



Reproduction in *Smilisca fodiens*, a burrowing treefrog from Mexico

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ABSTRACT: *Smilisca fodiens* (Lowland Burrowing Treefrog) is distributed from south-central Arizona along the coastal foothills to southern Mexico. This species is an explosive breeder in temporary pools that form immediately after monsoon rains. Nonetheless, we still lack basic information on many reproductive traits in this species, including no clutch-size estimates. For this study, we examined a large sample of museum specimens to ascertain the reproductive ecology of *S. fodiens* in México.

INTRODUCTION

- *Smilisca fodiens* is found from south-central Arizona in the USA, to southward along the Pacific coast through to western Sonora, Sinaloa, Nayarit and Colima in Mexico
- This species is a burrowing treefrog where it spends much of its life underground and in burrows
- The skull of this species is hyper-ossified which they use to plug burrows as an antipredator mechanism
- The life history of this species is very poorly known, and even basic reproductive traits lack empirical data
- In this study, we examined a large series of museum specimens of this species from Mexico to fill in several major gaps concerning its life history

MATERIALS and METHODS

- We measured 340 specimens of *S. fodiens* from Mexico at the University of Illinois Natural History Museum
- We measured body size in snout-vent length (SVL) and tibia-fibula length (TFL) of all specimens to the nearest 0.01 mm using hand calipers
- The presence of enlarged testes in combination with dark throat patches was used to determine sexual maturity in males and female maturity was based on egg development
- We used 12 gravid females to examine their clutch characteristics by removing the eggs, weighing the clutch, and generating a clutch size estimate for the species
- We used R to analyze basic statistics, including t-tests, regression analyses, and violin plots

RESULTS

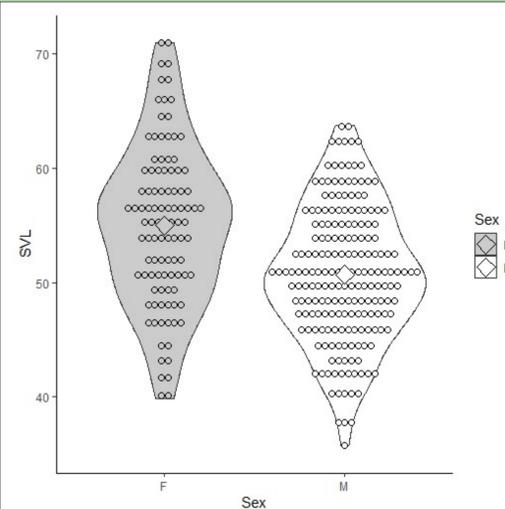


Figure 1: Violin plots for snout-vent length (SVL) in mm between males and females of *Smilisca fodiens*.

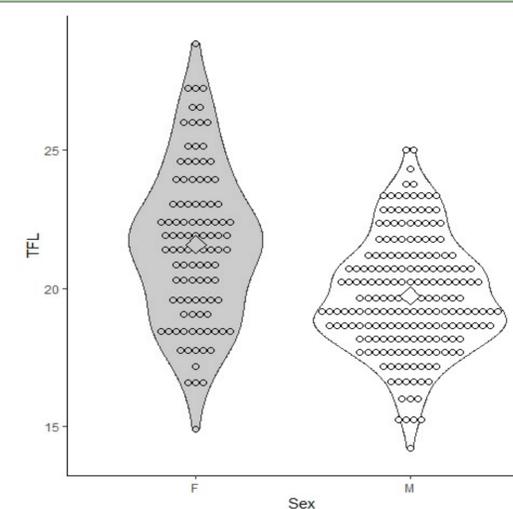


Figure 2: Violin plots for tibia-fibula length (TFL) in mm between males and females of *Smilisca fodiens*.

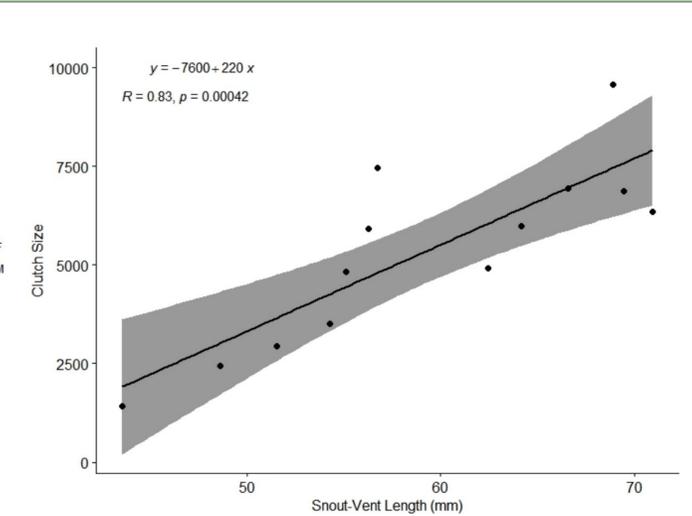


Figure 3: Relationship between body size (SVL) and clutch size in *Smilisca fodiens*.

- Females were larger (55.03 ± 6.98 mm, range = 39.85–70.99 mm, $n = 102$) in mean SVL than males (50.57 ± 5.89 mm, $n = 200$, range = 35.73–63.76 mm) ($t = 5.83$; $df = 300$; $P < 0.001$)

- Females were larger (21.58 ± 2.82 mm, range = 14.9–28.87 mm, $n = 102$) in mean TFL than males (19.72 ± 2.06 mm, range = 14.21–25.08 mm, $n = 197$) ($t = 6.49$; $df = 297$; $P < 0.001$)

- The mean SVL of 12 gravid females was 59.12 ± 8.65 mm (range = 43.57–70.93 mm) and their mean clutch size was $5,319 \pm 2,277$ eggs (range = 1,426–9,568 eggs)

DISCUSSION

- Only one previous study reported mean body sizes (Goldberg, 2019): mean male SVL = 48.7 ± 3.8 mm (range = 43–55 mm) from 20 specimens; mean female SVL = 56.8 ± 4.2 mm (range = 49–62 mm) from 11 specimens
- Maximum SVL was 62.6 mm for males and 63.7 mm for females (Sredl, 2005)
- This is the first study to report an estimated clutch size, relationship between body size and clutch size, and allometry between body length measures

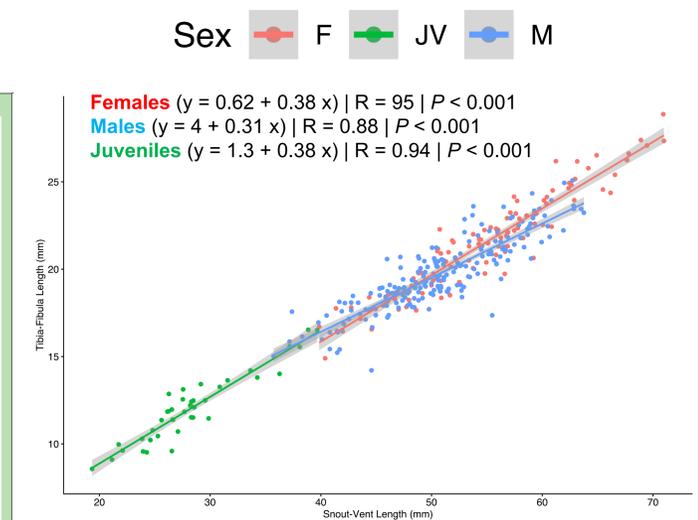


Figure 4: Allometry between SVL and TFL in *Smilisca fodiens*.

ACKNOWLEDGEMENTS

We thank the museum for hosting our research and sharing its specimen resources. We thank Coe College for funding.

LITERATURE CITED

Sredl, M. J. 2005. *Pternohyla fodiens* Boulenger, 1882 Lowland Burrowing Treefrog. Pp. 488-489 In: M. Lannoo, editor, Amphibian declines, The conservation status of United States Species. Berkeley: University of California Press.

Goldberg, S.R. 2019. Notes on Reproduction of Lowland Burrowing Treefrogs, *Smilisca fodiens* (Anura: Hylidae), from Sinaloa and Sonora, Mexico. Chicago Herpetological Society, 54: 83-84.