

PRELIMINARY OBSERVATIONS ON THE DIVERSITY OF BUTTERFLIES (LEPIDOPTERA : INSECTA) IN HIGH ALTITUDE GRAZING PASTURE IN GREAT HIMALAYAN NATIONAL PARK.

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ABSTRACT

Nine species of butterflies representing two families of order Lepidoptera, namely Pieridae and Nymphalidae, were recorded from different high altitude pastures and adjoining forest areas in the Great Himalayan National Park during the post-rainy season. These pastures have been heavily grazed by the migratory flocks of sheep and goats prior to the field observations. Implications of seasonal livestock grazing resulting in lower butterfly diversity have been discussed.

INTRODUCTION

For the first time an effort was made to study the insect fauna in the Great Himalayan National Park (GHNP). Entomological information for this park is completely lacking. However, the butterflies of the Himalayan region in general has been studied by Mani (1986). Haribal (1992) has described and classified butterflies of Sikkim Himalaya. Present study aims to examine suitability of high altitude pastures (Thatches) as butterfly habitat. Thatches are heavily used by migratory flocks of sheep and goat for grazing and also serve as suitable camping grounds for pastoralists since they are usually located near perennial water sources. Apparently, thatches seem to be ideal habitat for insect fauna, particularly butterflies.

The variability of biological indicators are the butterflies living on the surface of grazing area. Existing studies on butterflies and other insects indicate that the resource availability plays a key role in their population ecology. The presence of butterflies emphasize availability of the larval food plants in great abundance. Most butterflies have specific habitat requirements, females usually tend to lay eggs only on specific food plants occurring in the area. Although adult butterflies are also selective in their choice of flowers for feeding, most species never feed on some flowers as they become available. There is an intimate association between butterflies and plants and their lives are exceptionally interlinked. Wild plants have always co-evolved with insects. All brightly coloured flowers attract the insects. Butterflies visit plants for important reasons; to drink nectar, to lay their eggs, and to hide away from bad weather or predators and to over winter (Feltwell, 1986). The distribution of butterflies is thus dependent upon the availability of their food plants. Migrants move out of their breeding areas if they do not find suitable food plant sources in the new localities as they will fail to generate a future generation. However, the range of butterfly can be severely checked if the food plant does not exist beyond a certain region even though the butterfly itself may be able to disperse to other regions. Such is in the case with brimstone (*Gonepteryx rhamni nephalensis*).

Actually there are a few butterfly species that have single food plant, although there are several which are limited to one plant. Most butterfly species are associated with the grassland habitats. Grasslands include grassy clearing in wood,

open extensive grassland habitat, and man-made grassy parks and gardens. The butterflies recorded during the visit to GHNP are only Pierids and Nymphalids, those utilise grasses as food plants. Some butterflies like short grass, while other like tall grass. The availability of short and tall grass depends on grazing regime in the area.

STUDY AREA

During October 1995, this study was undertaken in the Great Himalayan National Park, The GHNP is situated between Lat. 31°31'16" and 31°56'41" North and Long 77°20' to 77°52'11" East in Kullu district of Himachal Pradesh (Map), covering a total area of 1,171 sq km. The park consists of the catchment of Tirthan, Sainj, Jiwa and Parvati rivers flowing into the Beas river. The variation in altitude ranges from 1,300 to 6110 m above mean sea level. Much of the eastern part of the park is perpetually snow bound or under ice. About one third of the park area supports closed canopy forest representing of five broad forest types (Gaston *et al.*, 1981). For the present study, different 'thatch' were surveyed representing temperate and alpine regions comprising oak forest, conifer forest, high altitude mixed forest, and sub-alpine as well as alpine pastures. The study was carried out in a few selected thatches namely Shilt, Dhela, and Humkhuni after heavy seasonal grazing (elevation of 2,900 to 3,820 m above mean sea level).

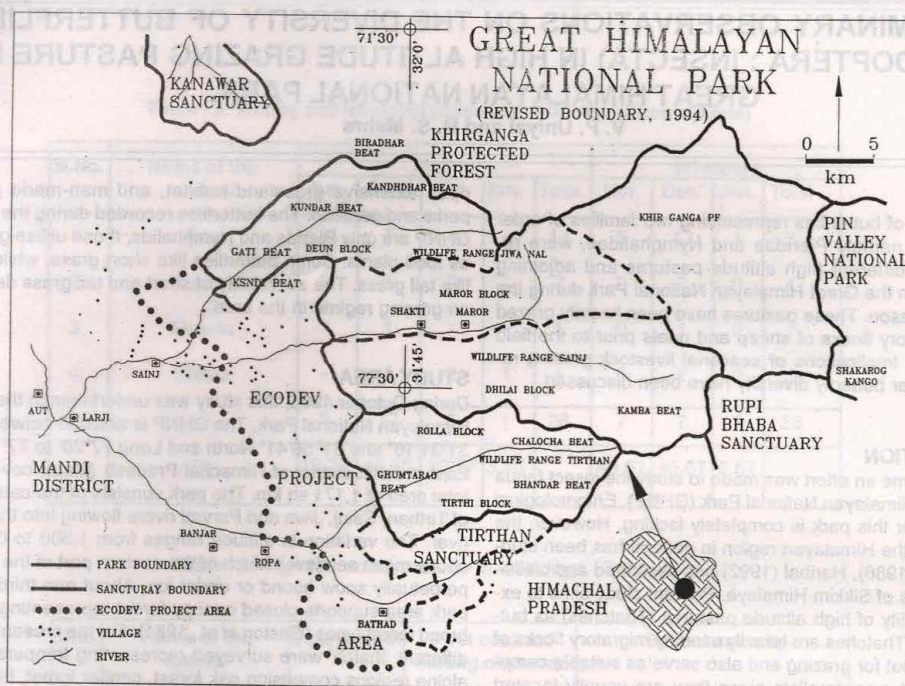
METHODS

All butterflies were collected or photographed and preserved (pinned), labelled and identified with the help of standard taxonomic keys.

OBSERVATIONS

The richest sites observed for butterflies in term of species diversity are grassland areas. It is good habitats for butterflies in Himalaya. Excessive grazing may have become a threat for some butterfly habitats. During the survey the ambient temperature recorded varied from 12°C to (-)4°C due to fresh snow fall in this region. The percentage of flowering plants found less number in thatches of park area due to fresh over grazing in this region. The present records shows that about 35,000 sheep and goats graze in the park during the summer months every year. The butterflies were collected from only few flowering plants like *Potentilla* sp., *Primula* sp., *Saussurea* sp., *Virbasum* sp., *Polygonum polystachyum*, *Indigofera* sp. Some patches of grasses which are found quite dominant in this region are *Hemarthra* sp., *Danthonia* sp., *Stipa* sp. and *Kobresia* sp. exist near the thatches wherever butterflies were observed.

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The *Colias fieldi*, member of family Pieridae found on low growing flowers are observed on few flowers of *Potentilla* and *Primula* sp. The *Issoria lathonia issae* of Nymphalidae were also observed in the same area but only from the few plants of *Virvasum* spp. The *Gonopteryx rhamni nephalensis* and *Dercas lycoris lycoris* were found on high flowering plants like *Indigofera* and some grassy patches of *Stipa* and *Himantaria* spp. The *Pieris brassica nephalensis* and *Anapheis aurota aurota* are also found from some grassy patches of *Kobresia*, *Danthonia* and from the flowers of *Indigofera* spp. Some other butterflies were observed as frequent visitors of all the flowering plants and grasses without any specific food preference. The reasons for this is due to over grazing of flowering plants in the area.

Over grazing on thatches causes the loss of flowering plants, grasses, and other vegetation causing disturbance in the habitat of butterflies and the availability of food plants.

The following butterflies were studied from this area with their distinguishing features.

Family : PIERIDAE

Members of the family Pieridae are small or medium sized butterflies with essentially light ground colouring, hence the label white and yellows. None of the Pieridae possess tails. There are great variations among the Pieridae according to wet and dry seasons prevalent in the area. They have a great affinity for congregating together in large number at pools or muddy bank of water bodies. All six legs are developed and fit

for walking. In general, the sexes are similar, but there are the cases of marked sexual dimorphism.

Colias fieldi (Menetries) 1995 (Dark coloured yellow)

A very common butterfly with orange-red with black border generally found throughout the Himalaya, particularly in alpine pasture, but during winter months it migrate in low elevations. It generally visits various species of low growing flowers like *Primula* spp.

Gonopteryx rhamni nephalensis (Doubleday) 1847 (Common Brimstone)

A sulphur coloured or greenish yellow butterfly with dark orange spot at the end cell, on each wing. It is generally found between the elevation of 1,500 to 3,500 m in Himalaya and visits only open pastures and forest edges.

Pieris brassica nephalensis (Gray) 1846 (Large Cabbage White)

White with black apex with two discal on fore wing. A very common butterfly visits flowers of various species and seen throughout the year in open areas. It is generally found between the elevation of 1,000 to 4,000 m. In winter it migrate down to the plain of the adjoining area.

Dercas lycoris lycoris, (Doubleday) 1842 (Plain Sulphur)

It is sulphur yellow with irregular shaped apical patch. Hind wing rounded, fore wings usually with dark spot in front. This species occurs on flowers of the pasture and damp patches in Himalayan region.

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Anapheis aurota aurota (Fabricius) 1793 (Pioneer)
White at apex with elongated spot on black back ground, hind wing also white spotted black border. Under forewing the spot of the apex yellowish and hind wing with yellow with black veins. It is a common butterfly found at 3,000 to 5,000 m altitude.

Prioneris thestylis thestylis (Doubleday) 1842 (Spotted Sawtooth)

Fore wing above white, with black apical area, enclosing white spots, fore wing produce an acute angle. Hind wing black with yellow spots. Fond of coming in damp patches and generally feed on low lying flowers.

Family : NYMPHALIDAE

Nymphalids are medium to large size, with a great fondness of sunshine: swift powerful fliers, brightly coloured, with wide range of flight. Fore legs imperfect and unfit for walking in both sexes. Generally the antennae are less than half the length of the coastal margin of the forewing. Migration of certain species is known.

Vanessa indica indica (Herbst) 1794 (Indian Red Admiral)
Dark brown with fore wing with central red divided in the inner side by large black spots. Two rows of disjoint white apical spots. Hind wing red margined band with black spots in the center. It is found in open forest glade in grassy area on promi-

nent leaves close to the ground. It occurs in the Himalayas up to 3,000 m elevations.

Aglais cachmirensis aesis (Kollar) 1844 (Indian Tortoise shell)
Fore wing above with costa base with yellow spots; outer margin brown; brown at base and also behind; cell with a broad cross-band; hind wing basally brown. It frequently visit all types of flower in Himalaya and generally found up to 5,485 m elevation.

Issria lathonia issaea (Doubleday) 1864 (Queen of Spain Fritillary)

Upper side tawny with black spots. Under hind wings yellowish brown with large silvery spots. A common butterfly throughout the Himalayan region between elevation of 2,000 m to 4,800 m and feed on the flowers of high altitude pastures.

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