Dune Toads

by Dale Turner

Sand dunes in hot deserts provide habitat for a variety of fascinating plants and animals, many with specialized adaptations for loose sand, high temperatures, intense sunshine, and extreme aridity. But sand dunes are not where I look for toads.

On contract from the U.S. Air Force, I led an inventory of reptiles and plants in the Mohawk Dunes, approximately 65 km east of Yuma, Arizona. With various collaborators and assistants we did a thorough job, with an average of 3 people/day searching the dunes for 144 calendar days throughout the warm seasons from February 1994 through October 1996. Additional field time was contributed by 3 University of Arizona herpetology class field trips. In the process, we found 84 plant, 20 reptile, and 1 amphibian species (Turner et al. 1997).

At about 1930h on the night of 28 April 1995, Betsy Wirt and Peter Holm caught 2 live Great Plains toads (*Bufo cognatus*). They found the toads about 200 m into the dune field on a tongue of sand which ramps up from a playa (ephemeral lake) on the east side of the Mohawk Dunes (32° 37'50"N, 113° 44'40"W). The toads weighed 68 and 61 g, and measured 84 and 70 mm SVL, respectively. Their sexes were not determined. The toads were photographed the next day (Fig. 1) and later released at their points of capture.

Fig.1 Great Plains Toad *(Bufo cognatus)* at Mohawk Dunes.

The site had received 1.98 cm of rain during the 20 days prior to these observations, according to my gauge just east of the playa. Average rainfall for the Mohawk area is 10.5 cm annually (Sellers et al. 1985).

At 2030h the following night, Wade Sherbrooke and I found an additional *B. cognatus* " first seeing its golden eye reflection on the highest crest of the dunes approximately 200 m west of that first pair, deeper into the dune field. We examined the toad but took no measurements.

Toads had not been seen previously at the Mohawk Dunes during intensive spring searches conducted by UA herpetology students in 1979 and 1980, and I have not found them subsequently during trips made each spring, 1997-2001, but I have not conducted monsoon-season searches since 1996.

The range of *B. cognatus* extends from Canada into Mexico, but this record is near the western edge of their distribution (Krupa 1990). While the species is not uncommon in the Sonoran Desert, this discovery was surprising since *cognatus* requires pools of standing water for breeding, egg survival, and as tadpoles, for about 40 days (Bragg 1937, Gates 1957). Sand dunes form very poor surfaces for water runoff or collection, since they immediately absorb virtually all rainwater that falls on them.

The only landscape feature that might hold water sufficiently long and is close enough to be likely breeding habitat for these toads appears to be the playa just east of the dunes. The playa, 1.4 km long by 250 m wide, lies along the eastern side of the dunes, about 8 km south from the dune field's north end. It appears to fill to a depth of <1 m about once per decade, the most recent event being in winter 1992-93. Most of the time it consists of sun-baked clay with an extensive network of deep cracks.

The next closest place where water stands for sufficient time is probably along the Gila River, about 18 km to the north. The surrounding desert consists of a gently sloping alluvial plain without any significant stream channels to form pools; the nearby Mohawk Mountains contains only 2 small bedrock tinajas, about 13 km to the southeast (Broyles 1996).

Despite the lack of standing water on dunes, absorbed rainwater after a heavy rain is held in the sand near the dune surface for months, potentially making dunes suitable for long-term hibernation/estivation by reptiles and amphibians. *Bufo cognatus* is known to dig deep burrows to avoid heat and dessication (Bragg 1940), and sand is easy to dig. There are records of *Scaphiopus couchii* living and breeding in or near Algodones Dunes of California and White Sands dunes, New Mexico, though that species requires only about 10 days of standing water before metamorphosis (Stroud 1949, Mayhew 1965, Dimmitt 1990).

The lifespan of *cognatus* is unknown, but may exceed the time between fillings of the playa. Thus a once-per-decade breeding opportunity may be enough to maintain this population.

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