

mating aggregation of *D. minutus* (Leivas et al. 2018. Herpetol. Notes 11:395–403), in which the intense activity of frogs created suitable opportunities for predation by spiders using different foraging strategies.

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HADDADUS BINOTATUS (Clay Robber Frog). PREDATION. The frog species *Haddadus binotatus* (Craugastoridae) is distributed throughout coastal Brazil, ranging from the northeastern State of Bahia to the southern state of Rio Grande do Sul (Carvalho and Dias 2012. Herpetol. Notes 5:419–422). Even though it is a locally common leaf-litter species of the Atlantic Rainforest, its natural history is still understudied, and little is known of its ecological interactions. Herein, we report an interaction between army ants and *H. binotatus*.

At 1145 h on 2 February 2019 I noticed a column of army ants (*Eciton* sp.) on the edge of a frequently used trail at Serra da Cantareira, the extensive Atlantic Forest urban area next to São Paulo, Brazil (23.25450°S, 46.38030°W; WGS 84; 889 m elev.). Several arthropods, such as grasshoppers and harvestmen, were seen or heard escaping the column, whilst simultaneously being chased by several parasitoid flies (Sarcophagidae). An adult individual of *H. binotatus* was then seen jumping on the trail away from the ants, which were biting and stinging it (Fig. 1). Since *H. binotatus* is mainly nocturnal (Rocha et al. 2007. Trop. Zool. 20: 99–108), it is likely that it was only moving during a dry hot morning due to the raiding ants. A frog died after being parasitoidized by a sarcophagid fly while hiding adjacent to an army ant column (Rettenmeyer 1961. Arthropods Associated with Neotropical Army Ants with a Review of the Behavior of these Ants [Arthropoda; Formicidae; Dorylinae]. Ph.D. Dissertation, University of Kansas, Lawrence, Kansas). Neotropical army ants rarely feed on live small vertebrates. However, they occasionally sting and kill small-sized vertebrates such as lizards and snakes (Schneirla 1971. Army Ants: A Study in Social Organization. W. H. Freeman & Co., San Francisco, California. 349 pp.). This suggests that army ants can be a potential hazard to frog species either involving direct mortality or indirect effects such as desiccation or parasitism by parasitoid flies.



FIG. 1. *Haddadus binotatus* bitten by *Eciton* sp. during a swarming raid.

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HYPEROLIUS ADSPERSUS (Sprinkled Long Reed Frog). PREDATION. Spiders are known predators of adult and larval anurans in both temperate and tropical regions, but such predation events have rarely been documented in the Afrotropics. In Tanzania, fishing spiders (Pisauridae: *Thalassius* sp.) prey on both metamorph and adult *Hyperolius spinigularis* reed frogs (Vonesh 2005. Oecologia 143:280–290). Likewise, Portik et al. (2018. Herpetol. Rev. 49:397–408) reported predation of an adult female *H. fusciventris* reed frog by a fishing spider (*Nilus* sp.) and Barej et al. (2009. Herpetol. Notes 2:137–139) reported predation of a *Leptopelis brevirostris* tree frog by a wandering spider (Ctenidae), both in Cameroon. Here, we report predation of a *H. adspersus* reed frog by a fishing spider (Pisauridae: *Nilus* sp.) in Gabon.

At 2053 h on 16 December 2017, we observed an adult *H. adspersus* being consumed by a spider (Fig. 1) in an open, flooded grassland at the edge of a lowland forest patch in the vicinity of Yenzi and Gamba town, Nyanga Province, Gabon (2.78011°N, 10.03758°E; WGS 84; 2 m elev.). The spider (Pisauridae: *Nilus* sp.) was hanging by its hind legs from tall grasses ca. 30 cm above the water. The frog was already partially digested when we happened



FIG. 1. Predation of *Hyperolius adspersus* by a fishing spider (Pisauridae: *Nilus* sp.) in Nyanga Province, Gabon.

upon the spider, so we did not attempt to intervene and preserve a voucher specimen of the frog. We observed several species of *Hyperolius* chorusing at this site including *H. adspersus*, *H. platyceps*, *H. tuberculatus*, and *H. olivaceus*, as well as three larger anuran species (*Leptopelis aubryi*, *Ptychadena perreti*, and *Hoplobatrachus occipitalis*).

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ITAPOTIHYLE LANGSDORFFII (Ocellated Treefrog). DEFENSIVE BEHAVIOR. At least 30 behavioral defense strategies are described for anurans, including eye-protection (Toledo et al. 2011. *Ethol. Ecol. Evol.* 23:1–25). Here, we observed an individual of *Itapotihyla langsdorffii* displaying eye-protection during a capture by hand. At 2125 h on 12 May 2017, during a night survey of the inventory research in Reserva Particular do Patrimônio Natural - Reserva Natural Guaricica, Brazil (25.30000°S, 48.66666°W; WGS 84), we captured an individual of *I. langsdorffii* which remained in the eye-protection position with eyes opened for at least 2 min while we identified the species (Fig. 1). We did not observe other defensive behaviors such as vocalization, cloacal urine, or others common in anurans. Eye-protection behavior has been reported in other families of anurans such as Rhacophoridae (Maát and Jablonski 2011. *Herpetol. Rev.* 42:307), Mantellidae (Andreone 2002. *Herpetol. Rev.* 33:299–300), and Ranidae (Haberl and Wilkinson 1997. *Herpetol. Bull.* 61:16–20), however, most instances, such as the one we report here, were observed in hylids (Toledo et al. 2011, *op. cit.*).



FIG. 1. Eye-protection behavior of *Itapotihyla langsdorffii* during capture.

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LEPTOPELIS FLAVOMACULATUS (Brown-backed Tree Frog). INTERSPECIFIC AMPLEXUS. Unusual forms of amplexus in anurans have been reported, including between males only (Mollov et al. 2010. *Biharean Biol.* 4:121–125), males with female of a different species (Bettaso et al. 2011. *Herpetol. Rev.* 42:578–621), males with dead animals (Bettaso et al. 2008. *Herpetol. Rev.* 39:384–498; Müller 2016. *Herpetol. Notes* 9:283–284), and even males with inanimate objects (Streicher 2008. *Herpetol. Rev.* 39:75; Mollov et al. 2010; Biharean Biol. 4:121–125). Most records on interspecific amplexus involve other frogs, and little is known regarding amplexus between amphibians and non-amphibians.

At ca. 2030 h on 10 March 2019, while surveying frogs in Amani Pond in Amani Nature Reserve, Eastern Usambara Mountains, Tanzania (5.09980°S, 38.63120°E; WGS 84; 917 m elev.), I observed a male *Leptopelis flavomaculatus* (Brown-backed Tree Frog) in amplexus with a slug (family Urocyclidae; Fig. 1) on a leaf about 1 m above the ground. The frog remained motionless when approached and was undisturbed by my closer observation, which lasted for 5 min. After photography was completed, I left the animals in their amplexic position. The slug was not identified to a more specific classification as dissection would be required (Rowson et al. 2017. *ZooKeys* 723:11–42). To my knowledge, this is the first record of amplexus between *L. flavomaculatus* and a urocyclid slug.

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