



A primary report on Rhopalocera diversity (Lepidoptera) from district Una of Himachal Pradesh, India

P.C. Pathania and Anita Kumari*

Department of Entomology, Punjab Agricultural University, Ludhiana

*Department of Biosciences, Vinayaka Missions University, Salem, Tamil Nadu

ABSTRACT : Twenty-eight species belonging to nineteen genera *i.e.*, *Aglais* Dalman, *Anosia* Hübner, *Ariadne* Horsfield, *Hypolimnas* Hübner, *Junonia* Hübner, *Lethe* Hübner, *Morpho* Fabricius, *Neptis* Fabricius, *Pyronia* Hübner, *Satyrus* Westwood, *Papilio* Linnaeus, *Atella* Doubleday, *Catopsilia* Hübner, *Cepora* Billberg, *Colias* Fabricius, *Delias* Hübner, *Eurema* Hübner, *Ixias* Hübner and *Pieris* Schrank of the three families *i.e.*, Nymphalidae, Papilionidae and Pieridae of the Superfamily Papilionoidea were collected from fifteen localities of district Una in Himachal Pradesh. Besides material examined their old distribution alongwith host plants (if any) were also provided.

Keywords : Geographical, Rhopalocera, Lepidoptera, Diversity

INTRODUCTION

Lepidoptera is the second largest order after Coleoptera which comprises moths, butterflies and skippers. There are about 2,00,000 species of Lepidoptera out of which 15,000 species belong to butterflies (Papilionoidea) and remaining moths worldover (Holloway *et al.*, 1992). Lepidopteran insects are characterized by having broad wings covered with minute overlapping scales, usually brightly coloured. From the usage point of view, most familiar division of Lepidoptera is divided into Heterocera (moths) and Rhopalocera (butterflies) and Microlepidoptera and Macrolepidoptera (Evans, 1932). During the course of present studies authors conducted survey-cum-collections tour to district Una (North Latitude 31° 21' and 31° 50' and East Longitudes 71° 55' and 76° 28', altitude 750 metres) present in South-Western part of Himachal Pradesh. Fifteen localities *i.e.*, Dehlan, Bangana, Gagret, Raipur, Mubarkpur, Bharwain, Haroli, Una, Amb, Chintpurni, Daulatpur, Basoli, Santokhgarh, Chauki Maniar and Lathiani were visited between during different seasons from March to August, 2008. This exercise led to the collection of 28 species of family Papilionidae, Nymphalidae and Pieridae.

MATERIAL AND METHODS

The specimens of butterflies were collected with the help of insect collection net (circumference 93 cm, handle length 87 cm, bag depth 77 cm) by sweeping method during day time. This methods were quite suitable for collection of butterflies over the leaves and flowers (Arora, 1990). Adults collected were killed in killing bottle by using liquid chemicals like ethyl acetate, carbon tetrachloride etc. All the specimens collected from various localities were pinned with different sizes entomological pins (38mm x .40mm; 38mm x .55mm) and stretching in spreading board boxes (40cm x 30cm x 10cm) or on plastazote pasted/fixed at the bottom of a slide

box. The stretched specimens were stored in well fumigated (naphthalene balls) wooden boxes. All the specimens carrying information such as locality, date of collection, altitude and name of the collector etc. The preparation of wings slide were undertaken as per Common (1970) and Zimmerman (1978). The taxonomic procedure involves an examination of various morphological characters such as head, labial palpus, legs, wing shape, wing maculation and wing venation. Photographs of the adults of different species were taken with the help of digital camera (Nikon D200).

OBSERVATIONS

The different species of butterflies were identified from literature Moore, 1865, 1866-68, 1880-87, 1890, 1896-1899; de Niceville, 1881; de Niceville and Marshall, 1882, 1886, 1890, 1883-1890; Hampson, 1892, 1895, 1918; Bingham, 1905, 1907; Bell, 1911; Talbot, 1939; Wynter-Blyth, 1957; Common, 1970; D'Aberra, 1980-86, 1998; Arora, 1990; Holloway, *et al.* 1992; Varshney, 1993, 1994, 1997, 1998; Rose and Sidhu, 1994, 1996, 1997, 1997a, 1999, 2001; Rose and Sharma, 1995, 1995a, 1998, 1998a, 1998b, 1998c, 1999, 2000, 2000a, 2000b; Gunatheraj *et al.*, 1998; Trigunayat, 1999; Yakovlev and Nakonechnyi, 2001; Rose and Walia, 2003; Bhaskaran and Eswaran, 2005; Thakur *et al.*, 2006; Uniyal, 2007 and Withrington and Veronik, 2008 and after comparison of adults from our national Museum at Forest Research Institute, Dehradun and Indian Agricultural Research Institute, New Delhi. The detail of the family diagnosis and species characters are given below:

I. FAMILY NYMPHALIDAE

Head vertex smooth, labial palpi three segmented, upcurved, maxillary palpi one segmented, haustellum naked, antennae filliform, clubbed, antennalpecten absent, ocelli absent, chaetosemata present, tympana absent, venation

variable, wing coupling absent, forewing pterostigma absent, forewing chorda absent, forewing anal veins A_{1+2} , forewing cell vein absent, hindwing pterostigma absent, hindwing anal veins $A_{1+2}A_3$, hindwing cell vein absent, epiphysis absent, tibial spurs absent in fore legs and two each in mid legs and hind legs.

Genus *Aglais* Dalman

Aglais Dalman, 1816, *K.Vet.Acad.Handl.Stockh.*, (1): 56.

1. *Aglais urticae rizana* (Moore)

Vanessa urticae rizana Moore, 1872, *Proc. Zool Soc. Lond.*: 559.

Material examined: Himachal Pradesh: Distt.Una; Raipur, 545m, 2.viii. 2008, 1♂, 2♀♀; Bharwain, 708m, 17.viii.2008, 2♂♂, 1♀, coll. Anita Kumari and P.C. Pathania.

Distribution: Sikkim, Himalayas (www.nhm.ac.uk); Himalayas from Kashmir to Sikkim (Bingham, 1905); Bharwain, Raipur (H.P.) (present study).

Larval host Plant: Unknown.

Remarks: The marking and colours of *rizana* Moore are similar to *kashmirensis* Kollar but the markings are more sharply defined and the colours are much brighter. In the present studies, the species is being reported from Raipur and Bharwain of District Una (H.P.) for the second time as it has earlier been reported from the Himalayas from Kashmir to Sikkim.

Genus *Anosia* Hübner

Anosia Hübner, 1816, *Verz. bekannt. Schmett.* (1):15-16.

2. *Anosia chrysippus* Linnaeus

Anosia chrysippus Linnaeus, 1758, *Syst.Nat. (Edn.x)*: 471.

Material examined: Himachal Pradesh: Distt. Una; Chauki Maniar, 530m, 5.vii. 2008, 1♀; Haroli, 375m, 1.viii.2008, 2♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Griechenland (Inseln) (www.nhm.ac.uk.); Southern Europe, Syria, Ethiopian Region, Arabia, Persia and Afghanistan (Bingham, 1905); Chauki maniar, Haroli (H.P.), (present study).

Larval host Plant: *Calotropis gigantea* (Bingham, 1905).

Remarks: Three females individuals collected between an elevation of 375m to 530m has been identified as *Anosia chrysippus* Linnaeus from the National Pusa Collection, IARI, New Delhi.

Genus *Ariadne* Horsfield

Ariadne Horsfield, 1829, *Cat.Lep.Ins.Mus.E.India.Co.*: 3.

3. *Ariadne merione tapestrina* (Moore)

Ergolis merione tapestrina Moore, 1884 *J.A.S.B.* Liii.: 19.

Material examined: Himachal Pradesh: Distt. Una; Dehlan, 374m, 4.viii. 2008, 1♂, 1♀, coll. Anita Kumari and P.C.Pathania.

Distribution: India (www.nhm.ac.uk.); the northern half of continental India, Shimla to Sikkim in the Himalayas, Rajputana, Bengal, Assam, Burma, Tenasserim, Malayan subregion (Bingham, 1905); Dehlan, (H.P.), (present study).

Larval host Plant: *Tragia cannabina* and *T. involucrata* (Bingham, 1905).

Remarks: As per old distribution, the reporting of above mentioned species from Shimla to Sikkim in Himalayas and the collection of two individual (one male and one female) is an additional distribution record from Shivalik range of Himalayas.

Genus *Hypolimnas* Hübner

Hypolimnas Hübner, 1819, *Verz. bekannt. Schmett.* : 45.

4. *Hypolimnas misippus misippus* Linnaeus

Hypolimnas misippus misippus Linnaeus, 1764, *Mus. Ulr.*: 264.

Material examined: Himachal Pradesh: Distt. Una; Haroli, 375m, 1.viii. 2008, 2♂♂, coll. Anita Kumari and P.C. Pathania.

Distribution: Regio Indica, Africa, Australia, Guiana (www.nhm.ac.uk.); in Himalayas upto 6000 feet; extending to the Malayan subregion and China, (Bingham, 1905); Haroli (H.P.), (present study).

Larval host Plant: *Portulaco oleracea* (Bingham, 1905).

Remarks: Earlier, this species has been recorded from Himalayas (6000 feet) and the collected samples of this is an additional distribution record from Himalayas i.e., from Una district of Himachal Pradesh.

Genus *Junonia* Hübner

Junonia Hübner, 1819, *Verz. bekannt. Schmett.*: 34, 35.

5. *Junonia almana almana* (Linnaeus)

Junonia almana almana Linnaeus, 1758, *Syst. Nat.*: 472, n.89.

Material examined: Himachal Pradesh: Distt. Una; Una, 370m, 21.v. 2008, 2♂♂, 1♀; Santokhgarh, 378m, 1.iv. 2008, 1♀, coll. Anita Kumari and P.C.Pathania.

Distribution: India, China (www.nhm.ac.uk); Una, Santokhgarh (H.P.), (present study).

Larval host Plant: *Mimulis gracilis*, Rice crop (Bingham, 1905).

Remarks: *Junonia almana almana* (Linnaeus) has been

reported from above mentioned localities having altitudinal range between 370m to 378m representing Shivalik range of Himalayas.

6. *Junonia atlites atlites* (Linnaeus)

Precis atlites atlites Linnaeus, 1763, *Amoen. Acad.*: 407, n.72.

Material examined: Himachal Pradesh: Distt. Una; Gagret, 472m, 1.vi. 2008, 2♂♂, coll. Anita Kumari and P.C.Pathania.

Distribution: India, China, Java (www.nhm.ac.uk); Gagret (H.P.), (present study).

Larval host Plant: Unknown.

Remarks: In the present studies, two males specimens were collected from Gagret (472m) and is identified as *Junonia atlites atlites* (Linnaeus) after comparison with National Pusa Collection, IARI, New Delhi.

7. *Junonia lemonias lemonias* (Linnaeus)

Precis lemonias lemonias Linnaeus, 1758, *Syst. Nat.*: 473.

Material examined: Himachal Pradesh: Distt. Una; Bangana, 573m, 17.v. 2008, 1♂, 1♀; Chauki maniar, 530m, 5.viii. 2008, 3♀; Dehlan, 374m, 4.viii. 2008, 2♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Regio Indica. (www.nhm.ac.uk); Bangana, Chauki maniar, Dehlan (H.P.), (present study).

Larval host Plant: Unknown.

Remarks: The above said species has been identified after comparison with reference collection housed at National Pusa Collection, IARI, New Delhi.

8. *Junonia orithya* Linnaeus

Junonia orithya Linnaeus, 1764, *Mus. Utr.*: 278.

Material examined: Himachal Pradesh: Distt. Una; Daulatpur, 436m, 24.iii. 2008, 2♂♂, 1♀; Amb, 484m, 5.iv.2008, 1♂, 3♀; Bangana, 573m, 17.v.2008, 4♂♂, 1♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Regio, Indica, Africa, (www.nhm.ac.uk.) India, Ceylon, Assam, Burma, Tenasserim, China and the Malayan Subregion (Bingham, 1905); Daulatpur, Amb, Bangana (H.P.), (present study).

Larval host plant: *Amaranthus* sp., Sweet Potato (Bingham, 1905).

Remarks: The forms in this genus are very variable. Seasonal polymorphism is very prevalent among them, and individual aberrations not uncommon. Specimens from Burma and other regions of heavy rainfall are more richly coloured than those procured from the dry districts of India. The collection of this species from different areas of district Una

shows that this is a very common and is a serious pest of vegetables in the areas (Bingham, 1905).

Genus *Lethe* Hübner

Lethe Hübner, 1819, *Verz. bekannt. Schmett.*: 56.

9. *Lethe europa nudgara* Fabricius

Lethe europa nudgra Fabricius, 1775, *Syst. Ent.*: 500.

Material examined: Himachal Pradesh: Distt. Una; Bharwain, 708m, 17.viii. 2008, 3♂♂, coll. Anita Kumari and P.C.Pathania.

Distribution: Jawa, Bawean, Kagean, Nias, Philippinen (www.nhm.ac.uk.); the plains of northern India, lower hill of the Himalayas, Assam, Burma, Tenasserin, extending to China and the Malay Peninsula (Bingham, 1907); Bharwain (H.P.), (present study).

Larval host Plant: Unknown.

Remarks: The species has earlier been reported from lower hills of the Himalayas and plains of north India yet, its present collections from the Bharwain (708m) of Una district represents the additional record from north-west India.

Genus *Morpho* Fabricius

Morpho Fabricius, 1807, *Ill. Mag.* 6:280.

10. *Morpho perseus perseus* (Crammer)

Mycalasis perseus perseus Crammer, 1779, *Pap. Ex. I*: 71.

Material examined: Himachal Pradesh: Distt. Una; Amb, 484m, 5.iv. 2008, 1♀; Bangana, 573m, 17.v.2008, 1♀; Haroli, 375m, 1.viii.2008, 2♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Himalayas, Kangra to Sikkim, Bhutan, Bengal, Southern India, Ceylon, China and Malayan Subregion (Bingham, 1905); Amb, Bangana, Haroli (H.P.), (present study).

Larval host Plant: Grasses (Bingham, 1905).

Remarks: A sample comprising four female specimens collected between an elevation range 375m to 573m has been identified as *Morpho perseus perseus* (Crammer) (Bingham, *loc.cit.*). All these individuals were found to be highly conspecific in nature after examination of morphological characters. The species has been reported from Himalayas (Kangra) and collection of this from Una district is an additional distributional record from Himalayas.

Genus *Neptis* Fabricius

Neptis Fabricius, 1807, *Ill. Mag.* 6 :282.

11. *Neptis hylas astola* Linnaeus

Neptis hylas astola Linnaeus, 1758, *Syst. Nat. (Edn.x.)*: 486.

Material examined: Himachal Pradesh: Distt. Una;

Daulatpur, 436m, 24.iii. 2008, 1♂, 1♀; Chintpurni, 710m, 7.v.2008, 1♀, coll. Anita Kumari and P.C.Pathania.

Distribution: India (www.nhm.ac.uk.); Western and east Himalayas, Khasis Hills, and Upper Burma (Moore, 1890); Daulatpur, Chintpurni (H.P.), (present study).

Larval host Plant: Large flower Mexican clover (Moore, 1890).

Remarks: The species has been identified as *Neptis hylas astola* Linnaeus after its comparison with reference collection at Indian agriculture Research Institute, New Delhi. Though, it has earlier been reported from Western and East Himalayas, Khasis Hills and upper Burma yet, its present collection from Una district is an additional distributional record from Himalaya.

Genus *Pyronia* Hübner

Pyronia Hübner, 1816, *Verz. bekannt. Schmett.*: 59.

12. *Pyronia kashmirensis* (Ruhl)

Vanessa kashmirensis Ruhl, 1894, *Pal Grossschmett* : 596.

Material examined: Himachal Pradesh: Distt. Una; Mubarakpur, 490m, 15.iii. 2008, 3♂, 2♀; Daulatpur, 436m, 24.iii.2008, 1♂, 4♀, coll. Anita Kumari and P.C.Pathania.

Distribution: The Himalayas from Kashmir to Sikhim (Bingham, 1905); Mubarkpur, Daulatpur (H.P.), (present study).

Larval host Plant: Unknown.

Remarks: The entire sample comprising ten individual collected from an elevation range of 436m to 490m. Three males and two females from Mubarakpur and one male and four females from Daulatpur have been collected and found to be conspecific after critical examination of their morphological characters. The species has already been collected from Kashmir to Sikhim and the localities from which it has been collected are additional records from North-West Himalayas.

Genus *Satyrus* Westwood

Satyrus Westwood, 1851, *Cen.diurn.Lep.* 2: 72.

13. *Satyrus swaha* (Kollar)

Aulocera swaha Kollar, 1844, *Hugel's Kashmir*, 4:444.

Material examined: Himachal Pradesh: Distt. Una; Mubarkpur, 490m, 15.iii. 2008, 2♀♀; Bangana, 573m, 17.v. 2008, 3♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Sikkim, Tschitral (www.nhm.ac.uk) Himalayas from Kashmir to east Kumaun (Bingham, 1905); Mubarkpur, Bangana (H.P.), (present study).

Larval host Plant: Wild blue Iris (different grasses),

(Bingham, 1905).

Remarks: Having known from Himalayas from India, the collection of *Aulocera swaha* (Kollar) from Mubarkpur and Bangana (Himachal Pradesh) in the Himalayan range is its second distributional record from India as such.

II. FAMILY PAPILIONIDAE

Head vertex very smooth, labial palpi three segmented, upcurved, maxillary palpi one segmented, haustellum naked, antennae filiform, clubbed, antennal pecten absent, ocelli absent, chaetosemata present, tympana absent, venation variable, wing coupling absent, forewing pterostigma absent, forewing chorda absent, forewing anal veins A_1A_2 , forewing cell vein absent, hindwing pterostigma absent, hindwing anal veins A_{1+2} , hindwing cell vein absent, epiphysis present, tibial spurs absent in fore legs and mid legs and two in hind legs.

Genus *Papilio* Linnaeus

Papilio Linnaeus, 1758, *Syst. Nat.* (Edn.x): 458.

14. *Papilio demoleus demoleus* Linnaeus

Papillio demoleus Linnaeus, 1758, *Sept. Nat.* (Edn.x): 464, n.35.

Material examined: Himachal Pradesh: Distt.Una; Dehlan, 374m, 4.viii. 2008, 5♂♂; Bangana, 573m, 17.v. 2008, 5♂♂, 3♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: China, Eainan, Tonkin, N.S.India, Ceylon, Perain (www.nhm.ac.uk); Ceylon, India, Northern Burma, Persia, Arabia (Bingham, 1907); Dehlan, Bangana (H.P.), (present study).

Larval host Plant: Citrus (Bingham, 1907).

Remarks: During the course of present studies, a sample comprising thirteen individuals (ten males and three females) from above mentioned localities have been collected and identified as *Papillio demoleus* Linnaeus (Bingham, 1907). In view of large sample, the collected materials were found to be conspecific after critical examination of their morphological characters (mouth parts, antennae, legs, wing maculation and wing venation). The species seems to be quite common in the aforesaid localities.

15. *Papilio polytes nikobarus* Linnaeus

Papilio polytes Linnaeus, 1758, *Syst. Nat* (Edn. x): 460, n 7.

Material examined: Himachal Pradesh: Distt. Una; Gagret, 472m, 1.vi. 2008, 1♂, 1♀; Raipur, 545m, 2.viii. 2008, 4♂♂, 2♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Liu-Kiu, Formosa, China, Eainan, Tonkin, Ceylon, Perain (www.nhm.ac.uk) Andamans (Bingham, 1907); Gagret, Raipur (H.P.), (present study).

Larval host Plant: Citrus, Murraya, Triphasia, Xanthoxylon (Talbot, 1939).

Remarks: The species under reference viz. *Papillio polytes nikobarus* Linnaeus shows some white spot near apex and on the termen margin of the fore wing. Hind wing wavy and produced a tail at tornus. The collected material shows that this species is common in the area mentioned above.

III. FAMILY PIERIDAE

Head vertex very smooth, labial palpi three segmented, upcurved, maxillary palpi absent, haustellum naked, antennae filiform, clubbed, antennal pecten absent, ocelli absent, chaetosemata present, tympana absent, venation variable, wing coupling absent, forewing pterostigma absent, forewing chorda absent, forewing anal veins A_{1+2} , forewing cell vein absent, hindwing pterostigma absent, hindwing anal veins $A_{1+2}A_3$, hindwing cell vein absent, epiphysis present, tibial spurs lacking in fore legs and two each in mid legs hind legs.

Genus *Atella* Doubleday

Atella Doubleday, 1847, *Gen. D. Lep.* (1). 165.

16. *Atella phalantha phalantha* Horsfield

Atella phalantha phalantha Horsfield, 1829, *Cat Lep. E. Ind. Comp.*: 7.

Material examined: Himachal Pradesh: Distt. Una; Basoli, 398m, 31.vii.2008, 2♂♂, 5♀♀; Raipur, 545m, 2.viii.2008, 1♂, 2♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Throughout Continental India, Ceylon, Assam, Burma, Tenasserin, China, Japan and the Malayan Subregion (Bingham, 1905); Basoli, Raipur (H.P.), (present study).

Larval host Plant: *Flacourtia* species (Bingham, 1905).

Remarks: This species are very variable in colour, some specimens being almost white and some bright green, the markings are usually silver, or tipped with red.

Genus *Catopsilia* Hübner

Catopsilia Hübner, 1823, *Verz.bekannt.Schmett.*: 98.

17. *Catopsilia pomona catilla* Crammer

Catopsilia pomona catilla Crammer, 1779, *Pap. Exot.* 3: 63, pl. 229.

Material examined: Himachal Pradesh: Distt. Una; Santokhgarh, 368m, 1.iv. 2008, 1♂, 1♀; Basoli, 398m, 31.vii.2008, 2♂♂, 4♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Ceylon, India, Burma, Andaman and Nicobar Islands, South China to Solomon Islands and Australia (Talbot, 1839); Santokhgarh, Basoli (H.P.), (present study).

Larval host Plant: *Cassia fistula* (Talbot, 1939).

Remarks: The species has already been reported from India as per its old distribution. In the present studies, it is reported from Santokhgarh and Basoli of district Una (H.P.) is an additional distribution record. It seems that the species is common in the area.

18. *Catopsilia pomona hilaria* Crammer

Catopsilia pomona hilaria Crammer, 1781 *Pap.Exot.* 4:95, pl. 339.

Material examined: Himachal Pradesh: Distt. Una; Gagret, 472m, 1.vi. 2008, 2♂♂, 2♀♀; Basoli, 398m, 31.vii.2008, 1♂, 3♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Ceylon, India, Burma Andaman and Nicobar Islands; South China to Solomon Islands and Australia (Talbot 1939); Gagret, Basoli (H.P.), (present study).

Larval host Plant: *Cassia fistula* (Talbot,1939).

Remarks: This species is the usual form in India, where the entire yellow forms appears to be absent. It is reported from Gagret (472m) and Basoli (398m), which is its additional distribution record from India. All the eight specimens (three males and five females) were found to be conspecific after comparison with their morphological characters (head, mouth parts, antennae, labial palpi, maxillary palpi, wings and thorax) and the species was identified from National Pusa Collection, IARI, New Delhi. The collected sample shows that it is common in these areas.

19. *Catopsilia pyranthe minna* Linnaeus

Catopsilia pyranthe minna Linnaeus, 1758, *Syst.Nat. (Edn.x)* 1: 469.

Material examined: Himachal Pradesh: Distt. Una; Daulatpur, 436m, 24.iii. 2008, 6♂♂, 1♀; Bangana, 573m, 17.v.2008, 3♂♂, coll. Anita Kumari and P.C.Pathania.

Distribution: Celebes, Baluchistan to Malay Peninsula, Borneo, Sumatra, Java, South China, Formosa, Haonan to Philippines, India. (www.nhm.ac.uk.); Ceylon, India, Burma and Andaman Islands extending to Hainan, Formosa and South China, South and East to Borneo, Java, Celebes and the Philippines. (Talbot, 1939); Daulatpur, Bangana (H.P.), (present study).

Larval host Plant: *Cassia tora*, *Cassia auriculata* (Talbot, 1939).

Remarks: This species is very common in the above mentioned localities. The sample being recorded as *Catopsilia pyranthe minna* Linnaeus has found to be conspecific after examination of various morphological characters of nine males and one females.

Genus *Cepora* Billberg

Cepora Billberg, 1820, *Enumer.Ins.*:76.

20. *Cepora nerissa phryne* Fabricius

Cepora nerissa phryne Fabricius, 1775, *Syst. Ent.* : 473.

Material examined: Himachal Pradesh: Distt. Una; Amb, 484m, 5.iv. 2008, 1♂, 6♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: N.W. Himalayas (to 4000ft) (www.nhm.ac.uk.); Nepal, Sikkim, Bhutan, Bengal, Assam, upper and lower Burma, Tenasserim, Thailand and China (Bingham, 1907); Amb (H.P.), (present study).

Larval host Plant: *Capparis* sp. (Bingham, 1907).

Remarks: One species i.e., *Cepora nerissa phryne* Fabricius of the genus *Cepora* Fabricius is collected from an elevation 484m from Amb of Una district. All the seven specimens seems to be congeneric after critical examination of their morphological characters. The species is being reported for the second time from North-West Himalayas.

Genus *Colias* Fabricius

Colias Fabricius, 1807, *Ill. Mag.* 6:284.

21. *Colias fieldi edusina* Leech

Colias fieldi edusina Leech, 1893, *Butt. China*, 2: 438, pl.35, f. 6,7.

Material examined: Himachal Pradesh: Distt. Una; Haroli, 375m, 1.viii.2008, 5♂♂, ♀; Dehlan, 374m, 4.viii.2008, 6♂♂, 3♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Sikkim to North Burma (2500-14000 ft.) and North Yunnan (www.nhm.ac.uk.); Baluchistan to North Punjab, Sikkim and northern Burma, Western Himalayas (Bingham, 1907); Haroli, Dehlan (H.P.), (present study).

Larval host Plant: Feed on leguminosae, *Trifolium* (Bingham, 1907).

Remarks: The present sample comprising fifteen individuals (eleven males and four females) from the two localities i.e., Haroli and Dehlan, which is an additional distribution record of this species from Himalayas. The present collection record shows that this species is very common in above mentioned areas.

22. *Colias hyale glicia* Linnaeus

Colias hyale glicia Linnaeus, 1758, *Syst. Nat. (Edn.x)*, I: 71.

Material examined: Himachal Pradesh: Distt. Una; Bangana, 573m, 17.v.2008, 2♂♂, 1♀, coll. Anita Kumari and P.C.Pathania.

Distribution: North (except South Russia), North Africa. (www.nhm.ac.uk.); Baluchistan, the Himalayas from Chitral, Kashmir to Bhutan and Palaeartic region (Bingham, 1907); Bangana (H.P.), (present study).

Larval host Plant: *Trifolium* (Bingham, 1907).

Remarks: During present investigation, three individuals (2 males, 1 female) from Bangana (573m) have been collected and identified as *Colias hyale glicia* Linnaeus (Bingham, 1907) and after comparison of National Pusa Collection, Indian Agricultural research Institute, New Delhi.

Genus *Delias* Hübner

Delias Hübner, 1820, *Verz. bek. Schmett.*, p.91.

23. *Delias eucharis* Drury

Delias eucharis Drury, 1773, *Ill. Ex. Ent.*2, pl. 10 f.5.

Material examined: Himachal Pradesh: Distt. Una; Chintpurni, 710mm, 7.vi. 2008, 2♂♂; Chauki Maniar, 530mm, 5.vii.2008, 1♂ 1♀, coll. Anita Kumari and P.C.Pathania.

Distribution: India, Ceylon (Talbot, 1939); Chintpurni, Chauki Maniar (H.P.), (present study).

Larval host Plant: *Loranthus* sp., *Dalbargia sisoo*, *Ficus glomerata* (Talbot, 1939).

Remarks: The species has been identified from the relevant literature (Bingham, 1907; Talbot, 1939) besides our reference collection.

Genus *Eurema* Hübner

Eurema Hübner, 1819, *Verz. bek. Schmett.* : 96.

24. *Eurema hecabe merguiana* Linnaeus

Eurema hecabe merguiana Linnaeus, 1758, *Syst. Nat.(Edn.x)* : 470.

Material examined: Himachal Pradesh: Distt. Una; Amb, 484m, 5.iv. 2008, 4♂♂, 2♀♀, Basoli, 398m, 31.vii.2008, 5♂♂, 4♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: South China, Bengal, Sikkim, Burma, Siam, Lankawi Island, Malay Peninsula (www.nhm.ac.uk.); Spread eastwards to Siam and China, South far into the Malayan subregion, and to west into parts of Ethiopian Region (Bingham, 1907); Amb, Basoli (H.P.), (present study).

Larval host Plant: *Sesbania aculeate* (a monsoon annual) and *Cassia tora* (Bingham, 1907).

Remarks: The above mentioned species has been identified after its comparison with reference collection housed at National Pusa Collection, Division of Entomology, Indian Agricultural Research Institute, New Delhi. From the collected material it seems that the species is quite common in these areas.

Genus *Ixias* Hübner

Ixias Hübner, 1820, *Verz. bek. Schmett.*,: 95.

25. *Ixias marianne* Crammer

Ixias marianne Crammer, 1779, *Exot. III* :41,: 217.

Material examined: Himachal Pradesh: Distt. Una; Daulatpur, 436m, 24.iii. 2008, 1♂, 1♀; Amb, 484m, 5.vii.2008, 1♂, coll. Anita Kumari and P.C.Pathania.

Distribution: S. India, Ceylon. (www.nhm.ac.uk.); Ceylon to Peninsular, India, Punjab, Kumaon (Talbot, 1939); Daulatpur, Amb (H.P.), (present study).

Larval host Plant: *Capparis sepiaria*, *C. divaricata*, *C. aphylla* and *C. grandis* (Talbot, 1939).

Remarks: The species is subject to much variations, many all transitional forms occur between the extreme wet season and extreme dry ones (Talbot, 1939).

26. *Ixias pyrene cingalensis* Linnaeus

Ixias pyrene cingalensis Linnaeus, 1764, *Mus. Utr.*: 241.

Material examined: Himachal Pradesh: Distt. Una; Santokhgarh, 368m, 1.viii. 2008, 3♂♂...; Chauki Maniar, 530m, 5.vii.2008, 2♂♂...; Haroli, 375m, 1.viii.2008, 4♂♂..., coll. Anita Kumari and P.C.Pathania.

Distribution: China (www.nhm.ac.uk.); Ceylon (Talbot, 1939); Santokhgarh, Chauki Maniar, Haroli (H.P.), (present study).

Larval host Plant: *Capparis sepiaria* (Talbot, 1939).

Remarks: This species is the most variable and most widely distributed and many names have been given to its varieties (Talbot, 1939).

Genus *Pieris* Schrank

Pieris Schrank, 1801, *Fauna Boica*, 2, (1):152, 164.

27. *Pieris brassicae* Linnaeus

Pieris brassicae Linnaeus, 1758, *Syst.Nat. (Edn.x)*, 467.

Material examined: Himachal Pradesh: Distt. Una; Mubarakpur, 490m, 15.iii. 2008, 3♂♂, 1♀; Santoshgarh, 368m, 1.iv.2008, 2♂♂, 4♀♀; Bangana, 573m, 17.v.2008, 3♂♂, 2♀♀, coll. Anita Kumari and P.C.Pathania.

Distribution: Europe to Asia Minor (www.nhm.ac.uk.); Europe, Northern Asia Central Asia, Himalayas from Chitral to Bhutan (upto 10,000 feet), North-west India Umballa (Bingham, 1907); Mubarkpur, Santokhgarh, Bangana (H.P.), (present study).

Larval host Plant: *Brassica* plants (Bingham, 1907).

Remarks: This is a very common species and is a serious pest on *Brassica* sp. Larvae feeds voraciously of *Brassica* sp. plants and cause damage to the plant parts.

28. *Pieris mesentima lordaca* Walker

Pieris mesentima lordaca Walker, 1870, *Entom.*, 5: 48.

Material examined: Himachal Pradesh: Distt. Una; Bangana, 573m, 17.v. 2008, 2♂; Bharwain, 708m, 17.viii.2008, 2♂♂, coll. Anita Kumari and P.C.Pathania.

Distribution: Himalayas from Kashmir to Sikkim, plains to southern India (Bingham, 1907); Bangana, Bharwain (H.P.), (present study).

Larval host Plant: *Capparis aphylla*, *Caparris sepiaria*, *Capparis heyneana*, *Cadaba indica*, *Maerua arenaria* (Talbot, 1939).

Remarks: The above mentioned old distribution clearly shows the presence of this species from Himalayas from Kashmir to Sikkim. The collection of four specimens (four males) from Una district represent its additional distribution record in said area.

REFERENCES

- Arora, G.S. (1990). Collection and Preservation of Animals: Lepidoptera: *Zoo. Surv. Of India*, Calcutta,: 131-138.
- Bell, T.R. (1911). The common butterflies of plain in India. *J. Bombay Nat. His. Soc.*, **20**: 1115-1136.
- Bhaskaran, S. and Eswaran, R. (2005). Status and Distribution of Butterfly species in Sivakasi Taluk, Tamilnadu. *Journal of Insect science*. **18**(1): 134-136.
- Bingham, C.T. (1905). The fauna of British India including Ceylon and Burma Butterflies Vol.I. Taylor and Francis, Red lion court, Fleet street,: 1-511. plate i-x.
- Bingham, C.T. (1907). The fauna of British India including Ceylon and Burma Butterflies Vol.II. London: Taylor and Francis, Red lion court, Fleet street, :1-480. plate xi-xx.
- Common, I.F.B. (1970). *Lepidoptera*, In Mackerras, I. M. (ed.). *The Insects of Australia. A Textbook for Students and Research Workers*. 1st edition. Melbourne University Press, Carlton, Australia. xiii + 1029, 765-866 pp.
- D'Aberrera, B. (1980-86). Butterflies of Oriental region. Victoria, Hill House, **3**: 1-97.
- D'Aberrera, B. (1998). The Butterflies of Ceylon, Victoria, Hill House,: 1-224.
- de Niceville, L. (1881). A list of butterflies taken in Sikkim. *Journ. As. Soc. Beng*, **1**(1): 49-60.
- de Niceville, L. and Marshall, G.E.L. (1882). The Butterflies of India, Burma and Ceylon, (Taylor and Francis London) **1**: 1-321 pls.
- de Niceville, L. and Marshall, G.E.L. (1886). The Butterflies of India, Burma and Ceylon, (Taylor and Francis London) **2**: 1-332 pls.
- de Niceville, L. and Marshall, G.E.L. (1890). The Butterflies of India, Burma and Ceylon, (Taylor and Francis London) **3**: 1-503 pls.
- Evans, W.H. (1932). The identification of Indian butterflies. *Bombay Nat. Hist. Soc.*, *Bombay*.: 1-454.

- Gunatheraj, K., Perumal, T.N.A., Jayarama, K. and Kumar, G. (1998). Some South Indian butterflies; Field guide published under project life scape, *Indian Academy of Sciences, Bangalor.*; 1-270.
- Hampson, G.F. (1892). Fauna of British India including Ceylon and Burma, Moths. Vol.I. Taylor and Francis, London, xiii+527pp.
- Hampson, G.F. (1895). Fauna of British India including Ceylon and Burma, Moths. Vol.IV. Taylor and Francis, London, xxiii+588pp.
- Hampson, G.F. (1918). Some small families of the Lepidoptera. *Novit. Zool.*, **25**: 366-394.
- Holloway, J.D., Bradley, J.D and Carter, D.J. (1992). The Guide of insects of importance to man (Lepidoptera): 1-21
- Moore, F. (1865). On the Lepidopterous insects of Bengal. *Proc. Zool. Soc. Lond.*, 755-823.
- MoEF, (1998). Implementation of Article 6 of the convention on Biological Diversity in India (National Report): 1-59.
- Moore, F. (1866-68). On the Lepidopterous Insects of Bengal. *Proc. Zool. Soc. London.*, 1866:755-823; 1867: 44-98; 1868: 612-688.
- Moore, F. (1880-87). The Lepidoptera of Ceylon. *London Reeve.*, **3**: 215.
- Moore, F. (1890). *Lepidoptera Indica*. L. Reeve and Co, 5 Henrietta street, Covent Garden London, 1-144.
- Moore, F. (1896-99) *Lepidoptera Indica*. Lovell. Reeve and Co, 5 Limited, Publishers to the hime, Colonial, and Indian governments 6, Henrietta street, Covent garden London, 226-229.
- Rose, H.S. and Sharma, N. (1995). Comments on *Junonia hierta* complex alongwith reporting of a new subspecies (Lepidoptera) from West Himalaya. *Actias*, **2**(1-2): 63-65.
- Rose, H.S. and Sharma, N. (1995a). Comments on the variations in *Junonia orithya* complex (Lepidoptera: Nymphalidae). *J Bombay nat. Hist. Soc.*, **92**(2): 278-280.
- Rose, H.S. and Sharma, N. (1998). Further studies on the genus *Mycalesis* Hübner(Lepidoptera Papilionoidea: Satyridae) *Ann. Ent.*, **16**(1): 51-62.
- Rose, H.S. and Sharma, N. (1998a). Two new species of the genus *Ypthima* Hübner from West and North- West Himalaya. (Lepidoptera: Papilionoidea: Satyridae) *Geobios New Reports*, **17**(2): 105-112.
- Rose, H.S. and Sharma, N. (1998b). Role of genitalia in the identification of *Melanitis* species (Lepidoptera : Satyridae) *Uttar Pradesh J. Zool.*, **18**(2): 81-86.
- Rose, H.S. and Sharma, N. (1998c). Inventory of Satyridae (Rhopalocera: Lepidoptera) of North-West India. *Zoos' Print Journal*, **13**(11): 29-30.
- Rose, H.S. and Sharma, N. (1999). Population Status and male genitalic studies on *Lethe europa niladana* and *Parage eversmani cashmirensis* (Lepidoptera: Satyridae) *J. Bombay nat. Hist. Soc.*, **96**(3): 433-435.
- Rose, H.S. and Sharma, N. (2000). Further contribution to the taxonomy and distribution of the genus *Lethe* Hübner (Satyridae: Lepidoptera) from North Western Himalaya. *Entomon.* **25**(2): 129-140.
- Rose, H.S. and Sharma, N. (2000a). Additional notes on a Himalayan Satyrid *Dallacha hydriva* (Moore) (Satyridae, Lepidoptera). *J. Bombay nat. Hist. Soc.*, **97**(3): 448-450
- Rose, H.S. and Sharma, N. (2000b). Distributional record and genitalic studies of four species of *Callerebia* Butler from North-West Himalaya. *Geobios*, **27**(2-3): 57-64.
- Rose, H.S. and Sidhu, A.K. (1994). Lycaenid butterfly diversity (Lepidoptera) of Mussoorie (Uttar Pradesh) alongwith comments on Wildlife (Protection) Act, 1972. *Cheetal*, **33**(3-4): 10-16.
- Rose, H.S. and Sidhu, A.K. (1996). Revision of genus *Tarucus* Moore (Lepidoptera : Papilionoidea) from North-West India. *Ann. Entomon.*, **14**(2): 69-80.
- Rose, H.S. and Sidhu, A.K. (1997). Comments on *Freyeria trochylus* complex (Lepidoptera: Papilionoidea : Lycaenidae) *Goebios New Reports*, **16**(3): 159-163.
- Rose, H.S. and Sidhu, A.K. (1997a). Taxonomic and distributional studies on the subfamily Lycaenidae (Lepidoptera: Papilionoidea : Lycaenidae) from Western Himalaya. *Bioved* , **8**(1,2): 61-76.
- Rose, H.S. and Sidhu, A.K. (1999). Remarks on the Distribution and identification of seven species from the genera *Rapala* Moore and *Everes* Hübner (Lycaenidae: Lepidoptera). *Proc. Nat. Seminar on Insects and Environment* , : 21-23.
- Rose, H.S. and Sidhu, A.K. (2001). Inventory of the Butterflies of Punjab (Rhopalocera : Lepidoptera). *Bionotes*, **3**(2): 43-44.
- Rose, H.S. and Walia, V.K. (2003). Inventory of butterfly diversity of Chandigarh *Bionotes*, **5**(3): 58-60.
- Talbot, G. (1939). The fauna of British India including Ceylon and Burma Butterflies Vol.I Taylor and Francis, LTD, Red Lion court, Fleet street, London, : 1-599 plate I-III.
- Thakur, M.S., Mattu, V.K. and Mehta, H.S. (2006). Studies on the butterflies of Sukhna and catchment area in Chandigarh, India; *J.ent. Res.*, **30**(2): 175-178.

- Trigunayat, M.M. (1999). Status survey of butterfly fauna of Keoladeo. National Park, Bharatpur; *Journal of Experimental Zoology, India*, **2**(1): 55-57.
- Uniyal, V.P. (2007). Butterflies in the Great Himalayan conservation Landscape in Himachal Pradesh, Western Himalaya, *Entomon*, **32**(2): 119-127.
- Varshney, R.K. (1993). Index. Rhopalocera Indica Part III Genera of butterflies from India and neighbouring countries (Lepidoptera: (A) Papilionidae, Pieridal and Danaidae) *Oriental Insects*, **27**: 347-372.
- Varshney, R.K. (1994). Index Rhopalocera Indica Part.III. Genera of Butterflies from India and Neighbouring countries [Lepidoptera: (B) Satyridae, Nymphalidae, Libytheidae and Riodinidae]; *Oriental insects*, **28**: 151-198.
- Varshney, R.K. (1997). Index Rhopalocera Indica and Neighbouring countries [Lepidoptera: (c) Lycaenidae] *Oriental insects*, **31**: 83-138.
- Varshney, R.K. (1998). Faunal diversity in India. ZSI Publication, : 146-157.
- Withrington, D.K.J. and Veronik, R. (2008). Butterflies (Rhopalocera) of the Croatian islands, *Entomological Gazette*, **59**(1): 3-25.
- Wynter Blyth, M.A. (1957). Butterflies of Indian region; The Bombay Natural History Society, Mumbai, : 1-523.
- Yakovlev, R.V. and Nakonechnyi, A.N. (2001). Butterflies (Lepidoptera: Rhopalocera) of Kurai Mt. Ridge (Altai), Russian *Entomological Journal*, **10**(2): 179-187.
- Zimmerman, E.C. (1978). Microlepidoptera. *Ins. Hawaii*, vol. 9. University Press of Hawaii, Honolulu. xviii + 1903pp.