

# FIRST RECORD OF PARTIAL MELANISM IN THE REDBACK COFFEE SNAKE *NINIA SEBAE* (SQUAMATA: DIPSADIDAE)

## PRIMER REGISTRO DE MELANISMO PARCIAL EN LA SERPIENTE DE ESPALDA ROJA DEL CAFÉ *NINIA SEBAE* (SQUAMATA: DIPSADIDAE)

Daniel Ariano-Sánchez<sup>1,2\*</sup>

<sup>1</sup>Departamento de Biología, Universidad del Valle de Guatemala, Guatemala City, Guatemala.

<sup>2</sup>Centro de Estudios Ambientales y Biodiversidad, Universidad del Valle de Guatemala, Guatemala City, Guatemala.

\*Correspondence: [dariano@uvg.edu.gt](mailto:dariano@uvg.edu.gt)

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**Resumen.**— Describo el primer caso de melanismo parcial en la serpiente cafetalera de espalda roja *Ninia sebae*. El 26 de octubre de 2021, se encontró un individuo melanístico de *N. sebae* en la reserva forestal dentro del campus central de la Universidad del Valle de Guatemala, en la ciudad de Guatemala, Guatemala. Se presenta una hipótesis de trabajo futuro sobre la evaluación de la pérdida de aposematismo en especies mímicas que habitan localidades en las que el modelo venenoso ha sufrido extinción local.

**Palabras clave.**— Aposematismo, bosque de pino y roble, fenotipo, hábitats degradados, hiperpigmentación.

**Abstract.**— I describe the first case of partial melanism in the redback coffee snake *Ninia sebae*. On October 26, 2021, one melanistic individual of *N. sebae* was found at the forest reserve within the central campus of Universidad del Valle de Guatemala, Guatemala City, Guatemala. A working hypothesis is proposed for the assessment of the loss of aposematism in mimetic species inhabiting locations where the venomous model has undergone local extinction.

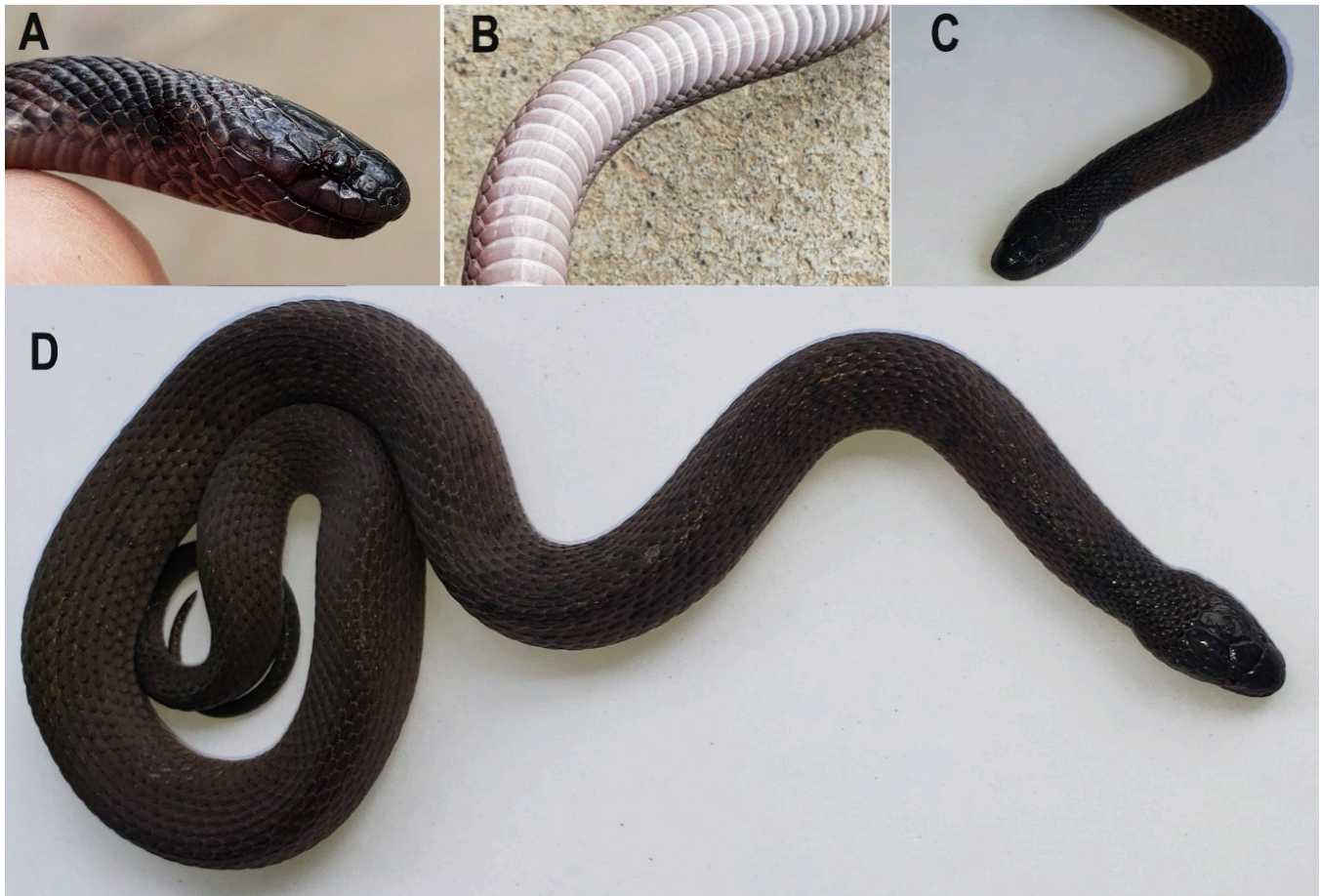
**Key words.**— Aposematism, pine-oak forest, degraded habitats, hyperpigmentation, phenotype.

*Ninia sebae* is a non-venomous Batesian mimic of the sympatric highly venomous coral snakes of the genus *Micrurus* (Köhler, 2008). Coral snake mimicry is a form of Batesian mimicry directed against visually driven predators such as birds (Hinman et al., 1997). Showing bright aposematic colors by coral-snake mimics can reduce predation risk by birds when the model species of *Micrurus* is present. However, the coloration reversal to a cryptic color pattern in coral snake mimics has been reported widely all over the world but the causes are still not fully understood (Davis et al., 2016).

On October 26, 2021, one melanistic adult snake of *Ninia sebae* was found by a gardener in a small pine-oak forest patch within the central campus of Universidad del Valle de Guatemala, Municipality of Guatemala, Guatemala, Guatemala (14.6059° N, 90.4937° W; WGS84; 1,486 m a.s.l.). The habitat is a degraded pine-oak forest with some exotic *Eucalyptus* trees. The melanistic individual was found crawling near the buildings of the campus. To the best of our knowledge, this is the first published record of

melanism in an adult *N. sebae*. The melanistic individual (Snout-vent length = 15 cm) exhibited an ochre coloration throughout the body, displaying faint markings of the typical banding of the species in the cephalic region and dorsal spots (Figure 1). Despite the phenotypic differences to known *N. sebae*, the identity of the specimen was confirmed following diagnostic lepidosis characters for the species following Köhler (2008). The specimen was measured, photographed, and released later back to the forest patch.

Given that the melanistic individual found comes from a highly degraded urban landscape forest, in which coral snakes had been largely extirpated from the site with no known reports for several decades (at least since the campus of the University was established in 1966), hereafter I propose a working hypothesis for future research into this topic. In places where the model venomous species of *Micrurus* had been extirpated a long time ago, the aversion of the bird population to coral snake mimics can be relaxed producing a selective pressure for reversals back



**Figura 1.** Reversión en la coloración mimética batesiana (melanismo) de *Ninia sebae* observada en el campus central de la Universidad del Valle de Guatemala, Ciudad de Guatemala, Guatemala, a una elevación de 1486 m el 26 de octubre de 2021, mostrando vista cefálica (A), ventral (B), dorsal (C) y de cuerpo completo (D).

**Figure 1.** Batesian mimic coloration reversal (melanism) of *Ninia sebae* observed at the central campus of Universidad del Valle de Guatemala, Guatemala City, Guatemala at 1486 m elevation on 26 October 2021, showing cephalic (A), ventral (B), dorsal (C) and whole body (D) views.

to cryptic colorations such as the melanistic individual I report here. In this scenario, cryptic colorations can be advantageous compared to brightly colored Batesian mimic patterns. This hypothesis can be tested with the analysis of rates of predation of coral-snake mimics within localities where the coral snake model is present and localities where the coral snakes had been extirpated long ago due to urbanization.

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## CITED LITERATURE

- Davis, A. R., C.L. Cox, D. L. Rabosky, P.O. Tile, I. A. Holmes, A. Feldman & J.A. McGuire. 2016. Coral snakes predict the evolution of mimicry across New World snakes. *Nature Communications* 7:11484.
- Hinman, K.E., H.L. Throop, K.L. Adams, A.J. Dake, K.K. McLauchlan & M.J. McKone. 1997. Predation by free-ranging birds on partial coral snake mimics: The importance of ring width and color. *Evolution* 51:1011-1014.
- Köhler, G. 2008. *Reptiles of Central America*. 2nd ed. Herpeton, Verlag Elke Köhler, Offenbach, Germany.

