Hemidactylus agrius (Country leaf-toed gecko): Polydactyly and tail bifurcation

MARIA JAQUELINE MONTE DE ANDRADE[1,2*], JOSÉ ROBERTO IZIDIO LOPES[2], RAUL FERNANDES DANTAS DE SALES[2] & ELIZA MARIA XAVIER FREIRE[2].

[1]Programa de Pós-graduação em Ciências Biológicas, Universidade Federal do Rio Grande do Norte, Campus Universitário Lagoa Nova, Natal, RN, Brazil.
[2]Laboratório de Herpetologia, Departamento de Botânica, Ecologia e Zoologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte. Campus Universitário Lagoa Nova, Natal, RN, Brazil.
[*]Corresponding author email: jackeline_monte@hotmail.com

Polydactyly is a congenital malformation affecting the extremities of individuals, causing the appearance of a greater number of fingers, which occurs frequently in populations of tetrapods (Minoli et al., 2009; Kaliontzopoulou et al., 2013). However, there are few cases of polydactyly described for lizards, especially for Gekkota (Bauer et al., 2009). Tail bifurcation in lizards is a relatively well-understood abnormality being closely related to variations in the process of caudal autotomy, which is widely used by lizards in response to the attack of predators (Meyer et al., 2002). This morphological change occurs when there is mechanical damage that does not result in complete loss of the tail (Arnold, 1988), thereby allowing the formation of an additional tail during the regeneration of the affected portion (e.g. Gogliath et al., 2012). This work describes instances of polydactyly and tail bifurcation in *Hemidactylus agrius* Vanzolini, 1978, a nocturnal gecko from Brazil that occurs in areas with rocky outcrops in the Caatinga Domain.

During a study on the population ecology of *H. agrius* between August 2012 and August 2013 in the Ecological Station of the Seridó (ESEC Seridó), a protected area located in the Caatinga Domain, municipality of Serra Negra do Norte, Rio Grande do Norte, Brazil (06°34'36.2"S, 37°15'20.7"W), 62 individuals, two of them with morphological abnormalities (polydactyly and tail bifurcation) were collected. In the laboratory these specimens were photographed, measured (snout-vent length – SVL) and analyzed under stereomicroscope. Both specimens were fixed in 10% formalin, preserved in 70% ethanol, and deposited in the Herpetological Collection of the Universidade Federal do Rio Grande do Norte (Voucher numbers: UFRN 4032 and 4055). The specimen with polydactyly was a female (SVL = 47.4 mm) collected on March 19, 2013, showing six digits in the left hind limb (Fig. 1A). The additional digit was near the toe V posteriorly located at 1 mm. This digit measured 1.4 mm, with in vivo colouration similar to that of the other digits, but there were no nail or infra-digital lamellae, suggesting a non-functional digit (Fig. 1B, C). The specimen tail bifurcation was a female (SVL = 50.6 mm), collected on October 23, 2012 (Fig. 2). The additional tail was 12.6 mm shorter than the main tail (22.6 mm). The additional tail had in vivo colouration similar to normal tails after regeneration, and developed in the individual's body medial plane (Fig. 2). Besides this collected

Figure 1. A) Female *H. agrius* (SVL = 47.4 mm) with polydactyly (six fingers) on a hindlimb, collected during March 2013 in the Ecological Station of the Seridó. B) Dorsal view of the left hind foot highlighting the absence of nail in the additional digit, inserted after the toe V. C) Ventral view of the left hind foot demonstrating the absence of plates in the additional digit, inserted after the toe V.

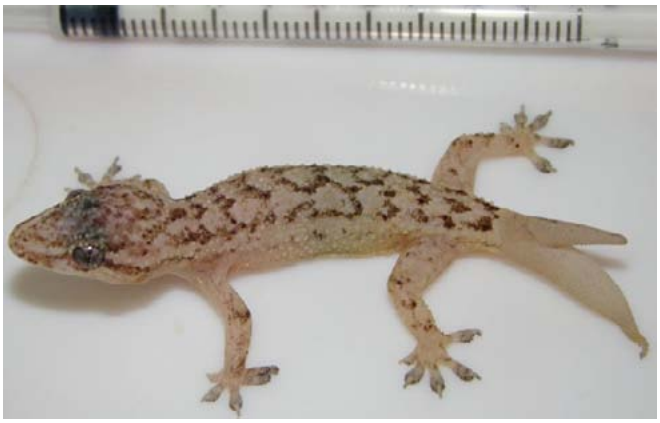

Figure 2. *H. agrius* (SVL = 50.6mm) with tail bifurcation in the medial body plane, collected in October 2013 in the Ecological Station of the Seridó. Dorsal portion length (additional) of 12.6 mm; ventral portion length (inset) of 22.6 mm.

specimen, a second record of tail bifurcation was observed in the field, but the lizard escaped the capture; in this instance the additional tail had developed in the individual's body lateral plane and was similar in size to the main tail.

The presence of a polydactyly in the *H. agrius* population of ESEC Seridó corresponds to a frequency of occurrence of 1.6%, a high estimate when compared to the rates reported in the literature for other lizards, for example, 0.5% in *Lacerta schreiberi* (Megia, 2012) and 0.6% in *Tropidurus etheridgei* (Pelegrin, 2007). Similar cases have been recorded for other lizards including *Podarcis muralis* (Lazić & Crnobrnja-Isailović, 2012) and *Liolaemus petrophilus* (Minoli et al., 2009).

The presence of two cases of tail bifurcation within the population of *H. agrius* of ESEC Seridó corresponds to a frequency of occurrence of 3.1%, suggesting this type of morphological change is relatively common in lizard populations. The injuries resulted in lateral and medial bifurcations to the body and represent additions to the two types of bifurcations described in the literature (McKelvy & Stark, 2012). This is the first record of polydactyly and tail bifurcation for *H. agrius*.

ACKNOWLEDGMENTS

We thank L. Anjos and M. Pichorim for helpful comments on a first draft of the manuscript, and the staff of Ecological Station of the Seridó logistical support on the field activities. This study was supported by research grants from the Coordernação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) to MJMA, and from the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) to EMXF (process 304077/200819). The permit for collecting the lizards was granted by ICMBio/Sisbio (Permit 36189-1).

REFERENCES

Arnold, E.N. (1988). Caudal autotomy as a defence. In, *Biology of the Reptilia*, pp.235-273. Gans, C. & Huey, R.B. (Eds.). New York: Liss Inc.

Bauer, A.M., Hathaway, S.A. & Fisher, R.N. (2009). Polydactyly in the Central Pacific Gecko, *Lepidodactylus* sp. (Squamata: Gekkonidae). *Herpetology Notes* 2: 243-246.

Gogliath, M., Pereira, L.C.M., Nicola, P.A. & Ribeiro, L.B. (2012) *Ameiva ameiva* (Giant Ameiva). Bifurcation. *Herpetological Review* 43: 129.

Kaliontzopoulou, A., Salvi, D., Gomes, V., Maia, J.P.M.C. & Kaliontzopoulos, P. (2013). Polydactyly in the Tyrrhenian wall lizard (*Podarcis tiliguerta*). *Acta Herpetologica* 8: 75-78.

Lazić, M.M. & Crnobrnja-Isailović, J. (2012). Polydactyly in the Common Wall Lizard *Podarcis muralis* (Squamata: Lacertidae). *Herpetology Notes* 5: 277-279.

McKelvy, A.D. & Stark, C. (2012). *Plestiodon fasciatus* (Common Five-lined Skink). Bifurcation. *Herpetological Review* 43: 138.

Megía, R. (2012). Un caso de polidactilia en *Lacerta schreiberi* en el Sistema Central. *Boletin de la Asociacion Herpetologica Española* 23: 54-57.

Meyer, V., Preest, M.R. & Lochetto, S.M. (2002). Physiology of original and regenerated lizard tails. *Herpetologica* 58: 75-86.

Minoli, I., Feltrin, N. & Ávila, L.J. (2009). Un caso de polidactilia en *Liolaemus petrophilus* (Iguania: Squamata: Liolaemini). *Cuadernos de Herpetologia* 23: 89-92.

Pelegrin, N. (2007). Presence of a polydactylous *Tropidurus etheridgei* (Squamata: Iguanidae: Tropidurinae) in the Dry Chaco of Córdoba Province, Argentina. *Cuadernos de Herpetologia* 21: 115-116.

Accepted: 10 February 2015