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Diversity of Butterflies (Lepidoptera: Insecta) from Dholbaha dam (Distt. Hoshiarpur) in Punjab Shivalik, India

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ABSTRACT : A detailed study on the butterfly species diversity was carried out at Dholbaha dam, in district Hoshiarpur, Punjab, India during 2002-04. The study area has a moist deciduous forest surrounding it. A total of 41 butterfly species belonging to 5 families of order Lepidoptera were recorded during the study period. The family Nymphalidae, represented by 19 species was the most dominant followed by Pieridae (10 species), Lycaenidae (8 species), Papilionidae (3 species) and Hesperiidae (1 species). *Eurema hecabe* (Linn.) was the most dominant species of Butterfly in terms of number of individuals followed by *Danaus chrysippus* (Linn.), *Euchrysops cnejus* (Fabr.), *Euploea core* (Cramer), *Junonia lemonias* Linn., *Catopsilia pyranthe* Linn. so on and least by *Graphium sarpedon luctatius* Fruhstorfer and *Delias eucharis* Drury. From the conservation point of view, the study area is undisturbed and rich in flora and fauna species.

Keywords : Butterfly species diversity, Dholbaha dam, Punjab Shivalik, India

INTRODUCTION

India having only 2.3 percent (3,287,263 Km^2) of the total land mass of the world so far recorded around 89,500 animal species, comprises 7.28 percent of the total world animal species (Alfred *et al.*, 1998). Approximately 17,200 species of butterfly throughout the world, of which 1,501 species of butterfly are known from India (Kunte, 2000). Butterflies are the most beautiful and attractive than most other insects and have fascinated human imagination and creativity. They are valuable pollinators when they move from plant to plant, gathering nectar and are the one of the important food chain components of the birds, reptiles, spiders and predatory insects. They are also good indicators of environmental quality as they are sensitive to changes in the environment. The largest Indian butterfly is Common Birdwing, *Troides helena* (Linn.) with a maximum expanse of 190mm and the smallest is Grass Jewel, *Freyeria trochilus putli* (Kollar) with a minimum expanse of 15mm (Wynter-Blyth, 1957).

Perusal of literature reveals that the workers contributed and documented their work in this field were de Niceville (1886, 1890), Moore (1890-1903), Marshall & de Niceville (1882), Swinhoe (1893, 1905-1912), Bingham (1905, 1907), Evans (1932), Talbot (1939, 1947), Wynter-Blyth (1957), Cantlie (1962) and presently Gaonkar (1996), Gunathilagaraj *et al.* (1998, 2000), Gupta and Mondal (2005), Haribal (1998), Heppner (1998), Kumar *et al.* (2007 a&b), Kunte (2000), Mathew and Rahamathulla (1993), Lewis (1973), Sharma *et al.* (2006), Varshney (1993, 1994, 1997) *etc.* enriched this field. Although India has a rich butterfly fauna, but due to various reasons such as habitat destruction, fire, use of pesticides and weedicides and illegal collection for trade, many species have become very rare and some are on the verge of extinction. Therefore, the present study makes a modest attempt to explore the existing diversity of butterflies from Dholbaha dam.

MATERIAL AND METHODS

(*a*) Study Area. Dholbaha dam is a man made wetland in village Dholbaha of district Hoshiarpur (Punjab: India), which is a part of Shivalik hills (9448.97 Km^2) of Punjab state and lies between latitude 30°34'10.82" and 32°33'02.96" North and longitude 74°50'30.30" and 76°52'51.26" East. Dholbaha Dam is constructed as under water harvesting structure in the year 1987, for controlling the water, which used to cause heavy loss to the nearby villages. Dholbaha dam is earth filled dam and area under water is 132 ha. The total catchment area of the Dholbaha dam is 56.14 Km^2 and it is 32 Km from Hoshiarpur town. The Dholbaha dam exists throughout the year although the water level may vary, thus it forms a congenial habitat for large number of aquatic insects and fishes. The prevailing climatic condition in Dholbaha dam is typically sub-tropical and north Indian monsoon type with distinct summer and winter months. The temperature varies between 14°-47°C in summer, where as between 0°-32°C during winter. The south-west monsoon arrives during June and remains till October. The average annual rainfall varies between 400-600 mm. The forest type around Dholbaha dam is moist deciduous. For carrying out the present studies the total reservoir and surroundings were divided into four sectors based on distribution and the types of vegetation and topography. In each sector five spots were selected according to the maximum availability of butterfly species.

(*b*) Collection and taxonomic study of Butterfly. An extensive and regular (monthly) collection of butterfly was made during October, 2002 to September, 2004 using a sweep net. The collected individuals were transferred into insect collection paper packs and were brought to the laboratory, where these were properly stretched, pinned, oven dried for 72 hours at 60^0C and preserved in collection boxes. Identification of adult individuals was carried out using identification keys provided by de Niceville (1886, 1890), Moore (1890-1903), Marshall & de Niceville (1882), Swinhoe (1893, 1905-1912), Bingham (1905, 1907), Evans (1932), Talbot (1939, 1947), Wynter-Blyth (1957). All the specimens collected from study area deposited in the National Zoological collections maintained by Northern Regional Station, Zoological Survey of India, Dehra Dun, India.

RESULTS AND DISCUSSION

A total of 41 butterfly species belonging to 5 families of order Lepidoptera were recorded in Dholbaha Dam during the study period and in four sectors of Dholbaha Dam, sector-IV recorded 30 butterfly species, sector-I 29 species, sector-III 26 species and sector-II 25 species (Table-1). The family Nymphalidae, represented by 19 species was the most dominant followed by Pieridae (10 species), Lycaenidae (8 species), Papilionidae (3 species) and Hesperiidae (1 species). Eurema hecabe (Linn.) was the most dominant species of Butterfly in terms of number of individuals (247) followed by Danaus chrysippus (Linn.) (215), Euchrysops cnejus (Fabr.) (183), Euploea core (Cramer) (164), Junonia lemonias Linn. (148), Catopsilia pyranthe Linn. (132) so on and least by Graphium sarpedon luctatius Fruhstorfer (24) and Delias eucharis Drury (21). Hypolimnas misippus (Linn.) is listed under Indian Wildlife (Protection) Act, 1972. About 82 species of all types of flora/ plants species recorded in and around Dholbaha Dam. The association between butterflies and plants is highly specific. Unlike bees, butterflies feed entirely on nectar, which they obtain through their long proboscis from flower. Thus pollination, a crucial link in the survival of ecosystem, is one such factor that needs to be well understood to develop appropriate strategies for conservation of the biodiversity.

Table 1 : Taxonomic composition of 41 Butterfly species recorded in and around Dholbaha dam (in four sectors) during 2002-04.

Sl.No.	Butterfly family/species	Sector I	Sector II	Sector III	Sector IV
(A)	**Family: Hesperiidae**				
1.	*Suastus gremius* (Fabr.)	+	+	-	+
(B)	**Family: Lycaenidae**				
2.	*Castalius rosimon* Fabr.	-	+	+	-
3.	*Catochrysops strabo* (Fabr.)	+	-	+	+
4.	*Euchrysops cnejus* (Fabr.)	+	+	+	+
5.	*Freyeria putli* (Kollar)	-	+	-	+
6.	*Lampides boeticus* Linnaeus	+	+	+	+
7.	*Tarucus nara* (Kollar)	+	-	-	+
8.	*Zizeeria maha ossa* (Swinhoe)	-	+	+	-
9.	*Zizula gaika* Treinen	+	-	+	-
(C)	**Family: Nymphalidae**				
10.	*Argyreus hyperbius* Linn.	-	+	-	+
11.	*Ariadne merione* Cramer	+	+	+	+
12.	*Cynthia cardui* Linn.	+	-	+	+
13.	*Danaus chrysippus* (Linn.)	+	+	+	+
14.	*Danaus genutia* (Cramer)	+	+	+	-
15.	*Euploea core* (Cramer)	+	-	+	+
16.	*Hypolimnas misippus* (Linn.)	-	+	-	+
17.	*Junonia atlites* Linn.	+	-	+	+
18.	*Junonia almana* Linn.	+	+	-	+
19.	*Junonia hierta* Fabr.	+	-	+	+
20.	*Junonia lemonias* Linn.	+	+	+	+
21.	*Junonia orithya* Linn.	+	-	-	+
22.	*Neptis hylas* Linn.	+	+	+	+

(Cont...)

Sl.No.	Butterfly family/species	Sector I	Sector II	Sector III	Sector IV
23.	*Parantica aglea* (Stoll)	-	-	+	-
24.	*Precis iphita* (Cramer)	-	+	-	+
25.	*Melanitis leda* (Drury)	+	+	+	+
26.	*Mycalesis mineus* (Linn.)	-	-	+	-
27.	*Tirumala limniace exoticus* Gmelin	+	-	+	+
28.	*Ypthima baldus* Fabr.	-	+	-	-
(D)	**Family: Papilionidae**				
29.	*Graphium sarpedon luctatius* Fruhstorfer	+	-	-	-
30.	*Papilio demoleus* Linn.	+	-	+	+
31.	*Papilio polytes* Linn.	-	+	-	+
(E)	**Family: Pieridae**				
32.	*Catopsilia crocale* (Cramer)	+	-	-	+
33.	*Catopsilia pyranthe* Linn.	-	+	+	+
34.	*Colias electo fieldi* Menetries	+	+	-	-
35.	*Eurema hecabe* (Linn.)	+	+	-	+
36.	*Delias eucharis* Drury	-	-	+	-
37.	*Ixias marianne* (Cramer)	+	-	+	+
38.	*Ixias pyrene* Moore	+	+	-	-
39.	*Leptosia nina nina* (Fabr.)	+	+	+	+
40.	*Pieris brassicae* (Linnaeus)	+	+	+	+
41.	*Pieris canidia* Linn.	+	+	+	+
	Total	**29**	**25**	**26**	**30**

+ = Species present; - = Species absent

Observing the alarming situation caused by the depletion of natural habitats of animals all over the globe, the Government of India took significant steps in establishing the Indian Board for Wildlife in 1952 followed by the Indian Wildlife (Protection) Act, 1972. Further India also became one of the signatories to CITES, IUCN and World Wide Fund for nature. For the conservation of biodiversity the Government of India so far protected more than 4% of the country geographical area, covered 99 National Parks, 513 Wildlife Sanctuaries, 41 Conservation Reserves and 4 Community reserves (Anonymous, 2008) and forest cover was 20.64% of the country geographical area (Anonymous, 2003a).

The Government of India under Indian Wildlife (Protection) Act, 1972 provided protection to 452 species of butterfly in three Schedules (out of six) as in Schedule I, Part IV, 128 species of butterfly; in Schedule II, Part II, 305 species and in Schedule IV (Secs. 2,8,9,11 and 61), 19 species listed (Anonymous, 2003b). The Ministry of Environment and Forests, Government of India through various schemes encouraged researchers and organization to develop 'butterfly gardens' through relatively simple methods involving introduction of appropriate, naturally occurring host plants and recreating the natural habitats and this becoming increasingly popular in many states in India, especially Kerala, Tamil Nadu and Karnataka. The illegal export/collection by visitors of rare species those restricted to particular habitats and the collection by immature workers (School/college students) all over India will adversely affected country fauna. The major repositories of butterflies in India are Zoological Survey of India (Ministry of Environment and Forests), Kolkata; National Pusa Collection, Entomology Division, Indian Agricultural Research Institute, New Delhi; Entomology Division, Forest Research Institute, Dehra Dun; Bombay Natural History Society, Mumbai; Zoology Department, Punjabi University, Patiala *etc*. from where the reference collection will be studied through permission. By the Government of India efforts in conservation of biodiversity/habitats and protection of threatened species under law, still there is need of public awareness/participation and interaction/collaborative work between researchers and to develop standard common methodology for study to conserve these valuable creatures. From the conservation point of view, the study area is undisturbed and rich in flora and fauna species.

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