinae	<i>Tanaorhinus reciprocatus confuciaris</i>	Walker, 1861	MU	vii
79	Geometridae	Geometrinae	<i>Thalassodes</i> cf. <i>veraria</i>	Guenée, 1857	DK,DK, MU	vi-vii
80	Geometridae	Larentiinae	<i>Ecliptopera triangulifera</i>	Moore, 1888	MU	viii
81	Geometridae	Larentiinae	<i>Electrophaes</i> cf. <i>fulgidaria</i>	Leech, 1897	RA	xi
82	Geometridae	Oenochrominae	<i>Eumelia rosalia</i>	Stoll, 1781	RA	x
83	Geometridae	Sterrhinae	<i>Problepsis vulgaris</i>	Butler, 1889	DK,DL	v,vii
84	Geometridae	Sterrhinae	<i>Rhodometra sacraria</i>	Linnaeus, 1767	DK, DL, MA	vi-vii
85	Geometridae	Sterrhinae	<i>Scopula</i> sp.		MA, MU	vi-vii
86	Geometridae	Sterrhinae	<i>Somatina</i> cf. <i>plynusaria</i>	Walker, 1862	DK	vii
87	Geometridae	Sterrhinae	<i>Timandra correspondens</i>	Hampson, 1895	DV	x
88	Geometridae	Sterrhinae	<i>Traminda mundissima</i>	Walker, 1861	DL, MU,WG	vii
89	Uraniidae	Epipleminae	<i>Epiplema bicaudata</i>	Moore, 1867	MU	vii

	Family	Subfamily	Scientific name	Author & Year of description	¹ Location	² Months observed
90	Lasiocampidae	-	<i>Gastropacha</i> sp.		DK	ii
91	Lasiocampidae	-	<i>Syrastrena minor</i>	Moore, 1879	MA	vi
92	Lasiocampidae	-	<i>Trabala vishnou</i>	Lefèbvre, 1827	DK, DV	iii,x
93	Lasiocampidae	-	<i>Kunugia</i> cf. <i>lattipennis</i>	Walker, 1855	MA	vi
94	Erebidae	Aganainae	<i>Asota caricae</i>	Fabricius, 1775	DK, DL, MA, RA, WG	iii,vi-vii
95	Erebidae	Aganainae	<i>Asota ficus</i>	Fabricius, 1775	DK, MU	iii,vii
96	Erebidae	Agarastinae	<i>Episteme adulatrix</i>	Kollar, 1844	DK	ix
97	Erebidae	Arctiinae	<i>Aemene</i> sp.		DK, DL	vi
98	Erebidae	Arctiinae	<i>Alphaea imbuta</i>	Walker, 1855	MU	vii
99	Erebidae	Arctiinae	<i>Amata cyseus</i>	Stoll, 1782	DK	iii
100	Erebidae	Arctiinae	<i>Areas galactina</i>	Hoeven, 1840	DK,DL,MA	vi-vii
101	Erebidae	Arctiinae	<i>Argina argus</i>	Kollar, 1844	DK	ii-iii
102	Erebidae	Arctiinae	<i>Asura dasara</i>	Moore, 1859	DK,DL,DV,MU	vi-vii,x
103	Erebidae	Arctiinae	<i>Barsine dharmia</i>	Moore, 1879	DL,MU,DK	vii
104	Erebidae	Arctiinae	<i>Asura nubifascia</i>	Walker, 1865	MU,DV	vii,ix,x
105	Erebidae	Arctiinae	<i>Barsine</i> cf. <i>maculifasciata</i>	Hampson, 1894	MA	vii
106	Erebidae	Arctiinae	<i>Barsine linga</i>	Moore, 1859	DK,MU	vi-viii
107	Erebidae	Arctiinae	<i>Barsine orientalis bigamica</i>	Cerny, 2009	DK,DL,DV,MA	vi-vii,x
108	Erebidae	Arctiinae	<i>Chrysorabdia biridana</i>	Walker, 1864	DV	x
109	Erebidae	Arctiinae	<i>Chrysorabdia bivitta</i>	Walker, 1856	DV,MU	viii,x
110	Erebidae	Arctiinae	<i>Creatonotos gangis</i>	Linnaeus, 1763	DK,DL,MA	iii, vii
111	Erebidae	Arctiinae	<i>Creatonotos transiens</i>	Walker, 1855	DK,DL,MA, WG	vi-vii
112	Erebidae	Arctiinae	<i>Cyana arama</i>	Moore, 1859	DV,MU	ix-x
113	Erebidae	Arctiinae	<i>Cyana coccinea</i>	Moore, 1878	DK,MA,RA	vi-vii,x-xi
114	Erebidae	Arctiinae	<i>Cyana</i> cf. <i>distincta babui</i>	Kishida, 1993	MU	viii
115	Erebidae	Arctiinae	<i>Cyana</i> cf. <i>guttifera</i>	Walker, 1856	DK,MA	vii
116	Erebidae	Arctiinae	<i>Cyana detrita</i>	Walker, 1854	MU	xi
117	Erebidae	Arctiinae	<i>Cyana gelida</i>	Walker, 1854	DL,MA	vi
118	Erebidae	Arctiinae	<i>Cyana puella</i>	Drury, 1773	DL, MU,DK	vi-viii
119	Erebidae	Arctiinae	<i>Eilema</i> cf. <i>costalis</i>	Moore, 1878	DK,MA	vii
120	Erebidae	Arctiinae	<i>Eilema</i> cf. <i>calamaria</i> .	Moore, 1878	DL, DK	vii
121	Erebidae	Arctiinae	<i>Eilema</i> sp.1		DL,DK	vi-vii
122	Erebidae	Arctiinae	<i>Eilema</i> sp.2		MU	vii
123	Erebidae	Arctiinae	<i>Eressa confinis</i>	Walker, 1854	DK	vi
124	Erebidae	Arctiinae	<i>Lemyra</i> sp.		DK,MA	vi
125	Erebidae	Arctiinae	<i>Lyclene</i> cf. <i>obsoleta</i>	Moore, 1878	MA	vi
126	Erebidae	Arctiinae	<i>Lyclene euprepoides</i>	Walker, 1862	DK	v
127	Erebidae	Arctiinae	<i>Lyclene</i> sp.		DK,MA	vi-vii
128	Erebidae	Arctiinae	<i>Machrobrachis gigas</i>	Walker, 1854	DK	vi
129	Erebidae	Arctiinae	<i>Machrobrachis prasena</i>	Moore, 1859	DL,MA	vi-vii
130	Erebidae	Arctiinae	<i>Macotasa tortricoides</i> *	Walker, 1862	MA,RA	vi,xi
131	Erebidae	Arctiinae	<i>Olepa ricini</i>	Fabricius, 1775	WG,DK	vii
132	Erebidae	Arctiinae	<i>Pangora distorta</i>	Moore, 1879	DK	vii
133	Erebidae	Arctiinae	<i>Rajendra perrotteti</i>	Guérin-Ménéville, 1844	DK	vi

	Family	Subfamily	Scientific name	Author & Year of description	¹ Location	² Months observed
134	Erebidae	Arctiinae	<i>Sidyra albifinis</i>	Walker, 1856	MU	vii
135	Erebidae	Arctiinae	<i>Spilosoma multiguttata</i>	Walker, 1855	MU	vii
136	Erebidae	Arctiinae	<i>Spilosoma</i> sp.1		DL,MA,MU	vi
137	Erebidae	Arctiinae	<i>Spilosoma</i> sp.2		MA	vii
138	Erebidae	Arctiinae	<i>Syntomoides imaon</i>	Cramer, 1780	DK,DV,MA,RA,WG	iii,vi,viii,x,xi
139	Erebidae	Arctiinae	<i>Teulisna</i> cf. <i>protuberans</i> *	Moore, 1878	DL	vi
140	Erebidae	Arctiinae	<i>Trichaeta teneiformis</i>	Walker, 1856	MU	viii
141	Erebidae	Arctiinae	<i>Utethesia lotrix</i>	Cramer, 1777	DK	xii
142	Erebidae	Arctiinae	<i>Vamuna remelana</i>	Moore, 1865	DV,MU	ix,x
143	Erebidae	Arctiinae	<i>Vamuna virilis</i>	Rothschild, 1913	DV	x
144	Erebidae	Aventiinae	<i>Zurobata</i> sp. 1		MA	vi
145	Erebidae	Aventiinae	<i>Zurobata</i> sp. 2		MA	vi
146	Erebidae	Aventiinae	<i>Zurobata</i> sp. 3		DK	xi
147	Erebidae	Calpinae	<i>Dierna strigata</i>	Moore, 1867	DK	vii
148	Erebidae	Calpinae	<i>Diomea lignicolora</i>	Walker, 1857	DL	vii
149	Erebidae	Calpinae	<i>Oraesia</i> cf. <i>emarginata</i>	Fabricius, 1794	RA	xi
150	Erebidae	Calpinae	<i>Calyptra</i> cf. <i>parva</i>	Bänziger, 1979	MA	vii
151	Erebidae	Erebinae	<i>Achaea janata</i>	Linnaeus, 1758	DK	viii-ix
152	Erebidae	Erebinae	<i>Artena dotata</i>	Fabricius, 1794	MU	viii
153	Erebidae	Erebinae	<i>Dysgonia stuposa</i>	Fabricius, 1794	DL,MA	vi
154	Erebidae	Erebinae	<i>Erebus caprimulgus</i>	Fabricius, 1775	DK	vii
155	Erebidae	Erebinae	<i>Erebus hieroglyphica</i>	Drury, 1773	DK	xi
156	Erebidae	Erebinae	<i>Fodina</i> cf. <i>stola</i>	Guenée, 1852	DL	vi
157	Erebidae	Erebinae	<i>Fodina pallula</i>	Guenée, 1852	DL	vi
158	Erebidae	Erebinae	<i>Lygniodes hypoleuca</i>	Guenée, 1852	DK	v
159	Erebidae	Erebinae	<i>Mocis undata</i>	Fabricius, 1775	DK	iii
160	Erebidae	Erebinae	<i>Ophiusa coronata</i>	Fabricius, 1775	DK	vii-viii
161	Erebidae	Erebinae	<i>Ophiusa tirhaca</i>	Cramer, 1777	MU	viii
162	Erebidae	Erebinae	<i>Spirama</i> cf. <i>retorta</i>	Clerck, 1759	DK	v
163	Erebidae	Erebinae	<i>Thyas juno</i>	Dalman, 1823	MU	viii
164	Erebidae	Erebinae	<i>Trigonodes hyppasia</i>	Cramer, 1779	DK	xii
165	Erebidae	Hypeninae	<i>Hypena</i> cf. <i>iconicalis</i>	Walker, 1859	DL	vii
166	Erebidae	Hypeninae	<i>Hypena quadralis</i>	Walker, 1859	DL,DK	viii
167	Erebidae	Hypeninae	<i>Hypena</i> sp.		MA	vii
168	Erebidae	Lymantriinae	<i>Arctornis</i> sp. 1		MA,RA	vii,xi
169	Erebidae	Lymantriinae	<i>Arctornis</i> sp. 2		DV,MA	vii,x
170	Erebidae	Lymantriinae	<i>Arctornis-l-nigrum</i>	Müller, 1794	MA	vii
171	Erebidae	Lymantriinae	<i>Artaxa diagramma</i>	Boisduval, 1844	DK,DL,MA	vi
172	Erebidae	Lymantriinae	<i>Artaxa guttata</i>	Walker, 1855	DL,MA,WG	vii
173	Erebidae	Lymantriinae	<i>Dasychira</i> sp.		DL,MA	vii
174	Erebidae	Lymantriinae	<i>Euproctis</i> cf. <i>lunata</i>	Walker, 1855	DK	vi
175	Erebidae	Lymantriinae	<i>Euproctis</i> cf. <i>vitellina</i>	Kollar, 1848	MA	vii
176	Erebidae	Lymantriinae	<i>Euproctis plagiata</i>	Walker, 1855	MA	vii
177	Erebidae	Lymantriinae	<i>Euproctis</i> sp. 1		DL,WG	vi-vii

	Family	Subfamily	Scientific name	Author & Year of description	¹ Location	² Months observed
178	Erebidae	Lymantriinae	<i>Euproctis</i> sp. 2		DL,WG,MA	vi-vii
179	Erebidae	Lymantriinae	<i>Himala argentea</i>	Walker, 1855	DV	x
180	Erebidae	Lymantriinae	<i>Lymantria</i> cf. <i>concolor</i>	Walker, 1855	DK,DV,RA	vi,x-xi
181	Erebidae	Lymantriinae	<i>Lymantria mathura</i>	Moore, 1856	DK,DV	v,x
182	Erebidae	Lymantriinae	<i>Lymantria obsoleta</i>	Walker, 1855	MA	vii
183	Erebidae	Lymantriinae	<i>Lymantria</i> sp.		MA	vii
184	Erebidae	Lymantriinae	<i>Lymantria semicineta</i>	Walker, 1855	MA	vii
185	Erebidae	Lymantriinae	<i>Lymantriades</i> cf. <i>varians</i>	Walker, 1855	WG	vii
186	Erebidae	Lymantriinae	<i>Orgyia</i> cf. <i>postica</i>	Walker, 1855	DL,WG	vi-vii
187	Erebidae	Lymantriinae	<i>Somena</i> cf. <i>scintillans</i>	Walker, 1856	DL	vii
188	Erebidae	Lymantriinae	<i>Varmina indica</i>	Walker, 1853	MU	vii
189	Erebidae	Scoliopteryginae	<i>Anomis flava</i>	Fabricius, 1775	MA	vii
190	Euteliidae	Euteliinae	<i>Eutelia adaltracoides</i>	Mell, 1943	MU	ix
191	Noctuidae	Aediinae	<i>Aedia</i> sp.		DK,DL	vii
192	Noctuidae	Amphipyriinae	<i>Callopietria</i> cf. <i>indica</i>	Butler, 1891	MA	vii
193	Noctuidae	Amphipyriinae	<i>Callyna jugaria</i>	Walker, 1858	DL	vii
194	Noctuidae	Amphipyriinae	<i>Callyna monoleuca</i>	Walker, 1858	MA	vii
195	Noctuidae	Amphipyriinae	<i>Chasmina judicata</i>	Walker, 1858	DK	vii
196	Noctuidae	Amphipyriinae	<i>Elaphria</i> cf. <i>conjugata</i>	Moore, 1881	MA	vii
197	Noctuidae	Condicinae	<i>Bagada pyrochroma</i>	Walker, 1858	DL,DK	vii
198	Noctuidae	Noctuinae	<i>Anaplectoides</i> cf. <i>tamsi</i> *	Dierl, 1983	DV	x
199	Noctuidae	Plusiinae	<i>Macdunnoughia tetragona</i>	Walker, 1857	DL	vii
200	Noctuidae	Plusiinae	<i>Erythroplusia</i> sp.		DL	vii
201	Noctuidae	Plusiinae	<i>Thysanoplusia intermixta</i>	Warren, 1913	DK	iii
202	Noctuidae	Plusiinae	<i>Thysanoplusia orichalcea</i>	Fabricius, 1775	DV,MU	v,x
203	Pyalidae	Pyalinae	<i>Endotricha olivacealis</i>	Bremer, 1864	MA	vii
204	Pyalidae	Pyalinae	<i>Tamaraca torridalis</i>	Lederer, 1863	DK	vi
205	Pyalidae	Pyalinae	<i>Xitha tactilis</i>	Swinhoe, 1890	DK,MA	vi
206	Crambidae	Acentropinae	<i>Eoophyla</i> cf. <i>peribocalis</i>	Walker, 1859	DK,DL,MA, RA,WG	vii
207	Crambidae	Acentropinae	<i>Eoophyla</i> sp.		DL	vi
208	Crambidae	Acentropinae	<i>Paracymoriza vagalis</i>	Speidel, 1984	DK,DL,MA	vi-vii
209	Crambidae	Spilomelinae	<i>Agathodes ostentalis</i>	Geyer, 1837	MU	viii
210	Crambidae	Spilomelinae	<i>Bradina diagonalis</i>	Guenée, 1854	MA	vi,vii
211	Crambidae	Spilomelinae	<i>Chabula acamasalis</i>	Walker 1859	DK	vii
212	Crambidae	Spilomelinae	<i>Cirrhochrista brizoalis</i>	Walker 1859	DK	vi
213	Crambidae	Spilomelinae	<i>Cnaphalocrocis medinalis</i>	Guenée, 1854	MA	vii
214	Crambidae	Spilomelinae	<i>Conogethes punctiferalis</i>	Guenée, 1854	DK,DL,MA	vii
215	Crambidae	Spilomelinae	<i>Glyphodes bicolor</i>	Swainson, 1821	DK,DL	vi-vii
216	Crambidae	Spilomelinae	<i>Hymenia</i> cf. <i>perspectalis</i>	Hubner, 1790	DK	vii
217	Crambidae	Spilomelinae	<i>Lamprosema commixta</i>	Butler, 1879	MU	vii
218	Crambidae	Spilomelinae	<i>Maruca</i> cf. <i>vitratata/testulalis</i>	Geyer, 1832	DL	vii
219	Crambidae	Spilomelinae	<i>Metoeca foedalis</i>	Guenée, 1854	DK	x
220	Crambidae	Spilomelinae	<i>Nacloeia</i> sp.		MA	vii
221	Crambidae	Spilomelinae	<i>Nausinoe</i> cf. <i>geometralis</i>	Guenée, 1854	MA	vii

	Family	Subfamily	Scientific name	Author & Year of description	¹ Location	² Months observed
222	Crambidae	Spilomelinae	<i>Nausinoe perspectata</i>	Fabricius, 1775	DL	vii
223	Crambidae	Spilomelinae	<i>Omiodes</i> sp.		DK,MA	vi
224	Crambidae	Spilomelinae	<i>Palpita</i> cf. <i>asiaticalis</i>	Inoue, 1994	DK	xii
225	Crambidae	Spilomelinae	<i>Parotis</i> sp.		DK	x
226	Crambidae	Spilomelinae	<i>Pileocera</i> cf. <i>chysorycta</i>	Meyrick, 1884	DK,DL	vi-vii
227	Crambidae	Spilomelinae	<i>Pilocrocis</i> cf. <i>barcalis</i>	Walker, 1859	DK	x
228	Crambidae	Spilomelinae	<i>Pleuroptya</i> cf. <i>balteata</i>	Fabricius, 1798	MA	vi-vii
229	Crambidae	Spilomelinae	<i>Pleuroptya</i> cf. <i>deficiens</i>	Moore, 1887	MU	vii
230	Crambidae	Spilomelinae	<i>Pycnarmon</i> cf. <i>cribrata</i>	Fabricius, 1794	DK	x
231	Crambidae	Spilomelinae	<i>Spoladea recurvalis</i>	Fabricius, 1775	DK, DV, MA, RA	x-xi
232	Crambidae	Spilomelinae	<i>Syllepte concatenalis</i>	Walker, 1856	MA	vi
233	Crambidae	Spilomelinae	<i>Syngamia</i> cf. <i>falsidicalis</i>	Walker, 1859	MU	vii
234	Crambidae	Spilomelinae	<i>Tyspanodes linealis</i>	Moore, 1867	DL	vi
235	Thyrididae	Siculodinae	<i>Rhodonuera</i> cf. <i>erubescens</i>	Warren, 1908	DK	v
236	Tineidae	-	<i>Gerontha</i> sp.		MA	vii
237	Oecophoridae	Oecophorinae	<i>Periacma</i> sp.		MA	vi
238	Tortricidae	Tortricinae	<i>Cerace</i> cf. <i>cyanopyga</i>	Diakonoff, 1950	MU	ix
239	Limacodidae	Limacodinae	<i>Altha subnotata</i>	Walker, 1865	DL,MA	vi-vii
240	Limacodidae	Limacodinae	<i>Cania</i> cf. <i>bilinea</i>	Walker, 1855	MA	vi
241	Limacodidae	Limacodinae	<i>Cheromettia</i> cf. <i>apicata</i>	Moore, 1879	DK	vi
242	Limacodidae	Limacodinae	<i>Miresa</i> sp.		DK	vi
243	Limacodidae	Limacodinae	<i>Parasa hilaris</i>	Westwood, 1848	MA	vii
244	Limacodidae	Limacodinae	<i>Phocoderma velutina</i>	Kollar, 1844	DK,DL,MA	vi-vii
245	Limacodidae	Limacodinae	<i>Thosea</i> sp.		MA	vii
246	Zygaenidae	Chalcosiinae	<i>Brachartona quadrimaculata</i>	Moore, 1879	MU	ix
247	Zygaenidae	Chalcosiinae	<i>Gynautocera papilionaria</i>	Guérin-Ménéville, 1831	RA	x
248	Zygaenidae	Chalcosiinae	<i>Soritia pulchella</i>	Kollar, 1844	MU	x

Notes: (1) Survey sites: Devalsari (DV), Danda Lokhand (DL), Dhoran Khas (DK), Malsi (MA), Mussoorie (MU), Rajaji National Park (RA), Welham Girls' School (WG). (2) Months in which the individuals were sighted. This does not exclude the possibility that the moths are not active outside these times, but is intended only to be an indicator of seasonal occurrence and flight periods. (3) Genus level identifications are represented as sp. Provisional identifications as cf. or near, the former for close matches and the latter for poor matches. * Indicates a range extension.

Table 4. Summary of families seen

Family	Number of species
Erebidae	96
Geometridae	58
Crambidae	29
Noctuidae	12
Drepanidae	11
Sphingidae	10
Limacodidae	7
Lasiocampidae	4
Assorted	21
Total	248

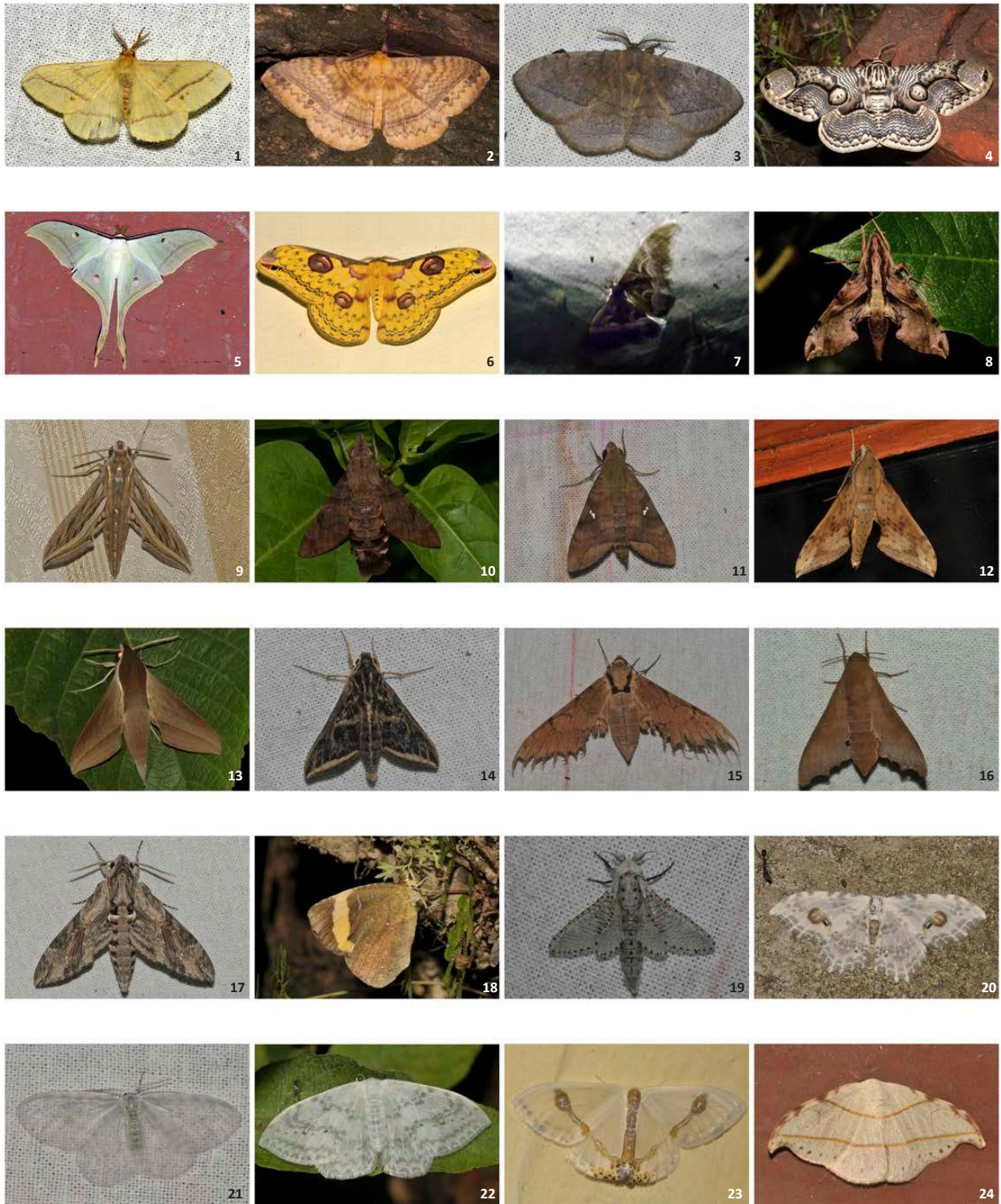
on 3 Oct 2014 from Devalsari. There are three species in the genus which are difficult to separate without examining the genitalia, *Anaplectoides inexpectata* (Dierl, 1983), *A. tamsi* (Boursin, 1955) and *A. virens* (Butler, 1878). The first two species have been recorded and described from Nepal, and *A. virens* has been described from Japan but has also been recorded in Darjeeling, the Amur area and China (Dierl 1983). Although the individual recorded during the survey could be any of these three species, none of them have been previously recorded from Uttarakhand.

While this checklist is by no means comprehensive, it aims to provide an insight into the moth diversity of Dehradun and the surrounding areas, and act as a

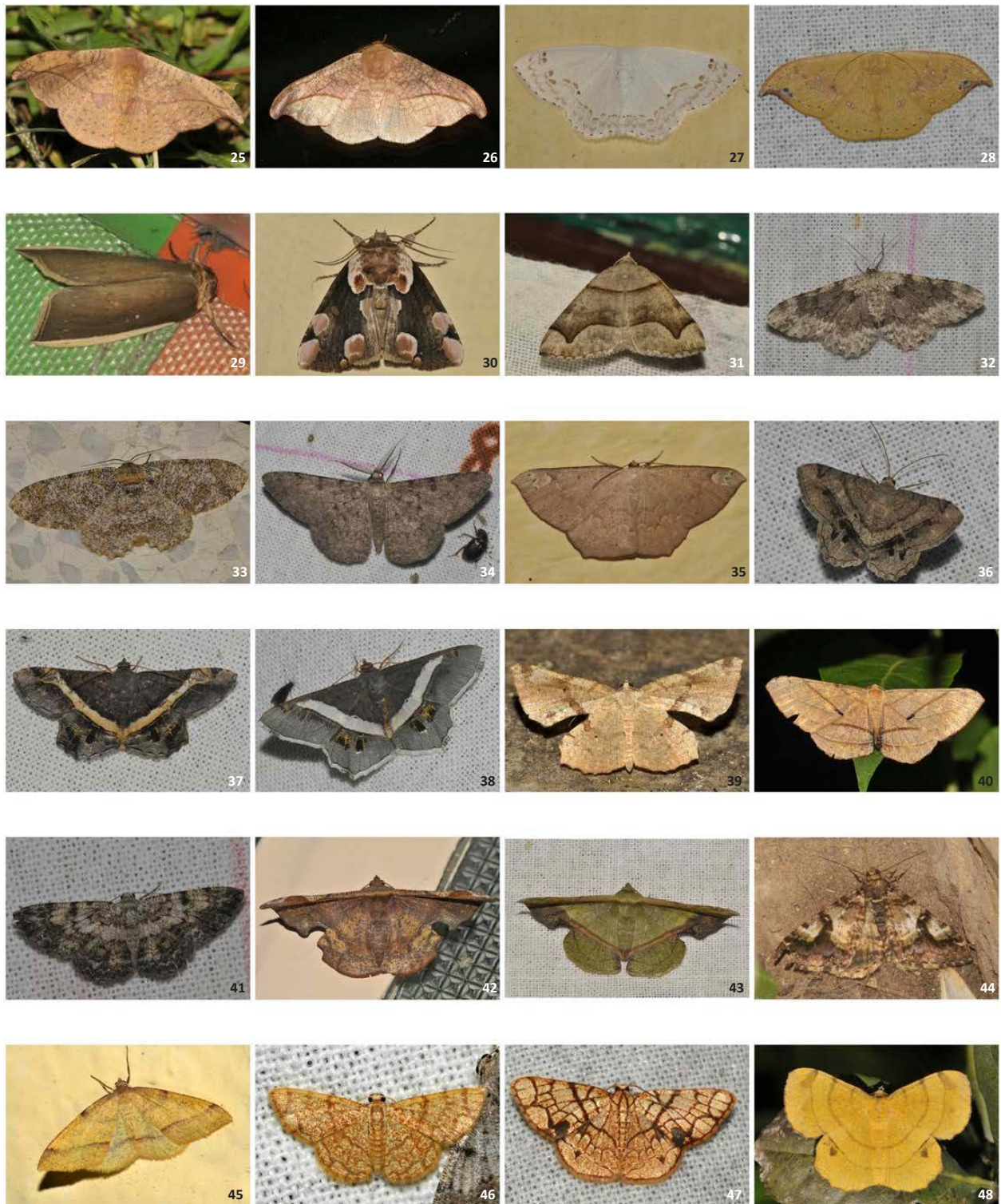
baseline for more detailed and comprehensive studies of the moths of this region.

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Images 1–24. 1 - *Eupterote bifasciata*; 2 - *Eupterote undata* form *sinuata*; 3 - *Ganisa plana*; 4 - *Brahmaea hearseyi*; 5 - *Actias selene*; 6 - *Loepa katinka*; 7 - *Samia canningi*; 8 - *Eupanacra mydon*; 9 - *Hippotion celerio*; 10 - *Macroglossum belis*; 11 - *Nephele hespera*; 12 - *Rhagastis castor*; 13 - *Theretra alecto*; 14 - *Theretra griseomarginata*; 15 - *Ambulyx liturata*; 16 - *Cypa pallens*; 17 - *Agrius convolvuli*; 18 - *Callidula erycinoides*; 19 - *Zeuzera coffeae*; 20 - *Auzata semipavonaria*; 21 - *Deroca* cf. *hyalina*; 22 - *Deroca* cf. *hidda bifida*; 23 - *Macrocilix mysticata*; 24 - *Nordstromia lilacina*. © 5,6,7 & 10 - Sanjay Sondhi; rest of the images © Yash Sondhi



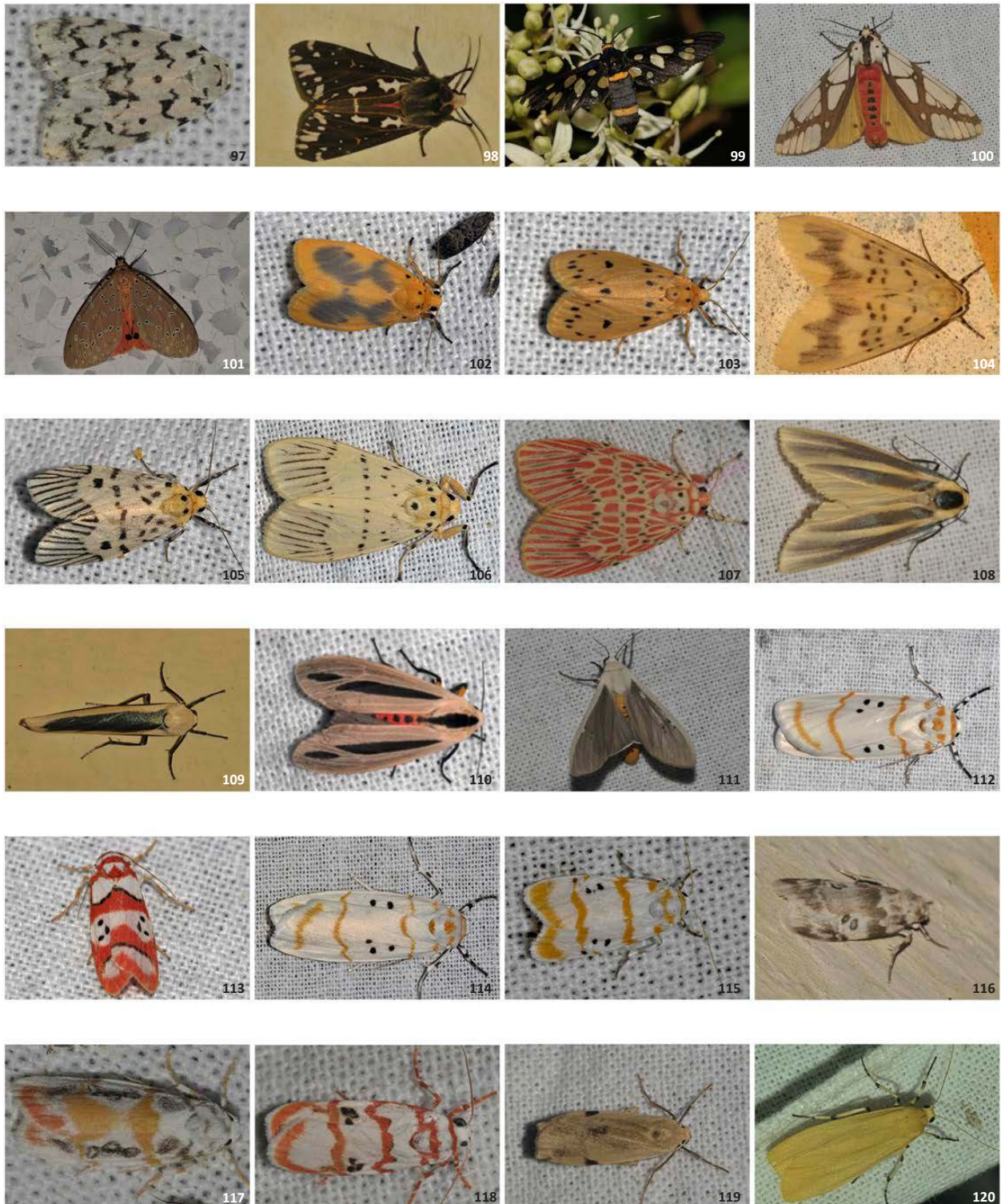
Images 25–48. 25 - *Oreta extensa suffusa*; 26 - *Oreta vatama*; 27 - *Teldenia vestigiata*; 28 - *Tridrepana* cf. *albonotata*; 29 - *Euparyphasma cinereofusca*; 30 - *Thyatira batis*; 31 - *Anonychia diversilinea*; 32 - *Biston* sp.; 33 - *Biston suppressaria*; 34 - *Boarmia* sp.; 35 - *Cassyma deletaria*; 36 - *Chiasmia* cf. *nora*; 37 - *Chiasmia* cf. *xanthonora*; 38 - *Chiasmia eleonora*; 39 - *Corymica deducta caustolomaria* form *wirthi*; 40 - *Dalima patularia*; 41 - *Ectropidia shoreae*; 42 - *Fascellina chromataria*; 43 - *Fascellina plagiata*; 44 - *Gasterocome pannosaria*; 45 - *Heterolocha* sp.; 46 - *Heterostegane* cf. *urbica urbica*; 47 - *Heterostegane subtessellata*; 48 - *Hyperythra lutea*.
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Images 49–72. 49 - *Hypomecis transcissa*; 50 - *Hyposidra talaca*; 51 - *Krananda semihyalina*; 52 - *Leptomiza calcearia*; 53 - *Medasina cf. albidaria*; 54 - *Menophra subplagiata*; 55 - *Myrioblephara albibasis*; 56 - *Opisthograptis cf. mimulina*; 57 - *Opisthograptis moelleri*; 58 - *Ourapteryx clara*; 59 - *Ozola sinuicosta*; 60 - *Pachyodes cf. erionoma*; 61 - *Parapholodes fuliginea*; 62 - *Percnia belluaria*; 63 - *Percnia maculata*; 64 - *Petelia cf. immaculata*; 65 - *Pingasa cf. pseudoterpnaria*; 66 - *Psyra angulifera*; 67 - *Thinopteryx crocoptera*; 68 - *Thinopteryx nebulosa*; 69 - *Xandrames dholaria*; 70 - *Zamarada sp.*; 71 - *Comibaena cassidara*; 72 - *Hemithea cf. constipunctata*.
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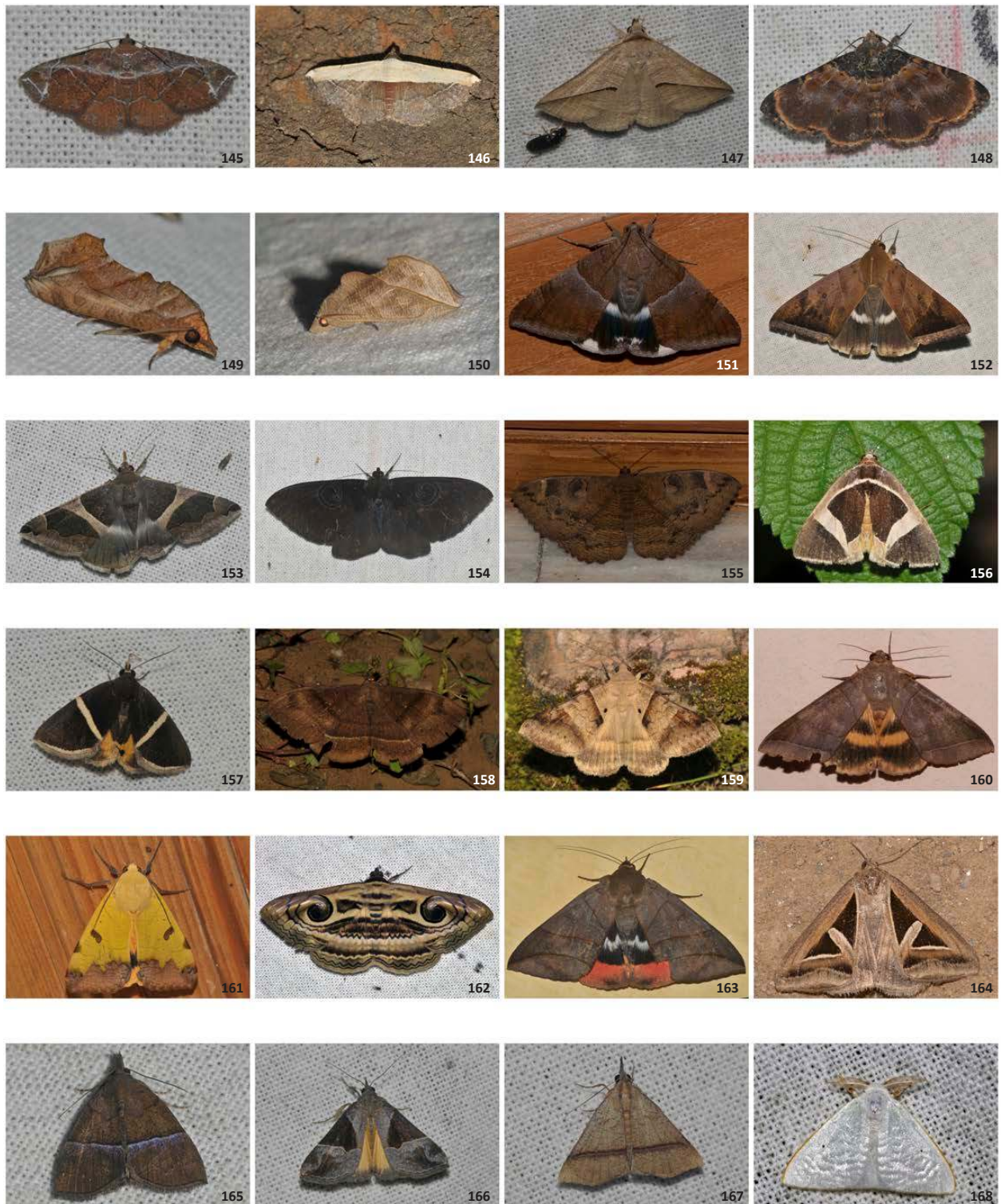
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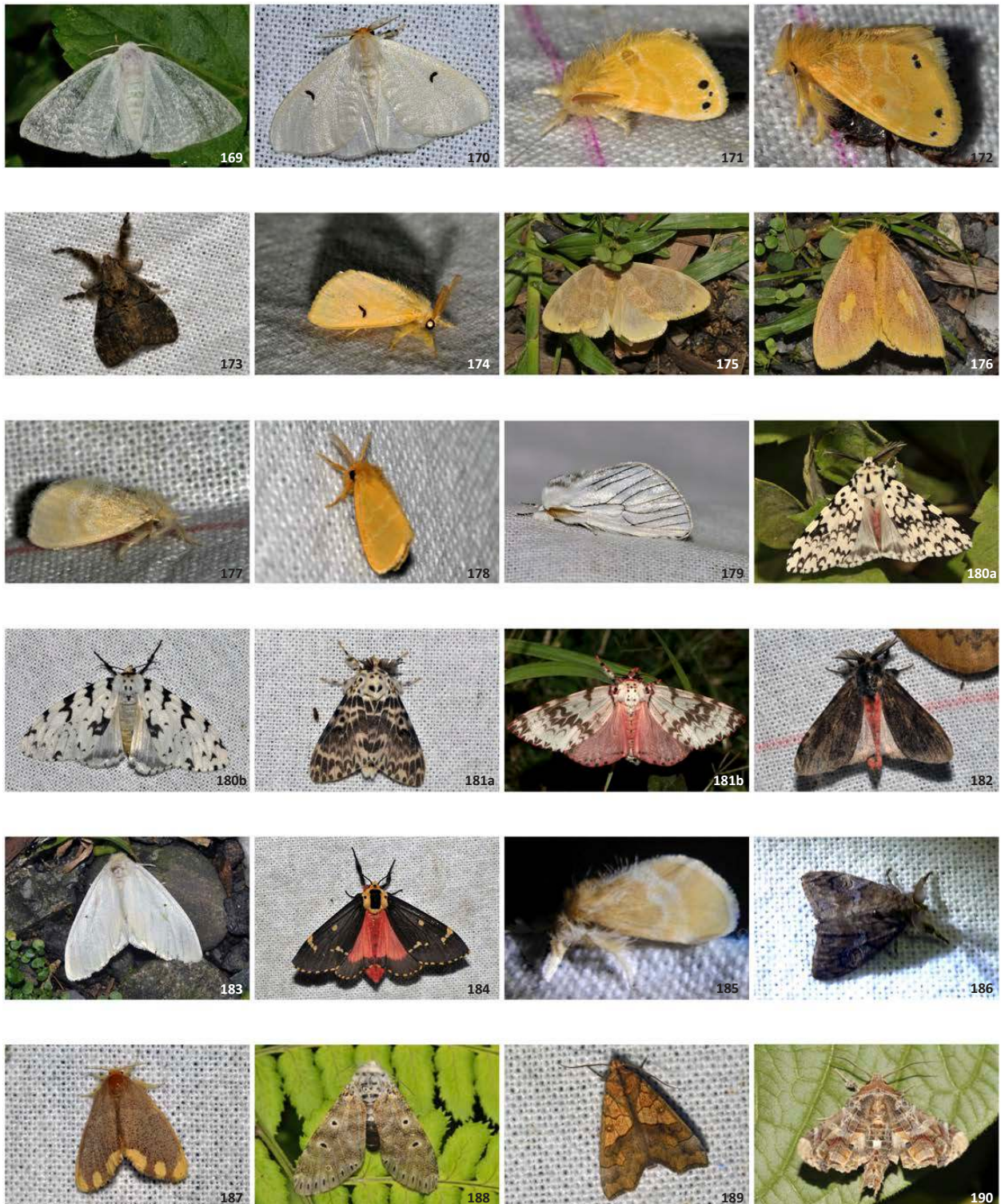
Images 97–120. 97 - *Aemene* sp.; 98 - *Alphaea imbuta*; 99 - *Amata cyseus*; 100 - *Areas galactina*; 101 - *Argina argus*; 102 - *Asura dasara*; 103 - *Barsine dharmia*; 104 - *Asura nubifascia*; 105 - *Barsine* cf. *maculifasciata*; 106 - *Barsine linga*; 107 - *Barsine orientalis bigamica*; 108 - *Chrysorabdia biridana*; 109 - *Chrysorabdia bivitta*; 110 - *Cretonotos gangis*; 111 - *Cretonotos transiens*; 112 - *Cyana arama*; 113 - *Cyana coccinea*; 114 - *Cyana* cf. *distincta babui*; 115 - *Cyana* cf. *guttifera*; 116 - *Cyana detrita*; 117 - *Cyana gelida*; 118 - *Cyana puella*; 119 - *Eilema* cf. *costalis*; 120 - *Eilema* cf. *calamaria*. © Yash Sondhi



Images 121–144. 121 - *Eilema* sp.1; 122 - *Eilema* sp.2; 123 - *Eressa confinis*; 124 - *Lemyra* sp.; 125 - *Lyclene* cf. *obsoleta*; 126 - *Lyclene euprepoides*; 127 - *Lyclene* sp.; 128 - *Machrobrochis gigas*; 129 - *Machrobrochis prasena*; 130 - *Macotasa tortricoides**; 131 - *Olepa ricini*; 132 - *Pangora distorta*; 133 - *Rajendra perrotteti*; 134 - *Sidyma albifinis*; 135 - *Spilosoma multiguttata*; 136 - *Spilosoma* sp.1; 137 - *Spilosoma* sp. 2; 138 - *Syntomoides imaon*; 139 - *Teulisna* cf. *protuberans**; 140 - *Trichaeta teneiformis*; 141 - *Utethesia lotrix*; 142 - *Vamuna remelana*; 143 - *Vamuna virilis*; 144 - *Zurobata* sp.1. © 140 - Sanjay Sondhi; rest of the images © Yash Sondhi



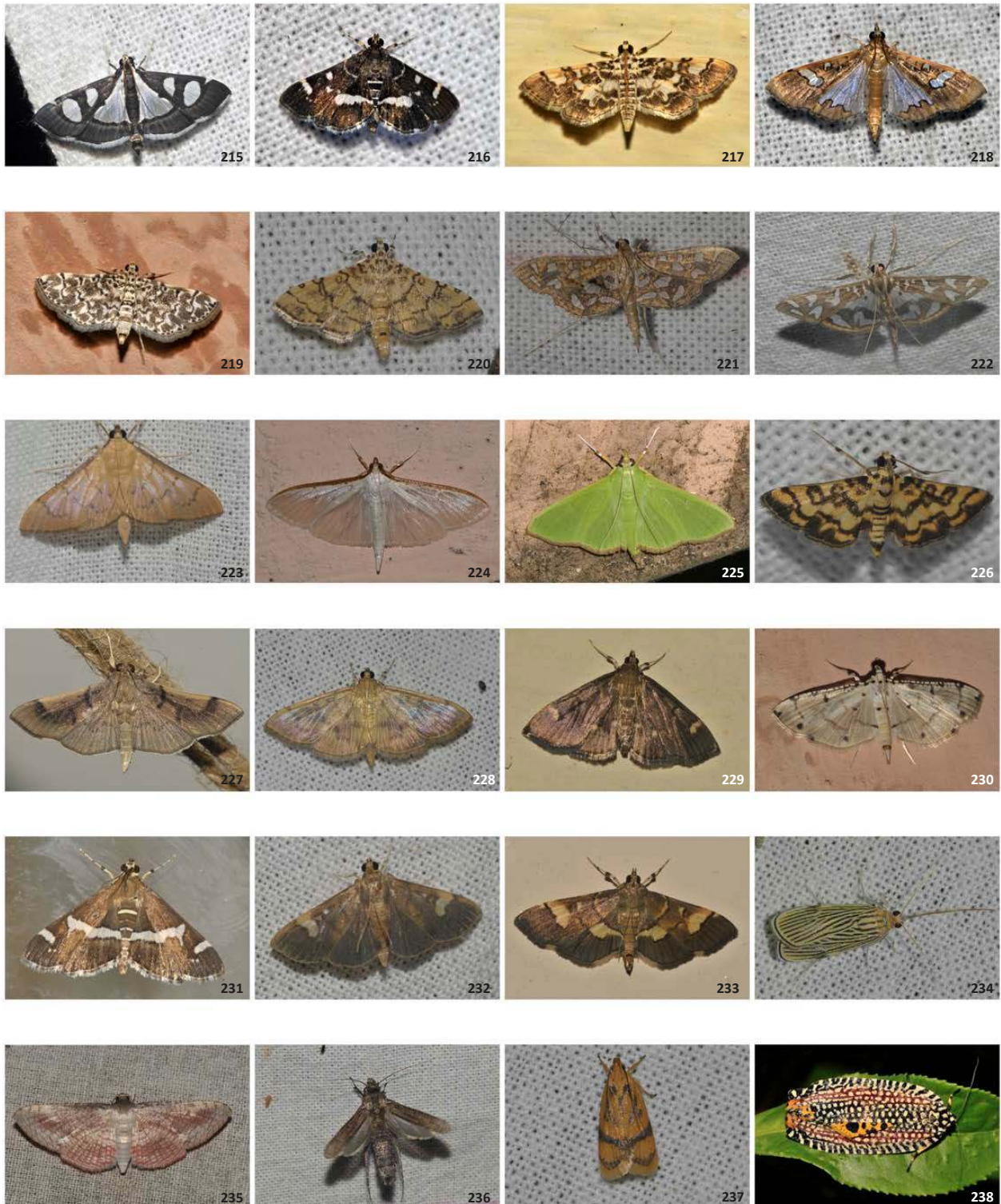
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Images 215–238. 215 - *Glyphodes bicolor*; 216 - *Hymenia* cf. *perspectalis*; 217 - *Lamprosema commixta*; 218 - *Maruca* cf. *vitrata/testulalis*; 219 - *Metoeca foedalis*; 220 - *Nacloea* sp.; 221 - *Nausinoe* cf. *geometralis*; 222 - *Nausinoe perspectata*; 223 - *Omiodes* sp.; 224 - *Palpita* cf. *asiaticalis*; 225 - *Parotis* sp.; 226 - *Pileocera* cf. *chrysorycta*; 227 - *Pilocrocis* cf. *barcalis*; 228 - *Pleuroptya* cf. *balteata*; 229 - *Pleuroptya* cf. *deficiens*; 230 - *Pycnarmon* cf. *cribrata*; 231 - *Spoladea recurvalis*; 232 - *Syllepte concatenalis*; 233 - *Syngamia* cf. *falsidicalis*; 234 - *Tyspanodes linealis*; 235 - *Rhodonuera* cf. *erubescens*; 236 - *Gerontha* sp.; 237 - *Periacma* sp.; 238 - *Cerace* cf. *cyanopyga*.
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Images 239–248. 239 - *Altha subnotata*; 240 - *Cania cf. bilinea*; 241 - *Cheromettia cf. apicata*; 242 - *Miresa sp.*; 243 - *Parasa hilaris*; 244 - *Phocoderma velutina*; 245 - *Thosea sp.*; 246 - *Brachartona quadrimaculata*; 247 - *Gynautocera papilionaria*; 248 - *Soritia pulchella*. © 246, 247, 248 - Sanjay Sondhi; rest of the images © Yash Sondhi

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