CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Nineteenth meeting of the Conference of the Parties
Panama City (Panama), 14 – 25 November 2022

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Inclusion of the species *Claudius angustatus* (narrow-bridged musk turtle) in Appendix II, in accordance with Article II, Paragraph 2a of the Convention, and satisfying Criterion A of Annex 2a, subparagraph B, of Resolution Conf. 9.24 (Rev. CoP17).

B. Proponent

Mexico*

C. Supporting statement

1. Taxonomy

1.1 Class: Sauropsida

1.2 Order: Testudines

1.3 Family: Kinosternidae (Subfamilia Staurotypinae)

1.4 Genus, species or subspecies, including author and year: *Claudius angustatus* (Cope 1865)

1.5 Sinónimos científicos: *Claudius megalocephalus* (Bocourt 1868)
Claudius macrocephalus (Gray 1873)
Claudius agassizii (Smith and Taylor 1950)

1.6 Common names: English: narrow-bridged musk turtle.
French:
Spanish: chopontil (Veracruz), taimán (Tabasco), joloque (Tabasco), taimame (Campeche), tortuga caimán (Chiapas), tortuga vampiro (Chiapas), tortuga rayo (Chiapas), tortuga almizclera.

Note: Current CITES reference nomenclature: Fritz and Havas (2007).

1.7 Code numbers: TSN 551948

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

2. Overview

The freshwater turtle *Claudius angustatus* (narrow-bridged musk turtle) occurs in Belize, Guatemala, and Mexico, and is an important resource for local communities in its area of distribution, mainly for its meat (for food). The species is highly traded, both at a national level and internationally (see **Section 6**). In Guatemala and Mexico, it is included in the national list of endangered species in the category "At risk of extinction" (NOM-059-SEMARNAT-2010; DOF, 2019) and "Endangered" (LEA, CONAP), respectively, and has been listed as "near threatened" on the IUCN Red List since 1996, with no recent update of its status. Apart from illegal harvesting and trade, the species is further threatened by a high level of habitat disturbance throughout its range due to land use changes for agricultural activities (see **Sections 4.1 and 5**). The region inhabited by the species is characterized by high turtle endemism and by anthropogenic modification.

In 2016, Reynoso et al. carried out a study, funded by CONABIO (CITES Scientific Authority in Mexico), on the conservation status, use and management of the species *C. angustatus* and *Staurotypus tryporcatus*. The study showed the negative impact of illegal trade on these turtles and the threat to their populations from habitat loss and fragmentation (see **Section 5**).

Currently, not only does illegal international trade in this turtle continue to be a threat to the species, it also seems to be on the increase as a result of the growing demand for the species (see **Section 6.2**). This was evidenced by recent seizures registered in Mexico, where thousands of specimens intended for export to China were seized at Mexico City International Airport; 4,000 of the 15,000 turtles seized were of the species *C. angustatus* (see **Section 6.4**).

3. Species characteristics

3.1 Distribution

Claudius angustatus is found in the lowlands of the Gulf of Mexico and the Caribbean watershed (0–300 masl), from central Veracruz, Tabasco, and northern Oaxaca, through northern and eastern Chiapas, western Campeche, and also in the northeast of Guatemala and Belize (**Figure 1**). There is a record of harvesting in the state of Yucatan (in the vicinity of Celestun), 200 km north of its maximum estimated occurrence (Calderón-Mandujano et al., 2001). According to the projected potential distribution model for Mexico, *C. angustatus* is found in water bodies located over an area of approximately 73,732.46 km^2, representing 3.75 % of national territory (Reynoso et al., 2016).

3.2 Habitat

The species occurs in a wide variety of permanent or semi-permanent, freshwater, aquatic habitats, and flood zones with slow flood-water flow and soft-bottomed mudflats (Legler y Vogt, 2013). It can be found in lakes, lagoons, rivers, streams, mangrove swamps, marshes, and savanna and grassland zones (Reynoso et al., 2016; Flores-Villela and Zug, 1995). The area of distribution includes semi-deciduous lowland forests, high evergreen forests, and grasslands. The habitat is significantly flat and topographically homogeneous throughout the area of distribution, which is only interrupted by the Tuxla mountain range (Reynoso et al, 2016, 2021). In disturbed habitats, the species can be found in ponds in agricultural areas, flood-meadows or acahuales (fallow secondary vegetation (Calderón-Mandujano, pers. com.).

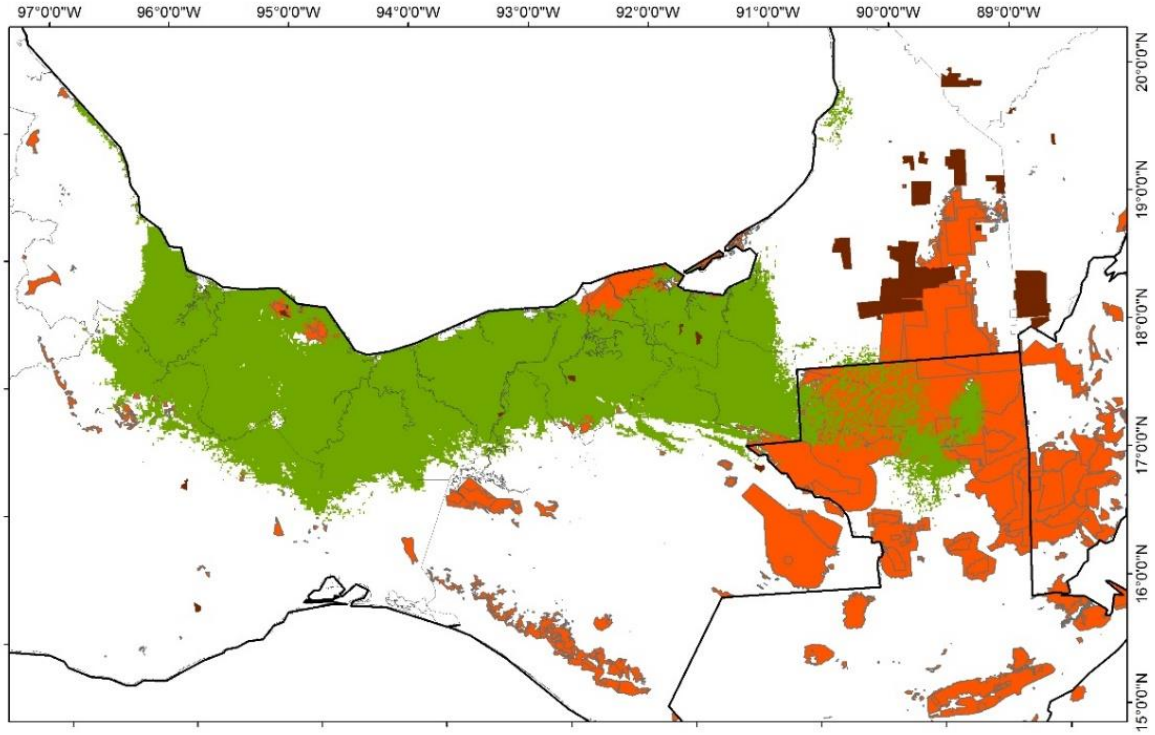

Figure 1. Potential range of *C. angustatus* (Reynoso et al. 2016).

Green: possibility of finding *C. angustatus* associated with water bodies; Orange: Natural protected areas; Red: polygons showing Wildlife Management Units (UMA) in Mexico. Only a few free-ranging Wildlife Management Units are registered for this species (overlapping red and green areas).

3.3 Biological characteristics

Claudius angustatus is a semi-aquatic species that sometimes wanders onto land. Specimens can be found aestivating during the dry season, in underground burrows where they can stay buried for up to two years. It is a territorial species and highly aggressive towards individuals of the same species or other species.

It feeds mainly on crustaceans such as cinnamon river prawns (*Procambarus sp.*), and supplements its diet with various aquatic insects and larvae (Reynoso et al., 2016; Legler and Vogt, 2013). Plants represent a very small proportion of its diet (Vogt, 1997); fragments of juveniles of another turtle species (*Trachemys venusta*) have been reported in faeces (Vásquez-Cruz y Reynoso-Martínez, 2020). In captivity, the species can be fed shrimps, worms, snails, aquatic insects, amphibians, fish, trout pellets, and occasionally meat or viscera (González-Porter, pers. com.).

The breeding season of the narrow-bridged musk turtle occurs between July and November, but may vary depending on the start of the rainy season (Espejel, 2004). Males reach sexual maturity at a carapace length (CL) of approximately 95–98 mm, and females at a CL of 89–100 mm, according to a census carried out by Espejel (2004) at El Jobo, Municipality of Alvarado, Veracruz. In captivity, breeding has been observed at four or five years of age (Reynoso, pers. com.). Females are pregnant during the nesting period between November and February. They deposit and bury their eggs on land, laying two to three clutches, each containing between one and six eggs (average clutch size: 2.5 eggs), (Espejel, 2004; Flores-Villela and Zug, 1995; Legler and Vogt 2013). The duration of natural incubation is unknown; in laboratory conditions, at different temperatures, average incubation time is 150–195 days (Hausmann, 1968; Flores-Villela and Zug 1995), although Reynoso et al. (pers. com.) reported a range of 90–230 days (due to diapause). Eggs are deposited at the edge of water bodies (beaches, sand, loose earth) during the rainy season (November to February). Sex is determined by sexual chromosomes (Vogt y Flores-Villela, 1992), and is not temperature-dependent, unlike other turtle species (Bickham and Carr, 1983).

3.4 Morphological characteristics

C. angustatus has an oval-shaped carapace with three, relatively weak, longitudinal keels. Average straight carapace length (CL) is 116 mm in males, and 106 mm in females (Legler and Vogt, 2013); average weight is 600 g and 350 g, respectively, for males and females. Reynoso et al. (2016) reported individuals throughout the area of distribution with a straight carapace length between 77 mm and 153 mm (average 116 mm) in males, and between 75 mm and 130 mm (average 105 mm) in females; males weighed between 79 g and 490 g (average weight 259 g); and females between 80 g and 430 g (average weight 195 g).

The plastron bridge is narrower than in other Kinosternidae. Unlike species of the genus *Kinosternon*, the plastron is hingeless, very small and cruciform, with an extremely narrow bridge, and is connected to the carapace by a ligament. Due to the reduced plastron, the gular, axillary, inguinal and humeral, scutes are absent. The plastron and bridge are yellow, but the juvenile plastron has a dark median blotch extending outward along the seams (Legler and Vogt, 2013; **Annex II, Figure 1a**). The head is a yellowish-brown colour, and is large, with a projecting snout and sharply-hooked upper jaw, with a pair of cusps in the lower margin (just below the eye, a unique feature of this species). The lower jaw has a medial hook. The neck has several tubercules, and is grey with dark mottlings. Limbs are greyish-brown, with webbed feet (Vogt, 1997). Males have a large head in proportion to their body, and large, thick tails. There is a patch of tuberculate scales on the hind legs of males, acting as stridulatory organs.

Figure 2. *Claudius angustatus* (Gracia González-Porter)

3.5 Role of the species in its ecosystem

Claudius angustatus has been reported to feed on other turtle species (e.g., *Trachemys venusta*; Vásquez-Cruz and Reynoso-Martínez, 2020). The species may scavenge on dead fish, thereby contributing to cleaning water bodies (Reyes-Grajales, pers. obs.). Apart from the fact that it predates on invertebrates, not much more is known about its role in ecosystems. Eggs of *C. angustatus* and other young turtles are prey for raccoons (*Procyon lotor*) and Morelet's crocodiles (*Crocodylus moreletii*; Legler y Vogt, 2013); during the dry season, crested caracaras (*Caracara cheriway*) feed on turtles

coming out of aestivation in the pastures, and turtles that have been accidentally burned by farmers during agricultural burning to clear crop fields (Canek Rivera, pers. obs.).

4. State and trends

4.1 Habitat trends

A large part of the habitat has been modified by land use change for agriculture, and by the spread of urban areas. The extent of the shrublands, pastures and wetlands (*popales* and *tulares*) that are the main habitat for these turtles has diminished as a result of agricultural modification. Based on vegetation layers and land use (INEGI, Series VI 2016), Reynoso et al. (2016) estimated that approximately 52,671 km^2 in Mexico, representing 71 % of the species' potential range in the country, have been modified by agricultural activities, and, to a lesser extent, by the spread of urban zones (**Annex I, Figure 1**). Habitat trend is unfavourable due to the continuous fragmentation and reduction of the area. (Reynoso et al., 2021).

4.2 Population size

Population size and density of the species throughout its range are unknown. However, densities observed in certain locations in the south-east of the country were relatively low, as were the expected abundances per site. In a survey made between 2012 and 2014 (Reynoso et al. 2016), varying abundances were found at 37 harvesting sites in the states of Veracruz, Tabasco, Oaxaca, Chiapas, and Campeche, ranging from 0.0016 turtles/m^2 (16 individuals/ha) to 0.0002 turtles/m^2 (2 individuals/ha), with 17 sites where no offtake occurred.

4.3 Population structure

Turtle populations are structured by carapace length (CL) rather than by age or reproductive status. In the survey carried out by Reynoso et al. (2016) at different locations in the south-east of the country, carapace sizes (CL) observed for 147 individuals ranged from 43 mm to 153.3 mm (average: 107.53 mm). Weight ranged from 64 g to 259.2 g (average: 217.29 g); 56 % of total specimens were females, 41 % males, and only 3 % juveniles. Some surveys of the species found a greater abundance of males, with ratios ranging from 2.5 males per female (2.5:1; Flores-Villela and Zug, 1995) in Lerdo de Tejada, Veracruz, to 1.07:1 in Alvarado, Veracruz (Espejel, 2004). In a widely-distributed study, Reynoso et al. (2016), reported a greater abundance of females, with a male-to-female ratio of 1:1.36.

4.4 Population trends

The population trend is difficult to assess on the basis of existing density and abundance estimates for the species, given that the information was not obtained from the same sampling sites as other surveys, making comparisons impossible (Reynoso et al., 2016). Nonetheless, according to Vogt (1997), offtake of turtles from the wild has significantly diminished populations in the regions of Coatzacoalcos and Minatitlan in Veracruz, and Villahermosa in Tabasco. Similarly, Reynoso et al. (2016) reported that, based on observations made during field work, and an analysis of the perceptions of fishermen and people from the communities where the species occurs, there are fewer sightings and captures for consumption. Not even wild specimens were found in the municipality of Boca del Río, and only two turtles were found, in captivity, in the vicinity of Laguna Real. At the Hondo River (forming the border between Mexico and Belize), according to interviews with fishermen, this formerly common species is now rare, and although consumption has dropped, thanks to the presence of border controls, turtles are harvested and widely consumed in Belize (Calderón-Mandujano, pers. com.).

4.5 Geographic trends

The projected potential distribution of *C. angustatus* in Mexico covers an area of approximately 73,732.46 km^2. Based on vegetation layers and land use between 1997 and 2016, it was estimated that 72 % of the original area had been modified by land use changes (INEGI series 1997, 2009, 2016; [**Annex I, Figure 1**]); nonetheless, the area has remained relatively constant since 2009 (Reynoso et al., 2016).

5. Threats

According to Reynoso et al. (2016, 2021), the main threats to populations of *C. angustatus* are illegal harvesting for meat consumption, and harvesting for the pet trade. With regard to the latter, it was not possible to determine the number of specimens harvested for international trade. However, seizures of specimens intended for international trade have increased recently, and this indicates the need for urgent measures to control this trade (see **Section 6.4**). Large quantities of individuals are harvested, particularly at the start and end of the rainy season when waters are shallow and the turtles are easily captured; the end of the aestivation period at the end of the dry season is a particularly critical time.

Reynoso et al. (2016, 2021) further reported that the second most important threat is habitat loss resulting from land use changes for agriculture, livestock farming, and urban development. Habit modification leads to a loss of appropriate sites for turtle populations to settle. At the same time, there are risks associated with agricultural activities that take place mainly during the dry season when turtles are aestivating: agricultural burning (to "revitalize" fields) causes the death of turtles burrowing in pastures; the use of tractors to plough the land causes mutilations; and the use of nitrogenous fertilizers in the fields poisons turtles.

As well as reducing the turtles' original habitat, urban growth also brings the building of roads and motorways, which are a further threat to turtles and to most of the nearby fauna, and the infilling of marshlands for other uses. Turtle road kill (Reynoso et al. 2016), pollution of water bodies by sugar mills, pesticide and petrochemical plants, among others, are also significant threats to the species (González-Porter, pers. com.).

6. Utilization and trade

6.1 National utilization

In Mexico, catching turtles is a deeply-rooted activity among fishermen, as is the consumption of turtle meat among local communities (Reynoso et al., 2016), dating back to pre-Hispanic times (Orenstein, 2012). For example, in the region of Lerdo de Tejada in Veracruz, it is estimated that between 4,000 and 5,000 narrow-bridged musk turtles are harvested each year for human consumption (Espejel, 2004).

The sale of turtle meat is an important source of income for fishermen and local communities where the species occurs (Reynoso et al., 2016). The shell is used medicinally to cure respiratory diseases, and eggs are used as aphrodisiacs (Morales-Mavíl et al., 2010; Vogt, 1997). Legal and illegal trade of specimens for the pet trade has become more intense over the past years (Reynoso et al., 2021).

6.2 Legal trade

Domestic trade: legal use and trade of the species are implemented through Wildlife Management Units (referred to by their Spanish acronym UMA) or Premises and facilities that manage wildlife in confined form (referred to by their Spanish acronym PIMVS; see **paragraph 7.1.**), and trade in the species is only authorized for captive-bred specimens. According to the information at DGVS-SEMARNAT (2020), there are five UMA/PIMVS registered to manage and use *C. angustatus*, mainly for broodstock and for sale as pets; there are also registrations for the sale of meat, bone, skin, and in some cases, for taxidermy. However, the majority of authorizations granted in the past few years have been for the export of live specimens (Reynoso et al. 2016, 2021).

From 2013 to 2019, DGVS-SEMARNAT authorized the use of 11,218 captive-bred specimens of *Claudius angustatus*; the highest number was authorized in 2018 (i.e., 4,841; **Annex IV, Figure1**); all specimens authorized between 2015 and 2019 were for commercial purposes (live specimens), for export. A comparison of the number of specimens before and after 2015 shows a considerable increase, shifting from hundreds to thousands (Reynoso et al. 2021).

International: *Claudius angustatus* is a highly-demanded species in trade, mainly for export to countries in Asia, particularly China (Reynoso et al. 2021). *C. angustatus* has been sold on the Asian market since the year 2000, mainly in Hong Kong SAR of China, Shenzhen, and Guangzhou (Cheung and Dudgeon, 2006). It is a much sought-after species in international trade, not only for the pet trade, but also for its meat and attributed medicinal properties (Reynoso et al., 2021). International trade of this turtle consists of whole, live specimens that are sold at prices ranging from $200 (hatchling or juvenile) to almost $3,000 (large adult; **Table 3, Annex IV**). Demand seems to have increased in recent years (Reynoso et al., 2021).

In the period 2005–2019, authorization was granted for the export of 11,846 live specimens of *C. angustatus* (see **Section 8.4**). Consultations with the Federal Attorney for Environmental Protection (PROFEPA), who is responsible for supervising law enforcement and the verification of permits and documents for the trade and export of the species, showed similar results for the same period 2009–2020, i.e., 10,655 specimens (**Annex IV, Figure2)**. Importing countries during the period 2013–2020 included mainland China (62 % of total), Hong Kong SAR of China (21 %), United States of America (8 %), and other countries such as Japan, Korea, Italy, and Spain (**Annex IV, Table 1**; **Annex IV, Figure 3**); 9,412 of these specimens were reported as originating from Mexico, and 1,243 as re-exports from the United States of America (with no reference to the origin of the specimens, **Annex IV, Table 1**).

Other countries for which trade was registered were also consulted: the United States of America exported 730 specimens and imported 296 individuals in the period 2003–2015, and in the period 2015–2019, there is a record of the import of 2,540 specimens of *C. angustatus* of Mexican origin, of which, 1,117 were wild-sourced; all transactions were reported as for commercial purposes (U.S. Fish and Wildlife Service: USFWS). The species is also much in demand in European trade, with current prices (October 2020) ranging from €250 to €500 for an adult specimen (Evert Henningheim pers. com. – Reynoso).

6.3 Parts and products in trade

In legal trade, *C. angustatus* is usually traded as live specimens for the pet trade, and as meat for consumption. Meat is traded less frequently due to the length of time it takes for a specimen to grow and fatten, making it less profitable. In the illegal domestic trade, mainly turtle meat is sold, and a dish made with turtle meat can cost between 600 and 800 pesos ($28–$38) (Reynoso et al. 2016). The majority of specimens sold for meat are wild-sourced. In the case of the illegal international market, live specimens are sought after for the pet trade, and, to some extent, for meat and for their so-called medicinal properties (Reynoso et al., 2021).

6.4 Illegal trade

Domestic: Trade in these turtles is a common practice at a regional level and, to a large extent, illegal. According to the information from DGVS-SEMARNAT, no authorizations have been given for harvesting specimens from a free-range management system; nonetheless, Reynoso et al. (2021) claim that it is possible that specimens are being taken illegally from the wild and mixed with harvested captive-bred specimens.

International: In the period 2010–2021, PROFEPA reported the seizure/confiscation of 7,434 narrow-bridged musk turtles (**Annex IV, Table 3**). The majority of turtles seized over the past ten years were obtained from two incidents that took place in 2020: one, at the cargo zone in the International Airport in Mexico City, where a shipment of 15,000 turtles intended for China was seized because no export permit had been submitted (4,216 specimens were identified as *C. angustatus;* PROFEPA, 2020); and the other, at a warehouse for the distribution and sale of the species. There are some discrepancies regarding the number of specimens registered in international trade, as was seen from consultations with other countries of trade interest: United States registered a total of 2,540 specimens of *C. angustatus* between 2015 and 2019, almost half of which were wild-sourced (see **Section 6.2**), while, for the same period, PROFEPA registered a total of 734 specimens showing the destination as the United States of America. It is possible that some of the specimens leaving the country go undetected by national authorities or are not reported to Mexico by the authorities in the destination countries.

It would seem that *C. angustatus* is one of the most highly-traded Mexican species, along with *Terrapene yucatana, T. mexicana, S. triporcatus*, and *S. salvinii*. According to Reynoso et al. (2021), and Evert Henningheim (pers. com.), the majority of specimens for sale in Asia seem to be wild-sourced and, therefore, illegally traded. A large part of the sales of *C. angustatus* is made on social media such as Facebook or the Terraristik website, which is the main reptile trading platform in Europe. The harvesting of free-ranging turtles documented as captive-bred specimens is one of the major challenges in the international trade of this species (Reynoso et al. 2016, 2021).

Internet trade**:** A general internet search for trade of *C. angustatus* (Reynoso et al, 2021; October 2020) returned 28 results on eight websites (webpages or forums) advertising these turtles for sale. On most of these websites, there was no mention of permits, and only a few stated that the turtles were captive-bred. Practically all of these websites were in the United States of America; prices varied between $200 and $695 for a hatchling or juvenile, and between $600 and $2,459 for a large-sized adult. In the European trade, prices ranged from €600 to €900 for a large adult (**Table 4, Annex IV**). Compared to

other turtles such as *S. triporcatus*, *C. angustatus* is slightly less commercially available, and is sold at much higher prices.

6.5 Actual or potential trade impacts

The potential impact of trade on the species is a decline in wild populations due to increasingly intensive and more large-scale harvesting (both for commercial purposes and for export). The risk of population decline due to harvesting is closely linked to the gradual loss and modification of the species' habitat. Thus, added to its population decline, there are also fewer areas for the species to settle and breed. The number of harvesting and export permits has increased significantly (**Annex IV, Table 2**), and, as a result, this demand in trade means a higher incidence of illegal trade.

7. Legal instruments

7.1 National

The main legal instruments in Mexico regulating the use and conservation of wildlife, their habitats and ecosystems are the General Law on Ecological Equilibrium and Environmental Protection (LGEEPA; SEDUE 1988), the General Law on Wildlife (LGVS; SEMARNAT 2000) and its regulations (SEMARNAT 2006), and likewise, the NOM-059-SEMARNAT-2010 Mexican list of endangered species (DOF, 2019), Environmental Protection – Native Mexican wild flora and fauna – Risk categories and specifications for inclusion, exclusion, or change.

The General Wildlife Law establishes the criteria for the types of use and harvesting of wildlife. The species is classified in the list of endangered species as "At risk of extinction". Accordingly, it may be harvested under very specific circumstances (Art. 84 and 85 of the General Law on Wildlife). Further, it may only be harvested through a Wildlife Management Unit (UMA) or Premises and facilities that manage wildlife in confined form (PIMVS), based on a Management Plan approved by the authorities that outlines the actions to be implemented for species of interest. The General Directorate of Wildlife (DGVS-SEMARNAT) will authorize the harvesting of specimens, provided that the Wildlife Management Units (UMA) or Premises and facilities that manage wildlife in confined form (PIMVS) meet the requirements provided by any applicable legislation for harvesting of the species (free-ranging and in captivity).

Similarly, the Mexican Federal Criminal Code, Article 420, imposes penalties on any person who fails to comply with the provisions of the General Wildlife Law, including any irregularities regarding the legal origin and traceability of specimens, or in the use of supporting documents.

"Article 420.- A penalty of one to nine years imprisonment, and a fine equivalent to three hundred to three thousand days, shall be imposed upon any person who illegally...

IV. Carries out any activity for the purpose of trafficking, or captures, possesses, transports, collects, introduces or takes out of the country, any specimen, product or subproduct thereof, and any other genetic resources of species of prohibited terrestrial or aquatic wildlife that is considered endemic, threatened, at risk of extinction, subject to special protection or regulated by an international treaty to which Mexico is a Party, or

V. Harms a specimen of the species of the aforementioned terrestrial or aquatic wildlife.

An additional penalty will apply of up to three more years imprisonment and an additional fine of up to one thousand more days, when the activities described in this article take place in, or affect, a natural protected area, or when such activities are engaged in for commercial purposes.

Article 420 quater. A penalty of one to four years imprisonment and a fine equivalent to three hundred to three thousand days shall be imposed upon any person who:

II. Enters false data in records, log books, or any other document, with the intent to simulate compliance with any obligations under Federal environmental laws and regulations;".

7.2 International

Claudius angustatus is listed in the IUCN Red List as “low risk/near threatened” LR/NT (Tortoise y Freshwater Turtle Specialist Group, last assessment 1996). In view of the time that has passed since the last assessment, and current threats, the species should be re-assessed (Reynoso et al., 2021). The species is categorized as “Endangered” in the list of threatened species in Guatemala (LEA CONAP).

8. Species management

8.1 Management measures

Activities related to the breeding, protection, sustainable use, recruitment, reintroduction, among others (as defined in the General Law on Wildlife) of *Claudius angustatus* may be carried out through Wildlife Management Units or Premises and facilities that manage wildlife in confined form (PIMVS), or at their request, provided such activities have been approved by SEMARNAT in a management plan (see **Section 7.1**).

8.2 Species monitoring

There is no type of programme in place to monitor the wild populations of *Claudius angustatus*. Genetic mapping is currently underway in order to enable relocation of seized wild-sourced specimens (C. Rivera and V. H. Reynoso, in process).

8.3 Control measures

8.3.1 International

8.3.2 Domestic

Border control is based on the recognition of administrative acts (permits and authorizations) issued by DGVS-SEMARNAT in its capacity as the authority for establishing non-tariff regulations and restrictions on cross-border movements of wildlife specimens (in cooperation with the Secretariat of Economy) and on the verification of such specimens by the enforcement authority (PROFEPA) at the authorized entry and exit points for goods and people to and from national territory, for commercial or other purposes. In the latter case, once compliance with non-tariff regulations and restrictions has been verified, and the authorization or permit issued by DGVS-SEMARNAT has been validated by PROFEPA, the customs authority will authorize customs dispatch for the formal import or export of goods (Customs Act, Article 36A). Health measures are established at the request of the foreign trade agent and in accordance with the requirements of the destination country, prior to shipment of the specimens, and will be verified by health authorities in the destination country on import.

8.4 Captive breeding and artificial propagation

Captive breeding and maintenance of the species is difficult, mainly because of dietary limitations, given that its diet consists mainly of freshwater crayfish of the genus *Procambarus* sp., which are not cultured as yet. The species has a high mortality rate and a low reproductive rate in captivity. Even so, captive breeding is carried out successfully, at a national level, at some of the Wildlife Management Units, and by some hobbyists in Europe (Pauler, 1981; Ledig, 1988; Scholtz, 1990; Grychta and Grychta, 1994; Llebaria, 2012; Klawonn, 2018).

8.5 Habitat conservation

Predictive distribution models indicate that there are seven natural protected areas in Mexico within the area of distribution of *C. angustatus*: the Alvarado lagoon system, Los Tuxtlas Biosphere Reserve, Popotera lagoon wetlands, Arroyo Moreno area, Centla swamps, Catazaja lagoon system and Terminos lagoon (Reynoso et al. 2016). The potential area of distribution in Mexico that lies within these natural protected areas is 2,045 km^2, equivalent to 2.7% of the total estimated distribution of the species in Mexico (**Figure 1**). Ramírez et al. (2015) reported the occurrence of *C. angustatus* at La Lacandona, even though existing models (Reynoso et al. 2016) show that its distribution at Montes Azules Reserve is probably marginal.

8.6 Safeguards

9. Information on similar species

Claudius angustatus is a monotypic species that is easily identified. It is the smallest species of the subfamily Staurotypinidae, and its morphological features make it difficult to confuse with other species. The species is distinguished by its large head, in proportion to its shell, and by an extremely narrow plastron bridge. Adults of *C. angustatus* are sometimes confused with juveniles of the genus *Staurotypus;* however, carapacial keels are less distinct in *C. angustatus.* Posterior marginal scutes not serrated, and carapacial scutes may be roughened due to growth annuli and radiations. The carapace is dark brown or yellowish-brown, with dark seams. Young turtles may exhibit dark radial patterns (**ANNEX II, Figure 1**).

Genetic barcodes for *C. angustatus* and *Staurotypus* spp. have already been identified and might help in the identification of specimens when the species cannot be identified (e.g., meat, pieces of shell, or bone fragments, etc.). Annex III includes the proposed barcode (sequencing) for genetic identification of *Claudius angustatus* (Reynoso et al., 2016, 2021).

10. Consultations

Range States (Guatemala and Belize) were consulted on 29 March 2022. At the time of writing, no replies had been received.

The IUCN Tortoise and Freshwater Turtle Specialist Group was consulted in February 2021, and expressed its support for Mexico's proposal to include *Claudius angustatus* in CITES Appendix II.

11. Additional remarks

12. References

Bickham J. W. y J. L. Carr 1983. Taxonomy and phylogeny of the higher categories of Cryptodiran turtles based on a cladistic analysis of chromosomal data. Copeia, 1983(4): 918- 932.

Calderón Mandujano R., J. R. Cedeño-Vázquez, C. Pozo. 2001. *Claudius angustatus*. Geographic distribution. Herp. Rev. 32(3):191

Cheung, S. M., y Dudgeon, D. (2006). Quantifying the Asian turtle crisis: market surveys in southern China. 2000 – 2003. *Aquatic Conserv:* Mar*. Freshw. Ecosyst.*, *16*, 751–770. https://doi.org/10.1002/aqc

Diario Oficial de la Federación (DOF). 31/10/2014. Reglamento de la Ley General del Equilibrio Ecológico y la Protección al Ambiente en Materia de Evaluación del Impacto Ambiental.

Diario Oficial de la Federación (DOF). 14/11/2019. MODIFICACIÓN del Anexo Normativo III, Lista de especies en riesgo de la Norma Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo, publicada el 30 de diciembre de 2010.

Diario Oficial de la Federación (DOF). 19/02/2021. Código Penal Federal. Nuevo Código Publicado en el Diario Oficial de la Federación el 14 de agosto de 1931. Texto vigente.

Ennen, J. R., M. Agha, S. C. Sweat, W. A. Matamoros, J. E. Lovich, A. G. J. Rhodin, J. B. Iverson, C. W. Hoagstrom. 2020 Turtle biogeography Global regionalization and conservation priorities. Biological Conservation 241 (2020) 108323.

Espejel, G. V. E. 2004. Aspectos biológicos del manejo del chopontil, *Claudius angustatus,* (Testudines: Staurotypidae*)*. Tesis de Maestría, Instituto de Ecología, A. C., 61 págs.

Flores-Villela, O. A. y G. R. Zug. 1995. Reproductive biology of the chopontil, *Claudius angustatus* (Testudines: Kinosternidae), in southern Veracruz, México. Chelonian Conservation and Biology, 1 (3): 181-186.

Fritz, U, y Havas, P. 2007. Checklist of Chelonians of the World. Vertebrate Zoology. 57(2). Museum für Tirkunde Dresden.

Gene Bank. https://www.ncbi.nlm.nih.gov/genbank/ (Consultado en octubre, 2020).

Grychta, U., y R Grychta. 1994. Haltung, Paarungsverhalten, Eianlage und Nachzucht der Grosskopf-Schlammschildkröte *Claudius angustatus* Cope, 1865. Sauria, 16(4), 11–14.

Hausmann, P. 1968. *Claudius angustatus*. International Turtle and Tortoise Society Journal, 2(3): 14-15.

INE – INEGI. 1997. Uso del suelo y vegetación, escala 1:250000, serie I (continuo nacional)', escala: 1:250000. Instituto Nacional de Ecología - Dirección de Ordenamiento Ecológico General e Instituto Nacional de Estadística, Geografía e Informática. Digitalización de las cartas de uso del suelo y vegetación elaboradas por INEGI entre los años 1980-1991 con base en fotografías aéreas de 1968-1986. México, D. F. México, D. F.

INEGI. 2016. Conjunto de Datos Vectoriales de Uso de Suelo y Vegetación. Escala 1:250 000. Serie VI (Capa Unión)', escala: 1:250 000. edición: 1. Instituto Nacional de Estadística y Geografía. Aguascalientes, México.

Klawonn, O. 2018. *Claudius angustatus* – Manageable Monsters. Radiata, 27(1), 37–54.

Ledig, J. 1988. Haltung und Zucht von Claudius *angustatus*. Elaphe, 10(2), 6.

Legler, J. M. y R. C. Vogt. 2013. The turtles of Mexico, Land and Freshwater forms. California, University of California Press. Págs. 77-181.

Llebaria, J. 2012. Experiencias en el mantenimiento de *Claudius angustatus* y *Staurotypus salvinii*. Quelonios, 1–5.

Morales-Mavíl, J., Suárez-Castillo, S., Guerra-Roa, M., Calmé, S., Gallina-Tessaro, S., Naranjo, E. 2010. Conocimiento y uso de tortugas de agua dulce por pescadores y lancheros de Sontecomapan, Veracruz, México. En: Uso y Manejo de la Fauna Silvestre en el norte de Mesoamérica. Secretaria de Educación, Instituto de Ecología, AC, ECOSUR, México, 193-261.

Orenstein, R. I. 2012. *Turtles, Tortoises and Terrapins: A Natural History* (2nd ed.). Toronto: Firefly Books.

Pauler, I. 1981. Zur Pflege und Zucht von *Claudius angustatus*. Herpetofauna, 13, 6–8.

PROFEPA, 2020. (https://www.gob.mx/profepa/prensa/profepa-asegura-precautoriamente-mas-de-15-mil-tortugas-que-pretendian-exportarse-de-manera-ilegal-a-china?idiom=es)

Ramírez, A., R. León-Pérez y D. Noriega. 2015. Apéndice 4, Lista de especies de herpetofauna registradas en la zona. En, Conservación y desarrollo sustentable en la Selva Lacandona, Carabias, J., J. de la Maza y R. Cadena (coords.), Natura y Ecosistemas Mexicanos. México, D. F.

Reynoso, V. H., Vázquez Cruz, M. L., Rivera Arroyo R. C. 2016. Estado de conservación, uso, gestión, comercio y cumplimiento de los criterios de inclusión a los Apéndices de la CITES para las especies *Claudius angustatus* y *Staurotypus triporcatus*. Universidad Nacional Autónoma de México. Instituto de Biología. Informe final SNIB-CONABIO, proyecto No. MM009. Ciudad de México. 144 p. http://www.conabio.gob.mx/institucion/proyectos/resultados/InfMM009.pdf

Reynoso, V. H. y Vázquez Cruz, M. L., 2021. "Elaboración de una propuesta de enmienda a los Apéndices de la CITES para incluir a *Claudius angustatus* y *Staurotypus triporcatus*, con base en los criterios establecidos en la Resolución Conf.9.24 (Rev.CoP17) de la CITES y en el Método de Evaluación de Riesgo de la NOM-059-SEMARNAT-2010". Universidad Nacional Autónoma de México. Instituto de Biología. Informe final SNIB-CONABIO, proyecto No. SE002. Ciudad de México. *http://www.conabio.gob.mx/institucion/proyectos/resultados/InfSE002_2021.pdf*

Scholtz, G. 1990. Die Haltung und Nachzucht der Grosskopf-Schlammschildkröte *Claudius angustatus* Cope 1865. Sauria, 12(4), 7–9.

SEDUE. Secretaría de Desarrollo Urbano y Ecología. 1988. Ley General de Equilibrio Ecológico y la Protección al Ambiente. Publicada el 28 de enero de 1988 en el Diario Oficial de la Federación. Última reforma publicada el 9 de enero de 2015.

SEMARNAT. Secretaría del Medio Ambiente y Recursos Naturales. 2000. Ley General de Vida Silvestre. Publicada el 3 de julio de 2000 en el Diario Oficial de la Federación. Última reforma publicada el 19 de diciembre de 2016.

SEMARNAT. Secretaría del Medio Ambiente y Recursos Naturales. 2010a. Norma Oficial Mexicana NOM-059-SEMARNAT-2010. Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo. Publicada el 30 de diciembre de 2010 en el Diario Oficial de la Federación.

Vásquez-Cruz V. y A. Reynoso-Martínez. 2020. Contributions to the knowledge of the natural history of *Claudius angustatus* (Testudines: Kinosternidae) in Veracruz, Mexico. Phyllomedusa, 19 (1): 113–116.

Vogt, R. C. 1997. *Claudius angustatus*. Pp. 480-481, en, E. González, R. Dirzo, y R. C. Vogt (eds.), Historia Natural de los Tuxtlas, Instituto de Biología, UNAM.

Vogt, R. C. y O. Flores-Villela. 1992. Effects of incubation temperature on sex determination in a community of neotropical freshwater turtles in southern Mexico. Herpetologica, 48(3): 265-270

ANEXO I / ANNEX I

(English and Spanish only / seulement en anglais et espagnol / únicamente en inglés y español)

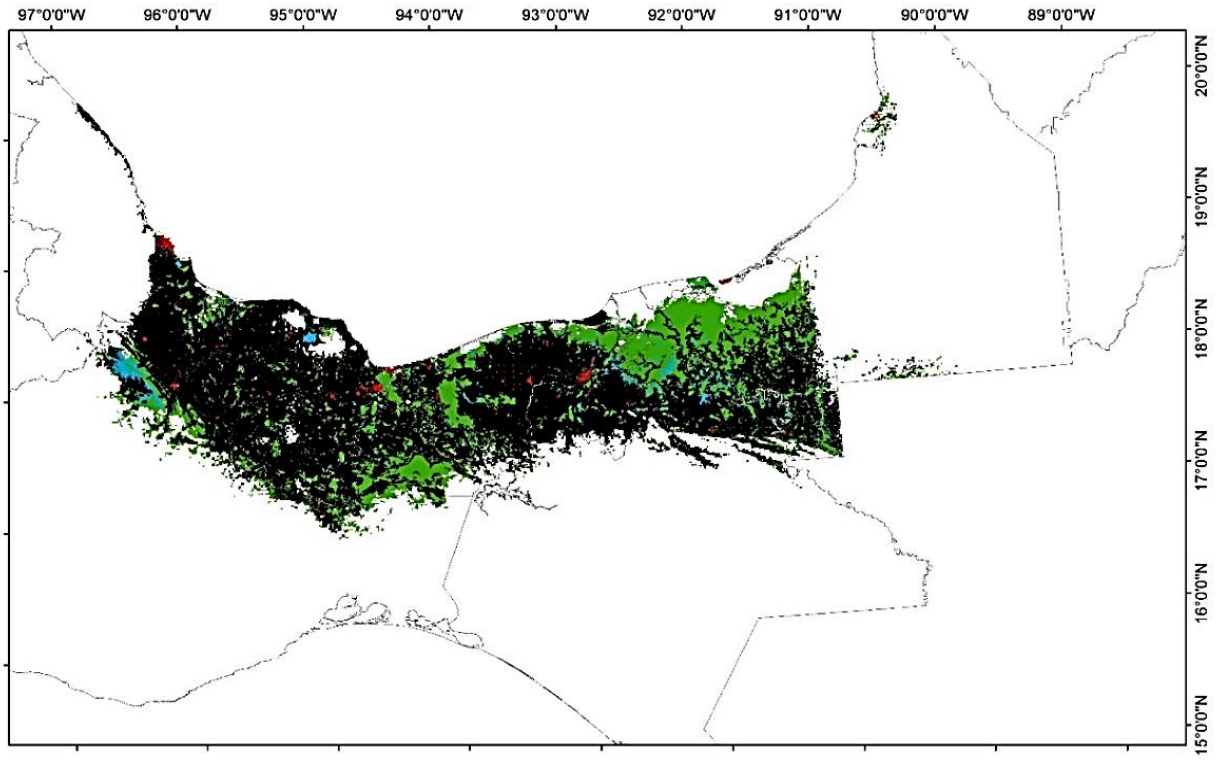

Figura 1. Mapa del cambio de uso de suelo en la zona de distribución de *Claudius angustatus.* En negro se muestra el área modificada para uso agropecuario y en rojo las zonas urbanas.

Figure 1. Change in land use change within *Claudius angustats* potential distribution area. In black is shown modified land to agricultural and cattle activities; in red, urban areas.

ANEXO II / ANNEX II

(English and Spanish only / seulement en anglais et espagnol / únicamente en inglés y español)

CARACTERÍSTICAS DE *Claudius angustatus* Y COMPARACIÓN CON ESPECIES SIMILARES
***Claudius angustatus* - SPECIES CHARACTERISTICS AND COMPARISON BETWEEN SIMILAR SPECIES**

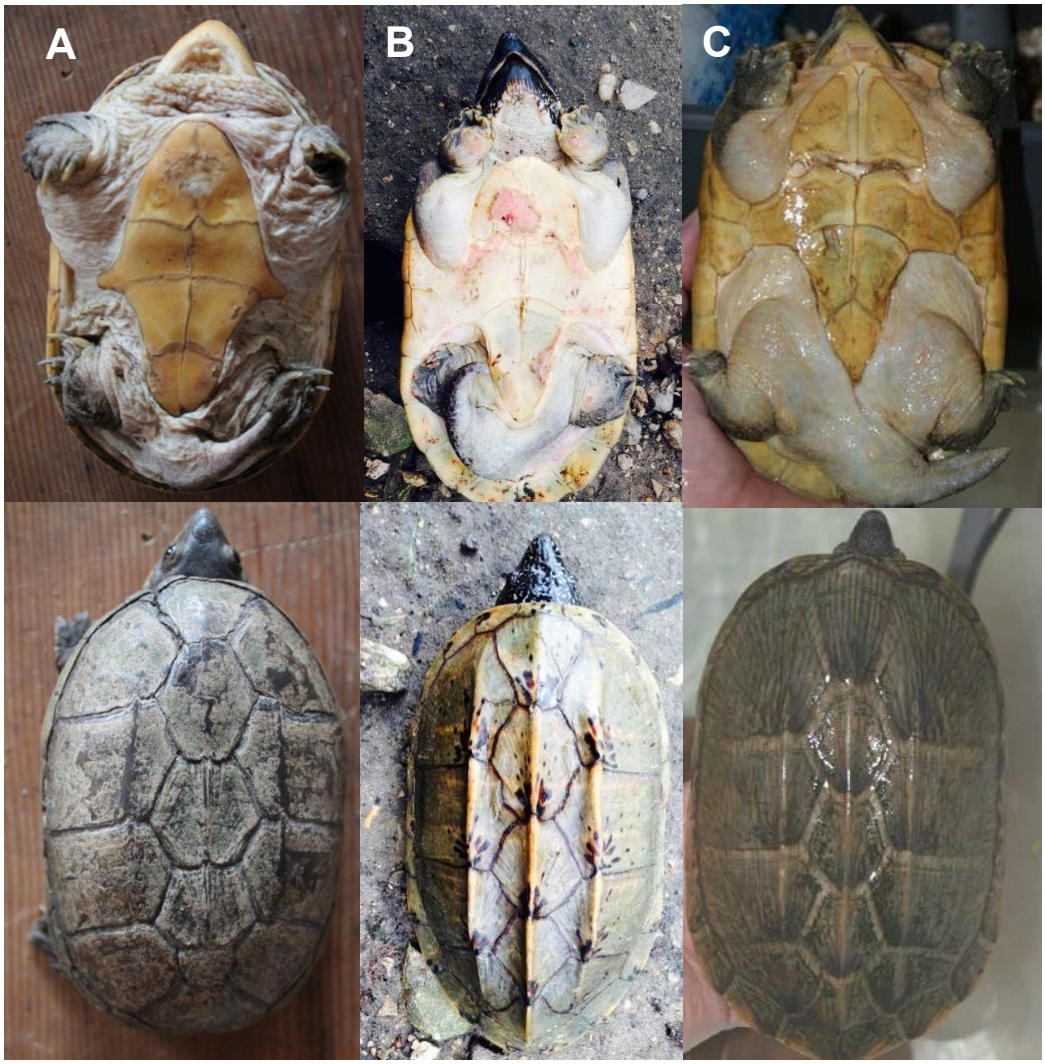

Figura 1. Vista ventral (arriba) y dorsal (abajo) de A) *Claudius angustatus*, B) *Staurotypus triporcatus* y C) *Staurotypus salvinii.*

Figure 1. Ventral view (above) and dorsal view (below) of A) *Claudius angustatus*, B) *Staurotypus triporcatus* and C) *Staurotypus salvinii.*

ANEXO III / ANNEX III

(English and Spanish only / seulement en anglais et espagnol / únicamente en inglés y español)

CÓDIGO DE BARRAS sugerido de *Claudius angustatus*.
SUGGESTED CODE BAR OF *Claudius angustatus*.

Genebank https://www.ncbi.nlm.nih.gov/genbank/

Claudius angustatus

LOCUS/ACCESSION HQ329706; Cytochrome Oxidase Subunit I (COI) gene, partial cds; DNA-mit, 650 bp.

ORIGEN

1 tatatctagt atttggggct tgagctggca taattggaac agcattaagc ttaataattc
61 gcacagaact aagccaacca ggaactattc taggggatga ccaaatttat aacgtagtcg
121 tgacagccca tgcttttgtc atgattttct ttatggttat acctattata attggtggtt
181 ttggaaactg acttgttcca ttaataattg gagcaccaga tatagcattt ccacgtataa
241 acaacataag cttctgacta ctacctccct ccctattgct tctattagca tcatctggga
301 ttgaagcagg cgcaggaaca ggatgaactg tctatcctcc cttagctagt aacctagccc
361 atgcaggagc ttctgtagat ctaactatct tctccctaca cctagctggt gcatcttcta
421 ttctaggggc aattaacttt attactacaa caatcaacat aaaatcccca gctatatcac
481 aatatcatac accattattt gtatgatccg tacttattac agccatttta cttcttctgt
541 cattacccgt acttgctgcg ggcattacta tactacttac agaccgaaac cttaacacaa
601 ccttttttga cccctctgga gggggagacc caatcttgta ccaacatcta

ANEXO IV / ANNEX IV
(English and Spanish only / seulement en anglais et espagnol / únicamente en inglés y español)

APROVECHAMIENTO, COMERCIO Y TRÁFICO
USE, LEGAL AND ILLEGAL TRADE

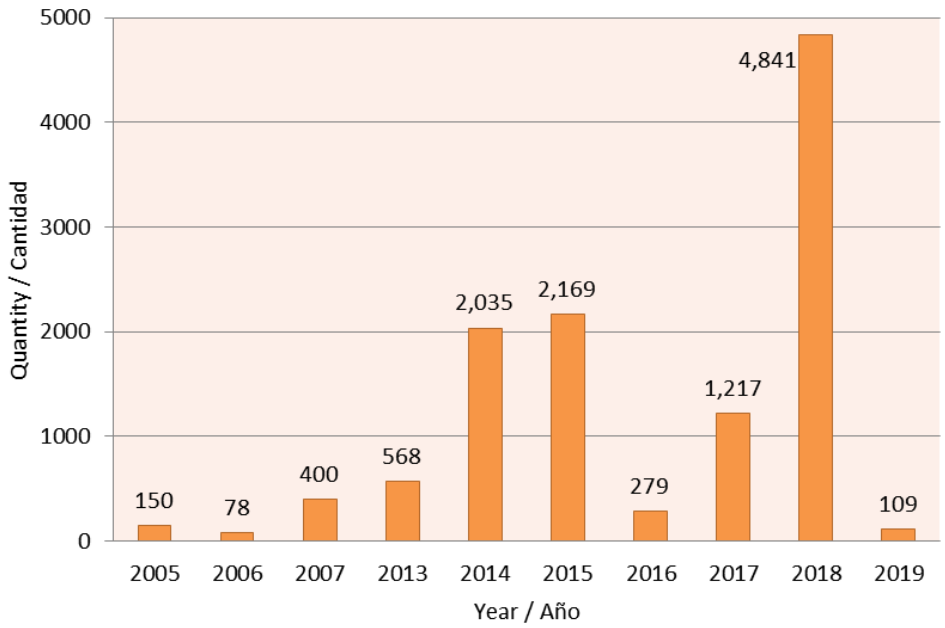

Figura 1. Número de ejemplares de *Claudius angustatus* autorizados para aprovechamiento de 2005 a 2019, solo de cría en cautiverio (datos DGVS). // **Figure 1.** Authorized specimens of *C. angustatus* for use, from 2005 to 2019. Only from captive breeding.

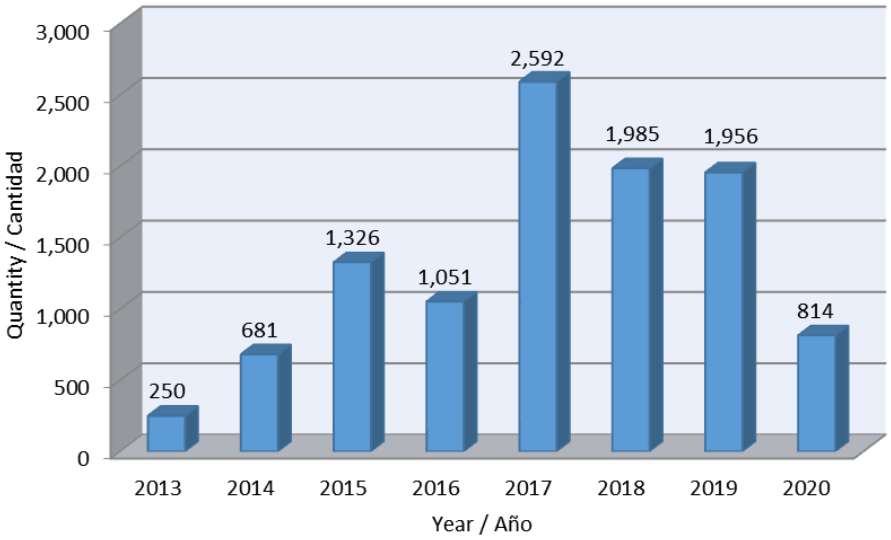

Figura 2. Número de ejemplares de *Claudius angustatus* registrados para exportación por la PROFEPA (2013-julio de 2020) // **Figure 2**. Registered specimens of *Claudius angustatus* for export, from 2013 to July 2020 (PROFEPA data).

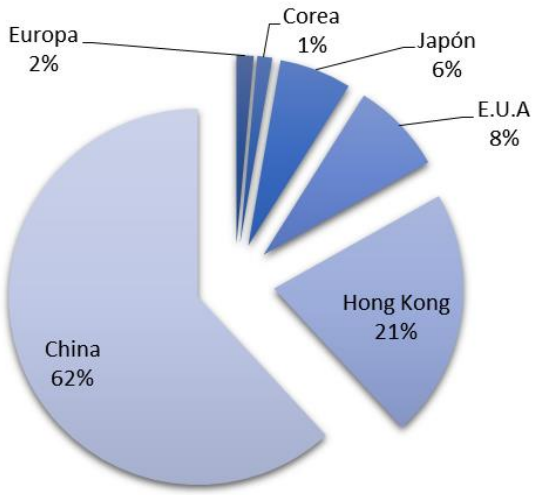

Figura 3. Países a los que se exportan individuos de *Claudius angustatus* y la proporción de ejemplares exportados en 7 años (2013 a 2020, datos PROFEPA) // **Figure 3**. Proportion of indivudals of *C. angustatus* exported from Mexico to other countries, between 2013-2020

Cuadro 1. Número de ejemplares de *Claudius angustatus* exportados de 2013 a 2020 y su país de destino (datos PROFEPA). // **Table 1**. Exported specimens of *C. angustatus*, 2013-2020 and their destination country (PROFEPA data).

País o región de destino/ Country or region of export	**Cantidad / Quantity**
Mainland China	6,587
Hong Kong SAR of China	2,227
E.U.A.	843
Japón	657
Corea	136
Italia	120
España	35
Total	**10,655**

Cuadro 2. Registro del número de ejemplares de *Claudius angustatus* aprovechados, exportados y asegurados ante la DGVS-SEMARNAT y PROFEPA, de 2015 a julio de 2020. // **Table 2**. *C. angustatus* specimens for use, export and seized, from 2015 to July 2020.

Año/ Year	**Aprovechamiento/ Exploitation**	**Exportación/ Export DGVS**	**Exportación/ Export PROFEPA**
2015	2,169	1,865	1,326
2016	279	1,648	1,051
2017	1,217	2,359	2,592
2018	4,841	1,459	1,985
2019	109	1,840	1,956
2020		1,200	814
Total	**8,615**	**10,371**	**9,724**

Cuadro 3. Registro del número de ejemplares de *Claudius angustatus* asegurados por la PROFEPA, de 2015 a 2021 // **Table 4**. *C. angustatus* specimens seized from 2015 to 2021.

Año / Year	**Entidad / Mexican State**	**Municipio / Locality**	**Cantidad asegurada / Assurance (individuals)**
2018	Yucatan	Mérida	2

2019	Distrito Federal	Tlalnepantla de Baz	1
2020	Distrito Federal	Naucalpan de Juárez	1
2020	Distrito Federal	La Paz	3071
2020	Distrito Federal	Venustiano Carranza	4216
2020	Distrito Federal	Venustiano Carranza	53
2021	Distrito Federal	Miguel Hidalgo	2
2021	Distrito Federal	Benito Juárez	1
Total			**7,347**

Tabla de datos proporcionada por la Subprocuraduría de Recursos Naturales –PROFEPA // Data provided by the Deputy Attorney for Natural Resources - PROFEPA

COMERCIO WEB / Web Trade

Cuadro 4. Comercio de *Claudius angustatus* a través de páginas y foros en internet. Se muestran los principales sitios web que comercializan a la tortuga, la mayoría de las publicaciones ofrecen varios ejemplares en venta. // **Table 4.** Web trade of *C. angustatus* – webpages and forums. Table shows the main websites where *C. angustatus* was found for sale; most of publications offers more than one turtle.

Página o foro web **Webpage or forum**	**Número de ofertas / publicaciones** **# offers or publications**	**Precios promedio por estadio o sexo** **Mean price for stage or sex**	**País de la publicación** **Country of publication**
Terraristik	13	€ 600 - € 900	Germany, Italy, Spain, Poland
Turtle source	6	Hatchling-Juvenil USD 695-895; Adult USD 995-2,495	USA
Monster fishkeepers	3	Hatchling-Juvenil USD 500, Female USD 700, Male USD 850	USA
Aquaimports	1	Adult USD 750	USA
Underground reptiles	1	Hatchling-Juvenil USD 200	USA
Fauna clasiffieds	2	Hatchling 450, Juvenil USD 650	USA
Morphmania reptiles	1	Hatchling USD 220	USA
Bonkay	1	MXN 1,498 pesos (USD 75)	Mexico

ANEXO V // ANNEX V

(English and Spanish only / seulement en anglais et espagnol / únicamente en inglés y español)

Relación de contribuyentes y revisores de la propuesta de inclusión de la tortuga *Claudius angustatus* al Apéndice II de la CITES.

List of contributors and reviewers of the CITES Appendix II inclusion proposal for *Claudius angustatus* turtle

Nombre	Institución
Redacción de la propuesta original	
Dr. Víctor Hugo Reynoso	Instituto de Biología, Universidad Nacional Autónoma de México, Coyoacán, CDMX
M.C. María de Lourdes Vázquez Cruz	
M.C. Canek Rivera Arroyo	
Insumos adicionales	
	Teyeliz A.C.
	Defenders of Wildlife México
Revisores de la propuesta	
	Autoridad Científica CITES de México / Comisión Nacional para el Conocimiento y Uso de la Biodiversidad
Dra. Gracia González Porter	Universidad Autónoma de Querétaro
Dr. Rodrigo Macip Ríos	Escuela Nacional de Estudios Superiores, Unidad Morelia. Universidad Nacional Autónoma de México
Biól. Eduardo Reyes Grajales	El Colegio de la Frontera Sur, San Cristóbal, Chiapas
M.C. Juana Margarita Garza Castro	Facultad de Ciencias, Universidad Nacional Autónoma de México, Coyoacán, CDMX
Dr. Guillermo Alfonso Woolrich Piña	Instituto Tecnológico Superior de Zacapoaxtla
Dr. Romel René Calderón Mandujano	El Colegio de la Frontera Sur (ECOSUR) / Universidad Autónoma de Chiapas -ISC
Participantes externos	
Evert Henningheim	IUCN Iguana Specialist Group, Trade