

Nature Notes

Male Colour Morphs in a Northeastern Trinidad Population of Streak Gecko *Gonatodes vittatus* (Squamata: Gekkota: Sphaerodactylidae)

Gonatodes vittatus (Lichtenstein and von Martens 1856) (Squamata: Gekkota: Sphaerodactylidae) is distributed along the northeastern edge of South America, ranging from northeastern Columbia to Guyana, including the islands of Trinidad and Tobago and smaller islands off the coast of Venezuela (Rivero-Blanco 1980, Demeter and Marcellini 1981). *G. vittatus* occurs in arid climates (Rivero-Blanco 1980) close to forests and is typically found on tree trunks and man-made structures, including stone walls and fences (Demeter and Marcellini 1981; Quesnel *et al.* 2002).

Males of *G. vittatus* are considered to show different colour morphs based on differences in throat, chin and lower lip colour (Quesnel 1957, Fuenmayor *et al.* 2006). Quesnel (1957) reported multiple male colour morphs from Trinidad, including three plain throat colour morphs (white, grey, and golden-yellow) and a patterned morph, with a black and white striped throat. Murphy *et al.* (2018: Plate 90, p. 175) documented two of these colour morphs (solid golden-yellow and black and white striped throat morph) with photographs, but otherwise made no reference to male throat colour variation in this species.

We investigated which of the male colour morphs of *G. vittatus* (as defined by Quesnel 1957) are represented, and in what abundance, in northeastern Trinidad. Our study took place on the property of Jammeev Beach Resort, Toco UTM 725990E 1197537N.

Individuals were captured by hand or with the aid of a small hand net from across the property between the hours of 7:00-11:00 and 16:00-18:00 over the course of 12 days from 28 May to 8 June 2018. Upon capture, individuals were immediately transferred to a breathable cloth bag and transported to a field laboratory for examination. During examination, specimens were sexed (based on colour), then placed gently on to a ruler and photographed in dorsal and ventral view using a smartphone (Samsung Galaxy S8+). Close-up images of the throat (ventral view) were also obtained for each male with the aid of a 4x macro lens (Easy-Macro, Manchester, MA) attached to the smartphone. After examination, all specimens were released at the same location from which they were collected. We did not collect at the same location more than once to avoid recapture of the same individual. Snout-vent length (SVL) was obtained for each individual to the nearest tenth of a millimetre from digital images using the program FIJI (Schindelin *et al.* 2012). Male individuals were also assigned to colour morph

using digital images. Statistical analyses were performed using Microsoft Excel©. A total of 66 individuals of *G. vittatus* were collected (29 female/37 male). The mean SVL of females was 34.7mm (range 28.6-37.4, SD 1.93). The mean SVL of males was 33.8mm (range 29.5-37.8, SD 1.99). No significant difference was detected in SVL between males and females (two-tailed t-test, $p = 0.06895$) (Fig. 1). Of the 37 males collected, 21 represented the black and white striped throat morph, seven represented the solid golden-yellow throat morph, and nine represented the solid white throat morph (Fig. 2). Males exhibiting different colour morphs did not differ significantly in SVL (Single Factor ANOVA, $p = 0.428$) (Fig. 3).

Species of *Gonatodes* are well known for exhibiting multiple male colour morphs (Rivero-Blanco and Schargel 2012, Fuenmayor *et al.* 2006). Of the four different male colour morphs of *G. vittatus* reported from Trinidad by Quesnel (1957), we encountered only three in the population that we studied in northeastern Trinidad (the solid grey throat morph was not encountered). Males representing the black and white striped throat morph were most abundant in our sample (55%), with males representing the solid white throat and the solid golden-yellow throat morphs being less abundant (25% and 20% of males sampled, respectively). Quesnel (1957) reported SVL of 34.0 and 33.5mm for males and females, respectively, of *G. vittatus*

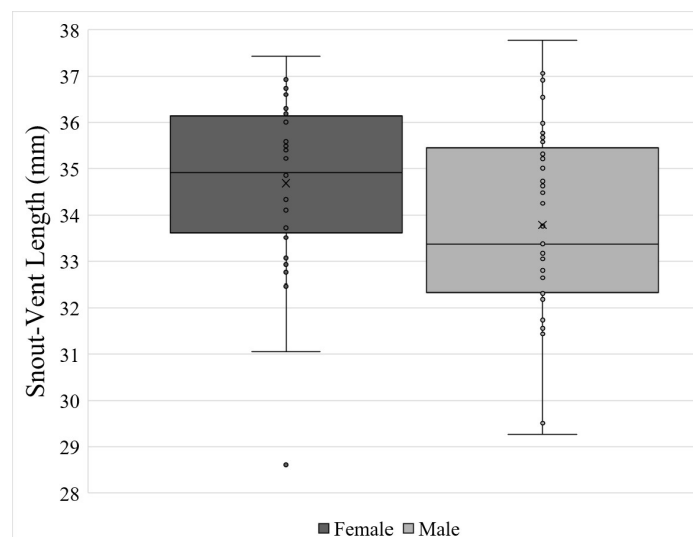


Fig. 1. Snout-vent length of male ($n=37$, 29.5-37.8mm) and female ($n=29$, 28.6-37.4) *Gonatodes vittatus* included in this study.

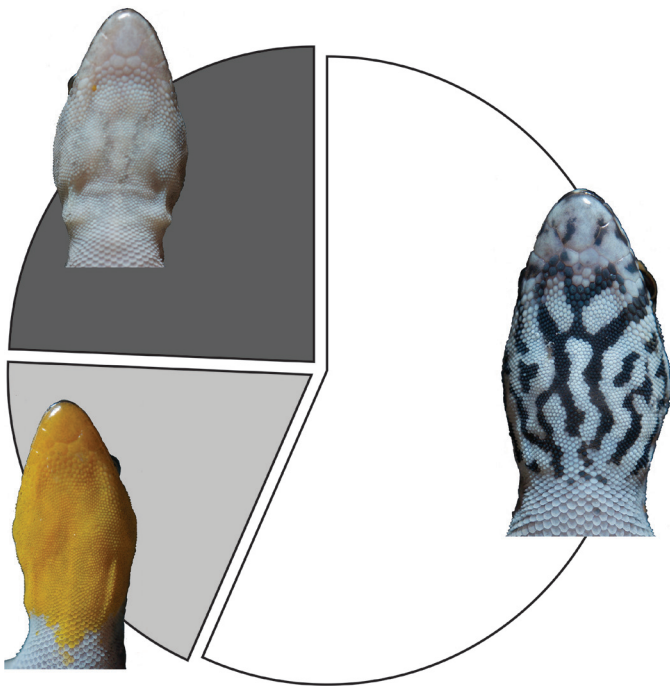


Fig. 2. Piechart showing proportion of three different male colour morphs observed across males of *Gonatodes vittatus* included in this study (n=37).

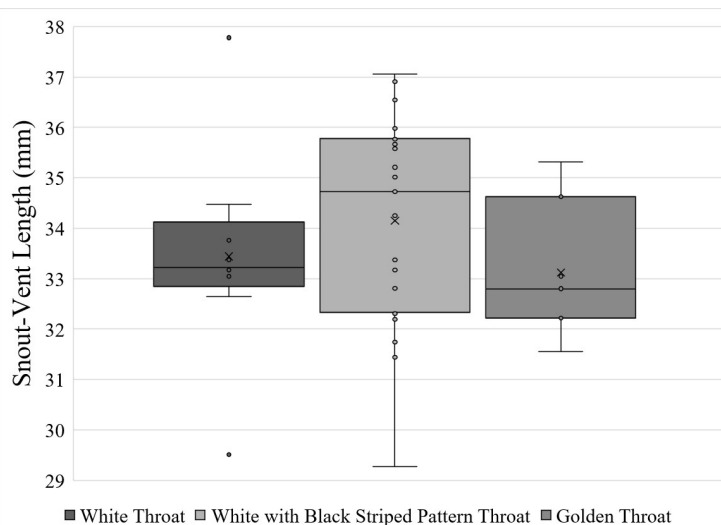


Fig. 3. Snout-vent length of male individuals of *Gonatodes vittatus* (n = 37) representing three different male colour morphs, including solid white throat (n = 9), white with black striped pattern throat (n = 21), and solid golden-yellow throat (n = 7) morphs.

from Trinidad. Murphy *et al.* (2018) reported SVL to be 33–34mm for both sexes. The values that we obtained for SVL based on 66 individuals (29 female/37 male) of *G. vittatus* from northeastern Trinidad (Fig. 1) are similar to those reported by Quesnel (1957) and Murphy *et al.* (2018) but we also encountered larger individuals than reported by either of these authors (the largest individual collected was a male, 37.8mm SVL). We detected no significant

difference in SVL between males representing different colour morphs (Fig. 3), supporting Quesnel's (1957) observation that the different male colour morphs of *G. vittatus* are not the product of ontogenetic colour change. *G. vittatus* is widespread across Trinidad (Murphy *et al.* 2018) and it would be interesting to extend this study to other regions of the island, not only to better understand the geographic distribution of the different morphs but also to assess whether the frequency of the different morphs differs between populations.

ACKNOWLEDGEMENTS

We thank Winston 'Monty' Montano (Jammev Beach Resort) for hosting our group and the Wildlife Section of the Forestry Division for granting permits. This study was conducted during the Texas A&M Caribbean Study Abroad, Summer 2018.

REFERENCES

- Demeter, B.J.** and **Marcellini, D.L.** 1981. Courtship and aggressive behavior of the streak lizard (*Gonatodes vittatus*) in captivity. *Herpetologica*, 37:250–256.
- Fuenmayor, G.R., Uctjeto, G., Barrio-Amoros, C.L.** and **Barros, T.R.** 2006. Natural history and color variation of two species of *Gonatodes* (gekkonidae) in Venezuela. *Herpetological Review*, 37:412–416.
- Lichtenstein, H.** and **von Martens, E.** 1856. Nomenclator reptilium et amphibiorum Musei Zoologici Berolinensis. Namenverzeichniss der in der zoologischen Sammlung der Königlichen Universität zu Berlin aufgestellten Arten von Reptilien und Amphibien nach ihren Ordnungen, Familien und Gattungen. Königliche Akademie der Wissenschaften, Berlin / Buchdruckerei der Königl. Akademie der Wissenschaften, iv + 48 p.
- Murphy, J.C., Downie, J.R., Smith, J.M., Livingstone, S.M., Mohammed, R.S., Lehtinen, R.M., Eyre, M., Sewlal, J-A.N., Noriega, N., Casper, G.S., Anton, T., Rutherford, M.G., Braswell, A.L. and Jowers, M.J.** 2018. A Field Guide to the Amphibians & Reptiles of Trinidad & Tobago. Trinidad & Tobago Field Naturalists' Club. 336 p.
- Quesnel, V.C.** 1957. Life history of the streak lizard, *Gonatodes vittatus*. *Journal of the Trinidad Field Naturalists' Club*, 1957: 5–14.
- Quesnel, V.C., Seifan, T., Werner, N. and Werner, Y.L.** 2002. Field and captivity observations of the lizard *Gonatodes vittatus* (Gekkonomorpha: Sphaerodactylini) in Trinidad and Tobago. *Living World, Journal of the Trinidad and Tobago Field Naturalists' Club*, 2002: 8–18.
- Rivero-Blanco, C.** 1980. The neotropical lizard genus *Gonatodes* Fitzinger (Sauria: Sphaerodactylinae). Unpublished Doctoral Dissertation. Texas A&M University.

Rivero-Blanco, C. and Schargel, W.E. 2012. A strikingly polychromatic new species of *Gonatodes* (squamata: Sphaerodactylidae) from northern Venezuela. *Zootaxa*, 3518:66–78.

Schindelin, J., I. Arganda-Carreras, E. Frise, V. Kaynig, M. Longair, T. Pietzsch, S. Preibisch, C. Rueden, S. Saalfeld, and B. Schmid. 2012. Fiji: an open-source platform for biological-image analysis. *Nature methods*, 9:676–682.

Marina Conner¹, Ryan S. Mohammed², Adrienne Brundage¹ and Kevin W. Conway³

1. Department of Entomology, Texas A&M University, College Station, TX 77843, USA

2. Department of Life Sciences, The University of the West Indies, St. Augustine, Trinidad & Tobago

3. Department of Ecology and Conservation and Biodiversity Research and Teaching Collections, Texas A&M University, College Station, TX 77843, USA