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Ecological Observations and Updated Locality Record of Ratel (*Mellivora capensis*) in Khirsara Reserve Forest, Gujarat, India

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SUMMARY

This study investigates the presence of *Mellivora capensis* (honey badger) in the Khirasara Reserve Forest, Rajkot District, Gujarat, through ecological surveys and the use of camera traps. Indirect evidence, such as pugmarks, led to the discovery of an active den, and six camera traps were deployed across the area. The honey badger was recorded on two of these cameras, marking the first confirmed sighting of the species in Rajkot District. The study also reviews prior records of the honey badger in Gujarat, particularly in the Saurashtra, Kachchh, and Gir regions, as well as its presence in the Balaram-Ambaji Wildlife Sanctuary in Banaskantha District. While the species is distributed across various regions of India, its presence remains rare and sporadic. Habitat fragmentation and human-induced threats, including trapping, poisoning, and road accidents, pose significant risks to its population. The honey badger, though an opportunistic carnivore inhabiting diverse ecosystems, faces challenges from larger carnivores, and its low population density is further exacerbated by small litter sizes and long birth intervals. Previous studies have highlighted the impact of habitat destruction and mortality from human-wildlife conflict, particularly in regions such as Odisha and Gujarat. This research contributes to the understanding of the species' distribution in Gujarat and emphasizes the need for conservation efforts to mitigate the threats facing *Mellivora capensis*.

Keywords: Conservation, Small Carnivore, Species Distribution Range, Camera Trapping, Honey Badger, Endangered Species, Biodiversity

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INTRODUCTION

Mammalian carnivores are among the most threatened groups in terms of biodiversity, experiencing significant population declines and range contractions (Di Minin et al., 2016). The Honey Badger (*Mellivora capensis*) (Mustelidae) (Schreber, 1776), also known as the ratel, is one of the largest mustelids, weighing between 6–14 kg, and is found across Africa, the Arabian Peninsula, West Asia, and the Indian subcontinent. Despite its broad distribution, it is classified as Least Concern on the IUCN Red List (Do Linh San et al., 2022). In India, however, the species is relatively

uncommon and is listed as Scheduled-I under the Wildlife (Protection) Act, 1972, granting it the highest level of protection. Known for being solitary foragers with a carnivorous diet (Begg, 2001), Honey Badgers are elusive due to their fossorial behavior and nocturnal activity (Gubbi et al., 2014), making population studies challenging. As a result, only one population density study has been conducted in India (Gupta et al., 2012). In India, much of the known distribution of the Ratel Mellivora capensis falls outside protected areas, where it shares space with humans (Jhala et al., 2021).

The honey badger belongs to the phylum Chordata, class Mammalia, order Carnivora, and family Mustelidae (Schreber, 1776). Initially described as *Viverra capensis*, its taxonomy has evolved over time. Baryshnikov (2000) recognized ten subspecies based on morphometrics and pelage variation, while Wozencraft (2005) identified 12. Sexual dimorphism complicates classification, with males being one-third larger than females (Begg, 2001). Further genetic research is needed to clarify subspecies validity.

The Honey Badger has an extensive range across sub-Saharan Africa, from South Africa to Morocco and Algeria, as well as parts of Arabia, Iran, and western to central Asia, including Turkmenistan, Uzbekistan, and India (Sapozhenkov et al., 1973; Amr et al., 2000; Werner, 2012). It is notably absent from Egypt (Basuony et al., 2010) and Syria (Masseti, 2009), though it may occur in the latter. In India, its distribution is patchy in the southern states (Gubbi et al., 2014) and minimal in the northeast (Choudhury, 2013).

MATERIALS AND METHODS

METHODOLOGY

A randomized field survey was conducted, primarily relying on pugmark identification and other indirect signs such as burrows and tracks. Sign surveys guided the placement of two camera traps, positioned approximately 10 meters apart to maximize detection probability. The GPS coordinates of each recorded sighting were documented for spatial reference.

Survey Schedule and Data Collection

Field surveys were carried out biweekly (every 15 days) during nocturnal and evening hours, aligning with the species' peak activity period. Habitat characteristics, including vegetation composition, terrain, and environmental conditions, were systematically recorded.

Community Engagement and Data Verification

Local community members contributed secondary data through informal discussions and knowledge-sharing. Camera trap images were analyzed, and species identification was verified through expert consultation and comparative reference materials.

STUDY AREA

Khirasara is a protected forest-grassland ecosystem in Rajkot, Gujarat, India, featuring hilly terrain, diverse grasses, and two seasonal water bodies (Figure 1). Located 15 km away from the city and approx. 4 km from the nearest village, it supports various bird species and mammals like jungle cats, civets, foxes, jackals, hyenas, blue bulls, porcupines, mongooses, shrews, wild hares, and field mice. Reptiles include the venomous "big four"—cobra, krait, Russell's viper, and saw-scaled viper—along with non-venomous snakes and geckos. Local communities majorly depend on livestock, and government-led grass cutting occurs in winter. Nearby rubber and tile factories, increased traffic, artificial lighting, and mining activities pose significant environmental threats, disrupting nocturnal species and degrading habitats, necessitating conservation efforts in this area.

Climate

This area is dominated by temperate grassland with three distinct seasons throughout in a year, winters are cold and in summer temperature increases from 30 to 45° c, and monsoon brings a mid. Rainfall each year.

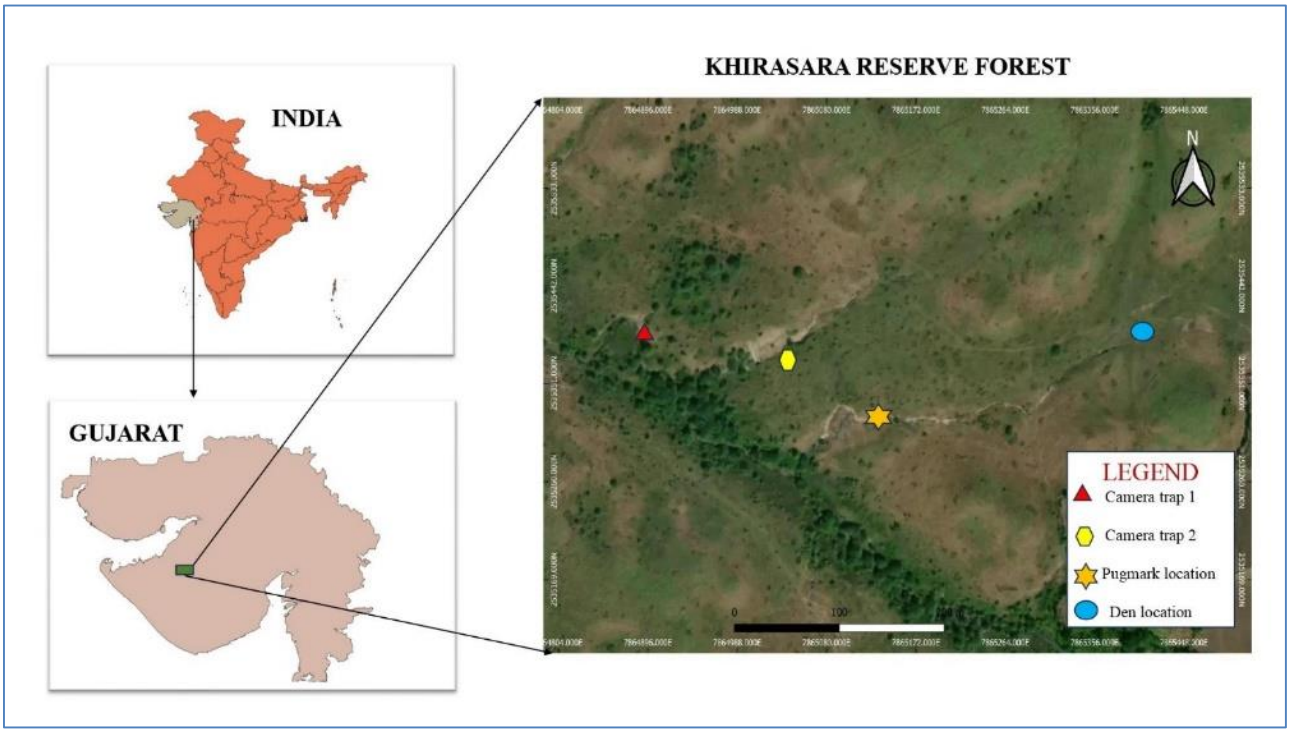

Figure 1: Geographic location of Camera Trap and observational records from Khirasara Reserve Forest, Rajkot, Gujarat, India.

RESULTS AND DISCUSSION

POPULATION

During ecological and field surveys conducted at Khirasara reserve forest by team in Rajkot district, Gujarat (22.1987366° N, 70.6561205° E) (Figure 1), we found some

indirect evidence in the form of pugmarks of a species. Following the discovery of pugmarks, an active den was located) (Figures 2 and 3). Subsequently, six Camera Traps were deployed to detect presence of the species across the area and *Mellivora capensis* was recorded among two of these camera traps, marking the first documented evidence of the species in the Rajkot district, Gujarat. Previous reports of the species in the Saurashtra and Kachchh regions of Gujarat (Jadeja et al., 2018; Ganguly and Srivastha, 2024) as well as the Gir region (Pati et al., 2001). The species has also been reported from Balaram-Ambaji Wildlife Sanctuary, Banaskantha District in Gujarat (Rabari et al., 2023). One instance of Ratel attack on an individual have been documented in the Junagadh district of Gujarat (Times of India, 2014). Habitat fragmentation has been a significant source of mortality for India's wildlife and previous report of road accident has been reported in Ratel from Odisha (Samal and Mohalik, 2024).

Honey Badgers are considered rare or to exist at low densities across most of their range (Begg et al., 2013). Population densities of the species have been estimated using night counts, with approximately 0.1 individuals per square kilometer recorded in Serengeti National Park, Tanzania, and around 0.03 adults per square kilometer in South Africa's Kgalagadi Transfrontier Park (Waser, 1980; Begg, 2001).

HABITAT AND ECOLOGY

The Honey Badger inhabits a wide range of environments, from equatorial rainforests (Bahaa-el-din et al., 2013) to the miombo and mopane woodlands of Eastern Africa (Bird and Mateke, 2013; Fischer et al., 2013), and arid deserts near the Sahara and Namib, as well as the sand and clay deserts of Central Asia (Heptner et al., 1967; Do Linh San et al., 2022). As opportunistic carnivores, they feed on a variety of prey, from insect larvae to young ungulates, and may scavenge from larger predators (Begg et al., 2003a; 2013). They face predation from large carnivores, such as lions and leopards, as well as jackals. Honey Badgers are solitary, with a promiscuous mating system and large home ranges, sometimes up to 500 km² for males. Their low population density is linked to small litter size and long birth intervals (Begg et al., 2005a, b).

THREATS

Honey badgers face direct persecution from apiculturists and small livestock farmers who use traps and poisons. They are also indirectly killed by non-selective control programs aimed at species like jackals and caracals (Begg et al., 2013). Evidence suggests local extinctions due to poisoning. A group of villagers in Kutch, India manhandled an endangered honey badger, protected under Schedule 1 of the Wildlife Protection Act, recording the abuse on their cellphones before circulating the video, which has since gone viral. The animal appears to have wandered into Batiyari village, located adjacent to a forest (Ahmedabad-Mirror, 2025). The species was spotted in the revenue area near Kangsa, Dalkhaniya Range of Gir (East) Dhari Division in Amreli district. The forest department was notified, and upon capturing the animal, it was found to have sustained minor injuries to its legs and back from a fight with two male lions. The animal was then transferred to Jasadhar Wildlife Hospital for treatment (TV9 Gujarati, 2025). In North Africa, where apiculture is

minimal, they are still persecuted through trapping and poisoning (K. de Smet and F. Cuzin pers. comm. 2007).

Figure 2: A) Pug marks of *Mellivora capensis* B) Active Den C and D) Camera Trap record of Ratel *Mellivora capensis* from Khirasara Reserve Forest (22.1987366° N, 70.6561205° E), Rajkot, Gujarat, India.

CONCLUSION

The Honey Badger (*Mellivora capensis*) remains an elusive and understudied species despite its widespread distribution across Africa, the Middle East, and South Asia. Although globally classified as *Least Concern* by the IUCN, its status in India warrants attention due to habitat fragmentation, human-wildlife conflict, and increasing anthropogenic pressures. The first recorded presence of the species in Rajkot, Gujarat, underscores the need for further ecological studies and conservation measures to better understand its population status and distribution in the region.

Our findings highlight the effectiveness of indirect survey methods, such as pugmark identification and camera trapping, in detecting this secretive species. The study also emphasizes the importance of community engagement in gathering local knowledge and verifying species presence. Given that much of the Honey Badger's habitat in India lies outside protected areas, targeted conservation efforts are essential to mitigate threats such as habitat degradation, road mortality, and persecution by apiculturists and livestock farmers.

Future research should focus on long-term monitoring, genetic studies to resolve subspecies classification, and assessing population densities in different habitat types across India. Conservation strategies should integrate habitat protection, awareness campaigns, and policy reinforcement to ensure the survival of this unique carnivore. Strengthening legal frameworks and enhancing coexistence strategies with local communities will be crucial in safeguarding Honey Badger populations in India.

Figure 3: Camera Trap record of Ratel *Mellivora capensis* from Khirasara Reserve Forest Rajkot, Gujarat, India.

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