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SHORT COMMUNICATION

New record on Asiatic Golden Cat Catopuma temminckii VIGORS & HORSFIELD, 1827 (MAMMALIA: CARNIVORA: FELIDAE): PHOTOGRAPHIC EVIDENCE OF ITS WESTERNMOST DISTRIBUTION IN **GAURISHANKAR CONSERVATION AREA, NEPAL**

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New record on Asiatic Golden Cat *Catopuma temminckii* Vigors & Horsfield, 1827 (Mammalia: Carnivora: Felidae): photographic evidence of its westernmost distribution in Gaurishankar Conservation Area, Nepal

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Abstract: The Asiatic Golden Cat *Catopuma temminckii* is poorly known in Nepal and was previously recorded only twice in the eastern part of the country. We conducted a camera trap survey in the Lapchi Valley (32km²) of Gaurishankar Conservation Area (GCA), a protected area in north-central Nepal, from October 2018 to April 2019. Eleven cameras were deployed to record mammalian diversity in a 2×2 km² grid across Lapchi block of GCA. During the study period, four photos and three videos (each of 10 seconds length) of Asiatic Golden Cats were recorded at an elevation of 2,540m at a single camera trap station. This is the first photographic record of Asiatic Golden Cat in this region of Nepal extending the distribution of the species further west in the Himalaya. A more detailed study on its distribution, population size and behaviour is warranted in the near future to implement appropriate conservation measures.

Keywords: Camera trap survey, capture rate, Himalaya, Lapchi Valley, small wild cats, threatened species.

The Asiatic Golden Cat *Catopuma temminckii* is one of the 12 wild felid species recorded in Nepal (Lamichhane et al. 2016), where it is the least studied species and listed as Data Deficient in the National Red List (Jnawali et al. 2011). It is a shy and elusive mammal with characteristic markings such as two distinctive mustache-like white facial stripes, longitudinal markings on the forehead, two white stripes lining the inner rims of the eyes and a white underside on the tail (Jnawali et al. 2011). Its global population has been assessed as Near Threatened and it is thought to be decreasing due to extensive habitat loss and poaching across its range (McCarthy et al. 2015). It is listed on Appendix I

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of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (McCarthy et al. 2015). To date, the cat is known to occur in the foothills of the Himalaya (Ghimirey & Pal 2009; Bashir et al. 2011; Rai et al. 2019), China (Jutzeler et al. 2010), and southeastern Asia (Grassman et al. 2005; Johnson et al. 2009; Than Zaw et al. 2014; Pusparini et al. 2014) (Figure 1). According to the IUCN Red List, the distribution of the Asiatic Golden Cat is limited up to Makalu Barun National Park in eastern Nepal (McCarthy et al. 2015).

Recent camera trap studies provided important records of the species' occurrence in eastern Nepal (Rai et al. 2019), in Bhutan (Tempa et al. 2013; Dhendup 2016; Dhendup et al. 2016), and in northeastern India (Choudhury 2007; Lyngdoh et al. 2011; Gouda et al. 2016; Nadig et al. 2016; Chatterjee et al. 2018; Mukherjee et al. 2019; Ghose et al. 2019; Nijhawan et al. 2019). Currently, there is a lack of research and conservation action as a result of which very little is known about the species in Nepal (Jnawali et al. 2011). The results of this study contribute important new information about its occurrence in the Himalaya of central Nepal.

STUDY AREA

The present study was conducted to assess the distribution and activity patterns of wildlife in Lapchi Valley of Gaurishankar Conservation Area (GCA) as part of a biodiversity monitoring program funded by National Trust for Nature Conservation (NTNC) in the frame of GCA project. GCA was declared as conservation area in January 2010. It comprises sub-tropical to nival bio-climatic zones with 16 major vegetation types and a faunal diversity of 235 bird, 34 mammal, 16 fish, 14 snake, 10 amphibian, and eight lizard species (NTNC 2013). Musk Deer Moschus leucogaster, Assam Macaque Macaca assamensis, Snow Leopard Panthera uncia, and Leopard Cat Prionailurus bengalensis are some of the nationally threatened species living in GCA (NTNC 2013). Major precipitation in the area includes rain during the summer monsoon from June to August and snow in winter from January to March (NTNC 2013).

GCA is divided into six blocks, namely Gumba, Lambagar/Lapchi, Rolwaling, Bigu/Kalinchowk, Marbu-Khare, and Gumdel/Marbu (NTNC 2013). The study area in Lambagar/Lapchi Block extends across Bigu Rural Municipality of Dolakha District and is surrounded by China in the west, north, and east (Figure 2). The Lapchi

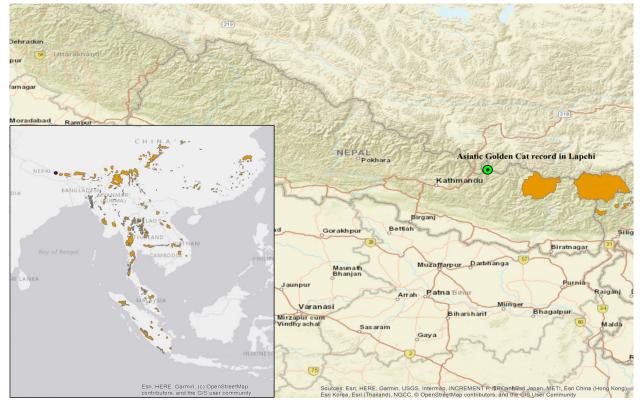


Figure 1. Asiatic Golden Cat recorded in Lapchi Valley of Gaurishankar Conservation Area (green circle with black dot) and the current global distribution of Asiatic Golden Cat (in orange, map modified from McCarthy et al. 2015).

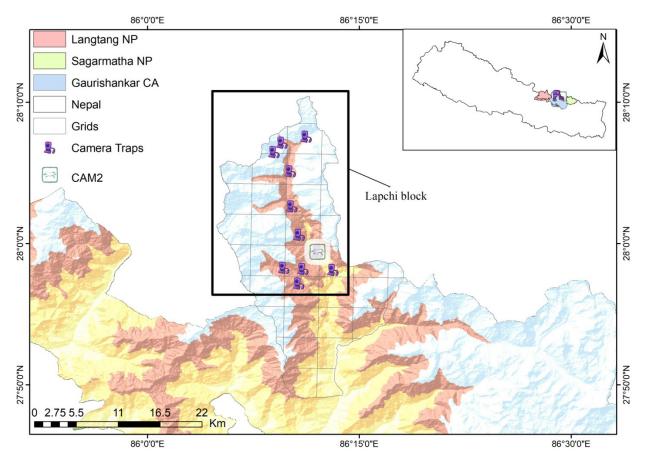


Figure 2. Study area in Lapchi block of GCA with camera trap locations, geo-processed between 2,100m and 4,100m elevation (in pink). The location where the Asiatic Golden Cat was recorded is indicated by the CAM2 icon.

Block consists of four vegetation types, namely, *Betula utilis* forest, mixed forest of *Abies spectabilis*, *Betula utilis*, *Rhododendron campanulatum*, and *Juniperus indica*, Rhododendron forest dominated by *R. campanulatum*, and alpine scrub dominated by Rhododendron shrubs (NTNC 2013). Sherpa people are the main residents of this area. They rear domestic Yak *Bos grunniens* as their livelihood and implement a shifting grazing system (NTNC 2013).

MATERIALS AND METHODS

During October 2018, a total of 11 camera traps (Bushnell Trophy Model #119537C and Model #119405C) were deployed at elevations of 2,200–4,200 m across the Lapchi Block. The block was divided into a grid of 2×2km² cells, and camera traps were deployed on the basis of accessibility and resource availability with a distance of at least 2km from each other. The infrared cameras are motion and heat sensitive at a range up to 15m. During the study period, two cameras were lost and one malfunctioned, leaving a total of eight cameras functioning for the duration of the study. Indirect signs such as faecal droppings, fur remains, latrine, and tracks of mammals were considered for selecting suitable sites for camera trap placement.

Camera model #119537C was set to take photographs, and model #119405C was set to hybrid mode for taking both photographs and videos simultaneously. All camera traps were active for 24 hours and set to take three images at an interval of one second between consecutive images and one minute between triggers. The camera traps were placed at a height of 30-40 cm above ground. Consecutive images of individuals of the same species at an interval of 30 minutes between triggering events, different individuals of same or different species in successive photographs, and nonconsecutive photos of individuals of the same species at the same site were considered independent events. Blank images and images from which species could not be identified were not included in the analysis. Photo capture rate index (PCRI) is defined as independent events per camera trap days ×100 (Carbone et al. 2001).

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RESULTS

Our study in Lapchi Valley lasted from 22 October 2018 to 6 April 2019 with a total survey effort of 1,476 camera trap days. The Asiatic Golden Cat was photographed (Image 1) at a single camera trap station in altogether three independent events (PCRI 0.20), consisting of four photographs and three videos of 10 seconds each (Video 1). This station was deployed in a mixed hardwood forest comprising *Acer*, *Betula alnoides*, *Abies spectabilis*, *Tsuga dumosa*, *Rhodendron campanulatum*, *Litsea oblonga* and other associated plants. This camera trap was active for a total of 188 camera trap days and recorded altogether 239 independent events (Table 1). These events show the cat coming from uphill on a wildlife trail that was also frequented by Assam Macaque, rodents, birds, and ungulates.

DISCUSSION

We report the first photographic record of an Asiatic Golden Cat in GCA, Nepal. This record indicates that the species occurs farther west than previously recorded (McCarthy et al. 2015), extending its distribution by about 130km farther west in the Himalaya. Interestingly, Schaller (1980) reported a direct observation of the cat in Lapchi Valley. The results of our survey corroborates this sighting after nearly 40 years, and provide important information on the overall distribution and occurrence of the Asiatic Golden Cat.

In Nepal, it is thought to also occur along mid-hills and within Annapurna Conservation Area as far west as Rara National Park (Jnawali et al. 2011). To date, it has, however, not been documented in the western Nepal Himalayas. A study conducted in the eastern mid-hills of Annapurna Conservation Area using camera trap and indirect sign surveys did not yield any evidence for the Asiatic Golden Cat in that area (Appel et al. 2012). Its occurrence in Nepal was previously authenticated only in eastern Himalaya, namely, in Makalu Barun National Park (Ghimirey & Pal 2009), Tinjure-Milke-Jaljale area in the Himalayan foothills (Rai et al. 2019), and in the

Kangchenjunga Landscape (Lama et al. 2019). In Lapchi Valley, the Asiatic Golden Cat moved along a wildlife trail in a hardwood forest that was also repeatedly used by Long-tailed Mountain Shrew, Assam Macaque, Kalij Pheasant and other birds. We therefore assume, that these species are potential prey of the Asiatic Golden Cat. Its prey spectrum is thought to consist of rodents, primates, snakes, lizards, and birds (Nowell & Jackson 1996). Scat samples of Asiatic Golden Cat collected by Kawanishi & Sunquist (2008) in a protected area in peninsular Malaysia contained remains of murids, small reptiles, *Tragulus*, and Dusky Leaf Monkey *Trachypithecus obscurus*.

As shown in Table 2, the PCRI of the Asiatic Golden Cat in our study area was similar to PCRI values obtained in Bhutan's Royal Manas National Park (Tempa et al. 2013), Nepal's Tinjure-Milke-Jaljale area (Rai et al. 2019), and India's Buxa Tiger Reserve (Ghose et al. 2019), but higher than in Makalu Barun National Park (Ghimirey et al. 2012). In contrary, in areas where survey effort exceeded 3,400 camera trap days, the Asiatic Golden Cat was recorded at PCRI values of 0.48 and higher (Johnson et al. 2009; Haidir et al. 2013; Pusparini et al. 2014; Mukherjee et al. 2016). This highlights the importance of increasing survey effort in GCA, both spatially and temporally, for obtaining meaningful data on the Asiatic Golden Cat in this area.

Gaurishankar Conservation Area is an area of high biodiversity, however, there are several threats to its ecological sustainability. The Lapchi Valley is part of an ancient trade route to Tibet. Two hydropower projects have been proposed to be constructed, and



Image 1. Asiatic Golden Cat recorded in Gaurishankar Conservation Area on 21 February 2019. © Gaurishankar Conservation Area Project, NTNC.

Table 1. Details of Asiatic Golden Cat recorded in Lapchi Valley of Gaurishankar Conservation Area, with independent images of other species recorded at this location (27.990°N, 86.200°E; 2,540m).

Date and time	Other species recorded at this location		
15.ii.2019, 02.02h	Assam Macaque (n=36), Long-tailed Mountain Shrew Soriculus macrurus (n=18), Masked Palm Civet Paguma larvata (n=1) Birds: Blue Whistling Thrush Myophonus caeruleus		
21.ii.2019, 18.21h	 (n=35), Kalij Pheasant Lophura leucomelanos (n=11) Yellow-billed Blue Magpie Urocissa flavirostris (n=1) Ungulates: Himalayan Goral Naemorhedus goral (n=55), Himalayan Serow Capricornis thar (n=30), Himalayan Tahr Hemitragus jemlahicus (n=23), Barking Deer Muntiacus muntjak (n=23), Domestic Yak (n=3) 		
26.ii.2019, 18.00h			

Table 2. Photocapture rates o	f Asiatic Golden Cat in se	lected survey areas in Asia.
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Study area	Total camera trap days	Independent events	Photo capture rate index (PCRI)	Source
Gaurishankar Conservation Area, Nepal	1,476	3	0.20	This study
Makalu Barun National Park, Nepal	1,184	1	0.08	Ghimirey et al. 2012
Tinjure-Milke-Jaljale area, Nepal	406	1	0.25	Rai et al. 2019
Buxa Tiger Reserve, West Bengal, India	2,366	6	0.25	Ghose et al. 2019
Royal Manas National Park, Bhutan	2,036	3	0.15	Tempa et al. 2013
Khangchendzonga Biosphere Reserve, Sikkim, India	6,278	25	0.5 (0.34–0.66)	Bashir et al. 2011
Eaglenest Wildlife Sanctuary, Arunachal Pradesh, India	8,044	39	0.48	Mukherjee et al. 2016
Nam Et-Phou Louey National Protected Area, Laos	8,499	48	0.56	Johnson et al. 2009
Gunung Leuser National Park, Sumatra, Indonesia	3,452	25	0.72	Pusparini et al. 2014
Kerinci Seblat landscape, Sumatra, Indonesia	9,255	123	1.33	Haidir et al. 2013

the government of Nepal is planning to open a road linking the border of Nepal and China, which would run through this valley. Such infrastructure development activities usually entail an increase in human presence, which in turn might lead to an increase of illegal hunting and poaching in the area. Heinen & Leisure (1993) recorded nine coats made from furs of Asiatic Golden Cat in tourist shops of Kathmandu, which were thought to have originated in India. Hunting and trapping for fur (Heinen & Leisure 1993), habitat loss and degradation, and human-wildlife negative interaction are the major threats to the Asiatic Golden Cat in the country (Jnawali et al. 2011).

In Nepal, no research activities have specifically targeted the Asiatic Golden Cat. To date, the records of the species in Nepal come in the form of anecdotal data from camera trap studies focused on other species. The finding from our study indicates that the Himalaya in Nepal likely serve as an important habitat core at the western extent of the species' range. Owing to the lack of information on the species in Nepal, and the importance of this area in the global distribution of the species, it is imperative that there be targeted studies of the species in the country, with a particular focus on its distribution, population status, habitat requirements and general ecology in Nepal.

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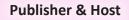
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