

Short communication

New updates on yellow woodbrown *Lethe nicetas* Hewitson, 1863 from Rara National Park, Nepal

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Abstract

This study presents new findings on the distribution and ecological characteristics of the yellow woodbrown *Lethe nicetas* butterfly in Rara National Park, Nepal. This butterfly species, which was previously only reported mainly from Eastern and Central Nepal, is recorded for the first time from the Western region of Nepal. The specimen was observed in October, and hence extends the seasonal range of observation of adults beyond the months of May–July. I have given a thorough description of *L. nicetas*, highlighting its characteristic patterns. The study reports the species' existence in the sub-alpine region, thereby extending its known habitat. I observed mud-puddling behavior of the specimen close to Rara Lake, which provided insight into its ecological preferences. The study's importance lies in the expansion of the butterfly's known distribution region and documenting its occurrence in a different Month for Nepal. The newly discovered data helps us comprehend the biological dynamics and habitat needs of various species. This study highlights the significance of continued butterfly species investigation and documentation in Nepal's varied landscapes and offers useful information for conservation initiatives.

Keywords: Butterfly; *Lethe nicetas*; Distribution; Ecological characteristics; Rara lake

1 | Introduction

Species from the genus *Lethe* Hübner 1819, belong to the Nymphalidae family and the Satyrinae subfamily. The genus *Lethe* has 119 different species (FUNET 1990). These uncommon species are widely distributed from Borneo through the Sunda Islands, Japan, and Siberia to the Himalayan region (Mani 1986). *Lethe nicetas* (Hewitson 1863) occurs on the Indian sub-continent from Kangra in Himachal Pradesh east through Uttarakhand, Nepal, Sikkim, northern West Bengal, and Bhutan to north-east India (Kabru Peak) (Gasse 2018) and in Myanmar as well (Choi et al. 2021). The yellow woodbrown butterfly, *L. nicetas* (Hewitson 1863) has junior synonyms *Zophoessa nicetas* and *Debis nicetas*, found in Sikkim, Assam, and Manipur (Hübner 1819; Weymer 1912).

The *L. nicetas* is distinguished by its pale rufous-brown underbelly with the outer half of the front wings having a darker brown tone and the middle being divided by a pale-yellow macular band and having three spots of the same color closer to the apex (Hewitson 1863; Evans 1927; Talbot 1947; Mani 1986). The hind wing is similar to the front wing, described above, but with a continuous transverse band and two small ocelli instead of three spots close to the apex (Hewitson 1863; Evans 1927; Talbot 1947; Mani 1986). The hind wing is divided in half by a band of seven silvery sub-marginal dark-brown ocelli (two of

which touch at the anal angle), each with a white pupil and a rufous iris bordered with lilac (Hewitson 1863; Evans 1927; Talbot 1947; Mani 1986). The presence of pre-apical sub-margin spot and underside hindwing blurred ocellus in 3 (and 4) distinguishes this species from the small woodbrown *L. nicetella*, a closely related species (Hewitson 1863; Evans 1927; Talbot 1947; Mani 1986). The upper side of the female is light rufous brown, whereas in the male it is golden-brown (Evans 1927).

The *L. nicetas* is a seldom-seen butterfly species, first recorded from eastern Nepal (Olangchung gola) at around 3050 m asl on 26 July 1963 during the Lepidopterological survey by Haruto (Mahendra Singh Limbu pers. comm. 2022). This butterfly species has also been recorded from the Central Nepal region (Kaski district), within the altitudinal range of 1700 to 2600 m asl (Smith 1994), and Champadevi hills, 1750 to 1959 m asl (mentioned as *Zophoessa nicetas*, Oli 2018).

This study aimed to do an opportunistic survey of butterflies in Rara National Park (RNP). During this, I recorded new ecological observations and distribution records of the yellow woodbrown butterfly (*Lethe nicetas*), a region where the species has never been documented before. Our understanding of the geographical and seasonal distribution of *L. nicetas* is expanded by this observation, which reports its occurrence in October and expands its known range to Western Nepal. The work is important to science because it closes a critical knowledge gap regarding the habitat preferences and behaviours of *L. nicetas*. This helps to conserve biodiversity and informs conservation

plans for butterfly species that are found in Nepal's varied ecosystems.

abroad. For the map preparation I have downloaded freely available map data from websites nationalgeoportal.gov.np,

2 | Materials and methods

2.1 | Study area

Rara National Park (RNP), Mugu, Karnali Province, Nepal is the smallest national park in Nepal, with an area of 106 km² and an elevation ranging from 1800 m to 4039 m. It was founded in 1976 and is located between 29°25'48"N and 29°33'00"N and 81°00'00"E and 82°09'00"E in the Himalayan region (Bhuju et al. 2007). Rara Lake, which is Nepal's largest lake, is the park's most prominent feature. The park is home to 1070 plant species (Bhuju et al. 2007). In the sub-alpine region, the vegetation consists of blue pine *Pinus wallichiana*, *Rhododendron* species, West Himalayan spruce *Picea smithiana*, black juniper *Juniperus indica*, brown oak or English oak *Quercus robur*, and Himalayan cypress *Cupressus torulosa* below 3200 m, and fir *Abies* sp., spruce *Picea* sp., and pine *Pinus* sp. above 3200 m (Bhuju et al. 2007). There are 51 mammal species, 241 birds, 2 reptiles, and 2 amphibians, both of which are endemic and 3 fish species endemics to Nepal reported from the national park (BPP 1995; Bhuju et al. 2007; Shrestha et al. 2022). The park area is home to 64 species of butterflies (Khanal 2007).

A single specimen of *L. nicetas* (Fig. 1) was seen during an opportunistic survey around the Rara Lake in 2017. We didn't collect specimens but instead took photographs using Nikon D500 camera attached with Nikon AF-S DX NIKKOR 55-200mm f/4-5.6G ED VR II. Later, species were confirmed by consulting Evans (1927), pictorial guidebooks by Smith (1994, 2010, and 2011), and Smetacek (2017) in the field, and confirmed with the help of experts from Nepal and



Figure 1. *Lethe nicetas* Hewitson, 1863 observed in Rara National Park © Sanej Prasad Suwal

protectedplanet.net, and opendatanepal.com and designed in freely available QGIS Desktop version 3.34.3.

3 | Results

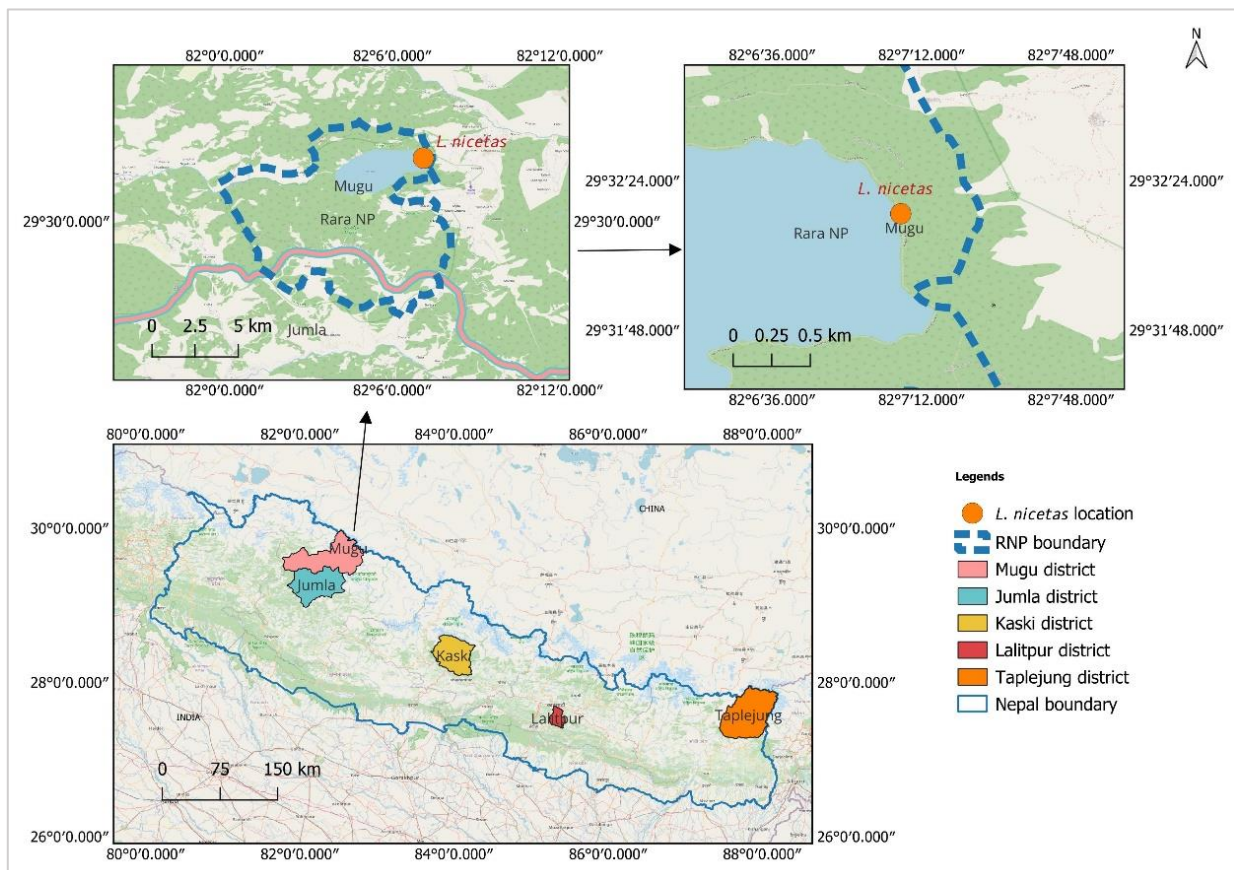


Figure 2. *Lethe nicetas* distribution locations in Nepal.

A single female adult individual of *L. nicetas* was observed in the RNP, Mugu district, Nepal, on 23 October 2017, at approximately

Table 1. Distribution updates of the yellow woodbrown *Lethe nicetas* Hewitson, 1863 in Nepal.

| Location in Nepal | Month and year | Elevation (m) |
|----------------------------|----------------|---------------|
| Olangchung Gola, Taplejung | July 1963 | 3050 |
| Kaski | May, June 1994 | 1700-2600 |
| Champadevi, Lalitpur | October 2018 | 1750-1959 |
| Hutu, Mugu | October 2017 | 2984 |

2:00 PM. The specimen was spotted at coordinates 29°32'16"N to 82°07'07"E at an elevation of 2984 masl (Fig. 2).

The area where the butterfly was found was characterized by ground vegetation of *Rubus nepalensis* and *lichen* spp. with a canopy cover of *Pinus wallichiana*. The observed specimen exhibited mud-puddling behavior in a moist marshland on a forest trail, about five meters from the northeastern side of Rara Lake.

4 | Discussion

Previously, *L. nicetas* was recorded only in eastern and central Nepal (Smith 1994; Oli 2018; Mahendra Singh Limbu, pers. comm. 2022). Khanal (2007) studied butterflies in the Rara National Park but did not record *L. nicetas*. The observation of *L. nicetas* in RNP marks the first recorded in Western Nepal, expanding its known geographical distribution within the country. Additionally, this sighting in October extends the known seasonal range of the species in Nepal, which was previously documented during the months of May, June, and July (Smith 1994; Mahendra Singh Limbu, pers. comm. 2022), and October (Buddhi Ram Oli, pers. comm. 2024) (Table 1).

This sighting not only extends the known range of *L. nicetas* to western Nepal but also adds to the seasonal records of its presence, highlighting October as an additional month during which adults can be observed. This seasonal extension aligns with records from India, where the species has been observed in May, June, October, and November (Kunte et al. 2022), suggesting that similar seasonal patterns may exist across its range.

The habitat where *L. nicetas* was observed in RNP, with its specific vegetation and proximity to Rara Lake, provides insights into the ecological preferences of the species. The mud-puddling behavior noted in the moist marshland area suggests that such microhabitats are important for the butterfly, possibly for nutrient uptake. This behavior has been similarly documented in

other regions (VanDyk 2021), indicating a common ecological trait among the species.

The findings underscore the importance of continued butterfly monitoring and documentation in Nepal's diverse landscapes. Given that, *L. nicetas* has now been recorded in Eastern, Central, and Western Nepal; it is likely that further surveys could reveal an even broader distribution within the country. The extended range and seasonal data contribute to a better understanding of the species' ecological requirements and can inform conservation efforts aimed at protecting its habitats.

5 | Conclusions

The discovery of *L. nicetas* in RNP marks a significant expansion of the species' known distribution in Nepal, recording its presence in the western region for the first time. This observation also extends the known seasonal occurrence of *L. nicetas* to October, providing new insights into its life cycle and ecological preferences in Nepal. The study highlights the importance of ongoing research and documentation to fill critical knowledge gaps regarding butterfly species in Nepal. Such efforts are crucial for biodiversity conservation and for developing informed conservation strategies tailored to the needs of specific species and their habitats. Continued exploration and monitoring are essential to fully understand the distribution, behavior, and ecological needs of *L. nicetas* and other butterfly species in Nepal.

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Conflicts of interest

The author declares no conflict of interest.

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