

KINOSTERNON FLAVESCENS (Yellow Mud Turtle). REPRODUCTION. *Kinosternon flavescens* is a highly terrestrial kinosternid occurring across a large portion of central North America, from Nebraska, USA south through the northern portions of Chihuahua, Coahuila, Nuevo León, and Tamaulipas, México (Seidel 1978. Cat. Am. Amphib. Rept. 216:216.1–216.4). Across their range, reproduction has generally been reported as occurring in the “spring” or after emergence from hibernation (Ernst and Lovich 2009. Turtles of the United States and Canada. Second edition. The Johns Hopkins University Press, Baltimore, Maryland. xii + 827 pp.; Fogell 2010. A Field Guide to the Amphibians and Reptiles of Nebraska. University of Nebraska—Lincoln, Lincoln, Nebraska. vi + 158 pp.). Despite their wide range, direct observations of copulation in the wild appear absent from the literature. Here, we report two observations of copulation in *K. flavescens* from Texas, USA.

At 1230 h on 13 August 2013, while conducting a mark-recapture study on *K. flavescens* in the Chihuahuan Desert, we (DRD, TJJ) observed a copulating pair of *K. flavescens* at 2-Section Pond, C.E. Miller Ranch, Jeff Davis County, Texas, USA (30.63864°N, 104.63358°W; WGS 84). The site was an earthen, dugout pond that holds water intermittently, usually as overflow from another well-fed dugout earthen pond immediately adjacent. The pair were copulating in shallow water (ca. 10 cm deep) with abundant emergent vegetation, ca. 2 m from the shoreline. When encountered, it was mostly sunny, and the air temperature was 30.8°C. The pair was collected, measured, marked, and released back at the site of capture. Both the male (251.1 g, 102.6 mm SCL) and female (218.3 g, 94.35 mm SCL) showed visible damage to the carapace suggestive of Stage 1 of a recently described algae-associated shell disease (Christensen et al. 2020. J. Herpetol. 54:1–8). Additionally, both individuals had relatively clean shells with minimal algae, suggesting that they had recently arrived at this pond from nearby terrestrial habitats.

At 1130 h on 25 June 2019, while conducting surveys for Black-spotted Newts (*Notophthalmus meridionalis*), we (DRD, PSR) collected a copulating pair of *K. flavescens* from Newt Pond, Laguna Atascosa National Wildlife Refuge, Cameron County, Texas, USA (26.31061°N, 97.36511°W; WGS 84; Fig. 1A). This dugout, ephemeral pond, which sits within a former resaca bed, was previously used as an earthen cattle tank. The pond was moderately turbid, with a water temperature of 29.1°C and a pH of 8.03. The pair of turtles were captured with a dip net, photographed, and released back at site within ca. 5 min of capture. The pair remained copulating with the male securely grasping the female for several minutes after capture. Both the male (Fig. 1B) and female (Fig. 1C) showed visible damage to the carapace suggestive of Stage 2 of the previously mentioned algae-associated shell disease (Christensen et al. 2020, *op. cit.*). Photographs of both were deposited at the Biodiversity Collections, University of Texas at Austin (male: TNHC 115082; female: TNHC 115083). When encountered, it was a clear sky with an air temperature of 29.4°C. The previous day, 5.1–10.2 cm of precipitation fell in eastern Cameron County, with higher

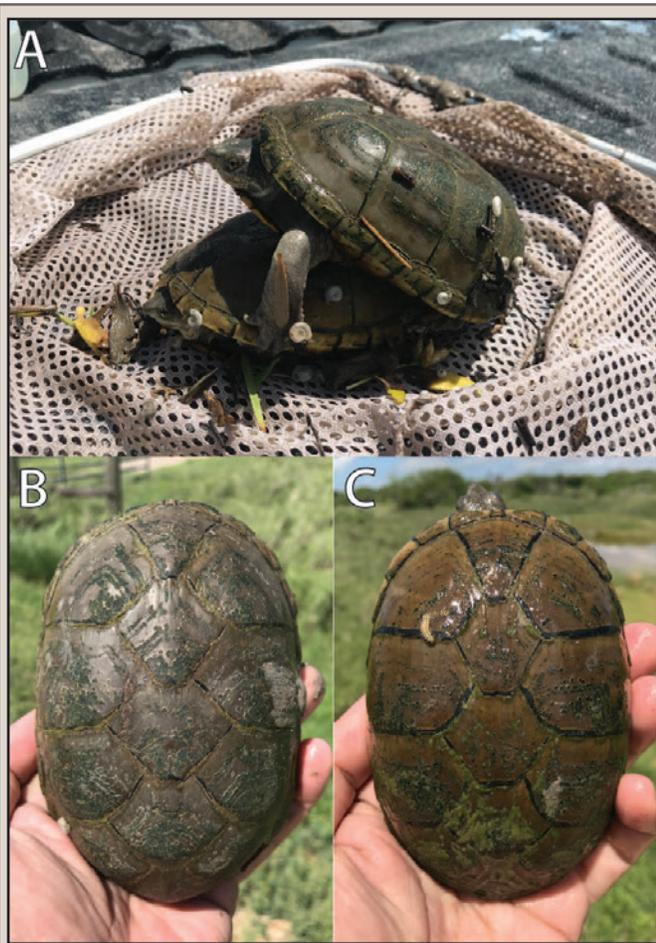


FIG. 1. Copulating pair of Yellow Mud Turtles (*Kinosternon flavescens*) found at Laguna Atascosa National Wildlife Refuge, Cameron County, Texas, USA on 25 June 2019 (A), with dorsal views of the male (B) and female (C).

precipitation totals (20.3–30.5 cm) falling ca. 25 km to the west. We suspect that movement from terrestrial uplands where *K. flavescens* spend a large portion of their time (Degenhardt et al. 1996. *The Amphibians and Reptiles of New Mexico*. University of New Mexico Press, Albuquerque, New Mexico. xix + 431 pp.; Legler and Vogt 2013. *The Turtles of Mexico: Land and Freshwater Forms*. University of California Press, Berkeley, California. xi + 402 pp.) to this site were triggered by this rainfall event, which resulted in copulation.

These two observations appear to be the first published accounts of *K. flavescens* copulation in Texas. Vermersch (1992. *Lizards and Turtles of South-central Texas*. Eakin Press, Austin, Texas. xiv + 170 pp.) states that information on *K. flavescens* reproduction is lacking from across the region and Hibbitts and Hibbitts (2016. *Texas Turtles & Crocodylians. A Field Guide*. University of Texas Press, Austin, Texas. xvi + 257 pp.) only state that mating occurs in the spring. In additional parts of their range, authors have remarked that copulation takes place in early May (Iowa, USA: LeClere 2013. *A Field Guide to the Amphibians and Reptiles of Iowa*. ECO Herpetological Publishing & Distribution, Rodeo, New Mexico. viii + 349 pp.) and “probably before June” (Kansas, USA: Collins et al. 2010. *Amphibians, Reptiles, and Turtles in Kansas*. Eagle Mountain Publishing, LC, Eagle Mountain, Utah. xvi + 312 pp.). Copulatory behaviors of *K. flavescens* were described by Mahmoud (1967.

Copeia 1967:314–319) after observing captive animals in April and May. Additional copulation in *K. flavescens* has been observed in the late summer and fall, but again, these were observations of captive individuals (August: Thornton and Smith 1996. *Bull. Chicago Herpetol. Soc.* 31:204–205; October: Taylor 1933. *Univ. Kansas Sci. Bull.* 21:269–271). Our observations add to the understanding of this species’ reproductive biology and is among the first to provide direct evidence of copulation in the field for *K. flavescens*.

Specimens were handled under a Texas Parks and Wildlife Scientific Permit for Research (SPR-1097-912; SPR-1018-294), approved IACUC protocols (AUP-2012-00112; AUP #18-28), and a USFWS Special Use Permit (STRC-12-17-18-CJP).

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