

## NOTEWORTHY RECORDS OF FRESHWATER TURTLES IN OAXACA, MEXICO

## REGISTROS DESTACADOS DE TORTUGAS DE AGUA DULCE EN OAXACA, MÉXICO

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**Resumen.**— Las tortugas dulceacuícolas representan un grupo diverso de reptiles en México, con la diversidad más alta distribuida principalmente en los estados tropicales del sur. Desafortunadamente, el conocimiento sobre su ecología, conducta, importancia cultural, distribución geográfica verificable es todavía insuficiente; esto dificulta los análisis espaciales, que ayudan a generar una serie de planes de conservación para su protección efectiva, contra los riesgos de extinción. Aquí proporcionamos registros adicionales, a los ya conocidos, de cuatro especies amenazadas de tortugas dulceacuícolas en el estado de Oaxaca. Estos registros no solo expanden el rango de distribución, sino que también proporcionan información adicional sobre el hábitat, y posibles amenazas ambientales. Cabe resaltar que el registro de *Chelydra rossignonii* confirma su presencia en la cuenca del Río Papaloapan; y los registros de *Dermatemys mawii* y *Claudius angustatus* se consideran entre los primeros para el estado. Adicionalmente, proporcionamos otra localidad para *Staurotypus triporcatus* en Oaxaca.

**Palabras clave.**— *Chelydra rossignonii*, *Claudius angustatus*, *Dermatemys mawii*, *Staurotypus triporcatus*.

**Abstract.**— Freshwater turtles represent a diverse group of reptiles in Mexico, with the highest diversity being distributed mostly in the southern tropical states. Unfortunately, knowledge regarding their ecology, behavior, cultural importance, and reliable geographic distribution is still scarce; consequently, preventing in-depth spatial analyses that aim to provide a set of conservation plans that effectively shield them from high risks of extinction. Herein, we provide additional geographic records for four endangered species of freshwater turtles in the state of Oaxaca. These records not only expand their distribution range, but also provide information on habitat, and possible environmental threats. Importantly, the record of *Chelydra rossignonii* confirms its presence in the Papaloapan river basin; and the records of *Dermatemys mawii* and *Claudius angustatus* are among the first for the state. Furthermore, we provide an additional locality for *Staurotypus triporcatus* in Oaxaca.

**Keywords.**— *Chelydra rossignonii*, *Claudius angustatus*, *Dermatemys mawii*, *Staurotypus triporcatus*.

Mexico is the second richest country with respect to freshwater turtles (van Dijk et al., 2014; Macip-Ríos et al., 2015). However, knowledge on ecology, natural history, and geographic distribution is still incipient for most species (Macip-Ríos et al., 2015). Unfortunately, this group of vertebrates currently faces a set of serious environmental threats, such as habitat loss and overexploitation. Consequently, this has resulted in 64% of these species to be categorized as threatened by the Mexican government (SEMARNAT, 2019), 60% included in the IUCN red list (IUCN, 2021), and on average 30% of these species are

considered with high environmental vulnerability by the EVS system (Wilson et al., 2013; Macip-Ríos et al., 2015).

Currently, 15 species of freshwater turtles are known to occur in the state of Oaxaca (Mata-Silva et al., 2015). Of those, the distribution of *Chelydra rossignonii*, *Dermatemys mawii*, *Staurotypus triporcatus*, and *Claudius angustatus* still remain poorly known (Mata-Silva et al., 2015). For instance, before 2015 the presence of *C. rossignonii* was still uncertain. To this respect, Ramírez-González and Canseco-Márquez (2015) commented on



**Figura 1.** *Chelydra rossignonii* de la Laguna Aparicio, Santa Teresa, municipio de San Juan Bautista Tuxtepec (UTEPObs: Herp: 197).

**Figure 1.** *Chelydra rossignonii* from Laguna Aparicio, Santa Teresa, municipality of San Juan Bautista Tuxtepec (UTEPObs: Herp: 197).

a record provided by Pérez-Higareda (1978) that was regarded as dubious by Legler and Vogt (2013). This individual was collected in Laguna La Campana, 7 km west of Valle Nacional, and transported and kept at the “Estación de Biología Tropical de Los Tuxtlas, Veracruz”. Then, Ramírez-González and Canseco-Márquez (2015) provided photographic evidence of *C. rossignonii* in semi evergreen tropical forest in the municipality of Santa María Guienagati, in the southeastern extreme of the Sierra Madre de Oaxaca physiographic region (Mata-Silva et al., 2015).

Presently, the distribution of *Dermatemys mawii* in the state falls in the Planicie Costera del Golfo (Gadow, 1905; Iverson,

1992) and presumably in the Sierra Madre de Chiapas (USNM 66666-69, 67732) physiographic regions (Mata-Silva et al., 2015); and *Staurotypus triporcatus* is distributed in the Planicie Costera del Golfo and Depresión Istmica de Tehuantepec physiographic regions (Mata-Silva et al., 2015), with more distribution records than the former. Lastly, *Claudius angustatus* is known to occur in the Planicie Costera del Golfo, Depresión Istmica de Tehuantepec, and Sierra Madre de Chiapas physiographic regions (Mata-Silva et al., 2015).

Reliable knowledge on species geographic distribution and especially on those regarded as endangered is among





**Figura 2.** *Chelydra rossignonii* de Escolapa (= Escuilapa), municipio de Santa María Chimalapa (UTEPObs: Herp: 198).

**Figure 2.** *Chelydra rossignonii* from Escolapa (= Escuilapa), municipality of Santa María Chimalapa (UTEPObs: Herp: 198).

the first valuable tools for the design and eventual execution of conservation plans. With that in mind, our purpose of this contribution is to document the presence of freshwater turtles in the state of Oaxaca. As it has been demonstrated, geographic records improve the modeling and interpretation of actual distributions of species (Berriozabal-Islas et al., 2020). Furthermore, these records also augment information concerning ecology, behavior, and potential threats, among others. Photo vouchers were deposited in The University of Texas at El Paso (UTEP) Biodiversity Collections (UTEPObs: Herp).

*Chelydra rossignonii*. On 19 August 2011, JAR-S photographed an individual (Fig. 1; UTEPObs: Herp: 197) in Laguna Aparicio, Ejido de Santa Teresa, municipality of San Juan Bautista Tuxtepec (18.12504° N, 96.10552° W, 22 m a.s.l.; Fig. 7a). The length of the plastral forelobe of this species usually is less than 40% of carapace length, and the dorsal surface of the neck is covered with pointed tubercles (Gibbons et al., 1988). After being photographed, the specimen was left undisturbed at the original

site. The locality is surrounded by plantain (*Musa paradisiaca*), and grazing fields (*Brachiaria spp.*). The area includes many permanent water bodies that are fed by the Papaloapan River when overflowing events occur. According to several local villagers, this species is captured in the region using fishing line with chicken guts as bait.

Then, on 13 December 2017, another individual (juvenile; Fig. 2; UTEPObs: Herp: 198) was photographed by EGP at a household in the village of Escolapa (= Escuilapa), municipality of Santa María Chimalapa (16.8500° N, 94.76638° W, 314 m a.s.l.; Fig. 7a), in the Sierra Madre de Chiapas physiographic region. According to the house owner, this individual, which was kept as a pet, was found at a small river named Escolapa. The vegetation at the site is represented by a mix of medium evergreen forest and riparian vegetation.

*Claudius angustatus*. On 24 December 2020, JAR-S found an individual of *Claudius angustatus* (Fig. 3; UTEPObs: Herp:





**Figura 3.** *Claudius angustatus* de los alrededores de Chichizapa, municipio de San Miguel Soyaltepec (UTEPObs: Herp: 199).

**Figure 3.** *Claudius angustatus* from near Chichizapa, municipality of San Miguel Soyaltepec (UTEPObs: Herp: 199).

199) crossing the state road La Granja–Temascal, near Ejido Chichizapa, municipality of San Miguel Soyaltepec (18.29123° N, 96.35205° W, 50 m a.s.l.; Fig. 7b). This site is surrounded by sugarcane fields. It is worth mentioning that the day before this observation took place, some sugarcane fields had been burned for subsequent cutting and harvesting. The turtle was immediately removed from the road, and then released in a pond near the reported locality but away from the sugarcane fields.

*Dermatemys mawii*. On 13 December 2017, EGP photographed a shell of *Dermatemys mawii* (Fig. 4; UTEPObs: Herp: 200) at a household in the village of Escolapa (= Escuilapa), municipality of Santa María Chimalapa (16.8500° N, 94.76638° W, 314 m a.s.l.; Fig. 7c), in the Sierra Madre de Chiapas physiographic region. This individual was found at Río El Corte, a tributary of Río Coatzacoalcos. The vegetation at the collecting site is represented by tropical evergreen forest. According to the house owner this turtle is consumed in the region.



**Figura 4.** *Dermatemys mawii* del Río El Corte y fotografiado en Escolapa (= Escuilapa), municipio de Santa María Chimalapa (UTEPObs: Herp: 200).

**Figure 4.** *Dermatemys mawii* from Río El Corte and photographed in Escolapa (= Escuilapa), municipality of Santa María Chimalapa (UTEPObs: Herp: 200).





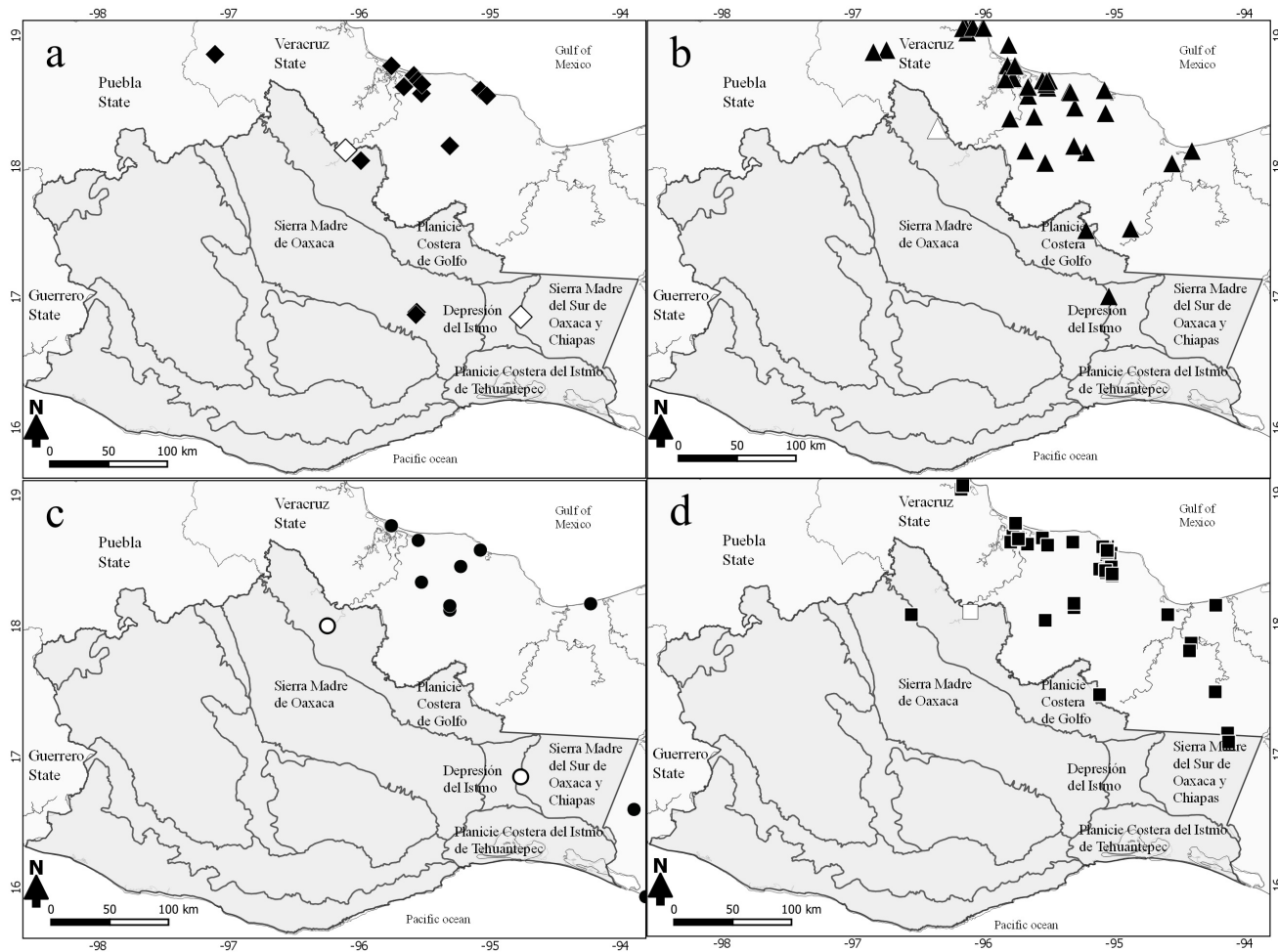
**Figura 5.** *Dermatemys mawii* del Arroyo Sal, Santa Ursula, municipio de San Juan Bautista Tuxtepec (UTEPObs: Herp: 201).

**Figure 5.** *Dermatemys mawii* del Arroyo Sal, Santa Ursula, municipality of San Juan Bautista Tuxtepec (UTEPObs: Herp: 201).



**Figura 6.** *Staurotypus triporcatus* de la Laguna del Diablo, municipio de San Juan Bautista Tuxtepec (UTEPObs: Herp: 202).

**Figure 6.** *Staurotypus triporcatus* from Laguna del Diablo, municipality of San Juan Bautista Tuxtepec (UTEPObs: Herp: 202).



**Figura 7.** Registros de tortugas de agua dulce en el sur de México. a) *Chelydra rossignonii*. Los diamantes negros representan los registros conocidos (GBIF 2020), el diamante gris representa el registro de Ramírez-González and Canseco-Marques (2015), y los diamantes blancos representan los nuevos registros. b) *Claudius angustatus*. Los triángulos negros representan los registros conocidos (GBIF 2020), y los triángulos blancos los nuevos registros. c) *Dermatemys mawii*. Los puntos negros representan registros conocidos (GBIF 2020a); y los puntos blancos representan los nuevos registros. d) *Staurotypus triporcatus*. Los cuadros negros representan los registros conocidos (GBIF 2020), y los cuadros blancos los nuevos registros.

**Figure 7.** Records of freshwater turtles in southern Mexico. a) *Chelydra rossignonii* in southern Mexico. Black diamonds represent known records (GBIF 2020), gray diamond represents the record by Ramírez-González and Canseco-Marques (2015), and the white diamonds the new records. b) *Claudius angustatus* in southern Mexico. Black triangles represent known records (GBIF 2020), and white triangle the new record. c) *Dermatemys mawii*. Black dots represent known records (GBIF 2020); and white dots represents the new records. d) *Staurotypus triporcatus* in southern Mexico. Black squares represent known records (GBIF 2020), and white square the new record.

A second individual of *Dermatemys mawii* (Fig. 5; UTEPObs: Herp: 201) photographed by JAR-S was randomly captured on 1 September 2019 by a local villager using a fish net in Arroyo Sal, in the vicinity of Santa Úrsula, municipality of San Juan Bautista Tuxtepec (18.00469° N, 96.24397° W, 32 m a.s.l.; Fig. 7c). The specimen had been kept alive for eventual consumption. Arroyo Santa Ursula is presently embedded in fields with sugarcane. The arboreal vegetation along this creek is dominated mostly by *Pachira aquatica*, *Guazuma ulmifolia*, *Ochroma pyramidale*, and *Ceiba pentandra*. According to the collector, this species used to

be relatively common in the area, but currently individuals are rarely seen.

*Staurotypus triporcatus*. On 28 February 2011, JAR-S photographed an individual of this species (Fig. 6; UTEPObs: Herp: 202) near Laguna del Diablo, municipality of San Juan Bautista Tuxtepec (18.09332° N, 96.09995° W, 27 m a.s.l.; 7d). This site contains remnants of evergreen high forest dominated by arboreal species such as *Schizolobium parahyba*, *Bursera simaruba*, *Attalea butyracea*, and *Ceiba pentandra*.



These records increase our knowledge regarding the current geographic distribution of four species of turtles for the state of Oaxaca, Mexico. We add two important records for *Chelydra rossignonii* to those already reported by Pérez-Higareda (1978), and Ramírez-González and Canseco-Márquez (2015). We also identified three more records of this species in Global Biodiversity Information Facility (GBIF, 2020a), with two of them reported in 2017 at a locality approximately 30 km west of that reported by Ramírez-González and Canseco-Márquez (2015), (Fig. 7a). The third record is from an arroyo that feeds the Yosocuta reservoir in the Mixteca region. Given the characteristics of the known habitat and elevation range of *C. rossignonii*, we do not think this locality is part of its natural distribution.

Field observations indicate that fishing of freshwater turtles, at least for *Dermatemys mawii* and *Chelydra rossignonii*, is still a relatively common practice by local communities in northern Oaxaca. Even though it seems that turtles have been resilient to the significant agricultural activities in the region, their populations are likely being affected by all kinds of waste that end up in the Papalopan River. For instance, in Arroyo Sal, Santa Úrsula, where *Dermatemys mawii* was recorded, we observed a significant loss of native vegetation cover and habitat pollution. Furthermore, serious threats to the site increased temporarily in 2008, when a hydroelectric power plant was planned to be built; however, this project did not prosper as the local communities strongly opposed this construction citing lack of consultation and violation of their land rights.

As noted earlier, currently freshwater turtles face numerous environmental threats, and consequently are regarded as a group with high extinction risk (Macip-Ríos et al., 2015). Among the species reported herein, the conservation status for *Chelydra rossignonii* has not been determined by the Mexican environmental laws (SEMARNAT, 2019), and this is likely in part because until recently this species was considered a subspecies of *C. serpentina*, which is considered as under Special Protection (Sujeta a Protección Especial). On the other hand, the IUCN red list places this species in the category of Vulnerable due to the development of urban settlements and hunting (van Dijk et al., 2007). More recently, using the EVS system, *C. rossignonii* was determined to be a species with high environmental vulnerability (EVS = 17; Wilson et al., 2013).

*Dermatemys mawii* is known to be facing serious conservation problems, so that is listed as a high risk by national and international conservation assessment systems. Currently, it is classified as Endangered (En Peligro) by SEMARNAT (2019), as Critically Endangered by IUCN, it is included in appendix

II of CITES (<https://checklist.cites.org>), and considered with high environmental vulnerability (EVS = 17) by the EVS system (Wilson et al., 2013). This large turtle is primarily threatened by activities such as agriculture, aquaculture, fishing, hunting, and habitat pollution (Vogt et al., 2006).

Regarding *Staurotypus triporcatus*, this species is listed as Threatened (Amenazada) and *Claudius angustatus* is listed as Threatened (En Peligro) (SEMARNAT, 2019). Both of these species are listed as Nearly Threatened by IUCN, with scarce information on their threats (Tortoise and Freshwater Turtle Specialist Group 1996a, 1996b). Furthermore, these two species are considered with high environmental vulnerability (EVS = 14) by Wilson et al. (2013).

Given the current situation of these species on their viability, their exploitation is only allowed with limited and required permits; thereof, the information provided herein is vital for the effective assessment of their populations and the steps that need to be taken to ensure their presence.

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