



Defensive Tail-curling and Head-mimicking Behavior in a Variable Coralsnake, *Micrurus diastema* (Squamata: Elapidae) in Cusuco National Park, Honduras

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The Variable Coralsnake, *Micrurus diastema* (Dumeril, Bibron, and Dumeril 1854), is distributed widely throughout Mesoamerica (Reyes-Velasco et al. 2020). The highly venomous New World coralsnakes in the genus *Micrurus* signal their lethal neurotoxicity with bright aposematic coloration and various warning displays, and the study of such behaviors has greatly advanced our understanding of relationships between aposematism and predator avoidance (Brodie 1993; Brodie and Janzen 1995), as well as the evolution of mimicry (Davis Rabosky et al. 2016). At least nine generally non-lethal but technically venomous snakes mimic *M. diastema* across its range (Torre-Loranca et al. 2006), and a further 150 or so species in the Western Hemisphere display a red-and-black coralsnake-like coloration (Savage and Slowinski 1992; Davis Robosky et al. 2016).

In combination with aposematism, widely used defensive strategies in both *Micrurus* and their mimics include non-locomotory thrash-and-flash displays (Moore et al. 2020) and tail-display behaviors (Green 1973). In the genus *Micrurus*, many species possess similarly patterned heads and tails to confuse predators (Jowers et al. 2019), and when attacked, often place their heads beneath the coils of their bodies while raising and flattening their tail to imitate the head (Green 1973). Tail-flattening behavior, a form of self-mimicry called the Protean effect (Gelbach 1972), was previously reported in *M. diastema* from Honduras (Talley et al. 2013). In other species of *Micrurus*, reported tail-display behaviors (following strong stimulation) include mock-strikes, hooding, and hemipenial inversion (Serafin and Duarte 2008). Herein we describe an observation of tail-curling and Protean mimicry in *M. diastema*.



Fig. 1. A Variable Coralsnake (*Micrurus diastema*) restrained with tongs in Cusuco National Park (CNP), Santo Tomas, Cortes, Honduras, flattens its body posteriorly and curls its tail into a head-like shape (left). The tail is elevated and curled and executes mock strikes and imitates head-like movements (right). Photographs © Tom W. Brown.

At 1815 h on 15 July 2016, while conducting fieldwork in the lowland buffer region of Cusuco National Park (CNP), Santo Tomas, Cortes, Honduras, we encountered an adult *M. diastema* on a dirt path crossing a pasture close to a rural community. In order to relocate the snake a safe distance from human habitation, a snake tong was used to safely capture it. When we grasped the snake firmly at midbody, it immediately and repeatedly struck at the tong before thrashing vigorously and writhing to expose its brightly colored venter. Unable to get free, the snake then curled its tail into a head-like shape, flattened its body dorsoventrally, and elevated its tail (Fig. 1). It then used its tail to execute a series of mock strikes, while the actual head remained motionless in a strike position. In curling and raising the tail, the reciprocal yellow-black banding rendered it difficult to distinguish from the head, and its emulating movement further suggested head mimicry. After photographing this defensive behavior for about five minutes, we relocated the snake approximately 150 m to the edge of a nearby patch of forest.

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