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A golden turtle in Nepal: First country record of chromatic leucism in the Spotted Northern Indian Flapshell Turtle, *Lissemys punctata andersoni*

Kamal Devkota^{1,*}, Dev Narayan Mandal², and Hinrich Kaiser³

The Indian Flapshell Turtle, *Lissemys punctata* (Bonnaterre, 1789) is a fairly common softshell turtle species with a distribution from Pakistan into Myanmar and throughout peninsular India (Bhupathy et al., 2014). It has been recorded throughout lowland Nepal up to an elevation of ca. 400 m (Schleich and Kästle, 2002; Shah and Tiwari, 2004), where it is regarded as the subspecies *L. p. andersoni* Webb, 1980 (Bhupathy et al., 2014). *Lissemys punctata* can be active throughout both day and night, primarily in shallow, densely vegetated bodies of water including ditches, lakes, ponds, and paddy fields with stagnant water. It is omnivorous in nature and its diet includes aquatic vegetation, leaves, flowers, fruits, snails, fish, and even frogs (Schleich and Kästle, 2002; Shah and Tiwari, 2004; Hossain et al., 2012; Bhupathy et al., 2014). Unfortunately, this is a species that is highly exploited for food and medicine throughout its range (e.g., Krishnakumar et al., 2009; Bhupathy et al., 2014; Rahman et al., 2015; Rathoure, 2018), and while it is categorised as a species of Least Concern in the International Union for Conservation of Nature's *Red List of Threatened Species*, it is protected from international trade by its inclusion on Appendix II of the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (Asian Turtle Trade Working Group, 2000).

Among the variety of colour aberrations occurring in turtles, ranging from the near-complete lack of colour in animals with albinism and leucism to very dark, melanistic individuals (e.g., Mahabal and Thakur, 2014), a golden yellow colour is perhaps the most dazzling variant. In albinism and leucism there generally is a complete lack of pigments in the body, resulting in an overall white colour, which in leucism combines with pigmentation of only the irises of the eye (Bechtel, 1991; Fleck et al., 2016). A golden colour, on the other hand, may be produced when a lack of melanin in the upper dermis, the dense skin layer where body colouration is produced (Bagnara, 1966; Bagnara and Ferris, 1971; Bechtel, 1991), paves the way for xanthophores, cells containing an abundance of yellow pteridine pigments and unaffected by the genetic effects of albinism or leucism, to dominate colour production. In addition, such hypomelanistic individuals may display dark eye



Figure 1. An Indian flapshell turtle (*Lissemys punctata andersoni*) with normal greyish green body colouration from Dhanusha Khoyr, Dhanushadham Municipality, Dhanusha District, Nepal. Of particular note in this subspecies are the yellow markings on the side of the neck and the yellow spots on the carapace. Photo by Dev Narayan Mandal.

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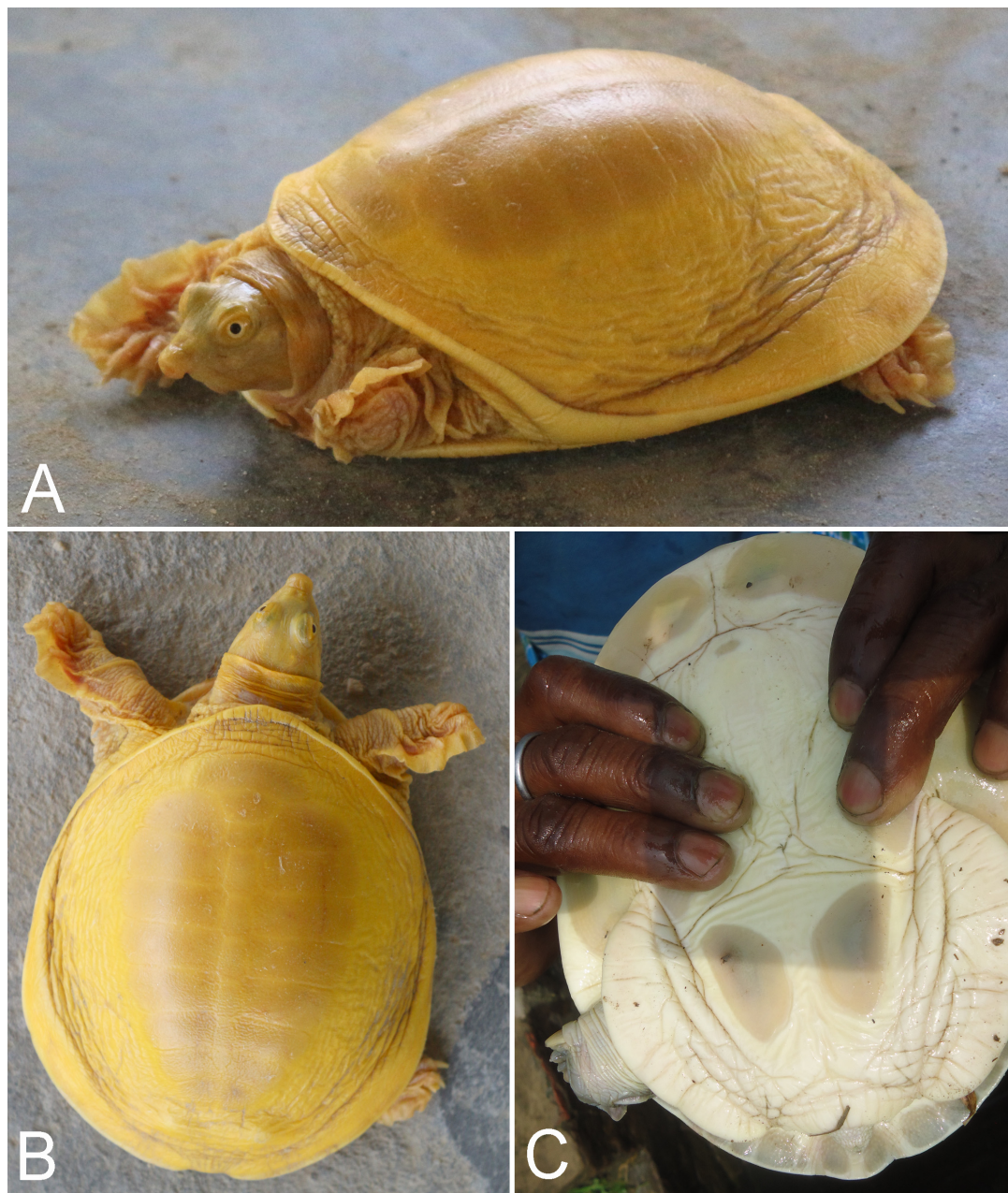


Figure 2. A golden individual of *Lissemys punctata andersoni* from southeastern Nepal displaying the symptoms of chromatic leucism. (A) Side view to show overall colouration and the fully pigmented eyes. (B) Dorsal view, shown to juxtapose the bright golden colouration in areas with thicker skin (along the edges of the carapace) with the more subdued colouration in areas with thinner skin (on the top of the carapace). (C) Ventral view, showing the plain white covering over most of the plastron, with some darker areas where the dermal bone of the plastral callosities darkens the skin. The image in (C) was rotated 180° to match the orientation of the turtle in (B). Photos by Dev Narayan Mandal.

colour, giving rise to a more colourful form of leucism, which can be described as chromatic leucism.

The normal colouration of *L. p. andersoni* includes a greenish grey body with yellow markings on the head and neck, and a grey carapace dotted with dark yellow spots (Fig. 1). Chromatic leucism in turtles has been reported previously in *L. p. vittata* by D'Abreu (1928; as *Emyda granosa intermedius*) and Vyas (1997; as *L. punctata*), *L. p. punctata* by Cyril Rufus (2009; as *L. punctata*), and *Pangshura tentoria* (Basu et al. 2002; as *Kachuga tentoria circumdata*). Leucism and chromatic leucism appear to be relatively uncommon among reptiles in nature (Devkota et al., 2020). Herein we document the first instance of chromatic leucism in *L. punctata* in Nepal, which is the first for the northern subspecies of *L. punctata* and the fifth documented observation in the species.

On 14 April 2018 we received word from a villager of Dhanusha Khoir, Dhanushadham Municipality, Dhanusha District, Nepal (26.8257°N, 86.0550°E, elevation 101 m) that he had rescued a golden turtle at 1045 h that morning. When DNM received the animal, he identified it as an Indian flapshell turtle displaying chromatic leucism. The lack of body pigmentation made the turtle appear a golden colour, with only the eyes showing a dark pigmentation (Fig. 2A, B). The venter had a relatively normal colouration (Fig. 2C), which usually is a creamy white. After photography, the turtle was released into the habitat in which it was discovered.

Colour aberrations are quite rare in nature because the affected individuals may be disadvantaged in their environment. For instance, a normally coloured *L. punctata* is much better camouflaged in the murky, greenish, aqueous environment the species frequents than a gold-coloured individual. Whereas genetically driven conditions such as chromatic leucism would be exposed to intense negative selective pressure in nature, such aberrant animals are highly valued in the pet trade: the recent discovery of a golden *L. p. vittata* in Odisha, India became a viral sensation and made international news (e.g., Gupta and Guy, 2020).

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