SHORT NOTE

ONCE DISTRIBUTED THROUGHOUT THE KASHMIR VALLEY, NOW ON VERGE OF EXTINCTION: A SIGHTING OF THE EURASIAN OTTER (*Lutra lutra*) IN THE GUREZ VALLEY, JAMMU AND KASHMIR

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(Received 20th January 2023, accepted 6th May 2024)

Abstract: This reveals the first photographic evidence establishing the presence of the Eurasian Otter in the Kishanganga River in the Gurez Valley of Jammu and Kashmir. This groundbreaking finding resolves uncertainties about the current status and occurrence of the species in the region. The Gurez Valley, tracing the course of the Kishanganga River and forming the upper reaches of the Neelum River in Pakistan, stands as an ecologically significant region inhabited by a diversity of rare, endangered, and unique flora and fauna. Unfortunately, this region has remained scientifically unexplored due to constraints imposed by military operations linked to border disputes and geopolitical tensions. During our camera trapping efforts aimed at studying Kashmir Musk Deer, two Eurasian otters were captured in camera traps. This revelation highlights the precarious state of small populations of mammals in the region, emphasizing the imperative for focused attention from the scientific community and relevant authorities to safeguard the delicate ecosystems of the Gurez Valley.

Citation: Javid, M., Ahmad, K., and Ilyas, O. (2024). Once Distributed throughout the Kashmir Valley, now on the Verge of Extinction: A Sighting of the Eurasian Otter (*Lutra lutra*) in the Gurez Valley, Jammu and Kashmir. *IUCN Otter Spec. Group Bull.* 41 (4): 189 - 196

Keywords: Camera trap, flagship species, holts and dens, semi-aquatic mammal, shore vegetation.

INTRODUCTION

Otters are semi-aquatic carnivore mammal belonging to the family Mustelidae, having seven genera and 13 species; they are found in every continent except Australia and Antarctica. Eurasian Otter (*Lutra lutra*), belonging to the subfamily *Lutrinae*, is an elusive, solitary animal with the most extensive range in Europe, Asia, and Africa (Corbet, 1966). Bhattacharya et al. (2019) identified seven subspecies of the Eurasian Otter, including *L.l. nair* found in southern India, Sri Lanka, Nepal, Bhutan, and Myanmar; *L.l. kutab* in northern India (specifically Kashmir); *L.l. aurobrunneus* inhabiting the Garhwal Himalaya and higher altitudes in Nepal; *L.l. monticolus* in Himachal Pradesh, Sikkim, and Assam; L.l. barang in southeastern Asia (Thailand, Indonesia, and Malaysia); *L.l. chinensis* residing in southern China and Taiwan; and *L. l. lutra* in Europe and northern Africa. In India, it can be found in the northern regions (Ladakh, Jammu and Kashmir, Himachal Pradesh, Uttarakhand), the northeastern part (mainly in the Himalayan foothills), Central India (Madhya Pradesh), the eastern region (Odisha), and the southern parts, covering portions of Kerala, Tamil Nadu, Karnataka, and Andhra Pradesh (Hussain, 1993; Prater, 1998). Additionally, the species has been

observed in the northern mountains of Pakistan, the Punatshanghchu basin in Bhutan (Yoxon and Yoxon, 2019), and Nepal (Basnet et al., 2019; Shrestha et al., 2021).

In Jammu and Kashmir the Eurasian Otter is regarded as an indicator of high-quality aquatic habitats (Cianfrani et al., 2011) and obtains food from fresh water ecosystems (Krawczyk et al., 2016). The species is listed as Near Threatened on the IUCN Red List (Loyet al, 2022), and Appendix I of CITES (CITES, 2023). In Himalaya, otters are found in cold streams and rivers, much like their counterparts in Europe. They can reach elevations of 3,660 meters in the Himalayas during the summer. These otters primarily occupy the land-water interface and prefer fast-flowing upper river sections where carp and other fish spawn.

OBSERVATION

During our study on musk deer in Gurez Valley, Jammu and Kashmir (Fig. 1), we deployed camera traps throughout the diverse ecosystem. The valley's unique topography, which includes riverine habitats, is particularly interesting for our research. Out of our network of 60 camera traps, 6 were positioned in these riverine areas, recognizing their critical role as wildlife corridors and watering points. This comprehensive approach allows us to document musk deer presence and gain valuable insights into other species in the valley. In an opportunistic sighting, one of the camera traps captured evidence of a Eurasian otter in the riverine habitat (Fig. 2). The otter sighting was recorded at 34.49° N and 74.27° E, at an altitude of 2600 meters. On August 6th, 2023, two Eurasian otters (*Lutra lutra*) were captured by camera traps in the Gurez Valley. These otters, displaying nocturnal behaviour, were observed at midnight, around 2:00 AM (Fig.2). The presence of otters in the area may be linked to the Kishanganga dam, which serves the 330 MW Kishanganga Hydro Electric Project located in the Bandipora District of Jammu and Kashmir. It is plausible that the dam has regulated water flow, creating more favourable conditions for otter habitat.

This camera trap was placed very close to the international border, around 200 meters from the Indian administrative army post known as "New post". The area is kept free of human presence, with only paramilitary activities permitted. After this sighting, we focused more efforts on the Indian territory. Unfortunately, due to heavy disturbance from fishing and other local and paramilitary activities, no further presence was documented. This sighting is from Gurez Valley, located at India-Pakistan border, where the Kishanganga River flows downstream through the Gurez Valley; originating from glaciers, it nourishes the valley's lush landscapes, supporting diverse flora and fauna. Kishanganga forms the upper part of the Nelum river passing through Pakistan. Gurez valley is a typical mountain area dominated by conifer and broadleaved Betula forests. Located in Jammu and Kashmir, India, in the west Himalayan region, it stands as a fascinating tapestry of geology, culture, and ecology. The valley extends from 34°40'48.81"N and 74°36'5.82"E to 33°22'43.30"N and 75°24'23.34"E and is bordered to the west and north by Pakistan-governed Kashmir and to the east by the union territory of Ladakh. The region's altitude ranges from 2600 meters in Kanazawa Gurez to above 4500 meters in Kawbul Gali Tulail. Snow in the valley gradually melts in the spring as daytime temperatures rise from 8 °C to 15°C; however, the nights are still freezing, and the temperature drops below freezing sometimes -10 °C. The valley has warm weather in summer, with daytime temperatures often ranging from 15 °C to 25 °C and more bearable night temperatures of 5 °C to 12 °C. This time of year sees increased precipitation, with thunderstorms and sporadic rain feeding the valley's flora.

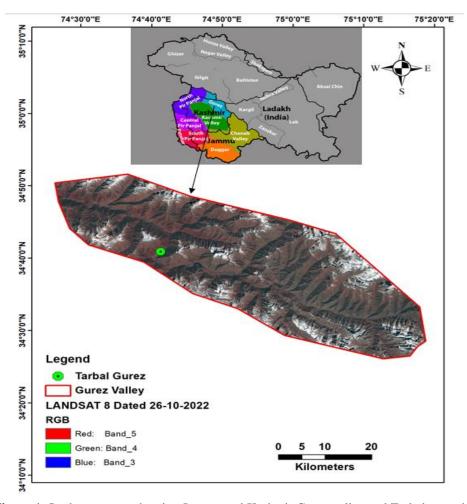


Figure 1. Study area map showing Jammu and Kashmir Gurez valley and Tarbal otter sighting point.



Figure 2. Eurasian otter camera trap record from Kishanganga river Gurez Valley.

DISCUSSION

The Eurasian otter is found in various regions across India, primarily in freshwater habitats such as rivers, lakes, and marshes. Its distribution in India is somewhat patchy and fragmented due to habitat loss, pollution, and human disturbances. Historically, the Eurasian otter was widely distributed across northern India, including the Himalayan foothills, the Gangetic plains, and parts of northeastern India. However, in recent decades, its range has become more restricted. Currently, the Eurasian otter is known to inhabit certain regions in northern India, including parts of Himachal Pradesh, Uttarakhand, Jammu, Ladakh, and the Terai region of Uttar Pradesh. In the northeast, it is found in some areas of Assam and Arunachal Pradesh. Additionally, there have been sightings reported in the Western Ghats of Karnataka and Kerala, indicating its presence in the southern part of the country.

Jammu, Kashmir and Ladakh are ecologically three distinct landscapes. Jammu, situated at lower altitudes, has a subtropical climate and harbours a rich biodiversity of flora and fauna. Ladakh, characterized by its high-altitude cold desert, features barren mountains, deep valleys, and sparse vegetation adapted to extreme cold and low precipitation. Despite its harsh conditions, Ladakh supports unique species like the snow leopard, Tibetan wild ass, and Himalayan marmot, showcasing remarkable adaptations to the environment. Kashmir is renowned for its lush greenery, serene lakes, and snow-capped peaks. Its temperate climate and fertile plains support a diverse array of flora and fauna, including endemic bird species and the endangered Hangul deer. Eurasian otter have been reported from both the Jammu and Ladakh valleys. In Jammu, in the Chinab valley, the Neru stream harbours Eurasian otters. Three individuals were photographed during a limited camera trap survey conducted in the Neru stream, a left bank tributary of river Chenab, during mid-October 2020 (Singh et al., 2023). The first systematic survey for otters (Lutra lutra) in Ladakh revealed their presence in the Indian Trans-Himalayas (Jamwal, et al, 2016). This underscores the significance of assessing otter populations in high-altitude regions, contributing to our understanding of their distribution and conservation needs.

The Gurez Valley forms part of the international border between India and Pakistan. The severe climate, alternating between harsh winters and warm summers, along with significant snowfall, dictates the rhythm of life. This climate profoundly shapes the valley's ecosystems, influencing the distribution of its abundant biodiversity. Amidst this natural magnificence, the people of the Gurez Valley weave a culturally diversified tapestry, preserving a wide range of customs and traditions. While the livelihood of the local community traditionally relies on daily labour, there is a noticeable shift towards tourism. Despite the valley's low human population density and minimal pressure on natural ecosystems, unmanaged tourism poses a significant threat to its future. Furthermore, the administration of the Gurez Valley by the Indian army, due to its proximity to the international border, has resulted in restrictions on access for local people. However, this administrative arrangement also fosters a positive attitude towards biodiversity conservation in some areas, one of which is the Tarbal area where the otter was sighted.

The riverine habitat, particularly Kishanganga, exhibits notable biodiversity. The area of Tarbal where the otter was sighted is a narrow valley of not more than 300 meters width. This area encompasses three different habitats - mainly open scrub, riverine and forest. Forest is mainly alpine, dominated by *Pinus wallichina*, Fir and Spruce, with mixed deciduous trees of Himalayan Mayapple. There is a diverse fauna of birds as the Kishanganga river is used by migratory waterfowl during winter as layover site, e.g. common Mergenser, Mallard, shoveler, and other shore birds.

Mammals include an overlap of black bear and brown bear distribution, common leopard, jungle cat, musk deer, Himalayan Iibex, fox , jackal and wolf. Land use within a 3 km² grid primarily consists of $1.43~\rm km²$ of forest, a $0.24~\rm km²$ stretch of riverine habitat, and $0.33~\rm km²$ occupied by human settlements, with an additional $1~\rm km²$ covered by scrubland.

The present study serves as the first photographic record of Eurasian otter from the Kishanganga river part of the Kashmir valley; earlier it was known that otters were distributed throughout the Kashmir valley, but due to multiple reasons they became rarely seen in the valley, and this needs further investigation on a landscape level. In recent years, new species of birds have been reported in the Kashmir Valley, possibly as a result of climate or ecological changes that have created habitats for these species. Among these recent sightings are the steep gull and white-breasted waterhen (Ahmad et al., 2022a, Ahmad et al., 2022b).

The otter habitat in the region is not extensively utilized by the local populace but experiences notable pressure from paramilitary activities and their accompanying dogs. Other wildlife species documented by the same camera trap include the Kashmir grey langur (Semnopithecus ajax), Himalayan black bear (Ursus thibetanus laniger), and red fox (Vulpes vulpes). Tourism in the area is in its nascent stages and necessitates immediate conservation efforts; otherwise, these species may not endure for an extended period. Otters, in particular, are highly sensitive to fluctuations in water quality and disruptions in their habitat, underscoring the ongoing necessity for conservation endeavors to safeguard the valley's unique biodiversity. Moreover, the presence of otters in the valley highlights the importance of maintaining healthy river ecosystems, as otters' sensitivity to environmental changes makes them vulnerable to disturbances such as pollution, habitat degradation, and fluctuations in water quality (Bouros, 2007). Understanding the interdependence between otters and other elements of the ecosystem is crucial for holistic conservation efforts. Otters not only regulate prey populations but also contribute to nutrient cycling and ecosystem resilience. Thus, conserving otter habitats and ensuring the health of freshwater ecosystems is imperative for preserving the biodiversity and ecological integrity of the Gurez Valley.

CONCLUSIONS

The Eurasian otter was once widespread throughout the Kashmir Valley. However, over time, sightings of the species have declined, with no reported sightings in the last 10 years. The Lidder Valley and Jehlum Valley, including Wular Lake, were the primary distribution areas for this species in the region. Kishanganga river also supports the favourable habitat for the species but unfortunately, they are not present along the length of the river and this needs further investigation. Otters are shy and being indicator species, they are highly affected by change in ecosystem (Bouros, 2007). Unregulated tourism in the Gurez Valley may disrupt otter habitats through uncontrolled pollution, garbage accumulation, increased carbon emissions, and habitat degradation, leading to potential population declines. Additionally, inadequate waste management near otter habitats can lead to contamination, affecting prey species and water quality, indirectly impacting otters by disrupting their food chain and exposing them to toxins (Leoncini et al, 2023). Changes in water chemistry, particularly fluctuations in pH levels, have the potential to harm otter habitats and prey species, resulting in health issues for otters and disturbances in aquatic life (Pedroso and Santos-Reis, 2006). Addressing these multifaceted challenges is crucial for the conservation and well-being of Eurasian otters. Kishanganga river is the last hope for revival of otter in Kashmir region.

Acknowledgements - Thanks to the Prime Minister's Research Fellowship for funding the study in the western Himalayan landscape. Gratitude to wildlife authorities, for granting permission specially Mr. Rashid Naqash, and Mr. Mohammad Maqbool Baba. Special thanks to the Snow Leopard Brigade team, especially 13 Kumaon 36, 51 RR, and 6/5 GR, for field permission in Gurez. We appreciate Mr. Intisar Suhail and Prof. Affifullah Khan for species identification comments in developing methodology. Thanks to Dr. Sharad Kumar and Dr. Asad Rahmani for reviewing the article.

Author contributions: Field survey camera trapping conducted by Mohsin Javid, who also wrote the first draft of the article. Khursheed Ahmad and Orus Ilyas contributed to the revision and finalization of the manuscript. All authors reviewed and approved the final text for submission.

Conflict of interest: The authors declare that they have no conflicts of interest regarding this article. Compliance with ethical standards: The authors declare no competing financial or non-financial interests that could influence the objectivity or outcomes of this research. Proper permissions were acquired from the concerned authorities for camera trapping.

Research funding: This study was funded by Prime Ministers Research fellowship for Ph.D. study on Kashmir musk deer in Western Himalayas.

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RÉSUMÉ: OBSERVATION DE LA LOUTRE EURASIENNE (*Lutra lutra*) DANS LA VALLÉE DE GUREZ, AU JAMMU ET AU CACHEMIRE. AUTREFOIS RÉPANDUE DANS TOUTE LA VALLÉE DU CACHEMIRE, L'ESPÈCE EST EN VOIE DE DISPARATION

Une première preuve photographique révèle la présence de la loutre eurasienne le long de la rivière Kishanganga située dans la vallée de Gurez au Jammu et au Cachemire. Cette découverte incroyable dissipe les incertitudes concernant le statut actuel et la présence de l'espèce dans la région. La vallée de Gurez, qui suit le cours de la rivière Kishanganga et forme le cours supérieur de la rivière Neelum au Pakistan, est une région écologique capitale, car d'une diversité floristique et faunistique rare, menacée et unique. Malheureusement, cette région est restée scientifiquement inexplorée en raison des contraintes imposées par les opérations militaires liées aux conflits frontaliers et aux tensions géopolitiques. Au cours de nos efforts de piégeage photographique visant à étudier le cerf porte-musc du Cachemire (Moschus cupreus), deux loutres eurasiennes ont été photographiées par nos pièges photos. Cette découverte met en évidence l'état précaire des populations de petits mammifères dans la région, soulignant la nécessité impérieuse d'une attention particulière de la communauté

scientifique et des autorités compétentes afin de sauvegarder les écosystèmes fragiles de la vallée de Gurez.

RESUMEN: SE DISTRIBUÍA POR TODO EL VALLE DE KASHMIR, HOY ESTÁ AL BORDE DE LA EXTINCIÓN; AVISTAJE DE NUTRIA EURASIÁTICA (LUTRA LUTRA) EN EL VALLE GUREZ, JAMMU Y KASHMIR

Este trabajo revela la primer evidencia fotográfica que establece la presencia de la Nutria Eurasiática en el Río Kishanganga, en el Valle Gurez de Jammu y Kashmir. Este hallazgo novedoso resuelve incertidumbres acerca del status actual y la ocurrencia de la especie en la región. El Valle Gurez, que sigue el curso del Río Kishanganga y que forma las nacientes del Río Neelum en Pakistán, es una región ecológicamente significativa habitada por una diversidad de flora y fauna rara, amenazada, y única. Desgraciadamente, ésta región ha permanecido científicamente inexplorada debido a las restricciones impuestas por las operaciones militares ligadas a disputas fronterizas y tensiones geopolíticas. Durante nuestros esfuerzos con cámaras-trampa, dirigidos a estudiar el Ciervo Almizclero de Kashmir, fueron capturadas dos nutrias Eurasiáticas en cámaras-trampa. Este revelación destaca el estado precario de las pequeñas poblaciones de mamíferos en la región, enfatizando el imperativo de focalizar la atención de la comunidad científica y las autoridades relevantes, para salvaguardar los delicados eocsistemas del Valle Gurez.