

Short Note

Clutch size, incubation time and hatchling morphometry of the largest known *Tropidurus* of the *semitaeniatus* group (Squamata, Tropiduridae), in a semi-arid area from northeastern Brazil

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The recently described lizard *Tropidurus jaguaribanus* (Passos, Lima & Borges-Nojosa, 2011) constitutes one of the four formally described species that compose the *semitaeniatus* group, which is characterized by marked dorsoventral flattening of the body and longitudinal dorsal light stripe colour pattern (Passos et al., 2011). These species are saxicolous, endemics of Caatinga from northeast of Brazil and have their ecology virtually unexplored, except *T. semitaeniatus* for which there are some studies, especially on its reproductive biology (Vitt & Goldberg, 1983), trophic ecology (Kolodiuk et al., 2010) and thermoregulatory behaviour (Ribeiro & Freire, 2010). *Tropidurus jaguaribanus* has its distribution restricted to the Rio Jaguaribe Valley, east region of Ceará state, northeastern Brazil, and up until the present little is known about its ecology, with only basic knowledge of daily activity and habitat usage (Passos et al., 2011). Herein we present, for the first time, data on clutch size, incubation time and hatchling morphometry for *T. jaguaribanus*.

On January 2011 in a semi-arid Caatinga area from São João do Jaguaribe municipality (5°19'21" S, 38°11'58" W, GPS datum: WGS 84), the type locality of *T. jaguaribanus*, we captured two gravid females of the species. We



Figure 1. Newly hatched *Tropidurus jaguaribanus*.

took the lizards to the Laboratory of Herpetology at the Núcleo Regional de Ofiologia da Universidade Federal do Ceará (NUROF – UFC), where they were housed individually in terrariums measuring 50 cm x 30 cm x 25 cm with environmental enrichment (sand, gravel and a clay tile) and were monitored until oviposition.

The eggs were incubated in a container measuring 35 cm x 25 cm x 10 cm on a mixture of damp sand and gravel. A small depression was made in the substrate to put the eggs in a manner that each egg was only half buried. Incubation occurred under laboratory conditions (ca. 25 °C, 65% RH and 12 h photoperiod).

Hatchling voucher specimens were placed in the scientific collection Coleção Herpetológica da Universidade Federal do Ceará (CHUFC).

The length and diameter of eggs were measured before hatching. The following body measurements of newborns were taken immediately upon hatching: snout-vent length, head length, head width, head height, axilla-groin length, body height, body width, humerus length, foreleg length, fourth finger length, femur length, hindleg length, fourth toe length, tail length, tail base width and mass. The measurements were made with a digital caliper with 0.1 mm precision and an electronic balance with 0.1 g precision.

On 25 January 2011, three days after collection, a female (CHUFC – L 4511; SVL = 78.7 mm; M = 17 g) laid two eggs (22.7 and 22.4 mm in length; 9.9 and 9.6 mm in diameter; 1.2 g in mass each one), and three days after that, the other female (CHUFC – L 4512; SVL = 80.5 mm; M = 18 g) also laid two eggs (23.6 and 21.4 mm in length; 10.3 and 9.6 mm in diameter; 1.24 and 1.1 g in mass). In both events, the eggs were found aggregated and juxtaposed to one another, oviposited under the clay tile within the enclosure. This trend of fixed clutch size with two eggs seems to be an ancestral trait of *Tropidurus* of the *semitaeniatus* group, possibly related to the saxicolous habits and mainly with the use of narrow rock fissures (Vitt, 1981). All the eggs were white, slightly elongated and had flexible soft shells in a similar way as found for other tropidurid species.

On 11 April 2011, 76 days after the first oviposition, a hatchling emerged (CHUFC – L 4509). The other egg within the clutch, after 90 days of incubation, began to discolour and was opened up revealing absence of embryos. On 24

April 2011, after 89 days in incubation, a neonate of the second clutch hatched (CHUFC – L 4510). In a similar way as occurred in the first clutch, the other egg became discoloured and desiccated. It was also opened up and its interior was dehydrated without evidence of embryonic development. The measurements of the two hatchlings are presented in Table 1.

Both the hatchlings presented the typical colouration of its species (Fig. 1) with a single mid-dorsal longitudinal light stripe that extended from the snout to the scapular region (Passos et al., 2011). This finding demonstrates that this colour pattern is present in the early stages of ontogeny, allowing accurate identification of this species, and reinforces the use of this character as diagnosis for *Tropidurus* of the *semitaeniatus* group. In view of the scarcity of ecological data on *T. jaguaribanus* and the difficulty of gathering data of this kind, these findings expand the understanding of the reproductive biology of this species, beyond contributing to knowledge on ecology of this poorly known *Tropidurus* of the *semitaeniatus* group.

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VOUCHER	SVL	HL	HW	HH	AG	BH	BW	HUL	FLL	FFL	FL	HLL	FTL	TL	TBW	M
CHUFC L 4509	25.1	8.0	6.1	3.5	8.1	4.2	6.3	6.0	5.5	5.3	7.3	8.4	6.6	56.4	4.3	0.8
CHUFC L 4510	25.9	7.3	5.5	3.3	9.4	3.4	5.4	4.9	7.1	4.9	6.4	7.2	6.9	47.0	3.4	0.6

Table 1. Data on two *Tropidurus jaguaribanus* hatched in the Núcleo Regional de Ofiologia da Universidade Federal do Ceará. Snout-vent length (SVL), head length (HL), head width (HW), head height (HH), axilla-groin length (AG), body height (BH), body width (BW), humerus length (HUL), foreleg length (FLL), fourth finger length (FFL), femur length (FL), hindleg length (HLL), fourth toe length (FTL), tail length (TL), tail base width (TBW) and mass (M). Measurements are in millimeters, and mass is in grams.

REFERENCES

- Kolodiuk, M.F., Ribeiro, L.B. & Freire, E.M.X. (2010). Diet and foraging behavior of two species of *Tropidurus* (Squamata, Tropiduridae) in the caatinga of northeastern Brazil. *South American Journal of Herpetology* 5: 35-44.
- Passos, D.C., Lima, D.C. & Borges-Nojosa, D.M. (2011). A new species of *Tropidurus* (Squamata, Tropiduridae) of the *semitaeniatus* group from a semiarid area in Northeastern Brazil. *Zootaxa* 2930: 60-68.
- Ribeiro, L.B. & Freire, E.M.X. (2010). Thermal ecology and thermoregulatory behaviour of *Tropidurus hispidus* and *T. semitaeniatus* in a caatinga area of northeastern Brazil. *Herpetological Journal* 20: 201-208.
- Vitt, L.J. (1981). Lizard reproduction: Habitat specificity and constraints on relative clutch mass. *American Naturalist* 117: 506-514.
- Vitt, L.J. & Goldberg, S.R. (1983). Reproductive ecology of two tropical iguanid lizards: *Tropidurus torquatus* and *Platynotus semitaeniatus*. *Copeia* 1983: 131-141.
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