Available online at http://www.ijims.com
ISSN: 2348 – 0343

Record of butterflies from high altitude cold desert, Suru valley of Kargil (Jammu and Kashmir)

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Abstract

Suru valley of district Kargil in Ladakh region also referred as the high altitude cold desert was surveyed during the year 2015-16 to record the insect fauna of the order Lepidoptera. A detailed field study of some prevalent butterflies of the study area is presented. The study revealed 8 species of butterflies belonging to 6 genera of family Pieridae and Nymphalidae It is the third largest insect order which include moths and the butterflies.

Keywords: Ladakh, Suru valley, Lepidoptera.

Introduction

Suru valley of district Kargil lies at an altitude 2,600 - 5,000 metres in Ladakh region of the J & K. The valley is drained by the Suru river, a powerful tributary of Sind river in Ladakh which originates from the Penzilla glacier. The beauty of this valley is further added by two gigantic peaks of spectacular Nun (7,135m) and Kun (7,932m) which loom over the skyline. It extends from Kargil town towards the south wards for a length of about 75 kms upto the expanse around Panikhar and eastward for another stretch of nearly 65 kms upto the foot of Penzilla. The hills of Suru valley are cultivated intensively than anywhere else in Kargil. Enough snow and water during the winters and the fertile lands makes it possible to yield two crops. The valley is relatively more fertile as compared to other areas of Kargil. The upper reaches of the valley particularly around the Sankoo, Panikhar and higher stretches beyond, present a spectacle of incredible feature as mighty mountain fortifications covered by snow capped peaks, undulating alpine slopes draining into mountain streams of foaming water, awesome glaciers descending along the mountain slopes to the river bed in riverine formation. Summer lasts here longer than in other parts so two crops can be yielded each year while in other parts of Kargil sometimes it is difficult to have even a single crop in the year. Main crops are wheat, barley and millets. Some of the vegetables grown here are turnip, radish, peas and black peas. Lepidoptera is one of the largest insect order comprising approximately 1,60,000 described species (Kristensen, 2007) most of which are primarily associated with Angiosperms. Their immense diversity and ability to adapt virtually to any climate has made them some of the most successful creatures on the earth as their swarms have been reported as far as from coldest part of the world above the snow lines. The order includes butterflies and the moths. They are characterized by the pigmented scales covering their bodies and wings, having two large compound eyes and siphoning type of mouth parts with an elongated proboscis. The scales are modified, flattened hairs which give butterflies and the moths their extraordinary colours and patterns. Almost all the species have some form of membranous wings, except for a few that have reduced wings or are wingless. They are holometabolous, i.e. they undergo complete metamorphosis. Mating and the laying of the eggs are carried out by adults, normally near or on host plants. The larvae are commonly called caterpillars, and are completely different from their adult, having a cylindrical body with a well developed head and a biting and chewing type of mouthparts with three thoracic and five abdominal pair of legs. As they grow, these larvae will change in appearance going through different stages called instars. Once fully matured, the larva develops into a pupa, referred to as chrysalis and cocoon in case of butterflies and moths respectively. A few butterflies and many moth species spin a silk case or cocoon prior to pupating, while others do not, instead

going underground (Powell, 2009).Butterflies and moths play an important role in the natural ecosystem as pollinators and as a food in the food chain. They play an important role in pollination and are also providing many commercially important products like natural silk, beautiful butterflies may even seen as the basis of art and design. Conversely their larvae are considered very problematic to vegetation as they feed on live plant matter. In many species the female may produce anywhere from 200 to 600 eggs a day while in others the number may increase. The caterpillars after hatching from these eggs can cause extensive damage to large quantities of crops of agriculture, horticulture crops and other economically important plants, resulting into huge economic losses.

Material and Methods

Collection and Identification: The butterfly fauna of Suru valley was surveyed from May-October 2015. Sampling was conducted at the sites dominated by the most representative vegetation of the region. The butterflies were collected by insect collection net consisting of telescopic handle and strong wire ring (diameter 30 cm). The specimens were killed by pinching their thorax with proper care or by killing the specimen using Ethyl acetate and finally placed in paper envelop. The collected specimens were placed in hot air oven for about 1 hour at 25°C - 35°C and transferred in relaxing chamber for 24 hrs containing moist absorbent cotton and few drops of phenol to avoid any fungal growth. Later on the specimens were pinned by entomological pins of different sizes according to the size of specimen. The pinned specimens were put on the stretching board after relaxing their wings, abdomen and legs. Stretched specimens were transferred to the insect boxes with proper labels. The storage boxes were poisoned with ethyl acetate soaked cotton and the side grooves of boxes were attached with naphthalene balls. The specimens were preserved in the insect cabinets by using standard preservation techniques. The specimens were identified with the help of available literature (Evans, 1932; Wynter-Blyth, 1957; Cantlie, 1963 and Mani, 1986; Bhaskaran and Eswaran, 2005; Biswas *et al*, 2012; Braby, 2012; Feltwell, 2001; Gay *et al*., 1992; Gunathilagaraj *et al.*, 1998; Haribal, 1992; kanerica *et al*., 2013; Khan *et al*, 2011; Kir'Yanov and Balcazer 2007; Kunte, 2000; Kunte, 2006; Liseki and Vane-wright, 2013; Pathania and kumari, 2009; Qureshi and Bhagat, 2013; Qureshi *et al.*, 2013; Rose and Sidhu, 2001; Rose and Walia, 2003; Singh and Koshta, 1997; Thakur, Mattu and Mehta, 2006 and Uniyal, 2007). The eggs and larvae observed during the surveys were collected and reared on their respective host plant under the laboratory conditions up to adult emergence. Species identification was done by dissecting the male/female genitilia. All the identified specimens have been deposited in the Department of Zoology, University of Jammu for future references.

Area of Study: The study area located in district Kargil of Ladakh region at an altitudinal range of 2,636 - 5,000 meters above sea level lying in between 34°36′ North Latitude and 76°06′ East Longitude. Topography variable consists of low land area, grassland area and high land glaciated area. The study area include Trespone-saliskote station, Sankoo station, Damsna and Panikhar station. Average rain fall is very low and mostly in the form of snow during winter months. The study area experienced both arctic and desert climate and commonly known as "Cold Desert" of the country. The vegetation cover of the area under study comprises of Agricultural Land, Forest Trees (Poplar sp. and Salix Sp.), Herbs, Shrubs and Grasses.

Figure: Panoramic view of study area.

Sampling: Random sampling of the area was done from riverine area, agricultural land and high altitude areas. Area predominant with Alfalfa fields and wheat fields.

Results and Discussion

During the study period eight species of butterflies belonging to three family under three genera were found. The present communication is preliminary and generalized report on the common butterflies of family Pieridae, Nymphalidae and Lycaenidae at Suru valley with an aim to appraise the reader about the diversity and richness of butterfly fauna in this region. It is likely that many more species could be added to the list for further exploration of the remote areas of Suru valley.

1. *Colias electo fieldi* (Ménétriés, 1855)

Common Name: The Dark Clouded yellow butterfly.

Distribution: South America and Africa, Bhutan, China, India, Nepal and Pakistan.

Host Plant: Their caterpillars feed on certain Fabaceae, for example vetches (Vicia). While most are thus beneficial by keeping weeds at bay, some occasionally become nuisance pests on crops like alfalfa.

Field Observations: The butterfly remained active in the field from May to October. It was usually seen flying nearer the ground but can be seen flying higher either singly or chasing others or when disturbed. It was found usually as a moderate to fast flier but moved slowly especially when present in groups or when newly emerged or during the early morning. It was noticed active during very hot and sweltering mid days, however preferred to fly before noon and afternoon when there was a moderate decrease prfall in the temperature. It did not arrive immediately after a mild, moderate or heavy rainfall or when there was fall in the sunlight even if the temperature was favourable for flight. It was found flying both singly as well in groups but prefer to fly in groups. It was found to be a slower flier than *Colias erate*. It was found present in different types of habitats like vegetable fields, gardens, parks, lawns, open places, wheat fields, forests, muddy places and along the roads. *Colias electo fieldi* was very much attracted to damp places, animal excreta and rotten fruits, and showed a prominent mud puddling behavior. It was seen highly attracted to flowers of *Tagetus petula.*

The specimen collection was done from Sankoo station from alfa alfa plant.

2. *Colias phiolodice* (Godart, 1819)

Common Name: The Common or Clouded Sulphur butterfly.

Distribution: *Colias philodice* is distributed from Alaska and western Canada, to Guatemala. All of North America except Arctic, part of California, and tropical Florida. But it is a permanent resident in Sierra valley and other irrigated alfalfa-growing areas.

Host Plants: Clouded Sulphurs nectar at flowers such as Milkweed (*Asclepias sp.),* Butterfly Bush (*Buddleja sp.*), Coneflower (*Dracopis*, *Echinace*a, and *Rudbeckia*), Alfalfa (*Medicago sativa*), Dandelion (Taraxacum sp.), Clover (Trifolium sp.), and Tall verbena (*Verbena bonariensis*) and many more.

Field Observation: Clouded Sulphurs can be seen from May to October. There are several broods (batches) found each year. During courtship, females respond to the male's pheromone, which is released when the male buffets her with his wings, causing the female to extend the abdomen out from the hind wings such that the male can join. Males of this and other sulphur species congregate at puddles and other moist ground possibly to take nutrients from the wet soil. They are most often seen flying low over lawns and fields. They are a medium-sized butterfly, with a wingspan of up to two inches wide. Males and females are slightly different. Males are yellow with a sharp black border on the wings. Females are duller yellow with yellow spots inside the black border. Both sexes have single black spots on the forewings, and dull orange spots on the hind wings. Underneath, there is no black border, but there is a silver spot, outlined in pink, on each hind wing. This can be seen when the

butterfly is resting with its wings folded. Adult Clouded Sulphurs take nectar from many different flowers, including clovers, milkweeds, goldenrods, asters, dandelions, thistles, and sunflowers. Clouded Sulphurs are usually seen in open areas. Besides lawns and fields, they can be seen in parks, gardens, stream banks, and roadsides. They fly close to the ground and are very fast. Predators of Clouded Sulphurs include birds, dragonflies, mantids, frogs and animals that eat caterpillars, such as beetles, squirrels, and shrews. If they fall in the water, they cannot get out, so they will probably be eaten by fish, crayfish, or aquatic insects. They also get moisture from puddles of water, mud, and animal poop. It is often seen that many sulphurs together collecting moisture. This is called "puddling." Collection of this specimen was done from Trespone station from wheat plant..

3. *Pontia daplidice* (Linnaeus, 1758)

Common Name: The Bath White butterfly.

Distribution: Africa, China, Europe, India, Pakistan, Tibet, Turkey.

Host Plant: The host plants of the larvae are in the Brassicaceae family and vary according to locality. They include tower mustard (*Arabis glabra)* and sea rocket (*Cakile maritima*), *Diplotaxis harra*, *Zilla spinosa* (Cruciferae), *Reseda spp* (Resedaceae).

Field Observations: *Pontia daplilice* population reached highest during the months of June, July and August. It usually and mostly showed flight activity nearer the ground but could be seen flying higher when chasing each other. It was found usually a moderate to fast flier but could move slowly especially when present in groups or when newly emerged or during the early morning. It was not very active during hot and sweltering mid days but preferred to fly before noon and afternoon when there was a moderate decrease or fall in the temperature. It did not arrive immediately after a mild or moderate or heavy rainfall or when there was fall in the sunlight even if the temperature was favourable for flight. This phenomenon was mostly found during summer. Its flying was seen mostly singly but at rare occasions, flight found in groups. It was also seen present in almost every type of habitat like vegetable gardens, orchids, gardens and parks, house lawns, open places, fields, forests and along the roads. Its flight activity was seen from May to October and collected from Sankoo area. It was seen highly attracted to flowers of *Tagetus petula.* The males and females chased each other during mating period for 3-5 minutes duration.

4. *Pieris brassicae* (Linnaeus, 1758)

Common Name: The Large Cabbage White butterfly.

Distribution: America, Africa, Britain, Burma, China, Nepal, Jordon, India, Pakistan, Russia, Sri Lanka, Turkey, Malaysia.

Host Plant: Plants with mustard oil glucosides are important for this butterfly because it dictates their eating behaviours, and resultant survival rates. This is so beneficial for cabbage butterfly because their large consumption of plants containing mustard oils is the specific reason they are so distasteful to predators, such as birds. Thus, caterpillars are protected from attack, despite them being brightly coloured, in fact the bright coloration is a signal to predators that they are not good in taste.

Field observations: *Pieris brassicae's* flight was observed very nearer to ground as well very higher with slow and very fast flight. When both sexes chased each other or when distributed or when flying singly, they showed fast zigzag type of flight, sometimes even go great height in the air. The flight activity witnessed from early morning upto dusk. In forest areas, it usually showed flight activity very high in the air, both in groups as well as singly, from May to October. In the present study it was observed that among all the butterfly species, this *Pieridae* was the first to emerge after a long and very cold winter. The active flight of *Pieris brassicae* was also

seen during the hot mid days of summer. It showed occurrence in almost all types of habitats like vegetable gardens, orchids, gardens, parks, house lawns, open places, wheat fields, forests, muddy places, animal excreta and rotten fruits and prominent puddling behaviour was also observed. It was found to be a serious pest of many vegetables like cabbage, Knolkhol and other green vegetables. The adult butterflies laid yellowish or lemonish yellow 30-100 eggs in groups, usually on the underside of the plant. The eggs hatched in 4-9 days. The catterpillars feed gregariously during the early instars and disperse as they approach maturity. They passed through five stages and were full grown in 20-30 days. The larvae pupated at some distance from the food-plant and remained attached with a firm whitish or lemonish white cremaster. The pupal stage lasted for 8-17 days. The adults of this butterfly lived for 3-12 days. The total life cycle was completed in 30-56 days. The adults of this butterfly keep their wings either closed or spread during rain. The adults were seen very much attracted to flowers, basking in the sun light, or taking shelter in the shadows during rain. The adults were seen much attracted to flowers. It was seen to be very common, highly dominant and widely distributed species in the Suru valley which might be due to its migratory nature and also being a polyphagous pest. The specimen was collected from Trespone area.

5. ***Pieris canidia*** **(Sparrman, 1768)**

Common Name: The Indian Cabbage White butterfly.

Distribution*:* *Pieris canidia* is found in India, Bhutan, Myanmar, Pakistan, Tibet, Laos, Cambodia, Thailand, China, Taiwan, Sikkim, Japan and Malaysia.

Host plant: The larval food plants include *Cardamine, Lepidium, Raphanus, Brassica, Cleome, Alstonia, Arabis* and *Rorippa* (Brassicaceae).

Field Observations: The species is usually found either singly or in groups, flying in open glades, field edges, gardens, or along riverbanks. Both the sexes visit a wide range of herbaceous flowers, fluttering from plant to plant and settle rarely. During overcast conditions they roost openly on herbs. After *Pieris brassica* their number was found to be very high and found mostly in groups with the species of *Pierris brassica*. The specie was collected from Damsna station from grassland near riverine area.

6. ***Vanessa cardui*** **(Linnaeus, 1758**)

Common name: Painted Lady

Distribution: Europe, Africa, Asia, Australia, New Zealand, Hawaii.

Host Plant: The Asteraceae family plants commonly referred to as aster, daisy, sunflower etc are host plants for the larvae of painted lady.

Field Observations: The species is usually found either singly or in cluster, flying in open glade, field edges, gardens, or along riverbanks and also in dry habitats but never found in larger group as that of family Pieridae. It is highly tolerant to the harsh arid conditions including fast moving wind and lower temperature. Beside low lands it was even recorded from higher altitudes and collected from Sankoo station in agricultural land. The specie is characterized by similar sexes, wings dorsally pinkish red with black markings, forewing slightly concave below apex, hindwing slightly wavy but otherwise evenly rounded, upperside of forewing with apex black bearing inner three conjoined and four separate marginal white spots.

7. ***Argynis*** **(Fabricius, 1807)**

Common Name: fritillaries.

Distribution: Europe, Algeria, Japan and Asia.

Host Plant: TheViolacae family plants acts as the host plant for fritillary butterfly.

Field Observations: The fritillary butterfly was found as single flier mainly in the grasslands and collected from the riverine area from Damsna station. The flight is swift and at a little higher from the surrounding. It is deep orange yellowish in colourwith black spots on the upperside of its wings of 54-70 mm, with the male being smaller and paler than the female. The underside is green and has silver spots.

8. *Hyponephele* (Moore, 1865)

Common name: White ringed meadow brown.

Distribution: Iran, Afghanistan, Himalayas, Tibet, Middle Asia, Baluchistan-Kumaon, North West India.

Host Plant: *Hyponephele* is found in grassy and flowery as well as arboreal habitats on plains and at foothills, the host plant includes the aster, black-eyed susan, butterfly milkweed, sunflower etc.

Field Observations: Sexes similar, upper side of forewing tawny with a prominent black ocellus towards apex, underside of hind wing with ocelli, discal line dark, outwardly white margined. The specimen shows swift flight little higher from the ground. It is found solitarily and not in groups on grasslands, agricultural fields and even on the stones and soil which provide them a sort of camouflage. The specimen assembled from Panikhar station, however it is found in lesser number in the valley.

Acknowlegements:

The authors are thankful to the Head, Department of Zoology, University of Jammu for providing necessary facilities. The second author acknowledges gratefully the JRF granted by UGC, New Delhi.

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