Dead but delicious: an unusual feeding event by the Sertão Muçurana snake (*Boiruna sertaneja*) on a bird carcass

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The Sertão Muçurana snake, Boiruna sertaneja Zaher, 1996 is a large pseudoboine (maximum SVL = 1940 mm; Zaher, 1996) endemic to the Caatinga domain in northeastern Brazil (Guedes et al., 2014). It is an oviparous snake (clutch size from four to 14 eggs) with terrestrial habits, nocturnal-diurnal activity, and appears to be locally rare (Loebmann and Haddad, 2010; Gaiarsa et al., 2013; Mesquita et al., 2013; Guedes et al., 2014). Boiruna sertaneja is an ophiophagous predator, but despite being characterised as a snake specialist (Alencar et al., 2013), it also feeds on lizards and mammals (Vitt and Vangilder, 1983; Gaiarsa et al., 2013; Leite et al., 2017). To date, 14 vertebrate species are known as prey of B. sertaneja: nine snakes, three lizards and two mammals (Table 1). Herein, we report a bird carcass as prey of B. sertaneja, increasing the knowledge about its feeding habits and foraging behaviour.

Our observation occurred during field work of a fauna monitoring program in a wind farm (05.2852°S, 35.8056°W, 123 m elev., datum: WGS84), state of Rio Grande do Norte. At 16:49 h on 4 May 2019, we observed an individual of *B. sertaneja* crossing a road within the monitored area of the wind farm. The snake moved slowly and showed no signals of disturbance by our presence nearby. After crossing the road, the *B*.

sertaneja moved toward a pond formed on the roadside due to a recent rainfall (Fig. 1A). After about a minute, at 16:51 h, the snake entered a shrubby bush near the pond, and found a bird carcass in the soil. The B. sertaneja tongue-flicked the carcass for about ten seconds and then grabbed and shook it sideways for a few seconds. After that, the snake released the carcass and distanced itself about 50 cm, but returned after 30 seconds and grabbed the carcass again, initiating ingestion (Fig. 1B). The snake clearly would have succeeded in the feeding attempt, but at 16:57 h we interrupted the event to collect the individuals and identify the bird species. After being captured, the B. sertaneja stopped ingestion and released the carcass, which was reliably identified as an adult individual of the Picui grounddove, Columbina picui (Temminck, 1813) (Fig. 1C), evidenced by a large white area in the wings and side parts of the tail (Sick, 1997). The other Columbina species present in the site are C. minuta Leach, 1820 and C. passerina Leach, 1820, both with coloration varying from pink to brown in the body and tail (Sick, 1997). A medium voltage power line is present just above the area where the snake found the carcass (Fig. 1D), and was the probable cause of the bird's death. Despite a high number of flies surrounding the carcass, it did not show signs of putrefaction, suggesting relatively recent death. The B. sertaneja individual was measured (snout-vent length: 1500 mm) and then released in the same area. During measurement, we also observed some diagnostic characters of B. sertaneja to confirm the species identification, including divided subcaudals and black ventrals, except for the 1/4 anterior part of the body (Zaher, 1996). The only other snake species with black coloration present in the area is Pseudoboa nigra (Duméril et al., 1854), which has undivided subcaudals and white, immaculate ventrals.

Carrion-eating is reported for at least 40 snake species in the world (DeVault and Krochmal, 2002; Otto and Miller, 2004; Sasa et al., 2009; Platt and Rainwater,

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Order – Family	Species	Source
Squamata - Anguidae	Diploglossus lessonae Peracca, 1890	Vitt and Vangilder, 1983*
Squamata – Boidae	Boa constrictor Linnaeus, 1758	Leite et al., 2017
Squamata – Boidae	Epicrates assisi Machado, 1945	Vitt and Vangilder, 1983*
Squamata – Dipsadidae	Erythrolamprus viridis (Günther, 1862)	Vitt and Vangilder, 1983*
Squamata – Dipsadidae	Lygophis dilepis Cope, 1862	Vitt and Vangilder, 1983*
Squamata – Dipsadidae	Oxyrhopus cf. trigeminus Duméril, Bibron & Duméril, 1854	Gaiarsa et al., 2013
Squamata – Dipsadidae	Philodryas sp.	Gaiarsa et al., 2013
Squamata – Dipsadidae	Xenodon merremii (Wagler, 1824)	Vitt and Vangilder, 1983*
Squamata – Teiidae	Ameiva ameiva (Linnaeus, 1758)	Vitt and Vangilder, 1983*
Squamata - Tropiduridae	Tropidurus hispidus (Spix, 1825)	Vitt and Vangilder, 1983*
Squamata - Viperidae	Bothrops erythromelas Amaral, 1923	Online video**, available at https://youtu.be/sbJYQZ-v7mI
Squamata - Viperidae	Crotalus durissus Linnaeus, 1758	Online video**, available at https://youtu.be/qsjqtIprTck
Rodentia – Echimyidae	Thrichomys apereoides (Lund, 1839)	Vitt and Vangilder, 1983*
Rodentia - Muridae	Rattus rattus Linnaeus, 1758	Vitt and Vangilder, 1983*
Columbiformes - Columbidae	Columbina picui (Temminck, 1813)	This study

Table 1. List of species reported as prey of Boiruna sertaneja.

* Data published prior to the description of Boiruna sertaneja, which is mentioned in the paper under the name Clelia occipitolutea, a synonym of Boiruna maculata.

** We performed a search on Youtube for records on diet of *B. sertaneja* and filtered out those videos that mention the geographic locality and where the image is good enough to reliably identify the snake species (predator and prey).



Figure 1. An individual of *Boiruna sertaneja* feeding on a carcass of *Columbina picui* in a wind farm located in Northeast Brazil. A: snake moving toward a pond on the roadside. B: snake attempting to ingest the carcass; note the flies in the bird's wing and near the snake's eye. C: close view of the carcass after our interruption of the snake's ingestion. D: general view of the area where the feeding observation was recorded, showing on the left the shrubby bush where the snake found the carcass.

2011; Marques et al., 2017; Gomes et al., 2017). Carcasses are an advantageous food source for both opportunistic and habitual carrion feeders, as this type of food resource does not defend against a predatory attack (DeVault and Krochmal, 2002). In this sense, scavenging behaviour may be common among snakes (DeVault and Krochmal, 2002; Marques et al., 2017). In our observation, circumstances of the encounter between the snake and the bird carcass clearly indicated a case of opportunistic ingestion. This is the first bird species reported as prey for *B. sertaneja* (Table 1) and the first report of carrion-eating in this species.

The installation of wind farms impose a potential cause of avian mortality due to collision with wind turbines and power lines (Erickson et al., 2001). In Brazil, fauna monitoring programs evaluate avian mortality in wind farms, and are a mandatory step for the environmental licensing of these enterprises. However, carcass removal by scavengers often biases such measurements. Mammals, birds and arthropods are the three groups of carcass scavengers identified in tropical wind farms (Villegas-Patraca et al., 2012). However, our observation suggests that squamate reptiles may also act as carcass scavengers, and must be taken into account in monitoring programs that evaluate avian mortality in wind farms.

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