

## NOTES ON THE REPRODUCTION OF THE SOUTHWESTERN POND TURTLE *Emys pallida* IN BAJA CALIFORNIA, MÉXICO

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**Abstract.**—We document observations on the reproduction of *Emys pallida* in drainages from the western Sierra San Pedro Mártir, Baja California, México. These are the first reported observations from Baja California populations of this species mating in the wild.

**Keywords.**—Northwestern Baja California, mediterranean region, Emydidae, reproduction.

**Resumen.**—Reportamos observaciones sobre la reproducción de *Emys pallida* en arroyos del oeste de la Sierra San Pedro Mártir, Baja California, México. Estas son las primeras observaciones sobre reproducción reportadas para las poblaciones de Baja California.

**Palabras clave.**—Noroeste de Baja California, región mediterránea, Emydidae, reproducción.

The Southwestern Pond Turtle, *Emys pallida*, is one of three emydid species native to western North America, and the only native freshwater turtle in the state of Baja California (Spinks et al. 2014). It is a small turtle, reaching 200 mm in carapace length (Grismer 2002), and ranges from the central coast south of San Francisco Bay, California to northwestern Baja California. Within Baja California, it is found in riparian habitats from the US-Mexico border to Arroyo El Rosario (Grismer 2002), with a disjunct population in the central desert of Baja California (Valdez-Villavicencio et al. 2016). Recent phylogenetic studies indicate that the Southwestern Pond Turtle in Baja California is highly divergent from populations in California and may represent a separate species (Spinks et

al. 2014). While a great amount of information is available for U.S. populations, little is known about its natural history in Baja California. Here we report observations on reproduction and hatchlings in *E. pallida* from drainages in the western Sierra San Pedro Mártir, Baja California, Mexico.

**Reproduction observations.**—On 15 March 2014 at 16:08 h we observed two *E. pallida* copulating underwater in Arroyo Valladares, Sierra San Pedro Mártir (30.82700°N, 115.73374°W, elevation 608 m). The turtles (Fig. 1) were in a shallow part of the arroyo about 10 cm deep and 2.5 m wide. The water temperature was 24°C, and air temperature was 18.1°C. After the accidental disruption of the copulation,

we captured, measured, and weighed both turtles. Female measurements were as follows: carapace length (CL) = 129.5 mm; plastron length (PL) = 111 mm; weight (Wt) = 325 g. Male CL = 117 mm; PL = 98 mm; Wt = 200 g. Additional observations were made on 20 March 2014 in Arroyo San Antonio Murillos, Sierra San Pedro Mártir (30.81837°N, 115.63112°W, elevation 540 m). At ca. 12:50 h we observed two *E. pallida* copulating under water inside a hoop net trap, set up in a deep pool (>1 m) near large boulders. After pulling out the trap from the water, the male and female continued copulating (Fig. 2). Female CL = 126 mm; PL = 110 mm; Wt = 292 g. Male CL = 122 mm; PL = 105 mm; Wt = 249 g. On the same day, at 17:42 h, we observed another pair copulating in the bottom of a small pool within the arroyo and left them undisturbed. The pool had a sandy bottom and a few southern cattails (*Typha dominguensis*). The pool depth was 36.5 cm and the water temperature was 19.3°C.

**Hatchlings observations.**—On 23 April 2014, we observed a hatchling in Rancho El Potrero, Sierra San Pedro Mártir (30.9145°N, 115.6553°W; elevation 890 m, Fig. 3A). The hatchling measured CL = 31.2 mm; PL = 26.27 mm; and Wt = 6.7 g. It was found at 10:30 h in a shallow area of a small oxbow pond (70 m<sup>2</sup>, ~80 cm deep) located six meters from the main stream. The pond water was turbid, with felled logs, overhanging willows, and scarce aquatic vegetation. We observed two additional hatchlings in Arroyo San Rafael. The first individual (Fig. 3A) was found on 16 April 2015, ~32 km E of Colonet (31.11746°N, 115.88538°W, elevation 311 m). The hatchling (CL = 36



**Figure 1.** Mating *Emys pallida* from Arroyo Valladares, Sierra San Pedro Mártir, trying to escape after our approach.



**Figure 2.** Copulating *Emys pallida* in a hoop net trap from Arroyo San Antonio Murillos, Sierra San Pedro Mártir.

mm; PL = 19.56 mm; and Wt = 8.3 g) was found at 19:25 h in a small pond (27 m<sup>2</sup>, 70 cm deep) located five meters from the main stream, in an area with dense willow trees (*Salix lasiolepis*) and mule-fat (*Baccharis salicifolia*). We found the second individual on 07 November 2015, 23 km E of Colonet (31.11894°N, 115.97145°W, elevation 210 m, Fig. 3B). This hatchling (CL = 23.5 mm; PL = 19.56 mm; Wt = 2.8 g) was found at 13:55 h walking on the ground among *B.*



*salicifolia* in the direction of a pond, about three meters from the shore.



**Figure 3.** Hatchlings observations at El Potrero (A) and Arroyo San Rafael (B).

Nothing has been reported on the reproduction of *E. pallida* from Baja California (Grismer 2002), therefore these observations represent the first records for reproduction and the emergence of hatchlings in the state. Information from populations in the United States indicates this species mates year-round, except in winter (Bury et al. 2012). More information is needed to determine if this remains true for Baja California populations, as

copulation has only been seen during April. We have conducted turtle surveys year round, but observing reproduction in the field is rare, so future research might confirm reproductive activities at other times of the year. In California females reach sexual maturity at CL of 120 mm, and males at about 110 mm (Holland 1994). The two pair of copulating turtles with measurements were larger than these minimum lengths and the third pair of turtles that was observed (but not captured) appeared to be as large, if not larger.

Observations of hatchlings in both November and April might indicate a double clutch reproductive season. In California, hatchlings have been reported from May to July, and less common in the fall/winter. However spring hatchlings could have been overwintering in the nest chamber and emerge for the first time with the warmer spring temperatures (Holland 1994). The smaller hatchling (CL = 23.5) from Arroyo San Rafael emerged in November and is one of the smallest hatchlings documented (CL = 23-31 mm, weight = 1.5-7 g; Holland 1994). One possibility is this late season hatchling did not overwinter and its small size is indicative of the size of a newly hatched individual. Although, we have so little information on the Southwestern Pond Turtle from Baja California, that hatchlings might naturally emerge at a smaller size compared to their northern relatives.

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