Coat colour variation in Common Palm Civet in Satkosia, eastern India calls for the need to revisit taxonomic and distribution status

Aberrant colouration has been reported widely in pelage of mammals and can vary due to environmental and geographical variations (Taylor et al. 1990). While it is known that the aberration is due to genetic mutations affecting the melanin metabolic pathway, the exact mutation responsible cannot be confirmed by limited visual observations of phenotype in wild individuals. The extent and appearance of albinism varies and can be broadly described as complete albinism or leucism or partial albinism.

Image 1. (A) Photograph of partial albino individual of common palm civet captured in camera trap on 13 March 2020 at 2057 hours in Satkosia Tiger Reserve. (B) Photograph of partial albino individual showing unpigmented fur in band like pattern, captured on 19 May 2020 at 0012 hours in Satkosia Tiger Reserve. (C) Photograph of normal coat colour individual of common palm civet (captured in the same area as (A) on 14 April 2020 at 0311 hours. © K. Ramesh/WII/Odisha Forest Department.

Three species are defined within the genus *Paradoxurus* (Cuvier, 1821), one of which is the Common Palm Civet *Paradoxurus hermaphroditus* (Pallas, 1777), also known as Asian Palm Civet or Indian Palm Civet. It is a small mammal belonging to the family Viverridae. It is distributed in southern and southeastern Asia (Patou et al. 2010; Veron et al. 2015). Coat colour variations have been described within *Paradoxurus hermaphroditus* based on the specimens collected from eastern India and also used as a basis to provisionally describe sub-species (*nictitatans*) and new species (*jorandensis*) (Taylor 1891; Pocock 1934; Ali et al. 1988). Coat colour variation in Common Palm Civet has been previously reported by Sharma (2004) and Chunekar et al. (2017). We report the partially albinistic individuals of Common Palm Civet, photo-captured in Satkosia Tiger Reserve.

Satkosia Tiger Reserve (946 km^2) is located in Odisha, India (Figure 1). The vegetation of Satkosia largely conforms to north Indian moist deciduous forest, northern tropical dry deciduous forest, and moist peninsular low-level Sal. Terrain is undulating

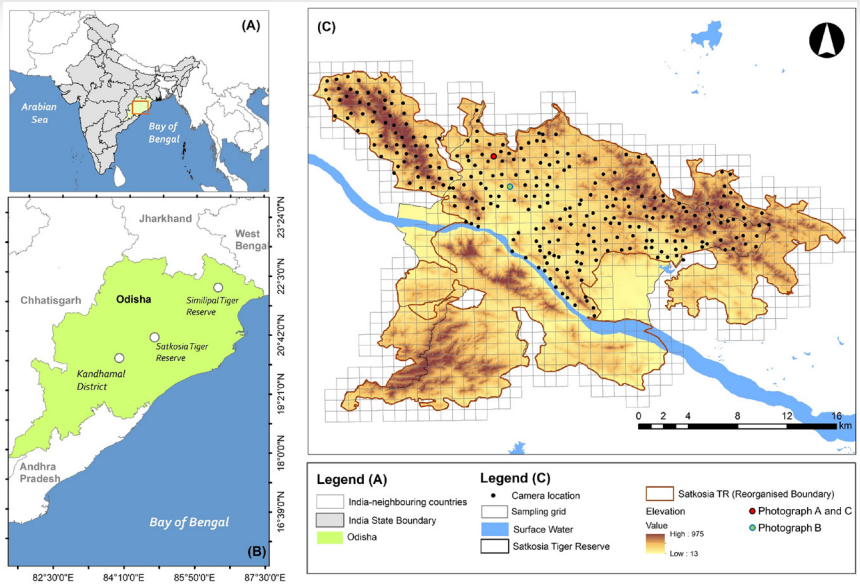

Figure 1. Map showing (A) location of Satkosia Tiger Reserve in India, and (B) in Odisha (C) Location of camera traps and sightings.

to hilly with maximum elevation of 992 m (Figure 1). Temperature varies from 4 to 48 ^{0}C. Climate is warm and humid with short winters.

The photographs were captured in the camera traps that were installed within a 2-km^2 sampling grid to monitor tiger movement and prey distribution. The cameras were deployed on trees, at a height of approximately 1 m, with a delay of 10 seconds and medium flash intensity, for a duration of 45 days. Systematic monitoring in Satkosia Tiger Reserve was being carried out since May 2018, but it was mainly focussed on the eastern part of the reserve. The western part of the reserve that concerns this study was surveyed for the first time since 2018. No repeat sightings had been observed in other parts of the reserve.

The photograph of a partial albino individual of Common Palm Civet was captured at two locations in Majhipada Reserve Forest in Satkosia Wildlife Division (20.6953^0 N, 84.7669^0 E) (Figure 1). It has dry deciduous forest mainly comprising of Sal *Shorea robusta*, Dhaura *Anogeissus latifolia*, Karada *Cleistanthus collinus* and Asana *Terminalia arjuna*. The elevation ranges between 200 and 350 m and has a gentle slope of less than 10 degrees. The photograph (Image 1A) was captured on 13 March 2020 at 2057 h and shows that the body below the shoulders has creamish-whitish fur, without any visible marks or spots. Similarly, tails and legs lack any pattern or pigmentation. The fur is pigmented only behind the ears and near eyes and close to the muzzle. White patches on the head below eyes are distinctly visible. Around the same area (Figure 1), we recorded another individual having unpigmented (creamish) band of fur near abdomen and the middle section of the tail (Image 1B). Image 1C shows an individual with normal coat colour and was captured in the same camera on 14 April 2020. It shows distinct markings as described for *Paradoxurus hermaphroditus* (Pocock, 1939). Pocock (1939) described the coat in species *hermaphroditus* has longitudinal stripes on the back, spots on the sides, shoulders, and thighs. White patches occur on head on a black ground, on each side of muzzle, and also below the eye (subocular). Veron et al. (2015) observed variation in the face pattern in specimens from northern India having a white patch. Some rare specimens collected previously from Kandhamal (Kondamal or lower Bengal

of pre-independence India) (Figure 1) have been observed to have only the head and shoulders normally coloured and rest of the body is white. Taylor (1891) described it as partial albinism and as subspecies *nictitatans* (similar to the pattern in Image 1A). Two other specimens from this region having broad band of white fur and some parts of tail as white were admitted as potentially different race due to limited specimen availability by Pocock (1939). Similar observations were made by Ali et al. (1988) in specimens collected near Similipal Tiger Reserve, Odisha (Figure 1) and the type of coat pattern was described as a new species *Paradoxurus jorandensis*. While there is no molecular evidence to support splitting of the species, our findings (Image 1B) suggest distribution of this particular coat pattern beyond Similipal region.

Conclusion regarding the exact genetic mutation causing this phenotype cannot be made without conducting a genetic analysis. This could possibly be described as leucism or partial albinism based on the limited photographic observation of pelage. Veron et al. (2015) have suggested possibility of at least two sub-species within the Indian region. Since coat colour variations are often influenced by climate and geography, further investigation using both morphologic (and pelagic) characteristics and molecular data are suggested. Therefore, a study that incorporates samples/specimens from Indian region specifically from eastern India is required to validate the existence of sub-species within *Paradoxurus hermaphroditus*, which has been lacking in earlier studies (Patou et al. 2010; Veron et al. 2015).

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Acknowledgements: We thank Odisha Forest Department, National Tiger Conservation Authority and Wildlife Institute of India for supporting the study. We are thankful to the beat guards and watchers who assisted in deployment of camera.

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Citation: Vasudeva, V., G. Behera, S.P. Behera, S.K. Panda, P. Ramasamy, P.R. Karat, S.K. Gupta & K. Ramesh (2021). Cost colour variation in Common Palm Civet in Satkosia, eastern India calls for the need to revisit taxonomic and distribution status. Mammal Tales #32, In: *Zoo's Print* 36(6): 15–17.