

SHORT COMMUNICATION

Fruit consumption by *Salvator merianae* (Squamata: Teiidae) in the Brazilian Caatinga

Virgínia Helen Figueiredo Paixão and Eduardo Martins Venticinque

Programa de Pós-Graduação em Ecologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte. Lagoa Nova, Natal, RN, 59078-970, Brazil. E-mail: paixaovir@gmail.com.

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Salvator merianae (Duméril and Bibron, 1839) is a native teiid lizard widely distributed in South America, occurring in all Brazilian environments, such as Caatinga dry forest, Cerrado savanna, Pampa grassland, and Atlantic and Amazon rainforest (Van Sluys and Rocha 1999, Kiefer and Sazima 2002, Vieira *et al.* 2018). It is the largest species in the genus, reaching 1.2 m total length and weighing over 4.5 kg (Milstead 1961, Fitzgerald 1992). The Black-and-white Tegu is known to have an omnivorous diet, which includes invertebrates, vertebrates, eggs, and many fruits (Kiefer and Sazima 2002). In fact, in the family Teiidae, frugivorous habits have been reported in 36 species (Valido and Olesen 2007, 2019).

Despite advances in the study of the diet of *S. merianae*, most of the data available for fruit eating in the diet of this lizard come from experiments in which individuals are presented with fruits, through stomach content analyses, or

traditional knowledge (Kiefer and Sazima 2002, Castro and Galetti 2004, Silva *et al.* 2014). Recently, passive sampling methods, such as video recording with camera traps, have increased the data about the natural diet and feeding behaviour of *S. merianae* (Luciano *et al.* 2020).

Here we describe new records of *S. merianae* consuming fruits directly from the plant at a Caatinga site. Primary seed dispersal, when seeds are consumed before reaching the ground (Muller-Landau and Hardesty 2005), was unknown in *S. merianae* prior to this study.

We conducted our fieldwork at the Municipality of Lajes, Rio Grande do Norte state, northeastern Brazil (05°47'55" S, 36°14'22" W). The region is characterized by Caatinga vegetation with thorny trees and shrubs, and a cacti physiognomy. The climate is dry semiarid, marked by an extended dry season and erratic and unpredictable rainfall that usually occurs from February to May, when the total amount of precipitation reaches 350 mm (Szilagyi 2007).

We monitored vertebrate frugivory interactions on *Pilosocereus gounellei* (F. A. C.

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Weber) Byles and Rowley (Cactaceae), a shrubby columnar cactus that can reach up to 3 m in height, is covered by thick spines of 150 mm in length, and bears glabrous dehiscent fruits (4 × 6 cm) with a pinkish pericarp and a magenta fleshy pulp with many ($N \leq 4000$) small (1 × 1 mm) seeds (Abud *et al.* 2012). We used camera traps (Bushnell 8 MP Trophy Cam) from September 2018 to July 2019, totaling 621 camera-days, to monitor 17 individual cacti. Cameras were installed close to (2–5 m) and pointing toward cactus fruits. They were programmed to take two pictures followed by a 10-s video in intervals of one minute when triggered. The cameras were set in

the field to work 24 h per day to detect frugivory events (Blanco *et al.* 2019).

We recorded *S. merianae* consuming two fruits of *P. gounellei* on two consecutive days, 22 and 23 May 2019, at 10:27 h and 11:04 h, respectively. By comparing the individual's morphology and color patterns on the images, we confirmed that the fruits were consumed by the same individual (Figure 1). At the time the frugivory was recorded, two fruits were available at a height of 0.7 m. The animal stood in a bipedal position and ate the pulp from both fruits, using its hands to improve balance by touching the thick spines (Figure 1; link to video: https://youtu.be/7t5MdJQKs_Y).




Figure 1. *Salvator merianae* consuming fruits of *Pilosocereus gounellei* at a Caatinga site in Lajes municipality, Rio Grande do Norte state, northeastern Brazil.

This report is the first evidence of primary seed dispersal by *S. merianae* as well as the first record of fruit consumption of *P. gounellei* by this large lizard. *Salvator merianae* has been reported to consume fruits from another columnar cactus, *Cereus jamacaru*, at another Caatinga area, although it is not clear if the animals accessed fruits fallen on the ground or in the cactus (Silva *et al.* 2014). This teiid lizard ate fruits of the cactus *Cereus peruvianus* when offered in a controlled experiment but the passage of the seeds through *S. merianae*'s gut did not affect the percentage and time of seed germination (Castro and Galetti 2004). However, it is known that *Pilosocereus* spp. depend on zoochoric vectors to remove chemical barriers present in their fruits and to promote seed germination (Meiado *et al.* 2012).

Despite being a generalist, the diet of *S. merianae* can include up to 50% of plant matter, such as fruits (Kiefer and Sazima 2002). Pulp fruits are easily metabolized because they are low in fiber and protein content, and many are rich in water, such as the fruits of *Pilosocereus* spp. (Nascimento *et al.* 2011). In addition to eating fruit, lizards potentially disperse seeds (Valido and Olesen 2019). *Salvator merianae* differs from other seed-dispersing lizards in the Caatinga, such as *Tropidurus* spp. (Gomes *et al.* 2016), because it is larger in size and weight (Fitzgerald 1992). These lizards search for food throughout their large home ranges (≥ 4 ha) (Vieira 2016). Thus, *S. merianae* potentially disperses seeds for a long distance, considering that it defecates intact seeds (Castro and Galetti 2004, Silva *et al.* 2014).

This study shows that *S. merianae* consumes fresh fruits directly from the plant as part of its natural diet, adding information about the diversity of plant species known to provide food for this lizard. It also increases knowledge about the intimate relationship between the lizards and cacti of the Caatinga (Guerrero *et al.* 2012, Leal *et al.* 2017). Future work should evaluate the role of *S. merianae* as an effective seed disperser of Caatinga plant species. Considering the

intense poaching pressure this lizard suffers in Brazilian semiarid ecosystems, this mutualism could be lost before it is understood (Alves *et al.* 2012).

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