



Albinism in the Thick-headed Groundsnake, *Atractus crassicaudatus* (Squamata: Dipsadidae)

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Some species of snakes exhibit substantial variability in coloration that can be influenced by environmental conditions and/or genetics (Solórzano 2011; Montandon et al. 2025). Such color variation can play a crucial role in individual fitness, mediating interactions with both the environment and other organisms (Bechtel 1994). Polychromatism in snakes frequently is associated with ecological strategies such as camouflage and aposematism, with coloration ranging from cryptic hues such as black, brown, gray, tan, or green for concealment, to vivid patterns incorporating red, blue, or yellow that often are used as warning signals (Cox and Davis-Rabosky 2023).

Although chromatophores are directly responsible for color patterns, mechanisms underlying coloration vary by species. In Eastern Cornsnakes (*Pantherophis guttatus*), coloration is strongly linked to the *CLCN2* gene, producing orange, red, and brown blotches or stripes (Montandon et al. 2025). In contrast, coloration of Yellow-bellied Sea Snakes (*Hydrophis platurus*) might be ecologically modulated by water temperatures and oxygen availability, resulting in color patterns ranging from bright yellow to black (Solórzano 2011).

Among the most striking color variants is albinism, a condition characterized by a complete absence of melanin, with

albino snakes typically displaying pale coloration, including white, pale yellow, or even bright orange scales, while retaining iridophores and xanthophores, which are not affected by the mutation (Bechtel 1994; Fertl and Rosel 2018). Although the ecological role of albinism in snakes remains unclear, it does impair camouflage, increase sensitivity to sunlight, reduce reproductive success, and affect thermoregulation (Sazima and Di Bernardo 1991; Bechtel 1994). Albinism has been reported in several dipsadid snakes, including *Conopsis nasus*, *Dipsas neuwiedi*, *Liophis miliaris*, and *Phalotris lemniscatus*, all of which are fossorial or nocturnal (Sazima and Di Bernardo 1991; Silva et al. 2010; Diesel-Abegg et al. 2015; Berriozabal-Islas et al. 2022).

Among cryptic, fossorial, and predominantly nocturnal snakes, the genus *Atractus* stands out not only for being among the most species-rich snake genera but also for its remarkable ecological and biogeographic breadth. Several species inhabiting the tropical Andes occur at elevations exceeding 2,000 m asl, an unusual trait among fossorial colubroids (Arteaga et al. 2022). Species of *Atractus* are typically fossorial or semi-fossorial, occupying leaf litter and superficial soil layers, and exhibit extensive morphological diversity, with bodies ranging from small, slender species to comparatively robust taxa exceed-



Figure 1. Color pattern variants in Thick-headed Groundsnakes (*Atractus crassicaudatus*): Well-defined yellow crossbands (left) and diffuse black-orange coloration (right). Photographs by Becerra-Martínez.

ing one meter in total length (Martins and Oliveira 1992). Coloration within the genus is highly variable, and cases of polychromatism have been reported in multiple species. Rare pigment anomalies have been documented, including albinism in *A. manizalensis* (De Plecker et al. 2020) and leucism in *A. reticulatus* (Entiauspe-Neto et al. 2018). One species that exhibits considerable color variation is the Thick-headed Groundsnake or “Serpiente Sabanera,” *Atractus crassicaudatus* (Duméril, Bibron, and Duméril 1854). Polymorphism in this Andean highland species includes individuals with well-defined patterns or more diffuse coloration (Fig. 1) featuring a black dorsum and lateral and ventral regions of yellow, gray, red, or orange. Males reach SVLs to 341 mm and females to 450 mm (Paternina and Capera 2017; Passos et al. 2024). These snakes are endemic to high-elevation habitats (2,000–3,700 m asl) that include sub-Andean forests to páramo ecosystems in the Altiplano Cundiboyacense, where they are nocturnal with an activity peak of 1900–2200 h and semifossorial, frequently found under rocks, logs, decomposing vegetation, and anthropogenic materials such as concrete debris (Paternina and Capera 2017). In Colombia, this species is commonly encountered in urban areas (Passos et al. 2024).

We herein document two records of albinism in *A. crassicaudatus* on the campus of the Universidad Nacional de Colombia - UNAL, Bogotá, Colombia. Angarita-Sierra et al. (2022) previously reported albinism in this species; however, that record was presented only as supplementary material and was based on a photograph obtained from a social media platform (Facebook). No information on locality, voucher specimen, or morphological measurements were provided. Thus, although the present records are not the first reports of albinism in the species, they represent the first formally

documented records supported by locality data, morphological measurements, and an analysis of diagnostic characters, allowing confirmation of both the species identity and albinism. The first record was documented by Jonathan Espitia-Romero at 1834 h on 12 December 2024, when he found an adult male exhibiting atypical albino coloration under a rock in the gardens near the wetland Humedal Mamá Dominga (4.64083, -74.08083; Fig. 2). The snake had red eyes, a pinkish-white head with multiple yellow blotches, a white dorsum diffusing laterally to yellow, and ventral scales with a mixture of yellow and white blotches. The second record was documented at 1735 h on 2 June 2025, when Samuel Becerra-Martinez found an adult albino female (SVL 291 mm, tail 26 mm, weight 13.85 g) (Fig. 2) under concrete debris in an open field behind the Instituto de Ciencias Naturales (ICN) (4.64201, -74.08056). This snake had red eyes, a faint yellow head with orange blotches on the temporal region, a pinkish-white dorsum with well-defined transverse orange stripes, and a predominantly yellow venter. Both snakes were photographed and released at the respective sites of capture.

Although albinism is a recessive genetic condition that can recur in populations, albino individuals tend to be rapidly eliminated due to increased mortality (Bechtel 1994). Several studies have demonstrated a correlation between small population sizes and elevated frequencies of recessive mutations (Runemark et al. 2013; Salles-Oliveira et al. 2020), as well as between urbanization and inbreeding (Lettoof et al. 2021). The presence of albino individuals on the UNAL campus might be suggestive of a reduced gene pool and possible inbreeding in this urban population. Also noteworthy is that albino individuals are more frequently detected in nocturnal and fossorial species, as diurnal snakes experience higher pre-



Figure 2. Albino Thick-headed Groundsnakes (*Atractus crassicaudatus*) from the campus of the Universidad Nacional de Colombia, Bogotá, Colombia: Male with diffused coloration encountered in December 2024 (left) and a female with a well-defined pattern encountered in June 2025 (right). Photographs by López-García (left) and Orozco-Gómez (right).

dition pressure from visually oriented predators such as birds (Sazima and Di Bernardo 1991; Diesel-Abegg et al. 2015; De Plecker et al. 2020).

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