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A note on Indian hare *Lepus nigricollis*: presence beyond the IUCN distribution in the Himalayas

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Abstract

Indian hare *Lepus nigricollis* have a vast distribution in southern Asia with several subspecies. Even though it is distributed in a large area, the species lacks regional assessment and has been understudied for taxonomy, ecology, and demography. The species is stated to be absent from the high reaches of the Himalayas; however, several records reveal the presence of the species in the higher reaches of the Himalayas. In this article, we present records of Indian hare from the higher reaches of the Himalayas based on questionnaire survey, literature review, and directed sightings, which could be used to reassign its distribution range.

Keywords: *Indian hare, distribution, Himalayas, high altitude, questionnaire survey*

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1. Introduction

The Indian hare *Lepus nigricollis* F. Cuvier, 1823 is a member of the family Leporidae. The species is considered to have a vast distribution in southern Asia with several subspecies and is endemic to the Indian sub-continent [1]. Indian hare has been understudied for taxonomy [2], ecology, and demography [3]. The Indian hare is known to primarily inhabit areas with open grasslands and forest–agricultural interface since their primary diet consists of grass [4]. They are known to avoid dense forests and prefer bushy areas in a mosaic of forested and cultivated lands as a refuge during the day. Their temporal activity pattern has been defined as crepuscular and nocturnal [4]. Indian hares frequent roadsides and kitchen gardens or compounds of human settlements to feed on grass and vegetables when food resource remains depleted or scarce during the drier seasons [5].

Indian hare is known to be distributed up to the Himalayan foothills (2400 m asl) and further up in the Darjeeling-Sikkim Himalayas in India [6–8] but is stated to be absent from the high reaches of the Himalayas and Sundarbans (mangrove forest in West Bengal). The uppermost altitudinal extent is not clearly defined for this species, and therefore, a possible distributional range between 50 and 4500 m asl is assumed with no confirmed evidence [3]. Therefore, the distribution map produced by the International Union for Conservation of Nature (IUCN) demarcates the range for the species up to at the base of the Himalayas. This article provides information on the presence of Indian hare beyond the IUCN demarcated range. Findings of this article can help in reassessing the distribution of Indian hare in the Himalayas.

2. Methodology

As a part of a project on key ecosystem services and biodiversity components in the socio-ecological landscapes of Darjeeling-Sikkim Himalaya, information was gathered (n = 182), from June 2018 to September 2021, about the faunal agents responsible for crop depredation. The survey revealed the presence of Indian hare in and around the croplands of the study area. Literature was reviewed to record the sighting of the species from different parts of the Himalayas to ascertain its presence. During the field activity, an individual was also photo captured from Darjeeling, West Bengal. The identification of the species was confirmed following Menon [6].

3. Results and discussion

Herein, we report multiple sightings of the Indian hare from the Darjeeling district of West Bengal, India, which falls under the biogeographic zone 2C of the central Himalayan province of the Indian Himalayas [9, 10].

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Data collected through the questionnaire survey revealed the presence of a hare species in Darjeeling (n = 48). Respondents indicated that hares often raided vegetable gardens causing economic losses to the farmers. They also mentioned that hares were mostly sighted near agricultural fields (n = 18) or in areas with open canopy grasslands near tea plantations (n = 30). Additionally, they were directly sighted (n = 11) in nine locations, and photographs were taken (n = 1) at one site during the survey in Darjeeling, West Bengal (inset image of hare in **Figure 1**). The photo-captured individual has rufous coloration on its limb extremities, white ventral pelage, and rufous black dorsal pelage, confirming its identity to be *Lepus nigricollis*, whereas lack of the typical black nape replaced by a brown patch on its nape and a comparatively large tail with rufous on the dorsal side indicates its subspecies to be *L. n. ruficaudatus*. However, further genetic data might confirm the subspecies more accurately.

This article reconfirms the presence of Indian hare at the high altitude of the Himalayas, up to 3000 m asl with multiple evidences (literature, questionnaire, and opportunistic observation). Although the IUCN distribution map of Indian hare excludes countries like Nepal, Bhutan, and several states of India such as Arunachal Pradesh, Sikkim, and Uttarakhand, our literature survey revealed the presence of the Indian hare in Nepal up to 2500 m asl [11], Bhutan [12], and the Himalayan states of Arunachal Pradesh [13], Uttarakhand [14, 15], up to 3000 m asl in the northern part of West Bengal (Darjeeling) [16], and up to 2700 m asl in Sikkim [7, 17] in India (**Table 1**).

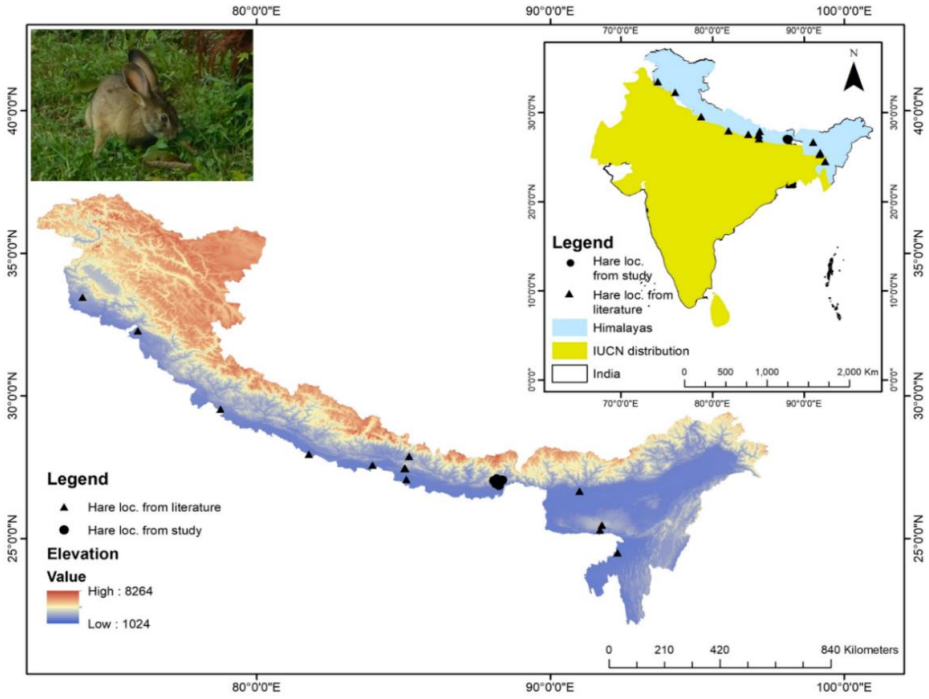

Figure 1 • Map showing the records of Indian hare from different locations in the Himalayas based on literature review and direct sighting. Individual photographed through direct sighting (inset) from the Darjeeling district of West Bengal, India.

Table 1 • Records of Indian hare outside of its known distribution demarcated by the IUCN

State/Country	Height	References
Nepal	63–2500 m	[11]
Bhutan (Royal Manas National Park)	97–2714 m	[12]
Arunachal Pradesh (D'Ering Memorial Wildlife Sanctuary)	100–150 m	[13]
Uttarakhand	1050–4700 m	[14, 15]
West Bengal (Darjeeling and Kalimpong)	Upto 3000 m	[7, 8, 16, 18–22]
Sikkim	Upto 2700 m	[7, 17, 23, 24]

Current information indicates the necessity for revising the distribution range of Indian hare in the Himalayas. Moreover,the communities living in the mountains have dedicated names in their respective dialects and languages ("Kharayo" in Nepal and Sikkim, "Kharha" by Bhotiya tribe in Uttarakhand). This indicates the presence of Indian hare in the Himalayas to be persisting over a long period of time and not a new event. Revising the distribution of Indian hare might assist more accurately in local-level population estimations invarious ecosystems and landscapes, leading to a better assessment forconservation status, guiding monitoring efforts, and directing conservation actions for species.

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Author contributions

AP conducted the fieldwork and questionnaire survey. AT & PC conceptualized the paper draft. AT wrote the first draft, later modified with comments from AP, PC & AS. PC prepared the map. AS finalized the draft. All authors approve of this work and take responsibility for its integrity.

Conflicts of interest

The author(s) declare no conflict of interest.

Data availability statement

Data supporting these findings are available within the article.

Institutional review board statement

Not applicable.

Informed consent statement

Not Applicable.

Sample availability

Not Applicable.

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