

AN INVENTORY OF SATYRIDAE (LEPIDOPTERA: RHOPALOCERA) OF NORTH WESTERN INDIA

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Introduction

Biodiversity monitoring and inventoring have acquired an unique place in the formulation of conservation strategies now-a-days. The earlier general concept of conservation in which major emphasis was always (alone) given to vertebrate diversity is changing. There is a renewed thinking in which insects and other invertebrates have been found to be rather quite relevant components of varied habitats/ecosystems. Recently, New (1984, 1992, 1993) has emphasised the conservation aspects of insects including butterflies. Also there are no two opinions that habitat destruction, fragmentation and degradations coupled with illegal hunting and poaching have led to the threatening, endangering and extinction of many species worldwide during the post DDT era. Under two ICAR projects (1991-1994; 1995-1998), authors have surveyed many localities in northwestern India with a view to prepare and update an inventory of the Satyridae.

Material and Methods

The material for present studies comprising fifty-four species has been collected through intensive survey undertaken in different localities in northwestern India which include several remote localities such as Pangi Valley, Manimahesh, Dhansoo, Bharmour, Tissa, Triund, Puh, Sangla, Hurling, Kaza, Kunzamla, Chandertal, Darcha (H.P.); Aglar valley, Bandhal valley, Loharkhet, Dhakuri, Hemkund Sahib and Flower valley (U.P.) etc. As such, the localities from where the collection has been made fall within an altitudinal range of 240m. above sea level to 4561m. above sea level. The material thus collected in the survey has been preserved as per standard techniques in Lepidopterology. The entire material has been critically scrutinized to record variations besides sorting it out on the basis of external genitalic characters. For identification, sources such as Marshall and de Niceville (1883), Elwes and Edwards (1893), Bingham (1905), Evans (1932), Talbot (1947) Wynter-Blyth (1957), Shirozu and Shima (1979), D'Abrera (1985), Mani (1986) and Rose & Sharma (1998) have been consulted. The following key was used to segregate various genera and the species were identified by reference to collection and literature.

Key to the genera of the Satyridae, presently studied

1. Eyes hairy 2
Eyes glabrous 8
2. Forewing with veins 1A+2A and Cu (lower margin of discoidal cell) swollen..... *Mycalesis* Hubner
Forewing with veins 1A+2A not swollen, Cu more or less swollen 3
3. Hindwing with outer margin not evenly rounded, incurved between veins M_1 and M_3 , generally caudate at vein M_3 , tornus slightly but definitely incurved before vein $Cu1b$ 4
Hindwing with outer margin evenly rounded from apex to tornus 7
4. Hindwing with vein $Sc+R_1$ extends about half the length of vein R_s , hindwing underside without an ocellus in $Sc+R_1$; male genitalia with valva not produced into spine at distal end 5
Hindwing with vein $Sc+R_1$ nearly as long as vein R_s , hindwing underside with an ocellus in $Sc+R_1$ or obscure;

male genitalia with valva produced into spine at distal end 6

5. Forewing with upper angle of discal cell evenly rounded, vein Sc terminates at a point above upper angle of discal cell (also referred as end cell), forewing underside with marginal and submarginal lines obscure *Zophoessa* Doubleday
Forewing with upper angle of discal cell angled, vein Sc terminates at a point beyond upper angle of cell, forewing underside with marginal and submarginal lines prominent..... *Lethe* Hubner.
6. Cell of forewing underside crossed by greyish white bars, forewing cell more than half the length of wing, vein R_2 arises before upper angle of cell *Neope* Moore
Cell of forewing underside without bars, forewing cell less than half the length of wing, vein R_2 arises beyond upper angle of cell *Patala* Moore
7. Antennal club pyriform, male genitalia with aedeagus with dorsal teeth present, prominent *Lasiommata* Westwood
Antennal club very slender, male genitalia with aedeagus with dorsal teeth wanting *Pararge* Hubner
8. Hindwing with precostal cell present female genitalia with signa extend the whole length of corpus bursae *Elymnias* Hubner
Hindwing without precostal cell..... 9
9. Forewing with vein Sc swollen..... 10
Forewing without swollen veins; male genitalia with saccus very long; female genitalia with signa oval *Melanitis* Fabricius
10. Forewing with vein 1A+2A thickened at base *Maniola* Schrank
Forewing with vein 1A+2A not thickened at base..... 11
11. Hindwing with upperside marginal and submarginal area white; Jullien's organs present....*Hipparchia* Fabricius
Hindwing with upperside marginal and submarginal area brown or dark brown; Jullien's organs wanting 12
12. Wings crossed by white or pale yellow band on both sides, hindwing with outer margin crenulate *Aulocera* Butler.
Wings not crossed by white or pale yellow band, hindwing with outer margin rounded or convex 13
13. Forewing with vein Cu swollen at base, vein R_2 always from vein R_s ; male genitalia with brachia wanting *Ypthima* Hubner
Forewing with vein Cu not swollen at base, vein R_2 always from cell; male genitalia with brachia present... 14
14. Antennal club spatulate; hindwing underside without ocelli; male genitalia with aedeagus long and slender.... *Paralasa* Moore

Antennal club slender; hindwing underside with ocelli; male genitalia with aedeagus long and broad, slightly curved in the middle 15

15. Hindwing underside with two subapical and two tornal, contiguous ocelli; male genitalia with distal end of valva concave *Dallacha* Moore
Hindwing underside without subapical ocelli or with a continuous series of five or six ocelli; male genitalia with distal end of valva more or less rounded *Callerebia* Butler

Inventory of species

1. *Aulocera brahminus brahminus* (Blanchard)
2. *Aulocera padma padma* (Kollar)
3. *Aulocera saraswati* (Kollar)
4. *Aulocera swaha swaha* (Kollar)
5. *Callerebia annada caeca* Watkins
6. *Callerebia hybrida* Butler
7. *Callerebia nirmala nirmala* (Moore)
8. *Callerebia scandā scandā* (Kollar)
9. *Dallacha hyagriva* (Moore)
10. *Elymnias hypermnestra undularis* (Drury)
11. *Hipparchia parisatis* (Kollar)
12. *Lasiommata maerula maerula* Felder
13. *Lasiommata menava menava* Moore
14. *Lasiommata schakra schakra* (Kollar)
15. *Lethe baladeva aisa* Fruhstorfer
16. *Lethe confusa confusa* Aurivillius
17. *Lethe europa niladana* Fruhstorfer
18. *Lethe insana insana* (Kollar)
19. *Lethe rohria rohria* (Fabricius)
20. *Lethe verma verma* (Kollar)
21. *Maniola davendra davendra* (Moore)
22. *Maniola lupinus cheena* (Moore)
23. *Maniola pulchra* (Felder)
24. *Maniola pulchra pulchra* (Felder)
25. *Melanitis leda ismene* (Cramer)
26. *Melanitis phedima galkissa* Fruhstorfer
27. *Mycalesis francisca sanatana* Moore
28. *Mycalesis heri* Moore
29. *Mycalesis lepcha lepcha* (Moore)
30. *Mycalesis mineus mineus* (Linnaeus)
31. *Mycalesis nicotia* Hewitson
32. *Mycalesis perseus blasius* (Fabricius)
33. *Neope pulaha pulaha* (Moore)
34. *Paralasa kalinda kalinda* (Moore)
35. *Paralasa shallada shallada* Marshall and de Niceville
36. *Pararge eversmanni cashmirensis* Moore
37. *Patala yama yama* (Moore)
38. *Ypthima asterope maharatta* Moore
39. *Ypthima baldus* (Fabricius)
40. *Ypthima hannyngtoni* Eliot
41. *Ypthima huebneri* Kirby
42. *Ypthima indecora* Moore
43. *Ypthima inica* Hewitson
44. *Ypthima kasmira* Moore
45. *Ypthima lisandra* (Cramer)
46. *Ypthima marshalli* Butler
47. *Ypthima nareda* (Kollar)
48. *Ypthima newara* Moore
49. *Ypthima nikaea* Moore
50. *Ypthima sakara* Moore
51. *Ypthima sarkaghatensis* Rose and Sharma
52. *Ypthima singala* Felder
53. *Ypthima uemurai* Rose and Sharma
54. *Zophoessa sidonis* (Hewitson)

General comments

The present survey shows that the species mentioned at serial numbers 2, 3, 4, 14, 19, 20, 21, 25, 26, 27, 29, 30, 38, 41, 43, 45, 47, 48, 49, 50, 53 and 5, 6, 7 and 8 are abundant; and those at 1, 11, 12, 13, 16, 18, 22, 25, 28, 31, 32, 35, 39, 40, 42, 44, 46, 51, 52, 54 are moderate and 9, 15, 17, 23, 24, 33, 34, 36, 37 are relatively less in numbers. Species such as *Maniola pulchella* (Felder), *M. pulchra pulchra* (Felder), *Lethe europa niladana* Fruhstorfer and *Pararge eversmanni cashmirensis* Moore which have previously been reported as common and are distributed only in northwestern Himalaya are found to be quite rare as per present surveys. On the other hand, *Maniola davendra davendra* (Moore) and *Callerebia annada* (Moore) included in the Wildlife (Protection) Act, 1972 have been found to be quite common.

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References

- Bingham, C.T. (1905) *The Fauna of British India, including Ceylon and Burma*. Butterflies 1. London: Francis Taylor: 1-115, Pls. 1-10.
- D'Abrera, B. (1985) *Butterflies of the Oriental Region. Part-II. Nymphalidae, Satyridae and Amathusiidae*. Hill House, Victoria: 295-534.
- Elwes, H.J. and J. Edwards (1893) A revision of the genus *Ypthima*, with especial reference to the characters afforded by the male genitalia. *Trans. ent. Soc. Lond.* 1893: 1-54.
- Evans, W.H. (1932) *The identification of Indian butterflies*, 2nd edition. *The Bombay nat. Hist. Soc.*, Madras, India.
- Mani, M.S. (1986) *Butterflies of the Himalaya*. Oxford & IBH Publ. Co. New Delhi: X+181, 25 pls., 34 figs.
- Marshall, G.F.L. and L. de Niceville (1883) *The Butterflies of India, Burmah and Ceylon*. A descriptive handbook of all the known species of Rhopalocerous Lepidoptera inhabiting that region, with notices of allied species occurring in the neighbouring countries along the border; with numerous illustrations. Volume-1. Calcutta Central Press: 327pp.
- New, T.R. (1984) *Insect Conservation: an Australian Perspective*. W. Junk, Dordrecht.
- New, T.R. (1992) Conservation of butterflies in Australia. *J. Res. Lep.* 29: 237-253.
- New, T.R. (1993) *Conservation Biology of Lycaenidae*. IUCN, Gland, Switzerland.
- Rose, H.S. and N. Sharma (1998) Two new species of the genus *Ypthima* Hubner from the West and N-West Himalaya, India. (Lepidoptera: Papilionoidea: Satyridae) *Geobios new Reports*, (Accepted).
- Shirozu, T. and H. Shima (1979) On the natural groups and their phylogenetic relationships of the genus *Ypthima* Hubner mainly from Asia (Lepidoptera: Satyridae). *Sieboldia* 4(4): 231-295.
- Talbot, G. (1947) *The Fauna of British India, including Ceylon and Burma*. Butterflies Vol.2 Taylor and Francis, London: 506pp.
- Wynter-Blyth, M.A. (1957) *Butterflies of the Indian Region*. The Bombay nat. Hist. Soc. xx+523pp, 72pls.