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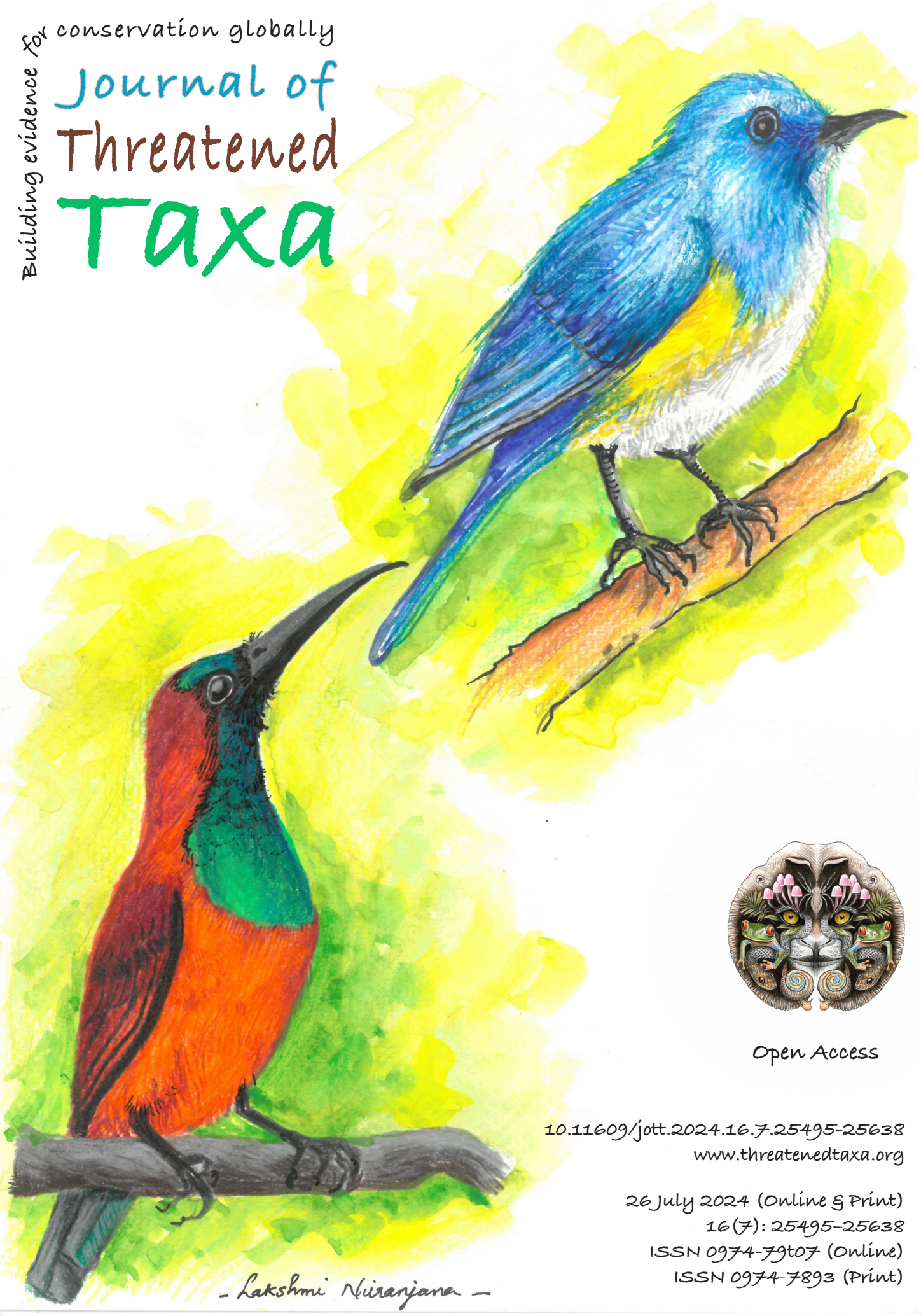

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10.11609/jott.2024.16.7.25495-25638
www.threatenedtaxa.org

26 July 2024 (Online & Print)
16(7): 25495-25638
ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

Publisher
Wildlife Information Liaison Development Society
www.wild.zooreach.org

Host
Zoo Outreach Organization
www.zooreach.org

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Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India
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Cover: Mixed media illustration of a Blue bird and Sunbird. © Lakshmi Niranjana.

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 July 2024 | 16(7): 25609–25612
ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)
https://doi.org/10.11609/jott.8233.16.7.25609-25612
#8233 | Received 20 October 2022 | Final received 05 June 2024 | Finally accepted 09 July 2024
OPEN ACCESS
SHORT COMMUNICATION

First record of *Pieris napi* L. (Lepidoptera: Pieridae) from Kashmir Valley, India

Firdousa Rasool [1] & **Altaf Hussain Mir** [2]

[1,2] Entomology Research Laboratory, Department of Zoology, University of Kashmir, Srinagar, Jammu & Kashmir 190006, India.
[1] firdousabintirasool@gmail.com (corresponding author), [2] draltaf_786@yahoo.com

Abstract: *Pieris napi*, a well-studied butterfly species distributed throughout the world, has remained undiscovered from Kashmir Himalaya to date. The present study reports the *Pieris napi* for the first time from Kashmir. This paper describes the diagnostic features and distribution patterns of the butterfly species in this region. It also includes specimen photographs and a distribution map of the species.

Keywords: Dachigam National Park, distribution, general hosts, *Geranium* sp., green-veined white butterfly, new record, Pir Panjal range, preservation, *Rubus* sp., *Stellaria media*, Zabarwan Range.

There are 34 different *Pieris* species reported in the world (Kirti et al. 2020). *Pieris napi* is found in the Himalayan region, including the northeastern states of India such as Arunachal Pradesh, Manipur, Assam, Himachal Pradesh, Meghalaya, Mizoram, Nagaland, and Uttarakhand, as well as Bhutan, Myanmar, China, Japan, North America, and Japan (Geiger & Shapiro 1992; Shaoji 2009; Gogoi 2013; Lodh & Agarwal 2015; Tadokoro 2015; Tadokoro 2017). The geographic distribution of the *Pieris napi* comprises the cool-temperate to cold wooded biomes of the Northern Hemisphere (Geiger & Shapiro 1992). In Russia, *Pieris napi* is present in the Caucasus; middle Siberia, and southwestern Siberia. It is a polymorphic species represented by a complex set of forms (Nuzhnova & Vasilevskaya 2013). The permanence of habitat and the oviposition on different hosts of the *P. napi* were studied by Ohsaki & Sato (1999). However, some researchers considered them as individual species, while others do not discriminate between various *Pieris* species such as *P. bryoniae*, *P. pseudorapae*, *P. euorientis*, *P. persis*, *P. narina*, *P. bowdeni*, *P. dulcinea*, *P. ocshenheimeri*, and *P. tomariana*, instead, they view the *P. napi* complex as a superspecies in a broad sense. The *P. napi* has been considered as a separate species by many authors and has provided distinguishing characteristic features (Richards 1940; Ohsaki & Sato 1999; Rayor et al. 2007; Bibi et al. 2022). Richards (1940) studied in detail the structural differences in eggs, pupae, larvae, and the hosts of *Pieris rapae* and *Pieris napi.* The *Pieris napi,* a multivoltine butterfly is widely spread in Europe at elevations below 200 m. Females of *Pieris napi* produce few large eggs, tend to be sedentary, and usually select those plants whose locations are long-lasting (Ohsaki & Sato 1990). As per Ohsaki (1979) *Pieris napi* lays eggs only on *Arabis* plants in the shade in the Kyoto area, Western Japan.

Since only five *Pieris* species have been reported in the Union Territory of Jammu and Kashmir—*Pieris brassicae*, *Pieris canidia*, *Pieris rapae*, *Pieris ajaka*, and *Pieris deota*—this survey focused on the Kashmir Valley.

Editor: Kushal Choudhury, Bodoland University, Kokrajhar, India.

Date of publication: 26 July 2024 (online & print)

Citation: Rasool, F. & A.H. Mir (2024). First record of *Pieris napi* L. (Lepidoptera: Pieridae) from Kashmir Valley, India. *Journal of Threatened Taxa* 16(7): 25609–25612. https://doi.org/10.11609/jott.8223.16.7.25609-25612

Funding: The current study was funded by Maulana Azad National Fellowship (MANF) and is a component of my Ph.D. work.

Competing interests: The authors declare no competing interests.

Acknowledgements: We are thankful to the Department of Zoology, University of Kashmir- Srinagar, for providing lab facilities.

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

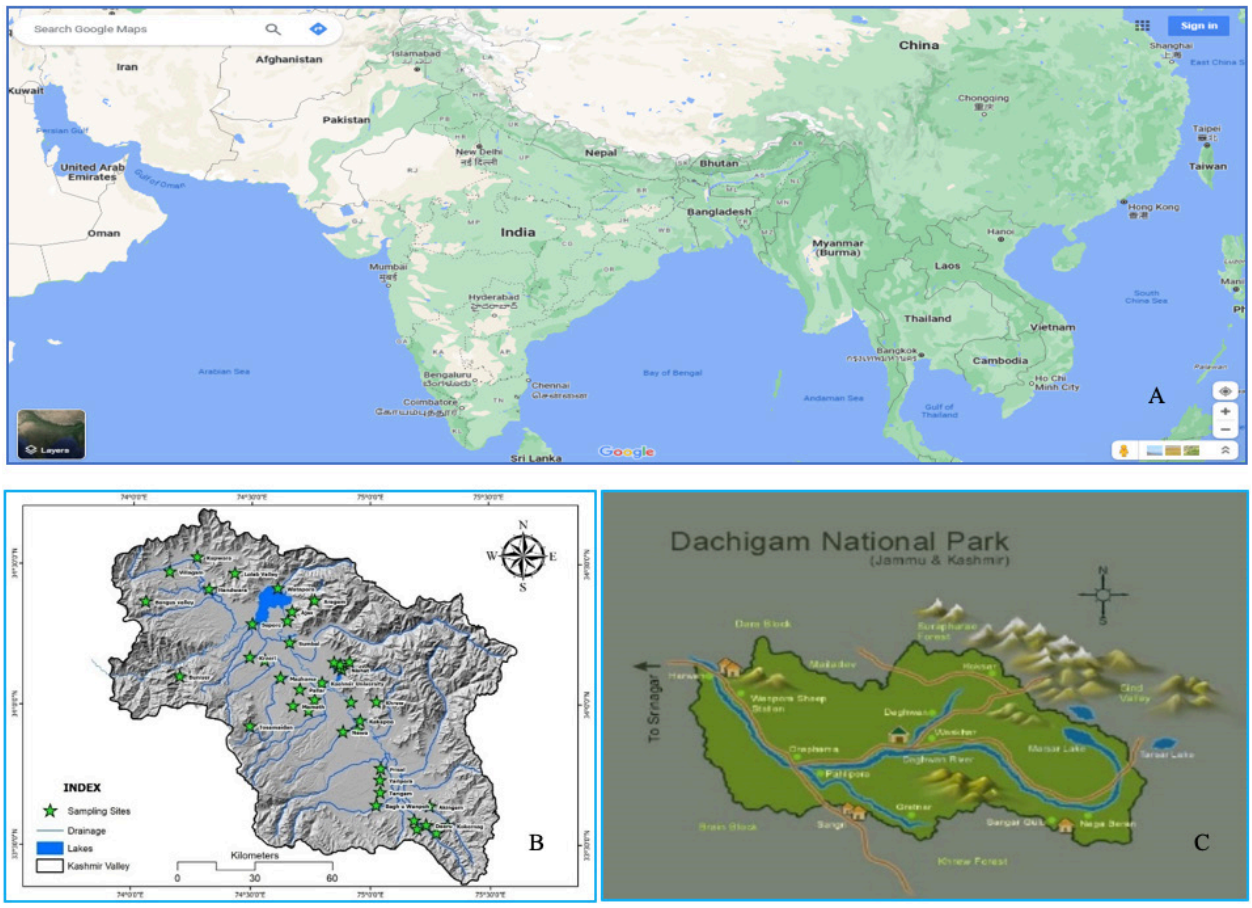

Image 1. A—Map of India in the world map | B—Sampling sites in different districts of Kashmir Valley (prepared with ArcGIS, version, 10.8.1) | C—Study site map- Dachigam National Park, Srinagar (source: Wikipedia).

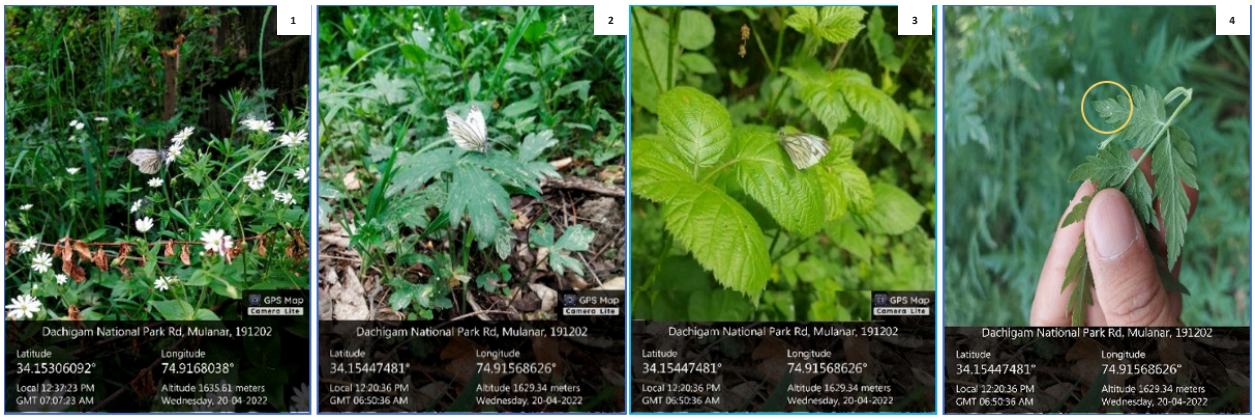

Image 2. *Pieris napi* spotted in Dachigam National Park, resting on: 1—Flowers of *Stellaria media* | 2—Leaves of *Geranium* sp. | 3 — Leaves of *Rubus* sp. | 4—Eggs on the leaves of *Cardamine flexuosa*.

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

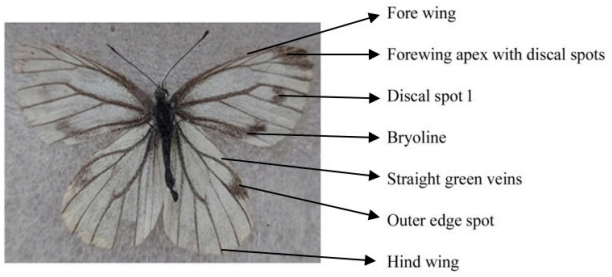

Image 3. *Pieris napi* of Kashmir, captured at Dachigam National Park, Srinagar, J & K, India

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.

References

Bibi, M., S. Bibi, N. Akhtar, Z. Ullah, M.F. Khan & I.Z. Qureshi (2022). Butterfly (Order: Lepidoptera) species Richness, diversity and distribution in different localities of Battagram, Pakistan. *Saudi Journal of Biological Sciences* 29: 1853–1857.

Borror, D.J., D.M. DeLong & C.A. Triplehorn (1976). *An Introduction to The Study of Insects*. 4th. Edition. Holt Reinehart and Wiston, New York, XII + 852pp.

Kirti, J.S., M. Kaur, A.V. Sidhu & N. Singh (2020). Taxonomic revision of the Genus *Pieris* Schrank (Lepidoptera: Pieridae) from India. *Journal of applied and Natural Sciences* 12(3): 328–343.

Chew, F.S. & W.B. Watt (2006). The Green-veined White (*Pieris napi* L.), its Pierine relatives, and the systematics dilemmas of divergent character sets (Lepidoptera, Pieridae). *Biological Journal of the Linnean Society* 88(3): 413–435.

Espeland, M., K. Aagaard, T. Balstad & K. Hindar (2007). Ecomorphological and genetic divergence between lowland and montane forms of the *Pieris napi* species complex (Pieridae, Lepidoptera). *Biological Journal of the Linnean Society* 92(4): 727–745.

Evans, W.H. (1932). The identification of Indian Butterflies. (Second edition revised). Bombay Natural History Society, 454 pp.

Friberg, M. & C. Wiklund (2019). Host preference variation cannot explain microhabitat differentiation among sympatric *Pieris napi* and *Pieris rapae* butterflies. *Ecological Entomology* 44(4): 571–576. https://doi.org/10.1111/een.12728

Fruhstorfer, H. (1909). *Parnassius* Latr., pp. 109–112. In: Seitz, A. (ed.). *Die Groß-Schmetterlinge der Erde. Dictado AustralischeTagtalter*. Stuttgart, Lehmann Vrlg.

Geiger, H. & A.M. Shapiro (1992). Genetics, systematics and evolution of holarctic *Pieris napi* species group populations (Lepidoptera, Pieridae). *Journal of Zoological Systematics and Evolutionary Research* 30(2): 100–122.

Gogoi, M.J. (2013). Book Review: Butterflies of the Garo Hills. *Journal of Threatened Taxa* 5(10): 4527–4528. https://doi.org/10.11609/jott.902.4527-4528

Howe, W.H. & D.L. Bauer (1975). *The Butterflies of north America*. Doubleday, Garden City, NY, 633 pp.

Kirby, W.F. (1896). *A Hand Book to the Order Lepidoptera*. Lloyds Natural History, London, I(II), 147– 150 pp.

Kunte, K., P. Churi, A. Bora & S. Debnath (2020). *Pieris canidia* (Linnaeus, 1768) - Asian Cabbage White. Kunte, K., S. Sondhi & P. Roy (Chief Editors). Butterflies of India, v. 2.87. Indian Foundation for Butterflies. http://www.ifoundbutterflies.org/sp/876/ Pieris-canidia.0/

Lodh, R. & B.K. Agarwala (2015). Inventory of butterfly fauna (Lepidoptera: Rhopalocera) of Tripura, India, in the Indo-Myanmar biogeographical zone, with records of threatened taxa. *Check List* 11(2): 1–37. https://doi.org/10.15560/11.2.1591

Nuzhnova, O.K & N.V. Vasilevskaya (2013). The effect of colour preferences on the foraging behaviour of the Green-veined White Butterfly (*Pieris napi* L.). *Contemporary Problems of Ecology* 6(1): 45–50. https://doi.org/10.1134/S1995425513010113

Ohsaki, N. (1979). Comparative population studies of three *Pieris* butterflies, *P. rapae, P. melete* and *P. napi,* living in the same area. Ecological requirements for habitat resourses in the adults. *Researches on Population Ecology* 20: 278–296.

Ohsaki, N. & Y. Sato (1999). The role of parasitoids in evolution of habitat and larval food plant preference by three *Pieris* butterflies. *Population Ecology* 41(1): 107–119.

Porter, A. H., R. Wenger, H. Geiger, A. Scholl & A.M. Shapiro (1997). The Pontia daplidice-edusa hybrid zone in northwestern Italy. *Evolution* 51(5): 1561–1573.

Rayor, L.S., L.J. Mooney & J.A. Renwick (2007). Predatory behaviour of *Polistes dominulus* wasps in response to Cardenolides and Glucosinolates in *Pieris napi* Caterpillars. *Journal of Chemical Ecology* 33: 1177–1185.

Richards, O.W. (1940). The biology of the small white butterfly (*Pieris rapae*) with special reference to the factors controlling its abundance. *Journal of Animal Ecology* 9(2): 243–288.

Shaoji, H. (2009). Preliminary field survey of butterflies on Xishan Hill (Kunming, Yunnan Province, China). *Journal of Research on the Lepidoptera* 41: 60–69.

Shreeve, T.G. (1981). Flight patterns of butterfly species in woodlands. *Oecologia* 51(2): 289–293.

Tadokoro, T. (2015). Taxonomic status of *Pieris* (napi) *nesis* Fruhstorfer, 1909 (Lepidoptera, Pieridae). *Lepidoptera Science* 66(3-4): 104–108.

Tadokoro, T., S. Wangchuk, S. Wangdi, K. Wangdi, R. Wangdi, S. Drukupa & M. Yago (2017). Description of a new subspecies of *Pieris erutae* Poujade, 1888 from Eastern Bhutan, with taxonomic notes on the *Pieris napi* group from the Himalayas (Lepidoptera, Pieridae). *Lepidoptera Science* 68: 3–4. https://doi.org/10.18984/LEPID.68.3-4_81

Valimaki, P. & A. Kaitala (2007). Life history tradeoffs about the degree of polyandry and developmental pathway in *Pieris napi* (Lepidoptera, Pieridae). *Oikos* 116(9): 1569–1580.

Wynter-Blyth, M.A. (1957). Butterflies of the Indian Region. Bombay Natural History Society, Bombay, xx+523 pp.

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NAAS rating (India) 5.64

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Journal of Threatened Taxa

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

July 2024 | Vol. 16 | No. 7 | Pages: 25495–25638
Date of Publication: 26 July 2024 (Online & Print)
DOI: 10.11609/jott.2024.16.7.25495-25638

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