Giants above us: two field observations of anacondas hunting on trees

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Predation is a major factor affecting population dynamics in ecosystems and their microhabitats, since a small number of predators may be sufficient to regulate an entire prey population (Odum, 1986; Ricklefs, 2003). Competition for food and adaptations to overcome prey defenses have given rise to refined morpho-physiological and behavioral mechanisms to find, capture and eat other animals (Owen, 1980). Each environment shows different levels of complexity that exerts a pressure on the phenotypes of organisms, and the interaction between behavior and morphology will ultimately influence the way in which each organism uses the resources available in the environment (Miles & Ricklefs, 1984). Understanding the intrinsic relationship between snake predatory behavior and their different habits may allow a better analysis of their occurrence in their microhabitats, besides corroborating the importance of preserving natural habitats (Ford, 1995; Cundall & Greene, 2000).

The Neotropical boid genus *Eunectes* (translates as “good swimmer”) includes four extant species: the Bolivian Anaconda, *Eunectes beniensis* Dirksen,

2002, the Dark-spotted Anaconda, *E. deschauenseei* Dunn & Conant, 1936, the Green Anaconda, *E. murinus* (Linnaeus, 1758), and the Yellow Anaconda, *E. notaeus* Cope, 1862 (Uetz et al., 2022). Anacondas are distributed in all lowlands of tropical South America east of the Andes (Thorbjarnarson, 1995; Rivas et al., 2007; Tarkhnishvili et al., 2022), and are usually closely associated with lakes and rivers, being the most specialized giant snakes in their preferred habitat (Murphy & Henderson, 1997). They are semi-aquatic and many morphological characters are adaptations for this lifestyle: narrower ventral scales, relatively small eyes and nostrils on top of head, with some species having a dark olive/greenish coloration with black spots with lighter centers that blend perfectly with the aquatic vegetation (Rivas, 1999). Anacondas are specialized for aquatic hunting, where they sit and wait for prey to approach with only eyes and nostrils above the water surface and they may go for long periods without a meal (Thorbjarnarson, 1995; Pizzatto et al., 2009).

The green anaconda *E. murinus* is one of the longest snake species worldwide, and is clearly the heaviest (Rivas, 1999). There are reports of 10–12 meter anacondas weighing up to 250 kg (Rivas, 1999), although the actual maximum size of an anaconda is the subject of much debate (Rivas, 1999; Rivas & Burghardt, 2001). These viviparous snakes show marked sexual size dimorphism, with females attaining much larger sizes than males (Duellman, 2005). They are opportunistic apex predators, feeding on any prey that they can kill and swallow, usually ranging from 14% to 50% of its own mass (O'Shea, 2007). Despite the prominence of *Eunectes* species in popular culture, there are few syntheses on their diet. Recently, Thomas & Allain (2021) presented an extensive study on prey items previously published in scientific literature, providing the first summary of diet across all four *Eunectes* species. The results indicate that *E. murinus* are trophically opportunistic and have a broad diet, taking a large variety of prey items that appears to vary ontogenetically, with juveniles feeding on birds more often than adults (Thomas & Allain, 2021). The prey includes all aquatic and terrestrial vertebrate groups, including a large diversity of fish, amphibians, reptiles, birds, and mammals (Miranda et al. 2016; Thomas & Allain, 2021). Anacondas swallow their prey whole and are considered gape-limited predators, with the size of prey being determined by the diameter of the snake's head (King, 2002).

Herein we report the first record of *Eunectes murinus* preying on a Brown-throated three-toed sloth, *Bradypus variegatus* Schinz, 1825 (Fig. 1). On 24 March 2022, at 09:02, during a tour on the banks of the Juruá River

(-4.8343°, -66.7768°; WGS84; 80 m above sea level), in the municipality of Carauari, state of Amazonas, Northern Brazil, a group of tourists observed an adult *E. murinus* of about 3500 mm total length. It was on branches of a Fabaceae tree at about 4 m above the water level. The group guide, Ismael Nascimento, recorded a video that shows the snake in the process of swallowing the sloth, with about one third of the sloth already consumed. The predation event occurred in a dense ombrophilous alluvial forest, also known as "Igapó", the vegetation that occurs along black and clear water rivers that are periodically flooded (Junk et al., 2011).

The sloth was identified as *B. variegatus* because of its brown colored throat and sides of the face, continuing on chest and shoulders; dark brown forehead and a suborbital stripe outlining the paler color of the ocular area (Wetzel, 1985). The sloth is a common inhabitant of primary and secondary evergreen and semi-deciduous forests. They occur from southern Honduras to northern Argentina, usually dwelling in high tree strata in various ecosystems, such as dry and rain forests (Eisenberg & Redford, 1989; Magnusson, 1997). The snake was identified as *E. murinus* by its characteristic dark olive-green dorsum, gradually changing to yellow ventrally, with round brown dorsal blotches with diffused black edges along the mid to posterior length of its body (Rivas, 1999). The event occurred within the known geographic range of *E. murinus* (Amorós & Manrique, 2008) and *B. variegatus* (Ruiz-García et al., 2020).

We also present a record of predation of an adult Green Iguana, *Iguana iguana* (Linnaeus, 1758) by *E. murinus*, at the top of a tree (Fig. 2). The Green Iguana is a tropical lizard, a folivore species when adult, with diurnal and preferably arboreal habits (Rand & Rand, 1976; Dugan, 1982). Two young individuals with estimated snout-vent length between 180 and 239 mm were formerly reported as prey of *E. murinus* (Rivas, 1999; Thomas & Allain, 2021). There is no information whether those individuals were captured in trees or on the ground. On 27 March 2017, at 15:30, during a tourist incursion on Tucunaré Lake (-3.6763°, -59.868°; WGS 84; 20 m a.s.l.), in the municipality of Careiro, Amazonas, Brazil, Ismael Nascimento spotted a ca. 3 m long anaconda on tree branches at about three meters above the water level in a "várzea" – floodplain ecosystems influenced by periodic floods of sediment-loaded, nutrient-rich white-water rivers (Prance, 1979). Ismael recorded the moment in a video that shows the anaconda constricting and swallowing the adult iguana, with only the hind legs and tail visible. In the final seconds of the video, the snake falls into the water while consuming the iguana.

To our knowledge, records presented here are the second and third records of *Eunectes murinus* consuming prey in trees (Freitas, 2009). Both predation events occurred during flood seasons (March 2017 and 2022), when the water level of most rivers in the Amazon basin is high and increasing (Da Silva et al., 2012). Therefore, it is reasonable to hypothesize that some *E. murinus* individuals/populations in flooded forests of Amazonia are forced to hunt in trees when the flood pulse reaches their foraging areas. Videos of the predation of the sloth and the iguana are available online at *https://www.herpetocapixaba.com.br/herpetovideos*

Both records came from field observation of professional guides that spend most of their time in the Amazon Forest. Is worthy of note how important it is to promote citizen science and work together with local people.

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Figure 1. Photographs of *Eunectes murinus* preying on *Bradypus variegatus* by constriction while hanging on tree branches in Caruari, Amazonas, Brazil.



Figure 2. Photographs of *Eunectes murinus* preying on an adult *Iguana iguana* by constriction while hanging on tree branches in Careiro, Amazonas, Brazil.

