

Observations of oviposition and calling in Cuban treefrogs, *Osteopilus septentrionalis*, from The Bahamas

GEOFFREY R. SMITH¹ & JOHN B. IVERSON²

¹Department of Biology, Denison University, Granville, OH 43023 USA

²Department of Biology, Earlham College, Richmond, IN 47374 USA

¹Corresponding author email: smithg@denison.edu

Cuban Treefrogs (*Osteopilus septentrionalis*) are potential threats to native amphibians and reptiles as competitors or predators of native species (see Meshaka, 2001). The known distribution of the Cuban Treefrog has been expanding in recent years as introduced populations are documented (e.g., Kraus, 2009), and further expansion is likely with projected climate changes (Rödger & Weinsheimer, 2009).

Knowledge of the reproduction and the timing of reproduction of Cuban Treefrogs throughout their native and introduced ranges might be useful in understanding their ability to expand their range. However, published observations on the timing of reproduction in the Cuban Treefrog are somewhat rare, especially given their rapidly expanding range. Cuban Treefrogs typically breed in temporary pools, and breeding appears associated with rainfall or thunderstorms (e.g., Meshaka, 2001; Henderson & Powell, 2009), and can take place over an extended range of months (see Meshaka, 2001; Henderson & Powell, 2009).

We report observations on the reproduction of Cuban Treefrogs in the northern Exuma Islands, The Bahamas. While conducting a population census of Allen Cays Iguanas (*Cyclura cyclura inornata*) as part of a long-term monitoring program, we made observations related to the reproduction of Cuban Treefrogs on Leaf Cay (24.75°N, 76.84166°W; see Iverson et al., 2004 for additional description). On 18 May 2015 we observed Cuban Treefrog tadpoles (≈ 0.5-0.75 cm in body length) in shallow puddles formed in holes and depressions in the limestone close to the splash zone. These puddles were relatively shallow (water depth ≈ 10 – 20 cm). On 19 May 2015 we observed new Cuban Treefrog egg masses in multiple (> 5) shallow puddles in the same vicinity of the tadpoles seen on 18 May 2015. We heard calling by the Cuban Treefrogs on the evenings of both 18 and 19 May 2015. It rained throughout the day on 18 May, and there was also rain on 19 May.

The timing of reproduction on Leaf Cay is consistent with the range of breeding times of Cuban Treefrogs in other locations in The Bahamas. Meshaka (2001) documented oviposition on New Providence from March-November, with calling being continuous during that period. Oviposition and calling on Grand Bahama was observed from March-September (Meshaka, 2001). Smith

et al. (2009) observed metamorphs and a range of tadpole stages on Southwest Allens Cay on 14 May 2008.

Our observations of the use of shallow water, and the successful production of tadpoles in such pools is consistent with previous observations. Cuban Treefrogs frequently breed in shallow water that is often quite warm, and indeed they are often not observed in pools < 30°C mean afternoon temperature (Meshaka, 2001). Their larvae can also apparently tolerate very warm water of ≥ 41°C (Meshaka, 2001), which is likely to be the case in the pools we observed on Leaf Cay. Furthermore, the salinity in some of these pools must have been quite high given the salty crust deposits along the margin of some of the pools. Previous observations suggest that Cuban Treefrog eggs can tolerate exposure to salty water (Powell et al., 2005).

Cuban Treefrogs only recently arrived in the Allen Cays. They were not observed in a survey of the Exumas done during 1990-1992 (Franz et al., 1993), and we first observed them on Southwest Allen's Cay in May 2001, with successful breeding first observed in 2008 (Smith et al., 2009). The observations reported here, to our knowledge, represent the first observation of Cuban Treefrogs on Leaf Cay in the northern Exumas, only the sixth record for the entire 365-island chain of the Exumas (see Buckner et al., 2012), the first observation of oviposition in the Allen Cays and the Exumas, and the first report of calling in the Exumas.

ACKNOWLEDGMENTS

We thank Mrs. Sandra Buckner, the Bahamas National Trust, the Bahamas Department of Agriculture, Bahamas Environment, Science and Technology Commission, and 7 C's Charters. Financial support provided by the late Dr. Ned and Sally Test, the Cope Museum Fund of Earlham College, and Denison University (Horizon Fund, Battelle Fund).

REFERENCES

- Buckner, S.D., Franz, R. & Reynolds, R.G. (2012). Bahama Islands and Turks & Caicos Islands. *Bulletin of the Florida State Museum of Natural History* 51: 93-110.
- Franz, R., Dodd, C.K. Jr. & Buden, D.W. (1993). Distributional records of amphibians and reptiles from the Exuma Islands, Bahamas, including the first reports of

- a freshwater turtle and an introduced gecko. *Caribbean Journal of Science* 29: 165-173.
- Henderson, R.W. & Powell, R. (2009). *Natural History of West Indian Reptiles and Amphibians*. Gainesville, University Press of Florida, 520 pp.
- Iverson, J.B., Hines, K.N. & Valiulis, J.L. (2004). The nesting ecology of the Allen Cays rock iguana, *Cyclura cyclura inornata* in the Bahamas. *Herpetological Monographs* 18: 1-36.
- Kraus, F. (2009). *Alien Reptiles and Amphibians. A Scientific Compendium and Analysis*. Dordrecht, Springer, 563 pp.
- Meshaka, W.E. Jr. (2001). *The Cuban Treefrog in Florida: Life History of a Successful Colonizing Species*. Gainesville, University Press of Florida, 191 pp.
- Powell, R., Henderson, R.W. & Parmerlee, J.S. Jr. (2005). Reptiles and Amphibians of the Dutch Caribbean: St. Eustatius, Saba, and St. Maarten. St. Eustatius National Parks Foundation, Gallows Bay, St. Eustatius, Netherlands Antilles.
- Rödger, D. & Weinsheimer, F. (2009). Will future anthropogenic climate change increase the potential distribution of the alien invasive Cuban treefrog (*Anura: Hylidae*)? *Journal of Natural History* 43: 1207-1217.
- Smith, G.R., Pieper, L. & Iverson, J.B. (2009). *Osteopilus septentrionalis*. Reproduction. *Herpetological Review* 40: 207.

Accepted: 3 November 2015