

BACK FROM THE BEYOND: DEFENSIVE BEHAVIOR OF THE BOGOTA ANADIA *ANADIA BOGOTENSIS* (SQUAMATA: GYMNOPTHALMIDAE)

REGRESANDO DEL MÁS ALLÁ: CONDUCTA DEFENSIVA DE LA ANADIA DE BOGOTÁ *ANADIA BOGOTENSIS* (SQUAMATA: GYMNOPTHALMIDAE)

Alexandra Montoya-Cruz^{1,2*} & Ronald A. Díaz-Flórez³

¹Grupo de investigación Morfología y ecología evolutiva. Instituto de Ciencias Naturales, Universidad Nacional de Colombia. Bogotá, Colombia.

²Laboratory of Adaptations to Extreme Environments and Global Change Biology. Universidad Nacional de Colombia, Departamento de Biología. Bogotá, Colombia.

³Semillero de Anfibios y Reptiles de la Pontificia Universidad Javeriana, Bogotá, Colombia.

*Correspondence: amontoyacr@unal.edu.co

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Resumen.— Los lagartos presentan diferentes comportamientos defensivos, donde podemos encontrar el comportamiento de simulación de muerte. Aquí presentamos el primer registro del comportamiento de simulación de muerte en *Anadia bogotensis*, una lagartija endémica de Colombia.

Palabras clave.— Lagartos, tanatosis, Colombia, endémica.

Abstract.— Lizards exhibit various defensive behaviors, including death-feigning behavior. Here, we present the first record of death-feigning behavior in *Anadia bogotensis*, an endemic lizard species of Colombia.

Keywords.— Lizards, death-feigning, Colombia, endemic.

Lizards exhibit a variety of defensive behaviors, ranging from passive to active strategies (Miranda et al., 2022). These defensive behaviors include tail autotomy, cloacal fluid expulsion, display of warning colors, tail movements, and notably, death-feigning behavior, known as thanatosis. In thanatosis, individuals simulate being dead by entering a state of immobility (Santos et al., 2010). During this behavior, individuals may become limp, occasionally protrude their tongue, have their eye pupils directed towards the eye's edge, and their body may partially or completely invert (Gehlbach, 1970; Kreiner, 2007; Toledo et al., 2011; Fernández-Guiberteau & Carrero, 2016).

This behavior has been observed in various lizard families, including Agamidae (Sengupta et al., 2020), Crotaphytidae (Gluesing, 1983), Dibamidae (Torres-Cervantes et al., 2004), Lacertidae (Dappen, 2010; Fernández-Guiberteau & Carrero, 2016), Liolaemidae (Rocha 1993; Santos et al., 2010), Scincidae (Langkilde et al., 2003; Patel et al., 2016), Sphaerodactylidae, and Tropiduridae (Galdino & Pereira, 2002; Gomes et al., 2004;

Kosldorf et al., 2004; Bertoluci et al., 2006; Vaz et al., 2012; Costa-Campos & Anaissi, 2020; Maia-Carneiro et al., 2021).

Anadia bogotensis (Peters, 1862) is a diurnal lizard with semifossorial habits, often found under vegetation, leaf litter, and rocks (Jérez & Calderón-Espinosa, 2014). It is an endemic species of Colombia, distributed in the departments of Cundinamarca, Boyacá, and Santander (Clavijo & Fajardo, 1981; Hernández-Camacho et al., 1992).

Here, we report the first instances of defensive death-feigning behavior in *A. bogotensis*. The initial observation occurred on May 29, 2022, at 14:31 h in the Chingaza National Natural Park, municipality of Fómeque, department of Cundinamarca, Colombia (4.55215° N, 73.797590° W, WGS84, 3410 m a.s.l.). An individual of *A. bogotensis* was found within the necromass of the plant *Espeletia grandiflora* (frailejon). During the process of capturing it for temperature and length measurements, the individual suddenly flipped onto its back and remained



Figura 1. Individuos de *Anadia bogotensis* (A y B) mostrando comportamiento defensivo. / **Figure 1.** Individuals of *Anadia bogotensis* (A and B) showing defensive behavior.

motionless (Fig. 1A). After being placed back on the ground, it resumed movement and escaped within a few seconds.

A second event was documented on July 20, 2023, at 14:07 h, at the same location. An individual of *A. bogotensis* was found too beneath the necromass of a frailejon. Upon capturing it for longitudinal and body temperature measurements, this specimen, like the previous one, initiated erratic movements in an attempt to free itself, accompanied by cloacal secretions. Unable to escape, the individual eventually rolled onto its back and remained motionless (Fig. 1B). This behavior persisted for approximately 15 seconds, after which the lizard rolled over and escaped.

The defensive death-feigning behavior in ectotherms may be associated with the temperature of the environment, where at low temperatures, the frequency of this behavior is usually higher, since individuals may not be able to perform other defensive strategies such as escape (Miyatake et al., 2008). Considering that *A. bogotensis* is a high mountain species that is exposed to large temperature variations that can condition its performance, the use of behaviors such as the death-feigning could be a defensive alternative to escape, under unfavorable environmental temperature conditions.

Death-feigning behavior has been previously reported in lizards of the Gymnophthalmidae family, including *Alopoglossus angulatus*, *Neusticurus bicarinatus*, *Cercosaura* aff. *argulus*, *Arthrosaura reticulata*, and *Arthrosaura kockii* (Costa-Campos & Anaissi), *Micrablepharus atticolus* (Mesquita et al., 2018), *Placosoma gabellum* (Muscat et al., 2016), *Iphisa elegans* (Machado-Filho et al., 2018), and *Cercosaura schreibersii* (Tedesco et al., 2013), however, this is the first report of thanatosis in the *Anadia* genus and one of the few records of lizards displaying this behavior in Colombia (Rojas-Suárez et al., 2023).

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