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Moth Fauna (Lepidoptera: Heterocera) from the Marathwada Region of Maharashtra

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Abstract

The present work includes an inventory of 112 moth species (15 families, 88 genera), recorded by light trapping method at 20 sites across Marathawada region of Maharashtra. Among the moth found, family Erebididae (48), Geomatrididae (19), Noctuididae (15) were most numerous. The highest number of moths recorded from college campus and back side of Matsyodari colony. Extensive sampling in this region may result in new records, as well as some endemic species. Further sampling may result in more numerous data.

Keywords: Moths, Marathawada region of Maharashtra, Erebididae, college campus.

Introduction:

Lepidoptera is a group of insects that contains many large and showy species. Among these, butterflies have been studied most due to their diurnal activity and colorful wing patterns. Consequently the conservation of butterflies is much better than any other group of insects (Wang & Fang, 2007). The moth fauna of India is poorly known. And there has been very few survey carried out before 20th century in British administration especially in Maharashtra state. Frederick Moore brought out a magnificent publication Lepidoptera of Ceylon in 1890-92, covering both the moths and butterflies of Sri Lanka and the first volume of Lepidoptera India was published in 1890. Both these publication are till date among the finest and most comprehensive works on Lepidoptera. The moths of Bombay, Poona and other localities in western India have been largely worked by Col. C. Swinhoe in 1885 that has made very large Indian collection. The moth fauna of Nilgiris was studied by G. F. Hampson in 1891 and contributed his work to the fauna of British India and recorded about 611 species of moths particularly from Maharashtra. Moore in 1867 published the lepidopteron insects of Bengal in the proceeding of Zoological Society of London. Leech J. H. in 1937 also made the large collection of moths from Kashmir; he also contributes to Japanese and Chinese collection. The moths of North West Himalaya were collected by the Rev. J. H. Hocking in 1890 which is now in the British museum (Hampson, 1892). In Assam and Burma region the fine collections made by W. Doherty in 1969 upper Assam; the Naga Hills and they presented their collection to British museum (Hampson, 1892). The moths found in Raipur and Bombay is reported by Swinch Gardner in 1941 and reported immature stages of Indian lepidopteron Noctuididae, Hyspiridae to Indian forest research entomology. South-East Asia is one of the rich biodiversity areas on the earth; more than 6000 Micro-Lepidoptera

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species are known (Robinson, et al. 1994). Srivastava, in 2002 studied Noctuid moths from Himachal Pradesh and published a book 'Taxonomy of moths in India'.

The Marathwada region occupies area about 64,590 Km². This region receives rainfall between 750-800 mm. Marathwada region has mostly fertile soil as it is comprised of rivers Godawari, Purna, Manjra, Wainganga, Dudhana which flourish this region. Cash crops like Sugarcane, Cotton, Cereal crops like Wheat, Jowar, Maize, Oil Seeds like Jatropha, Groundnut, Sunflower, Safflower, Mustard, Fruit crops like Citrus, Pomegranates, Guava, Banana, Grapes are mostly grown in this area. Marathwada region is comprised of eight districts and its relevant 76 talukas. Good type of biodiversity is found in the various river banks of Marathwada region and the vegetation sites like Gautala Sanctuary, Mahurgad, Dt. Nanded, Naygaon Mayur Wildlife Sanctuary are flourished with Fauna and Flora. Moth diversity is also significantly seen in Marathwada region. This moth survey is first of its kind to be undertaken in the region of Marathwada.

Methodology:

Moths were collected primarily by using Light Traps at night and by field visit at the day time near the crop plants, fruit crops, during the period of May 2016 to December 2017. The survey sites are listed in Table No. 1 as below. The traps were operated once in week or at consequent nights or with proper gaps as required. Various sites from Marathwada region were used to trap the moths.

The light trap was containing a 3X4 meter white cloth as a reflecting screen to attract moth was oppositely followed by 85 Watt (Philips CFL bulb). The cloth was hung between two trees or poles for stretching properly forming a screen. This is most suitable trap for tropical and sub-tropical regions (Recommended by: William, 1987). Generally light source was used from own resource by portable Honda Generator (1 Kw) for power supply at remote places. The traps were operated from 19:00 Hrs. To 05:00 Hrs to allow the moths (and other insects) to escape before 05:30 to avoid predation by birds. (Longcore and Rich 2004).

Moths trapped were brought to laboratory in plastic vials on the following day of collection. Moths were killed by using Ethyl Acetate Vapors afterward these were spread, pinned, and photographed (Dickson, 1976). Moths were further processed for preservation by baking in Hot Air Oven at the temperature 110^o C for four hours. Then baked specimens were forwarded to preserve in Moth Boxes especially made from wooden for moth preservation. Naphthalene balls were put as disinfectant in all corners inside the box, to prevent fungal or bacterial infections to the specimen. All moth specimens are currently retained by author in the Laboratory of Department of zoology of MSS, College, Ambad, Dt. Jalna, Marathwada region, Maharashtra, India.

The identification of Moth was done with the help of available literature, which included Moore (1882), Hampson (1892-1896), Bell and Scott (1937), Pinaratana and Lampe (1990), Robinson et al (1994), Kendrick, R. C. (2004), Zolotunin and Pinaratana (2005) and classification system used by Van Nieukerkan et.al.(2011) has been followed. Identified moth species are illustrated in images (Images 1-112). Many moth species needed examination of genitalia for confirmation of their identity; hence species identification can't be done only through photographs or description.

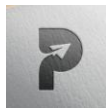


Table No. 1.Sites Surveyed

Sr. No	Sites	Latitude (North)	Longitude (East)	No. Of Night Traps	Number of Species Found
01	Matsyodari College Campus, Ambad	19 ⁰ 61'-08 ⁰ 85'	75 ⁰ 79'- 84 ⁰ 65'	14	29
02	Manjra River Bank Kallam	18 ⁰ 58'-30 ⁰ 84'	76 ⁰ 02' -1 8 ⁰ 50'	01	05
03	Shiv Temple Site Ambad	19 ⁰ 58' -81 ⁰ 07'	75 ⁰ 77' -42 ⁰ 55'	05	07
04	Gunj Farm Yard, Gunj	19 ⁰ 30'-76 ⁰ 83'	76 ⁰ 09' -01 ⁰ 23'	01	02
05	Dhalegaon, Tq. Pathari Dist.Parbhani	19 ⁰ 22'-53 ⁰ 99'	76 ⁰ 36'- 67 ⁰ 81'	01	02
06	Gunj Temple Site	19 ⁰ 30'-71 ⁰ 16'	76 ⁰ 09' -55 ⁰ 31'	01	01
07	Solanke Farm Murti	19 ⁰ 35'-36 ⁰ 50'	76 ⁰ 07' -18 ⁰ 12'	01	07
08	Gov. Polytechnique College,Pachod Road Ambad	19 ⁰ 61'-92 ⁰ 21'	75 ⁰ 77' - 49 ⁰ 36'	04	11
09	ITI College Campus,Ambad	19 ⁰ 61'-69 ⁰ 63'	75 ⁰ 80' -17 ⁰ 01'	01	02
10	Dhangar Pimpri Water Resort Site	19 ⁰ 69'-60 ⁰ 44'	75 ⁰ 80' -42 ⁰ 54'	01	03
11	Nagobachiwadi	19 ⁰ 32'-06 ⁰ 90'	76 ⁰ 08' -06 ⁰ 02'	01	01
12	Sai Temple Aurangabad Road , Jana	19 ⁰ 86'- 85 ⁰ 00'	75 ⁰ 82' -31 ⁰ 30'	02	02
13	Zawar Mangal Karyalay Site , Ambad	19 ⁰ 69'-52 ⁰ 88'	75 ⁰ 79' -52 ⁰ 30'	03	08
14	Forest Division Area Road Site , Ambad	19 ⁰ 59'-49 ⁰ 49'	75 ⁰ 79' -17 ⁰ 59'	01	03
15	Back side of Matsyodari Colony, Ambad	19 ⁰ 60'-86 ⁰ 29'	75 ⁰ 79' -30 ⁰ 02'	10	14
16	Tadhadgaon Water Resort , Tadhadgaon	19 ⁰ 56'-17 ⁰ 50'	75 ⁰ 85' -24 ⁰ 14'	03	04
17	Asthi , Tq. Partur, Dist Jalna	19 ⁰ 38'-13 ⁰ 86'	76 ⁰ 23' -72 ⁰ 89'	01	01
18	Mahurgad Mahur , Dist.Nanded	19 ⁰ 84'-62 ⁰ 16'	77 ⁰ 93' -58 ⁰ 81'	01	03
19	V.N. College Campus, Shirur (Taj) Ahamadpur Dist Latur	18 ⁰ 40'-00 ⁰ 71'	76 ⁰ 55' -99 ⁰ 79'	01	04
20	Daulatabad Road , Aurangabad	19 ⁰ 92'-65 ⁰ 77'	75 ⁰ 23' -00 ⁰ 11'	01	03
			Total	54	112

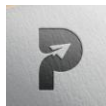


Table No. 2: List of Families and Number of Species

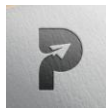
Sr. No.	Family	Number of species
01	Erebidae	48
02	Geometridae	19
03	Noctuidae	15
04	Crambidae	09
05	Sphingidae	08
06	Lasidocapidae	03
07	Limacodidae	02
08	Nolidae	01
09	Notodontiidae	01
10	Uraniidae	01
11	Saturniidae	01
12	Bombycidae	01
13	Cossidae	01
14	Hybladae	01
15	Psychidae	01
	Total =	112

Results and discussion:

A total 112 (Table. 3) moths were identified to species level comprising 09 superfamilies, 15 families, 88 genera. Among the moths found, family erebidae (48), geometridae (19), noctuidae (15) were most numerous (Table. 2). A range extension of 31 species is recorded in Maharashtra. From the site surveyed, highest species richness was recorded for college campus site due to green cover on and farm land around it. The present work, though incomplete, but provides primary data on moths of Marathwada region of Maharashtra.

The moths from sanjay Gandhi National park, Boriwali, Mumbai were studied by Vaylure Subhalaxmi in 2003. Mathew et al. in 2004 catalogued 202 species of butterflies and moths from shendurny wildlife sanctuary, Kerala. Chandra in 2007 studied moth diversity of Madhya Pradesh & Chhattisgarh 142 species of moths from 90 genera and 16 families. Gurule et al. in 2010 cataloged 70 species of moths of family Noctuidae from Nashik district of Maharashtra. Recently, Nimbalkar et al (2015) studied 49 species of moths from Marathwada region of Maharashtra.

The Moth fauna from this region have shown high endemism and many new records for India. *A. munda* which is endemic to Australia found in our study. A blood sucking moth *C. thalictri* was also observed in our study, which was previously not recorded in India. A range extension for *C. tenebrata* was observed. Moths are major pest of the commercial crops, fruit crop, in this part and the current study, with checklist of 112 species from Marathwada region of Maharashtra, is the first study on the



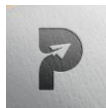
moths. Generally moths (Caterpillars) are polyphagous in nutrition habit. Future studies will provide information relevant to habitat restoration and species conservation drive.

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Table No.3: Partial checklist of moths recorded:

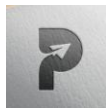
Sr. No.	Species Code	Family	Subfamily	Tribe	Genus	Species	Author And Year of Description
01	MCBF-8	Erebidae	Erebinae	Aediini	Aedia	leucomelas	Linnaeus ,1758
02	STA -3-4	Erebidae	Arctiinae	Artctiini	Olepa	schleini	Yosef Schlein , 2005
03	HBA-6	Erebidae	Calpinae	Calpini	Calyptra	thalictri	Borkhausen, 1790
04	FYA-2-3	Erebidae	Arctiinae	Artctiini	Olepa	ricini	Walker , 1855
05	MACA -5	Erebidae	Catocalinae	Pericymiini	Pericyma	mendax	Walker 1858
06	KCBMC-2	Erebidae	Lymantriinae	Nygmiiini	Orvasca	subnotata	Walker , 1865
07	GTSB -2	Erebidae	Lymantriinae	-	Euproctis	lunata	Walker , 1855
08	SFM -14	Erebidae	Erebinae	Ophiusini	Achea	janata	Linnaeus ,1758
09	SFM -2	Erebidae	Erebinae	Ophiusini	Ercheia	dubia	Butler ,1874
10	PRA -3-1	Erebidae	Erebinae	Euclidiini	Mocis	undata	Fabricius ,1775
11	SBMC-5	Erebidae	Arctinae	Syntomini	Amata	passalis	Fabricius, 1781
12	STAM-1	Erebidae	Arctinae	Poaphilini	Grammodes	geometrica	Fabraicius , 1775
13	ICCAB-10	Erebidae	Heliothinae	Heliothinae	Argina	astrea	Drury ,1773
14	ACCD-2	Erebidae	Eulopidontinae	Padopodini	Anticarsia	irrorata	Fabricius, 1781
15	DPWR-4	Erebidae	Erebinae	Pophilini	Grammodes	stolida	Fabricius, 1775
16	PRA-3-11	Erebidae	Arctinae	Arctiini	Mangina	syringia	Cramer , 1775
17	SFM-12	Erebidae	Erebinae	-	Homaea	clathrum	Guenee ,1852
18	PRA-3-9	Erebidae	Erebinae	Ophiusini	Bastilla	torrida	Guenee ,1852
19	NBWD-2	Erebidae	Erebinae	Erebinae incertae sedis	Bamra	mundata	Walker , 1858



20	JRAB-2	Erebidae	Lymantrinae	Arctiini	Lymantria	incerta	Walker ,1855
21	PRA-7	Erebidae	Arctinae	Arctiini	Cretonotus	gangins	Linnaeus, 1763
22	SFM-8	Erebidae	Arctinae	-	Spirama	retorta	Guenee ,1852
23	MACA-3	Erebidae	Lymantrinae	-	Lymantria	umbrifera	Wilman , 1910
24	PRA-1	Erebidae	Lymantriinae	Lymanriini	Lymantria	dispar	Linnaeus , 1758
25	STAM-5	Erebidae	Calpinae	Ophiderini	Eudocima	materna	Linnaeus ,1767
26	MATCA 2	Erebidae	Pangraptinae	-	Episparis	liturata	Fabricius ,1787
27	PRA -3-6	Erebidae	Aganainae	-	Asota	ficus	Fabricius, 1775
28	ICCAB-13	Erebidae	Erebinnae	Ophiusini	Trigonodes	hypassia	Cramer ,1779
29	MATCA-6	Erebidae	Arctinae	Actiini	Aloa	lactinea	Cramer ,1777
30	ZMKBR-8	Erebidae	Lymantriinae	Orgyiini	Olene	mendosa	Hubner 1823
31	ZMGR-2	Erebidae	Erebinnae	Ophiussini	Ophiusa	triphaenoides	Walker 1858
32	ZMKBR-3	Erebidae	Lymantriinae	Orgyiini	Acyphas	chionitis	Hubner , 1819
33	ZMGR-7	Erebidae	Hypeninae	-	Hypena	obacerralis	Walker, 1859
34	FYA-4	Erebidae	Boletobiinae	Aventiini	Ataboruza	divisa	Walker ,1862
35	PACR-4	Erebidae	Erebinnae	Ophiussini	Ophiusa	selenaris	Guenee ,1852
36	NFY-1	Erebidae	Arctinae	Arctiini	Pelicalia	ricini	Fabricius, 1775-
37	ZMGR-3	Erebidae	Erebinnae	Hulodini	Hulodes	drylla	Guenee ,1852
38	ZGR-6	Erebidae	Arctinae	Lithosiini	Lyclene	calamaria	Moore , 1888
39	STAMB-2	Erebidae	Boletobinae	Phytometriini	Raparna	orchreipennis	Moore 1882
40	ZMKBR-9	Erebidae	Hypocalinae	Hypocalini	Hypocala	Subsatura f. rostrata	Fabricius ,1794
41	NAGC-1	Erebidae	Heliethinae	Heliethinae	Mangina	astrea f.paradalina	Drury , 1773
42	MCBF-1	Erebidae	Erebinnae	Opiusini	Dysgonia	stuposa	Fabricius ,1794



43	GBS -1	Erebidae	Hermininae	-	Hydrillodes	metisalis	Walker, 1859
44	MRBK-4	Erebidae	Erebinae	Euclidini	Mocis	trifasciata	Stephens , 1830
45	JRA-1	Erebidae	Erebinae	Pandesmini	Pandesma	guenaudi	Guenee ,1852
46	ACC-6	Erebidae	Arctiinae	Syntomiini	Amata	cyssea	Stoll,1782
47	JRA-2	Erebidae	Arctiinae	Arctiini	Utetheisa	pulchella	Linnaeus , 1758
48	MRBK-8	Erebidae	Arctiinae	Arctiini	Utetheisa	pulchelloides	Hampson ,1907
49	ACCAB-4	Noctuidae		Caradrinini	Callopistrina	juventina	Stoll,1782
50	STA-14	Noctuidae	Agaristinae	-	Aegocera	venulia	Cramer ,1777
51	PRA- 3-12	Noctuidae	Tinolinae	-	Calesia	Stillifera	Felder & Rogenhofer 1874
52	TWR-2	Noctuidae	Noctuinae	Prodeniini	Spodoptera	exigua	Hubner , 1808
53	ACC-2	Noctuidae	Heliothinae		Helicoverpa	armigera	Hubner , 1808
54	ACCAB -2	Noctuidae	Noctuinae	Noctiuni	Agrotis	ipsilon	Hufnagel ,1766
55	NAG-8	Noctuidae	Noctuinae	Prodeniini	Spodoptera	littoralis	Boisduval ,1833
56	FDAR-1	Noctuidae	Noctuinae	Prodeniini	Spodoptera	mauritica	Boisduval ,1833
57	ICCAB -8	Noctuidae	-	-	Culasta	indecisa	Moore 1881
58	MCA-2	Noctuidae	Noctuinae	Noctiuni	Agrotis	munda	Walker , 1857
59	MRBK-5	Noctuidae	Noctuinae	Noctiuni	Agrotis	segetum	Denis & Schiffermuller 1775
60	CCA-6	Noctuidae	Noctuinae	Cardrinini	Athetis	reclusa	Walker ,1862
61	CCA-11	Noctuidae	Noctuinae	Apemeini	Sesamia	inferens	Walker , 1856
62	TWR-2-2	Noctuidae	Galleriinae	anella	Lamoria	anella	<u>Denis & Schiffermuller, 1775</u>
63	MFY-1	Noctuidae	Bagisarinae	-	Xanthodes	transversa	Guenee ,1852
64	SBMC-9	Nolidae	Eligminae	Nolini	Gadirtha	pulchra	Butler 1886
65	TWR-3	Notodontidae	Phalerinae	-	Nadata	gibbosa	J.E. Smith 1797
66	GFY-8	Geometridae	Ennominae	Macariini	Chiasmia	eleonora	Cramer , 1780
67	TWROS-1		Ennominae	Macariini	Chiasmia	hebesata	Walker , 1861
68	BHBA-16	Geometridae	Geometrinae	Pseudopteri	Pingasa	ruginaria	Guenee,1858



69	SBMC-2-5	Geometridae	Geometrinae	Comibaeni	Comibaena	marie	Lucas , 1888
70	DPWR-9	Geometridae	Sterrhinae	Cosymbini	Chrysocrapeda	faganaria	Guenee,1858
71	SBMC-2-7	Geometridae	Geometrinae	Geometriini	Pelagodes	maipoensis	Galsworthy, 1997
72	ICCA-4	Geometridae	Ennominae	Macariini	Chiasmia	fidoniata	Guenee , 1858
73	MACA-4	Geometridae	Ennominae	Boarmiini	Hyposidra	talaca	Walker , 1860
74	KCBMC-1	Geometridae	Ennominae	Macariini	Chiasmia	emersaria	Walker , 1861
75	CCAM-3	Geometridae	Ennominae	Boarmiini	Hypomecis	luridula	Hulst , 1896
76	MRBK-21	Geometridae	Ennominae	Boarmiini	Cleora	sublunaria	Guenee,1857
77	FDAB -1	Geometridae	Ennominae	-	Istrugia	disputaria	Guenee,1858
78	TDH 6	Geometridae	Ennominae	Bistoni	Biston	suppressaria	Guenee,1858
79	SBMC-2-3	Geometridae	Ennominae	Macariini	Chiasmia	emerasaria	Walker, 1861
80	ICCAB -6	Geometridae	Ennominae	Boarmiini	Cleora	tenebrata	Fletcher ,1953
81	CCA-12	Geometridae	Sterrhinae	-	Traminda	mundissima	Walker , 1861
82	ZMGR-8	Geometridae	Geometrinae	Synchlorini	Synchlora	cupedinaria	Grote , 1880
83	ZGR-2	Geometridae	Ennominae		Zamarada	excisa	Hampson , 1891
84	NVA -2	Geometridae	Geometrinae	Geometriini	Agathia	prasinaspis	Meyrick , 1889
85	DPWR-6	Uraniidae	Microninae	Microniini	Micronia	aculeata	Guenee , 1857
86	ACCAB-5	Sphingidae	Sphinginae	Sphinghulini	Agrius	convolvuli	Linnaeus , 1758
87	MCA-1	Sphingidae	Macroglossinae	Choerocampini	Theretra	clotho	Drury , 1773
88	MATCA-1	Sphingidae	Macroglossinae	Macroglossini	Daphnis	neril	Linnaeus , 1758
89	PRA-3-10	Sphingidae	Macroglossinae	Choerocampini	Hippotion	celerio	Linnaeus , 1758
90	SFM-7	Sphingidae	Macroglossinae	Macroglossini	Nephele	hespera	Fabricius 1775
91	MCLA-1	Sphingidae	Sphinginae	Sphingini	psilogramma	incretata	Walker 1865
92	SFM-1	Sphingidae	Sphinginae	Sphingini	Acherontia	styx	Westwood , 1847
93	KCBMC-3	Sphingidae	Macroglossinae	Macroglossini	Macroglossum	belis	Linnaeus 1758



94	HBS-1	Saturniidae	Saturninae	Saturniniini	Antheraea	mylitta	Drury 1773
95	FDAR-7	Bombycidae	Bombycinae	-	Trilocha	varians	Walker , 1855
96	CFS -5	Crambidae	Spilomelinae	-	Parotis	marginata	Hampson 1893
97	CFS-1	Crambidae	Spilomelinae	-	Pygospila	tyres	Cramer , 1780
98	STA-2-11	Crambidae	Spilomelinae	-	Conogethes	punctiferalis	Guenee,1854
99	MATCA13	Crambidae	Spilomelinae	-	Cirrhochri sta	brizoalis	Walker 1859
100	PRA-3-13	Crambidae	Spilomelinae	-	Diaphania	indica	Saunders , 1851
101	ZMGR-1	Crambidae	Spilomelinae	-	Glyphodes	sibillalis	Walker , 1859
102	NVA-3	Crambidae	Spilomelinae	-	Cydalima	laticostalis	Guenee,1854
103	ZGR-5	Crambidae	Spilomelinae	Spilomelini	Nausinoe	perspectata	Fabricius , 1775
104	GBS-4	Crambidae	Noordinae	-	Noorda	blitealis	Walker , 1859
105	NVAB -3	Lasiocampidae	-	-	Gastropacha	paradale	Ochsenheimer , 1810
106	SFM-18	Lasiocampidae	Lasidocampinae	Pinarini	Streblote	siva	Linnaeus , 1758
107	ZMKGR-2	Lasiocampidae	Lasidocampinae	Pinarini	Lebeda	nobilis	Walker ,1855
108	PRA-2-1	Cossiidae	-	-	Azygophleps	pusilla	Walker , 1856
109	BHBA -8	Limacodidae	Limacodinae	-	Altha	subnotata,	Walker 1865
110	STA 3-6	Limacodidae	Limacodinae	-	Parasa	indertermina	Boisduval ,1832
111	MCBF -3	Hybladae	-	-	Hyblaea	puera	Cramer, 1777
112	SBMC-8	Psychidae	Oiketicinae	-	Thyridopteryx	ephemeraeformis	Haworth , 1803



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