

PHOTO BY CLAUDIO DIAS COELHO



FIG. 1. *Helicops modestus* in the beak of a male *Chloroceryle amazona* from Minas Gerais, Brazil.

amazona subdued the *H. modestus*. In fact, this tactic of hitting the prey against the substrate and swallowing it headfirst is commonly observed (Davis and Graham 1991, *op. cit.*). To our knowledge, this is the first documented record of predation on *Helicops* by a *Chloroceryle*.

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HETERODON SIMUS (Southern Hog-nosed Snake). REPRODUCTION and NESTING. *Heterodon simus* is a highly fossorial species associated with xeric sandhill habitats within the declining Longleaf Pine (*Pinus palustris*) ecosystem of the southeastern USA. Its relative rarity and secretive nature have confounded documentation of certain basic natural history information. Natural nests have long gone unreported (Jensen et al. 2008. Amphibians and Reptiles of Georgia. The University of Georgia Press, Athens, Georgia. 575 pp.), with reproductive information being limited to observations of copulating pairs and egg clutches that were either oviducal or deposited by captive females (e.g., Palmer and Braswell 1995. Reptiles of North Carolina. University of North Carolina Press, Chapel Hill, North Carolina. 412 pp.; Beane et al. 2014. Copeia 2014:168–175). Herein, we describe an apparent failed natural nest of *H. simus*.

On 23 May 2020, one of us (DCS) found a gravid female *H. simus* (ca. 425 mm SVL, 485 mm total length, 153 g) crossing a sand road (ca. 15 km NW of Wagram, Scotland County, North Carolina, USA). She was confirmed gravid by a radiograph and surgically implanted with a radio transmitter (Holohil SB-2T, Holohil Systems, Ltd., Carp, Ontario) on 26 May 2020, released on 31 May 2020 at point of capture, and monitored frequently (located on 52 of the 71 dates between 1 June and 10 August). For the entire monitoring period, the snake utilized relatively



FIG. 1. Burrow used as refugium and nest by *Heterodon simus*, Scotland County, North Carolina, USA.



FIG. 2. Excavated nest chamber of *Heterodon simus*, Scotland County, North Carolina, USA.

open sandhills dominated by *P. palustris*, *Quercus incana* (Bluejack Oak), *Q. laevis* (Turkey Oak), and *Aristida stricta* (Carolina Wiregrass), and on a two- to three-year prescribed burn rotation. From 6 June to 14 July, she utilized a single burrow of her own construction (Fig. 1) and was found underground in that refugium on 25 dates, and on the surface only twice, during that period. On both occasions observed on the surface (30 June and 1 July) she was basking ca. 5 m from the burrow and still appeared noticeably gravid. Between 15 and 27 July, she used four additional burrows, all within 61 m of the most-used burrow, and on 27 July she was observed active on the surface



FIG. 3. Eggshells from failed nest of *Heterodon simus*, Scotland County, North Carolina, USA.

and no longer appeared gravid. On 10 August 2020, she was found dead and partially consumed by a predator. The condition of the remains suggested a raptor.

We suspected eggs had been deposited in the burrow the snake used for the longest period (6 June–14 July). From 25 August–5 October, a hardware cloth nest protector was placed over that burrow, as well as over each of the four additional burrows known to have been used between 6 June and 1 August. Each burrow was monitored daily. No indications of hatching or emergence were noted. On 31 October 2020, we carefully excavated the most-utilized burrow. A nest chamber was located off a side tunnel ca. 61 cm lateral distance from the burrow entrance. The chamber measured ca. 7 × 7 cm and was situated at the interface of the topsoil and roots of a tussock of *A. stricta* and the underlying layer of sandy soil (Fig. 2). The bottom of the chamber was ca. 25 cm below the surface. The chamber contained six non-adherent eggshells in an advanced state of degradation; none appeared to have hatched (Fig. 3). Although it was difficult to determine the precise number of ova visible in the radiograph, it was clearly more than six and may have been greater than 13. It is possible that some eggs were either reabsorbed or never developed fully, were infertile or otherwise deteriorated completely before we discovered the nest chamber, were deposited in another location, or were consumed by an underground predator. JCB and SJH found the shed skin of an adult *Cemophora coccinea copei* (Northern Scarlet Snake), a known reptile egg predator, within ca. 1 m of the nest burrow on 3 July. The remains of the female and eggshells are deposited in the herpetology collection of the North Carolina State Museum of Natural Sciences (NCSM 104650).

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HYDROPHIS PLATURUS XANTHOS (Golfo Dulce Yellow Sea-snake). **HARASSMENT BY DOLPHINS**. Within the true sea snakes (Elapidae: Hydrophiinae), *Hydrophis platurus xanthos* is a recently described subspecies endemic to the inner basin of Golfo Dulce, Costa Rica (Bessesen and Galbreath 2017. ZooKeys 686:109–123). Golfo Dulce is a semi-enclosed embayment with a profound inner basin (>200 m) and effective sill and shallow outer basin that prevent free exchange with the Pacific Ocean masses (Svendsen et al. 2006. Rev. Biol. Trop. 54:147–170). In contrast to black-and-yellow conspecifics residing outside the gulf, the geographically bound *H. p. xanthos* is bright canary yellow with significantly smaller body size (49 cm average total length; Bessesen and Galbreath 2017, *op. cit.*).

At 1239 h on 21 January 2012, two *Tursiops truncatus* (Bottlenose Dolphins) travelling in Golfo Dulce with a larger group broke off and began harassing an adult *H. p. xanthos*. Loose skin covering the snake's body indicated it may have been in the process of ecdysis when it was attacked (Fig. 1). This species employs a knotting behavior to aid shedding (Pickwell 1971. Copeia 1971:348–350; BLB, pers. obs.) which might have attracted the cetaceans. The dolphins tossed the serpent back and forth for 5–7 min in what appeared to be play, and then moved away to follow their group. The snake remained at the surface, knotting itself into a ball. It was netted for brief examination and deemed limp but alive, with teeth marks on the skin, especially around the head and neck (Fig. 1). After being returned to the water, its fate was unknown.

Hydrophis platurus outside Golfo Dulce possess black dorsums with yellow ventral surfaces and black spots or bands on the tail paddle (Bessesen 2012. Herpetol. Rev. 43:22–26). This coloration is considered aposematic as the species possesses neurotoxic venom and appears noxious, having few natural predators (Kropach 1975. In Dunson [ed.], The Biology of Sea Snakes, pp. 185–213. University Park Press, Baltimore, Maryland). Nevertheless, there are reports of *H. platurus* being attacked by octopus (van Bruggen 1961. Basteria 25:73–74), pufferfish (Pickwell et al. 1983. Calif. Fish Game 699:172–177), Lava Gulls (Reynolds and Pickwell 1984. Copeia 1984:786–789), pelicans (Álvarez-León and Hernández-Camacho 1998. Caldasia 20:93–102), Magnificent Frigatebirds (Sheehy et al. 2011. Herpetol. Rev. 42:443), Wood Storks (Solórzano and

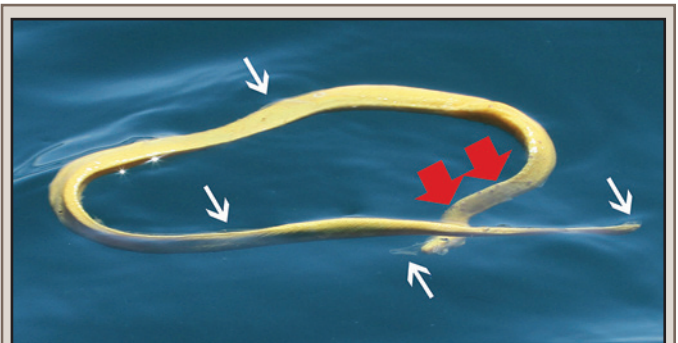


FIG. 1. *Hydrophis platurus xanthos* floating limp in Golfo Dulce, Costa Rica after being tossed around by two *Tursiops truncatus* (Bottlenose Dolphins) and left with multiple tooth marks (red arrows; white arrows point to loosened skin).

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