New records of predation attempt on *Rhinella* spp. in the Atlantic Forest: The importance of camera trap in recording species natural history

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Anura is an important component of trophic chains; transferring energy from aquatic to terrestrial environments during its biphasic life cycle (Whiles et al., 2006; Toledo et al., 2007). Due to the selective force imposed by predators, many species evolved chemical mechanisms for defense, as those from the genus *Rhinella* Fitzinger, 1826. These species have glands at the base of the head (paratoids), in the legs (paracnemis) and in the forearm (forearm) that store bufogenines and bufotoxins (Jared et al., 2009; Regis-Alves et al., 2017; Leal et al., 2018). Besides all these defenses, annelids, crustaceans, arachnids and some vertebrates (Toledo et al., 2007; Oliveira et al., 2017) are able to cheat these strategies and predate individuals of *Rhinella* spp.

The genus *Rhinella* has 92 species, most of them widespread in the Neotropics, from which 40 occur in Brazil (Segalla et al., 2016; Frost, 2019). Among them, *Rhinella icterica* (Spix, 1824) are known from Paraguay, Argentina and the central, southeast and south regions of Brazil, occurring in environments with different conservation levels (Silvano et al., 2010). The species has average snout-vent length of 160 mm, and males are smaller and thinner than females (Lema et al., 2011). The species’ diet is composed by arthropods, mainly ants (Sabagh and Carvalho-e-Silva, 2008; Sabagh et al., 2012).

There are scarce data on the predators of *Rhinella icterica*. Some records identified arachnids as Ancylometes rufus (Walckenaer, 1837), Ctenus amphora Mello-Leitão, 1930, Ctenus villasboasi Mello-Leitão, 1949, Theraphosa blondi (Latreille, 1804), snakes as Pseudochisporphyriacus (Shaw, 1794), Thamnodynastes strigatus (Günther, 1858) and mammals as Chrysocyon brachyurus (Illiger, 1815) and Procyon cancrivorus as predators of *Rhinella icterica* (see Rufatto et al., 2003; Cortês-Gomez et al., 2015; Oliveira et al., 2017).

The species natural history is commonly studied in the field by direct observation and recorded in photographs and videos (Cullen et al., 2006). However, the increasing popularization of passive sampling equipments, as cameras trap, has been helping data acquisition at natural habitats, mainly for medium and large size taxa (see Srbek-Araujo and Chiarello, 2007). The use of cameras trap in video format has also contributed to the natural history studies (e.g., Galetti et al., 2016; da Silva et al., 2019), because it records behavior and interactions data that are difficult to observe directly in the field, with the researcher interference.

Here we described three records of predation attempt of *Rhinella* spp. Two records of *Salvator merianae* (Duméril and Bibron, 1839) on a *Rhinella icterica* and on a *Rhinella* sp., and another record of *Aramides saracura* (Spix, 1825) on a *Rhinella* sp. The three records were made using cameras trap in the Atlantic Forest from southern Brazil, Santa Catarina State.

The records were obtained using cameras trap from Bushnell®, installed at the ground level to sample medium and large size mammals at an Atlantic Forest remnant, Municipality of Treviso, Santa Catarina State (-28.491117°, -49.523425°). The first record occurred on 22 October 2018 at 10:27 h; and the second on 13 January 2019 at 12:46 h. Both records were made using cameras trap from the Atlantic Forest from southern Brazil, Santa Catarina State.

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be/UHHiuatXCOU). The third record occurred on 25 September 2018 at 10:10 h, when a *A. saracura* was in a marsh area banging with the beak an individual of *Rhinella* sp. (Fig. 1C and D; web video available at: https://youtu.be/umtdk3mpQY0). During the predation attempt, it is possible to identify two antipredator mechanisms: body inflation and fighting (Toledo et al., 2011; Ferreira et al., 2019).

*Salvator merianae* has a generalist diet, consuming fruits, invertebrates such as annelids, gastropods, crustaceans, coleopterans, dipterans, lepidopterans, hymenopterans, arachnids, and vertebrates such as fish, anurans, other lizards, snakes, birds and mammals (Kiefer and Sazima, 2002; Castro and Galetti, 2004; Machado, 2007; Santos and Vaz-Silva, 2012; Sazima and D’Angelo, 2013; Silva et al., 2013; Kasperoviczus et al., 2015; Muscat and Moroti, 2016; Vieira et al., 2018). There are records of predation on other Anura species as *Rhinella granulosa* (Spix, 1824), *Rhinella diptycha* (Cope, 1862), *Leptodactylus latrans* (Steffen, 1815), *Scinax fuscovarius* (A. Lutz, 1925), and *Leptodactylus natalensis* Lutz, 1930 (Silva and Hillesheim, 2004; Maffei et al., 2009; Almeida et al., 2015; Gavira, 2018). These data combined with our records reinforce the hypothesis that *S. merianae* is a predator of many anuran species.

Although *A. saracura* is a common species in southern Brazil, little data are available on its diet. The consumption of Coleoptera and seeds (Ramos et al., 2011) had been described, but we could not find any report on vertebrate predation by *A. saracura*. We only found data on its family Rallidae, which are omnivore, since some species consume plant material, larvae, insects, and small snakes (e.g., species of *Rallus* prey on snakes *Helicops* Sick, 1997). The foraging of *A. saracura* near overload areas may increase opportunities to

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**Figure 1.** New records of predation attempt on *Rhinella* spp., recorded by a camera trap from an Atlantic Forest remnant, Municipality of Treviso, State of Santa Catarina, Brazil. (A) and (B) predation attempt of *Rhinella icterica* by *Salvator merianae*. (C) and (D) predation attempt of *Aramides saracura* on an individual of *Rhinella* sp.
predate anurans. The potential of *A. saracura* as an anuran predator will only be confirmed by robust data on its diet. All the three records reported here were obtained occasionally, since the sampling focus were medium and large size mammals. These records show the importance of using passive sampling methods as cameras trap in detailing species natural history.

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References


