

Sloth Bear Pede-Marking Caught on Video

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Chemical communication through scent marking plays a significant role in the behavioral lives of solitary predators, including bears. Different forms of scent marking have been documented among the bear species. Grizzly bears (*Ursus arctos*) and American black bears (*U. americanus*) have been observed scratching trees, rubbing against trees or other objects, and pede-marking — twisting their feet into the ground to apply scent (Taylor et al. 2015, Sergiel et al. 2016). Andean bears (*Tremarctos ornatus*) rub against trees and other objects (Filipczyková et al. 2017). Polar bears (*U. maritimus*) leave a scent in their tracks (Owen et al. 2014). Giant pandas (*Ailuropoda melanoleuca*) apply a waxy-sticky secretion from their anal gland on a tree or other substrate, sometimes using an elaborate handstand to do so (Kleiman 1983, Nie et al. 2012). Sloth bear (*Melursus ursinus*) scent marking has not been widely discussed, though Laurie and Seidensticker (1977) reported sloth bears rubbing and scratching trees.

The role of pede-marking in bears is not fully understood, and likely varies by species. Pedal glands, both apocrine sweat glands and holocrine sebaceous glands, are well developed in the polar bear (Owen et al. 2014). Brown bears also have relatively prominent apocrine sweat glands (Sergiel et al. 2016). Sloth bears have few prominent apocrine sweat glands on their interdigital skin or around hair follicles (Patil et al. 2016) and lack the rows of prominent apocrine sweat glands present in polar bears (Owen et al. 2014, Patil et al. 2016). It has been suggested, therefore, that sloth bear sexual behavior is likely communicated by other sources, including urine (Patil et al. 2016).

We captured 8 wild sloth bear pede-marking events on video over a period of 1.5 years (January 2014–June 2016), which may represent the first documented cases of this behavior in this species. These events were recorded by 4 camera traps, which we set to monitor sloth bear dens in eastern Karnataka, India. All of the subjects were identified as adult males. Additionally, though it is difficult to tell sloth bear individuals apart via camera-trap photograph, we could identify some individuals in multiple videos. In 1 location where we observed 3 pede-marking incidents, 2 were of the same bear and 1



Camera trap photos (extracted from videos) of wild male sloth bears sniffing and pede-marking in Karnataka, India. The pede-marking involved twisting the foot on the ground in an apparent attempt to apply scent. Left and center photos are of apparently the same bear (based on hair pattern) in the same cave doing the same behavior, a month apart. These 3 photos correspond with events 2, 4, and 8 in the accompanying table. Photos: Shanmugavelu Swaminathan.

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a different bear. The videos showed bears grinding and twisting their back feet into the ground. Some of the videos also captured the bear sniffing the ground before or after the pede-marking event. During some of the pede-marking events the bear was walking forward, while in others it was standing still while twisting and grinding the back paws. One video shows the bear intermittently pede-marking, defecating and rubbing its back side against the entrance of a cave. Pede-marking events typically only lasted a few seconds, though several of the videos captured multiple pede-marking events.

We also observed that one male captive bear at our Bannerghatta Bear Rescue Facility (an 18-year-old male that was rescued from the “dancing bear” trade) displayed the same behavior. Possibly of relevance, whereas the vast majority of male bears at our facility are castrated, this individual had been vasectomized instead.

Sloth bear pede-marking events, eastern Karnataka, India.

Event	Date	Time	Area	Sex	Comments
1	13 Jan 2014	22:59	Ramnagara	Male	Same den entrance as event #3.
2	8 Feb 2015	04:51	Gudeokotte	Male	Same den as event #4 (see photo).
3	22 Feb 2015	19:58	Ramnagara	Male	Possibly same bear as event #1 (1 year later)
4	11 Mar 2015	19:42	Gudeokotte	Male	Possibly same bear as event #2, based on fur pattern on back and strikingly similar behavior (see photo).
5	5 Jan 2016	21:21	Sulikeri	Male	Pede-marking while facing the camera, not by a den entrance.
6	14 Jan 2016	04:59	Sulikeri	Male	Sniffing and pede-marking not by a den.
7	31 Jan 2016	07:29	Sulikeri	Male	Same location as #5 and #6; appears to be the same individual as in #6.
8	7 June 2016	07:52	Ariskere	Male	Defecated twice while pede-marking, and also rubbed hind quarters on a rock near the den entrance (see photo).

The 8 videos clearly document the use of pede-marking by wild sloth bears. However, the frequency and purpose of this behavior remains uncertain. The largely nocturnal behavior of this species may be a reason why this behavior has eluded observation in the past. Our sampling was biased toward dens because that is where we set cameras, but we wondered if the behavior was intended to keep intruders away from valued den sites.

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