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Research note

Observations on nests of *Crocodylus moreletii* in San Luis Potosí, Mexico

Observaciones sobre nidos de *Crocodylus moreletii* en San Luis Potosí, México

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Abstract. Nesting ecology of Morelet's crocodile (*Crocodylus moreletii*) has been documented since 1940. However, only 2 nests constructed on floating vegetation have been recorded. Here, we presented additional information from a mainland population of *C. moreletii* in the Ciénega de Cabezas wetland, San Luis Potosí, describing 2 nests constructed on floating mats of cattails. The nests were constructed using *Typha sp*., close to the main channel. One nest was lost due to flooding, and contained 32 eggs. Seven eggs had a mean 72.6 ± 2.63 mm length (range = 70.0 -75.0 mm), 45.0 ± 2.30 mm width (range = 41.0-48.0 mm), and 140.7 ± 2.98 mm diameter (range = 136.0-145.0 mm). We suggest that the use of floating vegetation for nesting by *C. moreletii* is related to the availability of aquatic vegetation, combined with the lack of adequate nesting sites on land.

Key words: Ciénega de Cabezas, Morelet's crocodile, nesting ecology, reproductive ecology.

Resumen. La ecología de anidación del cocodrilo de pantano (*Crocodylus moreletii*) ha sido documentada desde 1940. Sin embargo, sólo existen 2 registros de nidos construidos sobre vegetación acuática. Presentamos información adicional de 2 nidos (N1 y N2) construidos en este tipo de hábitat en una población ubicada en la Ciénega de Cabezas en el estado de San Luis Potosí. Los nidos fueron construidos sobre *Typha sp.*, cerca del cauce principal de la ciénega. El N2 se perdió por inundación, en su interior encontramos 32 huevos, los promedios (± SD) del largo, ancho y diámetro de 7 huevos fueron 72.6 ± 2.63 mm (rango = 70.0 -75.0 mm), 45.0 ± 2.30 mm (rango = 41.0-48.0 mm), 140.7 ± 2.98 mm (rango = 136.0-145.0 mm), respectivamente. Sugerimos que este tipo de sitios para anidar por parte de *C. moreletii* está relacionado con la disponibilidad de vegetación acuática, combinado con la ausencia de sitios adecuados en tierra firme.

Palabras clave: Ciénega de Cabezas, cocodrilo de pantano, ecología de anidación, ecología reproductiva.

The nesting and reproductive ecology of Morelet's crocodile, *Crocodylus moreletii*, has been documented since 1940, with the first observations by Martín de Lucenay (1942) in Laguna Verde, Veracruz. In the 1960s, Zubieta (1967 in Casas-Andreu and Barrios-Quiroz, 2010) described the nest site and construction for an unspecified crocodile species, though the description suggests that this was a *C. moreletii* nest. Later, Álvarez del Toro (1974) described in detail the reproductive phenology and nest characteristics, and Hunt (1975) also described the maternal behavior of *C. moreletii,* both in captivity. Pérez-Higareda (1980) and Pérez-Higareda et al. (1989) conducted the first field observations on nesting and reproductive ecology of *C. moreletii*. Additional observations on various aspects of reproduction (Sigler and Gonzalez, 1994; Sigler and Marina, 2004) and nesting ecology (Escobedo-Galván et al., 2009) were made in recent years. Quantitative data on reproduction of Morelet's crocodile began with studies by Casas-Andreu and Rogel-Bahena (1986), Casas-Andreu et al. (1993), and Casas-Andreu and Barrios-Quiroz (1997). Recently, studies by Platt et al. (2008) on wild populations have contributed to our knowledge of the nesting and reproductive ecology of *C. moreletti*.

Morelet's crocodile is regarded as an exclusively mound-nesting species (Campbell, 1978). The nest is composed of vegetation, soil, leaves, and woody debris, but in some cases is a mix of mollusk shells, rocks, and sand, or even trash in areas with high leves of human

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activity (Platt et al., 2008; Escobedo-Galván et al., 2009). Although information exists on nest site selection across the range of *C. moreletii*, only 2 nests have been reported on a floating mat of vegetation (Pérez-Higareda, 1980; Platt et al., 2008). Here we present additional observations on 2 nest constructed on floating mat of grass in a mainland population of *C. moreletii*.

During a visit in November 2009, we found 2 *C. moreletii* nests on floating mats of cattails in the middle of the Ciénega de Cabezas wetland, located in Tamasopo Municipality in San Luis Potosí State (21º47' 37.37" N, 99º 18' 3.06" W; Fig. 1), at an elevation of 280 m (Torres, 2008). The vegetation in the wetland is dominated by cattail (*Typha sp.*), with sugarcane (*Saccharum officinarum*) at the edge of the wetland. The first nest (N1) was found at a distance of ≤2 m from the main channel, at a height of 1 m from the water to the egg chamber. The nest was constructed under tree-roots (tree species not identified) and cattail. We only observed egg-shells in this nest; therefore we considered it a successful nest. The second nest (N2) was located 900 m from N1, at less than 2 m from the main channel, at a height of 15 cm from the water to the egg chamber. This nest was constructed with mud and cattail and contained 32 eggs; however, the nest was lost due to flooding. We measured the dimensions of 7 eggs which had a mean (± SD) of 72.6 ± 2.63 mm length (range = 70.0 -75.0 mm), 45.0 ± 2.30 mm width (range = 41.0-48.0 mm), and 140.7 ± 2.98 mm diameter (range = 136.0-145.0 mm). We also evaluated the viability of 25 eggs by the presence of embryos in development, and determined a 100% viability of the clutch.

Using the characteristics of clutch size (CS), egg length (EL) and egg width (EW) it was possible to estimate the snout-vent length (SVL) of the nesting female (Thorbjarnarson, 1996; Platt et al., 2008). We used 3 linear models of Platt et al. (2008) to estimate the snout-vent length (SVL) of the nesting females in Ciénega de Cabezas (CS = 0.42 x SVL – 13.8; EG = 0.12 x SVL + 29.6; EL = 0.20 x SVL + 50.5). The SVL estimated for the egg-laying females in Ciénega de Cabezas was 109.0-128.3 cm. The

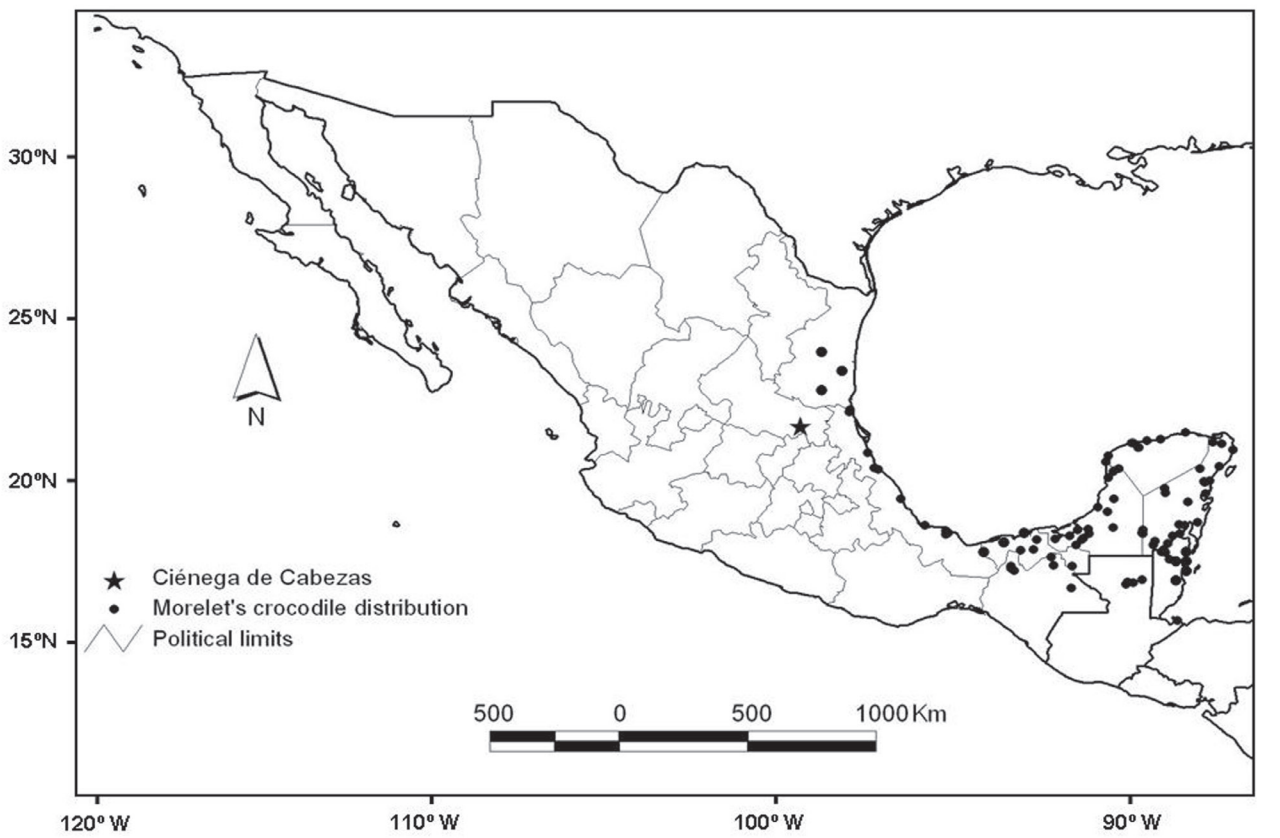

Figure 1. Distribution of *Crocodylus moreletii* (circles) showing new nest-site in Ciénega de Cabezas (star).

clutch size, egg length, and egg width recorded in Ciénaga de Cabezas is within the range reported by Casas-Andreu and Rogel-Bahena (1986), and Platt et al. (2008). The estimated SVL and TL of the nesting females is within the range of the high size-class distribution of females reported by Platt et al. (2008).

Additional observations were provided y local landowners who state that at least 2 or 3 nests per year are found in the same sites. The area around the nest was distinctively cleared of mud and grass by the nesting female. With information from local land owners, we estimated nest sizes as having a height of 50-70 cm and diameter between 100 and 120 cm.

We suggest than the association of *C. moreletii* nest-site with floating vegetation (*Typha* sp.) in the Ciénaga de Cabezas is related to the availability of this vegetation type in the wetland, and the lack of solid substrates for the construction of nests. The use of floating vegetation may also be associated with nest predation, as nests on floating vegetation may have less predation than nests on solid substrates (Campos, 1993). Montini et al. (2006) observed that hatching success from nests located on floating vegetation was higher than nests in forest. Therefore, this type of nest-site has greater nesting success than nests constructed on solid substrates.

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