

Journal of Threatened Taxa

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ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

SHORT COMMUNICATION

FIRST PHOTOGRAPHIC EVIDENCE OF THE ASIATIC GOLDEN CAT *CATOPUMA TEMMINCKII* VIGORS & HORSFIELD, 1827 (MAMMALIA: CARNIVORA: FELIDAE) IN SAKTENG WILDLIFE SANCTUARY, BHUTAN

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17 February 2020 | Vol. 12 | No. 2 | Pages: 15262–15266

DOI: 10.11609/jott.5089.12.2.15262-15266



SMALL WILD CATS
SPECIAL ISSUE



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First photographic evidence of the Asiatic Golden Cat *Catopuma temminckii* Vigors & Horsfield, 1827 (Mammalia: Carnivora: Felidae) in Sakteng Wildlife Sanctuary, Bhutan

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Abstract: The Asiatic Golden Cat *Catopuma temminckii* is among Asia's least studied wild felids. We report the first photographic evidence of its presence in Sakteng Wildlife Sanctuary, eastern Bhutan, where it was recorded above 3,000m. The photographs show three distinct colour morphs, viz., golden, buff brown, and melanistic. The main threat to the species in the sanctuary appears to be habitat loss due to increasing developmental activities and land use change. Future studies are needed to determine the conservation status of Asiatic Golden Cats in Sakteng Wildlife Sanctuary.

Keywords: camera trap, distribution, Merak, morphs, small wild cats, threats.

The Asiatic Golden Cat *Catopuma temminckii* has been recorded in several range countries of the Himalaya including Nepal, Bhutan, northeastern India, and Myanmar (Ghimirey & Pal 2009; Bashir et al. 2011; Dhendup 2016; Chatterjee et al. 2018; Mukherjee et al. 2019; Nijhawan et al. 2019; Than Zaw et al. 2014). Elsewhere in southeastern Asia, it occurs in Thailand, peninsular Malaysia, Sumatra, Vietnam, and Cambodia (McCarthy et al. 2015). It is listed as Near Threatened

on the IUCN Red List, mainly because of habitat loss and poaching across its range (McCarthy et al. 2015). Despite its wide distribution, it is among the least studied felids in Asia (Ghimirey & Pal 2009; Dhendup 2016; Chatterjee et al. 2018). In Bhutan, it has been recorded in seven of the country's 10 protected areas (Dhendup et al. 2016).

It inhabits broadleaved forests from an elevation of 150m in the southwest (Dhendup & Dorji 2018) to montane forests at 4,282m in the north (Dhendup et al. 2016). Most of this information was obtained during camera trapping surveys targeting Tiger *Panthera tigris* and Snow Leopard *P. uncia* (Dhendup 2016). Records outside the protected area network are limited to the campus of Ugyen Wangchuk Institute for Conservation and Environment in central Bhutan (Vernes et al. 2015) and Gedu Territorial Forest Division in southwestern Bhutan (Dhendup & Dorji 2018). Research on habitat and conservation requirements of the Asiatic Golden Cat has not been carried out in the country (Dhendup 2016).

Sakteng Wildlife Sanctuary in eastern Bhutan

Editor: Angie Appel, Wild Cat Network, Bad Marienberg, Germany.

Date of publication: 17 February 2020 (online & print)

Citation: Wangyel, S., K. Dorji, S. Tobgay & N. Yangdon (2020). First photographic evidence of the Asiatic Golden Cat *Catopuma temminckii* Vigors & Horsfield, 1827 (Mammalia: Carnivora: Felidae) in Sakteng Wildlife Sanctuary, Bhutan. *Journal of Threatened Taxa* 12(2): 15262–15266. <https://doi.org/10.11609/jott.5089.12.2.15262-15266>

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Funding: None.

Competing interests: The authors declare no competing interests.

Acknowledgements: We would like to thank the management of Sakteng Wildlife Sanctuary and the staff of Merak and Sakteng range offices for facilitating this survey within a short period of time.



represents the eastern Himalayan temperate ecosystem and harbours several globally threatened and endangered species—Tiger, Red Panda *Ailurus fulgens*, Himalayan Musk Deer *Moschus chrysogaster*, Arunachal Macaque *Macaca munzala*, Asiatic Black Bear *Ursus thibetanus*, and Himalayan Serow *Capricornis thar*—underlining its importance for wildlife conservation (SWS 2016). Here we report the first records of the Asiatic Golden Cat in Sakteng Wildlife Sanctuary obtained during a camera trapping study to assess its diversity of wildlife.

STUDY AREA

Sakteng Wildlife Sanctuary was gazetted in 2003 with the mandate to safeguard the rapidly degrading biodiversity of the easternmost part of the country (SWS 2016). It covers an area of 740.60km² and comprises three major habitat types from warm broadleaf, temperate, to alpine meadows, with elevation ranging from approximately 1,500 to 4,500 m (SWS 2016). It hosts a diversity of 41 *Rhododendron* species out of 46 recorded in the country, and is home to 39 mammal and 285 bird species (SWS 2016). Close to 5,000 people reside in 13 villages with 772 households in two ‘gewogs’ (Dzongkha: block), one each in Merak and Sakteng gewog (SWS 2016).

The temperature ranges from 5.41°C in winter to 27.75°C in summer (Gyeltshen 2010). The monthly rainfall between November and March is less than 50mm; it gradually increases from April onward to a maximum of 300.74mm rain falling in July (Gyeltshen 2010).

Our study was carried out in an area of 482.5km² in the Merak Range of Sakteng Wildlife Sanctuary (Fig. 1). Notable tree species in the study area are Bhutan Fir *Abies densa*, *Quercus*, *Magnolia campbellii*, *Acer*, Himalayan Birch *Betula utilis* and rhododendron shrubs.

MATERIALS AND METHODS

A total of six HCO ScoutGuard SG560C camera traps were deployed singly. They were all attached to trees 20–30 cm above ground and placed opportunistically along trails and ridge-lines to increase the probability of recording wildlife. No baits or lures were used. They were placed at least 2km away from the nearest human settlements and 500m away from areas used as pastures for livestock. The minimum distance between camera traps was kept at 300m. They were active for 24 hours and set to record only photographs with an interval of five seconds between consecutive photos. Coordinates and elevations of the camera trapping stations were recorded

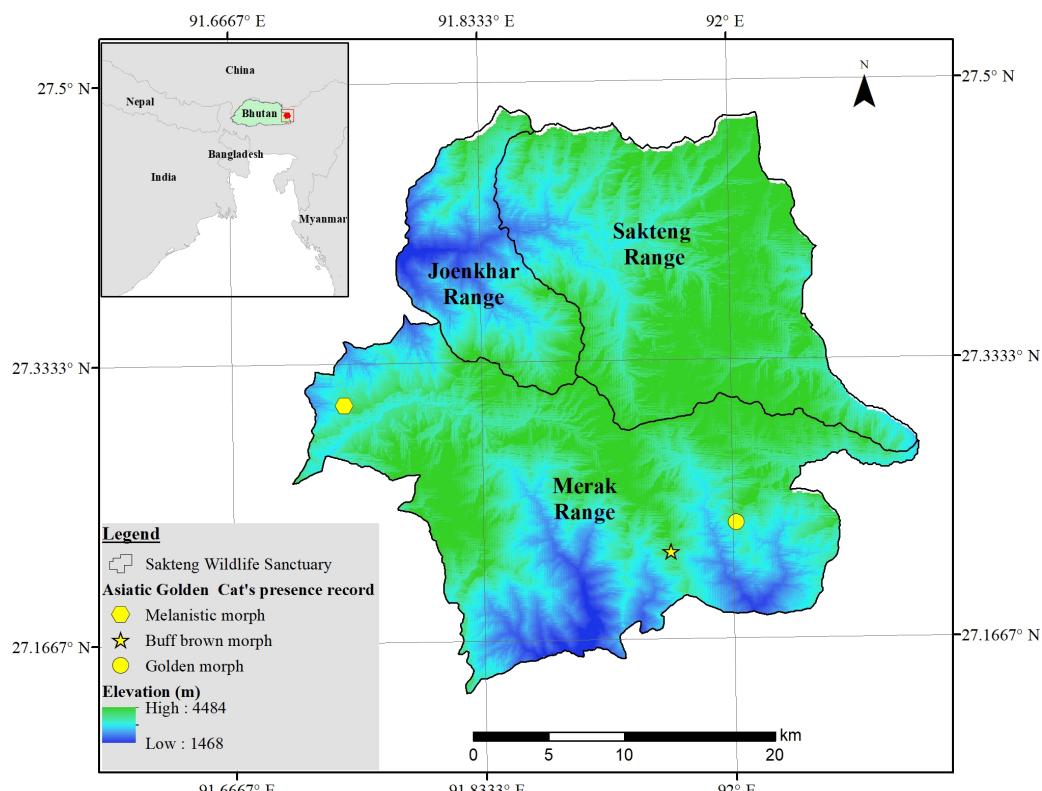


Figure 1. Study area in Sakteng Wildlife Sanctuary showing locations where Asiatic Golden Cats were recorded between July 2018 and February 2019.

using a GPS Garmin E-trex 30 device set to WGS 84 datum. Camera traps were checked once per month.

We define a notionally independent event as an interval of at least 30 minutes between consecutive photographs of the same individual Asiatic Golden Cat at the same camera trap location.

RESULTS

Camera traps were installed from 2 July 2018 to 15 February 2019 at six locations ranging in elevation from 3,000 to 3,700 m. Our total survey effort was 824 camera trap days, with cameras being operational for 224 days. Asiatic Golden Cats were recorded at three camera trap stations in 12 independent events (Table 1), showing three morphs (Images 1–4). They were all photographed in forests dominated by Bhutan Fir, during the day in eight independent events and by night in four independent events. The other three camera traps with no records of Asiatic Golden Cat were placed 100–150 m away from pastureland where herders stayed with their livestock.

DISCUSSION

The present camera trapping study in Sakteng Wildlife Sanctuary yielded the first records of the Asiatic Golden Cat in eastern Bhutan. Our results show that at least three morphs of the Asiatic Golden Cat inhabit the sanctuary's forest above 3,000m. Previous authors reported the occurrence of four morphs in Bhutan, namely golden, melanistic, spotted, and buff brown, which has also been called grey morph (Wang 2007; Jigme 2011; Lyngdoh et al. 2011; Chakraborty et al. 2013; Dhendup 2016; Dhendup et al. 2016). Vernes et al. (2015) reported all four morphs in the same study area in central Bhutan at elevations of 3,200–3,900 m in forest dominated by Bhutan Fir, Himalayan Birch, and Rhododendron. In contrast, Nijhawan et al. (2019) reported six morphs in Dibang

Valley, Arunachal Pradesh, India: golden, cinnamon, grey, melanistic, spotted, and a dark patterned morph with tight rosettes. In Dibang Valley, however, the patterned morphs appeared to be more common than solid colour morphs above 3,000m (Nijhawan et al. 2019). An additional morph with streaking called watermarked has been reported in peninsular Malaysia (Gumal et al. 2014).

Most of the independent records of the Asiatic Golden Cat in our study area corroborate the foremost diurnal activity pattern of the species described by Mukherjee et al. (2019). In four of our 12 independent records, however, the cat was photographed at night. Similar records after dark and before sunrise were also obtained in central Bhutan (Vernes et al. 2015), in Dampa Tiger Reserve, India, (Gouda et al. 2016), in Myanmar (Than Zaw et al. 2014) and in peninsular Malaysia (Gumal et al. 2014).

The main threat to wildlife in Sakteng Wildlife Sanctuary appears to be increased developmental activities such as construction of roads and electric power transmission lines, which lead to habitat loss and fragmentation (SWS 2016). More than 85% of the people living in the sanctuary practice a semi-nomadic lifestyle and use forest areas as pasture for their livestock, mainly Yaks *Bos grunniens* (SWS 2016). Though poaching of Himalayan Goral and Musk Deer in the sanctuary has been reported in the past, this has decreased considerably due to regular monitoring and awareness raising activities carried out by the park officials. To date, poaching of Asiatic Golden Cat has not been reported in the sanctuary (SWS 2016). The impact of habitat fragmentation and development projects on the sanctuary's wildlife needs to be assessed.

The Asiatic Golden Cat is known to occur in Bhutan since autumn 2006 (Wang 2007). Yet, its habitat preferences and conservation needs in the country have not been studied to date. We therefore recommend

Table 1. Details of Asiatic Golden Cats recorded in Sakteng Wildlife Sanctuary between July 2018 and February 2019.

Date and time	Coordinates	Elevation (m)	Morph colour	Independent events	Wildlife recorded at this station
19.x.2018, 11.23h; 8.xii.2018, 11.39h; 11.xii.2018, 10.04h; 12.xii.2018, 19.50h	27.235°N, 92.001°E	3,340	Melanistic (Image 1)	4	Marbled Cat <i>Pardofelis marmorata</i> , Yellow-throated Marten <i>Martes flavigula</i> , Red Panda <i>Ailurus fulgens</i> , Dhole <i>Cuon alpinus</i> , Southern Red Muntjac <i>Muntiacus muntjak</i> , Himalayan Serow <i>Capricornis thar</i>
8.xi.2018, 08.32h; 9.xi.2018, 18.57h	27.218°N, 91.958°E	3,240	Buff brown (Image 2)	2	Southern Red Muntjac, Himalayan Goral <i>Naemorhedus goral</i> , Kali Pheasant <i>Lophura leucomelanos</i> , Red Fox <i>Vulpes vulpes</i>
7.i.2019, 10.45h; 6.ii.2019, 08.12h			Golden (Image 3)	2	
16.xi.2018, 21.24h	27.308°N, 91.741°E	3,698	Golden	1	Satyr Tragopan <i>Tragopan satyra</i> , Southern Red Muntjac, Assam Macaque <i>Macaca assamensis</i> , Himalayan Goral, Himalayan Serow
9.xii.2018, 09.43h			Buff brown	1	
14.i.2019, 19.01h; 16.i.2019, 07.04h			Golden (Image 4)	2	



Image 1. Melanistic morph of the Asiatic Golden Cat recorded at 3,340m on 11 December 2018. © Sakteng Wildlife Sanctuary.



Image 2. Buff brown morph of the Asiatic Golden Cat recorded at 3,240m on 8 November 2018. © Sakteng Wildlife Sanctuary.

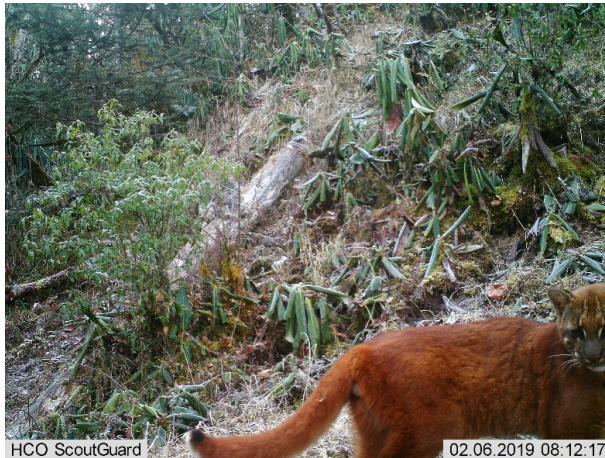


Image 3. Golden morph of Asiatic Golden Cat recorded at 3,240m on 6 February 2019 © Sakteng Wildlife Sanctuary.



Image 4. Golden morph of Asiatic Golden Cat recorded at 3,698m on 16 January 2019. © Sakteng Wildlife Sanctuary.

comprehensive research focussed on the ecology of the Asiatic Golden Cat in Bhutan. The results will form a basis for developing a conservation action plan for the species in Sakteng Wildlife Sanctuary and other areas in the country.

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