

Red Panda *Ailurus fulgens* and other small carnivores in Kyongnosla Alpine Sanctuary, East Sikkim, India

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Abstract

Camera-trapping in Kyongnosla Alpine Sanctuary, East Sikkim, India, between November 2011 and October 2012 confirmed the persistence of Red Panda *Ailurus fulgens* there, and provided: the first record of Red Panda cub-carrying in the wild; the highest elevational record of Large Indian Civet *Viverra zibetha* and the second-highest record of Leopard Cat *Prionailurus bengalensis* globally; and records of Red Fox *Vulpes vulpes*, Yellow-throated Marten *Martes flavigula* and Stone Marten *M. foina*. Pale Weasel *Mustela altaica* was sighted directly.

Keywords: camera-trapping, cub-carrying, high-altitude records, Large Indian Civet, Leopard Cat, *Prionailurus bengalensis*, *Viverra zibetha*

Introduction

Red Panda *Ailurus fulgens* is one of the most striking creatures inhabiting the Himalaya. Within the order Carnivora, it comprises the monotypic family Ailuridae (Glatston 2011). Categorized as Vulnerable by *The IUCN Red List of Threatened Species* (IUCN 2013), it is distributed widely in the Himalaya including parts of Nepal, India and Bhutan, and further extends to Myanmar and China (Choudhury 2001, Glatston 2011). In India, its distribution is restricted to small pockets of the Eastern Himalaya, in the states of Sikkim, West Bengal (Darjeeling district) and Arunachal Pradesh (Ghose & Dutta 2011), with records of animals of uncertain origin in Meghalaya and Assam (Choudhury 2013).

Red Panda is known to inhabit mostly areas with oak forests, mixed coniferous forests with bamboo understorey and subalpine habitat (Chakraborty 1999). In the Eastern Himalaya, it occupies an elevational range of 1,500–4,800 m (Choudhury 2001), excepting the anomalous records in Meghalaya and Assam, at much lower altitude (Choudhury 2013). The species's unobtrusive nature and the remote, almost inaccessible terrains it occupies hinder its study.

Sikkim, a small mountainous state in the Eastern Himalayan biodiversity hotspot, has a rich fauna and flora including elements of Afrotropical, Indomalayan and Palaearctic origin (Mani 1974). Its wide elevation gradient (300–8,000 m), albeit within a small geographical area, results in diverse vegetation types (tropical forests to cold deserts) and a wide variety of mammals including Red Panda (the state animal) and Snow Leopard *Panthera uncia*.

Sikkim holds the second-largest extent of Red Panda habitat in India after the state of Arunachal Pradesh (Ghose *et al.* 2011). Despite this, little information on the species is available from the state. It was earlier reported from six of Sikkim's eight protected areas: Khangchendzonga National Park in the North and West districts; Singba Rhododendron Sanctuary in the North; Pangolakha Wildlife Sanctuary and Kyongnosla Alpine Sanctuary in the East; Maenam Wildlife Sanctuary in the South; and Barsey Rhododendron Sanctuary in the West (Ghose & Dutta 2011). Recent surveys by Ghose *et al.* (2011) failed to record the species in Fambanglo Wildlife Sanctuary, where Choudhury (2001) had reported it to occur.

Study area

The study area (Fig. 1) spans 2,700–4,200 m asl, with the highest reaches within Kyongnosla Alpine Sanctuary (31 km²) and the lowest outside. Major vegetation comprises Oak *Quercus* forest mixed with *Arundinaria* bamboo thickets between 2,700 and 3,000 m (I) (mostly in areas outside the sanctuary); Juniper *Juniperus* – rhododendron *Rhododendron* scrub forest with bamboo understorey (3,000–3,300 m) (II); *Rhododendron* forest with scattered fir *Abies* (3,300 – 3,600 m) (III); *Abies*-dominated coniferous forest (contiguous with bamboo thickets at few places) (3,600 – 3,900 m) (IV); and Alpine scrub forest (3,900 – 4,200 m) (V). The area is surrounded by reserved forests holding quite a few small villages. People inhabiting these villages are not involved in hunting to the best of our knowledge. There is some evidence of fuel-wood extraction from the surrounding forests.

Methods

An intensive ecological study of small carnivores aimed to generate baseline information on species abundance and distribution patterns. Camera-trapping and faecal surveys between November 2011 and October 2012 covered the area's entire elevation gradient. After marking permanent trails, a reconnaissance survey confirmed trail-use (through indirect evidence) by small carnivores. The 16 trails comprised two, three, eight and three in habitat types II, III, IV and V, respectively, in accordance with their area of coverage in the study area. These trails served as basic sampling units for camera-trapping and to search for other evidence (faeces, footprints and direct sightings) of small carnivores.

The trails were walked once a month. Red Panda faeces were photographed and compared with the available photographic records (e.g. Srivastava & Dutta 2010) to assist the identification of the species. At each trail, one camera-trap unit was deployed 15–30 cm above the ground, attached to a rock or tree trunk, without baits or lures, and was operational for 24-hour monitoring. A one-minute delay was set between successive activations of the camera-traps. Occasions where the same species was photographed more than once within one

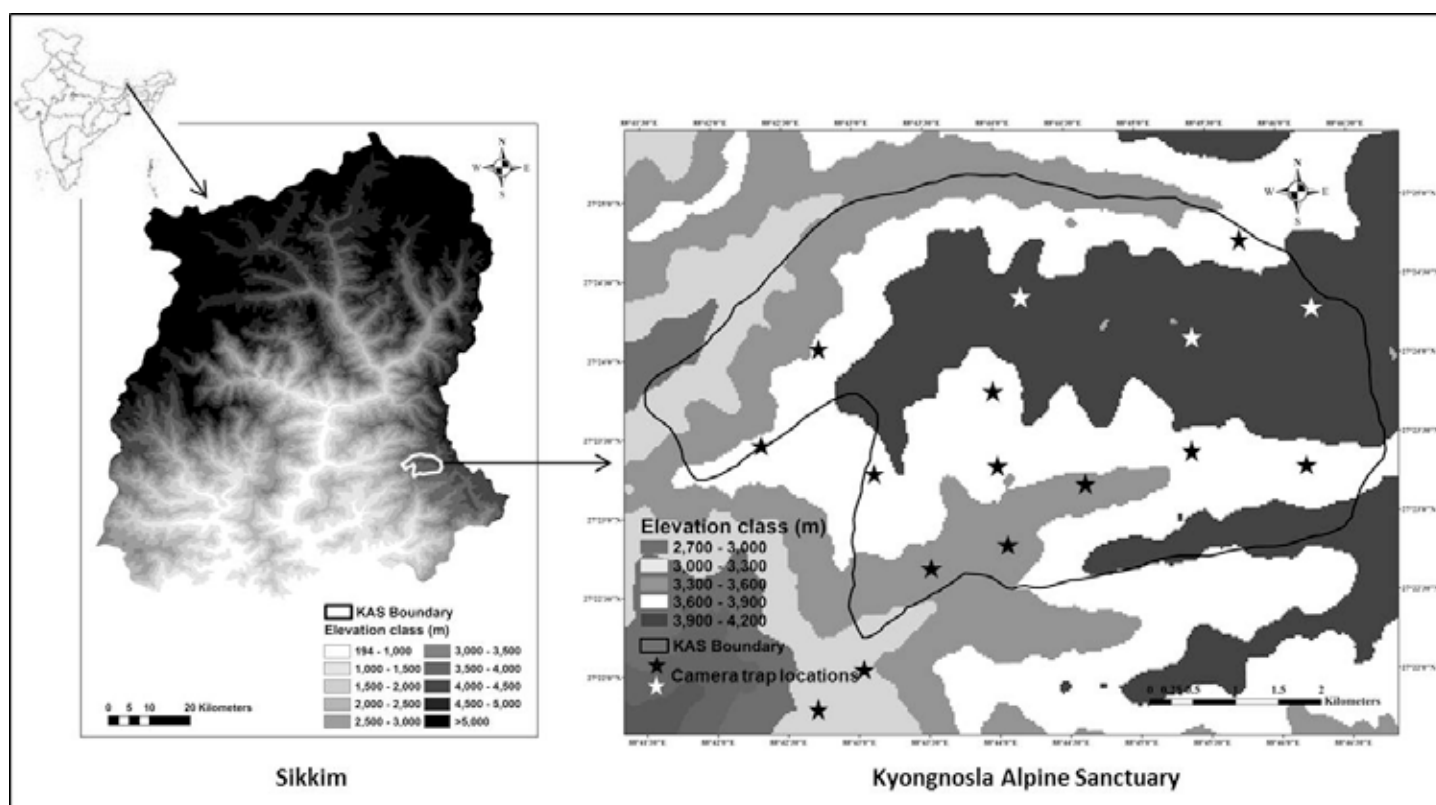


Fig. 1. Kyongnosla Alpine Sanctuary, Sikkim, India, showing camera-trap locations in different elevation classes.

hour by the same camera-trap were considered to constitute a single record. For each record, elevation and geographic coordinates were recorded using a handheld GPS (Garmin, GPS-map 60Cx; datum, WGS84) along with information on habitat type, date and time.

Results and discussion

A total of 2,398 camera-trap-nights comprised 334, 570, 1,124 and 370 in habitat types II, III, IV and V, respectively ('Study area' defines the habitat types). Red Panda was photo-captured at three of the 16 camera-trap stations, yielding a total of 13 photographic records. Most (10) photo-captures were recorded from one camera-trap station at an elevation of 3,630 m amid mostly *Abies*-dominated coniferous forest contiguous with bamboo thickets at adjacent lower elevations. *Abies* provides suitable daytime resting sites for the species, whilst bamboo serves as food. A photo-capture on 5 July 2012 at this location showed an adult carrying a cub, the latter estimated to be 1–2 months old (S. Pradhan *in litt.* 2014, A. R. Glatston *in litt.* 2014) (Fig. 2a). This seems to be the first such record from the wild, although cub-carrying is well documented in captivity (Gebauer 2011). The highest (3,780 m) and lowest (2,700 m) elevation records of Red Panda were direct sightings from locations 5–6 km outside the Sanctuary. In all, four direct sightings and four faeces encounters (Fig. 2b) were made (Table 1). Two of the faecal piles were found in the adjacent reserved forests comprising *Juniperus*–*Rhododendron* scrub forest with bamboo understorey. Although the areas outside the PA lie adjacent to small human settlements, they represent relatively undisturbed habitats with little human interference.

Camera-trapping recorded, among small carnivores, in

Table 1. Red Panda *Ailurus fulgens* records in Kyongnosla Alpine Sanctuary, Sikkim, India, November 2011 – October 2012.

Evidence ¹	Habitat type ²	Number of records	Measured elevation (m)	Coordinates
PC	IV	10	3,630	27°23.29'N, 88°42.22'E
PC	III	2	3,398	27°22.59'N, 88°43.17'E
PC	III	1	3,560	27°23.02'N, 88°43.94'E
DS	IV	1	3,780	27°22.27'N, 88°47.23'E
DS	I	1	2,700	27°22.19'N, 88°40.83'E
DS	III	1	3,593	27°22.54'N, 88°42.90'E
DS	III	1	3,398	27°22.59'N, 88°43.17'E
F	IV	2	3,789	27°23.42'N, 88°45.09'E
F	II	2	3,109	27°22.37'N, 88°42.91'E

¹PC, photo-capture; DS, direct sighting; F, faeces.

²I, Oak forest mixed with *Arundinaria* bamboo thickets; II, *Juniperus*–*Rhododendron* scrub forest with bamboo understorey; III, *Rhododendron* forest with scattered *Abies*; IV, *Abies*–dominated coniferous forest contiguous with bamboo thickets; V, Alpine scrub forest.

decreasing order of photo-capture rate, Red Fox *Vulpes vulpes*, Leopard Cat *Prionailurus bengalensis*, Yellow-throated Marten *Martes flavigula*, Red Panda, Stone Marten *M. foina* and Large Indian Civet *Viverra zibetha*; and a Pale Weasel *Mustela altaica* was seen (Table 2). The two Large Indian Civet photo-captures, on 30 December 2011 and 27 February 2012 (Fig. 3) were at 3,080 m. This is nearly 400 m higher than the highest record we could trace from anywhere in the species's range: 2,700 m (Khangchendzonga National Park, Sikkim; Sathyakumar *et al.* 2011). Most photo-captures of Leopard Cat were above 3,300 m, with the highest at a recorded elevation of 3,765 m. This is

Table 2. Small carnivore records in Kyongnosla Alpine Sanctuary, Sikkim, India, November 2011 – October 2012.

Species ¹	Evidence ²	Number of photo-captures in each habitat ³				Number of camera-trap stations	Elevation range (m)
		II	III	IV	V		
Red Panda	PC, DS, F	0	3	10	0	3	3,000–3,800
Red Fox	PC	11	74	98	0	12	3,000–3,800
Leopard Cat	PC	1	12	25	0	8	3,150–3,800
Yellow-throated Marten	PC	4	0	10	0	5	3,000–3,800
Stone Marten	PC	4	0	2	0	3	3,000–3,600
Large Indian Civet	PC	2	0	0	0	1	3,080
Pale Weasel	DS	0	0	0	0	0	3,910

¹Scientific names are given in the text.

²PC, photo-capture; DS, direct sighting; F, faeces.

³I, Oak forest mixed with *Arundinaria* bamboo thickets; II, *Juniperus–Rhododendron* scrub forest with bamboo understorey; III, *Rhododendron* forest with scattered *Abies*; IV, *Abies*-dominated coniferous forest contiguous with bamboo thickets; V, Alpine scrub forest.

well below the exceptionally high elevation of 4,474 m recorded in the Khambachen valley, Kangchenjunga Conservation Area, Nepal (Thapa *et al.* 2013), but above the previous highest record of 3,254 m (also Nepal; Ghimirey & Ghimire 2010). This is probably the highest record from India. Larger mammals camera-trapped included Snow Leopard, Asian Golden Cat *Catopuma temminckii*, Asian Black Bear *Ursus thibetanus*,

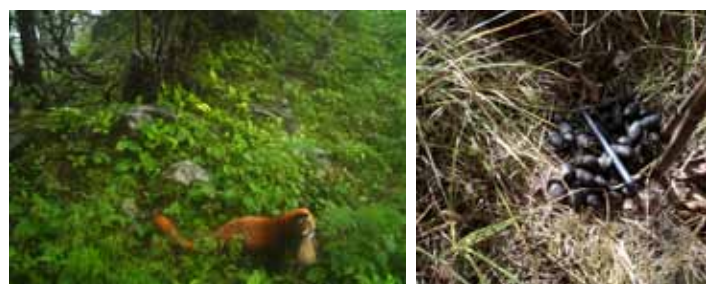


Fig. 2. Red Panda *Ailurus fulgens* evidence in Kyongnosla Alpine Sanctuary, East Sikkim, India. (left) Camera-trapped adult Red Panda carrying a cub in *Abies*-dominated coniferous forest, 5 July 2012; (right) faeces recorded in *Juniperus–Rhododendron* scrub forest with bamboo understorey on 3 May 2012.



Fig. 3. Camera-trapped Large Indian Civet *Viverra zibetha* at 3,080 m asl in *Juniperus–Rhododendron* scrub forest with bamboo understorey, 27 February 2012 in Kyongnosla Alpine Sanctuary, East Sikkim, India.

Himalayan Musk-deer *Moschus chrysogaster*, Himalayan Serow *Capricornis thar*, Himalayan Goral *Naemorhedus goral* and Eurasian Wild Pig *Sus scrofa*.

All the small carnivore species were found in areas between 3,000 and 3,800 m, except for Pale Weasel which was sighted in alpine scrub forest at 3,910 m. The area, although small, seems to support an appreciable fauna including some cryptic small carnivores. Also, with comparatively low human interference, the protected area and surrounds serve as a conspicuous refuge to the species inhabiting the area. More exhaustive and systematic surveys would therefore, be useful to better understand various ecological aspects of the small carnivore community in the area.

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