



First Report of Leucism in the Purple Caecilian (*Gymnopsis multiplicata*) from Río Tigre, Osa Peninsula, Costa Rica

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Gymnophiona is an order of limbless amphibians, commonly known as caecilians, which currently comprises 216 extant species (Frost 2022). Caecilians are restricted to the tropics and subtropics, and are mostly fossorial. Caecilians are understudied due to their secretive lifestyle, and their biology is perhaps the least known of all amphibians and reptiles (Taylor 1968). The genus *Gymnopsis* includes two currently recognized species native to Central America, *Gymnopsis syntrema* and *G. multiplicata* (Frost 2022).

The Purple Caecilian (*Gymnopsis multiplicata*) is a large, robust purplish caecilian that reaches 70 cm in total length (Fig. 1). It is widespread in Costa Rica and can be found from sea level to 1,400 m asl in a wide variety of habitats including gardens, pastures, and plantations (Leenders 2016). Like other caecilians, this species is nocturnal and fossorial, although they occasionally hunt earthworms, termites, and other soft-bodied invertebrates on the surface (Leenders 2016). Surface activity during warm, dry nights has been reported, indicating that the hardening of the soil sometimes forces these animals to the surface (Leenders, 2016).

Gymnopsis multiplicata differs from the other three caecilian species (*Dermophis glandulosus*, *Dermophis occidentalis*,

and *Osaecilia osae*) found on the Osa Peninsula by the presence of a pale spot on each side of the head that marks the location of eyes and tentacles (Fig. 1) and a higher number (201–250) of annular folds. In *Dermophis* spp., the eyes are visible as very tiny dark spots and total annular folds range between 132–159 and 126–149 for *D. glandulosus* and *D. occidentalis*, respectively. *Osaecilia osae* are very slender with tentacles that are located near the nostrils, no secondary annuli, and 232 annular folds (Leenders 2016).

Color variation is widespread among animals (Orteu and Jiggins 2020). The most common chromatic aberrations, albinism, leucism, and melanism, have been documented globally across different classes of vertebrates (e.g., Figon and Casas 2018). However, few reports document color variation or anomalies in caecilians (Venu et al. 2021; Venu et al. 2022).

At 2047 h on 29 November 2022, NCV encountered a leucistic *G. multiplicata* (Fig. 2) crossing a gravel road in the community of Dos Brazos de Río Tigre during a downpour (8.525944 N, -83.401778 W; elev. 111 m asl). The identity of the caecilian was not obvious at first but after closer inspection, counting the number of annular folds, and checking the



Figure 1. A Purple Caecilian (*Gymnopsis multiplicata*) displaying normal coloration from Sierpe, Puntarenas, Costa Rica. Photographs by Raby Nuñez Escalante.



Figure 2. A leucistic Purple Caecilian (*Gymnopsis multiplicata*) from Río Tigre, Costa Rica. Photographs by Raby Nuñez Escalante.

position of the tentacles, the animal was determined to be a leucistic adult *G. multiplicata* measuring 45 cm in total length (Fig. 2). The town where this observation was made runs along the two arms of the Tigre River that meet in the center of the town, giving the community its name “Dos Brazos de Río Tigre.” This small community is surrounded by riparian forest and located adjacent to Corcovado National Park in the Osa Peninsula, Puntarenas, Costa Rica (Fig. 3).



Figure 3. The gravel road in Río Tigre, Costa Rica, where the leucistic Purple Caecilian (*Gymnopsis multiplicata*) was found. Photograph by Raby Nuñez Escalante.

The individual found in Río Tigre lacked pigmentation on all body surfaces, except for some intermittent darker purplish patches 15 cm behind its head. The head was a lighter pinkish color compared to the rest of the body. The eyes were barely visible and black, indicating that this was not an albino.

To the best of our knowledge, this is the first record of leucism for the genus *Gymnopsis*. *Gymnopsis multiplicata* is the most commonly observed caecilian in Costa Rica, and this is the only example of any color abnormality found in *G. multiplicata* to date. Kubicki and Arias (2017) reported chromatic head and body variation in three individuals of *Caecilia volcani*, but no other reports document cases of color mutation in the country.

Literature Cited

- Figon, F. and J. Casas. 2018. Morphological and physiological colour changes in the Animal Kingdom. In: *eLS*. John Wiley & Sons, Chichester, UK. <https://doi.org/10.1002/9780470015902.a0028065>.
- Frost, D.R. 2022. *Amphibian Species of the World: An Online Reference*. Version 6.1. <https://doi.org/10.5531/db.vz.0001>. <<https://amphibiansoftheworld.amnh.org/Amphibia>>.
- Kubicki, B. and E. Arias. 2017. Vulcan’s slender caecilian, *Caecilia volcani*, in Costa Rica. *Mesoamerican Herpetology* 4: 488–492.
- Leenders, T. 2016. *Amphibians of Costa Rica: A Field Guide*. Zona Tropical Publications, Comstock Publishing Associates, Cornell University Press, Ithaca, New York, USA. <https://doi.org/10.7591/j.ctvrf89s6>.
- Orteu, A. and C.D. Jiggins. 2020. The genomics of coloration provides insights into adaptive evolution. *Nature Reviews Genetics* 21: 461–475. <https://doi.org/10.1038/s41576-020-0234-z>.
- Taylor, E.H. 1968. *The Caecilians of the World: a Taxonomic Review*. University of Kansas Press, Lawrence, Kansas, USA.
- Venu, G., G.N. Balakrishna, R.K. Browne, N.G. Raju, K. Varadh, S. Ramakrishna, and G. Venkatachalaiah. 2021. First Record of leucism in the amphibian order Gymnophiona: *Ichthyophis kodaguensis* Wilkinson et al., 2007 from the southern Western Ghats, India. *Herpetology Notes* 14: 77–81.
- Venu, G., G. Venkatachalaiah, H.G. Seetharama, G.N. Balakrishna, H.T. Lalremsanga, R.K. Browne, R. Nijagunaiah, N.G. Raju, K. Varadh, S. Ramakrishna, and K. Henle. 2022. Chromatic and morphological anomalies in gymnophionans from India. *Herpetozoa* 14: 121–132.