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Predation on *Dermophis* sp. (Gymnophiona: Dermophiidae) by *Bothrops asper* (Serpentes: Viperidae) in La Gamba Field Station, Costa Rica

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Bothrops asper (Garman "1883," 1884) commonly referred to as fer-de-lance or terciopelo, occurs in Central and South America ranging from the south of Mexico to Ecuador (Sasa et al., 2009). This pitviper is associated with primary and secondary forest types, riparian habitats, agricultural plantations, and human settlements (Leenders, 2019; Ramírez-Arce et al., 2021). In Costa Rica, *B. asper* is a common snake along both the Caribbean and the Pacific slopes (Leenders, 2019). It is a generalist predator with an ontogenetic diet shift: adults prey more frequently on mammals and birds, while juveniles primarily eat amphibians, lizards, and some arthropods (Savage, 2002; Sasa et al., 2009; Jones et al., 2014).

Dermophis Peters "1879," 1880 is a caecilian genus distributed from southern Mexico to northwestern Colombia in lowland to mid-elevation forests (Savage, 2002; Frost, 2021). There are five species of *Dermophis* reported from Costa Rica, two of which (*Dermophis glandulosus* and *D. occidentalis*) occur on the Pacific slope around the Golfo Dulce region (Leenders, 2016; AmphibiaWeb, 2021). They are predominantly fossorial (adapted for burrowing) and as with most caecilians (Gower et al., 2004), data about predator-prey interactions of *Dermophis* are scarce (Köhler, 2011; Leenders, 2016). Generally, snakes are considered the main predators of caecilians (Toledo et al., 2007; Acuña-Castillo, 2010; Köhler, 2011; Fernández-Roldán and Gómez-Sánchez, 2012; Mata-Lorenzen and Solórzano, 2021), although some other predators such as birds (Greeney et al., 2008; Nuñez Escalante and Amador, 2020), mammals (Cisneros-Heredia and Mosquera, 2010; Nuñez Escalante and Barrio-Amorós, 2014), and arthropods (Boistel and Pauwels, 2002) have also been observed preying on caecilians. Here, we report a predation event on a *Dermophis* sp. by the pitviper *Bothrops asper*.

On 3 November 2021 at 01:48 h, we observed a juvenile *Bothrops asper* feeding on a caecilian of the genus *Dermophis* (Fig. 1A, video: https://figshare.com/articles/media/Bothrops_asper_predating_on_a_caecilian_Dermophis_sp_mp4/16944202). The snake was found at the edge of the Quebrada Negra stream in La Gamba, Costa Rica (8.7007°N, 83.2022°W, 77 m elevation), after a heavy rain. At the time of the observation, the snake had already captured and killed the caecilian; only about 10 cm of the caecilian's front part was visible protruding from the snake's mouth and 5 minutes later it was completely ingested. The *B. asper* was a juvenile measuring approximately 60 cm in total length, with a body diameter that was only slightly larger than the caecilian it preyed upon. The caecilian was consumed tail first, allowing identification of the individual to the genus level based on the fact that its eyes were visible and based on the position of the tentacle, which is located centrally between the eye and nostril (Fig. 1B) – both features are diagnostic for Costa Rican *Dermophis*.

Snakes are commonly reported as predators of amphibians, yet, only 7.47% of these reports involved pitvipers (Toledo et al., 2007). Indeed, anurans constitute only a minor component (6.9%) of the reported diet of *B. asper* (Sasa et al., 2009). To date, only three observations of predation on caecilians by *B. asper* have been reported: *Caecilia volcani* (Jones et al., 2014 [as *Dermophis parviceps*], Leenders, 2019), *Gymnopis multiplicata* (Mata-Lorenzen and Solórzano, 2021), and

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Figure 1. (A) Terciopelo (*Bothrops asper*) predating on a caecilian (*Dermophis* sp.); (B) Head of the caecilian showing diagnostic features that enabled identification to genus. Photos by Moric F. Toszeghi and Raby Nuñez Escalante.

Dermophis sp. (this report). Our observation, therefore, confirms that *B. asper* opportunistically feeds on caecilians (Logan and Montero, 2009; Sasa et al., 2009). In the genus *Erythrolamprus*, it is common to observe the ingestion of long prey by the tail (Braz and Marques, 2016). However, despite the large number of predation reports by vipers (*Bothrops*) (Hertz et al., 2009; Jones et al., 2014; Gabrysova et al., 2020; Mata-Lorenzen and Solórzano, 2021) few of them describe how prey is ingested (head or tail-first). Although it is assumed that the terciopelo swallow prey head-first (e.g., Gabrysova et al., 2020; Mata-Lorenzen and Solórzano, 2021), it is possible that both head and tail-first ingestion are common in *Bothrops (*e.g., tail-first in Fujishima et al., 2021). Thus, including details about how individuals ingest their prey in future studies can help us determine the frequency of both strategies in the species. Because the specimens were not collected, it was not possible to identify the predated caecilian to species level. However, based on visible characteristics of the head and body colour, it likely is either *D. glandulosus* or *D. occidentalis*. These species have also been previously reported from this region (Köhler, 2011; Leenders, 2016).

Given the difficulty of studying amphibian-predator interactions (especially for fossorial caecilians), the description of opportunistically observed predation events represents an important contribution to the natural history knowledge of both species. This report not only helps to improve the understanding of the dietary composition of *B. asper* but also reveals a common predator of a rarely encountered *Dermophis* species.

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