



# Albinism and Leucism in Free-ranging Snakes Rescued in Gujarat and Tamil Nadu, India

Soham Mukherjee<sup>1</sup> and Ram Mohan<sup>2</sup>

<sup>1</sup>NAJA India, Ahmedabad, Gujarat, India (soham.naja@gmail.com)

<sup>2</sup>Department of Biology, Indian Institute of Science Education and Research, Pune, India

Coloration in animals can play a role in camouflage, mimicry, warning (aposematism), or physiological functions (Caro 2005) and can change due to age, season, diet, and health conditions (Mahabal et al. 2019). Abnormal variations in color include albinism, leucism, melanism, and piebaldism (Abreu et al. 2013; Lucati and López-Baucells, 2017). Albinism refers to a congenital absence of pigmentation due to a complete or partial lack of melanin expressed as reduced integumentary and retinal pigmentation (Deshmukh et al. 2020). Leucism, caused by a recessive allele (Owen and Skimmings 1992), is a partial loss of pigmentation (Wareham 2005). Albinos typically have pink eyes, whereas leucistic individuals have normally pigmented dark eyes (Wareham 2005).

In Indian snakes, leucism and albinism have been reported previously in the Indian Rock Python (*Python molurus*), Spectacled Cobra (*Naja naja*), Russell’s Viper (*Daboia russelli*), Common Trinket Snake (*Coelognathus helena helena*), Common Kukri Snake (*Oligodon arnensis*), Common Sandboa (*Eryx conicus*), Red Sandboa (*Eryx johnii*), Green Keelback (*Rhabdophis plumbicolor*), Checkered Keelback (*Fowlea piscator*), Common Wolfsnake (*Lycodon aulicus*), Common Krait (*Bungarus caeruleus*), Lesser Black Krait (*Bungarus lividus*), and Indian Ratsnake (*Ptyas mucosa*) (Mallik et al. 2009; Vyas 2009; Vyas et al. 2012; Mahabal and Thakur 2014; Patel and Tank 2014; Adimallaiah and Vyas 2015; Thombre and Dhande 2015; Hussain et al. 2016; Kumbar et al. 2016; Lobo and Sreepada 2016; Narayana et al. 2016; Chaudhuri et al. 2018; Thakur and Trivedi 2018; Mohalik and Kar 2019; Ashaharaza et al. 2020; Deshmukh et al. 2020; Ray and Pandey 2020; Sawant and Parmar 2020; Choure et al. 2021).

Herein we present observations spanning the years from 2007 to 2019 of leucism and albinism in six species of Indian snakes, three Common Kraits (*Bungarus caeruleus*), two

Common Sandboas (*Eryx conicus*), two Spectacled Cobras (*Naja naja*), a Common Wolfsnake (*Lycodon aulicus*), two Common Trinket Snakes (*Coelagnathus helena helena*), and an Indian Ratsnake (*Ptyas mucosa*), from the states of Gujarat and Tamil Nadu (Table 1). All observations resulted from rescue efforts. In India, where human-snake encounters are extremely common, citizen-science initiatives that include snake rescuers and review snake-rescue data can provide researchers with crucial baseline information on a variety of issues, including color abnormalities.

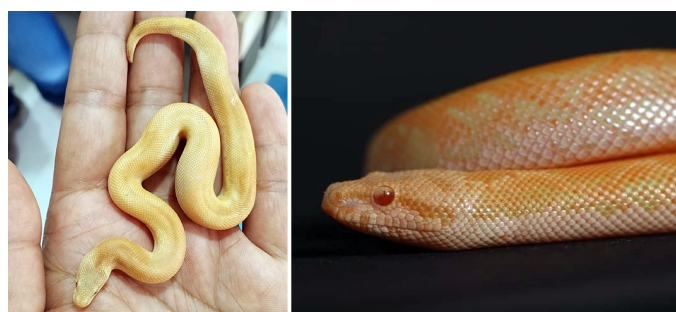
Color abnormalities, especially a lack of pigmentation, can be detrimental to the survival of animals (Caro 2005). However, seven of the 11 snakes recorded herein were adults or subadults and all were healthy. Nocturnal species, such as *Bungarus caeruleus* and *Lycodon aulicus*, probably survived until adulthood due to the elusive nature of nocturnal snakes that could reduce predatory pressure (Krecsák 2008).



**Fig. 1.** Leucistic Common Kraits (*Bungarus caeruleus*) rescued on 23 April 2015 and 1 September 2007 (inset) in Vejalpur, Ahmedabad, Gujarat, India. Photographs by Soham Mukherjee.

**Table 1.** Albino or leucistic snakes rescued from 2007 to 2019 in Gujarat and Tamil Nadu, India.

| Species  | Abnormality | Age & Size         | Location & Date  | Remarks (Rescuer or Observer)   |
|--|-------------|--------------------|--|---|
| Common Krait<br>( <i>Bungarus caeruleus</i> )          | Leucistic   | Adult<br>104 cm    | Vejalpur, Ahmedabad,<br>Gujarat; 23 April 2015         | Rescued at 0200 h from an urban area near a garbage dump (S. Mukherjee) (Fig. 1)        |
|  | Leucistic   | Adult<br>84 cm     | Vejalpur, Ahmedabad,<br>Gujarat; 1 September 2007      | Rescued at 1230 h from the same locality as above (S. Mukherjee) (Fig. 1 inset)         |
|  | Leucistic   | Subadult<br>69 cm  | Vejalpur, Ahmedabad,<br>Gujarat; 14 July 2012          | Rescued at 1230 h from the same locality as above (S. Mukherjee)                        |
| Common Sandboa<br>( <i>Eryx conicus</i> )              | Albino      | Neonate<br>13 cm   | Shahibaug, Ahmedabad,<br>Gujarat; 14 July 2019         | Rescued from a house in an urban area (S. Mukherjee) (Fig. 2)                           |
|  | Albino      | Juvenile<br>30 cm  | Navsari, Gujarat<br>22 July 2017                       | Rescued in an urban residential area (C. Mehta) (Fig. 2)                                |
| Spectacled Cobra<br>( <i>Naja naja</i> )               | Albino      | Subadult<br>81 cm  | Racharda Village, Ahmedabad,<br>Gujarat; 23 April 2016 | Rescued from a villager's house in a rural area (Y. Rafique) (Fig. 3)                   |
|  | Albino      | Adult<br>120 cm    | Chengalpattu, Tamil Nadu<br>12 October 2019            | Female; ticks on venter; dug out of a rice field (A. Kartik) (Fig. 3)                   |
| Common Wolfsnake<br>( <i>Lycodon aulicus</i> )         | Albino      | Adult<br>61 cm     | Jambughoda, Vadodara,<br>Gujarat; 2016                 | Rescued from a rural house near the Jambughoda Wildlife Sanctuary (T. Kureshi) (Fig. 4) |
| Common Trinket Snake<br>( <i>Coelognathus helena</i> ) | Albino      | Juvenile<br>~17 cm | Vaso Village, Gurata<br>29 September 2011              | Healthy; rescued from a house (V. Mistry)   |
|  | Albino      | Juvenile<br>~17 cm | Vaso Village, Gurata<br>7 October 2011                 | Healthy; rescued from a pile of bricks in a house (V. Mistry and M. Patel) (Fig. 4)     |
| Indian Ratsnake<br>( <i>Ptyas mucosa</i> )             | Albino      | Subadult<br>130 cm | Madurai, Tamil Nadu<br>2019                            | Male (A. Kartik) (Fig. 4)   |

**Fig. 2.** Albino Common Sandboas (*Eryx conicus*) rescued from Shahibaug, Ahmedabad (neonate; left) and from Navsari, Gujarat, India (juvenile; right). Photographs by Soham Mukherjee (left) and Dr. Yasser Rafique (right).**Fig. 3.** Albino Spectacled Cobras (*Naja naja*) from Racharda Village, Ahmedabad, Gujarat (left), and Chengalpattu, Tamil Nadu, India (right). Photographs by Sagirahmed Khan (left) and Ajay Kartik (right).

Interestingly, diurnal species like *Ptyas mucosa* and *Naja naja*, had also survived to become healthy subadults or adults. We speculate that the overall low detectability of snakes enables survival in human-dominated landscapes despite abnormalities in pigmentation.

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**Fig. 4.** An albino Common Wolfsnake (*Lycodon aulicus*) from Jambughoda, Vadodara, Gujarat (left), Common Trinket Snake (*Coelognathus helena*) from Vaso Village, Gujarat (center), and Indian Ratsnake (*Ptyas mucosa*) from Madurai, Tamil Nadu, India (right). Photographs by Dr. Yasser Rafique (left), Mehul Patel (center), and Ajay Kartik (right).

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