



# Albinism in Snakes Rescued in Surat, India

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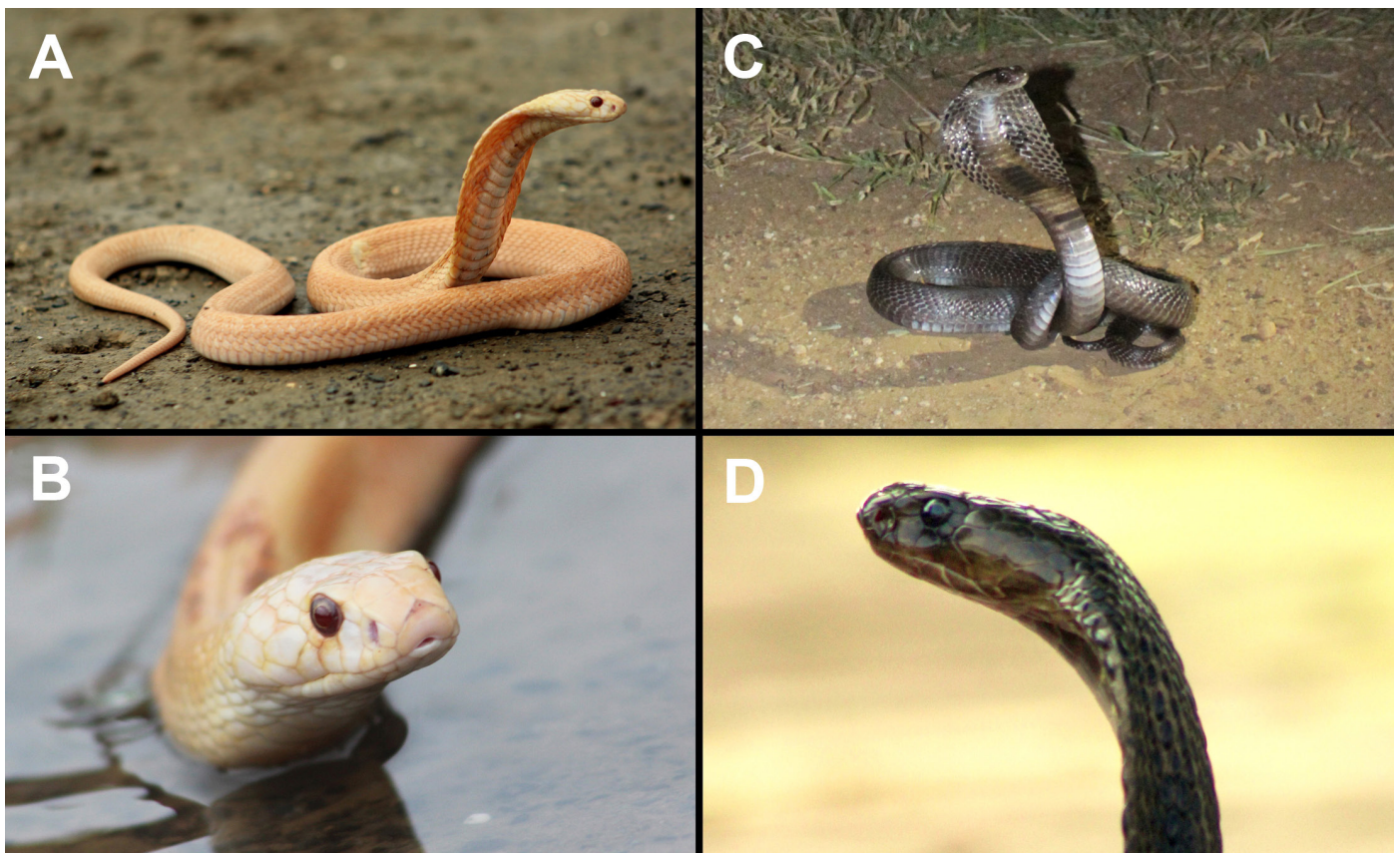
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**A**lbinism is a congenital hypopigmentation disorder that is characterized by a complete or partial lack of melanin (e.g., Cyril 2009). If the condition affects both skin and eye melanophores, it results in complete albinism; such albinos are recognized by pinkish-yellowish skin and reddish eyes in life. If the disorder affects only skin or eye melanophores, it leads to incomplete or partial albinism. Partial albinism is expressed as achromatic areas on various parts of the body (Spadola and Insacco 2010).

Albinism occurs in all vertebrates, including reptiles, although its occurrence in snakes in nature is rare, especially

in adults (Ferri and Bettiga 1992). Individuals with partial albinism are more frequently seen in small, isolated populations (Holyoak 1978; Bensch et al. 2000). Estimates of the ratio of albinism in wild vertebrates vary from 1:10,000 to 1:30,000 (Bechtel 1995). In general, cases of total (complete, true or pure) albinism are very rare in nature (Jadhav et al. 2014).

Albinos often are stillborn or malformed and have low survival rates, easily eliminating them from populations. The associated color defects have negative effects on fitness, feeding, and reproduction (Krečsák 2008). A literature review



**Fig. 1.** Spectacled Cobra (*Naja naja*): (A) Rescued albino (114.3 cm total length) from Olpad, Surat; (B) Head of albino showing the red eye; (C) Typically colored snake; (D) Head of typically colored snake showing the pigmented eye. Photographs by Krunal Trivedi.

revealed at least 70 examples of aberrant colors and unusual patterns recorded from 21 species of Indian reptiles, including snakes, turtles, and crocodiles (Mahabal and Thakur 2014).

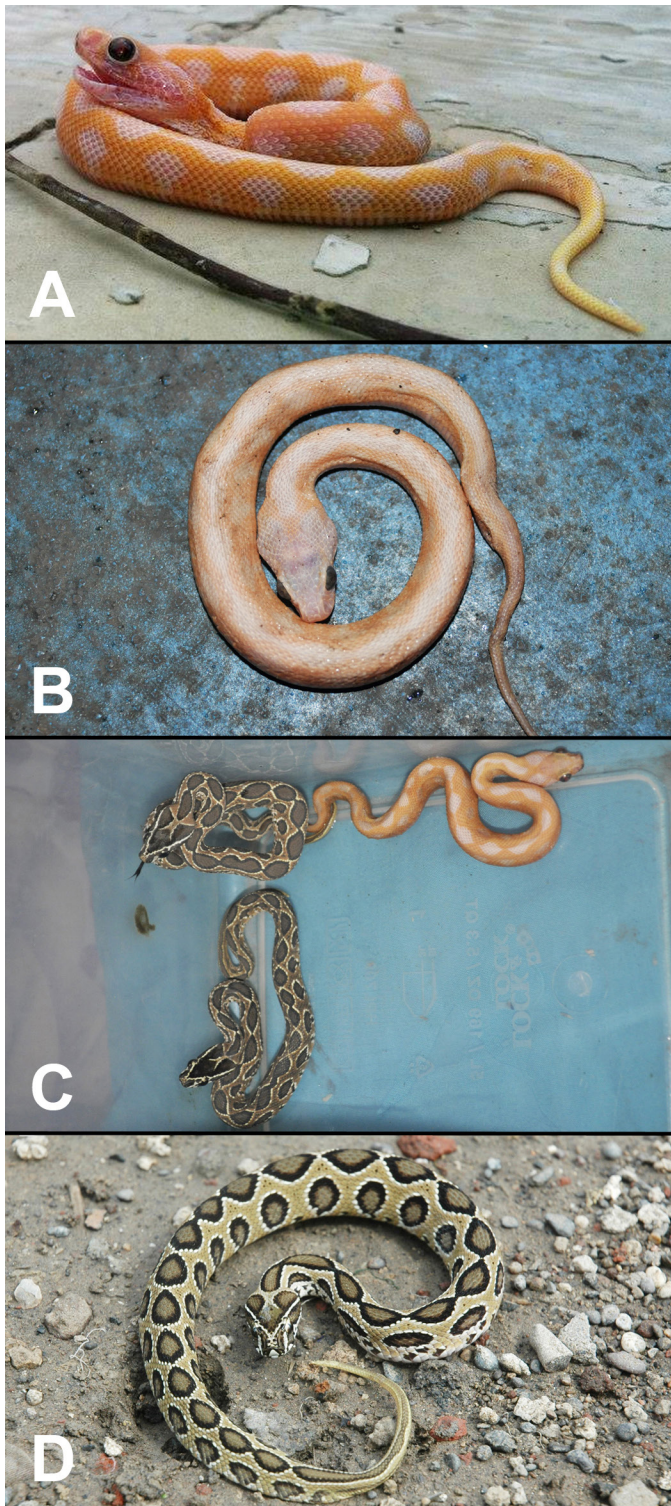
Surat is a city in southern Gujarat with a variety of aquatic and terrestrial habitats, resulting in a rich diversity of flora and fauna. Various non-governmental animal welfare organizations respond to distress calls regarding snakes in and around Surat city. Although the majority of the snakes rescued from 2010 to 2017 displayed normal coloration and patterns, eleven rescued snakes were complete or partial albi-

nos. After examination, all were released in suitable habitat in proximity to the original sites of capture.

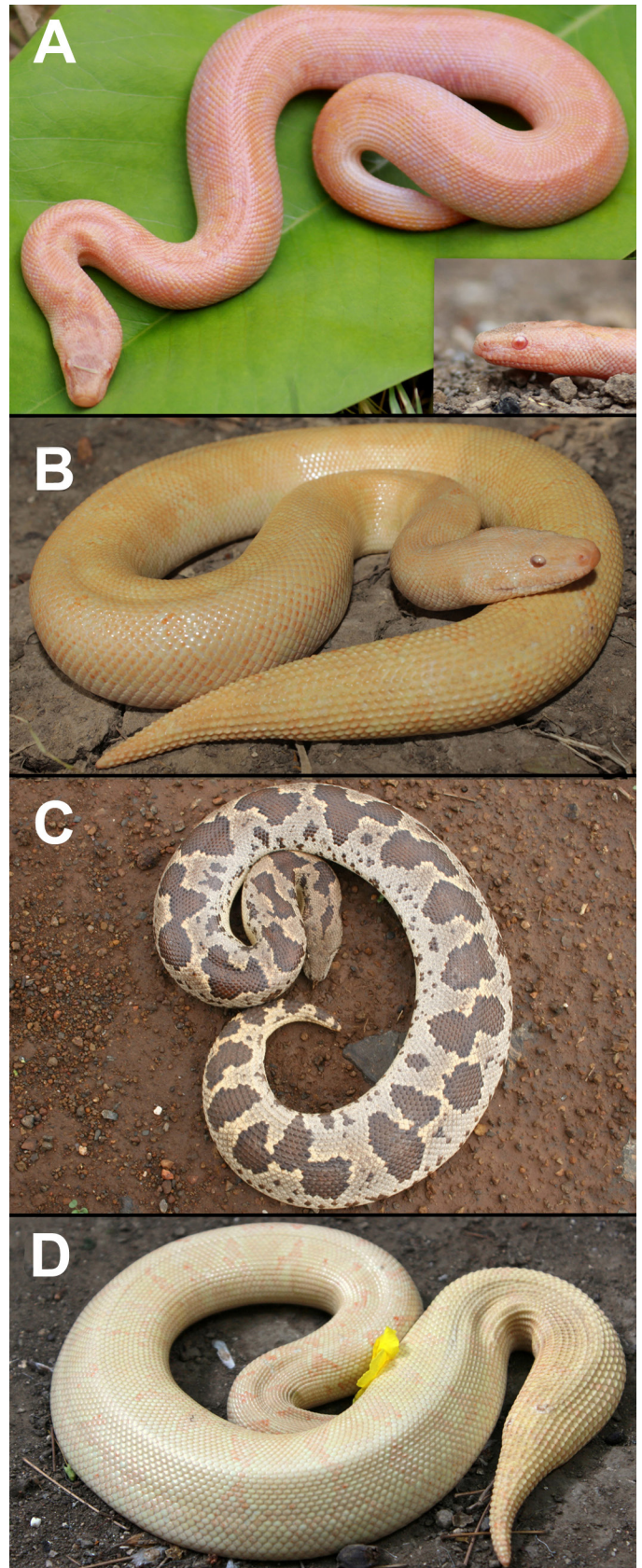
Five species were represented (Table 1): Spectacled Cobra, *Naja naja* (Linnaeus 1758) (Fig. 1); Russell's Viper, *Daboia russellii* (Shaw and Nodder 1797) (Fig. 2); Common Sand Boa, *Eryx conicus* (Schneider 1801) (Fig. 3); Common Trinket Snake, *Coelognathus helena* (Daudin 1803) (Fig. 4); and Common Kukri Snake, *Oligodon arnensis* (Shaw 1802) (Fig. 5). Identification was based on keys and descriptions in Daniel (2012) and Whitaker and Captain (2008).

**Table 1.** Total and partial albino snakes rescued in Surat during 2010–2017.

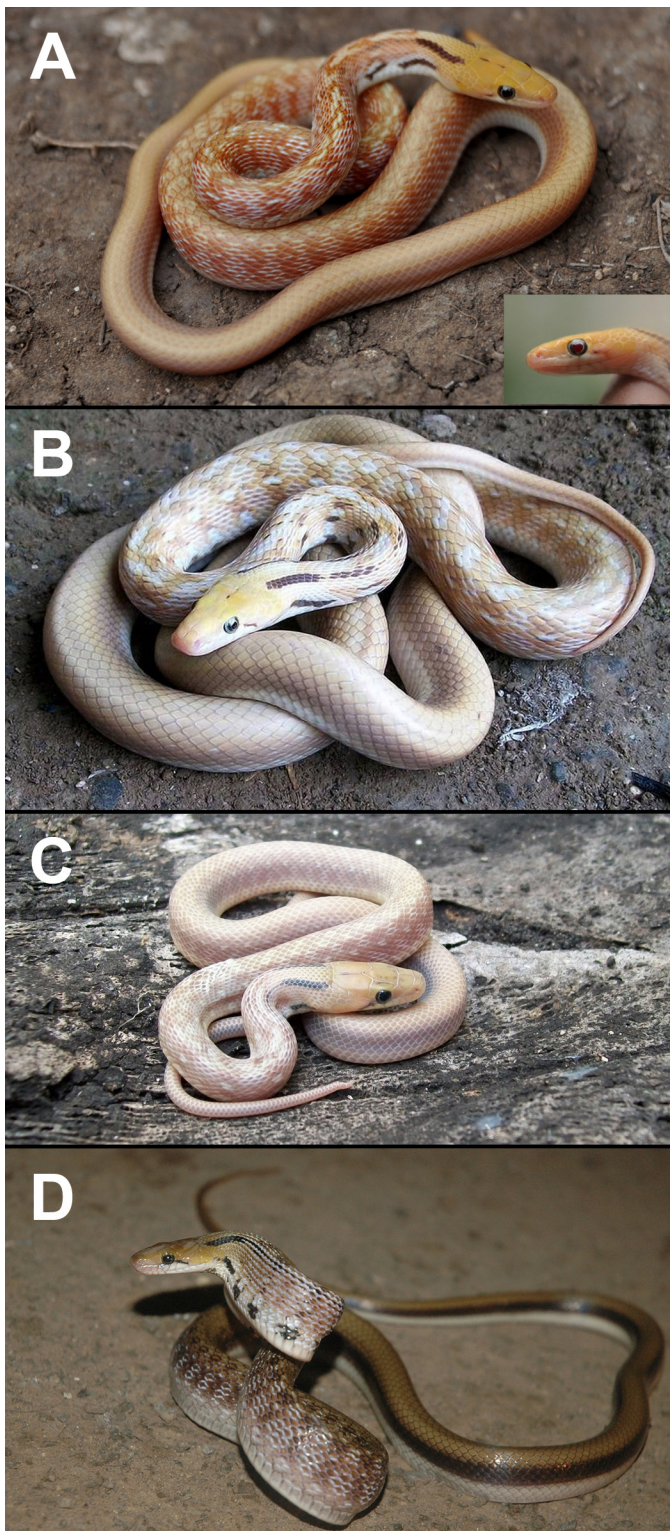
Species	Locality and date	Description	Rescuer (NGO)
Spectacled Cobra ( <i>Naja naja</i> )	Olpad 21°20'03.2"N, 72°45'30.2"E 1 October 2016	Total albino (orangish)	Vedant Lala (Sarp Suraksha)
Russell's Viper ( <i>Daboia russellii</i> )	Bhestan 21°07'30.15"N, 72°51'32.14"E 17 July 2013	Total albino (orangish)	Sonu Shinde (Prayas Team Environment)
Russell's Viper ( <i>Daboia russellii</i> )	Bhestan 21°07'34.58"N, 72°51'32.10"E 8 August 2014	Total albino (orangish)	Mehul Thakur (Prayas Team Environment)
Russell's Viper ( <i>Daboia russellii</i> )	Bhestan 21°07'27.9"N, 72°50'26.6"E 5 June 2014	Total albino (pale yellow)	Sonu Shinde (Prayas Team Environment)
Common Sand Boa ( <i>Eryx conicus</i> )	Dindoli, Surat 21°14'84.60"N, 72°87'94.63"E 4 April 2015	Total albino (orangish)	Jatin Silver (Prayas Team Environment)
Common Sand Boa ( <i>Eryx conicus</i> )	Dindoli, Surat 21°14'84.60"N, 72°87'94.63"E 4 April 2015	Total albino (orangish)	Jatin Silver (Prayas Team Environment)
Common Sand Boa ( <i>Eryx conicus</i> )	Olpad 21°20'39.8"N, 72°44'30.3"E 18 October 2017	Total albino (orangish)	Ravi Rathod (Sarp Suraksha)
Common Trinket Snake ( <i>Coelognathus helena</i> )	Piplod, Surat 21°09'58.6"N, 72°46'37.8"E 1 September 2010	Partial albino	Dikansh Parmar
Common Trinket Snake ( <i>Coelognathus helena</i> )	Piplod 21°09'57.6"N, 72°46'29.7"E 2 August 2011	Total albino	Dhaval Vankawala (Prayas Team Environment)
Common Trinket Snake ( <i>Coelognathus helena</i> )	Adajan (hatched in captivity) 3 September 2010	Partial albino	Dikansh Parmar
Common Kukri Snake ( <i>Oligodon arnensis</i> )	Singanpor 21°13'33.8"N, 72°48'30.9"E 22 March 2012	Total albino	Mayank Desai (Prayas Team Environment)



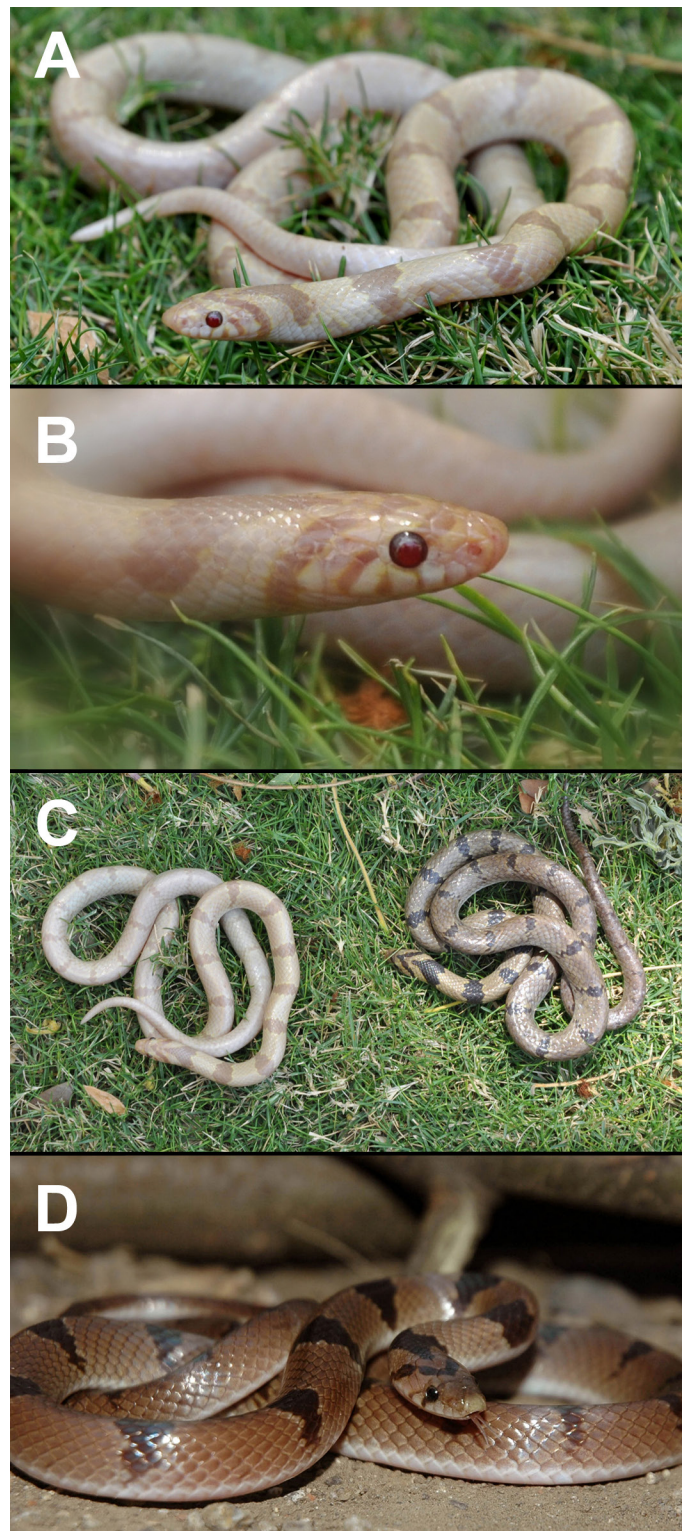
**Fig. 2.** Russell's Viper (*Daboia russelli*): (A) Albino neonate from Bhestan rescued on 17 July 2013 (male; 24.5 cm total length; eyes dark red); (B) Dead albino from Bhestan rescued on 5 June 2014 (neonate injured by locals); (C) Albino from Bhestan rescued on 8 August 2014 (27.6 cm total length) with typically colored neonates; (D) Typically colored adult. Photographs by Mehul Thakur.



**Fig. 3.** Common Sand Boa (*Eryx conicus*): (A) Albino neonate from Dindoli rescued on 4 April 2015 (reddish eyes; 12.9 cm total length; one of four neonates, the others with typical coloration); (B) Subadult albino from Olpad rescued on 18 October 2017 (pink eyes; 38.6 cm total length); (C) Typically colored adult; (D) Albino adult female from Dindoli rescued on 4 April 2015 (reddish eyes; 72.7 cm total length; suspected mother of the four neonates, including the individual illustrated in A). Photographs by Naitik Shah (A and D), Krunal Trivedi (B), and Mehul Thakur (C).



**Fig. 4.** Common Trinket Snake (*Coelognathus helena*): (A) Albino from Piplod rescued on 2 August 2011 (female; 87.9 cm total length; reddish eyes); (B) Partial albino from Piplod rescued on 1 September 2010 (female, 117.5 cm total length, pigmented eyes); (C) Partial albino hatched in captivity on 3 September 2010 from one of six eggs laid by a female rescued from Adajan (30.5 cm total length; all other hatchlings were typically colored); (D) Typically colored adult. Photographs by Mehul Thakur (A and D) and Dikansh Parmar (B and C).



**Fig. 5.** Common Kukri Snake (*Oligodon arnensis*): (A) Albino from Singanpor rescued on 22 March 2012 (female; 51.0 cm total length; one of five snakes rescued, all others were typically colored); (B) Head of albino showing the red eye; (C) Albino and typically colored snake rescued from the same apartment; (D) Typically colored snake. Photographs by Mehul Thakur.

### Acknowledgements

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