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An unusual aberrantly coloured frog: First record of complete leucism in the Indian Bull Frog, *Hoplobatrachus tigerinus* (Daudin, 1802)

Swastik P. Padhy[1,2], Harshit Chawla[1,3], and Robin Suyesh[1,*]

Pigmentation in anurans is primarily under the control of two types of cells: i) melanophores, containing melanosomes that are responsible for dark colouration; and ii) chromatophores, containing coloured pigments (Bhattacharya et al., 1976; Hoffman and Blouin, 2000). Chromatophores can further be categorised into xanthophores (containing red and yellow pigments) and iridiophores (containing reflecting chromatophores) (Rudh and Qvarnström, 2013). These cell types work in association to develop different skin colourations, and any alteration in pigment production could lead to changes in the expected colour and cause phenotypic abnormalities in pigmentation (Rudh and Qvarnström, 2013). Several types of colour aberrations have been reported in anurans, of which include the following seven: i) leucism (de Lima Moraes and Kaefer, 2015); ii) albinism (Toledo et al., 2011); iii) melanism (Henle and Dubois, 2017); iv) piebaldism (García-Padrón and Bosch, 2019); v) axanthism (Hall et al., 2018); vi) erythrism, (West and Allain, 2020); and vii) xanthochromism (Allain and Goodman, 2017). The most frequent ones include, leucism (total or partial loss of pigmentation except in body margins and the eyes, occurring mostly in patches), albinism (complete absence of pigmentation, including the eyes which appear red or pink) and melanism (total or partial blackening of skin). These colour anomalies have a negative consequence on the individual's survival and reproduction. Nature generally selects against abnormally pigmented individuals because their abnormal colouration makes them immunologically weak and increases their vulnerability to predation by reducing their camouflage. Thus, such animals do not reach the adult stage and pigmentation anomalies are very rarely observed in nature (Krecsák, 2008; de Lima Moraes and Kaefer, 2015; Izquierdo et al., 2018).

Here, we report on the first case of complete leucism in the Indian Bull Frog, *Hoplobatrachus tigerinus* (Anura: Dicroglossidae: Dicroglossinae) (Frost, 2022). This observation is a rare case, where the individual is completely white. Widespread throughout the Indian subcontinent (Nepal, Bhutan, Bangladesh, Northern Pakistan, and India), this species is identified by its large size, olive green or yellowish colouration, which becomes bright lemon yellow in breeding males, and a light-yellow vertebral streak (Daniels, 2005; Frost, 2022). The Indian bull frog is a voracious feeder with a predominantly carnivorous diet that includes insects and small birds (Daniels, 2005), other anurans (Tripathi, 2018; Gautam and Bhattarai, 2020), and rodents and snakes (Deshmukh et al., 2020). This species occupies diverse habitats, is generally slow moving, not shy of human presence and has been known to escape the dry season by burrowing 2–3 m deep in the soil (Daniels, 2005).

At 09:25 h on 3 December 2021, HC encountered a completely leucistic adult *H. tigerinus* along the banks of the Suheli River, Dudhwa Tiger Reserve, Kheri District, Uttar Pradesh, India (28.4929°N, 80.6140°E, elevation 178 m) (Fig. 1A). The individual exhibited a nearly complete white body, except at the eyes which showed no signs of depigmentation (typical of albinism) and a few discontinuous pigmented bands on the body. Even the tympana were nearly completely without colour (Fig. 1B).

The cause of such abnormalities has scarcely been studied. Most colour anomalies are congenital and

[1] Department of Environmental Sciences, Sri Venkateswara College, University of Delhi, Dhaula Kuan, New Delhi 110021, India.
[2] Department of Ecology, Evolution and Behavior, University of Minnesota, Saint Paul, Minnesota 55108, USA.
[3] Department of Policy and Management Studies, TERI School of Advanced Studies, New Delhi 110070, India.
[*] Corresponding author. E-mail: robins@svc.ac.in