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An Elusive and Endangered Life in Grassland: A Rare Sighting of the Hispid Hare (*Caprolagus hispidus*) in Chitwan National Park, Nepal

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ABSTRACT

Endemic to the grassland of the Indian sub-continent, the hispid hare (*Caprolagus hispidus*) confronts various conservation challenges. Though it is enlisted as an Endangered species on the IUCN Red List, there has been limited study of this species. Being a tall grassland dweller with a small in size and elusive nature, it is rarely observed in the wild. This study documents the observation of a very young hispid hare in Jayamangala phanta (grassland) in the Chitwan National Park, marking a significant discovery at a new location. Occurring eight years after the previous recorded sighting, this finding has drawn renewed attention from conservation stakeholders. As this study presents the account of rare observation, we urge for prioritizing an integrated and participatory conservation approach for small and lesser-known species like the hispid hare in the light of surging anthropogenic pressure.

Keywords: Hispid hare, Chitwan National Park, endangered, grassland, elusive, rare

1. INTRODUCTION

The Hispid hare (Caprolagus hispidus), known as "Laghukarna Kharayo" or "Pudke Kharayo" in Nepali, is a small lagomorph species endemic to the grasslands of the Indian subcontinent, is classified as Endangered on the IUCN Red List due to its declining population and highly fragmented distribution (Aryal and Yadav, 2019; Dhami et al., 2023b). Historically, the species inhabited the southern foothills of the Himalayas, extending from Uttar Pradesh in India, through southern Nepal, to Bangladesh (Aryal and Yadav, 2019; Dhami et al., 2023b: Prasai et al., 2024). In the mid-1960s, ecologists speculated that the hispid hare might be extinct. However, the discovery of a live specimen in 1971 in Barnadi Wildlife Sanctuary, Assam, provided definitive proof of the species' continued existence (Dhami et al., 2023b).

However, current knowledge regarding its distribution is limited, both within and outside protected areas across the Indian subcontinent (Aryal and Yadav, 2019; Dhami et al., 2023b; Prasai et al., 2024). Today, the hispid hare has a considerably more restricted range, with populations primarily confined to a few protected areas, including Shuklaphanta National Park, Bardia National Park, and Chitwan National Park (henceforth CNP) in Nepal, and Manas National Park, Jaldapara National Park in India, and Royal Manas National Park in Bhutan. Although its extent of occurrence is estimated at 188,316 km², the species' population remains severely fragmented, with only small pockets of suitable habitat left (Aryal et al., 2012; Nath, 2015; Khadka et al., 2017; Nidup, 2018; Aryal and Yadav, 2019; Dhami et al., 2023b).

In the undisturbed grasslands of Nepal, the population density of this species is estimated at one individual per 1,470 m². This species is legally protected under the National Parks and Wildlife Conservation Act, 1973 (Appendix I) and is listed under Appendix I of the CITES (Jnawali et al., 2011). The hispid hare primarily inhabits floodplain and alluvial grasslands dominated by early successional tall grasses, often referred to as "elephant grass" (Bell et al., 1990). These grasslands, especially near rivers, forest clearings, and areas abandoned after cultivation, serve as refugia during later stages of ecological succession, forming vital understory habitats (Chapman and Flux, 1990; Dhami et al., 2023b).

The hispid hare primarily feeds on thatch shoots and roots, using a distinctive feeding behavior where it bites off the base and removes the outer sheaths before consumption (Oliver, 1980). As a vital component of their habitat, these grasslands play a crucial ecological role in supporting biodiversity while providing resources such as fuel and thatch to local communities (Bhatta, 1999; Sadadev et al., 2021). However, they are increasingly threatened by natural succession, overgrazing by livestock, unregulated thatch harvesting, and uncontrolled burning (Khulal et al., 2021). Despite remarkable achievements in biodiversity conservation and protected area management in Nepal, research focusing on small and lesser-known species remains limited.

The focus of both government initiatives and donor agencies has primarily been on charismatic megafauna, which has led to insufficient attention given to smaller species (Dhami et al., 2023a). As a result, many of Nepal's ecosystems remain poorly understood, and important ecological roles played by small mammals, such as lagomorphs, continue to be overlooked. In this research note, we present new incidental photographic evidence of the hispid hare from CNP, providing important data on its distribution in an area that has previously been under-explored. Additionally, we summarize key research efforts conducted on the species in Nepal.

2. NEW PHOTOGRAPHIC EVIDENCE FROM CHITWAN NATIONAL PARK

Our rare sighting marks the third recorded observation of the hispid hare in CNP, with the first documented sighting occurring in 1984. The observation was made twice on November 13, 2024, at 10:35 AM & 3:25 PM on a sunny day in Jayamangala phanta (grassland) of the eastern sector of CNP (Figure 1A & B). Jayamangala phanta is dominated by *Saccharum spp* interspersed with *Trewia nudiflora* (rhino apple tree) and other riverine forest species (Figure 1C). This grassland is periodically managed by the CNP administration as part of its annual grassland management program. Remarkably, this species was sighted more than eight years after the second observation, in a location significantly distant from the previous sighting. Khadka et al., (2017) documented the species in the Sukhibhar phanta (grassland) in the CNP on January 30, 2016, highlighting its elusive nature and the significance of the rediscovery.


A

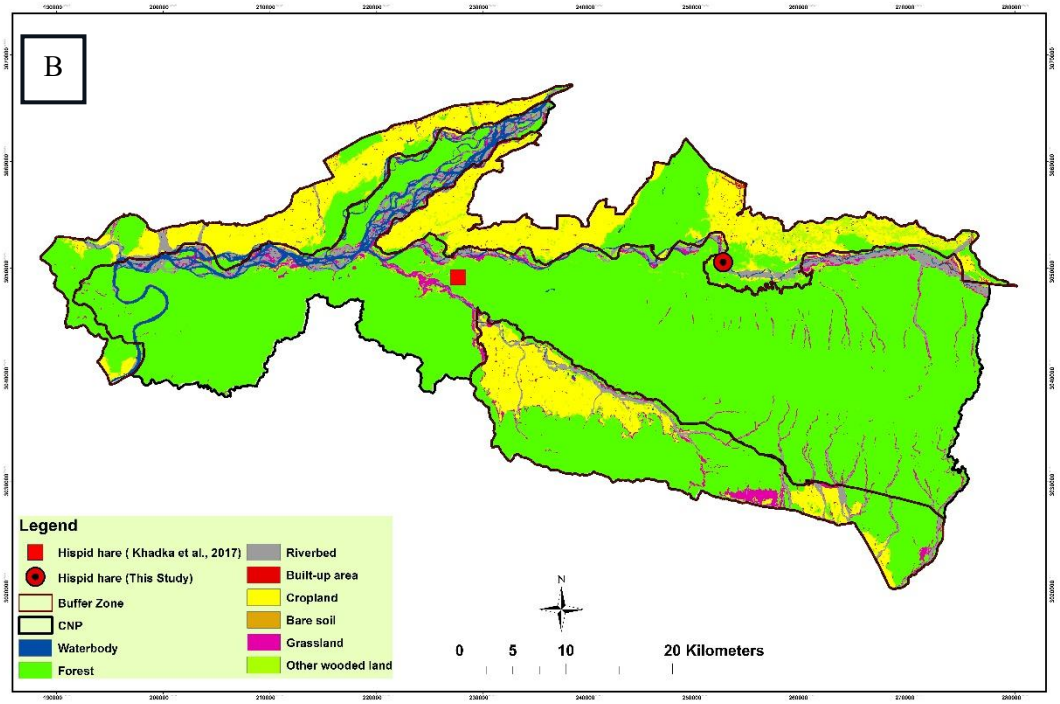
B
Legend
Hispid hare (Khadka et al., 2017)
Hispid hare (This Study)
Buffer Zone
CNP
Waterbody
Forest
Riverbed
Built-up area
Cropland
Bare soil
Grassland
Other wooded land
N
0 5 10 20 Kilometers

Figure 1 (A) A very young hispid hare observed in the Jayamangala phanta of CNP (Photo: ©Binod Chaudhary), B) Map of CNP and its buffer zone showing the location of the previous and recent sighting, C) Surroundings of the hispid hare sighted location

3. NATIONAL PARK RESEARCH INSIGHTS AND FUTURE RESEARCH DIRECTIONS

We conducted systematic literature review following the procedure outlined by (Pullin and Stewart, 2006). Research articles were identified using key terms such as hispid hare, assam rabbit, and bristly rabbit in google scholar. After retrieving relevant articles, the abstracts were reviewed, and each paper was categorized into specific research themes (Table 1) based on its content. If an article discusses several different themes equally, it was counted under multiple primary themes. If an article discusses one major theme but other themes are covered to a lesser extent, these are counted as secondary themes.

Table 1 Specific research themes for the study of the hispid hare

S. N	Theme	Description
1.	Baseline survey	Photographic records, anecdotal evidence
2.	Diet and food analysis	Diet analysis, foraging preference
3.	Habitat use and distribution	Habitat selection, habitat overlap, occupancy surveys, distribution surveys, co-existence with other predators, habitat suitability analysis, habitat fragmentation analysis, environmental niche modeling, resource availability assessment, carrying capacity, factors affecting habitat use
4.	Movement ecology	Movement dynamics, home range size, dispersal, migration, landscape connectivity

5.	Population status	Site abundance, population density, sex ratio, reproductive success, population trends
6.	Human dimension	Local knowledge and awareness, community-based conservation, impact of livelihood practices on habitat, personality assessment
7.	Ethology	Feeding behavior, social behavior, mating and reproductive behavior, territorial behavior, predator avoidance and defensive behavior, diurnal and nocturnal activity patterns, communication behavior, mother-offspring interactions
8.	Anatomy and physiology	Metabolic processes, thermoregulation, skeletal structure, body weight and size
9.	Molecular Ecology	Phylogeography, genetic structure, genomes, genetic variation, phylogenetic analysis, genetic connectivity, genetic drift, genetic diversity, evolutionary differences, neotype
10.	Threats	Habitat loss and fragmentation, climate change, poaching and hunting, invasive species, disease and pathogens, grassland burning, thatch collection, ecotourism
11.	Review/synthesis	Systematic review of literature or meta-analysis on this species

Our literature review found majority of research on the hispid hare has been conducted in Shuklaphanta National Park, with studies covering a range of themes, including baseline surveys, movement ecology, habitat use and distribution, population status, diet and food dynamics, and threats. Bardia National Park follows, with research primarily focused on population status, diet and food dynamics, habitat use and distribution, and threats. CNP has also been the subject of some studies, which mainly focus on baseline surveys and habitat use. Additionally, substantial study was found on the factors affecting the hispid hare's distribution and to determine suitable protected areas across its distribution range, considering both current and future climatic scenarios (Table 2). This suggests that future research should expand into less-explored thematic areas, addressing existing gaps in knowledge and enhancing both understanding and management strategies.

Table 2 Study areas and research focus on the hispid hare

S. N	Study area	Research theme	Authors
1.	Shuklaphanta National Park	Movement	(Bell, 1986)
		Habitat use and distribution	(Bell, 1986), (Yadav et al., 2008), (Aryal et al., 2012), (Chand et al., 2017), (Dhami et al., 2023b)
		Population status	(Yadav et al., 2008), (Chand et al., 2017), (Dhami et al., 2023b)
		Baseline survey	(Aryal and Yadav, 2010)
		Diet and food dynamics	(Aryal et al., 2012)
		Threats	(Chand et al., 2017), (Dhami et al., 2023b)
2.	Bardia National Park	Population status	(Tandan et al., 2013)
		Diet and food dynamics	(Tandan et al., 2013)
		Habitat use and distribution	(Thapa et al., 2024)
		Threats	(Thapa et al., 2024)
3.	Chitwan National Park	Baseline survey	(Khadka et al., 2017)
		Habitat use and distribution	(Prasai et al., 2024)

4.	Across Nepal	Habitat use and distribution	(Abedin et al., 2024)

4. CONCLUSION

The hispid hare's rareness can be understood as it has been observed only three times in CNP, i.e., for the first time in 1984, then in 2016, and now in 2024. Our study firmly urges for an in-depth study of the species and its habitat. In the same time, observing a very young hispid hare at a new location, about 25 kilometers (straight-line or aerial distance) away from the previous observed location, potentially suggests a growing and distributed hispid hare population in the park. This encourages an integrated and participatory approach to conserving this elusive and endangered species.

CNP and its stakeholders have long prioritized the conservation of charismatic and flagship species, whose conservation often benefits a wide array of smaller mammals. However, placing greater focus on small and lesser-known species like the hispid hare could further enrich overall conservation and habitat management efforts. Moreover, this rare observation offers an opportunity to promote the holistic and sustainable conservation of biodiversity in the park and its buffer zone.

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Ethical Statement

No animals were harmed, disturbed, or manipulated during the observation process. All sightings were recorded from a safe distance to minimize stress and disruption to natural behaviors. Observations were conducted in strict compliance with the National Parks and Wildlife Conservation Act, 1973 of Nepal and research permission letter 2081/082 Eco 75 ensuring adherence to ethical standards and legal guidelines for wildlife research and conservation. The Animal ethical guidelines are followed in the study for species observation, identification & experimentation.

Informed consent

Not applicable.

Conflicts of interests:

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

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