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FIG. 1. A male *Odontophrynus carvalhoi* climbing a sloping ravine on Baturité Mountain, Ceará, northeastern Brazil.

carvalhoi in a rainforest enclave in Ceará, northeastern Brazil. In April 2019, we found an *O. carvalhoi* (50 mm SVL, 20 g) climbing up a sloping ravine on Baturité Mountain (4.2704°S, 38.9385°W; WGS 84; 912 m elev.). It was ca. 60 cm above level ground (Fig. 1). Although some non-arboreal frogs have been reported to exhibit climbing behavior (e.g., Hudson et al. 2016. Biol. J. Linn. Soc. 119:992–999; Maia-Carneiro and Maia-Solidade 2020. Braz. J. Biol. Sci. 7:149–151), this is the first report of this behavior for the Odontophrynidae. The climbing behavior of non-arboreal frogs may be associated with feeding or escape attempts from predators (Maia-Carneiro and Maia-Solidade 2020. Braz. J. Biol. Sci. 7:149–151). Nevertheless, we observed no imminent potential threats for this individual. In addition, *O. carvalhoi* tends to burrow whenever it is at risk (Costa et al. 2017. Bol. Mus. Biol. Mello Leitão 39:95–115). Therefore, we believe this climbing behavior might be associated with the environmental characteristics (rugged landscape) where this individual was found, which facilitates climbing up sloping ravines on Baturité Mountain.

We are grateful to the CNPq/FUNCAP/CAPES for financial support (Finance Code 001; 151124/2020-5), and the ICMBio for the collection license (Permit: ICMBio 72384, process: 29613).

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***PHRYNOIDIS ASPER* (River Toad). DEFENSIVE BEHAVIOR.** Anurans use a wide variety of defensive behaviors to avoid predation. Bufonids are known to exhibit several defensive behaviors. For example, several species of *Rhinella* are known to engage in stiff-legged behavior (Nehemy et al. in press, Caldasia) and *Ansonia hanitschi* is known to exhibit the unken reflex (Malkmus et al. 2002. Amphibians and Reptiles of Mount Kinabalu [North Borneo]. Koeltz Scientific Books, Königstein, Germany. 424 pp.). *Phrynoidis asper* is a large, stream-dwelling toad widely distributed in Thailand, Myanmar, Malay Peninsula, Sumatra, Borneo, Java, and surrounding islands. Here, we report the first observation of defensive behavior in *P. asper* and the first observation of this behavior for the genus *Phrynoidis*.

On 8 March 2019, at 2200 h, we found an adult male *P. asper* at the base of Mount Halau-halau, Batang Alai Timur, Kabupaten Hulu Sungai Tengah, Kalimantan Selatan, Indonesia (2.674°S, 115.610°E; WGS 84; 560 m elev.). The *P. asper* was found on a

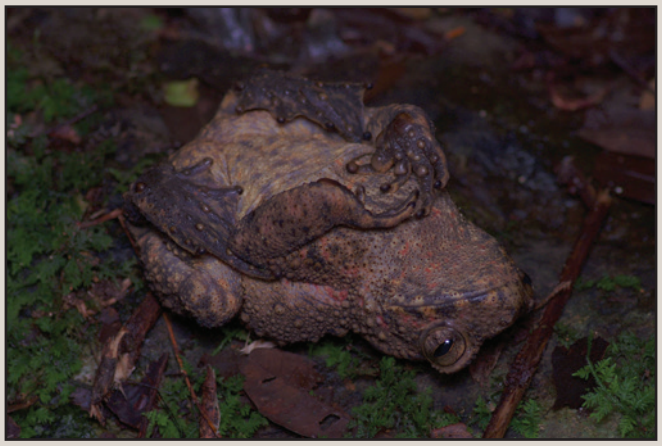

FIG. 1. *Phrynoidis asper* from Kalimantan, Indonesia displaying defensive behavior.

stone along a stream in primary forest, without any external injuries. When it was captured by hand, it folded its limbs close to the body (Fig. 1). At this time, no toxic secretion was released from the parotoid glands. The *P. asper* maintained this posture, but after a few minutes returned to a posture with its limbs extended normally. This defensive behavior has been described as contracting behavior (Toledo et al. 2011. Ethol. Ecol. Evol. 23:1–25). To clarify the significance of this behavior by *P. asper*, more data needs to be collected and validated.

This research was conducted under the authorization of the Indonesia government (Research Permit Number: #79/E5/E5.4/SIP/2019).

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***PHYSALAEMUS (ENGYSTOMOPS) PUSTULOSUS* (Túngara Frog). EGG PREDATION.** As a seasonally breeding anuran, the reproduction of *Physalaemus pustulosus* coincides with the rainy season where females choose their mates at a lek of calling males. While still in amplexus, females also choose the oviposition site at a water source that can range from a pond to a divot in the road (Ryan 1985. The Túngara Frog, A Study in Sexual Selection and Communication. University of Chicago Press, Chicago, Illinois. 46 pp.). During oviposition, *P. pustulosus* males use their hind legs to kick up the egg-jelly produced by the females. Along with the addition of water, this kicking action produces a foam structure that houses the developing embryos and protects them from desiccation, even if the initial water source evaporates. As the eggs are held near the core of the viscous foam, the egg-free outer portion provides an ideal environment for incubation while also buffering the embryos from predators (Dalgetty and Kennedy 2010. Biol. Lett. 6:293–296). However, if a predator is able to breach the nest, they have access to a nutrient-dense meal at the nest's core. At ca. 0950 h on 11 August 2019, we observed a juvenile *Erythrolamprus* (*Liophis*) *epinephelus* (Fire-bellied Snake) in Soberanía National Park near Gamboa, Panamá performing this behavior.

The ca. 2-d-old *P. pustulosus* foam nest was located on Pipeline Road. The puddle where it was originally oviposited had evaporated and the nest was resting on a mud surface. Repeated movement from within the nest drew our attention and we watched as the snout of a juvenile *E. epinephelus* emerged from the center. With its tail sticking out of the opposite side, the snake struggled to push itself out of the nest, likely as a result of the foam's viscosity. The physical effort to push into (or out of) the nest indicates that the snake made a concerted effort to gain access to the interior of the nest. After exiting the foam nest, the *E. epinephelus* spread its neck in defense and remained motionless until we left.

Prior to this observation, there have been no direct accounts of a terrestrial vertebrate predator for the foam nests of *P. pustulosus*. Aquatic predation by tadpoles of *Agalychnis callidryas* (Red-eyed Leaf Frog) on *P. pustulosus* foam nests has been documented (Ryan 1985, *op. cit.*), along with an account of predation by wasps (Starr et al. 2020. J. Hymenop. Res. 78:91–96). However, in both of these instances, the foam nests were thoroughly degraded so that the eggs lay exposed, whereas the foam nest we observed was still fully intact. This suggests that a snake predator may more easily burrow into and take advantage of an intact foam nest than other potential predators. Snakes of species closely related to *E. epinephelus* (Lingnau and Di-Bernardo 2006. Biociências 14:223–224) have been documented as oophagous to other leptodactylid species, but until now, a terrestrial vertebrate predator has not been documented for the nests of *P. pustulosus*. In addition, although *E. epinephelus* is a known predator of adult anurans (Savage 2002. The Amphibians and Reptiles of Costa Rica: A Herpetofauna between Two Continents, between Two Seas. University of Chicago Press, Chicago, Illinois. 581 pp.), it has not, to our knowledge, been documented as oophagous.

Foam nests likely fostered the diversification of the Leptodactylidae so that these anurans could occupy new environments unhindered by their reliance on permanent water sources to reproduce (Pereira et al. 2017. Biol. J. Linn. Soc. 122:814–823). Some researchers have therefore argued that the principal role for a foam nest is to prevent microbial growth and desiccation in an environment where water sources are sometimes unreliable (Fleming et al. 2009. Proc. R. Soc. B. 276:1787–1795). Even so, the dissuasion of predators has likely been important for the evolution of foam nests as instances of oophagy remain fairly rare for species that produce foam nests. This may be in part attributed to the lectins and cystatins found in a foam nest that, in tandem with its viscous consistency, are thought to largely be sufficient to deter oophagy (Fleming et al. 2009, *op. cit.*). While the nest structure likely discourages egg predation, our observation indicates that at least one snake species has been able to breach the physical defense of a *P. pustulosus* nest to gain access to the eggs.

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PIPA CARVALHOI **(Carvalho's Surinam Toad). PREDATION.** *Pipa carvalhoi* inhabits preserved or relatively disturbed water bodies (Silva et al. 2010. Check List 6:451–453; Santana et al. 2014. Check List 10:407–408), having adaptations such as lateral line retention in the adult, suction feeding, interdigital membranes, absence of tympanic membranes and vocal cords, and crypsis as a strategy to escape predation (Trueb and Cannatella 1986. Herpetologica 42:412–449). *Megascops choliba* (Tropical Screech Owl) is a nocturnal bird that inhabits interior forest environments (Menq and Anjos 2015. Rev. Bras. Biol. 75:143–149). Its diet consists of invertebrates and, occasionally, small vertebrates (Motta-Junior 2002. J. Raptor Res. 36:332–334; Vieira et al. 2015. Herpetol. Notes 8:275–276; Brentano et al. 2020. Oecol. Aust. 24:204–210). Herein, we report the first record of *M. choliba* preying upon a *P. carvalhoi*.

PHOTO BY RENAN LUXINGER BETZEL

FIG. 1. Juvenile *Megascops choliba* feeding upon an adult *Pipa carvalhoi* in Colatina, Brazil.

During a herpetological survey on 17 November 2018, in Córrego São João Grande (19.46038°S, 40.83278°W; WGS 84; 125 m elev.), Municipality of Colatina, Espírito Santo, Brazil on a rural private property, at ca. 1845 h, we found an adult *M. choliba* with an adult *P. carvalhoi* in its talons. It flew away a few seconds later. At ca. 1854 h, we observed a second *M. choliba*—a juvenile in a tree close to our initial observation. The juvenile *M. choliba* was feeding on a *P. carvalhoi*, holding it with its talons and eating it headfirst (Fig. 1). We believe it to be the same *P. carvalhoi* which was brought to the juvenile by its parent. Amphibians are not common prey items of neotropical birds. However, they can be consumed when there is low availability of arthropods during certain times of the year (Poulin et al. 2001. J. Trop. Ecology 17:21–40). To our knowledge, this is the first record of *M. choliba* preying upon *P. carvalhoi*.

This work is part of 'Herpeto Capixaba: for the knowledge and conservation of amphibians and reptiles of Brazil. This study was financed in part by Fundação de Amparo à Pesquisa e Inovação do Espírito Santo (EDITAL FAPES Nº 03/2021 - UNIVERSAL #437/2021).

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