BUTTERFLIES OF THE GENUS *YPTHIMA* HÜBNER (LEPIDOPTERA: RHOPALOCERA) FROM NORTHWESTERN INDIA

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Abstract

A sample comprising 560 examples, collected from various localities in northwestern India have been identified and belong to, as many as, 16 species viz. *lisandra* Cramer, *singala* Felder, *marshalli* Butler, *baldus* Fabricius, *indecora* Moore, *sarkaghatensis* Rose & Sharma, *nikaea* Moore, *uemurai* Rose & Sharma, *hannyngtoni* Eliot, *sakra* Moore, *kasmira* Moore, *huebneri* Kirby, *inica* Hewitson, *asterope* Klug, *nareda* Kollar and *newara* Moore referable to the genus *Ypthima* Hübner. A key to these species has been prepared by taking into account the structure of the male and female genitalia besides maculation and venation. Owing to variation in maculation, the conspecificity of different individuals has been established on the basis of genitalic structures. In addition to distribution, remarks have been recorded for all the species.

Key words

Ypthima, genitalia, androconia, fascia, Satyrid butterflies

Abbreviations

AED - Aedeagus
CO - Costa
DSF - Dry-season form
DU.EJ - Ductus ejaculatorius
LA.AV - Lamella antevaginalis
O.B - Ostium bursae
PO.APOL - Apophysis Posterioris
SBZ - Subzonal portion of aedeagus
SPZ - Suprazonal portion of aedeagus
UN - Uncus
VLV - Valva
APX.ANG - Appendix angularis
CRP.BU - Corpus bursae
DU.BU - Ductus bursae
DU.SEM - Ductus seminalis
LA.PV - Lamella Postvaginalis
P.A - Papilla analis
SA - Saccus
SL - Sacculus
TEG - Tegumen
VIN - Vinculum
WSF - Wet-season form

Introduction

According to Shirozu and Shima (1979), *Ypthima* Hübner is represented by about 100 species, distributed in the paleotropical and eastern Palearctic regions. Marshall and de Nicéville (1883) separated Indian species into two groups on the basis of presence or absence of the male brand. Besides brand, Moore (1890, 1892) also took into consideration the number of ocelli on underside of the hindwings and assigned various species in the genera *Thympia* Moore, *Kolasa* Moore, *Nadiria* Moore, *Pandima* Moore and *Lohana* Moore. Elwes and Edwards (1893) revised the genus *Ypthima* on world basis and gave an account of the valva of 47 species. Evans (1932) and Talbot (1947) have divided the genus into four groups to accommodate species from the Indian subcontinent. Shirozu (1960) made an attempt to distinguish natural groups of the Formosan *Ypthima* by taking into account the structure of the male genitalia. Eliot (1967) published an account of 14 species of the *sakra* section of this genus, whereas, Hiura (1969) discussed natural groups of the Japanese, Korean, and Formosan *Ypthima* based on the male genitalia.

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During the course of present studies, a sample comprising about 560 examples has been assigned to 16 species (including two new species, Rose & Sharma, 1998) referable to seven groups i.e., *philomela* group, *sakra* group, *huebneri* group, *obscura* group, *asterope* group, *nareda* group and *newara* group (Shirozu & Shima, 1979). Owing to numerous population variations, the male and female genitalia have been taken into

consideration to establish conspecificity besides formulation of a key to the presently studied species. The nomenclature for naming various constituent parts of the genitalia have been followed from Pierce (1909, 1914), Sibatani *et al.* (1954), Shirozu and Shima (1979) and Coutsis (1990).

Results and Discussion

Genus *Ypthima* Hübner
The Rings

Hübner, 1818, Zutr. z. Samml.exot. Schmett. 1:17. Type species by designation by the Commission under its Plenary Power under Article 70 (a): *Ypthima huebneri* Kirby, 1871, Syn. Cat. dirun. Lep.: 95
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Kirby, 1871, Syn. Cat. diurn. Lep.: 95.

An account of variations in the maculation, the structure of the male and female genitalia and distribution record of the *Ypthima* species are as follows.

***Ypthima lisandra* (Cramer)**
The Jewel Fourring
(Figs. 1-7)

Cramer, 1782, Pap. Exot. 4.11 (*Papilio*).

Material examined:
Himachal Pradesh: 1male WSF, 8.ix.92 Kumarsain, Shimla; 1male WSF, 11.ix.92, Dutt Nagar, Rampur, Shimla; 1male WSF, 10.ix.92, 4 females WSF, 12.ix.92, Nogli, Rampur, Shimla; 1male WSF, 7.vii.92, 3 males DSF, 19.iv.93, Sarkaghat, Mandi; 1male WSF, 14.ix.91, Nauni, Solan; 1male WSF, 16.ix.91, Dadegharat, Solan.

Diagnostic features:
Male genitalia: (Fig. 1-6). Uncus short, narrow in lateral view, in dorsal view tapers towards apex; tegumen in dorsal view broader anteriorly, narrow posteriorly; fenestrula small, membranous spot; appendices angulares small, stumpy, blunt distally; vinculum longer than tegumen, inwardly curved, narrow proximally, broader distally; saccus stumpy with rounded distal end; valva broad, costa with triangle-like costal process, distal end with dorsal conical process and ventral thumb like process, setae present on ventral margin; juxta semicircular sclerotized plate; aedeagus long, narrow proximally, broader distally, straight in dorsal view, curved dorsally in lateral view except anterior one-third, suprazone longer than subzone, ductus ejaculatorius entering dorsally.

Female genitalia: (Fig. 7). Anterior portion of copulatory cavity broadly sclerotized near lamella antevaginalis; the latter broad, deeply notched posteriorly; lamella postvaginalis membranous; apophysis anterioris wanting, apophysis posterioris small, membranous; papilla analis elongated, pilose; ductus seminalis originate from ductus bursae near corpus bursae; ductus bursae moderately long, broader near corpus bursae; the latter globular, strongly sclerotized.

Forewing length: Male: 18.0 mm.; Female: 18.0 mm

Remarks: The species, under reference, shows some variations in the dry and wet-season forms. The subapical ocellus on dorsal side of the forewing may be wanting (2 males WSF, 1male DSF), indistinct (2 males WSF, 2 males DSF) or developed (2 males WSF) and bipupilled. The species also shows sexual dimorphism as the subapical ocellus on upperside of the forewing is always well developed in females, whereas, in males it is not so. Similarly, on upperside of the hindwing, a pair of subtornal ocelli may be yellow ringed or without any rings in either sex. The subtornal spots may be either equal in size or unequal or even reduced to small specks as seen in one of the specimens of a dry form. In other two dry form specimens, the subtornal spots are well developed on upperside of the hindwings. Their sampling being done on the same date i.e., 19.iv.1993 in the same locality i.e. Sarkaghat (Mandi, H.P., 750 m.). Similarly, on the underside ,there are five ocelli, out of which the anal is bipupilled. The individuals of the wet season form also shows that the ocelli present between interspaces Cu 1a and M_3 may be separated or joined together.

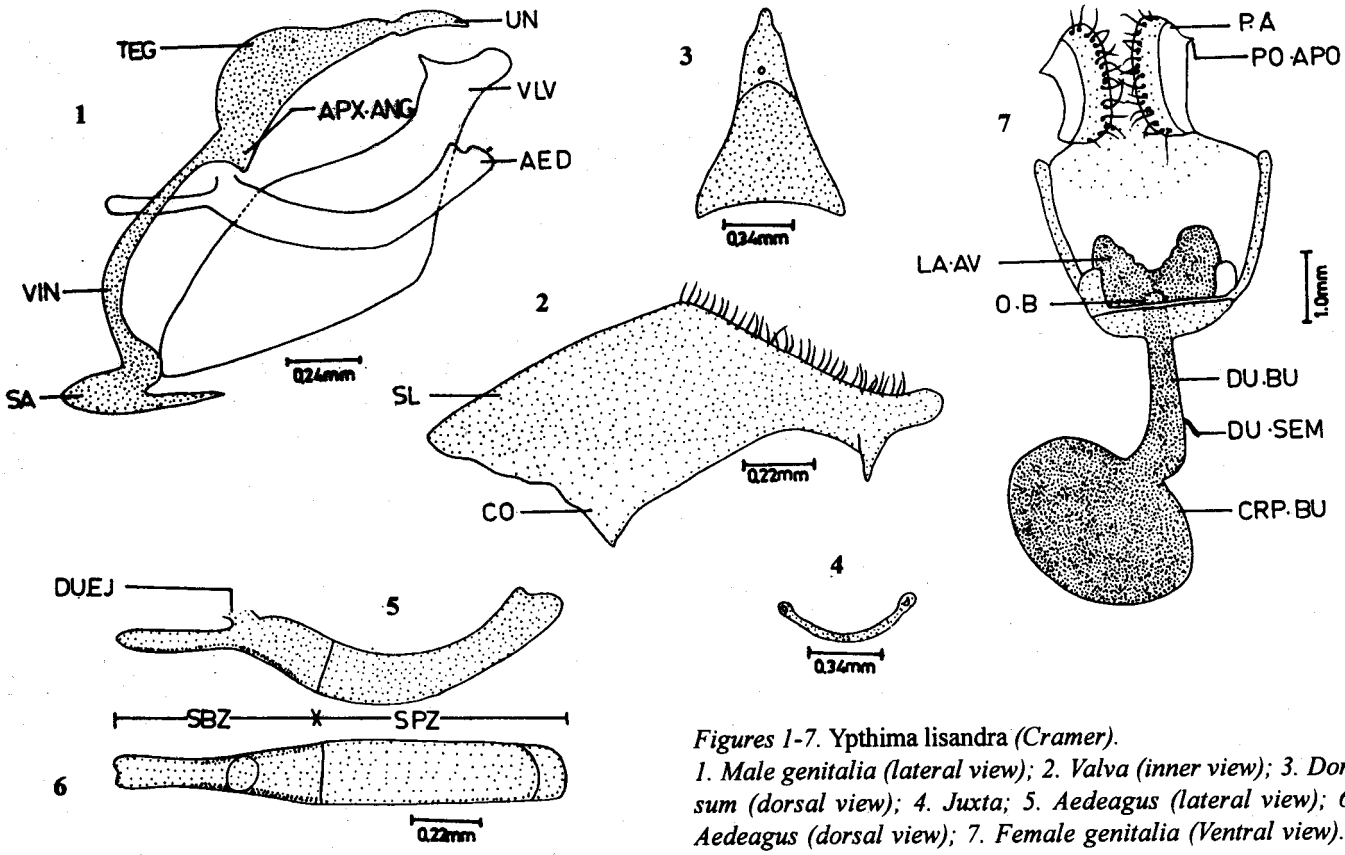
Owing to all these variations, a series of seven males and two females have been dissected and individuals of either sex have been found to be conspecific. It may also be added that though Elwes and Edwards (1893) outlined one of the valva of the male genitalia of this species but it is slightly wrongly drawn and hence it is corrected accordingly.

Regarding nomenclature, *lisandra* Cramer has been considered to be a full-fledged species by Talbot (1947), Shirozu and Shima (1979) and Varshney (1994). The species has restricted distribution, as evident from the presently examined material.

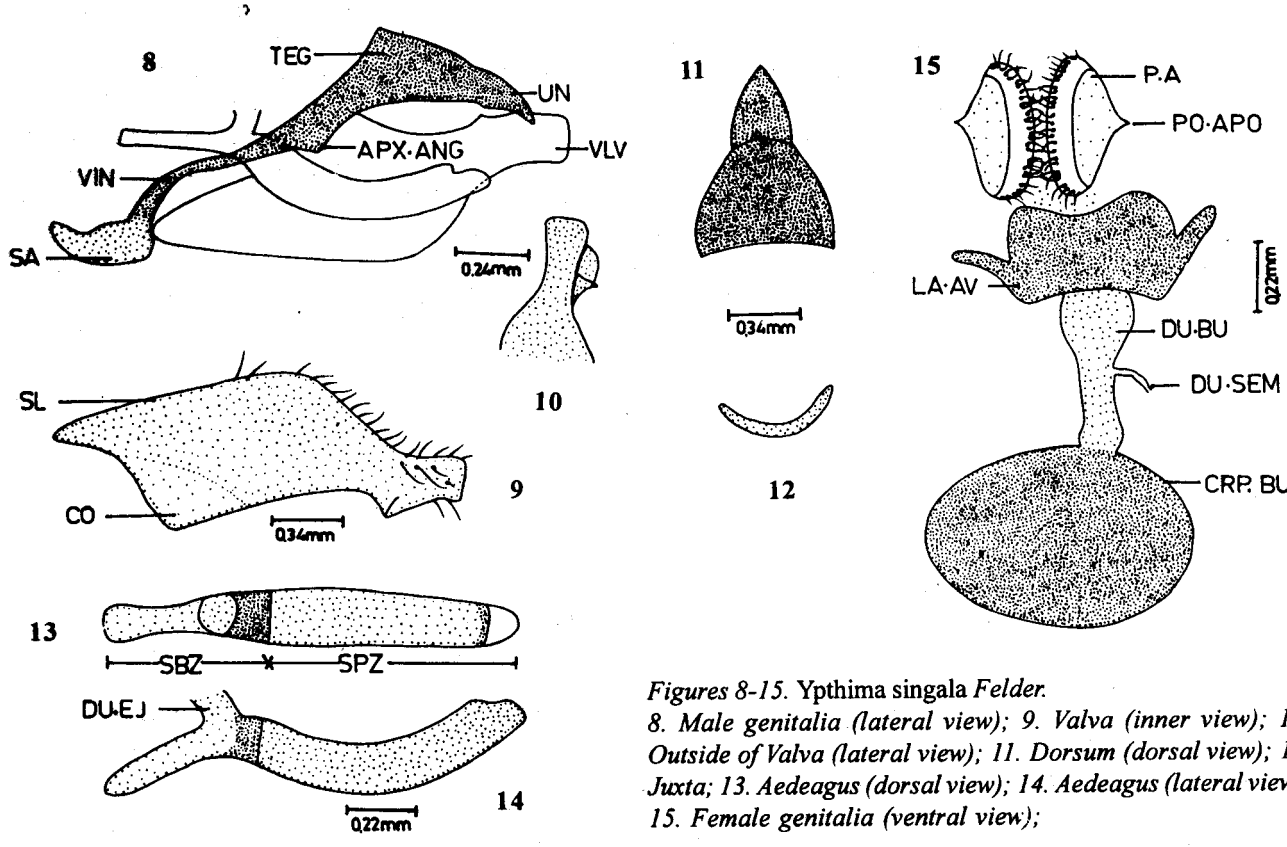
***Ypthima singala* Felder**
The Jewel Fourring
(Figs. 8-15)

Felder, 1868, Verh. zool -bot. Wien. 18: 283 (*Ypthima*).

Material examined:
Himachal Pradesh: 8 males, 1 female WSF, 6.ix.92, Saketi, Sirmaur; 4 males DSF, 29.ix.91 Parwanoo, Solan.
Punjab: 2 males DSF, 30.v. 91, Talwara, Hoshiarpur.
Uttar Pradesh: 6 males DSF, 8.vi.92, Garhwal University, Srinagar.



Figures 1-7. Ypthima lisandra *(Cramer).*
1. Male genitalia (lateral view); 2. Valva (inner view); 3. Dorsum (dorsal view); 4. Juxta; 5. Aedeagus (lateral view); 6. Aedeagus (dorsal view); 7. Female genitalia (Ventral view).



Figures 8-15. Ypthima singala *Felder.*
8. Male genitalia (lateral view); 9. Valva (inner view); 10. Outside of Valva (lateral view); 11. Dorsum (dorsal view); 12. Juxta; 13. Aedeagus (dorsal view); 14. Aedeagus (lateral view); 15. Female genitalia (ventral view);

Diagnostic features:
Male genitalia: (Figs. 8-14). Uncus in dorsal view appears some what triangle-like with broad base, in lateral view gradually slender towards apex, short, setae absent; brachia wanting; tegumen in dorsal view broad, longer than uncus, narrow ventrally in lateral view; fenestrula small, rounded membranous spot; appendices angulares stumpy; vinculum longer than tegumen, narrow at middle than at both the ends; saccus short, slightly depressed dorsally near distal end; valva broad, costa long and narrow with more or less rounded projection on its dorsal surface, sparsely setosed; juxta semicircular; aedeagus moderately long, bat-like in dorsal view, curved dorsally in lateral view except anterior one third, subzone smaller than suprazone, anterior margin rounded, ductus ejaculatorius entering dorsally.

Female genitalia: (Fig. 15). Copulatory cavity broadly sclerotized near lamella antevaginalis; latter some what rectangular with posterior margin incurved; lamella postvaginalis membranous; apophysis anterioris missing, apophysis posterioris small, membranous; papilla analis elongated, pilose; ductus seminalis attaching ductus busae nearly in the middle; the latter broad posteriorly; corpus brusae globular strongly sclerotized.

Forewing length: Male: 17.0 mm.; Female: 17.0 mm.

Remarks: According to Shirozu and Shimla (1979), the species, under reference, has long been considered as a subspecies of *avanta* Moore (Evans, 1932) and *lisandra* Cramer (Talbot, 1947) by the respective workers. During the course of present studies, 20 males representing variations in respect of ocelli (reduced in dry form 12 males; well developed in wet form 8 males) on the underside of the hindwings have been dissected and found to be conspecific. Similarly, the subapical spot on upperside of the forewings is missing in fifteen males, moderately developed in three males and well developed in two males besides that the subtormal spots on upperside of the hindwings may be well developed or indistinct and equal sized or unequal sized have also been found to be similar on the basis of genitalia.

Ypthima marshalli Butler
(Figs. 16-22)

Butler, 1882, Ann. Mag. Nat. Hist. 10: 373 (*Ypthima*).

Material examined:
Himachal Pradesh: 1 male, 3 females WSF, 18.vii.92, Sarkaghat, Mandi; 2 females DSF, Jawalamukhi, Kangra.

Diagnostic features:
Male genitalia: (Figs. 16-21). Uncus strongly curved ventrally in lateral view, in dorsal view slender towards apex, broad at base, fringed with small setae anterio-dorsally; brachia missing; tegumen in dorsal view gradually narrowed posteriorly, laterally compressed, narrow ventrally; fenestrula small, rounded, membranous spot; appendices angulares stumpy; vinculum longer than tegumen, almost uniform in breadth, slightly incurved; saccus short, narrow and rounded distally; valva elongated, proximal half broader, distal end, sparsely setosed; juxta V- shaped; aedeagus straight in dorsal view, curved ventrally in lateral view, subzone squeezed in the middle in dorsal view, suprazone longer than subzone, ductus ejaculatorius entering dorsally.

Female genitalia: (Fig. 22). Anterior portion of copulatory cavity broader; lamella antevaginalis with nearly rectangular process, slightly concave posteriorly, fringed with setulae; lamella postvaginalis membranous; apophysis anterioris wanting, apophysis posterioris minute, strongly sclerotized; papilla analis ellipsoidial, pilose; ductus seminalis originate from ductus bursae near corpus bursae; ductus bursae moderately long; corpus bursae globular.

Forewing length: Male: 17.0 mm.; Female: 17.0 mm.

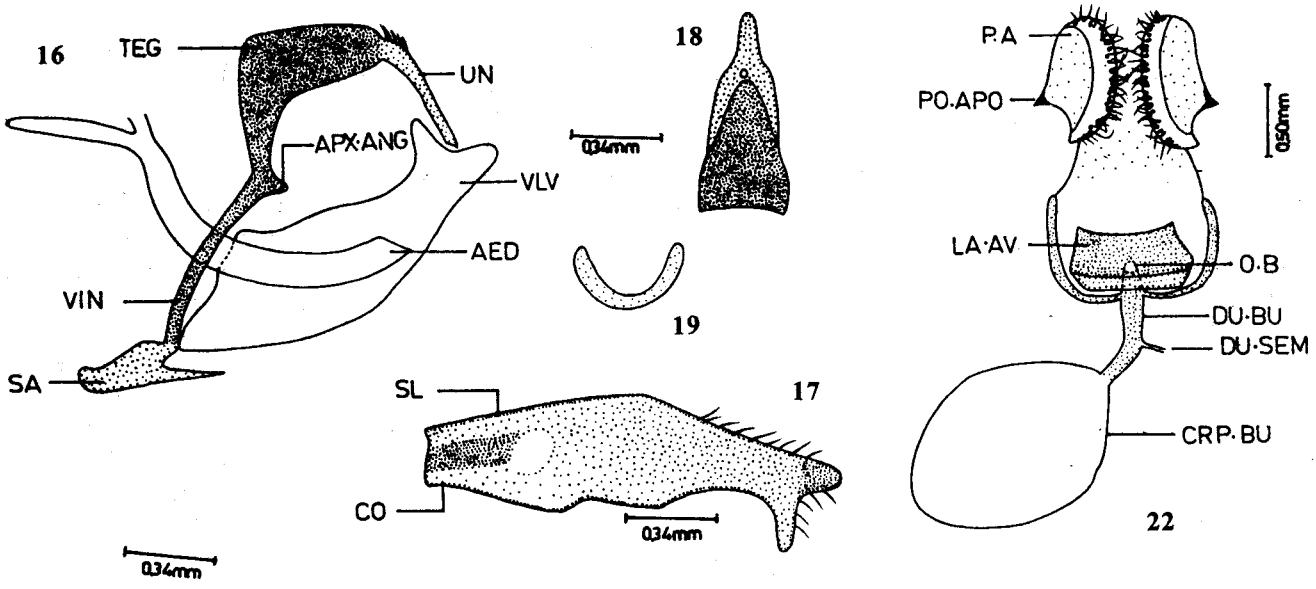
Remarks: Elwes and Edwards (1893) while giving an outline of the tegumen and valva of *marshalli* Butler, have cautioned that the description given by Butler (1882) applies only to the dry-season from and its type (female) lies in the Natural History Museum, London (formerly BMNH, London). Workers like Marshall and de Nicéville (1883), and Elwes and Edwards (1893), considered it a full-fledged species, while Bingham (1905) and Talbot (1947) took it as a synonym of *baldus* Fabricius. The valva of the male genitalia agrees with the figure given by Elwes and Edwards (1893). The structures such as the genital plate, corpus bursae, origin of ductus bursae and ductus seminalis in the female genitalia and the aedeagus (coecun highly specialised), uncus, tegumen and valvae in the male genitalia are different from *baldus* species under which it has been considered as a synonym, so far. In view of these genitalic differences, besides absence of the brand, *marshalli* Butler becomes a distinct species different from *baldus* Fabricius. Accordingly, the species, under reference is removed from the synonymy of *baldus*. The distribution of this species in western Himalaya is a new record.

Ypthima baldus (Fabricius)
The Common Fivering
(Figs. 23-30)

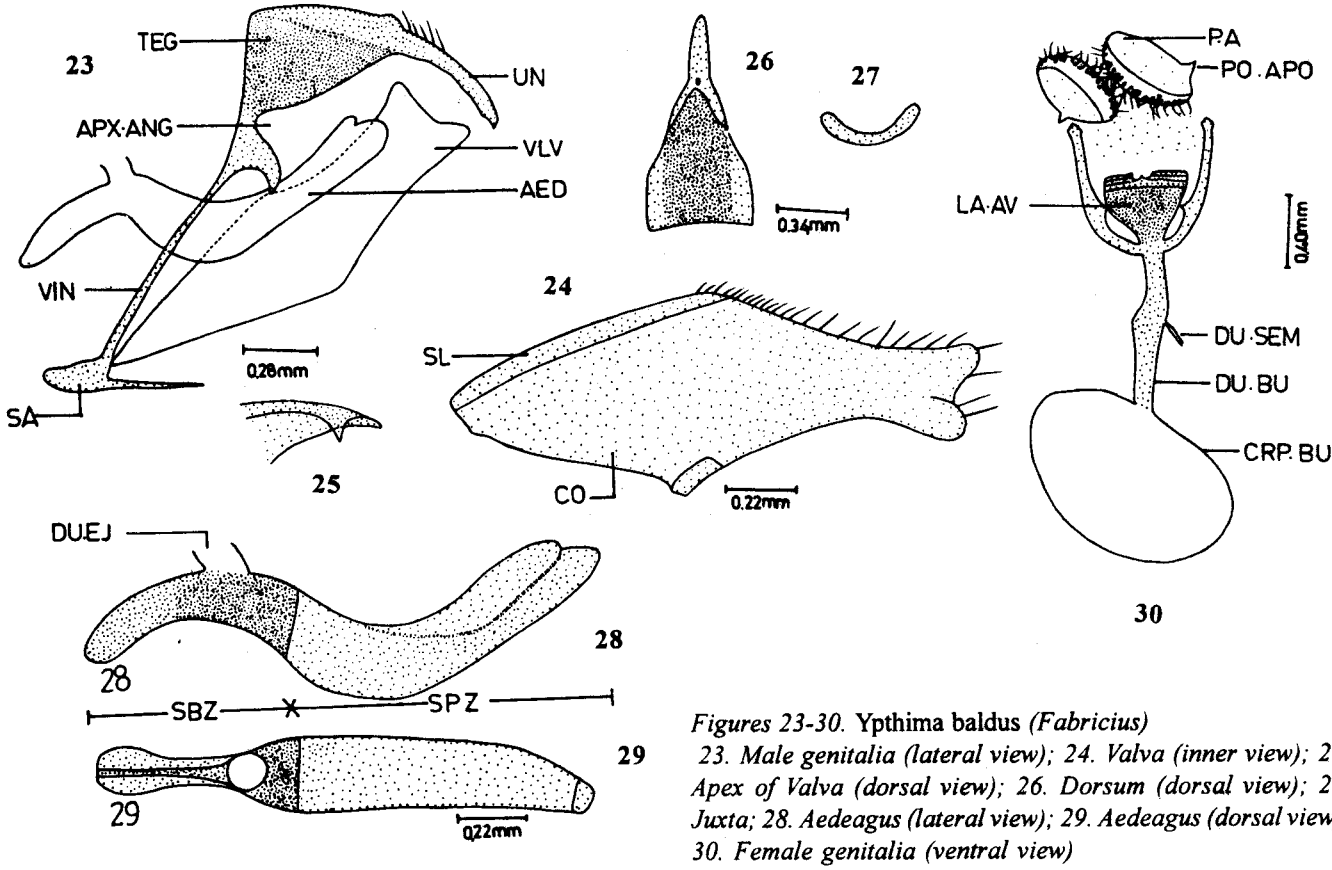
Fabricius, 1775, Sys. Ent. (3) 1:829 (*Papilio*).

Material examined:
Himachal Pradesh: 1 male, 1 female DSF, 4.xi.93, Paonta Sahib, Sirmaur.
Uttar Pradesh: 3 males WSF, 6.ix.92, 1 female WSF, 9.vi.93, Forest Research Institute, Dehradun.

Diagnostic features:
Male genitalia: (Figs. 23-29). Uncus in lateral view slightly curved



Figures 16-22. Ypthima marshalli *Butler*
16. Male genitalia (lateral view); 17. Valva (inner view); 18. Dorsum (dorsal view); 19 juxta; 20. Aedeagus (dorsal view); 21. Aedeagus (lateral view); 22. Female genitalia (ventral view)



Figures 23-30. Ypthima baldus *(Fabricius)*
23. Male genitalia (lateral view); 24. Valva (inner view); 25. Apex of Valva (dorsal view); 26. Dorsum (dorsal view); 27. Juxta; 28. Aedeagus (lateral view); 29. Aedeagus (dorsal view); 30. Female genitalia (ventral view)

ventrally, in dorsal view broad at base, tapers posteriorly, distal end pointed, sparsely setosed at base dorsally; brachia wanting; tegumen dorsally broad, narrow posteriorly, in lateral view small ridge present at posterior end, broad, longer than uncus; fenestrula small, oval, membranous spot; appendices angulares hooked, broad at base; vinculum longer than tegumen, thin, almost straight; saccus short, distal end rounded; valva broad at middle than both the ends, costa long with small rectangular costal process, sacculus narrow and long, distal end forked in dorsal view, sparsely setsoed; juxta semicircular, sclerotized plate; aedeagus straight in dorsal view, strongly curved dorsally in lateral view, subzone smaller, ductus entering dorsad.

Female genitalia: (Fig. 30). Anterior portion of copulatory cavity narrow, broader posteriorly; lamella antevaginalis with single some what triangular plate, posteriorly notched in the middle; apophysis anterioris wanting, apophysis posterioris small, membranous; papilla analis oblong, pilose; ductus seminalis attaching ductus bursae nearly in the middle; the latter broad at middle than both the ends; corpus bursae elliptical in shape, membranous.

Forewing length: Male: 17.0 mm.; Female: 19.0 mm.

Remarks: While working on *philomela* group of the genus *Ypthima*, 17 individuals were tentatively sorted out as belonging to the *baldus* complex. During his studies on butterflies in Thailand, Pinratana (1988) has stated that the *baldus* complex may comprise a single variable species or upto three species lacking distinctive morphological characters. The male gentalia of individuals collected from Dehradun and Paonta Sahib in the Dun Valley conform to the description and diagnosis given for *baldus* Fabricius by Aoki and Uemura (1984). The female genitalia of this species is described for the first time.

Further, both the dry and wet-season forms, mentioned above, have been presently examined. According to Pinratana (1988), the individuals can usually be separated without great difficulty in WSF but may be very hard to distinguish in the DSF. Since workers, like Bingham (1905), Evans (1932), Talbot (1947), Wynter-Blyth (1957) and Mani (1986) did not examine the male and female genitalia without which identity of the species cannot be authenticated, have referred that it is present form Chamba to Assam (no locality mentioned) which appears to be apparently wrong. As per present studies, the species seems to be restricted only to the Dun valley.

Ypthima indecora Moore
The Western Fivering
(Figs. 31-37)

Moore, 1882, Proc. Zool. Soc. Lond., 1882: 238 (*Ypthima*).

Material examined:
Himachal Pradesh: 7 males WSF, 20.vi.93, Tissa Bridge, Tissa, Chamba; 4 males, 1 female WSF, 14.ix.91, Nauni, Solan.
Uttar Pradesh: 7 males WSF, 10.vi.92, Gopeshwar, Chamoli.

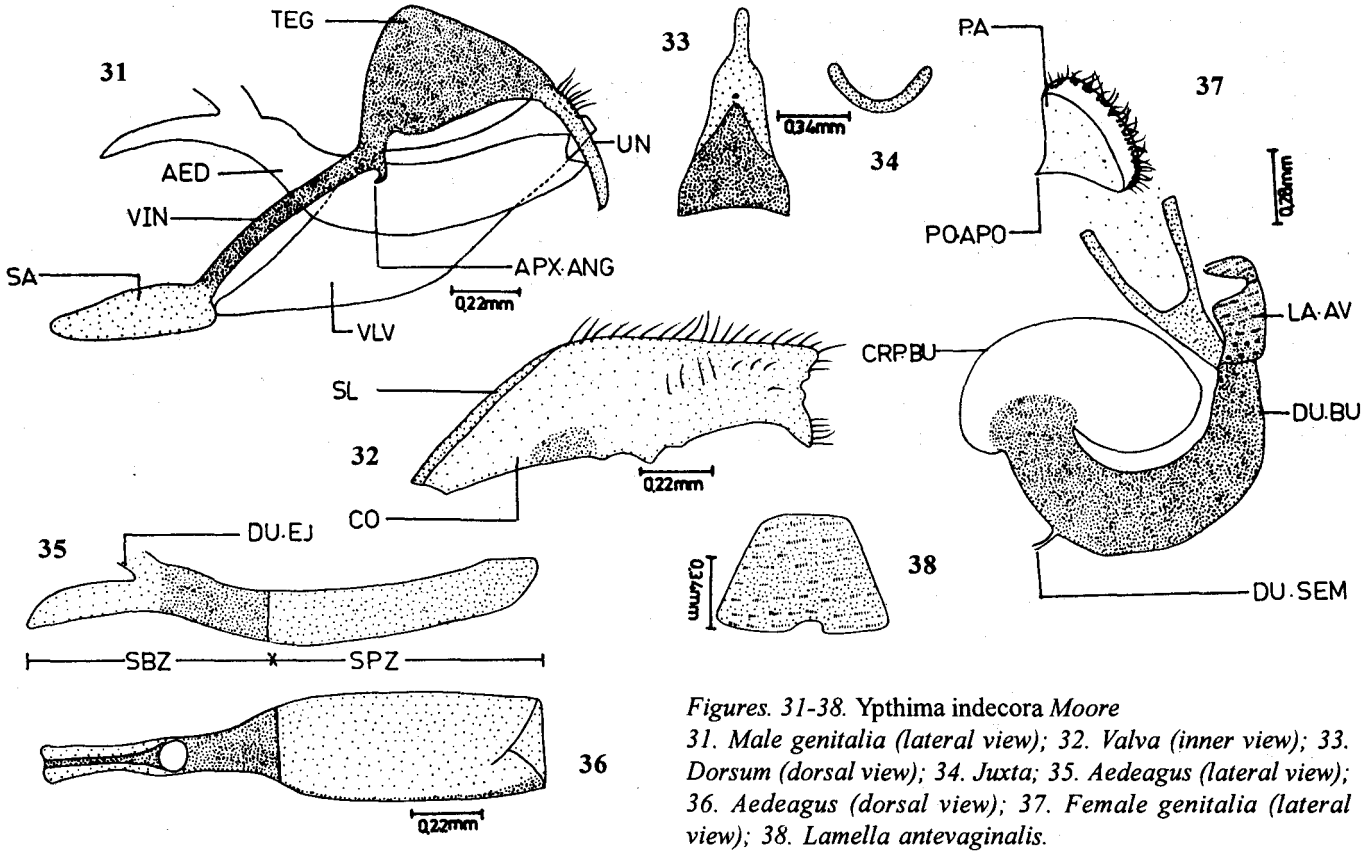
Diagnostic features:
Male genitalia: (Figs. 31-36). Uncus in dorsal view broad at base, gradually becoming slender to apex, strongly curved ventrally in lateral view, distal end pointed, small, sparse setae present at base dorsally; tegumen in dorsal view broader anteriorly, narrowed posteriorly, long and broad laterally; fenestrula very small membranous spot; appendices angulares small, hook-like; vinculum longer than tegumen, strap-like; saccus short proximally, narrowed distally; valva broad, trapezoid, costa long and narrow, distal end slightly notched, pilose; juxta V-shaped; aedeagus long, tubular, in dorsal view proximal half narrowed, distal half broad, slightly curved dorsally in lateral view, suprazone longer than subzone, ductus ejaculatorius entering dorsally.

Female genitalia: (Figs. 37-38). Copulatory cavity narrow anteriorly, broader posteriorly; lamella antevaginalis with broad, somewhat rectangular process, notched posteriorly in the middle, clothed with minute setulae; lamella postvaginalis membranous; apophysis anterioris missing, apophysis posterioris small, membranous; papilla analis oblong, pilose; ductus seminalis originate from ductus bursae near corpus bursae; ductus bursae long, sharply curved and broad; corpus bursae roughly subglobular.

Forewing length: Male: 13.0 mm.; Female: 13.0 mm.

Remarks: Ninteen individuals representing wet-season form were examined and identified as *Ypthima indecora* Moore, owing to the occurrence of ocelli in twos on underside of the hindwings. However, males collected from Tissa and Gopeshwar show intraspecific variations such as the two ocelli present on upperside of the hindwings may be equal or unequal or may be fused or separated. One of the males collected from Tissa has an additional small subapical ocellus on upperside of the hindwing. Similarly, middle pair of ocelli on underside of the hindwings may be equal sized and joined with each other or unequal sized and narrowly spaced. One male collected on the same date and time (10.vi.92) form Gopeshwar posseses relatively reduced ocelli on the undersurface which are clearly spaced. All these males are conspecific genitically though some minor variations have been noticed in the distal part of the valva, as have also been reported earlier in another satyrid species i.e., *Maniola jurtina* Linnaeus by Goulson (1993).

Ypthima indecora Moore has been described as a race of *Ypthima philomela* (Linnaeus) by Bingham (1905), whereas, workers such as Marshall and de Nicéville (1883), Elwes and Edwards (1893), Evans (1932), Talbot (1947), Wynter-Blyth (1957), Shirozu and Shima (1979) and Mani (1986) have reported it as a full-fledged



Figures. 31-38. Ypthima indecora *Moore*
31. Male genitalia (lateral view); 32. Valva (inner view); 33. Dorsum (dorsal view); 34. Juxta; 35. Aedeagus (lateral view); 36. Aedeagus (dorsal view); 37. Female genitalia (lateral view); 38. Lamella antevaginalis.

species.

Ypthima nikaea Moore
The Himalayan Fivering
(Figs. 39-45)

Moore, 1874. Proc. Zool. Soc. Lond., 1874: 576 (*Ypthima*).

Material examined:
Uttar Pradesh: 6 males, 5.vi.92, 4 males, 5.vi.93, Bhilaru pumping station, Mussoorie, Dehradun; 5 males, 2 females, 6.vi.93, Murray Pumping Station, Mussoorie, Dehradun; 5 males, 6.vi.92, 6 males, 5.vi.93, Kempty Falls, Mussoorie, Dehradun; 2 males, 4.vi.92, Aglar Valley, Mussoorie, Dehradun; 1 male, 9.vi.93, Bandhal Nadi, Dhanolti, Dehradun.

Diagnostic features:
Male genitalia: (Figs. 39-44). Uncus smaller than tegumen, nearly straight becoming slender towards apex, sparsely setosed on both the surfaces; tegumen in dorsal view rather narrow, weakly narrowed posteriorly, narrow ventrally; appendices angulares broad with rounded distal end; fenestrula small and membranous spot; vinculum broader near saccus, strap-like, almost equal to tegumen; saccus broad proximally, narrow distally; valva broad, costa slightly upwardly produced, long, sacculus long and narrow, dorso-distal end serrated, ventro-distal portion strongly projected and marginally serrated, pilose; juxta V-shaped; aedeagus straight in dorsal view and depressed near anterior end, curved dorsally in lateral view, ductus ejaculatorius entering dorsally.

Female genitalia: (Fig. 45). Anterior portion of copulatory cavity broader and weakly sclerotized; lamella antevaginalis with two, moderately long, strongly sclerotized processes; lamella postvaginalis single lobed, somewhat oval process; apophysis anterioris missing, apophysis posterioris small, membranous; papilla analis globular, pilose; ductus seminalis originates from ductus bursae near corpus bursae; ductus bursae broader and moderately long; corpus bursae oval, membranous.

Forewing length: Male: 23.0 mm.; Female: 23.0 mm.

Remarks: While examining *sakra*-complex, twenty nine males and two females having a distinct brown submarginal transverse fascia on underside of the hindwings were segregated as *nikaea* Moore. The whole sample has been collected from Mussoorie, where this species shares its habital with a closely allied species i.e., *sakra* Moore. In all these specimens, two apical ocelli on underside of the hindwings are relatively larger and joined together with a yellow band between them. Fujioka (1970) has also reported that these two species fly together in Nepal but

Shirozu and Shima (1979) have remarked that detailed examination is needed as to whether both these speices are truly different or not. Besides, female genitalic differences, both the species can be separated out on the basis of androconia and uncus and tegumen of the male genitalia.

Elwes and Edwards (1893) reported this species as *austeni* Moore under *Ypthima* Hübner while Bingham (1905) synonymised this specific name alongwith *nikaea* Moore under *sakra* Moore. However, Evans (1932) and Talbot (1947) have described it as an independent species.

Regarding distribution, Mackinnon and de Nicéville (1897) have reported it from Mussoorie which appears to be a good habitat from where it has also been presently collected.

Ypthima hannyngtoni Eliot
Hannyngtons Fivering
(Figs. 46-51)

Eliot, 1967, Entom. 100: 54 (*Ypthima*).

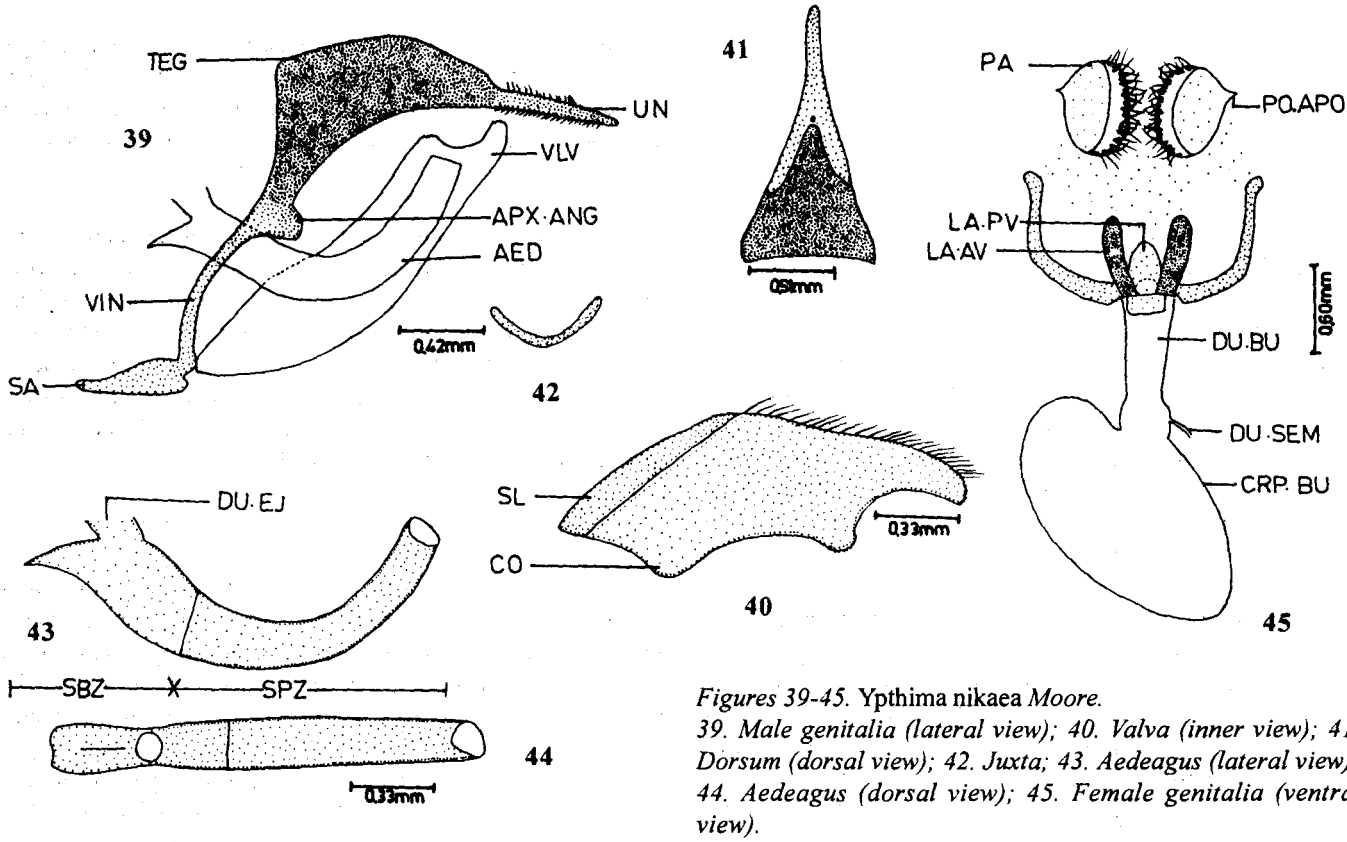
Material examined:
Himachal Pradesh: 2 males, 29.vi.92, Triund, Dharmsala, Kangra. Uttar Pradesh: 2 males, 15.vi.94, Chakrata, Dehradun; 4 males, Loharkhet to Dhakuri, Almora.

Diagnostic features:
Male genitalia: (Figs. 46-51). Uncus with broad base, tapers posteriorly in dorsal view, sparsely setosed dorsally and ventrally, posterior end rounded; tegumen broad anteriorly, narrow posteriorly in dorsal view, longer than uncus; fenestrula small, oval, membranous spot; appendices angulares somewhat triangle-like; vinculum narrow and weakly curved at middle, broader at both the ends, longer than tegumen; saccus moderately long, narrow at distal end; valva broad at middle than both the ends, pilose, costa long, weakly developed costal process, dorso-distal portion arc-like, serrated, ventro-distal end axe-like, serrated; juxta V-shaped; aedeagus with subzone smaller, suprazone longer, strongly curved dorsally, coecum with margin deeply notched, ductus entering dorsally.

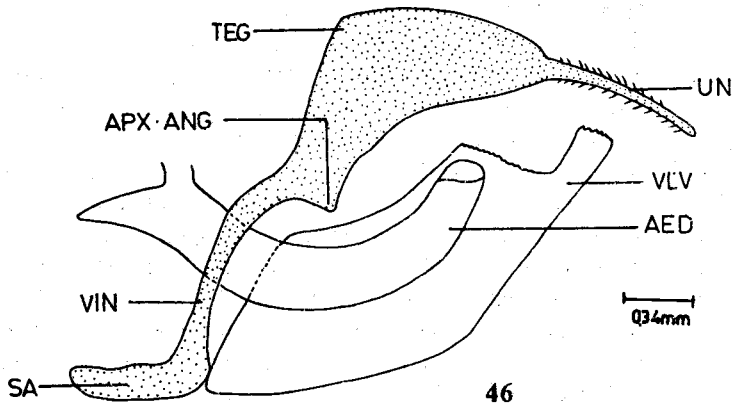
Female genitalia: Not studied.

Forewing length: Male: 20.0-22.0 mm.

Remarks: During the course of present studies, a sample comprising eight males collected from the above mentioned localities has been identified as *Ypthima hannyngtoni* (Eliot, 1967). The latter author while reporting this species has remarked that there is always an additional small blind ocellus in M_1 on



Figures 39-45. Ypthima nikaea *Moore.*
39. Male genitalia (lateral view); 40. Valva (inner view); 41. Dorsum (dorsal view); 42. Juxta; 43. Aedeagus (lateral view); 44. Aedeagus (dorsal view); 45. Female genitalia (ventral view).



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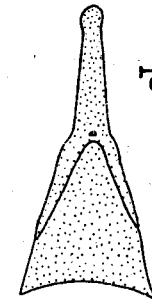

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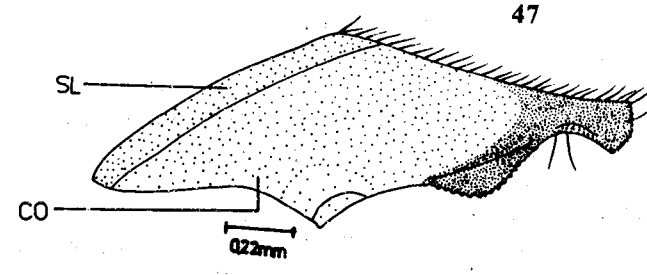

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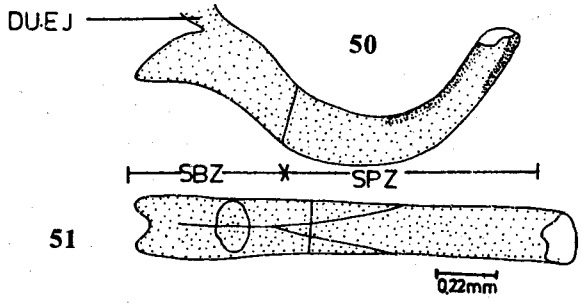

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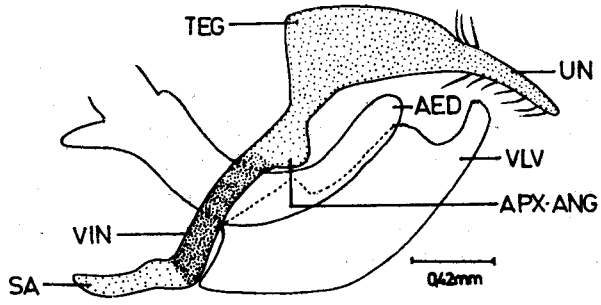
Figures 46-51. Ypthima hannyngtoni *Eliot.*
46. Male genitalia (lateral view); 47. Valva (inner view); 48. Dorsum (dorsal view); 49. Juxta; 50. Aedeagus (lateral view); 51. Aedeagus (dorsal view)



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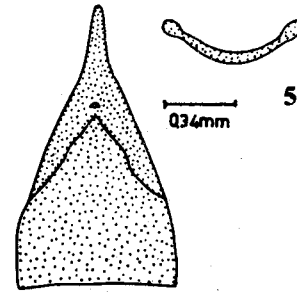

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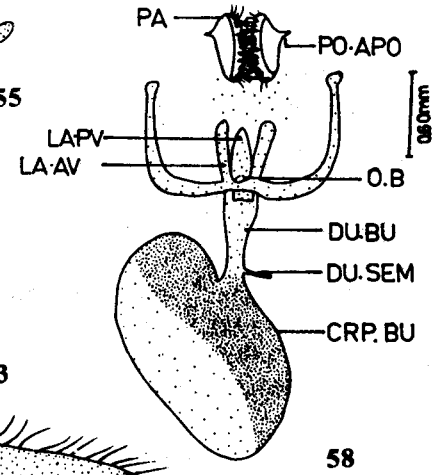

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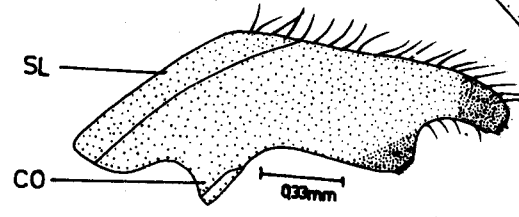

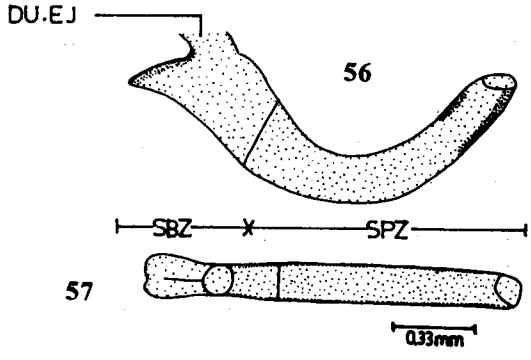

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Figures 52-58. Ypthima sakra *Moore.*
52. Male genitalia (lateral view); 53. Valva (inner view); 54. Dorsum (dorsal view); 55. Juxta; 56. Aedeagus (lateral view); 57. Aedeagus (dorsal view); 58. Female genitalia (ventral view).

upperside of the hindwings (very seldom found in *nikaea* Moore) and its underside resemble *nikaea* except that usual dark submarginal fasciae are wanting. Individuals collected from Triund have the ocellus in space Cu1b divided by a yellow line into lower minute blind ocellus and upper larger white centred ocellus, whereas, the specimens from Kumaon and Chakrata have single large ocellus with white centre in Cu1b. In view of these variations, these variable males were dissected and found similar to each other in every respect. Loharkhet to Dhakuri is a new distributional record in the Kumaon Himalaya.

Ypthima sakra Moore
The Himalayan Fivering
(Figs. 52-58)

Moore, 1857, in Horsfield and Moore, Cat. Lep. Ins. E. Ind. Co. 2:236 (*Ypthima*).

Material examined:
Himachal Pradesh: 8 males, 12.ix.92, Taklech, Rampur, Shimla.
Uttar Pradesh: 11males, 6 females, 3.vi.92, 8 males, 6 females, 5.vi.92, 8 males, 4 females, 2.vi.93, 8 males, 2 females, 3.vi.93, 9 males, 4 females, 5.vi.93, Bhilaru Pumping Station, Mussoorie, Dehradun; 2 males, 6.vi.93, Murray Pumping Station Mussoorie, Dehradun; 4 males, 2.vi.92, Aglar Valley, Mussoorie, Dehradun; 6 males, 4.vi.92, Company Garden, Mussoorie, Dehradun.
Jammu & Kashmir: 2 males, 28.viii.94, 7 males, 29.vii.94, Patni Top.

Diagnostic features:
Male genitalia: (Figs. 52-57). Uncus in lateral view weakly curved ventrally, tapers posteriorly with rounded distal end, base broad, sparsely setosed at base dorsally and ventrally; brachia wanting; tegumen longer than uncus, in dorsal view broad anteriorly, narrow posteriorly slightly curved ventrally; appendices angulares broad, short with blunt distal end; vinculum longer than tegumen, broader, slightly curved inwardly at middle; saccus moderatly long with concical distal end; valva broad, costal process narrow, rectangular, sacculus long and narrow, dorso-distal end rounded, serrated, ventro-distal portion digitate with serrated end, sparsely setosed; juxta V-shaped; aedeagus straight in dorsal view, squeezed near anterior end, strongly curved dorsally, ductus ejaculatorius entering dorsally.

Female genitalia: (Fig. 58). Copulatory cavity broader and weakly sclerotized anteriorly; lamella antevaginalis with two, weakly sclerotized processes; lamella postvaginalis with single conical lobe; apophysis anterioris wanting, apophysis posterioris small, membranous; papilla analis elongated, pilose; ductus seminalis attaching ductus bursae near corpus bursae; ductus bursae narrow anteriorly, broader posteriorly; corpus bursae globular.

Forewing length: Male: 24.0-25.0 mm.; Female: 24.0-25.0 mm.

Remarks: A phenon comprising 73 male and 22 female individuals have been presently examined for the species, *sakra* Moore. According to Moore (1857), absence of a yellow intervening band betwen the apical ocelli on underside of the hindwings is a test character of this species, as has also been stated by D'Abrera (1985). During the course of present studies, it has been observed that geminated condition of these subcostal spots on underside of the hindwings is quite variable even in those individuals, collected from the same locality (Mussoorie) on the same date. In sixty-two individuals, there is a single outer ring while these ocelli are split in the remaining 33 individuals. So much so, the condition is not consistent on the right and left underside of the hindwing. In four individuals, there is an additional minute spot below the geminated spot. The ocellus in space 1A+2A on underside of the hindwings is with a single white dot in a specimen from Taklech. The number of ocelli on upperside of the hindwings are also variable.

In view of above differences, particularly exhibited by the geminated spot (referred as a test character by Moore, 1857), a series of 10 males and four females have been dissected and the male genitalia agrees with the diagram given by Shirozu and Shima (1979), thus confirming the conspecificity of different individuals. Further, Eliot (1967) has mentioned that the broadly uniform pattern of the male genitalia in this group of species shows considerable individual variations, particularly in the breadth of the valva on the length of its inwardly curving terminal projection. However, this has been found to be consistent in the present case.

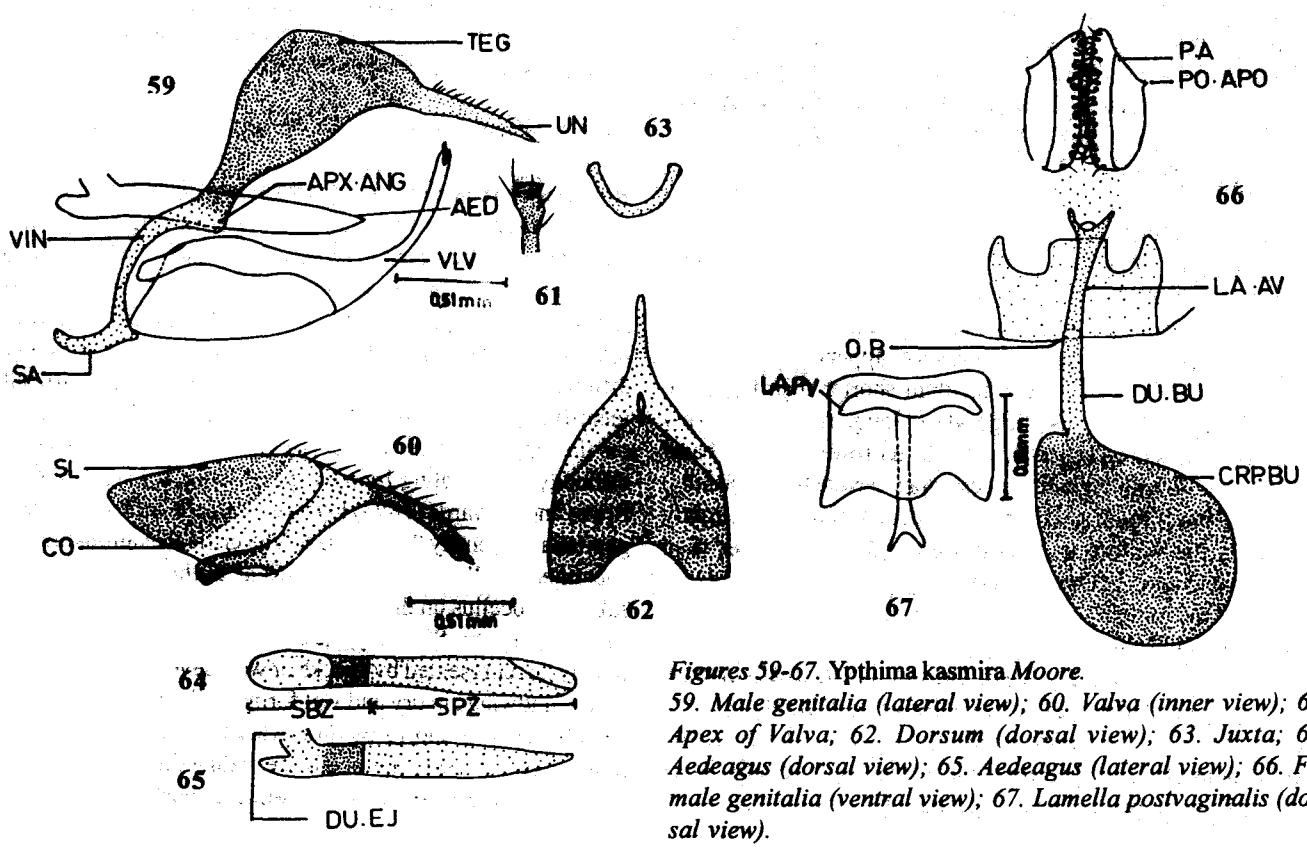
The ground colour on the underside of the wings is with yellow striations and there is no submarginal fascia present in all individuals of this species. The brand is obscure in this species (Moore, 1857). It could not be collected from its earlier known localities such as Shimla, Pangi and Chamba (Marshall and deNicéville, 1883). However, Taklech, Mussoorie and Patni Top are new distribution records.

Ypthima kasmira Moore
The Kashmir Fourring
(Figs. 59-67)

Moore, 1884, J. Asiat. Soc. Bengal 53 (2): 17 (*Ypthima*).

Material examined:
Himachal Pradesh: 1 male WSF, 22.viii.92, 1 male WSF, 16.xi.92, 1 female DSF, 22.iv.93, Sarkaghat, Mandi.

Diagnostic features:
Male genitalia: (Figs. 59-65). Uncus shorter than tegumen, nearly straight, distal end pointed , sparsely setosed dorsally; tegumen in dorsal view notched anteriorly, broad basally and narrowed posteriorly; fenestrula small, elongated, membranous spot;



Figures 59-67. Ypthima kasmira *Moore.*
59. Male genitalia (lateral view); 60. Valva (inner view); 61. Apex of Valva; 62. Dorsum (dorsal view); 63. Juxta; 64. Aedeagus (dorsal view); 65. Aedeagus (lateral view); 66. Female genitalia (ventral view); 67. Lamella postvaginalis (dorsal view).

appendices angulares small, rounded distally; vinculum smaller than tegumen, narrow at middle; saccus moderately long, tubular; valva with proximal half broader, distal half strongly narrowed, pilose, costa with flap-lile costal process, apex serrate latero-distally; juxta more or less U-shaped; aedeagus, narrow at both the ends in lateral view, subzone smaller than suprazone ductus entering dorsally.

Female genitalia: (Figs. 66-67). Anterior portion of copulatory cavity broad and weakly sclerotized; lamella antevaginalis narrow, bifurcated posteriorly, below lies a rectangular, weakly sclerotized plate, notched posteriorly; lamella postvaginalis with a semicircular plate; apophysis anterioris wanting, apophysis posterioris minute, membranous; papilla analis elongated, pilose; ductus bursae smaller than corpus bursae, the latter more or less globular.

Forewing length: Male: 16.0 mm.; Female: 19.0 mm.

Remarks: While examining conspecificity of different individuals of *huebneri* Kirby, two wet-season examples (males) collected from Sarkaghat (Mandi, 900 m.) were found to possesses four ocelli in interpaces Cu1b, Cu1a, M_3 and R_5 on underside of the hindwings. But they are different from *huebneri* as the ocelli (Cu1b, Cu1a and M_3) are joined to each other. Owing to this particular difference, these males were dissected and found not only conspecific but different for *huebneri* in respect of structures such as the uncus, tegumen (dorsal side), valva (particularly, the distal portion) and the aedeagus. Except for Sarkaghat from where 33 males and two females of *huebneri* Kirby were collected, *kasmira* Moore could not be collected from any other localities including Mandi, Chamba and Khajjiar from where according to Elwes and Edwards (1893), it is supposed to be available.

Ypthima huebneri Kirby
The common Fourring
(Figs. 68-75)

Kirby, 1871, Syn. Cat. Diurn. Lep.: 95 (*Ypthima*).

Material examined:
Himachal Pradesh: 7 males WSF, 6.vii.92, 4 males WSF, 7.vii.92, 3 males WSF, 18.vii.92, 3 males WSF, 19.iv.93, Sarkaghat, Mandi; 4 males WSF, 2 males DSF, 22.iv.93, Kanda Patan, Sarkaghat, Mandi; 10 males WSF, 22.viii.92, Dharmpur, Sarkaghat, Mandi; 20 males, 2 females WSF, 2.viii.92, Kangra; 6 males, 1 females WSF, 3.vii.92, Jwalamukhi, Kangra; 10 males, 4 females, WSF, 23.vi.93, Bilaspur; 4 males, 1 female WSF, 12.ix.91, Karian, Chamba;

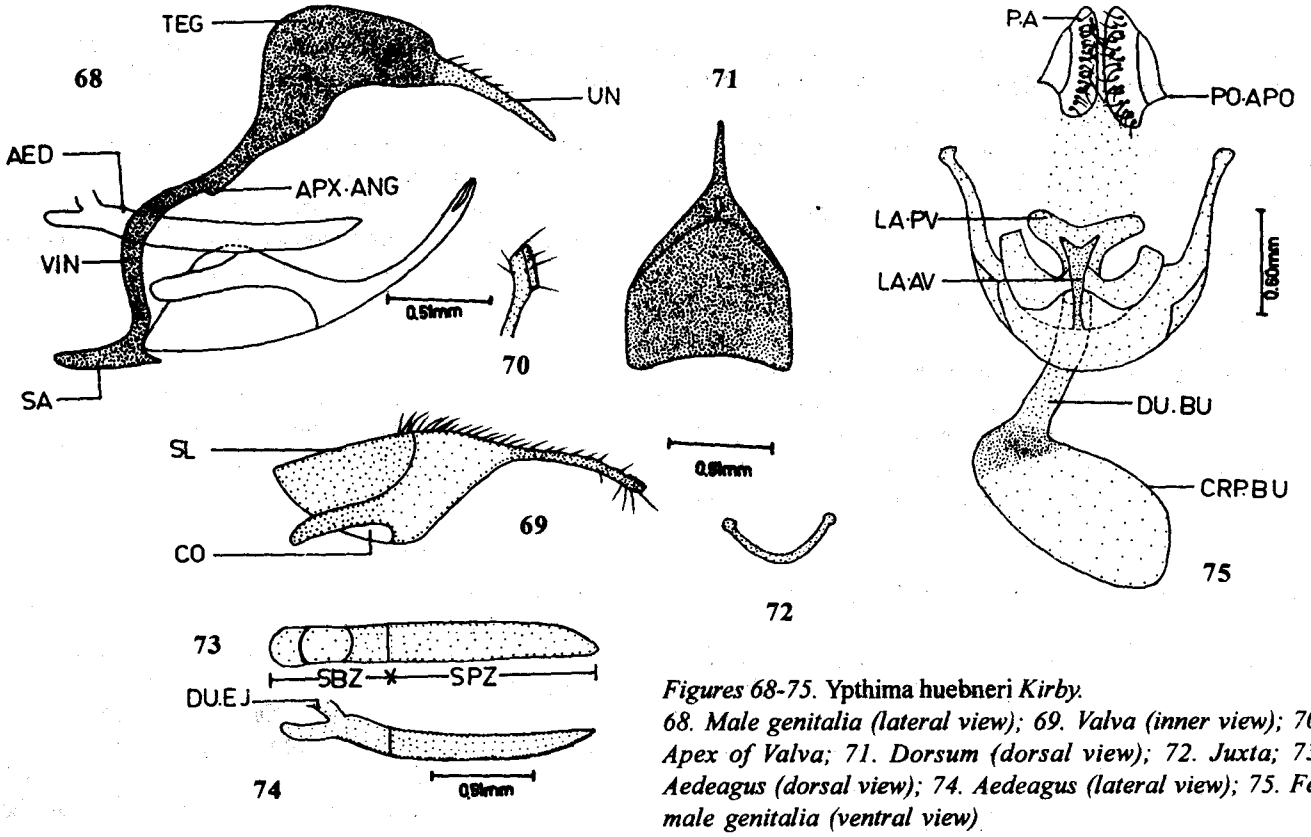
2 males WSF, 14.vi.91, Sarol, Chamba.
Punjab: 6 males, 2 females WSF, 8.vi.91, Shahpurkandy, Gurdaspur; 1 male, 2 females WSF, 1.vi.91, Talwara, Hoshiarpur.
Uttar Pradesh: 5 males, 2 females WSF, 18.vi.92, Dakpathar, Dehradun; 5 males WSF, 18.vi.92, 10 males WSF, 21.vi.92, Vikasnagar, Dehradun.

Diagnostic features:
Male genitalia: (Figs. 68-74). Uncus shorter than tegumen, tapering to weakly pointed apex, sparsely setosed dorsally; tegumen in dorsal view broad basally and narrowed posteriorly; fenestrula oblong and membranous spot; appendices angulares small, rounded at distal end; vinculum shorter than tegumen, inwardly curved; saccus moderately long, tubular, narrow anteriorly; valva broad basally, strongly narrowed beyond basal half, costa long with digitate process, apex serrate latero-distally; juxta V-shaped, moderately sclerotized; aedeagus long, slightly curved in the middle in lateral view, subzone smaller than suprazone, ductus entering dorsad.

Female genitalia: (Fig. 75). Copulatory cavity anteriorly rather broadly and weakly sclerotized; lamella antevaginalis narrow and long, bifurcated at apex, lateral lobes of lamella antevaginalis weakly developed, membranous, below lies a semicircular membranous plate, notched at middle; lamella postvaginalis more or less triangular plate; apophysis anterioris wanting, apophysis posterioris small, membranous; papilla analis elongated, pilose; ductus bursae moderately long, moderately sclerotized; corpus bursae ellipsoidal, weakly sclerotized.

Forewing length: Male: 15.0-17.0 mm.; Female: 18.0 mm.

Remarks: According to Marshall and de Nicéville (1883), *huebneri* Kirby is a very variable insect in which upperside of the fore and hindwings may be immaculate or there may be a great diversity in the size and prominence of the ocelli, when present. Similarly, the variations on underside of the hindwings present all sorts of gradations. In fact, individuals representing different populations of this species are extremely difficult to identify, owing to seasonal variations, especially the ocellation on the upper and underside of the hindwings. In view of difficulty of separating *Ypthima* species from apparent characters, Elwes and Edwards (1893) have recommeded the application of genitalia to identify this species. The critical examination of the specimens collected by the present authors reveal that the subapical ocellus on the dorsal side of the forewings show great variations in size. Similarly, the ocelli may be completely wanting or may be represented by specks or well developed on upperside of the hindwings in dry and wet forms. Likewise, the ocellation has also been found to be quite variable on under side of the hindwings. In DSF, the ocelli are reduced to specks. On the contrary, in the WSF, these 4 ocelli are black and the ocelli in



Figures 68-75. Ypthima huebneri *Kirby.*
68. Male genitalia (lateral view); 69. Valva (inner view); 70. Apex of Valva; 71. Dorsum (dorsal view); 72. Juxta; 73. Aedeagus (dorsal view); 74. Aedeagus (lateral view); 75. Female genitalia (ventral view)

interspaces Cu1a and M_3 are generally joined to each other. It has also been noted that the ocellus in interspace Cu1b never fuses with the ocellus in interspace Cu1a. Besides these variations, the general colouration is generally pale fuliginous brown. In order to solve the identification problem, though Elwes and Edwards (1893) have examined the male genitalia yet furnished a more or less diagrammatic figure of the valva alone. In order to sort out this confusing phenon, 18 males and five females from different localities were dissected. In the male genitalia, different constituent parts are quite consistent except serration at the latero-distal end of each valva.

Regarding distribution, the species is more abundant in Himachal Pradesh followed by Vikas Nagar in Uttar Pradesh and Punjab. Workers like Talbot (1947), Varshney (1980) and D'Abrera (1985) have considered *huebneri* Kirby as a subspecies of *ceylonica* Hewitson, which is apparently wrong in view of the findings of other workers like Marshall and de Nicéville (1883), Bingham (1905), Evans (1932), Talbot (1947), Wynter-Blyth (1957) and Shirozu and Shimla (1979), who have considered it as a full fledged species, like the present arrangement.

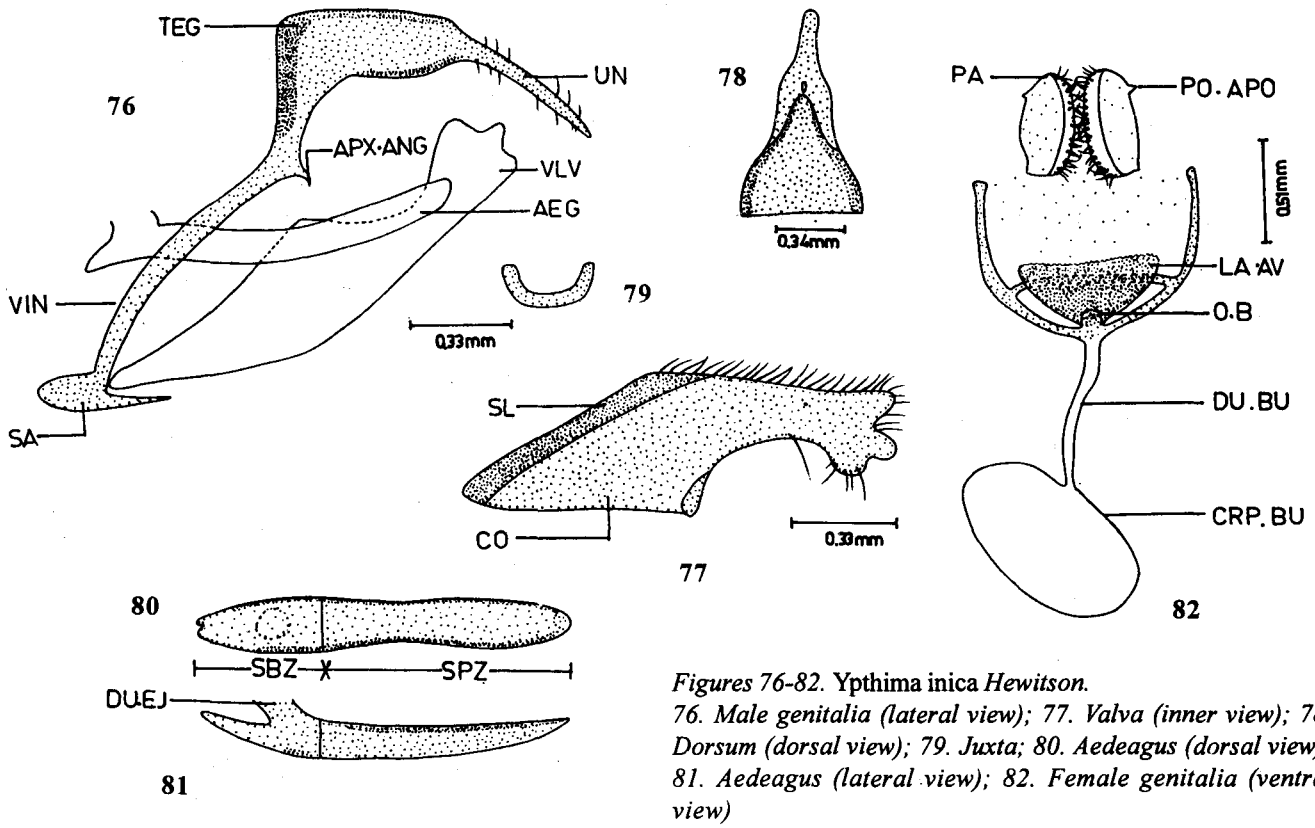
Ypthima inica Hewitson
The Lesser Threering
(Figs. 76-82)

Hewitson, 1865, Trans. Ent. Soc. Lond., 2(3): 284 (*Ypthima*).

Material examined:
Himachal Pradesh: 2 females DSF, 6.ix.92 Saketi, Sirmaur.
Punjab: 8 females DSF, 13.iv.92, Bir Dusang, Nabha, Patiala; 4 females DSF, 12.iv.92, Bir Agol, Nabha, Patiala; 4 males DSF, 31.iii.91, 1male DSF, 2.iv.91, 1 female DSF, 10.iv.91, 1 female DSF, 7.x.91, 3 males, 2 females DSF, 15.iv.92, 1 female, 1 male WSF, 3.viii.96, Nabha Bir, Nabha, Patiala.

Diagnostic features:
Male genitalia: (Figs. 76-81). Uncus shorter than tegumen, weakly curved ventrally, distal end slightly pointed, clothed with sparse setae; tegumen long and broad; fenestrula small, oval, membranous; appendices angulares small, hook-like; vinculum longer than tegumen; saccus small, tubular with rounded distal end; valva with proximal half broader, distal half sharply narrowed, pilose, costa long, sacculus long and narrow, distal end trilobed; juxta V-shaped; aedeagus long, tubular, narrow at middle in dorsal view, subzone smaller than suprazone, ductus entering dorsad.

Female genitalia: (Fig. 82). Anterior portion of copulatory cavity



Figures 76-82. Ypthima inica *Hewitson.*
76. Male genitalia (lateral view); 77. Valva (inner view); 78. Dorsum (dorsal view); 79. Juxta; 80. Aedeagus (dorsal view); 81. Aedeagus (lateral view); 82. Female genitalia (ventral view)

broad, triangularly sclerotized; lamella antevaginalis broad, posterior margin crenulate, more or less triangular in shape; lamella postvaginalis membranous; apophysis anterioris wanting, apophysis posterioris small, membranous; papilla ellipsodial, pilose, membranous; ductus bursae long, membranous; corpus bursae oval, membranous.

Forewing length: Male: 16.0 mm.; Female: 17.0 mm.

Remarks: Except the above mentioned localities, the species could not be collected from any other locality in northwestern India, as reported earlier by Marshall and Nicéville (1883), Evans (1932) and Talbot (1947). The WSF could be collected in the month of August only. Bingham (1905) has reported that besides upper Bengal and Central India, the species is available in Punjab (old Punjab including Himachal Pradesh, Haryana and part of Pakistan) and has given the alar expanse varying from 38.0 mm to 44.0 mm. (1.4 to 1.7 inches), which appears to be apparently wrong, as per present studies, besides Marshall and de Nicéville (1883). The latter authors have also pointed out that Hewitson (1865) while reporting this species for the first time has given a wrong dimension about the alar expanse as 1.7 inches (about 1.4 inches in figure). According to them, the range of alar expanse varies from 1.1 to 1.3 inches and the present study supports this measurement. However, workers like Bingham (1905), Evans (1932) and Talbot (1947) have given 38.0-44.0 mm., 30.0-34.0 mm. and 30.0-34.0 mm. alar expanse respectively. The males presently collected differ from the one photographed by D'Abrera (1985), as far as, tornal spot on upperside of the hindwings and bipupilled structure of the subapical spot on upperside of the forewings are concerned.

In view of variation in dry and wet populations, three males and five females (1 male, 1 female, WSF; 2 males, 4 females, DSF) have been dissected and found to agree with each other in every respect. The valva is quite unique in the entire genus *Ypthima* Hübner (Elwes & Edwards, 1893). The latter authors have, however, not mentioned anything else about other constituent parts of the genitalia besides complete neglect of the female genitalia.

As per present study and in view of the restricted distribution (Agol Bir, Nabha Bir, Dhusanj Bir in Patiala District), of the species, under reference, it is felt that its habitat needs to be suitably conserved.

Ypthima asterope (Klug)
The Common Threering

Klug, 1832, Symb. Phys.: Pl. 29, Figs. 11-14 (*Hipparchia*).

Ypthima asterope mahratta Moore
(Figs. 83-90)

Moore, 1884, J. Asiat. Soc. Bengal 53(2): 16 (*Ypthima*)

Material examined:
Himachal Pradesh: 4 males, 3 females, WSF, 6.ix.92, Saketi, Sirmaur, 4 males DSF, 2 females WSF, 29.ix.91, Parwanoo, Solan; 1 male WSF, 1 female DSF, 10.ix.92, Nogli, Rampur, Shimla; 1 female WSF, 3.vii.92, Jwalamukhi, Kangra, 1 male, DSF, 18.vii.92, Sarkaghat, Mandi.
Uttar Pradesh: 6 males WSF, 1 male DSF, 8.vi.92, Garhwal University, Srinagar.
Haryana: 6 males WSF, 29.ix.91, Pinjore, Ambala.

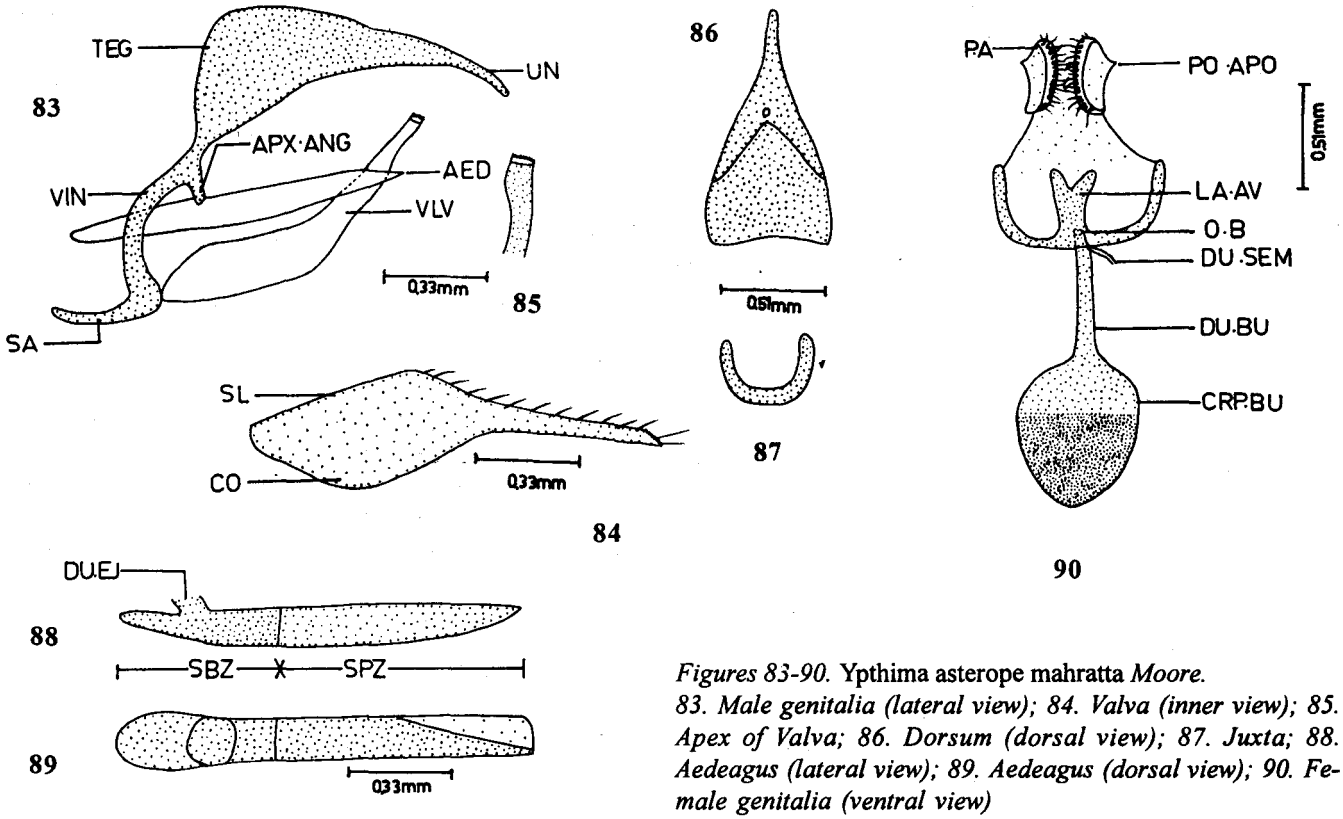
Diagnostic features:
Male genitalia: (Figs. 83-89). Uncus broad at base, gradually tapering posteriorly to rounded distal end; tegumen in dorsal view broader anteriorly, narrow posteriorly; fenestrula oblique, membranous; appendices angulares short, stumpy; vinculum shorter than tegumen, narrow anteriorly, broader posteriorly; saccus thin, moderately long; valva with proximal half broader and strongly narrowed beyond proximal half, distal end with fine serrations; juxta U-shaped; aedeagus long, tubular, narrow at both the ends in lateral view, coecum rounded, subzone smaller than suprazone, ductus ejaculatorius entering dorsally.

Female genitalia: (Fig. 90). Anterior portion of copulatory cavity weakly sclerotized; lamella antevaginalis biforked posteriorly; lamella postvaginalis membranous; apophysis anterioris wanting, apophysis posterioris reduced, membranous; papilla analis elongated, pilose; ductus seminalis attaching ductus bursae near ostium bursae; ductus bursae long; corpus bursae oval, sclerotized.

Forewing length: Male: 16.0 mm.; Female: 18.0 mm.

Remarks: According to Shirozu and Shima (1970), the species, *asterope* Klug has the widest distribution in this genus. In northwestern Himalaya, it has been reported from Chamba, Kasauli, Nainital (Marshall & de Nicéville, 1883), Khajjiar, Chamba (Elwes & Edwards, 1893), the then Punjab (Bingham, 1905) and Chamba to Assam (Evans, 1932; Talbot, 1947) but during the course of present surveys, it could not be collected from Khajjiar, Chamba, Kasauli and Nainital. On the contrary, localities such as Srinagar (Garhwal Himalaya), Pinjore, Parwanoo, Saketi, Sarkaghat, Jwalamukhi and Nogli are new distribution records. The present survey shows that the species is mainly available between an altitudinal range varying from 353 m. to 924 m.

As pointed out by Bingham (1905), the species is variable and is represented by dry and wet forms. During the course of present studies, the dry and wet forms referable to either sex (males smaller than females) have been examined and examples showing



Figures 83-90. Ypthima asterope mahratta *Moore.*
83. Male genitalia (lateral view); 84. Valva (inner view); 85. Apex of Valva; 86. Dorsum (dorsal view); 87. Juxta; 88. Aedeagus (lateral view); 89. Aedeagus (dorsal view); 90. Female genitalia (ventral view)

variations have been dissected (5 males, 3 females) and found conspecific. In fact, valva in the male genitalia is quite distinct.

Regarding nomenclature, according to D'Abrera (1985), the species is represented by three sub species i.e., *burmana* Evans, *mahratta* Moore, *annamitica* Fruhstofer. As per distribution from northwestern India to Assam, the present taxon may be referred as, *Y. asterope mahratta* Moore, as has also been followed by Varshney (1980) and Smith (1993).

Ypthima nareda (Kollar)
The Large Threering
(Figs. 91-98)

Kollar, 1844, in Hugel's Kashmir 4:451 (*Satyrus*).

Material examined:
Himachal Pradesh: 8 males, 26.vi.92, Rivalsar, Mandi; 6 males, 14.vi.92, Mahog, Chail, Shimla; 6 males, 8.ix.92, Kumarsain, Shimla; 7 males, 5 females, 13.ix.92, Chowai, Kullu; 6 females, 19.vi.93, Ka' . 'n, Kullu; 2 females, 19.vi.93, Tissa Bridge, Tissa, Chamba; 3 males, 15.ix.92, Bhabhanagar, Kinnaur.
Uttar Pradesh: 4 males, 2 females, 5.vi.92, 1 male, 3.vi.93, 4 males, 5.vi.93, 1 male, 11.vi.94, Bhilaru Pumping Station, Mussoorie, Dehradun; 3 males, 6.vi.93, Murray Pumping Station, Mussoorie, Dehradun; 4 males, 7.vi.93, Mossyfalls, Mussoorie, Dehradun; 3 males, 5.vi.93, Kemptyfalls, Mussoorie, Dehradun; 2 males, 4.vi.92, Aglar Valley, Mussoorie, Dehradun; 2 females, 9.vi.93, Bandhal Nadi, Dhanolti, Dehradun; 3 females, 6.ix.92, Forest Research Institute, Dehradun; 1 male, 15.vi.94, Chakrata, Dehradun; 4 males, 15.vi.92, Gopeshwar, Chamoli.
Jammu & Kashmir: 1male, 29.viii.94, Kud, Patni Top.

Diagnostic features:
Male genitalia: (Figs. 91-96). Posterior half of uncus narrow, curved ventrally, pointed at distal end, anterior half of uncus and posterior portion of tegumen strongly expanded laterally, so that dorsum in dorsal view appearing nearly rectangular with short process of uncus; fenestrula small, rounded, membranous spot; appendices angulares triangular with pointed apex; vinculum nearly equal to tegumen, saccus moderately long, narrow distally; valva broad proximally and strongly narrowed beyond the middle, pilose, costa long, sacculus long and narrow, distal end with dorsal pointed tip; juxta V-shaped; aedeagus long, tubular, slightly curved at middle, subzone smaller than suprazone, ductus entering dorsad.

Female genitalia: (Figs. 97-98). Copulatory cavity broader posteriorly, narrow anteriorly; lamella antevaginalis with weakly

sclerotized process, making a loop anterior to ostium bursae; lamella postvaginalis membranous; apophysis anterioris wanting, apophysis posterioris small membranous; papilla analis guttiform, pilose; ductus bursae short and narrow, corpus bursae subglobular, membranous.

Forewing length: Male: 18.0-19.0 mm.; Female: 21.0 mm.

Remarks: The species, under reference, is a near sibling to another species i.e, *newara* Moore. Owing to this, though Elwes and Edwards (1893) examined the male genitalia yet figured only the uncus and the valva of these species. Presently, 14 males collected from the above mentioned localities were dissected and found to be conspecific, especially owing to characteristic tegumen, the latter wrongly referred as uncus by Doherty (1886). The female genitalia of this species is described for the first time. All the 58 males and 20 females have been collected within an altitudinal range of 640 m. to 2150 m.

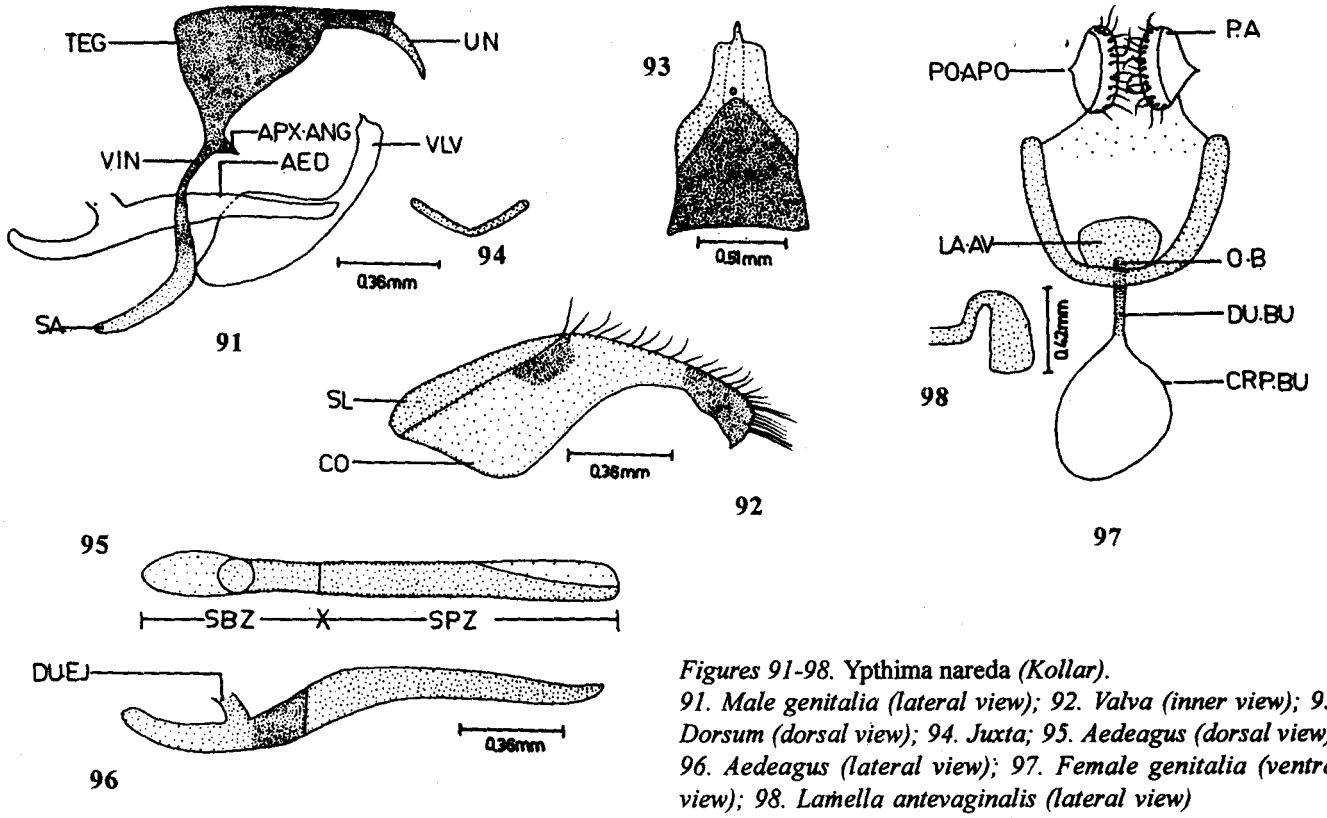
According to workers such as Marshall and de Nicéville (1883), Elwes and Edwards (1893), Bingham (1905), D'Abrera (1985) and Mani (1986), *nareda* Kollar is restricted only to the northwestern Himalaya. The present surveys reveal that though the species is quite common, yet could not be collected from localities such as Pangi, Shimla, Theog, Kangra and Mandi, reported earlier. Accordingly, except for Mussoorie and Katrain (Kullu), all the above mentioned localities noted under material examined are new distribution records of this species in northwestern India.

Ypthima newara Moore
The Newar Threering
(Figs. 99-105)

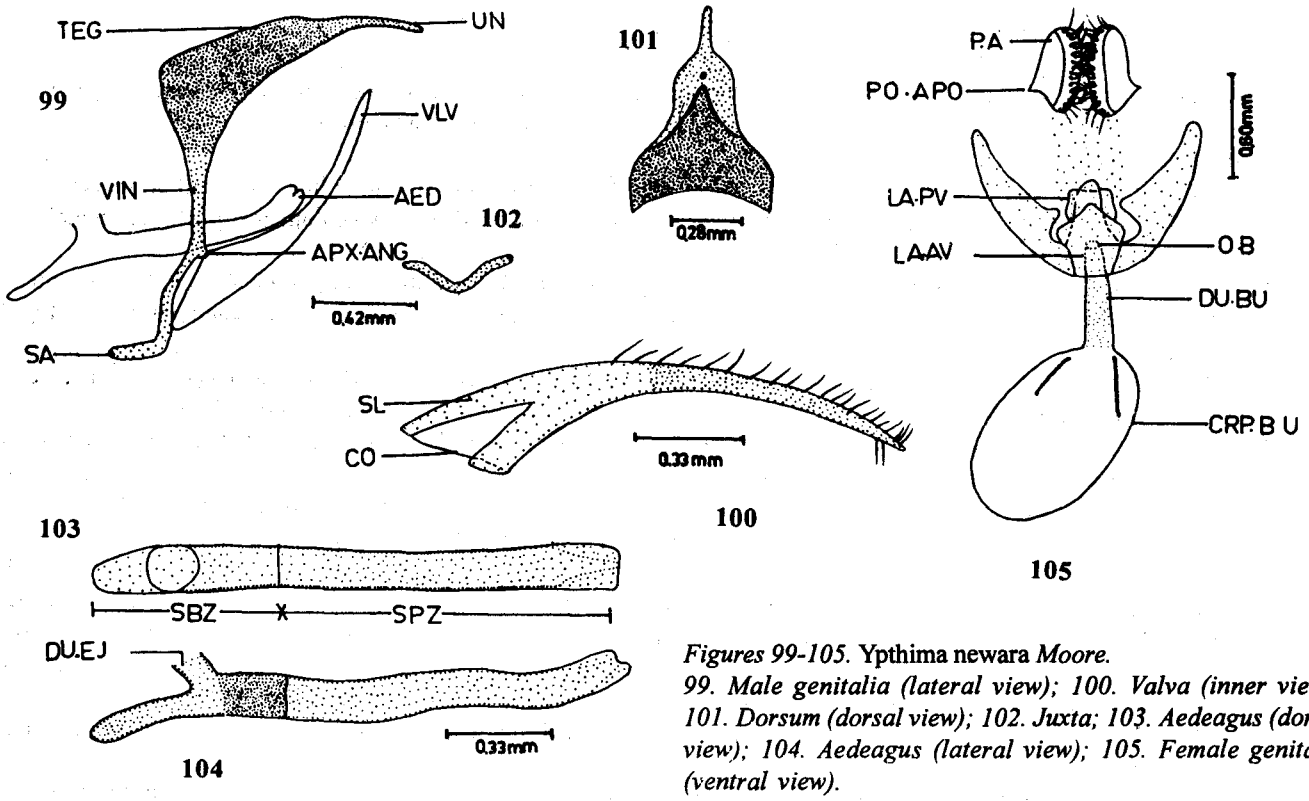
Moore, 1874, Proc. Zool. Soc. Lond. 1874: 567 (*Ypthima*).

Material examined:
Himachal Pradesh: 10 males, 4 females, 20.vi.93, Tissa Bridge, Tissa, Chamba; 8 males, 4 females, 27.vi.92, Dal Lake, Mcleodgnaj, Dharmsala, Kangra; 6 males, 3 females, 16.ix.92, Taklech, Rampur, Shimla; 5 males, 11.ix.92, Duttnagar, Rampur, Shimla; 4 males, 2 females, 15.ix.92, Bhabhanagar, Kinnaur; 6 males, 3 females, 14.ix.91, Nauni, Solan; 2 males, 2 females, 16.ix.91, Dedegharat, Solan; 8 males, 4 females, 6.vii.92, Sarkaghat, Mandi.
Uttar Pradesh: 5 males, 4 females, 10.vi.92, Gopeshwar, Chamoli.

Diagnostic features:
Male genitalia: (Figs. 99-104). Uncus shorter than tegumen, broad, proximally, tapers posteriorly to blunt distal end, tegumen in dorsal view broad basally, gradually narrowed posteriorly; fenestrula small oval membranous spot; appendices angulares very small, stumpy; vinculum shorter than tegumen; saccus short,



Figures 91-98. Ypthima nareda *(Kollar).*
91. Male genitalia (lateral view); 92. Valva (inner view); 93. Dorsum (dorsal view); 94. Juxta; 95. Aedeagus (dorsal view); 96. Aedeagus (lateral view); 97. Female genitalia (ventral view); 98. Lamella antevaginalis (lateral view)



Figures 99-105. Ypthima newara *Moore.*
99. Male genitalia (lateral view); 100. Valva (inner view); 101. Dorsum (dorsal view); 102. Juxta; 103. Aedeagus (dorsal view); 104. Aedeagus (lateral view); 105. Female genitalia (ventral view).

narrow, valva broad at base, strongly narrowed beyond basal one-third, distal two-third portion slender, parallel sided, weakly pointed at apex; juxta V-shaped; aedeagus long, slender, undulating slightly bent ventrally proximally, suprazone longer than subzone, ductus ejaculatorius entering dorsad.

Female genitalia: (Fig. 105). Anterior sclerite of copulatory cavity roughly triangular, lamella antevaginalis with broad, posteriorly nearly triangular central process, below central process lies another somewhat digitate process, broad proximally; lamella postvaginalis with broad, weakly concave posteriorly; apophysis anterioris missing, apophysis posterioris small, membranous; papilla analis elongated, pilose; ductus bursae broader anteriorly, narrow posteriorly; corpus bursae guttiform, membranous, signa paired, moderately long, situated in the posterior half, scobinate patches.

Forewing length: Male: 18.0-19.0 mm.; Female: 21.0 mm.

Remarks: Moore (1874) reported *newara* as a new species from Nepal and pointed out that it can be separated from its allied species *nareda* Kollar on the basis of being larger in size, with ocelli of both sexes much larger on underside and position of the ocellus on the forewing being less inwardly oblique. Marshall and de Nicéville (1883) though reported *newara* Moore as a different species from Nepal, Sikkim, Assam and Upper Burma, yet made a statement that it is not improbable that this may be merely a geographical variety of *Ypthima nareda* Kollar, which it replaces in the eastern Himalaya. Owing to obvious apparent morphological resemblance between *newara* and *nareda*, Elwes and Edwards (1893) have distinguished them on the basis of structure of the valva in the male genitalia. However, inspite of this, Evans (1932), Talbot (1947) and D'Abrera (1985) have considered *newara* Moore as a subspecies of *nareda.*

In the present studies, representative material of both the species -- *newara* and *nareda* have been collected from various localities in northwestern India. The species are clearly sibling in nature and in fact, difficult to sort out with authenticity on the basis of apparent morphological characters/maculations. As many as 54 males and 26 females of *newara* Moore have been examined, out of which five males and seven females have an additional small ocellus near the tornus on upperside of the hindwings. The subapical ocellus on upperside of the forewings is also quite variable, as far as its size is concerned and the same is also true for the ocellus present on hindwings. Similarly, on the underside of the hindwings, the subtornal ocelli may be separated or joined together. The female genitalia is described for the first time besides updating the account of the male genitalia.

The description and other details of the species *Ypthima sarkaghatensis* Rose and Sharma and *Y. uemurai* Rose and

Key to the species of the Genus *Ypthima* Hübner

1. Forewing with vien R_1 arising beyond end of cell (*philomela* group) 2
1A. Forewing with vien R_1 arising before end of cell 7
2. Hindwing underside with double ocellus (WSF) or black dots (DSF) in space culb in line with ocelli in spaces M_3 and Cula; male genitalia with appendices angulares, small, stumpy, blunt at distal end, vinculum more or less incurved; female genitalia with ductus bursae smaller 3
2A. Hindwing underside with double ocellus (WSF) or black dots (DSF) in space Cu1b out of line with ocelli in spaces M_3 and Cula; male genitalia with appendices angulares more or less curved, pointed distally, vinculum nearly straight; female genitalia with ductus bursae comparatively longer 5
3. Hindwing underside with greyish brown striations, white pupil and ocelli comparatively larger; male genitalia with anterior one-third of aedeagus nearly straight (Fig. 6); female genitalia with lamella antevaginalis deeply notched posteriorly (Fig. 7) ..... *lisandra* Cramer
3A. Hindwing underside with greyish white striations, white pupil and ocelli comparatively smaller; male genitalia with anterior one-third of the aedeagus curved ventrally; female genitalia with lamella antevaginalis concave posteriorly 4
4. Forewing upperside with subapical ocellus wanting or obscurely marked in male; male genitalia with uncus smaller, nearly straight (Fig. 8); female genitalia with ductus bursae strongly sclerotized (Fig. 15) ..... *singala* Felder
4A. Forewing upperside with subapical ocellus prominent in both sexes; male genitalia with uncus longer strongly curved ventrally (Fig. 16); female genitalia with ductus bursae comparatively narrower, corpus bursae membranous (Fig. 22) ..... *marshalli* Butler
5. Forewing upperside with brand prominent, underside with white striations; humeral vein arched; male genitalia with valva deeply notched at distal end (Fig.24); female genitalia with ductus seminalis attaching ductus bursae nearly in middle (Fig 30) ..... *baldus* Fabricius
5A. Forewing upperside with brand moderately developed ,underside with greyish brown striations; humeral vein T-shaped; male genitalia with valva slightly concave or slightly notched at distal end; female genitalia with ductus seminalis attaching ductus bursae near corpus bursae 6
6. Upperside darker, submarginal and discal fascia less prominent; male genitalia with uncus less curved ventrally (Fig. 31): female genitalia with ductus bursae sharply curved and broader (Fig. 37) ..... *indecora* Moore
6A. Upperside paler, submarginal and discal fascia prominent; male genitalia with uncus strongly curved ventrally; female genitalia with ductus bursae nearly straight and narrower ..... *sarkaghatensis* Rose & Sharma
7. Moderate of large species; underside hindwing with five ocelli; male genitalia with aedeagus strongly curved dorsally (*sakra* group) 8
7A. Moderate or small species; underside hindwing with four or less than four ocelli or dots; male genitalia with aedeagus more or less straight, or curved ventrally anteriorly 11
8. Hindwing underside with submarginal fascia prominent; male genitalia with tegumen longer than vinculum 9
8A. Hindwing underside with submarginal fascia obscure; male genitalia with tegumen shorter than vinculum 10
9. Hindwing upperside ocellus in M_3 generally without white centre; androconia rounded at base; male genitalia with uncus nearly straight (Fig 39); female genitalia with processes of lamella antevaginalis not excurved (Fig. 45) ..... *nikaea* Moore
9A. Hindwing upperside ocellus in M_3 always without white centre; androconia notched at base; male genitalia with uncus curved ventrally; female genitalia with processes of lamella antevaginalis slightly excurved ..... *uemurai* Rose & Sharma
10. Forewing upperside with brand distinct; hindwing upperside always with an ocellus in M_1; androconia much longer; male genitalia with valva axe-shaped at distal end (Fig. 47) ..... *hannyngtoni* Eliot
10A. Forewing upperside with brand indistinct; hindwing upperside ocellus in M_3 generally wanting; androconia moderately long; male genitalia with valva nearly rounded at distal end (Fig. 53) ..... *sakra* Moore
11. Hindwing underside with four ocelli or dots; male genitalia with valva with serrations latero-distally; female genitalia with lamella antevaginalis long and forked distally (*huebneri* group) 12
11A. Hindwing underside with three ocelli or dots; male genitalia with valva with serrations either absent or present distally; female genitalia with lamella antevaginalis either triangular, rounded or small and forked posteriorly 13
12. Hindwing underside with three ocelli in M_3, Cu1a and Cu1b contiguous, androconia less broader and slightly notched at base; male genitalia with vinculum smaller (Fig. 59); female genitalia with lamella postvaginalis with semicirucular plate (Fig. 67) ..... *kasmira* Moore
12A. Hindwing underside with three ocelli in M_3, Cu1a and Cu1b not fused, ocelli in M_3 and Cu1a may fuse or not; androconia broader and notched at base; male genitalia with vinculum longer (Fig. 68); female genitalia with lamella postvaginalis roughly triangular (Fig. 75) ..... *huebneri* Kirby

13. Small species; forewing length less than 18.0 mm.; male genitalia with juxta U-shaped, aedeagus slightly upturned anteriorly 14

13A. Moderate species; forewing length 18.0 mm. or even longer; male genitalia with Juxta V-shaped, aedeagus not upturned but curved ventrally 15

14. Underside with greyish-white striations, ocelli with yellow ring broader and prominent (WSF); androconia parallel sided at base; male genitalia with valva with distal end trilobed (Fig. 77); female genitalia with lamella antevaginalis crenulate at poserior margin (Fig. 82) (*obscura* group) ..... *inica* Hewitson

14A. Underside with greyish-brown straitions, ocelli with yellow ring less prominent and less broader (WSF); androconia with narrow stalk at base; male genitalia with valva with distal end serrated (Fig. 84); female genitalia with lamella antevaginalis biforked posteriorly (Fig. 90) (*asterope* group) ..... *asterope* Klug

15. Hindwing with humeral vein traingle-like; androconia produced into a stalk at base; male genitalia with anterior half of uncus and posterior half of tegumen expanded dorsally (Fig. 93); female genitalia with corpus bursae without signum (Fig. 97) (*nareda* group) ..... *nareda* Kollar

15A. Hindwing with humeral vein forked distally; androconia broader proximally ; male genitalia with anterior half of uncus and posterior half of the tegumen narrower dorsally (Fig.101); female genitalia with paired signa present (Fig. 105) (*newara* group) ..... *newara* Moore

Sharma have been discussed by Rose and Sharma (1998) and hence not reported here.

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