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Short communication

First record of Siberian weasel *Mustela sibirica* Pallas, 1773 (Mammalia: Carnivora: Mustelidae) with photographic evidence in Jajarkot, Nepal

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Abstract

Camera traps placed in Nalgaad Municipality, Kuse Rural Municipality, and Barekot Rural Municipality of Jajarkot District, Karnali Province, Nepal showed a new distributional information for Siberian weasel *Mustela sibirica*. This finding helps fill gaps in our knowledge about the species' distribution, contributing to a more comprehensive understanding of the species' range.

Keywords: Carnivore; Camera trap; Jajarkot; Mustelids; Siberian weasel

1 | Introduction

In Nepal, 13 species of mustelids: yellow-throated marten *Martes flavigula*, stone marten *Martes foina* of sub family Guloninae, large toothed ferret badger *Melogale personata* of sub family Helictidinae, Asian small-clawed otter *Aonyx cinerea*, Eurasian otter, *Lutra lutra*, smooth-coated otter, *Lutrogale perspicillata* of sub family Lutrinae, honey badger *Mellivora capensis* of sub family Mellivorinae, stoat (Ermine in North America) *Mustela erminea*, Siberian weasel *M. sibirica*, yellow-bellied weasel *M. kathiah*, mountain weasel *M. altaica*, stripe-backed weasel *M. strigidorsa* and steppe polecat *M. eversmanii* of sub family Mustelinae belonging the Mustelidae family have been documented (Amin et al. 2018; Baral & Shah 2008; Jnawali et al. 2011). Overall mustelids studies in Nepal are at the state of infancy. There is a significant lack of scientific studies that focus exclusively on mustelid species, and most of the available data are derived from incidental bycatch information collected during studies on other taxa. This scarcity of targeted research highlights a critical gap in our understanding of these species' ecology, distribution, and conservation needs.

Despite Siberian weasel's extensive distributional range in the Palearctic region, there is a notable scarcity of comprehensive records documenting its presence. The chronicled and handful records from Gaurishankar Conservation Area (Chetri et al. 2024); Langtang National Park (Basnet et al. 2024); Dhorpatan Hunting Reserve (Basnet et al. 2022), Api-Nampa Conservation Area (Yadav et al. 2019), Annapurna Conservation Area (Baral et al. 2019b), Manaslu Conservation Area (Katuwal et al. 2013), and Makalu Barun National Park (Ghimirey & Acharya 2012) inside protected areas are based on observational data (Figure 1). Only sketchy information is known about the Siberian weasel's distribution outside protected areas in the Himalayas (Kashmir, Nepal and Sikkim) in its range (Abramov et al. 2018). Allied to this, there are a few shreds of Siberian weasel occurrence in Nepal outside protected area: Humla (Yadav et al. 2019), Mugu (Ghimirey et al. 2014) (Figure 1). The records of this species outside protected areas are limited, indicating that its presence in such areas may be overlooked outside protected areas, resulting in significant gaps in our understanding of the species' ecology, behavior, and population dynamics.

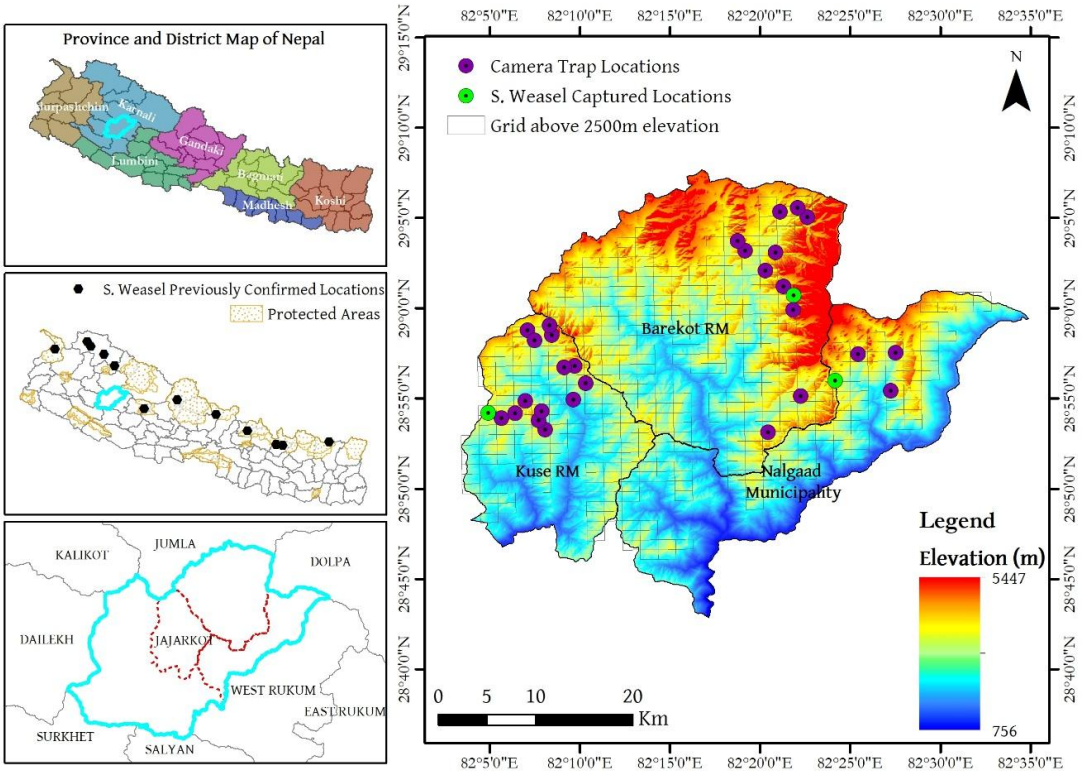

Figure 1. Siberian weasel *Mustela sibirica* records in Jajarkot District and across the Nepal

It has been assessed as 'Least Concern' in the IUCN Red List of Threatened Species (Abramov et al. 2016) and *The Status of Nepal Mammals: The National Red List Series* (Amin et al. 2018; Jnawali et al. 2011). It is accorded under Appendix I of CITES. To date, besides yellow-bellied weasel, there has been no sighting and photographic record of any weasel's species in Jajarkot District, Nepal (Baral et al. 2019a). Despite previous biodiversity studies suggesting the possible presence of the Siberian weasel in Jajarkot (Baral 2014; Basnyat et al. 2019), there was no confirmed evidence. This paper presents the first camera trap photo evidence of the presence of Siberian weasel in Jajarkot.

2 | Materials and methods

The study area lies outside the protected area, in Nalgaad Municipality, Kuse Rural Municipality (RM), and Barekot RM of Jajarkot District which comprises community forests and government managed forests. The study area extends between 82°0.302'E to 82°34.804'E longitude and 29°7.646'N to 28°42.864'N latitude (Figure 1), comprising wildlife habitat dominated by Himalayan birch *(Betula utilis*) and rhododendron (*Rhododendron arboretum*) with the understory of Himalayan bamboo *(Thamnocalamus spthiflorus*, *Drepanostachyum falcatum*, and *Yushania* sp.) species, with vegetation characterized by temperate, sub-alpine and alpine. Traditional transhumance practice of livestock management is common in the region and people from the nearest villages frequently visit the habitat to fetch fodder and firewood for their household requirements, which affects the weasel habitat in the region (Baral 2014; Baral et al. 2019b). The area remains undisturbed for most of the year, but during the summer and monsoon seasons, some herders move their cattle and sheep to graze along that route.

Table 1. Details of Siberian weasel recorded in Jajarkot

GPS Coordinates	28°55. 990'N, 82°24. 011'E	29°0. 720'N, 82°21. 888'E	28°54. 215'N, 82°04. 907'E
Place	Dhyargaun, Nalgaad Municipality	Karaichuli, Barekot RM	Kuse RM
Elevation	3407 masl	3518 masl	3366 masl
Duration of camera trap	Wednesday, May 1, 2024, 9:29:20AM to Wednesday, October 9, 2024, 2:22:18 PM (161 days)	April 29, 2024, 11:54:29 AM to June 1 2024, 12:40:43 AM (33 Days)	May 16, 2024 12:14:47 PM September 4, 2024, 12:59:54 PM (108 days)
Total number of photographs captured	264	14809	660
Siberian weasel recorded date and time	25 August 2024 7:28 AM	May 07 2024 7:46 AM May 16, 2024 9:11 AM May 17 2024 11:51 AM	June 1 2024, 3:19 AM
Habitat	Temperate deciduous forests dominated by Rhododendron	Temperate deciduous forests with Bamboo understory	Rocky outcrop in Temperate deciduous forests
Other species recorded	Red panda *Ailurus fulgens*, musk deer *Moschus* sp., Himalayan black bear *Ursus thibetanus*, leopard cat *Prionailurus bengalensis*, Assam macaque *Macaca assamensis*, barking deer *Muntiacus vaginalis*, Himalayan goral *Naemorhedus goral*, Himalayan tahr *Hemitragus jemlahicus*, yellow-throated marten *Martes flavigula*, Nepal gray langur *Semnopithecus schistaceus*, rhesus macaque *Macaca mulatta*, Eurasian wild boar *Sus scrofa,* Asiatic golden cat *Catopuma temminckii*, Indian crested porcupine *Hystrix indica*, and Himalayan serow *Capricornis thar*		

The camera-trap survey targeting Red Panda (*Ailurus fulgens*) was carried out during October 2023–October 2024. The study area was delineated by selecting forest regions located above 2500m elevation, and 9.6 km² grids (Fox et al. 1996) were overlayed considering home range of red panda resulting 91 total grids. Each grid was further divided into 6 sub-grids having 1.6 km² area, and 30% of these grids were selected randomly. Finally, available 31 trail camera traps (model UV557) were randomly placed in such sub-grids maintaining at least 1 km spatial difference. Considering the difficult terrain, after a reconnaissance survey for carnivore signs and usage for which observers used to walk slowly in the morning (6 am to 9 am) to detect both direct and indirect signs (scat, pellets or droppings, pug marks), camera traps were deployed at the most suitable locations within each grid. Cameras were tied to a pole/tree at a height of 30–45 cm from the ground. The cameras were programmed to take 3 photos per triggered events with 5 seconds time delay between successive pictures.

3 | Results

Of total 31 camera traps stations, Siberian weasels were photographed in three camera traps stations. It was captured thrice in Barekot RM, once in Nalgaad Municipality and Kuse RM (Table 1). A total of 16 mammalian species belonging to 10 families of four order has been reported in Jajarkot District (Table 1). The species was identified with the morphological characteristics as a bright reddish-ocherous monotoned coloured body with an elongated, narrow, and relatively small head, and a long, stretched-out body with relatively short legs (Menon 2014) suggesting the species to be Siberian weasel (Figure 2).

Figure 2. Camera trap pictures of Siberian weasel from Jajarkot District

4 | Discussion

Siberian weasel, like other weasels, maintain ecosystem stability through consistent population levels, ensuring uninterrupted predation on rodent populations and preventing overgrazing, which supports vegetation diversity (Cove & O'Connell, 2022). Their adaptability allows them to sustain key ecological functions in maintaining ecological stability, ensuring continuous trophic interactions and mitigating disruptions associated with the decline of endangered species (Ripple et al. 2017). In contrast, many threatened species experience fluctuating numbers, associated ecological imbalances, trophic interactions disruption and inability to fulfill similar uninterrupted ecosystem services essential for long-term ecological balance.

Barekot has been designated as an Important Bird Area (IBA) (BCN 2024), attracting significant scientific attention and leading to new wildlife discoveries, including weasels. In contrast, despite sharing similar landscapes, Kuse and Nalgaad remain understudied with limited research efforts. Although previous research and biodiversity surveys (Baral 2014; Basnyat et al. 2019) suggested the potential presence of the Siberian weasel in Jajarkot, definitive evidence was lacking. The recent camera traps record of the Siberian weasel from multiple localities in Nalgaad Municipality, Kuse RM, and Barekot RM outside protected areas, provide the first verifiable documentation of the species in the region. This finding along with the previously recorded yellow-bellied weasel (B. Baral et al. 2019) enhances our understanding of mustelids diversity and distribution in this region.

These records of Siberian weasel in rocky outcrops and on the ground within temperate deciduous forests dominated by *Rhododendron spp.* are ecologically comparable to the previously discussed across diverse forest types, alongside human-modified landscapes such as cattle trails and trekking routes and high-altitude alpine pastures (Basnet et al. 2022; Chetri et al. 2024). The habitat types share similar key structural components: bamboo understory and dominant tree species; however, may have varied vegetation composition, canopy composition, and degree of human disturbance demonstrating its ecological plasticity to persist in diverse habitat types.

Forest encroachment by locals for the construction of shelters and raising cows; including poultry which has led to retaliatory persecution of different mustelids due to reported poultry losses. However, discussions about the Siberian weasel revealed that residents were unaware of its presence and had not engaged in its persecution. This lack of recognition underscores the need for increased awareness and education efforts to inform communities about the species and its ecological importance of this species.

Considering available information on Siberian weasel, Ghimirey & Acharya (2012) expostulated it to be 'Least Concern' and earnestly urged to assess it 'Data Deficient' at National level. This report remains a crucial reference for reassessing the species, as it provides essential data on its presence and distribution.

5 | Conclusions

This new locality records of Siberian weasel within its presumed ranges through locality record in Jajarkot remains crucial in strengthening conservation efforts by reducing uncertainties in distribution data, enhancing predictive models and improving conservation planning in dynamic ecosystems. Implementing intensive surveys, rapid assessments, and systematic use of bycatch data, along with focused camera trapping studies and community engagement, is essential for refining biodiversity knowledge, enhancing conservation strategies, and ensuring the long-term protection of the Siberian weasel and other threatened species within their ecosystems.

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Authors' contributions

B.B.- conceptualization, data collection and manuscript preparation; D.R.B. and J.R.-data collection and manuscript preparation; G.B.S., R.K., and D.D.- data collection.

Conflicts of interest

The authors declare no conflict of interest.

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