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Cover: Mixed media illustration of a Blue bird and Sunbird. © Lakshmi Niranjana.



It also included high-altitude forest areas like the Pir Panjal Range, Dachigam National Park, and various vegetable-growing regions of Kashmir.

MATERIALS AND METHODS

Study area: The present study was conducted in high-altitude forest areas such as the Pir Panjal Range, Dachigam National Park, and various vegetable-growing regions of Kashmir, UT Jammu & Kashmir. The Dachigam National Park is a part of the Zabarwan range of the western Himalaya located at 34.1547°N & 74.9155°E and altitude 1634.36 m (Image 1).

Survey and collection: The current study highlighted all *Pieris* species of different regions of Kashmir from 2020 to 2021. Random surveys were conducted fortnightly in different months of the year depending on the prevailing weather conditions and butterfly activity. The survey was done twice a month and conducted near water sources, damp patches in the forest areas, open sunny areas, and blossoming flowers. Adult butterflies were collected with the help of an insect collecting net.

After collection, the butterflies were kept in jars and killed with ethyl-acetate. Thereafter, these specimens were then shifted in the relaxing chamber with wet sand for at least 24 hours and were properly labelled bearing (i) sample number, (ii) date of collection, (iii) name of the place, and (iv) name of the collector. The collected specimens were stretched on an insect stretching board by passing an entomological pin of size 4 through the thorax. The wings were spread in such a manner that the lower margin of the fore-wing was at a right angle to the body and the antenna in front of the head.

Preservation: After proper spreading, the specimens were left for about 2 to 4 days at room temperature inside the Entomology Research Laboratory, Department of Zoology, and were then shifted to wooden insect-storing boxes (Image 4). Each specimen was labelled bearing the same information as was written on the relaxing chamber previously. In order to protect the collected specimens from pests and fungus, cotton balls dipped in ethyl acetate vapours or benzene-dipped papers were periodically inserted in these boxes. The storage

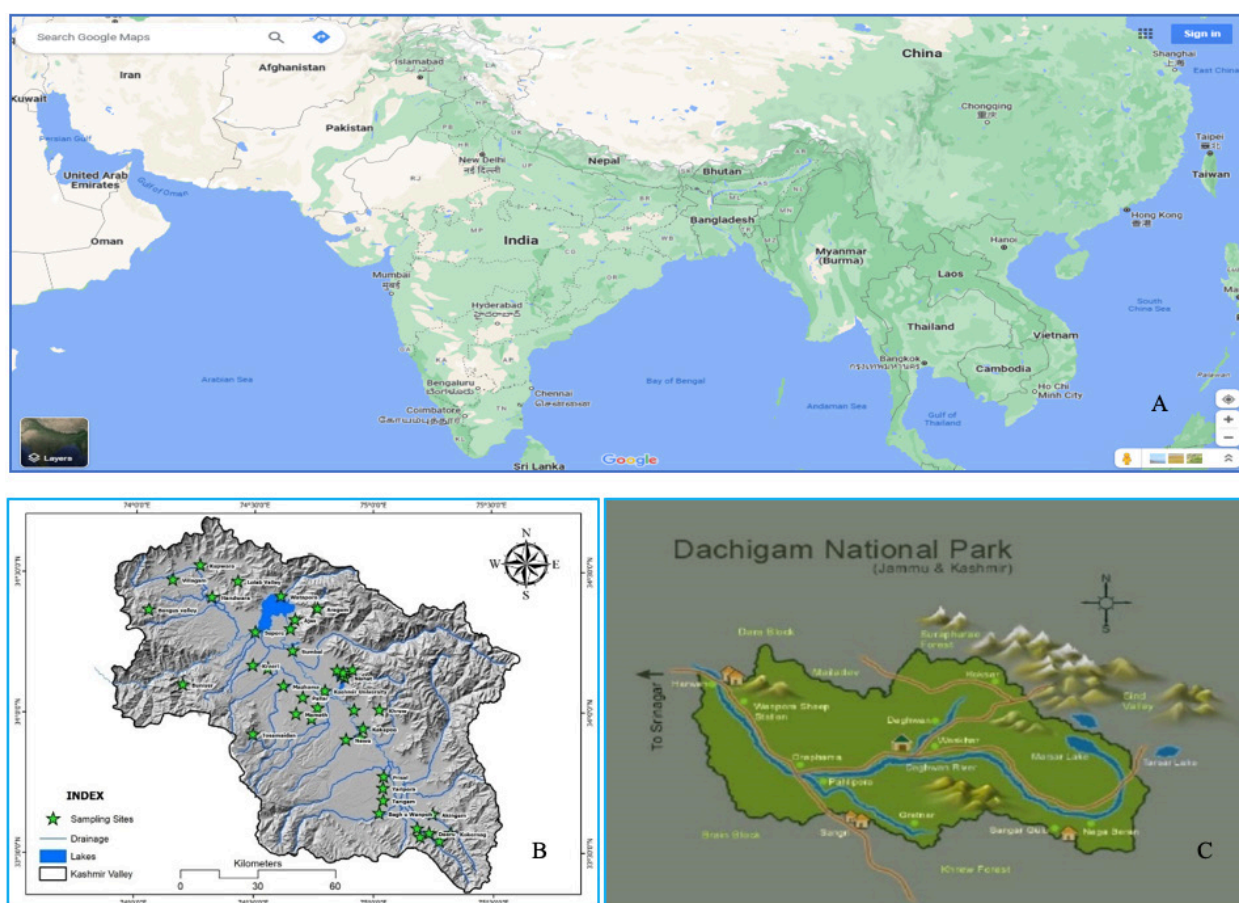


Image 1. A—Map of India in the world map | B—Sampling sites in different districts of Kashmir Valley (prepared with ArcGIS, version, 10.8.1) | C—Study site map- Dachigam National Park, Srinagar (source: Wikipedia).

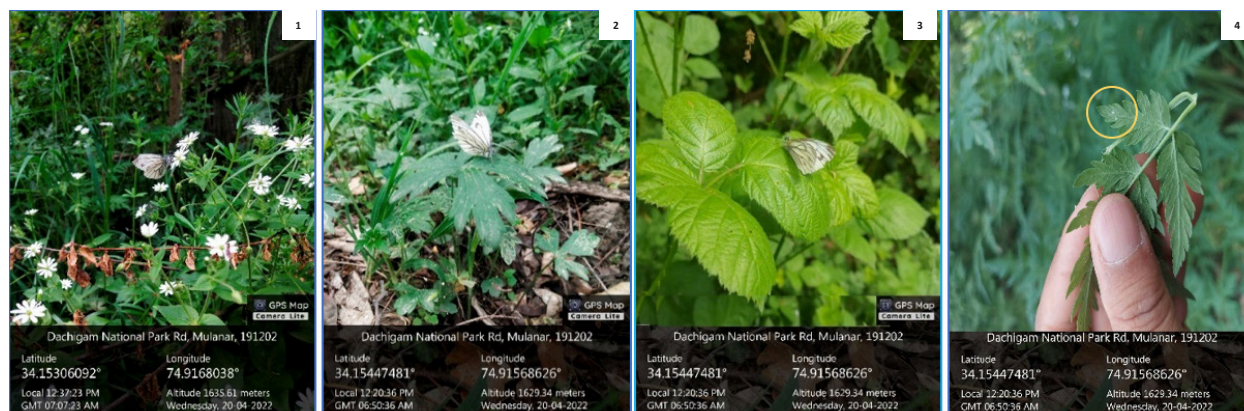


Image 2. *Pieris napi* spotted in Dachigam National Park, resting on: 1—Flowers of *Stellaria media* | 2—Leaves of *Geranium* sp. | 3 — Leaves of *Rubus* sp. | 4—Eggs on the leaves of *Cardamine flexuosa*.

boxes were kept in clean and shadow places, away from direct sunlight as per the technique adopted by Borror et al. (1976), Kunte et al. (2020), and Wynter-Blyth (1957). The specimens were identified later by using the identification keys of Evans (1932).

RESULTS AND DISCUSSION

Material examined: 4♂, 1♀, Dachigam National Park along Dagwan River, 20.iv.2022, 34.154°N 74.915°E, 1634.36 m, insect collection nets, coll. Firdousa Rasool.

Diagnosis: The upper side of both Male and female is white coloured, veins conspicuously green or black, the base of the forewing is dusted with black scales, the apex and terminal border is black down to vein 2, and a black spot is present in the outer half of interspace 1. Hindwing with a black sub-costal spot. Under side veins are margined with black, the apex of the forewing and the whole surface of the hindwing are tinged with yellow, base of the costa of the hindwing is bright yellow. The female is much darker than the male, all the markings are broader. The upper side of the body is black with whitish hairs (Image 3).

Pieris napi was observed to fly inside Dachigam National Park and mostly rested on the flowers of *Stellaria media*, leaves of *Geranium* sp., and the leaves of *Rubus* sp. (Image 1, 2). A total of 5 specimens were collected from the same site with insect collection nets. Out of 30 different sampling sites, *P. napi* was spotted and trapped only in Dachigam National Park as it typically occurs in moist habitats, favours shaded or partly shaded woodland edges in a cool, moist environment as also suggested by (Howe & Bauer 1975). The present study revealed that *P. napi* exhibited the narrowest range of distribution being confined to only Dachigam National Park; outside the Dachigam National Park, no specimen

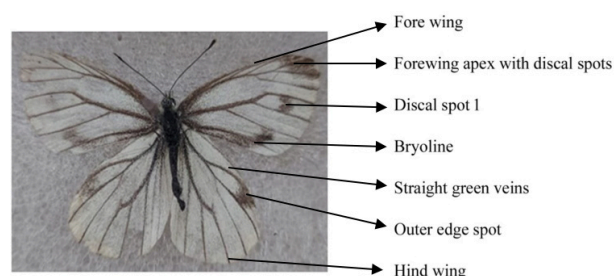


Image 3. *Pieris napi* of Kashmir, captured at Dachigam National Park, Srinagar, J & K, India

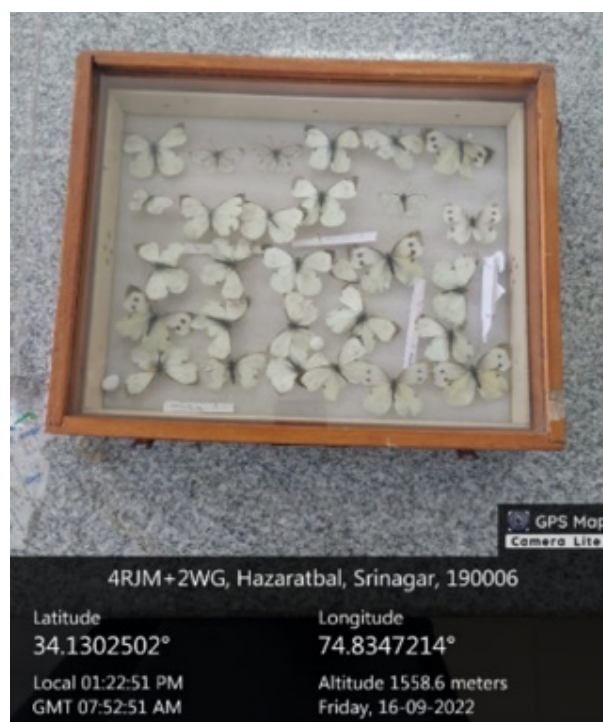


Image 4. Preservation of *Pieris napi* in Entomological Research Laboratory, Department of Zoology, University of Kashmir.

was collected. The *P. napi* and its narrowest natural distribution within forest edge habitat have also been proved in an experiment conducted by Ohsaki & Sato (1999) in the northern city of Kyoto, Japan. *P. napi* eggs and larvae were found on the plants of the Brassicaceae family like *Cardamine flexuosa*, acting as the host of the *P. napi* in the Dachigam National Park (Image 2(4)), and the same results were obtained by (Chew & Watt 2006; Friberg & Wiklund 2019). *Pieris napi* was very difficult to trap as it was flying high and fast. The species was captured at an elevation of 1676 m (5,500 ft) above sea level. The same results were documented by Shreeve (1981) as *Pieris napi* can fly high and cover large distances. *Pieris napi* trapped in Kashmir is not too much white but has long parallel green veins and broad discal spots that may be due to the variation in morphology due to the effect of latitude and altitude. According to Espeland et al. (2007) and Valimaki & Kaitala (2007), the morphology and life history of *P. napi* vary with latitude. *P. napi* is predominantly white at low elevations and low latitudes in Scandinavia; however, at higher elevations and latitudes, it is darker and more melanized and is frequently known as *Pieris bryoniae* (Ochsenheimer 1808; Kirby 1896) in central Europe and *Pieris napi adalwinda* (Fruhstorfer, 1909) in Scandinavia (Porter et al. 1997). Richards (1940) found that the proboscis sheath of *p. napi* projects only a very short distance in pupae, with its eggs and larvae being found on cabbage very rarely.

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