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Preliminary studies of macro-moths diversity (Lepidoptera) in chirpine forests of Himachal Pradesh

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Abstract

The present biodiversity study was conducted in Himachal Pradesh, India to find the status of moth diversity in Chirpine forests. During the study, about 526 specimens of moths were collected with the help of light trap from different selected sites of Chirpine forests. All the specimens were sorted into 80 species of moths belonging to 71 genera and 11 families. Out of which 06 species from family Crambidae, 03 from family Drepanidae, 29 from family Erebidae, 01 species from family Euteliidae, 14 from Geometridae, 02 species from family Lasiocampidae, 18 species from family Noctuidae, 02 species from family Nolidae, 01 species of family Notodontidae, 03 species from family Sphingidae and 01 species from family Uraniidae were recorded. This is the first record of moth diversity study in the Chirpine forest of Himachal Pradesh.

Keywords: Diversity, lepidoptera, chirpine forests, Himachal Pradesh

Introduction

The Himalayan Subtropical Pine forests are a large subtropical coniferous forest eco-region covering portions of Bhutan, India, Nepal and Pakistan and are mainly classified into types – Lower Siwalik Chirpine Forest and Upper (Himalayan) Chirpine forest. The variety of life forms i.e. Flora and fauna that occur in the subtropical pine forests forms an important part of biological diversity along with its spectacular beauty and wild richness. The predominant flora of this eco-region is thin woodland of drought-resistant Chirpine (*Pinus roxburghii*) trees with a ground cover of thick grass. These habitats are vulnerable to logging for firewood or conversion to grazing or farmland and more than half the area has been cleared or degraded which then allows the mountain water to wash away the soil quickly. The climate is subtropical to sub-temperate type with average annual rainfall being 1253 mm and temperature ranges from 0° in winters to 40° in summers. Main forest types of this area are subtropical with dominating pine trees. Insects form a major part of fauna available in these areas. Lepidoptera is considered to be a large and important part of our biodiversity as moths and butterflies play vital roles in the ecosystem, affecting many other types of wildlife as being important herbivores, pests, food and host for other organisms. They are increasingly being recognized as a flagship group to monitor global warming and the rate and effect of habitat loss globally (Kendrick, 2007) [8]. The Lepidoptera has more than 157,000 described species (Nieuwerkerken *et al.*, 2011) [18]. As per the Indian sub-region is concerned, recent estimates reveals that Lepidoptera comprises over 17,734 species distributed over 18 superfamilies and 84 families (Chandra, 2011) [1]. As per the economic importance of moths they are defoliators, leaf rollers, leaf miners, stem borers, timber borers, root, tuber and flowers feeders, fruit piercers, stored product pests. Research work on moths is growing day by day with the emerging techniques as well as evolution of new species every time an order is being studied. Classification has also been updated many times and still the process is going on for a more satisfactory work because of huge synonymy present in previous classification systems. The present checklist is an attempt to update the information available on moth fauna of Himachal Pradesh.

Materials and Methods

For the study on Heterocera diversity of Pine forests, moths were collected using light trap fitted with 165 watt mercury bulb and ethyl alcohol and benzene were used as killing agents.

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The collected moth species were pinned, stretched and preserved in fumigated insect boxes. The checklist was prepared after identification of moths with the help of taxonomic literature and comparison to ZSI and IARI collections.

Results and Discussions

A total of 80 species referable to 71 genera and 11 families are described out of which 06 species from family Crambidae,

03 from family Drepanidae, 29 from family Erebidae, 01 species from family Euteliidae, 14 from Geometridae, 02 species from family Lasiocampidae, 18 species from family Noctuidae, 02 species from family Nolidae, 01 species from family Notodontidae, 03 species from family Sphingidae and 01 species from family Uraniidae were recorded. This is the first attempt to form a checklist of moths from Pine forests of Himachal Pradesh which will help to update the information available on Heterocera faunal studies.

Table 1: Overview of the identified moth species of Chirpine forests of Himachal Pradesh, India

S. No.	Species name	Family	Number of examples
1.	<i>Cnaphalocrocis medinalis</i> (Guenee, 1854)	Crambidae	6
2.	<i>Cydalima conchylalis</i> (Guenée, 1854)	Crambidae	9
3.	<i>Tetridia caletoralis</i> Walker, F., 1859	Crambidae	6
4.	<i>Diaphania indica</i> (Saunders, 1851)	Crambidae	7
5.	<i>Botyodes asialism</i> (Guenée, 1854)	Crambidae	6
6.	<i>Maruca vitrata</i> Fabricius, 1787	Crambidae	15
7.	<i>Macrocilix mysticata</i> , (Walker, [1863])	Drepanidae	2
8.	<i>Auzata semiparonaria</i> , (Walker, [1863])	Drepanidae	1
9.	<i>Thyatira cognata</i> (Warren, 1888)	Drepanidae	1
10.	<i>Agylla pallens</i> (Hampson, 1894) ^[4]	Erebidae	10
11.	<i>Asota ficus</i> (Fabricius, 1775)	Erebidae	15
12.	<i>Callimorpha dominula</i> (Linnaeus, 1758)	Erebidae	1
13.	<i>Callindra principalis</i> (Kollar, [1844])	Erebidae	9
14.	<i>Chrysorabdia viridata</i> (Walker, [1865])	Erebidae	7
15.	<i>Cretonotos gangis</i> (Linnaeus, 1763)	Erebidae	7
16.	<i>Cretonotos transiens</i> (Walker, 1855)	Erebidae	15
17.	<i>Cladartia quadriramosa</i> (Kollar, [1844])	Erebidae	9
18.	<i>Miltochrista gratiosa</i> (Guerin-Meneville, 1843)	Erebidae	10
19.	<i>Miltochrista linga</i> (Moore, [1860])	Erebidae	13
20.	<i>Nyctemera adversata</i> (Schaller, 1788)	Erebidae	1
21.	<i>Spilosoma leopardina</i> (Kollar, 1844)	Erebidae	9
22.	<i>Spilosoma oblique</i> (Walker, 1855)	Erebidae	17
23.	<i>Utethesia pulchella</i> (Linnaeus, 1758)	Erebidae	2
24.	<i>Grammodes geometrica</i> , (Fabricius, 1775)	Erebidae	9
25.	<i>Ericia inangulata</i> (Guenee, 1852)	Erebidae	2
26.	<i>Hypocala subsatura</i> , (Guenee, 1852)	Erebidae	12
27.	<i>Anomis flava</i> (Fabricius, 1775)	Erebidae	2
28.	<i>Calyptra minuticornis</i> (Guenee, 1852)	Erebidae	2
29.	<i>Anomis mesogona</i> (Walker, 1857)	Erebidae	2
30.	<i>Dichromia pullata</i> , (Moore, 1885)	Erebidae	8
31.	<i>Euproctis fraterna</i> , (Moore, 1883)	Erebidae	6
32.	<i>Laelia testacea</i> , (Walker, 1855)	Erebidae	1
33.	<i>Dasychira complicata</i> , (Walker, 1865)	Erebidae	8
34.	<i>Euproctis sulphurens</i> (Moore, 1888)	Erebidae	2
35.	<i>Artaxa vitellina</i> (Kollar, 1848)	Erebidae	6
36.	<i>Lymantria concolor</i> , (Walker, 1855)	Erebidae	4
37.	<i>Achaea janata</i> (Linnaeus, 1758)	Erebidae	10
38.	<i>Ophiura triphaenoides</i> (Walker, 1858)	Erebidae	3
39.	<i>Lophoptera squammigera</i> Guenée, 1852	Euteliidae	7
40.	<i>Zamarada baliata</i> (Felder, 1874)	Geometridae	6
41.	<i>Pelagodes falsaria</i> Prout, 1912	Geometridae	7
42.	<i>Peratophyga hyalinata hyalinata</i> (Kollar, [1844])	Geometridae	8
43.	<i>Chiasmia effusiata</i> , Guenee	Geometridae	3
44.	<i>Agathia hilarata</i> Guenée, [1858]	Geometridae	5
45.	<i>Chiasmia eleonora</i> (Cramer, [1780])	Geometridae	5
46.	<i>Heterostegane subtessellata</i> (Walker, [1863])	Geometridae	7
47.	<i>Scopula stigmata</i> , (Moore, 1888)	Geometridae	4
48.	<i>Ecliptopera fulvotincta</i> (Hampson, 1895) ^[4]	Geometridae	2
49.	<i>Cleora acaciaria</i> Boisduval, 1833	Geometridae	10
50.	<i>Abraxas fuscescens</i> , Butler, 1886	Geometridae	12
51.	<i>Gonodontis angularia</i> , Moore	Geometridae	5
52.	<i>Ourapteryx ebuleata</i> Guenée, [1858]	Geometridae	10
53.	<i>Ctenognophos eolaria</i> Guenée, [1858]	Geometridae	9
54.	<i>Kunugia lineata</i> (Moore, 1879)	Lasiocampidae	1
55.	<i>Trabala vishnou</i> (Lefèbvre, 1827)	Lasiocampidae	2

56.	<i>Helicoverpa armigera</i> (Hübner, [1805])	Noctuidae	15
57.	<i>Xestia c-nigrum</i> (Linnaeus, 1758)	Noctuidae	13
58.	<i>Mythimna unipuncta</i> (Haworth, 1809)	Noctuidae	2
59.	<i>Spodoptera litura</i> , (Fabricius, 1775)	Noctuidae	16
60.	<i>Thysanoplusia orichalcea</i> (Fabricius, 1775)	Noctuidae	14
61.	<i>Dichagyris flammata</i> (Denis & Schiffermüller, 1775)	Noctuidae	9
62.	<i>Auchmis inextricata</i> (Moore, 1881)	Noctuidae	8
63.	<i>Thyas coronate</i> (Fabricius, 1775)	Noctuidae	1
64.	<i>Mocis undata</i> (Fabricius, 1775)	Noctuidae	11
65.	<i>Chrysodeixis chalcites</i> (Esper, 1789)	Noctuidae	16
66.	<i>Aedia leucomelas</i> (Linnaeus, 1758)	Noctuidae	1
67.	<i>Calesia haemorrhoea</i> , (Guenee, 1852)	Noctuidae	4
68.	<i>Oraesia emarginata</i> , (Fabricius, 1794)	Noctuidae	2
69.	<i>Attonda adpersa</i> (R. Felder & Rogenhofer, 1874)	Noctuidae	1
70.	<i>Lacera alope</i> (Cramer, 1780)	Noctuidae	2
71.	<i>Feliniopsis indistans</i> (Guenee, 1852)	Noctuidae	5
72.	<i>Ophiusa indistincta</i> (Moore, 1882)	Noctuidae	6
73.	<i>Trachea stoliczkae</i> (Felder & Rogenhofer, 1874)	Noctuidae	10
74.	<i>Earias insulana</i> , (Boisduval, 1833)	Nolidae	1
75.	<i>Westermannia superba</i> , (Hubner, 1823)	Nolidae	2
76.	<i>Syntypistis perdix</i> (Moore, 1879)	Notodontidae	6
77.	<i>Theretra clotho</i> (Drury, 1773)	Sphingidae	2
78.	<i>Agrius convolvuli</i> , (Linnaeus, 1758)	Sphingidae	2
79.	<i>Pergesa acteus</i> , (Cramer, 1779)	Sphingidae	1
80.	<i>Phazaca theclata</i> (Guenee, 1858)	Uraniidae	18

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