



Survival on Three Legs: The Case of a Cuban Knight Anole, *Anolis equestris* (Dactyloidae)

Anaisa Cajigas Gandia¹, Javier Torres López², and Tomas M. Rodríguez-Cabrera³

¹Department of Animal and Human Biology, University of Havana, Cuba (acajigasgandia27@gmail.com)

²Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, Kansas, USA (javiertorres@ku.edu)

³Sociedad Cubana de Zoología, Havana, Cuba (tomasmichel.rodriguez@gmail.com)

Lizards of the genus *Anolis* are common prey for a wide range of vertebrates and even some invertebrates (Losos 2009; Henderson and Powell 2009; Fonseca and Rodríguez-Cabrera 2014). However, for large species such as those in the *Anolis equestris* group, predation during adulthood should be less intense than that on smaller congeners, mainly because fewer potential predators threaten the largest species.

Anolis equestris has few predators (e.g., the Lizard Cuckoo, *Saurothera merlini*; American Kestrel, *Falco sparverius*; Red-legged Thrush, *Turdus plumbeus*; Barn Owl, *Tyto alba*; Fernández and Manso 1998; Rodríguez-Schettino 1999; López 2012) despite its wide distribution and sometimes great local abundance. In addition to size, *A. equestris* is very aggressive when threatened, and a bite is likely to be painful



Fig. 1. Adult Cuban Knight Anoles (*Anolis equestris*) observed at the National Botanical Garden of Cuba. (A) The three-legged individual described herein engaged in an aggressive display (dark color phase, mouth opened, tongue extruded, body laterally flattened, and dewlap extended) while being handled. (B) Another adult in basal state walking down a tree trunk. Photographs by Greg A. Martin (A) and Raimundo López-Silvero Martínez (B).

given that bite force is correlated with size (Anderson et al. 2008). Herein we report a case of limb loss in an adult *A. equestris*, although the cause of the injury is uncertain.

Anolis equestris Merrem 1820 (Fig. 1) is an endemic polytypic dactyloid lizard that is distributed throughout most of Cuba (except only the extreme western and eastern parts of the island; Rodríguez Schettino et al. 2013). This species inhabits forested and open areas (Rodríguez-Schettino et al. 1999; Garrido 1981; Garrido et al. 2001) ranging from sea level to 760 m (Rodríguez Schettino and Rivalta 2010). Adults are among the largest anoles, with males reaching 188 mm SVL and females 170 mm (Schwartz and Garrido 1972).

At 1100 h on 27 March 2016, we captured an adult *A. equestris* (undetermined sex, estimated SVL = 130 mm) at the National Botanical Garden of Cuba (NBGC; 22.99865°N, 82.34380°W; WGS84). The anole initially was on a tree trunk 3 m above the ground with the head down in the typical survey posture (Stamps 1977; Losos 2009). When captured, we noticed that the left hindlimb was missing with signs of recent cicatrization (Fig. 1A). After photographing the individual, we released it at the site of capture.

Although this was the end of the dry season in Cuba, when water and food presumably are limited (Wolda 1987), the lizard seemed to be in good physical condition despite the missing leg. It reacted immediately upon capture with typical defensive behavior, consisting of a rapid change in coloration from green to brown, gaping with partial tongue extrusion, lateral flattening of the body, and dewlap extension (Fig. 1A). In the basal state, these lizards are in the light color phase (bright green in the nominal subspecies), do not laterally flatten their bodies or extend their dewlaps, and, of course, the mouth remains closed (Fig. 1B).

Immediately after release, despite the missing hindlimb, the lizard rapidly climbed a vertical surface. Hindlimbs in anoles are more important than forelimbs in maintaining traction and in acceleration due to the larger area of the subdigital lamellae (Losos 2009).

One of two possible scenarios likely explains the mutilation of this lizard. A predation attempt might have been responsible, since the known avian predators of *A. equestris* are abundant at the NBGC (pers. obs.). Although raptors generally grasp their prey, birds such as the Lizard Cuckoos can inflict a wound that could lead to a loss of a limb. Alternatively, the lizard might have been engaged in a territorial fight. The bite of another *A. equestris* is not only strong but, since the teeth of anoles are not adapted to produce clean

cuts but to hold and crush, certainly capable of inflicting such an injury.

Non-lethal injuries in lizards often involve the loss of fingers and toes (Fong et al. 1999; Vervust et al. 2009), but entirely-missing limbs are uncommon. We have observed a few instances of partial limb loss in anoles (*A. sagrei*, *A. porcutus*, *A. alutaceus*, *A. allisoni*), but to the best of our knowledge this is the first report of an entire hindlimb loss in an anoline lizard.

Acknowledgements

We thank Greg A. Martin and Raimundo López-Silvero for providing photographs.

Literature Cited

- Anderson, R.A., L.D. McBrayer, and A. Herrel. 2008. Bite force in vertebrates: Opportunities and caveats for use of a nonpareil whole animal performance measure. *Biological Journal of the Linnean Society* 93: 709–720.
- Fernández Méndez, I. and E. Manso Valdés. 1998. *Anolis gigantes*. *Flora y Fauna* 2: 43–45.
- Fong, A.G., R.M. Viña, and A.B. Arias. 1999. Aspectos de la historia natural de *Cricosaura typica* (Sauria: Xantusiidae) de Cuba. *Caribbean Journal of Science* 35: 148–150.
- Fonseca, H.E. and T.M. Rodríguez-Cabrera. 2014. Predation on a Cuban Brown Anole, *Anolis sagrei* (Dactyloidae), by a spider, *Cupiennius cubae* (Ctenidae), in the Cienfuegos Botanical Garden, south-central Cuba. *Reptiles & Amphibians* 21: 98–99.
- Garrido, O.H. 1981. Nueva subespecie de *Anolis equestris* (Sauria: Iguanidae) para Cuba, con comentarios sobre la distribución y afinidades de otras poblaciones del complejo. *Poeyana* 232: 1–15.
- Garrido, O.H., L.V. Moreno, and A.R. Estrada. 2001. Subespecies nuevas de reptiles del complejo *Anolis equestris* (Lacertilia: Iguanidae) para los cayos Las Brujas, Coco y Sabinal, Archipiélago Sabana-Camaguey, Cuba. *Solenodon* 1: 55–65.
- Henderson, R.W. and R. Powell. 2009. *Natural History of West Indian Reptiles and Amphibians*. University Press of Florida, Gainesville.
- Losos, J.B. 2009. *Lizards in an Evolutionary Tree: Ecology and Adaptive Radiation of Anoles*. University of California Press, Berkeley.
- Rodríguez Schettino, L. 1999. Systematic accounts of the species, pp. 104–380. In: L. Rodríguez Schettino (ed.), *The Iguanid Lizards of Cuba*. University Press of Florida, Gainesville.
- Rodríguez Schettino, L., V. Rivalta González, and E. Pérez Rodríguez. 2010. Distribución regional y altitudinal de los reptiles de Cuba. *Poeyana* 498: 11–20.
- Rodríguez-Schettino, L., C.A. Mancina, and V. Rivalta-González. 2013. Reptiles of Cuba: Checklist and geographic distributions. *Smithsonian Herpetological Information Service* 144: 1–92.
- Schwartz, A. and O.H. Garrido. 1972. The lizards of the *Anolis equestris* complex in Cuba. *Studies on the Fauna of Curaçao and other Caribbean Islands* 39: 1–86.
- Stamps, J.A. 1977. The function of the survey posture in *Anolis* lizards. *Copeia* 1977: 756–758.
- Vervust, B., S. Van Dongen, I. Grbac, and R. Van Damme. 2009. The mystery of the missing toes: Extreme levels of natural mutilation in island lizard populations. *Functional Ecology* 23: 996–1003.
- Wolda, H. 1987. Seasonality and the community, pp. 69–95. In: J.H.R. Gee and P. Giller (eds.), *Organization of Communities: Past and Present*. British Ecological Society Special Publication. Blackwell Science, Inc., Boston, Massachusetts.
- López, 2012. Alimentación de la lechuga (*Tyto alba*) en Cuba central: Presas introducidas y autóctonas. Tesis de Diploma, Facultad de Biología, Universidad de La Habana, Cuba.