Camera trapping records confirm the presence of the elusive Spotted Linsang *Prionodon pardicolor* (Mammalia: Carnivora: Prionodontidae) in Murlen National Park (Mizoram, India)

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Abstract: The Spotted Linsang is an elusive and infrequently recorded small carnivore believed to be distributed widely throughout southern-southeastern Asia. Here, we present the first confirmation of this species from Murlen National Park, Mizoram, a protected area with tracts of subtropical evergreen forest less than 30 km from the western Myanmar border. These records are also the first to confirm the occurrence of the species in the southern portion of northeastern India. Although we could distinguish several individuals despite low camera-trap sampling effort, this population may be threatened by opportunistic and intentional hunting using projectiles and snares meant to kill small game for wildmeat.

Keywords: Conservation, distribution, new record, northeastern India, small carnivore, snares.

The Spotted Linsang *Prionodon pardicolor* is a small, nocturnal carnivore native to southeastern Asia and parts of eastern southern Asia (Jennings et al. 2015; Duckworth et al. 2016). Based on what little is known of this elusive species, linsangs are solitary and partially arboreal; however, very little is known about their behaviour (Lim 1973; Kuznetzov & Baranauskas 1993; Gaubert 2009). Previously classified as part of the Viverridae, linsangs are now classified in their own family, the Prionodontidae, which is considered a sister taxonomic group to the Felidae (Barycka 2007).

Spotted linsangs inhibit dense moist tropical forests, particularly lowland dipterocarp forests and some grasslands, throughout southeastern Asia (Sunquist 1982). Although information are lacking on their distribution ranges, they are known to occur in eastern Nepal, northeastern India, Bhutan, northern & central Myanmar, northern & central Thailand, Lao PDR, Cambodia, most of Vietnam, and central to southern China (Van Rompaey 1995; Zhang et al. 1997; Walston 2001; Holden & Neang 2009; Choudhury 2014). In India, the species has been recorded in the states of Assam (Choudhury 2004; Borah 2010), Mizoram (Mizo-Envis 2008; no details given), Manipur (Ramakantha 1994; Envis 2005), Nagaland (Choudhury 2002, 2013), Sikkim (Ganguli-Lachungpa 1989; Schreiber et al. 1989), Arunachal Pradesh (Singh et al. 1996; Choudhury 1999; Kumar 1999; Datta et al. 2008), Meghalaya (Khatonier &
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Despite its rarity in northeastern India (Choudhury 1999) and the infrequency with which it is generally detected range-wide, the spotted linsang is listed as ‘Least Concern’ on the IUCN Red List of Threatened Species (Duckworth et al. 2016). However, it is considered a CITES Appendix I species and a Schedule I species by the Indian Wildlife (Protection) Act (1972).

Recently, there have been no direct efforts to research Spotted Linsangs in northeastern India, as only some opportunistic records exist. This report is part of a larger study to assess the diversity of and threats to small carnivores, with particular reference to felids and their relatives, in eastern Mizoram, a biodiversity hotspot of the Indo-Burma region.

**Materials and Methods**

Our study site occurred in the part of Murlen National Park (MNP) (23.53–23.7°N & 92.21–92.45°E), which is located in the Champhai district of Mizoram and is part of the Indo-Burman Biodiversity Hotspot (Myers et al. 2000). This protected area covers 100 km² and the recorded peak elevation is 1,929 m within the park. (highest point is recorded inside the park by gps) (Amit Kumar Bal’s pers. obs.). The predominant forest types occurring in the park are tropical and subtropical mixed evergreen forests, which are distributed across undulating hills and mountainous terrain (Sharma et al. 2017). Several ongoing human activities such as logging, encroachment of livestock inside the park, widespread Jhum cultivation, and illegal hunting using firearms, snares, and other projectiles has severely threatened the wildlife diversity of MNP. (Amit Kumar Bal’s pers. obs. between November 2019 – May 2022).

Our sampling occurred as part of an exploratory survey between November 2019 and May 2022. We initially overlaid a grid cell network of 1 x 1 km² over the area of MNP and deployed ten Cuddeback (WI, USA) C1 type digital camera-traps (20.0 megapixel) enabled with a white flash. Camera-traps were enabled to take three photos in rapid succession every time the motion sensor was triggered. Each camera-trap was installed for 40 days with a trap night of 400 days. Camera trap stations were spaced 1 km apart from nearby traps (average trap distance = 910 m). Camera-trap sensitivity was set low (minimum value), and units were placed between 1.8–4.5 m away from an animal trail, depending on the angle of intersection, so that each camera had sufficient time to detect an animal (i.e., specifically small carnivores), and take full-frame pictures. Individuals of certain carnivores, including spotted linsangs, were identified from their unique pelage markings/patterns in photographs.

**Records**

We obtained six images of spotted linsangs from six camera-trap stations over 400 trap nights in and around MNP (Image 1). The first individual was captured on 20 February 2020 (23.6586°N, 93.3004°E) at an elevation of 1,563 m, and the last was photographed on 26 March 2022 (23.6354°N, 93.2907°E) at an elevation of 1,800 m. We used right flanks only to identify a minimum of four different individuals (Image 2) in these six photographs; the other photos of left flanks may or may not have represented additional individuals. These are the first ever confirmed photographic records of this species from Mizoram, validating a previously suspected range extension further south into northeastern India and the Myanmar border (Figure 1). The characteristics of all records are mentioned in the table below (Table 1).

On 28 January 2022, we also discovered the carcass of a Spotted Linsang (Image 3) in the house of a local hunter in the village Murlen. After some discussion with locals to determine the reason for this individual’s death, we identified that it was shot and killed by a handheld catapult or slingshot (Image 4), a local weapon that is often used by children in the area to kill birds for food and to sell locally. The hunter initially thought the species was a leopard cat when he first saw it. Despite being a lifelong resident of the region, he told us he had never seen this species before, noting that the bones, claws, and teeth of leopard cats were somewhat valuable for sale locally. He also told us that, as far as he knew, other local hunters had never encountered spotted linsangs before, and thus they don’t consume its meat. The specimen was a female, and it measured at 69 cm from snout to tail, of which the tail was 35 cm in length (Image 3).

**Conservation Implications**

Possibly due to their arboreal, nocturnal nature and ambush predatory tactics (Van Rompaey 1995; Lyngdoh et al. 2011), there are only a handful of camera-trap records of spotted linsangs across their range. Despite their ‘Least Concern’ status, this may be cause for concern, as habitat loss and degradation, hunting and trade all remain important threats to the species (Schreiber et al. 1989; Lau et al. 2010; Bhupathy et al. 2013). Although the risk of linsangs being killed by hunters or poachers may be lower relative to other more terrestrial, diurnal, and gregarious mammals (Duckworth et al. 2016), the observation we report here still suggests they are vulnerable to local opportunistic hunters (Amit Kumar Bal’s pers. obs. between November 2019 – May 2022).
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Figure 1. Range extension of spotted linsang further south into northeastern India added on IUCN global distribution map of Spotted Linsang.

Image 1. Murlen National Park showing camera trap locations of Spotted Linsang captures.
In the Lower Subansiri district of western Arunachal Pradesh, indiscriminate noose-traps (i.e., snares) kill spotted linsangs (Lyngdoh et al. 2011), and Datta et al. (2008) suggested they are also killed for ornamental purposes (i.e., their skins & pelts for display) and in retribution for killing poultry. These threats suggest that diverse threats from opportunistic hunting still persist in some parts of the linsang range. To better understand the ecology and potential threats of this little-known species, we urge additional range-wide surveys and local studies specifically targeting linsangs and their behaviour highlighting its proper global conservation context.

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