REPTILES & AMPHIBIANS

Use of Buttress Holes Filled with Water by Ecuador Sipos, *Chironius grandisquamis* (Peters 1869), on the Atlantic Slope of Costa Rica

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Of the 27 species in the Neotropical genus *Chironius* (Uetz et al. 2025), which collectively range from northern Honduras to Uruguay and northeastern Argentina, three occur in Costa Rica in habitats that vary from lowland rainforests to montane cloud forests (Savage 2002; Leenders 2019; Jadin et al. 2024). These snakes are diurnal and both terrestrial and arboreal and they generally hunt during the day and rest at night in trees and bushes (Dixon et al. 1993; Savage 2002).

Figure 1. An Ecuador Sipo (*Chironius grandisquamis*) submerged in a buttress cavity of a *Pentaclethra macroloba* at Río Blanco, Guápiles, Limón Province, Costa Rica: The cavity marked by the white circle (A), the snake in the cavity (note the opaque ocular scales indicative of a snake prior to ecdysis) (B–C) and the snake and stagnant water in the cavity fluorescing under an ultraviolet flashlight (D). Photographs by Rosbil González.

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The Ecuador Sipo (*Chironius grandisquamis*), with a distribution that extends from northern Honduras to northwestern Bolivia, Peru, and Ecuador, is a large species (maximum total length to 2.8 m), with males longer than females (Dixon et al. 1993; Solórzano 2022). In Costa Rica, *C. grandisquamis* inhabits rainforests from near sea level to 1,600 m asl (Savage 2002).

Diving into water as an antipredator response has been reported in *Chironius diamantina* (Fernandes da Silva and Hamdan 2014), *C. fuscus*, *C. carinatus* (Angarita-Sierra et al. 2024), *C. flavolineatus* (Mascarenhas et al. 2020), *C. brazili* (Parreira et al. 2024), and *C. grandisquamis* (Rojas and Marín-Martínez 2022; Sosa-Bartuano et al. 2024). Angarita-Sierra et al. (2024) also observed a *C. carinatus* diving but were unable to attribute the behavior to antipredator behavior. All of these observations were of active snakes diving into streams. Rojas and Marín-Martínez (2022) also suggested that streams might serve as potential foraging and resting sites. We herein report two observations of *C. grandisquamis* remaining submerged in standing water in the buttresses of two trees on the Atlantic slope of Costa Rica.

At 1630 h on 3 August 2023, while doing trail maintenance in Río Blanco, Guápiles, Limón Province, Costa Rica (10.18898, -83.83231; elev. 344 m asl), RG encountered an adult *Chironius grandisquamis* totally submerged in stagnant water in a cavity about 1 m above the ground in the trunk of a *Pentaclethra macroloba* (Fabaceae) (Fig. 1A–B). The snake had "cloudy" or opaque ocular scales and clearly was in the process of shedding its skin (Fig. 1C). The water smelled of decay and both the snake and the water presented considerable fluorescence under an ultraviolet flashlight (Fig. 1D). Seemingly untouched spider webs were present around the entrance of the cavity. During the next month, the snake was monitored almost daily, and it stayed in the cavity until 10 September 2023. RG searched the area for shed skin but found none, nor was the snake seen again.

At 2340 h on 9 September 2024, while walking along a trail at the Texas A&M Soltis Center in San Juan de Peñas Blancas, San Ramón, Alajuela Province, Costa Rica (10.38344, -84.61779; elev. 450 m asl), we noticed the reflection off the eyes of a snake peeking out of the buttress roots of an unidentified tree. Upon closer examination, we identified an adult *Chironius grandisquamis* in a hole (62 x 30 cm filled with water to a maximum depth of ~ 40 cm) ~ 30 cm above the forest floor (Fig. 2). Upon our approach, the snake with opaque ocular scales indicative of ecdysis retreated into the hole, which was filled with water and the opening of which was bordered by intact spider webs (Fig. 2). The site was left untouched. At 1409 h on 27 September 2024, we found what was almost certainly the same snake in the same hole with no obvious disruption of the spider webs. The hole was monitored until 1330 h on 6 October 2024, when the snake was no longer inside the cavity.

We do not know whether the snakes left the holes between our initial and final observations, but multiple sightings and the seemingly untouched spider webs at the entrances of the holes suggest that the snakes were not leaving them to forage and the sites were used for more than usual resting behavior.

The snakes could have been using the holes to facilitate ecdysis. Shedding snakes are known to seek humid and protected microhabitats to avoid the risks of dehydration or sensory disruptions (Chiszar et al. 1992; Greene 1997; Dupoué et al. 2015; Graham 2018; Hensley and Hensley 2023). The high humidity and protection provided by the partially enclosed and water-filled tree cavities likely present ideal conditions for shedding snakes. The possible antipredator behavior recorded on 9 September when the snake retracted its head into the hole as we approached resembles that described in Mascarenhas et al. (2020), suggesting that the tree cavity also might function as a refuge while shedding.

Figure 2. An Ecuador Sipo (*Chironius grandisquamis*) submerged in a buttress cavity of an unidentified tree at the Texas A&M Soltis Center, San Juan de Peñas Blancas, San Ramón, Alajuela Province, Costa Rica: The cavity marked by the white circle (left) and the snake flicking its tongue while almost totally submerged inside the hole (note the opaque ocular scales indicative of a snake prior to ecdysis) (right and inset). Photographs by Alexander Moya-Valverde.

The two snakes showed pre-ecdytic signs for at least 38 and 27 days, respectively, a duration that seemed unusually long compared to the 5–8 day durations for colubrids of similar size kept in captivity in the National Serpentarium of Costa Rica (A. Solórzano, pers. comm.) and those reported for other species such as Common Gartersnakes (*Thamnophis sirtalis*) (5 days) (King and Turmo 1997) and Nose-horned (*Vipera ammodytes*) and Northern Vipers (*V. berus*) (8 to 10 days) (Környei 1982). Data about ecdysis in snakes is somewhat limited. For example, more frequent than usual shedding periods have been associated with health problems (Lorch et al. 2015; Lind et al. 2023), ectoparasites (Loomis 1951; Chinnasamy and Bhupathy 2013; Sumaira et al. 2020), and environmental factors such as temperature (Semlitsch 1979), humidity, or a combination of both (Gibson et al. 1989; Chinnasamy and Bhupathy 2013; Sumaira et al. 2020). However, duration of the pre-sloughing period in snakes has not been correlated with any of these issues, and we observed no ectoparasites or any indications of illness or relevant environmental conditions during our limited observations.

Our observations suggest that water-filled tree cavities could play a role in ecdysis in *C. grandisquamis* and also might function as refuges. However, more robust data is necessary to affirm or reject this hypotheses.

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