

A water snake uses the tail and body to scan for fish prey in tide pools

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Some snake species use the tail as a lure to attract potential prey within striking distance. Caudal luring is mostly recorded for the Boidae, Colubridae, Dipsadidae, Elapidae, and Viperidae (Murphy et al., 1978; Sazima & Puerto, 1993; Sazima, 2006; Hagmant et al., 2008; Andrade et al., 2010). An extreme example of elaborate caudal luring displayed to attract birds is that of the viperid *Pseudocerastes urarachnoides*, whose tail tip bears an extraordinary resemblance to a spider (Fathinia et al., 2015).

One or two snake species use the tail to flush potential prey from their shelters and cause them to move. The movement attracts the attention of the snake, which attempts to catch the fleeing prey. This poking behaviour is recorded for the dipsadid *Hydrodynastes gigas* (Strüssmann & Sazima, 1990) and is suggested for the dipsadid *Echinanthera undulata* (Gomes & Marques, 2012).

We describe here another hunting tactic - scanning - with the use of tail and body to flush fish prey from crevices in tide pools, displayed by the dipsadid water snake *Erythrolamprus miliaris*. Tail poking differs from scanning by the use of tail only (Strüssmann & Sazima, 1990). This water snake has a wide distribution in South America, recorded from Brazil, Ecuador, Bolivia, Paraguay, Argentina, and Uruguay (Giraudou, 2006). It dwells in different habitats including lakes, rivers, swamps, mangroves, and occasionally tide pools and beaches (Sazima & Haddad, 1992; Marques & Souza, 1993; Duarte et al., 2014; Rocha-Lima et al., 2018; Van der Burg, 2020). *Erythrolamprus miliaris* is an opportunistic and generalist feeder, preying on fish, amphibians, reptiles, and small mammals (Van der Burg, 2020; Eisfeld et al., 2021), and even scavenges on roadkill frogs smashed to pieces (Gomes et al., 2017).

We recorded an *E. miliaris* individual on 30 October 2022, at 12:25 h at the Pontinha beach (25° 33'47.2" S, 48° 19'06.5" W, WGS84, 9 m a.s.l.), in the Ilha do Mel, Paranaguá, Paraná, Brazil. It searched for prey in a tide pool and displayed a hunting tactic we are calling 'tail and body scanning'. The sequence of events can be viewed on the video we made of its behaviour (BHS video, 2023). The snake had its head out of the water (Fig. 1A) when it began to make waving movements with the tail and part of the body to scan the tide pool. This scanning flushed out a frillfin goby *Bathygobius*



Figure 1. The water snake *Erythrolamprus miliaris* scans a tide pool for fish prey - **A.** The snake in the pool during its searching, **B.** Scanning flushed a frillfin goby *Bathygobius saporator* (red asterisk) from its shelter - note the snake's tail position while moving it in the crevice, **C.** Further scanning caused the goby to move towards the snake, which quickly caught the prey underwater, **D.** The snake moves to higher ground on a rock and swallows the prey tail first

saporator, which was previously undetected by the snake (Fig. 1B). The scanning repeatedly disturbed the fish, which swam from one spot to another of the tide pool looking for a safe place. At one moment of the scanning, the goby swam towards a higher point of the pool, being quickly detected by the snake and was caught (Fig. 1C). The snake held the prey and carried it to a rock out of the water (Fig. 1D), where it was swallowed tail first. From our first sighting of the snake in the tide pool, the above-described event lasted about 1 min 15 s.

This is the first report of tail and body scanning behaviour for *E. miliaris* and, to our knowledge, the first one by any

snake. Our record adds to the already known variable feeding tactics of this water snake, which forages in diverse microhabitats and preys on a wide array of vertebrates (Sazima & Haddad, 1992; Marques & Souza, 1993; Duarte et al., 2014; Rocha-Lima et al., 2018; Van der Burg, 2020; Eisfeld et al., 2021).

In a study on the aquatic snakes *Nerodia* spp., Gillingham & Rush (1974) comment that water snakes display non-stereotyped (variable) hunting tactics according to habitat. The same may apply to *E. miliaris*, which forages in a variety of aquatic habitats (Sazima & Haddad, 1992; Marques & Souza, 1993; Duarte et al., 2014). It is possible that the frillfin goby recorded as prey of *E. miliaris* by Marques & Souza (1993) was hunted in the tide pool using the same scanning tactic reported here, as it seems very effective for such a microhabitat. As *E. miliaris* displays some surprising foraging behaviours (e.g. Duarte et al., 2014; Gomes et al., 2017; this study), we expect that further natural history observations will disclose additional behaviours not yet described for this snake.

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