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BUTTERFLIES OF DISTRICT HOSHIARPUR, PUNJAB, INDIA

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ABSTRACT

Hoshiarpur district has been recognized as one of the biodiversity rich pockets in the Punjab Shivaliks. The district shares a boundary with Kangra district, and Una district of Himachal Pradesh in the northeast. The district was extensively explored by conducting ramdom sampling surveys from 2013 to 2015. 81 species Papilionidae (5 species), Pieridae (15) Nymphalidae (31), Lycaenidae (20) and Hesperiidae (10) of butterflies were recorded. Of these seven species are new records for the state.

Key words: Shivaliks, Kandi area, Microendemic zones, Biodiversity.

Introduction

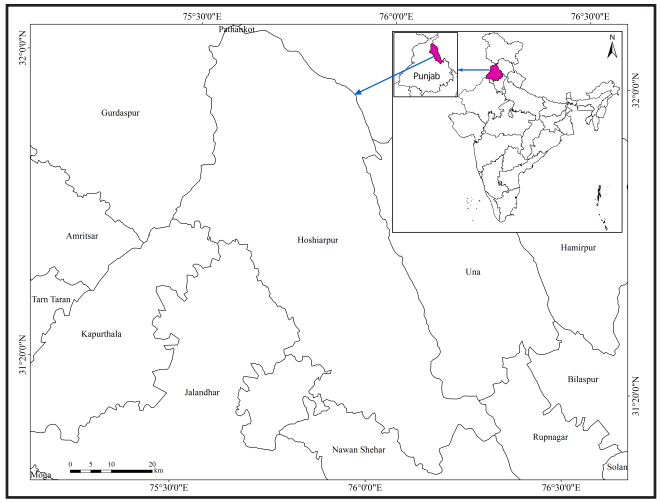
The ecosystem of the Shivalik range in North West India extends across the states of Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Uttarakhand and Uttar Pradesh. The Shivalik hills of Punjab spreads over the geographical area of 9448.97 km and lies in the north-eastern part of the state extending from north-west to south-east along the Himachal Pradesh border (Jerath *et al.,* 2014). It is spread across the eastern parts of the districts of Pathankot, Gurdaspur, Hoshiarpur, Nawanshahr and Rupnagar. The area has been identified as one of the micro-endemic zones of the country and is also one of the most degraded rain-fed agro-ecosystem of Punjab. It is one of the unique ecosystems of Punjab and is the only major area of the state harbouring natural vegetation. Besides, 90% of the invertebrate fauna of the Punjab Shivaliks is comprised of arthropods (Jerath *et al.,* 2014). The butterfly fauna of Punjab was surveyed by Peile (1911) and Sevastopulo (1948). Rose and Sidhu (2001) provided an inventory of 74 species of butterflies from Punjab. Arora *et al.* (2006) listed 74 species from the Punjab Shivaliks. Sharma and Joshi (2009)*;* Sharma (2014)*;* Sharma *et al.* (2013)*;* Sharma *et al.* (2015) and Kumar (2015) have scrutinized the butterfly fauna from Punjab shivalik area in recent years. However, information on the butterfly diversity of the various protected areas of Punjab is almost totally lacking (Sharma *et al.,* 2015).

Material and Methods

Study area

Hoshiarpur district (31.644029°N, 75.793075°E) occupies the Northeastern part of the Punjab state. This district falls under the Kandi area of Punjab which is a sub-mountainous zone that stretches in a thin belt along the northeastern border of the state of Punjab, and comprises the Punjab Shivaliks and strip of undulating land below the hills with a length and width of 161 km and 10 km, respectively (Rawat *et al.,* 2013) (Map 1) The climate of the area is semi-arid and hot. Two main sites which were surveyed regularly are - Mukerian 31° 57' 0'' N, 75° 37' 12'' E Talwara 31° 54' 0'' N, 75° 39' 0'' E.

Surveys were conducted from 2013 to 2015 during the pre and post monsoon seasons. Sampling was done during morning hours from 9:00h to 14:00h. Only photographic documentation was done and no specimen was collected. The identification was done by using Evans



Map 1: Study area

Eighty one (81) species of butterfly were recorded from District Hoshiarpur of which seven species were mew recorded from the state.

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(1932), Talbot (1939, 1947) and Wynter-Blyth (1957).

Results

81 butterfly species belonging to 60 genera [(Papilionidae (5 species, 3 genera), Pieridae (15 species, 9 genera), Nymphalidae (31 species, 22 genera), Lycaenidae (20 species, 17 genera) and Hesperiidae (10 species, 9 genera)] were recorded during the present survey (Table 1). Out of these 81 species, one species is enlisted under the Schedule I (*Papilioclytia* Linnaeus) and thee species (*Hypolimnas misippus* Linnaeus, *Lampides boeticus* Linnaeus, *Euchrysops cnejus cnejus* Fabricius are enlisted under Schedule II of Indian Wildlife (Protection) Act, 1972. Family Nymphalidae formed the most dominant family in terms of relative abundance and species richness, followed by family Lycaenidae. Besides, five taxa have been added to the butterfly fauna of Punjab.

Table 1: List of butterflies recorded from district Hoshiarpur, Punjab

Scientific name	Common name	Local status
Family: Nymphalidae		
Subfamily: Nymphalinae		
1. *Vanessa cardui* (Linnaeus)	Painted Lady	Common
2. *Vanessa indica* (Herbst)	Indian Red Admiral	Common
3. *Symbrenthia lilaea* (Hewitson)	Common Jester	Rare
4. *Junonia almana* (Linnaeus)	Peacock Pansy	Abundant
5. *Junonia lemonias* (Linnaeus)	Lemon Pansy	Common
6. *Junoniai phita* (Cramer)	Chocolate Pansy	Common
7. *Junonia orithya* (Linnaeus)	Blue Pansy	Common
8. *Junonia hierta* (Fabricius)	Yellow Pansy	Common
9. *Junonia atlites* (Linnaeus)	Grey Pansy	Common
10. *Kaniska canace* (Linnaeus)	Blue Admiral	Uncommon
11. *Hypolimnas misippus* (Linnaeus) Sch II	Danaid Eggfly	Uncommon
12. *Hypolimna sbolina*(Linnaeus)	Great Eggfly	Common
Subfamily: Charaxinae		
13. *Charaxes solon* (Fabricius)	Black Rajah	Rare
14. *Polyura agrarius* (Swinhoe)	Anomalous Nawab	Uncommon
Subfamily: Limenitidinae		
15. *Moduza procris* (Cramer)	Commander	Uncommon
16. *Neptis hylas* (Linnaeus)	Common Sailor	Abundant
17. *Athyma perius* (Linnaeus)	Common Sergeant	Less Common
18. *Euthalia aconthea* (Cramer)	Common Baron	Common
Subfamily: Satyrinae		
19. *Melanitis ledaleda* (Linnaeus)	Common Evening Brown	Common
20. *Mycalesisperseus* (Fabricius)	Common Bush Brown	Common
21. *Lethe europa* (Fabricius)	Bamboo Tree Brown	Less Common
22. *Lethe rohria* (Fabricius)	Common Tree Brown	Less Common
23. *Ypthima huebneri* Kirby	Common Four Ring	Uncommon
Subfamily: Heliconiinae		
24. *Argynnis hyperbius* (Linnaeus)	Indian Fritillary	Uncommon
25. *Phalantha phalantha* (Drury)	Common Leopard	Abundant
Subfamily: Libytheinae		
26. *Libythea myrrha* Godart	Club Beak	Uncommon
Subfamily: Danainae		
27. *Dannus chrissipus* (Linnaeus)	Plain Tiger	Common
28. *Dannus genutia* (Cramer)	Striped Tiger	Uncommon
29. *Tirumala limniace* (Cramer)	Blue Tiger	Uncommon
30. *Parantica aglea* (Stoll)	Glassy Tiger	Uncommon
31. *Euploea core* (Cramer)	Common Crow	Less common
Family: Pieridae		
32. *Pontia daplidice* (Linnaeus)	Himalayan Bath White	Common
33. *Pieris brassicae* (Linnaeus)	Large Cabbage White	Common
34. *Pieris canidia* (Linnaeus)	Indian Cabbage white	Common
35. *Catopsilia pomona* (Fabricius)	Lemon Emigrant	Common
36. *Catopsilia pyranthe* (Linnaeus)	Mottled Emigrant	Common
37. *Eurema hecabe* (Linnaeus)	Common Grass Yellow	Common
38. *Eurema brigitta* (Stoll)	Small Grass Yellow	Uncommon

Scientific name	Common name	Local status
39. *Eurema laeta laeta* (Boisduval)	Spotless Grass Yellow	Very Uncommon
40. *Eurema blanda* (Boisduval)	Three Spot Grass Yellow	Very Uncommon
41. *Colias fieldii fieldii* Ménétriés	Dark Clouded Yellow	Common
42. *Delias eucharis* (Drury)	Common Jezebel	Uncommon
43. *Ixias pyrene* (Linnaeus)	Yellow Orange Tip	Common
44. *Ixias marianne* (Cramer)	White Orange Tip	Common
45. *Cepora nerissa* (Fabricius)	Common Gull	Common
46. *Belenois aurota* (Fabricius)	Pioneer White	Common
Family: Papilionidae		
47. *Papilio polytes* Linnaeus	Common Mormon	Abundant
48. *Papilio demoleus* Linnaeus	Lime Butterfly	Common
49. *Papilio clytia* Linnaeus Sch I	Common Mime	Less common
50. *Graphium doson* (C. & R. Felder)	Common Jay	Uncommon
51. P*achliopta aristolochiae* (Fabricius)	Common Rose	Common
Family: Lycaenidae		
52. *Pseudozizeeria maha* (Kollar)	Pale Grass Blue	Abundant
53. *Zizeeria karsandra* (Moore)	Dark Grass Blue	Common
54. *Zizinaotis* (Fabricius)	Lesser Grass Blue	Common
55. *Chilades pandava pandava* (Horsfield)	Plains Cupid	Less Common
56. *Euchrysops cnejus cnejus* (Fabricius) Sch II	Gram Blue	Common
57. *Lampides boeticus* (Linnaeus) Sch II	Pea Blue	Common
58. *Azanus ubaldus* (Stoll)	Bright Babul Blue	Uncommon
59. *Azanus Uranus* Butler	Dull Babul Blue	Uncommon
60. *Prosotas nora* (Felder)	Common Line Blue	Common
61. *Virachola isocrates* (Fabricius)	Guava blue	Rare
62. *Rapala airbus* (Fabricius)	Indian Red Flash	Uncommon
63. *Surendra quercetorum* (Moore)	Acacia Blue	Very Rare
64. *Leptotes plinius* (Fabricius)	Zebra Blue	Common
65. *Spindasis vulcanus* (Fabricius)	Common Silverline	Uncommon
66. *Spindasis ictis* (Hewitson)	Shot Silverline	Uncommon
67. *Castalius rosimon* (Fabricius)	Common Pierrot	Uncommon
68. *Tarucus extricatus* Butler	Rounded Pierrot	Common
69. *Tarucus nara* (Kollar)	Striped Pierrot	Common
70. *Talicada nyseus* (Guérin-Méneville)	Red Pierrot	Common
71. *Rapala manea* (Hewitson)	Slate Flash	Uncommon
Family: Hesperiidae		
72. *Matapa aria* (Moore)	Common Red Eye	Uncommon
73. *Borbo cinnara* (Wallace)	Rice Swift	Common
74. *Telicota colon* (Fabricius)	Pale Palm Dart	Uncommon
75. *Telicota bambusae bambusae* (Moore)	Dark Palm Dart	Uncommon
76. *Hasora chromus chromus* Cramer	Common Banded Awl	Extremely Rare
77. *Spialiag alba* (Fabricius)	Indian Grizzled Skipper	Common
78. *Udaspes folus* (Cramer)	Grass Demon	Less Common
79. *Hasora chromus* (Cramer)	Common Banded Awl	Uncommon
80. *Parnanra* sp.		Common
81. *Pelopidas* sp.		Common

New records

***Papilio clytia* Linnaeus, 1758:** This species is commonly known as Common mime. It has two subspecies distributed in India i.e. *P.C. clytia* Linnaeus, 1758 and *P.C. flavolimbatus* Oberthür, 1879. The latter subspecies is distributed in Andamans (Evans 1932). Perhaps the distribution of former subspecies is unclear. Peile (1911) recorded it at Fatehgarh Sahib, Punjab. Evans (1932), Talbot (1939) and Wynter-Blyth (1957) mentioned its distribution from Southern India to N.W. Himalaya. However, only recently Cotton *et al.* (2013) and Varshney and Smetacek (2015) mentioned its distribution throughout India except the J&K, Punjab and Rajasthan. During the present study this species was recorded on 14 April, 2014 during the morning hours at 09:22h from the village Sibbochack, Hoshiarpur, Punjab (Fig. A).

1. ***Charaxessolon* Fabricius 1793:** Initially, *Charaxes solon* Fabricius was treated as *Charaxes fabius* Fabricius by Moore (1880, 1882), Rothschild and Jordan (1900), Evans (1932) and Wynter-Blyth (1957).

C. solon Fabricius has two subspecies distributed within India i.e. *C.S. sulphureus* Rothschild and *C.S. solon* Fabricius. The former subspecies is known to be distributed from Assam to Myanmar and the latter is known to be distributed in S. India and from Kangra to Sikkim. Varshney and Smetacek (2015) also described *Charaxes solon solon* Fabricius to be distributed from Rajasthan to Kerala, Delhi, Himachal Pradesh to Sikkim and W. Bengal.

During the present survey *Charaxes solon solon* Fabricius (Fig. B) was spotted at village Sibbochack (32.050062° N, 75.657992° E), Tehsil Mukerian, Hoshiarpur, Punjab on 12 November, 2013 at 11: 32h.This is first record of the Black Rajah from the Punjab state.

2. ***Polyura agrarius* Swinhoe 1887:** *P. agrarius* Swinhoe 1887 also known as Anamolous Nawab was first described under the genus *Charaxes* Ochsenheimer. Smiles (1982) described the distribution of the nominate species in Tiruchirappalli, Nilgiri, Coonoor, Kallar, Mysore (=Mysuru), Hyderabad, Mhow, Kumaon, Kullu, Dharamshala, and Orissa. Bingham (1905), Evans (1932) and Wynter-Blyth (1957) treated *P. agrarius* as pale south Indian form of *P. athamas*. As a result of this taxonomic confusion, there is not much information available on distribution, habits and habitat preferences of *P. agrarius* (Smetacek, 1999). Recently Toussaint *et al.* (2015) confirmed the specific status of *P. agrarius* through molecular studies. Smetacek (1999,2012) confirmed the occurrence of *P. agrarius* in Kumaon Himalaya. According to Varshney and Smetacek (2015), the distribution of this species in the North India spans Himachal Pradesh to N. E. India. Kehimkar (2008) reports its distribution from south India up to Gujarat, Haryana, Himachal Pradesh and Uttarakhand.

   During the present survey *Polyura agrarius* Swinhoe, 1886 **(**Fig. C**)** was sighted at village Sibbochack (32.050062° N, 75.657992° E), Tehsil Mukerian, Hoshiarpur, Punjab on 9 November, 2013 during the after-noon hours at 02:53 pm. (This is to be concluded as the first record of the Anamolous Nawab for the Punjab state).

3. ***Moduz aprocris* (Cramer, 1777):** Commonly known as Commander, this species was originally described under the genus *Limenitis* Fabricius. Its distribution spans the Peninsular India (south of Madhya Pradesh), North India (Dehradun) to North East India (Bengal, Assam and Burma) and South India Evans, 1932; Wynter-Blyth, 1957; Kunte, 2006). This is typically a low elevation species (304 to 1219 m) occupying areas with heavy to moderate rainfall (Wynter-Blyth, 1957) .

   During the present survey this species was observed twice from Talwara village (31.930947°N; 75.894971° E), District Hoshiarpur, Punjab (Fig. D) on 4 December 2015 at 13:27 h.

4. ***Kaniska canace* (Linnaeus, 1763):** Commonly known as the Blue Admiral. This butterfly has two subspecies found in India viz., *canace* Linnaeus and *viridis* Evans. The former subspecies is distributed in North West Himalaya (Chitral in Pakistan to Kumaon) and Norht East Himalaya (from Sikkim to North Burma) (Evans, 1932) whereas, the latter subspecies is found in Southern India. In Himalaya, this species occupies the elevation range from 609 to 2743 m (Wynter-Blyth, 1957).

   Under the current survey this species was reported from Talwara village, Hoshiarpur (29 March, 2015). Additionally this species was also spotted in Ludhiana (15 February, 2014). This is the confirmatory record for the presence of this species from the plains of Punjab as previously this species was known to be restricted to only the hilly areas (Fig. E).

5. ***Surendra quercetorum* Moore:** It is commonly known as Common Acacia Blue. Three subspecies are known under the nominate species viz., *biplagiata* Butler is commonly found in South India, *latimargo* Moore is known from Andaman, *quercetorum* Moore confine itself to the area with heavy rainfall in north India (from Himachal Pradesh, Dehradun to N. E. India). The species was observed in Village Sibbochack (32.050062° N, 75.657992° E), Tehsil Mukerian, Hoshiarpur (Fig. F) on 18 November, 2014. This confirmatory record adds one more Lycaenid to the butterfly fauna of Punjab.

6. ***Matapa aria* (Moore, 1866):** This is a monotypic species. Confined to bamboo jungles, it is known to be distributed from Dehradun to Assam and South India (Wynter-Blyth, 1957). However there is one record of this species from the Renuka Wildlife Sanctuary, Sirmaur, Himachal Pradesh by Singh (2008).

   This species was spotted in village Sibbochack, Hoshiarpur, Punjab (Fig. G) on 23August 2015 at 13:43h.

7. ***Hasora chromus chromus* Cramer– Oriental Common Banded Awl:** During the present survey one specimen of (Fig.H) was spotted in village Sibbochack, Hoshiarpur, Punjab on 2nd September, 2013.

Major forest areas in Punjab fall under Shivaliks and Mand (Wetlands). Hoshiarpur district of Punjab falls under the Punjab Shivalik area. Shivalik area is marked by fragile

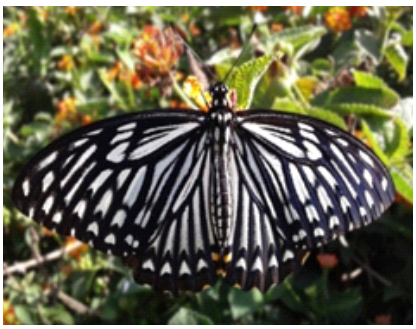

Fig. A. *Papilio clytia* Linnaeus

Fig. B. *Chraxes solon* Fabricius

Fig. C. *Polyura agrarius* Swinhoe

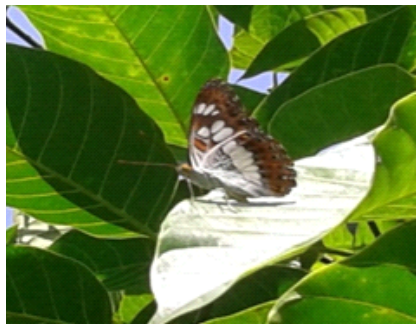

Fig. D. *Moduza procris* (Cramer)

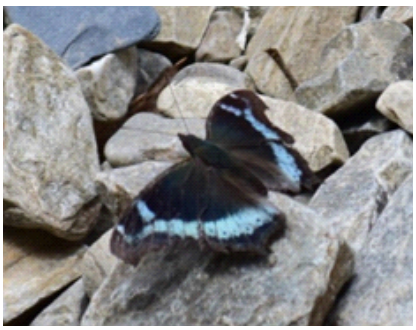

Fig. E. *Kaniska canace* Linnaeus

Fig. F. *Surendra quercetorum* Moore

Fig. G. *Matapa aria* (Moore)

Fig. H. *Hasora chromus chromus* Cramer

land formation, sub-tropical climate, varied topography and rich alluvial soils (Sivakumar *et al.,* 2010). The fragility of this ecosystem in Punjab is enhanced due to heavy anthropogenic activities like sand and stone mining. Shivaliks is one of the most degraded ecosystems in Punjab. The Wildlife divisions of Ropar, Hoshiarpur and Gurdaspur in Punjab and the catchment area around the Sukhna lake WLS have been potential wildlife habitats (Jerath *et al.,* 2006). Shivalik ecosystem acts as a transitional zone between the plains of Punjab and higher mountains in the North. This attributes the high floral and faunal diversity to this region.

Under the current survey 81 butterfly species were recorded from the Hoshiarpur district out of which five are new records. Occurrence of *Papilio clytia* Linnaeus, 1758 in Punjab has confirmed the earlier reports by Peile (1911). Present survey also confirms the range extension of *Libythea myrrha* Godart and *Graphium doson* Felder and Felderin Punjab which was recently reported by Sharma *et al.* (2013) and Kumar and Singh (2014) respectively. However, *Euploea mulciber mulciber* (Cramer) also recently reported from Hoshiarpur, Punjab by Sharma (2014) could not be spotted under the present survey. These new records witness the previously underestimated butterfly fauna from the Punjab state. In particular, the state of Punjab is still unexplored in terms of its butterfly diversity (Sharma *et al.,* 2015). Hence there is a need of the conservation practices and regular surveys to be conducted for the updating of the faunal elements.

जिला होशियारपुर, पंजाब, भारत की तितलियां

वरिन्दर सिंह, जगबीर सिंह कीर्ति एवं दीपिका मेहरा

सारांश

होशियारपुर जिले को पंजाब शिवालिकों में जैवविविधता समृद्ध पॉकेटों में से एक के रूप में मान्यता दी गई है। जिले की सीमा उत्तरपूर्व में हिमाचल प्रदेश के कांगड़ा जिले और ऊना जिले के साथ में है। 2013 से 2015 तक बेतरतीब सैम्पलिंग सर्वेक्षण करके जिले की गहन खोज की गई। तितलियों की कुल 81 प्रजातियां, यथा–पेपिलिओनिडा (5 प्रजाति), पीरिडा (15), नीम्फेलिडा (31), लाइकेनिडा (20) और हीस्पीरिडा (10), अभिलिखित की गई। इनमें से सात प्रजातियां राज्य के लिए नए अभिलेख हैं।

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