Camera trapping records of Indian pangolin (*Manis crassicaudata*) from Shergarh Wildlife Sanctuary in the semi-arid western Indian landscape

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Abstract

Pangolins are one of the most trafficked animals in the world. Apart from poaching for traditional medicines and meat, habitat destruction is responsible for the shrinking range and declining population of pangolins. Despite their widespread distribution, the status and distribution of Indian pangolins are not well documented. Herein, we report the camera trap-based evidence of Indian pangolins from Shergarh Wildlife Sanctuary in Rajasthan, India. The presence of feral dogs and the pervasive human footprints inside the Sanctuary are major concerns for the pangolinsand other wildlife species.

Keywords: All India Tiger Estimation, Feral dogs, Human-dominated landscape, Scaly anteater, Wildlife trafficking.

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Indian pangolins, or thick-tailed pangolins, *Manis crassicaudata*, (Crassus L. thick or heavy, Cauda L. tail), are medium-sized mammals weighing between 9 kg to 18 kg. They primarily feed on termites and ants, and their specialized feeding habit, known as myrmecophagy, has led to specific morphological adaptations such as a long sticky tongue and long sharp claws [(1)]. Pangolin's keratinized scales act as armour, protecting it when it curls up into a ball (referred to as 'Pengguling', a Malay word meaning 'rolling up') in response to threats [(2)]. Ironically, these scales, which evolved to protect pangolins against predators, now drive them to extinction as thousands of pangolins are killed for their scales every year by humans [(3)]. Indian pangolin faces an extreme risk of extinction due to poaching, habitat loss, and fragmentation [(4)]. Its habitat extends from northern Burma and the southern Yunnan province in China to the eastern parts of Punjab and Sindh in Pakistan, as well as most of India, Nepal, and Bangladesh [(5)]. Despite the wide range of pangolins, little is known about their distribution and status, except for a few presence records obtained from semi-arid regions of

western India [6, 7, 8], moist deciduous forests of North Bengal [9], tropical moist forests of the Western Ghats [10], and the lower Shivalik hills of Himachal Pradesh [11].

Shergarh Wildlife Sanctuary (hereafter Shergarh WLS, 24°45'N, 76°28'E to 24°36'N, 76°33'E) covers an area of 98.7 km2 and is located in the semi-arid western Indian landscape (Fig. 1 & 2). The forest type in Shergarh WLS is northern tropical dry deciduous forest, dominated by *Anogeissus pendula* forests and associated scrublands [12]. Despite human disturbances and the small isolated nature of the sanctuary, it harbours a diverse assemblage of wild mammals (Table. 1). Furthermore, the sanctuary can serve as a stepping stone for the Ranthambhore tiger meta-population [13]. As part of the All India Tiger Estimation [14], we deployed double-sided camera traps (n = 31) from 20 June to 21 July 2022, resulting in a trapping effort of 992 trap nights, along animal trails and forest roads of Shergarh WLS (Fig 1 & 2). All the cameras were positioned at a height of 30-45 cm above the ground to capture both large and small mammals [15]. On 14 July 2022, at 21:07 and 21:09 hrs, two photo-captures of Indian pangolin were recorded in the camera trap ID 28 (Fig. 3 & 4). This camera was deployed on an animal trail in the northern part of the sanctuary. The presence point was ~1000 m far from the nearest water point and was ~2000 m far from the nearest village. The broad terrain type was flat, and the tree community was dominated by *Anogeissus pendula*, *Butea monosperma* and *Ziziphus mauritiana*. The photographs confirmed the presence of Indian pangolins in Shergarh WLS. Additionally, we frequently observed captures of humans and domestic dogs in the sanctuary (Fig. 1 & 2 respectively), posing a serious threat to the conservation of the species.

The presence of pangolins in Shergarh WLS highlights the importance of conserving such forest fragments, as they play a crucial role in the conservation of wildlife species in human-dominated landscapes [16, 17]. It is essential to enforce stringent protection measures to safeguard the remaining pangolin populations and develop an integrated conservation

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approach that incorporates community awareness, protection of their habitats, and mitigation of existing linear infrastructure projects passing through wilderness areas.

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Declarations

Competing interests

The authors have no competing interests.

Authors' contributions

Q.Q., Y.V.J., and A.S. designed and supervised the study. P.A., K.K., S.R.Y., and A.N.G. conducted the fieldwork and handled the logistics. A.S., P.A., and K.K. processed and analysed the data. P.A. and A.S. wrote the manuscript. All the authors reviewed and contributed in the final manuscript.

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Table. 1. List of mammal's photo-captured during the camera-trap survey in Shergarh Wildlife Sanctuary

Sl no.	Common Name	Scientific Name	WPA (1972)	IUCN
	Order: Artiodactyla			
1	Blackbuck	*Antellope cervicapra*	Schedule I	Near threatened
2	Chinkara	*Gazella bennetti*	Schedule I	Least concern
3	Nilgai	*Boselaphus tragocamelus*	Schedule II	Least concern
4	Wild pig	*Sus scrofa*	Schedule II	Least concern
	Order: Carnivora			
5	Common palm civet	*Paradoxurus hermaphroditus*	Schedule I	Lower risk
6	Desert cat	*Felis sylvestris*	Schedule I	Lower risk
7	Golden jackal	*Canis aureus*	Schedule I	Least concern
8	Indian fox	*Vulpes bengalensis*	Schedule I	Least concern
9	Indian grey mongoose	*Herpestes edwardsii*	Schedule I	Least concern
10	Indian leopard	*Panthera pardus*	Schedule I	Near threatened
11	Indian striped hyena	*Hyaena hyaena*	Schedule I	Near threatened
12	Indian wolf	*Canis lupus*	Schedule I	Least concern
13	Jungle cat	*Felis chaus*	Schedule I	Lower risk
14	Ruddy mongoose	*Herpestes smithii*	Schedule I	Least concern
15	Rusty spotted cat	*Prionailurus rubiginosus*	Schedule I	Vulnerable
16	Small Indian civet	*Viverricula indica*	Schedule I	Least concern
	Order: Lagomorpha			
17	Indian hare	*Lepus nigricollis*	Schedule II	Least concern
	Order: Pholidota			
18	Indian pangolin	*Manis crassicaudata*	Schedule I	Endangered
	Order: Primata			
19	Northern plains langur	*Semnopithecus entellus*	Schedule II	Least concern
	Order: Rodentia			
20	Indian porcupine	*Hystrix indica*	Schedule I	Least concern

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Figure 1. Camera Trap locations (black dots) in Shergarh Wildlife Sanctuary with special reference to camera trap in which pangolin was photo-captured (asterisk mark). The heat maps depicting the photo-capture intensity of human (A) & domestic dogs (B) inside the PA; (C & D) The camera trap photographs of Indian pangolin (*Manis crassicaudata*) in Shergarh Wildlife Sanctuary, Rajasthan. Inset: Location of Shergarh Wildlife Sanctuary in India and Rajasthan.