



First Photographic Record of Himalayan Brown bear from Kanawar Wildlife Sanctuary, Himachal Pradesh, India

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Abstract: The Himalayan brown bear (HBB) population is restricted to a few geographical areas of India, Pakistan, and Nepal. In India, the HBB was distributed in the fragmented pockets of Jammu-Kashmir, and Ladakh UT, followed by Himachal Pradesh and Uttarakhand. HBB is a high conservation priority species in India and is listed as Schedule I of the Indian Wildlife Protection Act (1972). However, in the recent past, the extant population of HBB has been under tremendous threats such as accelerated habitat fragmentation, human encroachment, and climate change. The present study was conducted in the Kanawar wildlife sanctuary (KWS), situated in the Kullu district of Himachal Pradesh, using camera trapping and trail sampling. The study reports the first photographic evidence of HBB from the Kanawar wildlife sanctuary (KWS). Further, we recommend a long-term assessment and population estimation of HBB in and around KWS to conserve the species.

Keywords: Camera trap, Conservation, Opportunistic records, Schedule I, Brown bear

The brown bear (*Ursus arctos*) is polytypic species with a wide range of distribution in most of Europe, North America to northern and Central Asia (McLellan et al 2017). The Himalayan brown bear subspecies of brown bear occupies a high elevation zone of the Himalayan region (Aryal et al 2012). The species distribution is confined to Northern areas in Pakistan and the north and North Western Himalayan regions of India (Sathyakumar 2006, Abbas et al 2015). In Indian Himalayan Region (IHR), the species is distributed in high altitude scrub, sub-alpine, and alpine meadows and are in very low densities in the elevation range of 2500m to 5000m (Su et al 2018, Sharief et al 2020). Brown bear is the least concerned, according to IUCN. However, the population of Himalayan brown bear (HBB) (*Ursus arctos isabellinus*) is considered endangered on the IUCN Red List under criteria D (McLellan et al 2017). It is also listed as Appendix I of CITES (GOI, 1992) and on Schedule I of the Indian Wildlife Protection Act (1972) as amended in 2003 (Mohanta et al 2014). The population of HBB is vulnerable due to three major prevailing threats in its entire distribution range, viz climate change, habitat encroachment/ degradation, and conflict with humans (Su et al 2018, Sharief et al 2020, Mukherjee et al 2021). Even though the species population is declining, HBB is the least studied carnivore species in IHR (Rathore 2008, Sharief et al 2020). Several methods exist, such as sign survey (direct and indirect sign), camera trapping, and non-invasive genetic method to study carnivore species in the IHR (Joshi et al 2020). The species

demands urgent attention and conservation for its long-term survivability. The present study was conducted to assess the biodiversity of the sanctuary.

MATERIAL AND METHODS

Study area: Kanawar Wildlife sanctuary is situated in Kullu district (Himachal Pradesh) is extended from North latitude N 32° 00' 21" to longitude E 77° 18' 11", East latitude N 31° 54' 40" and longitude E 77° 27' 03", South latitude N 31° 53' 25" and longitude E 77° 24' 41", West latitude N 31° 57' 25" and longitude E 77° 15' 04" elevation ranging between 1800m to 4817m with a total area of 107.29 sq. km (Fig. 1). Kanawar wildlife sanctuary has diverse habitats and species. The area's climate is typically temperate, sub-alpine, and alpine types. The primary habitat is temperate and sub-alpine forests dominated by broad-leaved deciduous, western mixed conifers forest, and alpine meadows mainly dominated by alpine shrubs and herbaceous species (Devi K et al 2019). The rainfall varies from 733 to 1733 mm with an average rainfall of 1090 mm, and the temperature of the district ranges from as low as -2°C to -5°C in January to 25°C to 37°C in June (Suman Jangra and Mohan Singh 2011, Thakur et al 2019).

Camera trapping and sign survey: As a part of Project "Pilot project on Biodiversity corridor" in selected protected areas of Himachal Pradesh, deployed seven camera traps (Spypoint-11Force-D) in Kanawar wildlife sanctuary (Fig. 2), and traversed eight trails of 1-2 km in length in between April

to July 2021. Camera traps are placed 15–30 cm above the ground and 3–5 m away from the trail or expected areas of animal movement for 15 days (Joshi et al 2020). Necessary information such as type of forest, disturbance, distance from water and human settlement, geo-coordinates, and elevation was recorded for every camera trap location and digging signs.

RESULTS AND DISCUSSION

The total sampling effort of 105 camera trap nights (7 camera traps) and eight trails of 19 km walked in Kanawar wildlife sanctuary. Unfortunately, HBB was captured only in one camera trap location (N 31.949425, E 77.355522) (Fig. 1). Also, the digging signs were recorded during the trail walk, apart from the camera trap. HBB capture was in the sub-alpine forest with dominated trees *Picea smithiana* and *Quercus semecarpifolia*; the other tree species in the area

are *Aesculus indica*, *Prunus sp.*, *Rhododendron campanulatum*.

The present study reports the first confirmed presence record of HBB from the Kanawar wildlife sanctuary. The literature revealed that HBB is reported in 10 protected areas of Himachal Pradesh (Sathyakumar 2001, Rathore 2008). The distribution of HBB occurs in a narrow elevation range between 2500-5000 m. Due to its prevailing threats, the population of the species is declining, which demands urgent conservation. The study suggests that suitable habitats of HBB will decrease by more than 70% from its entire distribution range by 2050 (Mukherjee et al 2021). The study has also highlighted that most of the suitable habitats within the Kanawar Wildlife sanctuary may get lost due to climate change impact (Mukherjee et al 2021). Furthermore, the retaliatory killing of HBB by humans due to bear-human conflict is another threat to the declining population of HBB. Studies revealed that species are sensitive to anthropogenic disturbances (Sharief et al 2020). The present study confirms the presence of HBB from Kanawar Wildlife Sanctuary, which is a new record from that area. Knowing the increasing threats of HBB in IHR, strongly suggest monitoring of HBB population in Kanawar Wildlife Sanctuary for conservation and management implications.

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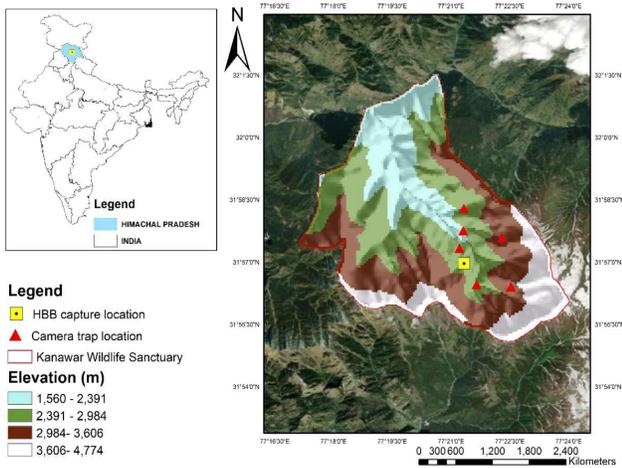


Fig. 1. Map of study area showing capture location of Himalayan brown bear and camera traps sites

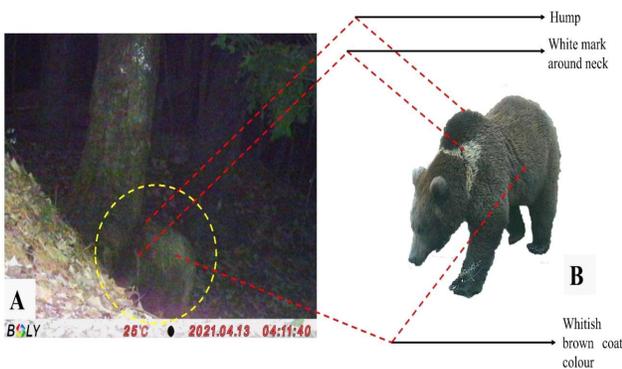


Fig. 2. Camera trap record of HBB from Kanawar Wildlife sanctuary (A) Yellow circle shows the original image (B) Image shows the prominent identification character of HBB

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