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SHORT COMMUNICATION

FIRST CAMERA TRAP RECORD OF RED PANDA

AILURUS FULGENS (CUVIER, 1825) (MAMMALIA: CARNIVORA: AILURIDAE) FROM KHANGCHENDZONGA, SIKKIM, INDIA

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FIRST CAMERA TRAP RECORD OF RED PANDA *AILURUS FULGENS* (CUVIER, 1825) (MAMMALIA: CARNIVORA: AILURIDAE) FROM KHANGCHENDZONGA, SIKKIM, INDIA

Tawqir Bashir¹ , Tapajit Bhattacharya² , Kamal Poudyal³ & Sambandam Sathyakumar⁴

^{1–4} Wildlife Institute of India, Post Box #18, Chandrabani, Dehradun, Uttarakhand 248001, India.

¹ Centre of Research for Development, University of Kashmir, Hazratbal, Jammu & Kashmir 190006, India.

² Department of Conservation Biology, Durgapur Government College, Durgapur, West Bengal 713214, India.

³ Namchi Government College, Kamrang, Namchi, Sikkim 737126, India.

¹tawqir84@gmail.com (corresponding author), ²tapajit@gmail.com, ³chettrikamal@gmail.com, ⁴ssk@wii.gov.in

Abstract: The Red Panda *Ailurus fulgens* (Cuvier, 1825) is recognized as one of the most elusive arboreal carnivores of the eastern Himalaya that is poorly documented. We report the first camera trap record of the Red Panda from the Prek catchment of Khangchendzonga Biosphere Reserve (KBR) in Sikkim, India. A total of three independent image captures were recorded during the sampling. All occurrence records were exclusively from the sub-alpine habitat and restricted to an elevation range of 3,000–3,850 m. This study not only accentuates the significance of sub-alpine habitats for the conservation of the Red Panda but also elucidates the importance of camera traps as an efficient sampling tool. Through this study, we propose the requirement of a long-term study on the species within and outside the protected areas of Sikkim.

Keywords: Conservation, opportunistic records, Prek catchment, sub-alpine habitat.

The Red Panda *Ailurus fulgens* (Cuvier, 1825), also known as the Lesser Panda, is an endangered monotypic member of the family Ailuridae and the only representative of the genus *Ailurus* (Roberts & Gittleman 1984; Glatston 2011). Primarily associated with the eastern Himalaya, its distribution range extends from western Nepal through Bhutan, India, and Myanmar to southern Tibet and the western Yunnan Province

of China (Choudhury 2001; Glatston et al. 2015). In India, its distribution is restricted to small pockets of the eastern Himalaya in the states of Arunachal Pradesh, West Bengal (Darjeeling District), and Sikkim (Choudhury 2001; Ghose & Dutta 2011), with anecdotal records from Meghalaya and Assam (Choudhury 2013). Its habitat is typically characterized by the presence of mixed deciduous and coniferous forests with bamboo-thicket understory (Choudhury 2001; Pradhan et al. 2001; Zhang et al. 2006; Chakraborty et al. 2015; Bista et al. 2017). Being an unusual member of Carnivora, it occupies a highly specialized niche as a bamboo feeder like that of the Giant Panda *Alieuropoda melanoleuca* (Wei et al. 1999; Pradhan et al. 2001). In the eastern Himalaya, it occupies an elevation range of 1,500–4,800 m (Yonzon & Hunter 1991; Choudhury 2001).

The Red Panda mainly feeds on bamboo, with supplements of fruits, roots, succulent grasses, mushrooms, acorns, and lichens, and occasionally on bird eggs, insects, and grubs (Reid et al. 1991; Pradhan et al. 2001; Zhang et al. 2009; Panthi et al. 2012). Fallen logs, tree stumps, and shrubs are important habitat

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elements for Red Pandas that provide substrates suitable for defecation (Pradhan et al. 2001; Zhang et al. 2006). Being a habitat specialist, even a minor change in habitat conditions can cause a significant impact on its occurrence and survival (Dorji et al. 2011; Chakraborty et al. 2015). The species has been under tremendous threat across its distribution range due to habitat loss and fragmentation, habitat degradation, harvesting of timber, bamboo, and minor forest products, livestock grazing, inefficiently managed tourism, and other physical threats such as poaching for pelts (Sharma & Belant 2010; Dorji et al. 2012; Panthi et al. 2017) and killing by stray dogs (Chakraborty et al. 2015). Its global population is decreasing continuously and declined by nearly 50% over the last three decades as a result of which it was listed as Endangered by IUCN (Glatston et al. 2015). In spite of being a charismatic species of the eastern Himalaya, there is limited information on the ecology of the species from most parts of its distribution range, particularly from India, except for a few long-term studies (Pradhan et al. 2001; Chakraborty et al. 2015). Apart from these, information available on the species is merely based on incidental records, secondary information, and local knowledge (Sharma & Belant 2009; Srivastava & Dutta 2010; Dorjee et al. 2014; Khatiwara & Srivastava 2014). Moreover, the elusive, arboreal nature of the species and the difficult terrain it inhabits also pose limitations and challenges for conducting field surveys.

Sikkim holds the second largest extent of Red Panda habitat in India after the state of Arunachal Pradesh (Ghose & Dutta 2011). Despite being recognized as the state animal of Sikkim occurring in all seven protected areas (PAs) of the state (Ghose et al. 2011), very little information is available on the Red Panda from the area. Moreover, Khangchendzonga Biosphere Reserve (KBR) represents the largest PA in Sikkim (including the Khangchendzonga National Park and its buffer zone) having an array of habitat types that inhabit a rich diversity of flora and fauna including 1,580 species of vascular plants (Maity & Maiti 2007), 195 species of butterflies (Chettri 2000, 2010), 42 species of reptiles (Chettri et al. 2010), over 213 species of birds (Chettri et al. 2001, 2005) and more than 42 species of mammals (Sathyakumar et al. 2011). The Red Panda is also being considered critical for maintaining the quality of sub-alpine habitats (Pradhan et al. 2001) and, therefore, a detailed understanding of its ecology seems a prerequisite. Therefore, as a first step towards filling the knowledge gap, an attempt towards generating baseline information on the occurrence and distribution of this

elusive species was made using camera traps.

MATERIAL AND METHODS

Study area

Khangchendzonga Biosphere Reserve covers an area of 2,620 km² (National Park = 1,784 km² and buffer zone = 836 km²) and is categorized into seven watersheds, namely Lhonak, Jemu, Lachen, Rangyong, Rangit, Prek, and Churong. The area encompasses a sharp elevation gradient of 1,220–8,586 m accompanied by a wide range of habitat types (Tambe 2007; Fig. 1a). We selected Prek catchment (182 km²) for our camera trapping surveys because it represents all the habitat types found in KBR (Sathyakumar et al. 2011). Covering an elevation range of 1,220–6,691 m, the major habitats types in Prek catchment include mixed sub-tropical, mixed temperate, sub-alpine, krummholz, alpine pastures, rock and snow cover, and water bodies (Tambe 2007). The relative humidity recorded for the Prek catchment is more than 60% all through the year in temperate, sub-alpine, and alpine habitats and reaches even above 90% in the months of June and July in the sub-alpine habitats (Chettri 2000; Tambe 2007). The annual temperature of the catchment varies from -16.11°C to 33.9°C and from -8.89°C to 15°C in the sub-alpine habitat.

Camera trapping

As part of a multi-disciplinary sampling exercise carried out in KBR to document the faunal assemblage of the area, Prek catchment was initially divided into 2 km x 2 km sampling grids. Camera traps were deployed (at least one in each grid) based on the occurrence of animal signs and the accessibility of the sampling grids. A total of 27 camera trap units (Stealth Cam, Model STC-IS40IR) was deployed at 71 different locations during 2008–2011 across the elevation range of Prek catchment, covering different habitat types (Fig. 1b). Camera units were attached to trees or rocks 15–30 cm above the ground and 3–5 m away from the trail or location of expected animal movement. Camera traps were set for 24h-monitoring covering all seasons. Moreover, geographical coordinates, elevation, and forest type were recorded at each camera trap location. Since the sampling design was extensive in its approach, not focusing on any particular genus (e.g., Red Panda), the camera traps were not placed on treetops to capture arboreal species. This implies that our results on Red Panda are opportunistic records.

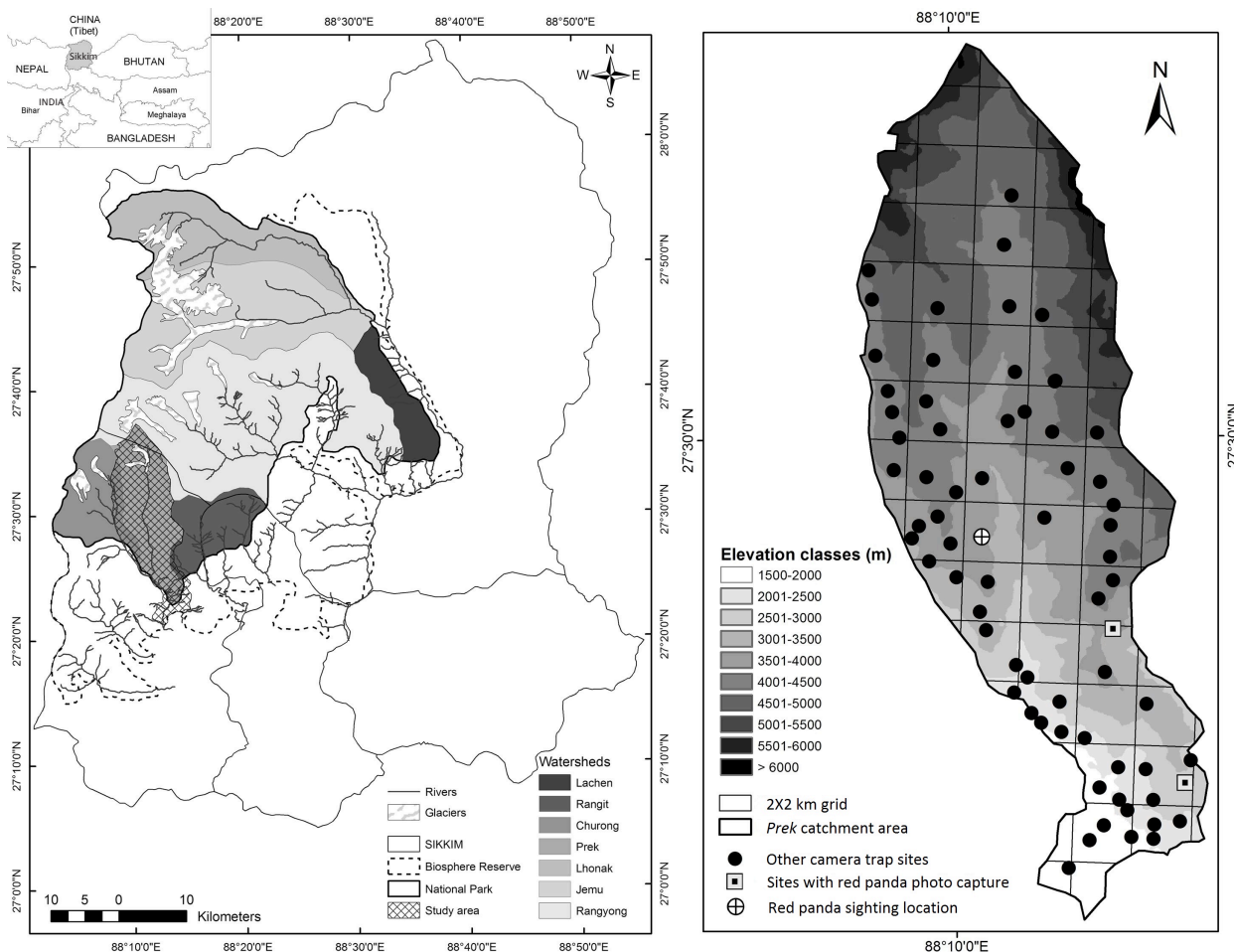


Figure 1. a - Khangchendzonga Biosphere Reserve in Sikkim showing the seven catchments including Prek catchment area; the shaded area in the inset indicates Sikkim in northeastern India | b - Deployment of camera traps in 2km × 2km grids in Prek catchment area indicating Red Panda occurrence records.

RESULTS

A total sampling effort of 6,910 camera trap days included 629 trap days in sub-tropical, 1,426 in temperate, 2,671 in sub-alpine, 702 in krummholz, and 1,482 in alpine habitats. The Red Panda was image captured only at two camera trap locations (namely Kasturi ridge and Phedi; Table 1) with a total of three independent image captures (Image 1). Image captures were recorded during both night and daytime. These camera locations were in sub-alpine fir *Abies densa* and birch *Betula utilis* forests with *Rhododendron* spp. as the understory. A luxuriant growth of bamboo *Arundinaria maling* was also present in the lower elevation areas of Kasturi ridge. Moreover, besides a single sighting (in Kokchurong area), no indirect evidence (droppings/scats or feeding marks) of Red Panda was recorded during the study period. The habitat at Kokchurong was a typical eastern Himalayan fir forest with *Abies densa* as the most dominant species and *Rhododendron hodgsonii*

as the undergrowth. All presence records (sighting and images) were exclusively from the sub-alpine habitat and restricted to an elevation range of 3,000–3,850 m, particularly around the Kasturi area which is free from organized tourism.

DISCUSSION

The present study reports the first camera trap record of the elusive Red Panda from the intricate habitats of KBR. It also plausibly documents the highest elevation record (3,850m) of the species from the state of Sikkim. Irrespective of the nocturnal and cryptic behaviour of the species, its detections during the night as well as the daytime only in winter can be attributed to its increased activity during the mating season, occurring mostly between early January and mid-March (Nowak 1999).

The occurrence records revealed a narrow elevation belt of just 850m (3,000–3,850 m) for the Red Panda in the area, which coincides with its preferred altitude

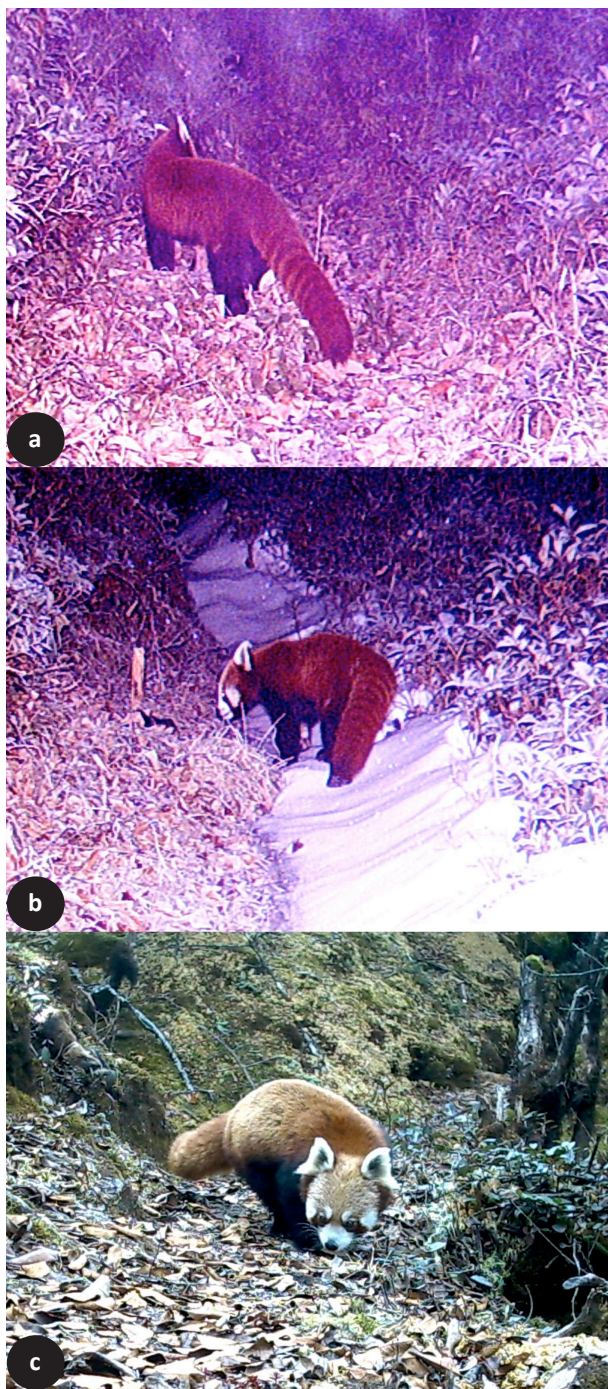


Image 1. Camera trap image of the Red Panda Khangchendzonga Biosphere Reserve in Sikkim: a & b - at Kasturi ridge | c - at Phedi.

range of 2,800–3,600 m reported in similar habitats (Yonzon et al. 1991; Pradhan et al. 2001). Besides the present record, Red Pandas were also camera trapped in Barsey Rhododendron Sanctuary and Kyongnosla Alpine Sanctuary, Sikkim, up to an elevation of 3,630m with direct sightings and feces recorded up to 3,780 and 3,789m, respectively, in different forest types including *Rhododendron* forest with scattered *Abies* and *Abies*-dominated coniferous forest contiguous with bamboo thickets (WWF-India 2011; Khatiwara & Srivastava 2014). Such habitat specificity is in coherence with the present occurrence records, thus validating the affinity of the species for the sub-alpine forests of the Sikkim Himalaya. Similarly, a preference for mixed coniferous and *Rhododendron* forests were also shown in studies conducted in Wolong Reserve in China (Reid et al. 1991), Dhorpartan Hunting Reserve in Nepal (Sharma & Belant 2009; Panthi et al. 2012), Jigme Dorji National Park in Bhutan (Dorji et al. 2011), and Chitwan-Annapurna Landscape in Nepal (Bista et al. 2017). Moreover, the Red Panda was also reported to be relatively abundant between 2,800m and 3,600m in other parts of Sikkim, Darjeeling, and Arunachal Pradesh (Pradhan et al. 2001; Srivastava & Dutta 2010; Bhutia 2011; Ghose et al. 2011; Chakraborty et al. 2015), although its occurrence was also reported at 2,350m in Neora Valley National Park in Darjeeling (Mallick 2010) and at 4,325m in Tawang District of Arunachal Pradesh (Dorjee et al. 2014). Given the arboreal habit of Red Panda, however, habitats above the tree-line may not be considered consistently occupied by them (Choudhury 2001).

Non-detection of Red Panda signs during the sampling period could be attributed to the arboreal, cryptic nature of the species and its habit of defecating at feeding sites generally on trees and fallen logs (Pradhan et al. 2001; Zhang et al. 2006). Previous studies reported the presence of the Red Panda in the northeastern states and parts of Nepal but very few calculated their abundance indices. While comparing the present records with that of 32 sightings in three years (Pradhan et al. 2001), 10 in one year (Mallick 2010, by the study team), 10 in five years (Chakraborty et al. 2015), and four in one year

Table 1. Records of the Red Panda in the Prek catchment of Khangchendzonga Biosphere Reserve, Sikkim, India, during 2008–2011.

Place	Evidence	Date	Time	Elevation (m)	Coordinates	
Kasturi ridge	Photo capture	26.xii.2009	02.12h	3,000	27.399N	88.244E
Kasturi ridge	Photo capture	06.i.2010	04.14h	3,000	27.399N	88.244E
Phedi	Photo capture	18.xii.2009	10.57h	3,850	27.439N	88.218E
Kokchurong	Sighting	10.iii.2010	16.28h	3,720	27.464N	88.173E

with 13 image captures for an effort of 2,398 trap days (Khathiara & Srivastava 2014), Red Pandas seem to be either more elusive or in very low densities in KBR. A species-specific camera trap design, however, would increase Red Panda detection and thereby its capture rate, aiding in a more comprehensive comparison.

CONCLUSION

This scientific documentation symbolizes a crucial step towards the conservation of the Red Panda and its habitat in KBR. In spite of a strong pro-conservation attitude shown by the government of Sikkim by declaring Red Panda as its state animal, very less work has been done on the ground to ensure efficient conservation and management of the species and its habitat across the Sikkim landscape. This study highlights the importance of sub-alpine forests for the occurrence and survival of the Red Panda in the area. Considering its low abundance status, increasing threats on habitat, and the lack of detailed ecological information from the area, any management intervention towards its conservation seems impractical. We, therefore, propose an urgent need for a long-term ecological study across the Sikkim Himalayan landscape covering the entire sub-alpine belt (within and outside the PAs), as an essential step towards Red Panda conservation in Sikkim. In view of this, the Forest, Environment and Wildlife Management Department (FEWMD), Govt. of Sikkim, recently initiated a camera trap based monitoring program which resulted in first occurrence records of species like Tiger *Panthera tigris*, Snow Leopard *Panthera uncia*, and Marbled Cat *Pardofelis marmorata* from different PAs of the state. We recommend the continuation of such monitoring programs along with serious attention on the ecological study on the Red Panda to benefit its conservation and management in the area. We also recommend referring the management guidelines proposed by Pradhan et al. (2001) to append further towards achieving this goal.

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