



Defensive Head-mimicry in Coralsnakes, *Micrurus* spp. (Squamata: Elapidae): Three New Records and a Review of Congeners Exhibiting this Behavior

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Different defensive strategies, acoustic, chemical, or visual (Rowe and Halpin 2013; Dalziell and Welbergen 2016), have been evolutionarily adopted by animals in response to predation (Brodie et al. 1991). Snakes exhibit a variety of anti-predatory strategies (Green 1988; Tozetti et al. 2009); however, knowledge of these mechanisms is scarce in some species (Lopes de Assis et al. 2020).

Over 80 species American coralsnakes in the genus *Micrurus* (Uetz et al. 2021), which are characterized by diverse patterns of aposematic coloration, exhibit a great diversity of antipredatory mechanisms that include body flattening, tail-coiling, head-hiding, hemipenial eversion, and cloacal discharge (DuVal et al. 2006; Serafim and Ribeiro Duarte 2008;

Getelina et al. 2020; Moore et al. 2020; Tozetti et al. 2021). Another defense strategy is head-mimicry, which consists of curling and raising the tail while hiding the head and remaining motionless (Greene 1973, 1979; Jackson 1979). This behavior has been described in species as diverse as the South American False Coralsnake (*Erythrolamprus aesculapii*), Sao Paulo False Coralsnake (*Simophis rhinostoma*) (Sazima and Abe 1991), South American Hognose Snake (*Xenodon dorbignyi*) (Tozzetti et al. 2009), Neuwied’s False Fer-de-lance (*Xenodon neuwiedii*), Wagler’s Snake (*Xenodon merremii*), Günther’s False Fer-de-lance (*Xenodon guentheri*) (Pedrozo et al. 2020), Western Coralsnake (*Micruroides euryxanthus*) (Greene 1988), Ringneck Snake (*Diadophis punctatus*), Yellow-bellied



Fig. 1. Defensive head-mimicry in coralsnakes (*Micrurus* spp.): Andean Black-backed Coralsnake (*Micrurus narducci*) (A), Common Capuchin Coralsnake (*Micrurus dumerilii dumerilii*) (B), and Camila’s Coralsnake (*Micrurus camilae*) (C). Photographs by Fredy Montero (A), Carlos Brand (B), and John Calderón (C).

Seasnake (*Hydrophis platurus*), Black Groundsnake (*Atractus elaps*), Atlantic Central American Milksnake (*Lampropeltis polyzona*), African Gartersnake (*Elapsoidea sundevallii*), Blue Malaysian Coralsnake (*Calliophis bivirgatus*) (Greene 1973), and a number of coralsnakes in the genus *Micrurus* (Table 1). Greene (1973) suggested that head-mimicry might occur in all American coralsnakes, and the similar head and tail coloration in many species of *Micrurus* might render this behavior more effective (Jowers et al. 2019). Herein we present new records of head-mimicry in three species of *Micrurus*.

An Andean Black-backed Coralsnake (*Micrurus nar-*

ducci), found on 29 July 2021 in the municipality of Villa Garzón, Putumayo, Colombia (elev. 400 m asl), coiled its tail as it was about to be photographed (Fig. 1A). A Common Capuchin Coralsnake (*Micrurus dumerilii dumerilii*), encountered on 24 October 2021 in the municipality of Turbana, Bolívar, Colombia (elev. 80 m asl), coiled its tail while it was being positioned for photography (Fig. 1B). A Camila's Coralsnake (*Micrurus camilae*), found on 26 November 2021 in the municipality of Apartadó, Antioquia, Colombia (elev. 20 m asl) coiled its tail when initially detected (Fig. 1C). All of the snakes were released after being photographed.

Table 1. Reports of defensive head-mimicry in snakes of the genus *Micrurus*.

Species	References
Uruguayan Coralsnake (<i>Micrurus altirostris</i>)	Campbell and Lamar (2004)
Boicora Coralsnake (<i>Micrurus boicora</i>)	Bernarde et al. (2018)
Sierra Madre Coralsnake (<i>Micrurus browni</i>)	Greene (1973)
Camila's Coralsnake (<i>Micrurus camilae</i>)	This note
Clark's Coralsnake (<i>Micrurus clarki</i>)	Greene (1973)
Painted Coralsnake (<i>Micrurus corallinus</i>)	Tozetti et al. (2021)
Brazilian Coralsnake (<i>Micrurus decoratus</i>)	Marques (2002)
Variable Coralsnake (<i>Micrurus diastema</i>)	Brown et al. (2020)
Pigmy Coralsnake (<i>Micrurus dissoleucus</i>)	Greene (1973)
West Mexican Coralsnake (<i>Micrurus distans</i>)	Greene (1973)
Common Capuchin Coralsnake (<i>Micrurus dumerilii dumerilii</i>)	This note
Slender Coralsnake (<i>Micrurus filiformis</i>)	Greene (1973)
Southern Coralsnake (<i>Micrurus frontalis</i>)	Sazima and Abe (1991); Hudson et al. (2019)
North American Coralsnake (<i>Micrurus fulvius</i>)	Roze (1983); Roze (1996)
Venezuelan Coralsnake (<i>Micrurus isozonus</i>)	Roze (1983); Roze (1996); Greene (1973)
Western Ribbon Coralsnake (<i>Micrurus lemniscatus helleri</i>)	Arteaga et al. (2021)
South American Coralsnake (<i>Micrurus lemniscatus lemniscatus</i>)	Sazima and Abe (1991); Greene (1973)
Tuxtlan Coralsnake (<i>Micrurus limbatus</i>)	Greene (1973)
Villavicencio Coralsnake (<i>Micrurus medemi</i>)	Montoya-Cruz et al. (2021)
Andean Red-tailed Coralsnake (<i>Micrurus mipartitus decussatus</i>)	Ayerbe et al. (1990)
Popayan Coralsnake (<i>Micrurus mipartitus popayanensis</i>)	Ayerbe et al. (1990)
Roze's Coralsnake (<i>Micrurus mipartitus rozei</i>)	Roze (1983)
Many-banded Coralsnake (<i>Micrurus multifasciatus</i>)	Reid et al. (2010)
Cauca Coralsnake (<i>Micrurus multiscutatus</i>)	Arteaga et al. (2021)
Andean Black-backed Coralsnake (<i>Micrurus narducci</i>)	Campbell and Lamar (2004); this note
Central American Coralsnake (<i>Micrurus nigrocinctus</i>)	Campbell and Lamar (2004); Greene (1973)
Argentinian Coralsnake (<i>Micrurus pyrrhocryptus</i>)	Ávila et al. (2010)
Carib Coralsnake (<i>Micrurus pysches</i>)	Greene (1973)
Amazonian Coralsnake (<i>Micrurus spixii</i>)	Greene (1973)
Aquatic Coralsnake (<i>Micrurus surinamensis</i>)	Greene (1973)
Texas Coralsnake (<i>Micrurus tener</i>)	Campbell and Lamar (2004)

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