REPTILES & AMPHIBIANS

First Record of Fluorescence in Colombian Long-tailed Snakes (*Enuliophis sclateri*) (Squamata: Dipsadidae) from Panama

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Biofluorescence is a phenomenon that occurs when external light is absorbed by the fluorosphores in a biofluorescent organism and converted into light of a longer wavelength with less energy (Gaytán 2021). This phenomenon has been studied in marine vertebrates such as reef fish, sharks, and sea turtles (Gruber and Sparks 2015). However, in recent years, it has been

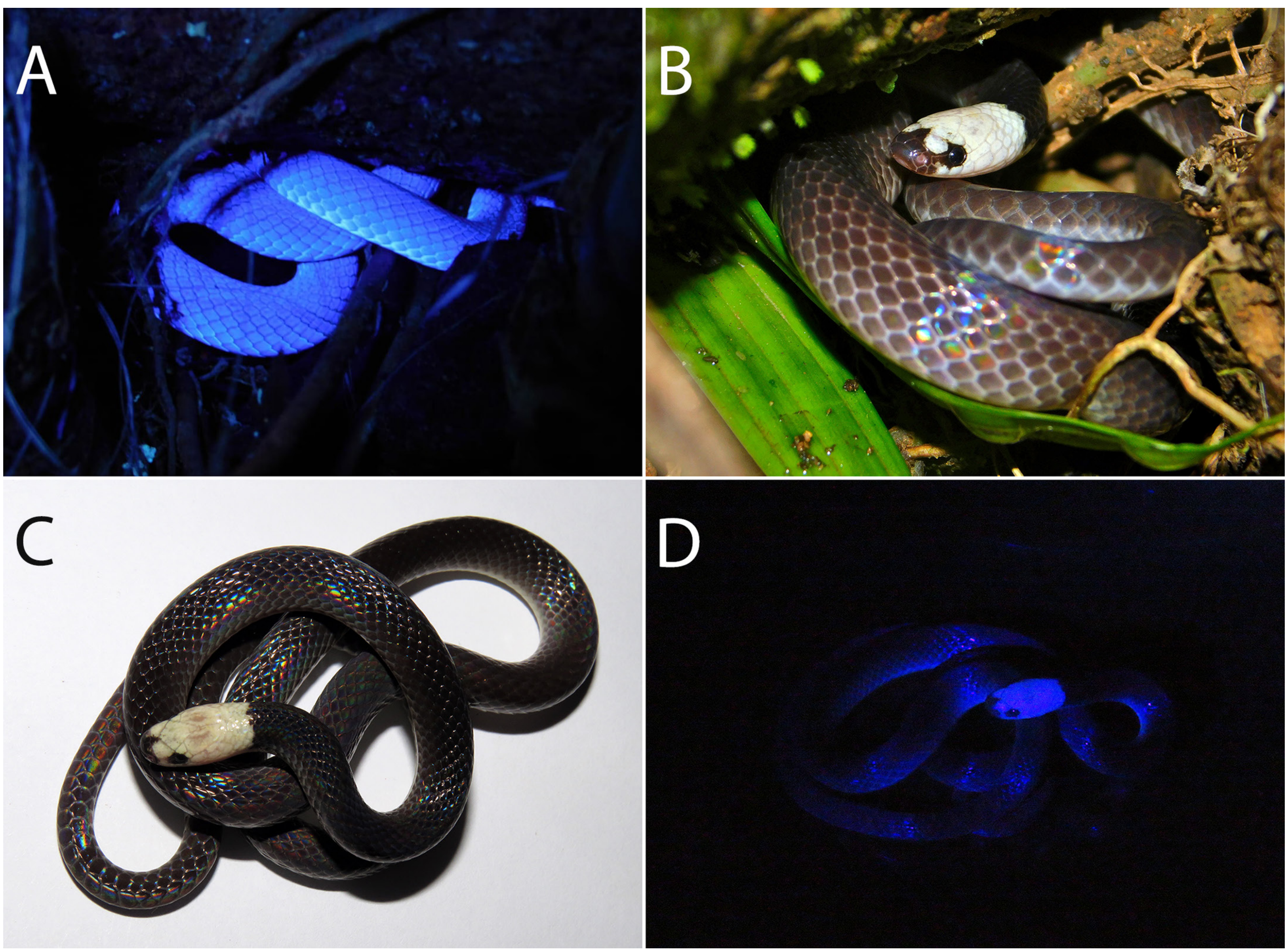

Fig. 1. A fully fluorescent Colombian Long-tailed Snake (*Enuliophis sclateri*) under UV light (A) and under white light (B) (video at https://youtu.be/ztSBkHUnkcw); dorsal view of a male Colombian Long-tailed Snake under white light (C) and a dorsolateral view under UV light (D), in which only the white cap fluoresces. Photographs by Jesse Ashcroft (A–B) and Rogemif Fuentes (C–D).

observed in various terrestrial organisms, such as an American Flying Squirrel (*Glaucomys* sp.) and Australian Budgerigars (*Melopsittacus undulatus*). In these vertebrates, fluorescent compounds have been found in bones, plumage, carapace, and skin, and they have been shown to fluoresce in a wide spectrum of visible colors that include shades of red, green, blue, and pink. We do not yet understand whether this phenomenon plays an ecological role in these animals (Gaytán 2021).

In amphibians, biofluorescence has been reported in some species of frogs by Taboada et al. (2017a, 2017b), who suggested that this phenomenon could highlight the individual, especially in low light conditions, and thus play a role in visual communication (Taboada et al. 2017a, 2017b; Saporito 2019).

In reptiles, fluorescent emission have been reported so far in geckos (Sloggett 2018; Top et al. 2020; Prötzel et al. 2021), lizards (Ortiz and Williams-Ahsman 1963), chameleons (Prötzel et al. 2017), seaturtles (Gruber and Sparks 2015), and snakes, including the Common Sea Krait (*Laticauda laticaudata*) (Seiko and Terai 2019) and the Western Threadsnake (*Rena humilis*) (Hulse 1971). Although fluorescence in snakes is poorly studied, a fluorescent substance has been reported in the skin of three species of colubrids, the Japanese Ratsnake (*Elaphe climacophora*), Japanese Four-lined Ratsnake (*E. quadrivirgata*), and Japanese Burrowing Ratsnake (*Euprepiophis conspicillata*), and a viperid, the Mamushi (*Gloydius blomhoffii*) (Odate et al. 1959).

Herein, we report the first record of fluorescence in Colombian Long-tailed Snakes (*Enuliophis sclateri*) from Panama. While searching for scorpions at 2200 h on 16 June 2018 with an INOVA X5 UV LED flashlight near the pool known as "Los Tucanes" in the Guanche River, Colón Province, Panamá (9.5042°N, -79.6523°W), JA noticed a Colombian Long-tailed Snake that reflected a fluorescent blue when exposed to UV light (Figs. 1A–B). He photographed and videotaped but did not collect the individual. In March 2021 we collected an adult male of the same species (Figs. 1C–D) in which only the white cap on the head fluoresced. Based on these observations, we propose the following hypotheses: (A) one or both sexes fluoresce to facilitate detection of prospective mates during the mating season; given that mating may occur as high as 16 m in middle forest strata (Robertson et al. 2007) and these snakes are largely nocturnal, this could be highly advantageous; and/or (B) the presence, absence, or extent of fluorescence could reflect variation within what might be a species complex.

We subsequently subjected a Pacific Long-tailed Snake (*Enulius flavitorques*), Central American Coralsnake (*Micrurus nigrocinctus*), Clark's Coralsnake (*Micrurus clarki*), Colombian Earthsnake (*Geophis* aff. *brachycephalus*), Big-scaled Blindsnake (*Trilepida macrolepis*), and White-nosed Blindsnake (*Liotyphlops albirostris*) to UV light and found fluorescence in none of these species. In particular, because *Enulius flavitorques* is related to *Enuliophis sclateri* and exhibits similar arboreal habits (Brown et al. 2018), we expected it to fluoresce as well. Further studies will be necessary to shed light on the possible advantages (or disadvantages) of fluorescence in these snakes.

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