

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

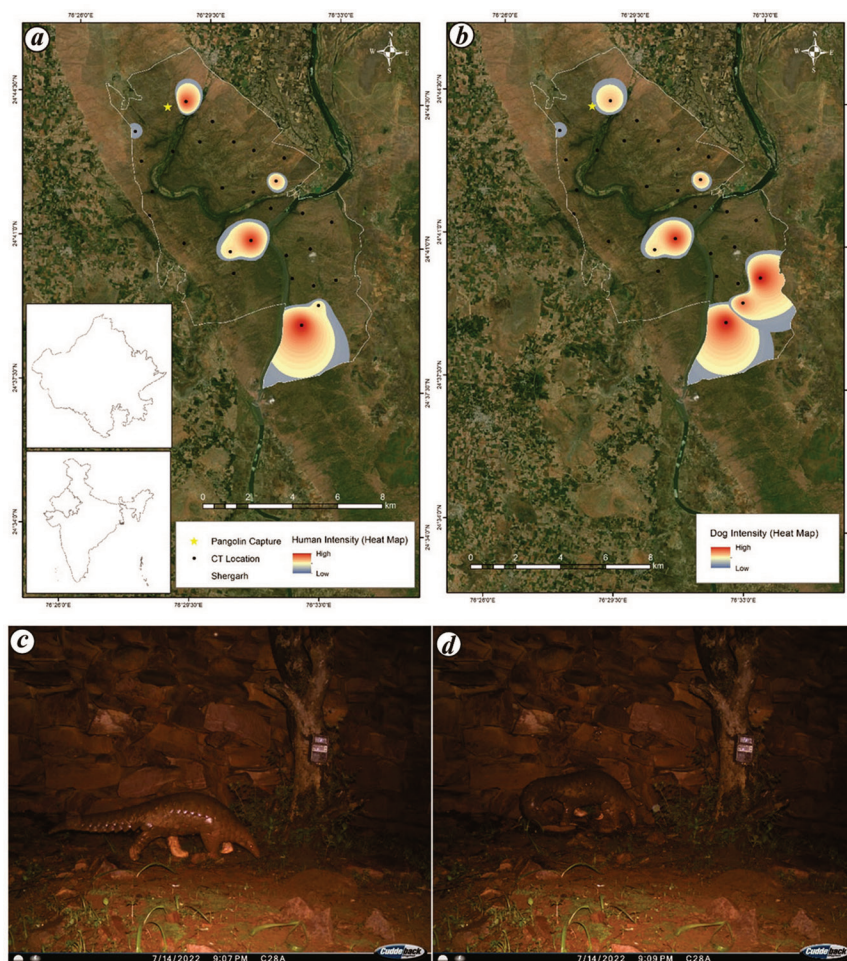
Indian pangolins or thick-tailed pangolins, *Manis crassicaudata* (the word *crassicaudata* derived from Latin words *crassus* (thick or heavy) and *cauda* (tail)), are medium-sized mammals weighing between 9 and 18 kg. They primarily feed on termites and ants, and their specialized feeding habit, known as myrmecophagy, has led to specific morphological adaptations such as a long sticky tongue and long sharp claws<sup>1</sup>. The keratinized scales of pangolins act as an armour, protecting them when they curl up into a ball (referred to as ‘pengguling’, a Malay word meaning ‘rolling up’) in response to threats<sup>2</sup>. 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<sup>3</sup>. Indian pangolins face extreme risk of extinction due to poaching, habitat loss and fragmentation<sup>4</sup>. Their 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<sup>5</sup>. Despite the wide range of pangolins, little is known about their distribution and status, except for a few presence records obtained from the semiarid regions of western India<sup>6–8</sup>, moist deciduous forests of North Bengal<sup>9</sup>, tropical moist forests of the Western Ghats<sup>10</sup> and the lower Shivalik hills of Himachal Pradesh<sup>11</sup>.

The 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 km<sup>2</sup>, and is located in the semiarid western Indian landscape (Figure 1 *a* and *b*). The forest type in Shergarh WLS is northern tropical dry deciduous forest, dominated by *Anogeissus pendula* forests and associated scrublands<sup>12</sup>. 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 corridor for the dispersing tigers in the greater Ranthambhore ecosystem<sup>13</sup>. As part of the All-India Tiger Estimation<sup>14</sup>, 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 (Figure 1 *a* and *b*). All the cameras were positioned at a height of 30–45 cm

above the ground to capture both large and small mammals<sup>15</sup>. On 14 July 2022, at 21:07 and 21:09 h two photo-captures of Indian pangolin were recorded in the camera trap ID 28 (Figure 1 *c* and *d*). This camera was deployed on an animal trail in the northern part of the sanctuary. The presence point was ~1000 m away from the nearest water point and ~2000 m from the nearest village. The broad terrain type was flat and the tree community was dominated by *A. 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 (Figure 1 *a* and *b* respectively), posing a serious threat to the conservation of this 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<sup>16,17</sup>. It is essential to enforce stringent protection measures to safeguard the remaining pangolin populations and develop an integrated conservation approach that incorporates community awareness, protection of their habitats, and mitigation of existing linear infrastructure projects passing through wilderness areas.



**Figure 1.** *a, b*, Camera-trap locations (black dots) in the Shergarh Wildlife Sanctuary, Rajasthan, India. Asterisk mark indicates the location where the Indian pangolin (*Manis crassicaudata*) was photo-captured in the Sanctuary. Heat maps depicting the photo-capture intensity of (*a*) human and (*b*) domestic dogs. (Inset) Location of the Shergarh Wildlife Sanctuary. *c, d*, Camera trap photographs of the Indian pangolin in the Sanctuary.

**Table 1.** List of mammals photo-captured during the camera-trap survey in Shergarh Wildlife Sanctuary, Rajasthan, India

Common name	Scientific name	WPA (1972)	IUCN
Order: Artiodactyla			
Blackbuck	<i>Antelope cervicapra</i>	Schedule I	Near threatened
Chinkara	<i>Gazella bennetti</i>	Schedule I	Least concern
Nilgai	<i>Boselaphus tragocamelus</i>	Schedule II	Least concern
Wild pig	<i>Sus scrofa</i>	Schedule II	Least concern
Order: Carnivora			
Common palm civet	<i>Paradoxurus hermaphroditus</i>	Schedule I	Lower risk
Desert cat	<i>Felis sylvestris</i>	Schedule I	Lower risk
Golden jackal	<i>Canis aureus</i>	Schedule I	Least concern
Indian fox	<i>Vulpes bengalensis</i>	Schedule I	Least concern
Indian grey mongoose	<i>Herpestes edwardsii</i>	Schedule I	Least concern
Indian leopard	<i>Panthera pardus</i>	Schedule I	Near threatened
Indian striped hyena	<i>Hyaena hyaena</i>	Schedule I	Near threatened
Indian wolf	<i>Canis lupus</i>	Schedule I	Least concern
Jungle cat	<i>Felis chaus</i>	Schedule I	Lower risk
Ruddy mongoose	<i>Herpestes smithii</i>	Schedule I	Least concern
Rusty spotted cat	<i>Prionailurus rubiginosus</i>	Schedule I	Vulnerable
Small Indian civet	<i>Viverricula indica</i>	Schedule I	Least concern
Order: Lagomorpha			
Indian hare	<i>Lepus nigricollis</i>	Schedule II	Least concern
Order: Pholidota			
Indian pangolin	<i>Manis crassicaudata</i>	Schedule I	Endangered
Order: Primata			
Northern plains langur	<i>Semnopithecus entellus</i>	Schedule II	Least concern
Order: Rodentia			
Indian porcupine	<i>Hystrix indica</i>	Schedule I	Least concern

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