

SCAPHIOPUS COUCHII (Couch's Spadefoot). AGGREGATION.

Tadpole aggregation behaviors have been observed in many North American anuran families, including Bufonidae, Hylidae, Leptodactylidae, Microhylidae, Ranidae, Rhinophrynidae, and Scaphiopodidae (Wells 2007. *The Ecology and Behavior of Amphibians*. The University of Chicago Press, Chicago, Illinois. 1148 pp.). Benefits of aggregations include increased foraging opportunities, increased resource availability, physiological benefits, and decreased predation. However, this could come at the cost of increased competition, cannibalism, and predation risk (McDiarmid and Altig 1999. *Tadpoles: The Biology of Anuran Larvae*. The University of Chicago Press, Chicago, Illinois. 444 pp.; Wells, *op. cit.*). Although the exact triggers influencing the occurrence of aggregation in tadpoles are not fully understood, it is likely strongly influenced by environmental and ecological parameters and a balance between the benefits and costs of this behavior.

Observations of various forms of aggregation in spadefoot (family Scaphiopodidae) tadpoles have resulted in the identification of three major types of aggregation: feeding aggregations,

premetamorphic protective aggregations, and metamorphic aggregations (Bragg 1965. *Gnomes of the Night: The Spadefoot Toads*. University of Pennsylvania Press, Philadelphia, Pennsylvania. 127 pp.; Black 1973. Ph.D. dissertation, University of Oklahoma, Norman, Oklahoma. 221 pp.). Within this family, the majority of studies have detailed aggregation behaviors in Plains Spadefoot (*Spea bombifrons*) tadpoles (Bragg and King 1960. *Wasmann J. Biol.* 18:273–289; Bragg 1964. *Wasmann J. Biol.* 22:299–305; Bragg 1965, *op. cit.*; Black 1968. *Proc. Oklahoma Acad. Sci.* 49:13–14). Similarly, several studies have documented aggregation behaviors in tadpoles of the Eastern Spadefoot (*Scaphiopus holbrookii*; Abbott 1884. *Am. Nat.* 18:1075–1080; Ball 1936. *Trans. Connecticut Acad. Arts Sci.* 32:351–379; Richmond 1947. *Ecology* 28:53–67), Hurter's Spadefoot (*S. hurteri*; Bragg 1956. *Herpetologica* 12: 201–204; Bragg 1959. *Wasmann J. Biol.* 17:23–42; Bragg 1968. *Wasmann J. Biol.* 26:11–16), and Mexican Spadefoot (*Spea multiplicata*; Dodd 2013. *Frogs of the United States and Canada*, Volume 2. The Johns Hopkins University Press, Baltimore, Maryland. 982 pp.). Compared to these species, considerably less is known about *Scaphiopus couchii*. Black (1973, *op. cit.*) experimentally demonstrated aggregation behaviors in *S. couchii* tadpoles under laboratory conditions, and similar to Bragg (1965, *op. cit.*), provided no account of this behavior in the field. Here, we report an observation of aggregation behavior in *S. couchii* tadpoles from the Chihuahuan Desert of west Texas.

On 3 July 2014, two large aggregations of *Scaphiopus couchii* tadpoles were found in a shallow, ephemeral pool along a dirt road on C. E. Miller Ranch, Jeff Davis County, Texas, USA (30.60548°N, 104.64239°W; WGS 84; Fig. 1). Each aggregation consisted of approximately 700 tadpoles that were visible at the surface of the water. However, turbid water and the presence of individuals at the bottom of the pool prevented a more accurate assessment of the number of tadpoles in each aggregation. Surrounding these large aggregations were smaller aggregations of 8–20 tadpoles. In sum, the total size of each of these aggregations likely exceeded 1000 tadpoles. The majority of individuals were feeding at the water surface in a vertical position, as described by Black (1973, *op. cit.*). A group of 16 individuals (15 fluid preserved and one preserved as tissue sample) were taken as vouchers to confirm identification (following Altig and McDiarmid 2015. *Handbook of Larval Amphibians of the United States and Canada*. Cornell University Press, Ithaca, New York. 345 pp.) and deposited at the Biodiversity Collections at the University of Texas at Austin (TNHC 91983 [TJL 2691]). Although aggregations have been observed in other *Scaphiopus* (see Bragg 1965, *op. cit.*), to the best of our knowledge, this appears to be the first detailed description of aggregation behavior in the field for *S. couchii*.

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