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

Eighteenth meeting of the Conference of the Parties
Colombo (Sri Lanka), 23 May – 3 June 2019

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

The inclusion of the genus *Ctenosaura* (18 species) in Appendix II of CITES in accordance with Article II, Paragraph 2a of the Text of the Convention, as well as Criterion A of Annexes 2a and 2b of the Resolution Conf. 9.24 (Rev. CoP17) as follows:

a) *C. bakeri, C. conspicuosa, C. nolascensis, C. oedirhina, C. alfredschmidti, C. clarki, C. defensor; C. flavidorsalis, C. oaxacana, C. praeocularis, C. quinquecarinata, C. melanosterna* and *C. palearis* in accordance with Criterion A of Annex 2a of Res. 9.24 (Rev. CoP17).

C. acanthura (Shaw, 1802); *C. hemilopha* (Cope, 1863); *C. macrolopha* Smith, 1972; *C. pectinata* (Wiegmann, 1834) and *C. similis*, (Gray, 1831) in accordance with Criterion A of Annex 2b, of Resolution Conf. 9.24 (Rev. CoP17).

B. Proponent

Mexico*:

C. Supporting statement

1. Taxonomy

Based on Resolution Conf. 12.11 (Rev. CoP17) subparagraph d) under the first "RECOMMENDS", and in consultation with the wildlife nomenclature specialist (Dr. Peter Paul Van Dijk), it is recommended that Iverson *et al*., (2016) should be used as a taxonomic reference for the genus.

1.1 Class: Sauropsida

1.2 Order: Squamata

1.3 Family: Iguanidae

1.4 Genus, species or subspecies, including author and year: *Ctenosaura* Wiegman 1828

Species

Ctenosaura acanthura (Shaw 1802), *C. alfredschmidti* Köhler 1995, *C. bakeri* Stejneger 1901, *C. conspicuosa* Dickerson 1919, *C. clarki* Bailey 1928, *C. defensor* (Cope 1866), *C. flavidorsalis* Köhler and Klemmer 1994, *C. hemilopha* (Cope 1863), *C. macrolopha* Smith 1972, *C. melanosterna* Buckley and Axtell 1997; *C. nolascensis* Smith 1972;, *C. oaxacana* Köhler and Hasbún 2001, *C. oedirhina* de

* *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.*

Queiroz 1987; *C. paleraris* Stejneger 1899; *C. pectinata* (Wiegmann 1834), *C. praeocularis* Hasbún and Köhler 2009; *C. quinquecarinata* (Gray 1842), *C. similis* (Gray 1830).

1.5 Scientific synonyms: (in **Annex I: Table 1)**

1.6 Common names:

Iguanas in the genus *Ctenosaura* are commonly known spiny-tailed iguanas in English (garrobos, iguanas negras and iguanas de cola espinosa in Spanish, and iguanes à queue épineuse in French) (see other common names in Annex I: Table 2).

1.7 Code numbers: *Ctenosaura bakeri* 5031; *Ctenosaura melanosterna* 11046; *Ctenosaura oedirhina* 8208; *Ctenosaura palearis* 10819

2. Overview

The genus *Ctenosaura* belongs to the family Iguanidae, which includes 18 species native to Mexico and Central America (ITWG 2011; Köhler 2008). At present, four species are included in Appendix II (CoP15 Doha, Qatar): *Ctenosaura palearis* (endemic to the Motagua Valley, Guatemala), *C. melanosterna* (endemic to the Río Aguán Valley and Cayos Cochinos, Honduras), *C. bakeri* (endemic to Útila Island, Honduras) and *C. oedirhina* (endemic to Roatán Island and Barbareta Island, Honduras).

Ctenosaura species are threatened by fragmentation, habitat loss, over-harvesting locally for their meat, and by illegal trade for the pet market (Stephen et al. 2012; Pasachnik et al. 2012, 2013, 2015; Faria et al. 2009; Köhler 2004 a-f). IUCN classifies 13 of the 18 *Ctenosaura* species in its Red List as follows: 2 Critically Endangered (*C. bakeri, C. oaxacana*); 5 Endangered (*C. flavidorsalis, C. melanosterna, C. oedirhina, C. palearis, C. quinquecarinata*); 3 Vulnerable (*C. clarki, C. defensor, C. nolascensis*); 1 Near Threatened (C. *alfredschmidti*); 1 Data Deficient (*C. praeocularis*) and 1 of Least Concern (*C. similis*) (Ariano-Sánchez et al. 2013, Hasbún et al. 2013, Pasachnik et al. 2012, 2013, 2015; Reynoso et al. 2012; Köhler 2004 a-f). Mexico classifies 7 of its species as: En Peligro [Endangered] (*C. defensor*); Amenazada [Threatened] (*C. clarki, C. oaxacana, C. similis, C. pectinata*) and Bajo Protección Especial [Under Special Protection] (*C. hemilopha, C. acanthura*) (Diario Oficial de la Federación, 2010). Guatemala classifies 1 species as En Peligro [Endangered] (*C. similis*) and 1 as Amenazada [Threatened] (*C. palearis*) (Stephen et al. 2012).

Some *Ctenosaura* species are exported legally, mainly to the United States (USA) and Europe. The imports of *Ctenosaura* spp. to the USA quadrupled between 2010 and 2018, reaching almost 2,000 specimens per year (USFWS, Internal Report 2018). Other species in the genus that have been traded in the USA and Europe do not have export permit records in their countries of origin, and it is presumed that they form part of illegal trafficking for the international pet trade: *C. alfredschmidti, C. clarki, C. bakeri, C. flavidorsalis, C. melanosterna, C. oaxacana, C. palearis, C. praeocularis, C. conspicuosa, C. macrolopha, C. hemilopha* and *C. acanthura*.

In order to help identify species of *Ctenosaura* included in CITES, in 2011 the IUCN Iguana Specialist Group (ISG) created a *Ctenosaura* Identification Guide (Stephen and Binns, 2010), which includes the 18 species that make up the genus, and points out that they are hard to identify, even for experts. At present, the Attorney General's Office (Mexico) along with the UNAM Institute of Biology, are working on the production of genetic barcodes for the identification of individuals, parts and derivatives.

In 2016, academic experts' concerns were raised and they decided to try to include the genus *Ctenosaura* in Appendix II of CITES, in order to regulate trade and ensure that the latter did not constitute a direct cause of the extinction of species in this genus, and also to combat and detect illegal trade. That year, the first version was drawn up of the document coordinated by Dr. Víctor Hugo Reynoso (UNAM Institute of Biology), Ma. Elena Sánchez (Species Survival Network) and Juan Carlos Cantú (Defenders of Wildlife). The current version was coordinated by Víctor Hugo Reynoso, Lourdes Vázquez Cruz, Eduardo Alexis López Esquivel and Gabriela Díaz Juárez (UNAM Institute of Biology) and revised by experts who contributed extensively to the drawing up of this document (**Annex VII**). However, in the version resulting from these revisions, some information gaps were identified. The latter were rectified in the "Expert workshop to review the proposal to include the genus *Ctenosaura* in Appendix II of CITES", which was held on 7 November 2018 at the Universidad Veracruzana in Xalapa, Veracruz, organised by Dr. Víctor Hugo Reynoso and Dr. Jorge Morales Mávil, and funded by the CITES Scientific Authority of Mexico (National Commission for the Knowledge and Use of Biodiversity).

3. Species characteristics

3.1 Distribution

Details of the distribution of these species are presented in **Annex II** (**Table 1 and Figure 1**). The 18 species in the genus *Ctenosaura* are distributed in 8 countries; from Mexico to Colombia (species endemic to each country are indicated with asterisks):

Mexico: *C. acanthura*, *C. alfredschmidti**, *C. clarki**, *C. conspicuosa**, *C. defensor*, *C. hemilopha**, *C. macrolopha**, *C. nolascensis**, *C. oaxacana**, *C. pectinata**, *C. similis*.

Belize: *C. similis*.

Guatemala: *C. acanthura*, *C. defensor*, *C. flavidorsalis*, *C. palearis**, *C. similis*.

Honduras: *C. bakeri**, *C. flavidorsalis*, *C. melanosterna, C. oedirhina**, *C. praeocularis**, *C. similis*.

El Salvador: *C. flavidorsalis*, *C. similis*.

Nicaragua: *C. quinquecarinata*, *C. similis*.

Costa Rica: *C. quinquecarinata, C. similis.*

Panama: *C. similis.*

Colombia: *C. similis*.

3.2 Habitat

Iguanas in the genus *Ctenosaura* are found in habitats such as dry and humid forests, scrubland and dry tropical and subtropical forests (Pasachnik et al. 2012). They are also found in coastal lagoons and marshes, on sandy beaches, in palm groves, on agricultural land, open disturbed areas, pastures and grazing land, and can be found near to or in urban zones (Pasachnik 2015, Suárez Domínguez et al. 2004, 2011). Some species are semi-arboreal, prefer rocky terrain and use dry branches and rocks as shelters (Blázquez and Rodríguez-Estrella 1997; Köhler 2004 a -f).

The small species (e.g. *C. clarki*, *C. defensor*, *C. oaxacana*, *C. palearis*), prefer dry forests (Rioja et al. 2012). They spend most of their life in hollows in trees, which constitute a microhabitat that facilitates the appropriate thermoregulation and the availability of the necessary resources to ensure optimal performance in their growth, breeding and survival (Dunham et al. 1988).

3.3 Biological characteristics

The *Ctenosaura* iguanas are generally herbivorous (Pasachnik et al. 2012; Köhler 2004 a-f; Grismer 2002, Blázquez and Rodríguez-Estrella 2007). Studies carried out in Mexico focusing on the composition of the diet of *C. pectinata*: Morelos, Oaxaca (Vélez 1997; Zurita et al. 2009), Chiapas (Álvarez del Toro 1972), Michoacán (Suazo and Alvarado 1994) and Jalisco (Valenzuela 1981), show that the *Ctenosaura* species in Mexico are generalists and can adapt to the availability of food resources present in their habitat, where the small species eat: leaves, fruit, flowers, arthropods; and the large species even consume small vertebrates.

Information on the iguanas' life history is influenced by the spatial-temporal variation in the individuals: in general, the life history corresponds to the availability of resources (refuges, breeding pair, nesting zone, food and water) (Blázquez and Rodríguez-Estrella, 1997; 2001), and to climate change, habitat structure or anthropogenic activity. Small species have a semi-sedentary lifestyle, involving little movement. Individuals spend most of their time in crevices or refuges, and only move occasionally to eat and breed. In general, species in the genus *Ctenosaura* breed between the months of November and February, and hatching mainly occurs at the start of the rainy season, normally in June (Working Group, 2018). In *C. oaxacana*, the breeding season occurs between November and December, eggs are laid between January and March, and hatching occurs between June and August (Díaz-Juárez and Reynoso, under review).

In *Ctenosaura*, the species mature late compared to other lizards, and this is related to changes in their environment and the availability of resources. Irrespective of the size of the species, iguanas in the genus *Ctenosaura* are approximately 1.6 years old the first time they breed (Aguirre-Hidalgo 2002; Aguirre-Hidalgo

and Reynoso, under review; Díaz-Juárez and Reynoso, under review). On average, the young take 92 days to hatch (80 to 108 days) (Aguirre-Hidalgo 2002; López- Rojas and Fuentes-Mascorro 2007; Díaz-Juárez and Reynoso, under review; Morales-Mávil et al. 2016a). Breeding data indicate that recruitment is low, and that generally 5% of the young survive.

The reproductive effort is the energy intake each female invests in breeding. In lizards, there is a relation between the clutch size and the number of reproductive events per year (Tinkle 1969; Andrews and Rand 1974). In large lizards such as iguanas, the relative clutch mass (RCM), calculated by comparing the clutch mass to the mass of the female, can be as much as 20 to 30%. For *Ctenosaura,* and in particular *C. pectinata*, the females invest on average 34.5% of their weight per reproductive event (Aguirre-Hidalgo 2002; Díaz-Juárez 2014).

The iguanas only exhibit one reproductive event a year. Aguirre-Hidalgo and Reynoso-Rosales (2000) consider that this strategy favours the allocation of energy for reproduction during this one period. With this strategy, the small species (e.g. *C. oaxacana* and *C. defensor)* manage to have relatively large young in comparison with their size, with the young having a greater life expectancy; thus, small *Ctenosaura* species produce young similar in size to those of large species and with large clutches (Aguirre-Hidalgo 2002; Arcos et al. 2005; Morales-Mávil et al. 2016 a,b).

All iguanas are oviparous and lay eggs in holes or tunnels, which they dig out in the sand or loose earth. No parental care has been documented, and the females leave the nest after laying the eggs. The small species in the group *Cachryx* lay 2 to 6 eggs (e.g. *C. alfredschmidti* and *C. defensor*); *Ctenosura* species sensu stricto lay as many as 9 eggs (e.g. *C. clarki* and *C. oaxacana;* Díaz-Juárez and Reynoso, submitted; Morales-Mávil et al. 2016b), the large desert species (e.g. *C. conspicuosa*, *C. hemilopha*, *C. macrolopha* and *C. nolascensis*) lay as many as 13 eggs (Goldberg and Beaman 2005; Goldberg 2009), and the large iguanas in the group *palearis* (e.g. *C. bakeri*, *C. oederina*, *C. melanosterna* and *C. palearis*) lay 4 to 11 eggs (Cotí and Ariano-Sánchez 2008; Pasachnik et al., 2013**)**. On average, large tropical iguanas lay 20 to 40 eggs (Morales-Mávil et al. 2016b) and can lay as many as 70 or 88 (e.g. *C. pectinata* and *C. similis* respectively; Aguirre Hidalgo 2000; Lee 2000).

3.4 Morphological characteristics

Ctenosaura species have distinctive, spiny, keeled scales on their long tails, hence their common name. The genus includes small iguanas with a maximum snout-cloaca length (SCL) of up to 17.5 cm in *C. oaxacana* and *C. alfredschmidti* (Díaz-Juárez and Reynoso, under review, Morales-Mávil et al. 2016b), and large species such as *C. similis* in which the SCL exceeds 50 cm. The colouration varies greatly, even between individuals in the same population, which makes visual identification very difficult. The distinctive characteristics of each species are based more on unique combinations than on diagnostic features, which makes them hard to determine. An identification key that describes the most important features for distinguishing *Ctenosaura* species is given in **Annex III**.

Moreover, they display sexual dimorphism, which in males is obvious in juveniles over 10 cm in length (SCL) for small species and ~15 cm or over in large species (Working Group, 2018). This is characterised by the presence of a prominent dorsal crest, the bulging of the hemipenes, the greater body mass and developed femoral pores (Arcos et al. 2005; Köhler y Hasbún 2001). There are differences in the proportions of the head in males and females in all species, for example, *C. bakeri* (Gutsche and Streich 2009), *C. melanosterna* (Pasachnik et al. 2012a) and *C. pectinata* (Arcos et al. 2005).

3.5 Role of the species in its ecosystem

In the ecosystems they inhabit, the iguanas provide important environmental services (Ariano et al. 2016). For example, there is evidence that they control pests (insects and rodents; Esquivel, 1999), and can help regenerate vegetation through seed dispersal (Gómez-Mora et al. 2012). Since they are mainly herbivorous, they are some of the main seed dispersers for several deciduous forest plants in Costa Rica (Traveset 1990) and are essential for the survival of the seeds of the cactus *Pachycereus pringlei* on the islands in the Sonoran Desert (Salinas Matus 2016) and of other dry forest plants and other cacti (Blázquez and Rodríguez-Estrella, 2001). Moreover, these species are preyed on, since their eggs are attacked by fungi, insects and oviparous reptiles; and the young by birds, mammals and reptiles (Delibes et al., 1997; Salvatore-Olivares and Reynoso 2001; Ariano, 2007; Aguirre and Reynoso under review).

4. Status and trends

4.1 Habitat trends

The habitat has been lost or modified across the genus' entire range, due to anthropogenic factors such as: agriculture, livestock farming, urban and tourism development, deforestation, etc. Agriculture and livestock farming affect 16 of the 18 species, the exception being island species in protected areas (*C. conspicuosa* and *C. nolascensis*). Urban and tourism development are destroying the habitat of *C. acanthura, C. bakeri, C. oedirhina, C. palearis* and *C. similis* in particular. Deforestation, fires and habitat fragmentation have been recorded as affecting *C. acanthura, C. pectinata, C. quinquecarinata, C. praeocularis, C. oaxacana, C. flavidorsalis, C. defensor* and *C. bakeri*. Several other factors also constitute a threat, such as the introduction of invasive species or climate change, which deteriorate the quality of the habitat in the case of *C. bakeri, C. nolascensis, C. macrolopha* and *C. hemilopha* (Stephen et al. 2012; Grismer 2002; Gómez-Mora et al. 2012; Zurita et al. 2009; Flores et al. 2008; Ariano-Sánchez et al. 2015, Hasbún et al. 2013, Pasachnik et al. 2012, 2013, 2015; Reynoso et al. 2012; Köhler 2004 a-f). However, *C. acanthura* (Suárez-Domínguez et al. 2011; Morales-Mávil et al. 2016a) and *C. similis* (Mora, 1989) are able to adapt successfully to disturbed areas and have established populations.

4.2 Population size

For most species in the genus, the size of the population is unknown, with estimates indicating that the populations contain fewer than 2,500 individuals for *C. alfredschmidti, C. defensor, C. conspicuosa, C. flavidorsalis, C. nolascensis, C. oedirhina, C. palearis* and *C. quinquecarinata (*Pasachnik et al. 2015; Ariano-Sánchez et al. 2015 Köhler 2004 a-e). It is estimated that there are fewer than 5,000 individuals of *C. bakeri* and *C. melanosterna* (Pasachnik et al. 2012, 2013). The widely distributed species (e.g.. *C. acanthura*, *C. hemilopha*, *C. pectinata*, *C. similis*), have populations that are divided up into small, restricted metapopulations: for example *C. pectinata* is divided up into at least 5 genetically isolated groups, each very different, and with small distribution ranges (Zarza et al. under review), and *C. similis* is divided into 3 groups, of which only one is widely distributed from Chiapas to Panamá, whilst the other two are more restricted (Ozturk, 2015).

There are very few studies on the abundance and density of iguana populations. Robleto (2010) reported a density of 0.93 ind./ha for *C. quinquecarinata* in the Río Escalante-Chaconcete Wildlife Refuge, Nicaragua; for *C. pectinata*, Gómez-Mora et al. (2012) a density of 1.06 ind./ha was reported for the municipality of Buenavista, Michoacán (Mexico) and Orozco-Sánchez (2008) reported 0.013 individuals/ha in Oaxaca. Terán (2006) reported a density of 3.1 ind./ha for *C. similis* in the Zamorano region, Honduras. An unusual density was reported for *C. oaxacana* in a study carried out in an isolated subpopulation in 9 ha with a species with little vagility (no more than 50m) in Nizanda, Oaxaca, where a density of up to 21 iguanas/ha was reported (Díaz-Juárez and Reynoso, under review).

4.3 Population structure

In most of the species, the structure of the population has not been well studied. Based on body growth rate, *Ctenosaura* populations can be divided up into four categories: young, juveniles, sexually mature adults, and old adults. Large species such as *C. pectinata* have a minimum hatching size of 6.7 cm. The females can be sexed with a minimum SCL of 10.5 cm and can reach a maximum size of 37.5 cm. The males can also be identified with a minimum SCL of 10.3 cm and can reach a maximum size of 35.5 cm (Arcos García, et al. 2005, Aguirre Hidalgo and Reynoso, under review). Moreover, *C. oaxacana*, as a small species, displays a minimum size at hatching of 3.8 cm, and the females can be identified with a minimum SCL of 10.1 cm and can reach a maximum size of 16.8 cm; the males can be identified with a minimum SCL of 10.5 cm and can reach a maximum of 17.5 cm (Díaz-Juárez and Reynoso, under review).

Molecular studies have shown that the genetic and geographical patterns overlap for the iguanas in the genus *Ctenosaura*. Many species are distributed in adjacent geographical areas where species come into contact with one another, generating hybridisation between genetic lineages, and even between species, occasionally being induced by the anthropogenic effect (Gutsche and Köhler 2008; Zarza et al. 2008, 2011, Reynoso et al. 2010; Davy et al. 2010; Pacheco 2016). Hybrid populations with fertile offspring have been recorded between *C. macrolopha* x *C. pectinata, C. pectinata* x *C. acanthura* and *C. macrolopha* x *C. nolascensis*. For *C. quinquecarinata*, the population structure and life history are unknown.

Additionally, high genetic variability has been found in *C. oaxacana*, with 100% polymorphic loci and an average of 3.6 alleles per locus. The observed and expected heterozygosity values are high with a low endogamy coefficient (Santos-Hernández, 2012).

4.4 Population trends

Ctenosaura species have undergone rapid declines in numbers in recent years, and have disappeared in many areas where they were previously abundant (Fitch et al. 2003). No population increases have been reported in any of the populations of the species in this genus. According to IUCN's assessments, 9 species are declining: *C. bakeri, C. clarki, C. flavidorsalis, C. oaxacana, C. oedirhina, C. palearis, C. pectinata C. quinquecarinata* and *C. alfredschmidti*; the trend is unknown for three species: *C. macrolopha, C. defensor* and *C. praeocularis;* and five are stable: *C. acanthura, C. conspicuosa, C. hemilopha, C. nolascensis, C. similis (*Ariano-Sánchez et al. 2015, Hasbún et al. 2013, Pasachnik et al. 2012, 2013, 2015; Reynoso et al. 2012; Köhler 2004 a-e; Grismer 2002; Gómez-Mora et al. 2012; Zurita et al. 2009; Reynoso et al. 2012; Morales-Mávil et al. 2016a; CONABIO 2015). In Guerrero and Oaxaca, *Ctenosaura pectinata* is affected by hunting, and *C. similis* is subject to the same pressure in Honduras and Nicaragua (Zurita-Carmona et al. 2009; Stephen et al. 2012). This is relevant because hunting targets pregnant females, on the one hand affecting the population replacement rate, by eliminating possible young and, on the other hand, the sex ratio, since males are more common than females in natural populations. Coupled with this, in *C. pectinata*, the problem becomes more complicated given the apparent single paternity, which reduces the possibilities of increasing the genetic variation of the population (Faria et al 2010).
The decrease in the survival and growth rates affects fertility on spatial-temporal scales, so it is important to maintain the survival of juveniles sizes and breeding adults, in order to generate large female adults, capable of laying large clutches that will favour the recruitment rate and population growth.

C. oaxacana has a stable growth rate (15% annual increase in the restricted locality of Nizanda, Oaxaca) (Díaz-Juárez and Reynoso, under review); however, the juveniles represent the most sensitive age class in the population, where minimum mortality levels can cause significant decreases in the size of the population, and they are sensitive to changes in their environment (Díaz-Juárez and Reynoso, under review). The growth rates for the other *Ctenosaura* species have not been reported.

It has been shown that the reduced populations isolated by fragmentation display a considerable decrease in their genetic diversity, e.g. *C. oaxacana* (Martínez-González 2015). For this species, it was found that in the same locality there were two genetically differentiated populations without the production of hybrid individuals, showing that at least for this species, the destruction of a habitat involves an irretrievable loss in genetic diversity.

4.5 Geographic trends

The original distribution range of all species of *Ctenosura* has been modified by degradation, fragmentation and destruction of the habitat, except for *C. conspicuosa* and *C. nolascensis*, which occur on islands that do not allow human settlements or changes in land use (Carabias-Lillo et al. 2000). Species that inhabit very desert-like locations (e.g. *C. hemilopha*, *C. macrolopha*, *C. melanosterna*) suffer from a reduction in their distribution range to a lesser degree (V. H. Reynoso pers. obs.) than species that inhabit tropical areas such as *C. acanthura*, *C. pectinata* and *C. similis*, highly affected by agriculture and livestock farming. Some species such as *C. bakeri* and *C. oederhina* are being seriously affected by tourism development and its facilities, which involves the development of urban zones adjacent to the latter (Pasachnik et al. 2012a; 2015). Despite change in land use, many species can coexist with human beings. Species such as *C. defensor* and *C. alfredschmidti* are the exception, since they need pristine locations for their survival (V.H. Reynoso and C. Malone pers. obs.). Despite many species coexisting with human beings, the former are in danger due to hunting (Stephen et al. 2014).

5. Threats

The main threats facing the genus are habitat destruction, hunting for their meat and skins, the national and international pet trade, hybridisation due to the introduction of similar species, elimination by invasive species (e.g. cats), elimination due to confusion with venomous species, and drastic changes in habitat in species with a small range (Grismer 2002, Köhler 2004 a-f, Flores et al. 2008, Zurita et al. 2009, Gómez-Mora et al. 2012, Pasachnik et al. 2012, 2013, 2015, Ariano-Sánchez et al. 2013, Hasbún et al. 2013, Otero et al. 2013, Stephen et al. 2012, Reynoso et al. 2012, Rioja et al 2012; see details in **Annex IV**). Dry forests inhabited by small species consistently suffer changes in land use due to livestock farming, which eliminates arboreal species, since this is the only habitat available to them. This is important for *C. alfredschmidti*, *C. defensor*, *C. clarki, C. flavidorsalis, C. quinquecarinata* and *C. defensor* (Köhler, 2004e; Otero 2011; Morales-Mavil et al. 2016). The specific threats by species are listed in **Annex IV**.

6. Utilisation and trade

6.1 National utilisation

Iguanas in the genus *Ctenosaura* are frequently hunted locally for their meat and eggs (Stephen et al. 2012, Gómez-Mora et al. 2012; Zurita et al. 2009; Grismer 2002). Gravid females are eaten most frequently

(Álvarez 2007; Pasachnik et al. 2014; 2012a). In some regions, they are assigned medicinal properties, it is thought that they can cure colds, and they are used to treat sprains or head and tooth ache (Stephen et al. 2012; Álvarez et al. 1988; Köhler 1995). Some are sold as crafts and skins, for example *C. pectinata* (Zarza et al. 2016). It has been reported that *C. similis* and *C. quinquecarinata* are used to feed domestic animals (Otero 2011; Sasa and Bolaños-Vives 2004).

6.2 Legal trade

National trade

Mexico: Mexico's General Directorate of Wildlife of the Secretariat of the Environment and Natural Resources (DGVS-SEMARNAT) (2005-2018), reported the authorisation of the harvesting of 8,927 individuals bred in captivity in 13 Wildlife Management Units [Unidades de Manejo de Vida Silvestre, UMA] and Wildlife Management Properties and Facilities [Predios e Instalaciones que Manejan Vida Silvestre, PIMVS]. Of those animals, 8,920 iguanas (50 permits) corresponded to *C. pectinata* and 7 (3 permits) to *C. defensor* (see **Annex V, Table 1**).

El Salvador: Includes *C. similis* in Agreement 74 of the List of Threatened and Endangered Species, in order to adopt the measures required to ensure their conservation, based on Art. 3 of the Wildlife Conservation Law (CITES Scientific Authority, El Salvador 2018).

Guatemala: In its List of Threatened and Endangered Species [Listado de Especies Amenazadas de Extinción, LEAE], *C. palearis* is included in Criterion 2, which only allows its use for scientific purposes and for breeding for conservation. *C. similis* is in Criterion 3, which regulates its trade (Stephen et al. 2012).

Nicaragua: Regulates the capture of and trade in *C. similis* and *C. quinquecarinata* (Stephen et al. 2012). It has a law that focuses on iguanas (Decree 547), which bans the capture and cruel trade and export of *C. similis* and its products such as eggs. This species is also protected by the national closed season law by a partial ban from 1 January to 30 April, which prohibits its commercialisation, hunting and consumption. In Ministerial Resolution N° 003.01.2018, approved on 12 January 2018 in Managua, Nicaragua, an indefinite closed season was ruled for *Ctenosaura quinquecarinata* at a national level.

International trade

Some time ago now, international trade in species in this genus was documented; in a review carried out by Stephen et al. (2012), on the trade reported by USA in the LEMIS database (2001-2008), it was reported that almost 20,000 specimens were imported by that country, made up of *C. similis, C. quinquecarinata* (over 90% of the registers), *C. palearis* and *C. melanosterna*. 56% of the individuals were imported from Honduras, 18% from Nicaragua, 14% from El Salvador and 12% from Guatemala. 79% of the imports were of animals originating in the wild, and 29% bred in captivity.

In order to learn about the legal international trade in species in the genus *Ctenosaura* that are currently included in CITES, the United Nations Environment Programme World Conservation Monitoring Centre (WCMC) database was consulted for the period 2010-2018. There were no records of trade for the species *C. melanosterna*, whilst there were records for *C. palearis*, *C. oedirhina* and *C. bakeri*. There was only one record for *C. palearis* but its origin was illegal. Despite the fact that *C. quinquecarinata* is not listed in CITES, the WCMC has trade records for this species, which is the one with the highest number of trade events (time and number of individuals). Of these records, 36.3% are of unknown origin, 4.5% correspond to individuals in captivity and the same percentage to individuals from the wild, and 54% of the data had no information on the animals' origin (**Annex V, Table 2**).
Moreover, in order to provide more clarity regarding the performance of international trade in the species in this genus, on 10 September 2018, CONABIO consulted the CITES Authorities in the countries that reported international trade during the period 2008-2018, both through databases and the Internet, and also consulted the countries in which the genus occurs. The consultation was sent to 23 countries that are Party to CITES: Austria, Belize, Canada, China, Costa Rica, the Czech Republic, El Salvador, France, Germany, Guatemala, Honduras, Hong Kong, Japan, Malaysia, the Netherlands, Nicaragua, Panama, Spain, the Ukraine, the United Arab Emirates, the United Kingdom, United States of America, and the European Union. Replies were received from 11 of them: Austria, Canada, China, El Salvador, France, Germany, Hong Kong, Malaysia, the Netherlands, Spain, and the United Kingdom; five of which replied saying that there is no known trade in these species in their countries (France, Canada, China, Hong Kong and Malaysia); and six replied saying that there is trade in one or more species in the genus *Ctenosaura* in their country: Austria, El Salvador, Germany, the Netherlands, Spain, and the United Kingdom (**Annex V, Table 3**).

Additionally, the United States Fish and Wildlife Service (USFWS) was consulted about trade in *Ctenosaura*. The data they provided corresponded to the period 1999-2018. In the *Exports* section, an analysis is given of these data, identifying the exports of each country in the genus' distribution range.

Exports. In the consultations with the countries, Canada, China, France, Hong Kong and Malaysia indicated that they had no records of international trade movement for *Ctenosaura* spp. However, when comparing the information with export records provided by the DGVS-SEMARNAT (2015), the latter indicated that, in 2015, Malaysia and Hong Kong were export destination countries for 190 and 10 individuals of *C. pectinata*, respectively. Furthermore, the USFWS (2018) also records movements of *Ctenosaura* from France and Canada to the USA. Moreover, the WCMC's records in 2015 show exports to Canada of individuals of *C. palearis*.

Mexico: With regard to exports, the DGVS-SEMARNAT reported that from 2000 to 2015, a total of 50 specimens were exported for scientific purposes (46 specimens of *C. hemilopha* preserved in alcohol, and 4 live specimens of *C. conspicuosa*). On the other hand, the commercial exports consisted of 1,493 live specimens of *C. pectinata*, and five of *C. defensor*, with the United States being the main importer (1,275 individuals); with other importer countries being Hong-Kong, Malaysia and Ukraine (see **Annex V, Table 4**). The data provided by the USFWS indicated that between 1999 and 2015 USA imported a total of 3,696 specimens of *C. quinquecarinata*, *C. hemilopha*, *C. pectinata*, *C. acanthura*, *C. defensor*, as well as other records that did not specify the species. Of these imports, 55.8% of the specimens were of unknown origin, 23% came from the wild and 21% from captivity. Over 86% of the records of specimens that came from the wild had a "personal" purpose (code P).

El Salvador: In response to the consultation conducted, El Salvador mentioned that they had exported 3,960 live specimens of *C. similis* between 2002 and 2005, and that after 2005 no new exports were recorded. The countries it exported animals to were Germany, Spain and the USA (**Annex V, Table 3**). In the data provided by the USFWS, it was indicated that between 1999 and 2015 the USA imported a total of 4,592 specimens of *C. similis*, *C. pectinata* and other individuals whose species was not mentioned. Of these imports, 76% were captive animals, 22% wild animals, and 1% of the specimens were of unknown origin. Of the imports of wild animals, 80% were carried out for commercial purposes.

Costa Rica: Costa Rica did not report any exports of these species (Stephen et al. 2012). Between 1999 and 2017, the USFWS recorded that the USA imported 49 specimens of *C. similis* for scientific purposes.

Guatemala: Between 2001 and 2008, Guatemala exported just over 2,000 specimens of *C. similis* to the USA. (Stephen et al. 2012). In the data provided by the USFWS, 3,833 specimens of *C. similis* and *C. palearis* were recorded as being imported to the USA. Over 90% of these animals came from the wild and the origin of 6.3% of them was unknown. 100% of these transactions (of animals originating in the wild) were carried out for commercial purposes.

Honduras: It exported over 10,000 specimens of *C. similis* to the USA and 28 of *C. melanosterna* between 2001 and 2008. This represented 56% of all the *Ctenosaura* individuals that the USA imported from Central American countries (Stephen et al. 2012). Between 1999 and 2014, the USFWS recorded the import of 15,373 live specimens of *C. similis, C. quinquecarinata, C. oedirhina, C. bakeri, C. melanosterna* and *C. flavidorsalis* by the USA. Of these animals, over 95% came from the wild, 4.5% were of unknown origin and under 0.5% came from captivity. Of the imports of animals that originated in the wild, over 87% were imported for commercial purposes and only 12% for scientific purposes.

Nicaragua: Between 2001 and 2008, Nicaragua exported almost 4,000 specimens of *Ctenosaura,* mainly *C. quinquecarinata*, to the USA (Stephen et al. 2012). Between 1999 and 2018, the USFWS recorded the import of 23,520 specimens of *C. conspicuosa*, *C. quinquecarinata*, *C. similis* and *C. pectinata* by the USA; the records indicate that most were live individuals. 96% of these individuals originated in captivity, and over 3% in the wild. 99% of these transactions were carried out for commercial purposes.

Trade through the Internet: In web searches during 2018, a total of 30 pages were found offering iguanas for sale outside of their country of origin, for example Austria, Canada, Germany, Mexico, Spain, the UK and the USA. The species on sale are *C. acanthura*, *C. bakeri*, *C. clarki*, *C. conspicuosa*, *C. defensor*, *C. melanosterna*, *C. oedirhina*, *C. pectinata*, *C. quinquecarinata* and *C. similis*. The prices of the iguanas range from USD 20 for a young specimen of *C. similis*, to USD 3,500 for an adult specimen of *C. pectinata*. Most iguanas for sale are hatchlings, and in most places the origin of the individuals is not indicated, although in some cases it is stated that they are bred in captivity. Only two websites selling iguanas in the USA indicate that they do not sell to customers outside of the USA (**Annex V, Table 5**). Similarly, personal Facebook pages were analysed and adverts valid from 2013 to 2018 were found. In the latter, it was seen that 17 sites were in Indonesia, Spain, the UK and the USA, and several were undetermined. The species on sale are *C. alfredschmidti*, *C. bakeri*, *C. defensor*, *C. oaxacana*, *C. melanosterna*, *C. quinquecarinata*, *C. palearis*, *C.*

pectinata and *C. similis*. The iguanas range in price from USD 15 (for a hatchling of *Ctenosaura similis*), to USD 1,200 for an adult *C. defensor*. Most of the adverts are for adult iguanas and very few indicate that the animals were bred in captivity (**Annex V, Table 6**).

Imports

Mexico: In accordance with data from the DGVS-SEMARNAT, 14,644 live individuals of *Ctenosaura* spp. were recorded (14,426 of *C. similis*, 374 *C. pectinata*, 24 *C. palearis* and 20 *C. alfredschmidti*). (**Annex V: Table 7**). The main country of origin for the individuals is Guatemala. All the animals were imported for commercial purposes.

United States: The USFWS (2018), registered the movement of 63,971 iguanas in the genus *Ctenosaura* between 1999 and 2018; recording 15 of the 18 species: *C. acanthura*, *C. alfredschmidti*, *C. bakeri*, *C. clarki*, *C. conspicuosa*, *C. defensor*, *C. flavidorsalis*, *C. hemilopha*, *C. melanosterna*, *C. oederina*, *C. palearis, C. pectinata, C. praeocularis, C. quinquecarinata* and *C. similis*. (Figures 2 and 3). The countries of origin of the specimens are Germany (103 specimens), Argentina (1), Austria (35), Brazil (2), Canada (4), Costa Rica (84), El Salvador (4,058), Spain (4), USA (71), Philippines (11,574), France (11), UK (12), Guatemala (3,963), Honduras (15,501), Mexico (4,783), Nicaragua (23,726), the Netherlands (29), Poland (4) and the Czech Republic (6). In **Annex V (Figures 2 and 3**) the import and export activity of *Ctenosaura* is detailed by year and by species in accordance with the USFWS internal report (2018).

Much of the trade in species between the borders of Europe is not well controlled or recorded, since the borders do not constitute real barriers.

Additionally, it is important to mention that, based on species native to Mexico whose export has been authorised, 5 endemic species have been found (C. *alfredschmidti*, *C. clarki*, *C. conspicuosa*, *C. hemilopha*, *C. oaxacana*) in international trade, of unknown origin.

6.3 Parts and derivatives in trade

The main derivatives of *Ctenosaura* iguanas that are traded are their meat and eggs. In some regions, their skin is used in handicrafts (Zarza et al. 2016; Stephen et al. 2012). Internationally, movements of meat, skins, samples for scientific use (blood and museum specimens), jewellery and trophies can be found; although trade movements of live individuals are the most common (USFWS, 2018).

6.4 Illegal trade

The illegal sale and consumption of *Ctenosaura* iguanas in Mexico and Central America is a common activity at a regional level, mainly using the animals as a source of food, including traditional consumption (e.g. *C. pectinata* at Easter and during the Guelaguetza Festival, in Oaxaca, Mexico), and to a lesser degree for sale as pets. One serious problem is the fact that the species are hard to identify. Seized specimens are often assigned the name of the wrong species, generally the most common *Ctenosaura* species in the region, meaning that the necessary laws and measures to protect and regulate trade are not applied (Working Group 2018).

Mexico: *Ctenosaura* iguanas have been captured illegally in this country for their meat and eggs for a long time. The hunting of species listed in NOM-059-2010-SEMARNAT, may be legal if it complies with the regulations established in the General Wildlife Law [Ley General de Vida Silvestre]. Otherwise, hunting and trade are illegal; however, the current conservation legislation is ignored in many regions (Reynoso et al. 2006). One of the largest areas in which the hunting and illegal trade in *Ctenosaura pectinata* takes place is the Balsas Depression situated along the border between the Mexican states of Michoacán and Guerrero.

In accordance with a consultation conducted with the Federal Attorney's Office for Environmental Protection [Procuraduría Federal del Medio Ambiente y Recursos Naturales (PROFEPA, 2018)], on seized specimens of iguanas in the genus *Ctenosaura*, between 2008 to 2018 a total of 159 seized specimens were recorded, 131 of *C. pectinata*, 16 of *C. quinquecarinata*, 8 of *C. defensor* and 4 of *C. similis* (**Annex V, Table 8**).

Guatemala: Some of the largest seizures that are carried out in this country are made up of illegal shipments of *C. similis* and *Iguana iguana*; the species most frequently consumed as food; some of these are transported to El Salvador (Sánchez 2009). It has been reported that *C. acanthura* is exploited in the country and can be acquired illegally (Stephen et al. 2014).

Honduras: Between 2005 and 2008, the authorities in Honduras confiscated 220 specimens of *Ctenosaura;* this was the third most commonly seized group of species after lizards and turtles (Sánchez, 2009).

Nicaragua: *Ctenosaura similis* is harvested illegally from the Bosawas Biosphere Reserve, in the departments of Jinotega, Nueva Segovia and the Atlántico Norte Autonomous Region; which covers 15% of the surface area of Nicaragua (Sánchez 2009). In 2008 alone, the Nicaraguan authorities seized a total of 1,162 illegally harvested wild animals, 707 of which were *Ctenosaura* spp. and *Iguana iguana,* which made them the most frequently seized animals that year (Sánchez 2009). Between 2005 and 2010, over 1,561 specimens of *Ctenosaura* were seized (Stephen et al. 2012).

El Salvador: Illegal shipments of *Ctenosaura* provenientes from Honduras and Guatemala have been recorded in El Salvador; which have been seized by the authorities (Sánchez 2009). Between 2006 and 2008, 3,611 *Ctenosaura s*pp. and *Iguana iguana* were seized (Stephen et al. 2012). In 2009, a total of 241 *Ctenosaura* specimens from Nicaragua were seized, and in 2010, 45 specimens of *C. pectinata* (Stephen et al. 2012). The country's CITES Authorities (Ministry of the Environment and Natural Resources, MARN 2018), mentioned that in El Salvador six cases of seizures of *C. similis* had been recorded in the last 10 years, involving a total of 226 individuals.

Illegal International Trade

In accordance with the consultations conducted with exporting/importing countries (2018), in 2016 Spain documented the seizure of 16 specimens of *C. pectinata* at Amsterdam Airport Schiphol, which were destined for Madrid, and in 2017, the seizure of 2 specimens of *C. oaxacana* and 24 of *C. conspicuosa* at the home of the same person involved in the first seizure in Amsterdam (**Annex V, Table 9**). The market value of one specimen of *Ctenosaura oaxacana* can be €2,500, and a specimen of *C. conspicuosa* can be worth around €1,500.

6.5 Actual or potential trade impacts

For all the species in the genus, illegal consumption and trade represents an important threat (Pasachnik et al. 2014; Teran 2006; Köhler 2004d; Köhler and Hasbun 2001). In Mexico, in some regions such as the Central Valley of Chiapas, they have almost been wiped out due to illegal hunting (Guzmán et al. 2003; Fitch et al. 1982). According to Carmona et al. (2009), in four municipalities of Oaxaca, a total of 3,655 spiny-tailed iguanas were caught in a single year, which is alarming considering that the population in this area is estimated at only 5,281 iguanas. For most of the species, unregulated trade represents a risk due to the endemic nature of these iguanas and the small size of their populations.

7. Legal instruments

7.1 National

Mexico: The General Wildlife Law [Ley General de Vida Silvestre], establishes strict criteria for the use and conservation of wild species Endangered [En Peligro "P"] and Threatened [Amenazadas "A" (Diario Oficial de la Federación 2000). The NOM-059-2010-SEMARNAT classifies 7 species in the following categories: Endangered [En Peligro] (*C. defensor*); Threatened [Amenazada] (*C. clarki, C. oaxacana, C. similis, C. pectinata*); and Under Special Protection [Bajo Protección Especial] (*C. acanthura* and *C. hemilopha,* which includes *C. conspicuosa, C. macrolopha* and *C. nolascensis*) (Diario Oficial de la Federación 2010). Those classified as "P" or "A" can only be used for conservation and captive breeding purposes (Diario Oficial de la Federación 2010).
Costa Rica: The Wildlife Conservation Law [Ley de Conservación de Vida Silvestre] bans the hunting and harvesting of Threatened wildlife species; except those that originate in sustainable, registered animal breeding facilities. The exports and imports of all species are banned (Stephen et al. 2014).

Guatemala: The Protected Areas Law [Ley de Áreas Protegidas] regulates the restoration of Threatened fauna and the protection of endemic species. It bans the collection, commercial hunting and exporting of Endangered fauna (Stephen et al. 2012) Decree 4-89 or Protected Natural Areas Law [Ley de Áreas Naturales Protegidas] Art. 25, 26 and 27 (Annex XI). Guatemala has an official list of Threatened species, the List of Threatened Species [Listado de Especies Amenazadas de Extinción, LEA], which has three categories: Category 1 for species that are virtually extinct; Category 2 for Endangered or endemic species that only authorises their use for scientific purposes or for conservation reasons; and Category 3 for Threatened species with restricted use including trade. *Ctenosaura palearis* is included in Criterion 2, which only allows its use for scientific purposes and for breeding for conservation purposes. *Ctenosaura similis* is in Criterion 3, and the trade in this species is regulated.

Honduras: The General Environmental Law [Ley General de Medio Ambiente]; regulates the use and conservation of wildlife (Stephen et al. 2014).

Nicaragua: The only country with a law that focuses on iguanas (Decree 547), which bans the cruel capture or trade and forbids the export of *C. similis* and its products such as eggs. The conservation and trade in other species of iguana such as *C. quinquecarinata* are regulated by the "Nicaraguan Obligatory Technical Regulations regarding the Internal Wildlife Trade" ["Norma Técnica Nicaragüense obligatoria de comercio interno de Fauna Silvestre*"* (NTON 05011-01)] (Stephen et al. 2014), Law 217, General Law on the Environment and Natural Resources [Ley General del Medio Ambiente y los Recursos Naturales], which covers the allocation of closed seasons.

El Salvador: The Wildlife Conservation Law [Ley de Conservación de Vida Silvestre]; the hunting, harvesting and trade in wild species (Stephen et al. 2014).

7.2 International

The species *C. palearis, C. melanosterna*, *C. bakeri* and *C. oedirhina* have been included in Appendix II of CITES since 2010. *C. quinquecarinata* is included in Annex D of the EU Wildlife Trade Regulations (EWTR), of Council Regulation (EC) 338/97 of the European Council; that includes species for which there is a desire to control import levels in the European Union, since they may comply with the requirements for being included in one of the Appendices of CITES.

8. Species management

8.1 Management measures

Mexico: The capture, breeding and export of the 11 Mexican species of *Ctenosaura* are regulated by the General Wildlife Law [Ley General de Vida Silvestre]. There have been authorisations for the capture of wild specimens of *C. pectinata,* and specimens in captivity with *C. pectinata* and *C. defensor* since 2000 (SEMARNAT 2015; DGVS 2018). At present, there are harvesting authorisations for both *C. pectinata* and *C. defensor* (SEMARNAT 2018).

Honduras: Exports of *C. melanosterna*, *C. bakeri* and *C. oedirhina* have been restricted*;* and nurseries have been created for *C. melanosterna* and *C. bakeri* for conservation and reintroduction projects (Stephen et al. 2012).

Nicaragua: Only the export of *C. quinquecarinata* from two nurseries is permitted; the capture and export of *C. similis* is banned (Stephen et al. 2012).

8.2 Population monitoring

8.3 Control measures

8.3.1 International

8.3.2 Domestic

8.4 Captive breeding and artificial propagation

There are very few *Ctenosaura* spp. nurseries in the Central American region, due to the fact that the farmers say that these are very aggressive species that are hard to keep, and also because there is a far greater demand for the common green iguana (*Iguana iguana*) (Stephen et al. 2012).

Mexico: There have been eight nurseries for *C. pectinata* and 1 for *C. defensor* since 2000. From 2000 to 2015. A total of 6,016 specimens of *C. pectinata* and 7 of *C. defensor* were produced (SEMARNAT 2015).

Honduras: There is a nursery for *C. bakeri* used to strengthen the wild populations, and a farm has been proposed for *C. melanosterna* for reintroduction purposes (Stephen et al. 2012).

Nicaragua: There are two nurseries for *C. quinquecarinata,* one of which reported having bred over 6,000 individuals per year. A breeding farm for *C. similis* is used exclusively for research purposes (Stephen et al. 2012).

Guatemala: There is a semi-captive breeding programme for *C. palearis* for conservation purposes, in a private reserve (Ariano et al. 2016).

8.5 Habitat conservation

Mexico: The 11 species are found in protected natural areas (PNAs). *C. oaxacana* has been observed in the Huatulco National Park, Oaxaca (Díaz-Juárez, in progress), *C. nolascensis,* and *C. conspiscuosa* occur within the boundaries of the Islas del Golfo de California Biosphere Reserve, and *C. hemilopha* in the El Vizcaíno Biosphere Reserve (Reynoso et al. 2012); *C. similis* occurs in several PNAs throughout its range: the La Sepultura Biosphere Reserve and the La Encrucijada Biosphere Reserve in Chiapas, the Laguna de Términos Flora and Fauna Protection Area in Campeche and in the Banco Chinchorro Biosphere Reserve in Quintana Roo (Pasachnik 2015, Reynoso and González, 2005; Charrua, 2015). *C. pectinata*, occurs in the Islas Marías Biosphere Reserve in Nayarit; the Chamela-Cuixmala Biosphere Reserve in Jalisco; the Sierra de Manantlán Biosphere Reserve in Jalisco and Colima; the Tehuacán-Cuicatlán Biosphere Reserve in Puebla and Oaxaca; the La Sepultura Biosphere Reserve in Chiapas; the El Veladero National Park in Guerrero, and the El Tepozteco National Park in Morelos and D. F.; and in the Chichinautzin Biological Corridor Flora and Fauna Protection Area, Morelos (Reynoso and González-Monfil, 2005). there are collection records of *C. acanthura* in the Presa Chicayán PNA, the Santa Gertrudis Ecological Reserve, the Los Tuxtlas Biosphere Reserve, the Loro Huasteco Sanctuary, Arroyo Moreno PNA and the Ciénaga del Fuerte PNA in Veracruz, and the Sierra Gorda Biosphere Reserve in Querétaro, and in the Sontecomapan Lagoon Mangroves and Wetlands Ramsar Site, the Alvarado Lagoon System Ramsar Site, La Mancha and El Llano Ramsar Site, and the Mangroves and Wetlands of Tuxpan Ramsar Site, Veracruz (Morales-Mávil et al. 2016a). It has also been recorded in PNAs within the city and port of Veracruz. The Biosphere Reserve in Quintana Roo can act as an important refuge for *C. alfredschmidti*, and individuals have been captured in this reserve's buffer zone (Morales-Mávil et al. 2016b). Other *Ctenosaura* spp. in Mexico need to be assessed.

Guatemala: *C. palearis* occurs within the private Nature Reserve for the Conservation of the Beaded Lizard and the Motagua Valley Dry Forest (Ariano et al. 2015).

Honduras: *C. flavidorsalis* and *C. praeocularis* are not found in any protected areas (Köhler 2004b; Hasbún et al. 2013). *C. oedirhina* occurs in several wildlife refuges and marine reserves (Guanaja, Utila, Islas de Roatán, Islas de la Bahía, Cayos Cochinos and the Cuero y Salado Wildlife Refuge) (Pasachnik et al. 2015). *C. melanosterna* occurs within the boundaries of the Cayos Cochinos Marine Protected Area and the Botaderos National Park (Pasachnik et al. 2012).

Nicaragua: *C. quinquecarinata* is found in the Apacunca Nature Reserve (Köhler 2004d; Hasbún et al. 2013).

It is considered that habitat conservation favours the growth rate of the populations. For example, in more detailed studies, it was shown that the populations of *C. pectinata* and *C. oaxacana* in the Nizanda Region, Oaxaca, which is an area that is conserved even when a large amount of hunting is carried out there, have annual growth rates of 17 and 15% respectively (Medina-Mantecón 2005 and 2009; Díaz-Juárez, 2014).

8.6 Safeguards

9. Information on similar species

The species in this genus are similar to one another and are hard to differentiate by non-experts, and even by expert biologists. The young of large species in the genus *Ctenosaura* can be confused with those of *Iguana iguana*, due to their green colouration (Working Group, 2018).

10. Consultations

On 30 October 2018, Mexico consulted the Administrative Authorities of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama regarding the proposal to list all the species in the genus *Ctenosaura* in Appendix II of CITES in search of additional information and joint proposals (Annex VI).

11. Additional remarks

For all these reasons, the entire genus must be included in Appendix II, in order to regulate legal trade, to attack and discourage illegal trade and facilitate the work of CITES and the customs authorities when they are faced with shipments of iguanas in the genus *Ctenosaura*.

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Anexo I

Cuadro 1. Detalle de las sinonimias taxonómicas referidas a las especies del género

ESPECIES	**SINÓNIMOS**
Ctenosaura acanthura	*Lacerta Acanthura* Shaw 1802 *Uromastyx acanthurus* Merrem 1820 *Cyclura teres* HARLAN 1825 *Ct. [enosaura] cycluroides* Wiegmann 1828 *Iguana (Ctenosaura) Cycluroides* Gray 1831 (en Cuvier; edit. Griffith) *Iguana (Ctenosaura) Acanthura* Gray 1831 (in Cuvier; edit. Griffith) *Cyclura Shawii* Gray (nombre sustituto por Shaw) *Iguana (Ctenosaura) Armata* Gray 1831 (in Cuvier; edit. Griffith) *Iguana (Ctenosaura) Lanceolata* Gray 1831 (in Cuvier; edit. Griffith) *Iguana (Ctenosaura) Bellii* Gray 1831 (in Cuvier; edit. Griffith) *Iguana (Cyclura) Teres* Gray 1831 (in Cuvier; edit. Griffith) *C. [yclura] articulata* Wiegmann 1834 *C. [yclura] denticulata* Wiegmann 1834 *Cyclura acanthura* Duméril & Bibron 1837 *Cyclura (Ctenosaura) denticulata* Fitzinger 1843 *Cyclura semicristata* Fitzinger 1843 *Cyclura (Ctenosaura) articulata* Fitzinger 1843 *Cyclura (Ctenosaura) Shawii* Fitzinger 1843 *Cyclura (Ctenosaura) Bellii* Fitzinger 1843 *Ctenosaura acanthura* Gray 1845 *Cyclura denticulata* Hallowell 1855 *Cyclura (Ctenosaura) acanthura* Cope 1869 *Ctenosaura teres* Bocourt (in Duméril & Bocourt) 1874 *Ctenosaura multispinis* Cope 1886: 267 *Ctenosaura teres* Cope 1886: 269 *Ctenosaura (Ctenosaura) acanthura* Köhler et al. 2000
Ctenosaura alfredschmidti	*Ctenosaura defensor* de la que se dividió *Cachryx defensor* Cope; Malone, Reynoso & Buckley 2017
Ctenosaura bakeri	*Enyaliosaurus bakeri* Stejneger 1901
Ctenosaura clarki	*Enyaliosaurus clarki* Bailey 1928
Ctenosaura conspicuosa	*Ctenosaura hemilopha* de la que se dividió *Ctenosaura hemilopha conspicuosa* Lowe & Norris 1955 *Ctenosaura conspicuosa* (especie genéticamente diferenciada) Pacheco-Hoyos y Reynoso (en proceso)
Ctenosaura defensor	*Cachryx defensor* Cope 1866 *Cachryx erythromelas* (Boulenger 1886) *Ctenosaura erythromelas* Boulenger 1886 *Ctenosaura (Cachryx) annectens* Werner 1911 *Enyaliosaurus erythromelas* Smith & Taylor 1950 *Enyaliosaurus defensor* Duellman 1965 *Cachryx defensor* Cope; Malone, Reynoso & Buckley 2017
Ctenosaura flavidorsalis	*Ctenosaura (Enyaliosaurus) flavidorsalis* Köller et al. 2000

Ctenosaura hemilopha	*Cyclura (Ctenosaura) hemilopha* (Cope 1863) *Ctenosaura interrupta* Bocourt 1882 *Ctenosaura insulana* Dickerson 1919 *Ctenosaura hemilopha insulana* Lower & Norris 1955 *Ctenosaura hemilopha interrupta* Lower & Norris 1955 *Ctenosaura hemilopha hemilopha* Smith 1972 *Ctenosaura (Ctenosaura) hemilopha* Köhler et al. 2000
Ctenosaura macrolopha	*Ctenosaura hemilopha macrolopha* Smith 1972 *Ctenosaura hemilopha* de la que se dividió *Ctenosaura macrolopha* (especie genéticamente diferenciada) Pacheco-Hoyos y Reynoso (en proceso)
Ctenosaura melanosterna	*Ctenosaura (Loganiosaura) melanosterna* Köhler et al. 2000 *Ctenosaura palearis* o *Enyaliosaurus palearis* de la que se dividió
Ctenosaura nolascensis	*Ctenosaura hemilopha hemilopha* Lowe y Norris 1955 *Ctenosaura hemilopha nolascensis* Smith 1972 *Ctenosaura nolascensis* (especie genéticamente híbrida *C. conspicuosa*X*C. macrolopha*) Pacheco-Hoyos y Reynoso (en proceso)
Ctenosaura oaxacana	*Ctenosaura quinquecarinata sensu* Bailey 1928 de la que se dividió *Enyaliosaurus quinquecarinatus*
Ctenosaura oedirhina	*Ctenosaura bakeri* de la que se dividió *Enyaliosaura bakeri* *Ctenosaura (Loganiosaura) oedirhina* Köhler et al. 2000
Ctenosura palearis	*Enyaliosaurus palearis* (Stejneger 1899) Ctenosaura (Loganiosaura) palearis Köhler et al. 2000
Ctenosaura pectinata	*Cyclura pectinata* (Wiegmann 1834) *Ctenosaura brevirostris* Cope 1886 *Ctenosaura teres brachylopha* Cope 1886 *Ctenosaura brachylopha* Bailey 1928 *Ctenosaura parkeri* Bailey 1928 *Ctenosaura (Ctenosaura) pectinata* Köhler et al. 2000 *Ctenosaura pectinata* podría estar dividida en tres especies genéticamente diferenciadas (Zarza et al. sometido)
Ctenosaura praeocularis	*Ctenosaura flavidorsalis* de la que se dividió, y menos comúnmente como *Ctenosaura quinquecarinata*.
Ctenosaura quinquecarinata	*Cyclura quinquecarinata* (Gray 1842)

	Enyaliosaurus quinquecarinatus (Gray 1842) *Cyclura (Ctenosaura) quinquecarinata* Cope 1870 *Ctenosaura (Enyaliosaurus) quinquecarinata* Bocourt 1874 (In: Duméril & Bocourt)
Ctenosaura similis	*Iguana (Ctenosaura) Similis* Gray 1831 (In Cuvier; Edit. Griffith) *Ctenosaura similis similis* (Gray 1831) *Ctenosaura completa* Bocourt 1874 *Ctenosaura similis multipunctata* Barbour & Shreve 1934 *Ctenosaura (Ctenosaura) similis* Köhler et al. 2000

Cuadro 2. Nombres comunes utilizados para designar las diferentes especies de iguanas.

ESPECIES	**ESPAÑOL**	**INGLÉS**	**FRANCÉS**	**ALEMÁN**
Ctenosaura acanthura	Iguana espinosa del Golfo, tilcampo, Garrobos del Noreste, Chiguipiles.	Veracruz Spiny-tailed iguana	Iguane à queue épineuse de Golfe du Mexique	Ostmexicanischer Schwarzleguan
Ctenosaura alfredschmidti	Iguana enana, iguanita de Campeche, escorpiones	Campeche Spiny-tailed iguana	Iguane à queue épineuse de Campeche	Campeche-Schwarzleguan
Ctenosaura bakeri	Iguana de la Isla de Utila, swamper, Wishy-Willy	Utila Island Spiny-tailed iguana; Baker's Spiny-tailed Iguana	Iguane à queue épineuse de l'île d'Útil; Iguane noir d'Útila.	Utila-Schwarzleguan
Ctenosaura clarki	Iguana del Balsas, Nopilchi, Nopiches	Mexican Spiny-tailed iguana	Iguane à queue épineuse de Michoacán	Michoacán-Schwarzleguan
Ctenosaura conspicuosa	Iguana espinosa de Isla San Esteban, Heepni	San Esteban Spiny-tailed iguana	Iguane à queue épineuse de l'île de San Esteban	San Esteban-Schwarzleguan
Ctenosaura defensor	Iguanita maya, Chop, Choop	Yucatán Spiny-tailed iguana	Iguane à queue épineuse de Yucatán	Yucatán-Schwarzleguan
Ctenosaura flavidorsalis	Rumia	Yellow-backed Spiny-tailed iguana	Iguane à queue épineuse á dos jeune	Gelbrücken-Schwarzleguan

Ctenosaura hemilopha	Iguana espinosa de Baja California; Iguana de palo	Baja California Spiny-tailed iguana; Cape Spiny-tailed iguana	Iguane à queue épineuse du Cape	Baja California-Schwarzleguan
Ctenosaura macrolopha	Iguana espinosa de Sonora, Heepni	Sonoran Spiny-tailed iguana	Iguane à queue épineuse de Sonora	Sonora-Schwarzleguan
Ctenosaura melanosterna	Jamo, Jamo negro; Iguana del Valle de Aguán	Black-chested Spiny-tailed iguana; Honduran Paleate Spiny-tailed Iguana; Rio Aguan Valley Spiny-tailed Iguana	Iguane à queue épineuse de la Vállé d'Águán	Schwarzbrust-Schwarzleguan
Ctenosaura nolascensis	Iguana espinosa de la Isla de San Pedro Nolasco	San Pedro Nolasco Spiny-tailed iguana	Iguane à queue épineuse de l'île de Nolasco	Nolasco-Schwarzleguan
Ctenosaura oaxacana	Iguanita de Oaxaca, Guiú (derivativo Nguio), Raboancho (derivativo Raguancho), Cuepo, Tlalchiquín, Gumaga, Chiquipil o Chipilipi, Colitancha.	Oaxaca Spiny-tailed iguana	Iguane à queue épineuse de Oaxaca	Oaxaca-Schwarzleguan
Ctenosaura oedirhina	Iguana de la Isla de Roatán, Iguana negra, Wish-willys	Roatán Spiny-tailed iguana	Iguane à queue épineuse de l'île de Roatán	Roatán-Schwarzleguan
Ctenosaura palearis	Iguana de órgano, Garrobos del Motagua, Iguanas de Tuno	Paleate Spiny-tailed iguana; Guatemalan Black iguana o Spiny-tailed	Iguane à queue épineuse du Guatemala	Guatemala-Schwarzleguan
Ctenosaura pectinata	Iguana negra; Garrobo; Iguana espinosa Mexicana;	Mexican Black Spiny-tailed iguana, Western Spiny-tailed iguana	Iguane Mexicain à queue épineuse	Westmexikanischer - Schwarzleguan
Ctenosaura praeocularis	Jamo	Southern Honduran Spiny-tailed Iguana	Iguane à queue épineuse du Sud de Honduras	
Ctenosaura quinquecarinata	Iguana cola chata	Five-keeled Spiny-tailed iguana	Iguane à queue épineuse courte	Fünfkiel-Schwarzleguan

Ctenosaura similis	Iguana rayada, iguana de roca	Common Spiny-tailed iguana	Iguane commun à queue épineuse	Mittelamerikanische r- Schwarzleguan

ANEXO II

Cuadro 1. Descripción detallada de la distribución de las especies de *Ctenosaura*.

ESPECIES	**Distribución**
Ctenosaura acanthura	Endémica de Tamaulipas hacia el sur Veracruz, Tabasco, Oaxaca y Chiapas, México
Ctenosaura alfredschmidti	Endémica del sur de la Península de Yucatán en Campeche México
Ctenosaura bakeri	Endémica de Isla Utila, Honduras
Ctenosaura clarki	Endémica de Michoacán, Jalisco y Guerrero, México
Ctenosaura conspicuosa	Endémica de Islas San Esteban y Cholludo, Sonora, México.
Ctenosaura defensor	Endémica del nor-noroeste de la Península de Yucatán en México y norte de Guatemala
Ctenosaura flavidorsalis	Endémica de Guatemala, El Salvador y sur de Honduras
Ctenosaura hemilopha	Endémica de sur de Baja California Sur, México
Ctenosaura macrolopha	Endémica de Sonora, Sinaloa y Chihuahua, México
Ctenosaura melanosterna	Endémica de río Aguán Valley y cayos Cochinos, Honduras
Ctenosaura nolascensis	Endémica de Isla San Pedro Nolasco, Sonora, México
Ctenosaura oaxacana	Endémica de Oaxaca, México
Ctenosaura oedirhina	Endémica de Islas Roatán, Santa Elena, Barbaretta, Honduras
Ctenosaura palearis	Endémica de sureste de Guatemala
Ctenosaura pectinata	Endémica de oeste de México de Sinaloa a Oaxaca
Ctenosaura praeocularis	Endémica de Francisco Morazán y Choluteca, Honduras
Ctenosaura quinquecarinata	Endémica de Nicaragua al noroeste de Costa Rica
Ctenosaura similis	Endémica del sur de México a Panamá e isla San Andrés, Colombia

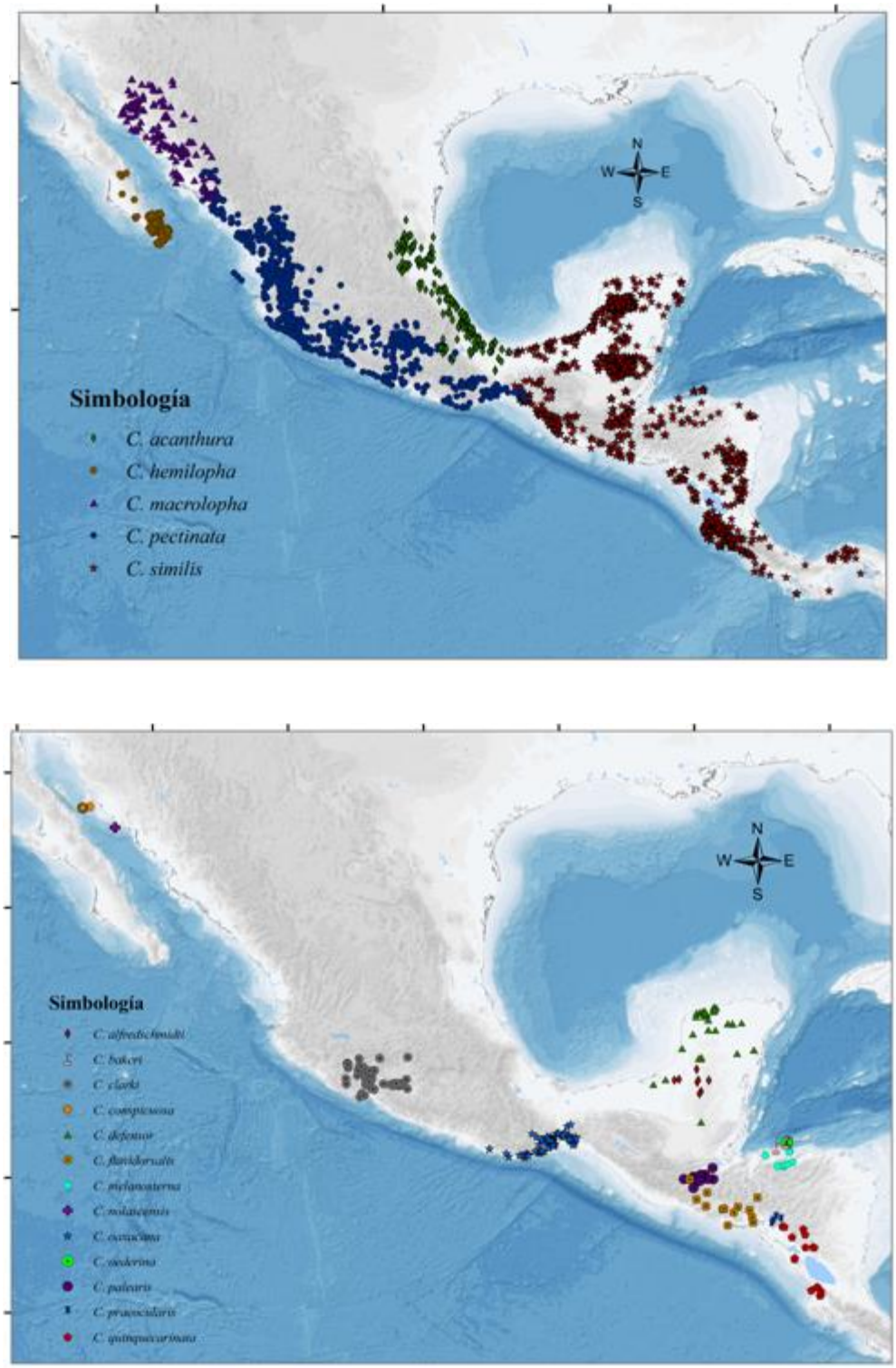

Figura 1. Distribución de 18 especies de *Ctenosaura* (elaborado por Eduardo Alexis López Esquivel, Colección Nacional de Anfibios y Reptiles).

Anexo III

Clave de identificación de las especies del género *Ctenosaura*.

1a. En la ubicación de la circunferencia máxima de la cola, la cola es alta (proporción ancho-alto 1.66-1.76); la proporción de la longitud de la cola/LHC es tan pequeña como 1.5; LHC máxima es por debajo de 200 mm; las bandas oscuras dístales en la cola son más anchos que las bandas oscuras proximales.....2

b. En la ubicación de la circunferencia máxima de la cola, la cola es ancha y alta (proporción ancho-altura 0.90-1.11); la proporción de la longitud de la cola/LHC es mayor que 1.6; la longitud máxima de la cola es 250 mm; las bandas oscuras dístales en la cola son igual de ancho que las bandas oscuras proximales.....7

2a. Aproximadamente 2/3 parte de la cola está cubierta de verticilos de escamas espinosas agrandadas; el ojo parietal es fácilmente visible a simple vista 3

b. Toda la cola está cubierta con escamas agrandadas; ojo parietal es apenas visible 5

3a. Los machos adultos tienen una cresta dorsal poco desarrollada (altura de menos de 2 mm); generalmente con espacios entre las escamas de la cresta (especialmente en la parte frontal de la zona dorsal); 2 o 4 escamas postmentales; la coloración dorsal suele incluir patrones amarillos *Ctenosaura flavidorsalis*

b. Los machos adultos tienen una cresta dorsal bien desarrollada (supera los 2 mm de alto); sin huecos entre las escamas de la cresta; 2 escamas postmentales; la coloración dorsal no incluye patrones amarillos 4

4a. Cola menos espinosa; 3-7 (promedio de 4.5) verticilos de la cola alineadas con escamas paramedianas espinosas; por lo general, tienen una franja ancho y brillante a lo largo del dorso (puede estar interrumpido); LHC hasta 170 mm (machos) o 124 (hembras) *Ctenosaura oaxana*

b. Cola espinosa, 4-13 (promedio de 6.4) verticilos de la cola alineados con escamas paramedianas espinosas; sin franja ancho y brillante a lo largo del dorso; LHC hasta 195 mm (machos) o 145 (hembras) *Ctenosaura quinquecarinata*

5a. Cola moderadamente espinosa; coloración es igual en la parte delantera y trasera del dorso *Ctenosaura clarki*

b. Cola muy espinosa; parte delantera del dorso principalmente negra, parte posterior del dorso rojizo..6

6a. 27-29 verticilos en la cola; proporción longitud de la cola/LHC 0.79-0.85; tienen filas de dorsales medianas agrandadas y regulares que llegan a la pelvis; parietal claramente visible con ojo parietal pequeño; solo los primeros 0 a 3 espacios intercalares no presentan filas de escamas intercaladas *Ctenosaura alfredschmidti*

b. 22-24 verticilos en la cola; proporción longitud de la cola /SVL 0.65-0.74; las filas de dorsalia medianas agrandadas son irregulares y reducidas; parietal es reducido y el ojo parietal no es visible; generalmente filas de pequeñas escamas intercalan las primeras ocho verticilos de escamas espinosas agrandadas *Ctenosaura defensor*

7a. 31-47 espinas de la cresta dorsal; Papada moderadamente marcada 8

b. 66-106 espinas de la cresta dorsal; no tienen papada, sólo presentan un pliegue transversal de la garganta 10

8a. De 7 a 17 verticilos en la cola con dos filas de escamas intercaladas planas entre los verticilos de escamas espinosas agrandadas; espinas de la cresta son uniforme en coloración con las escamas del dorso; el dorso es principalmente mono-cromo gris-marrón

Ctenosaura bakeri

b. Desde la primera a la tercera verticilo de la cola, las escamas intercalares forman solo una fila entre las verticilos de escamas espinosas agrandadas; espinas de la cresta no tienen la misma coloración que las escamas del dorso; tienen varias bandas anchas de gris a negro en el dorso, separadas por hileras de pequeños puntos de color brillante 9

9a. El área del pecho es principalmente de color negro; 9-12 escamas supralabiales *Ctenosaura palearis*

b. Área del pecho es marrón; 8-10 escamas supralabiales

Ctenosaura melanosterna

10a. Escamas agrandadas, fuertemente quilladas en la parte delantera de la parte inferior de las piernas; el hocico de los animales adultas es plano y redondeado; 9-15 poros femorales por extremidad; en el área entre el 4º y 6º verticilo de la cola sólo hay una fila de escamas intercalares *Ctenosaura oedirhina*

b. Las escalas de la parte delantera de la parte inferior de las piernas no están agrandadas, sólo están ligeramente quilladas; el hocico no es plano o redondeado; 4-10 poros femorales por extremidad; en el área entre el 4º y 6º verticilo de la cola hay al menos dos filas completas de escamas intercalares..... 11

11a. 75-107 (sólo en casos excepcionales menores de 80) dorsalia mediana ampliada; la cresta se interrumpe sobre el sacro por 25-65 filas de escamas dorsales; las escamas intercalares entre los verticilos dístales de escamas espinosas agrandadas son reducidas a una fila

12

b. 66-80 dorsalias medianas agrandada; si la cresta se interrumpe sobre el sacro, es sólo por un máximo de 20 filas de escamas dorsales; siempre hay un mínimo de dos filas de escamas intercalares entre verticilos de escamas espinosas agrandadas de la cola 15

12a. La parte inferior de la cabeza, las piernas y la cola tienen muchas manchas pequeñas de color negro (con un diámetro de aproximadamente 1/3 de la del tímpano)

Ctenosaura nolascensis

b. La parte inferior de la cabeza, las piernas y la cola no tienen manchas pequeñas negras 13

13a. La cresta dorsal llega casi a la pelvis *Ctenosaura macrolopha*

b. La cresta dorsal termina antes (máximo a 4/5 parte de la distancia entre el cuello y la pelvis) 14

14a. La parte superior de las extremidades posteriores tiene manchas irregulares; en la parte posterior del dorso hay bandas transversales de color brillante; los animales jóvenes son monocromático de color verde *Ctenosaura hemilopha*

b. La parte superior de las extremidades posteriores tienen bandas transversales; la parte posterior del dorso no tiene bandas transversales de color brillante; los animales jóvenes no son monocromático de color verde *Ctenosaura conspicuousa*

15a. Escamas de los verticilos de la cola son extremadamente espinosas (con ángulo de las quillas de mas que 30 grados) con quilla recta; la cresta está interrumpida en el área de la pelvis; en muchos individuos, las escamas intercalares se reduce a una fila en el área de la 5º a 8º fila intercalada..... *Ctenosaura acanthura*

b. Las escamas de los verticilos de la cola son moderadamente espinosas (con el ángulo de las quillas menor a 20 grados) con quilladas inclinadas; la cresta puede ser interrumpida en el área de la pelvis; siempre hay al menos dos filas de escamas intercaladas entre verticilos 16

16a. Tienen varias bandas transversales en el dorso, que en medio de la espalda generalmente tienen un centro brillante; la cresta dorsal continua sin interrupción sobre la cola; entra el 3º y 5º verticilo de la cola hay dos filas de escamas intercalares entre las escamas espinosas agrandadas *Ctenosaura similis*

b. No hay bandas oscuras transversales en el dorso; la cresta puede ser interrumpida sobre la pelvis; entre el 3º y 5º verticilo de la cola hay tres filas de escamas intercalares entre los verticilos de escamas espinosas agrandadas *Ctenosaura pectinata*

Anexo IV

Amenazas a las que se encuentran expuestas las especies del género *Ctenosaura*.

Especies	Amenazas
1.*Ctenosaura acanthura*	Destrucción del hábitat, consumo alimenticio, mercado ilegal de mascotas (nacional e internacional)
2.*Ctenosaura alfredschmidti*	Destrucción del hábitat
3.*Ctenosaura bakeri*	Destrucción del hábitat, especies invasoras, consumo alimenticio, hibridismo.
4.*Ctenosaura clarki*	Destrucción del hábitat, las matan por confundirla como especies venenosas, mercado ilegal de mascotas (nacional e internacional)
5.*Ctenosaura conspicuosa*	Cambios drásticos del hábitat por efectos del clima
6.*Ctenosaura defensor*	Destrucción del hábitat, mercado ilegal de mascotas (nacional e internacional)
7.*Ctenosaura flavidorsalis*	Destrucción del hábitat, consumo alimenticio
8.*Ctenosaura hemilopha*	Destrucción del hábitat, especies invasoras, consumo alimenticio
9.*Ctenosaura macrolopha*	Destrucción del hábitat, hibridismo.
10.*Ctenosaura melanosterna*	Destrucción del hábitat, consumo alimenticio, mercado ilegal de mascotas (nacional e internacional)
11.*Ctenosaura nolascensis*	Cambios drásticos del hábitat por clima, especies invasoras, mercado ilegal de mascotas (nacional e internacional), hibridismo.
12.*Ctenosaura oaxacana*	Destrucción del hábitat, consumo alimenticio,, mercado ilegal de mascotas (nacional e internacional)
13.*Ctenosaura oedirhina*	Destrucción del hábitat, especies invasoras, mercado ilegal de mascotas (nacional e internacional)
14.*Ctenosaura palearis*	Destrucción del hábitat, consumo alimenticio, mercado internacional de mascotas
15.*Ctenosaura pectinata*	Destrucción del hábitat, mercado ilegal de mascotas (nacional e internacional); consumo alimenticio, peletería.
16.*Ctenosaura praeocularis*	Destrucción del hábitat, consumo alimenticio
17.*Ctenosaura quinquecarinata*	Destrucción del hábitat, las matan como especies venenosas, mercado ilegal de mascotas (nacional e internacional)
18.*Ctenosaura similis*	consumo alimenticio, mercado ilegal de mascotas (nacional e internacional), hibridismo.

Fuente: Stephen et al. 2012; Otero et al. 2013; Grismer 2002; Gómez-Mora et al. 2012; Zurita et al. 2009; Flores et al. 2008; Ariano-Sánchez et al. 2016; Hasbún et al. 2013, Pasachnik et al. 2012, 2013, 2015; Reynoso et al. 2012; Köhler 2004 a-f

ANEXO V

Cuadro 1. Autorizaciones de aprovechamiento de ejemplares de México del género *Ctenosaura* del 2005 al 2018 (DGVS-SEMARNAT 2018).

Año	Especie	Número de productores	Número de permisos	Número de iguanas
2005	*C. pectinata*	1	1	120
2006	*C. pectinata*	1	1	250
2007	*C. pectinata*	2	2	494
2008	*C. pectinata*	2	5	858
2009	*C. pectinata*	2	2	181
2010	*C. pectinata*	1	4	618
2011	*C. pectinata*	3	12	1782
	C. defensor	1	1	2
2012	*C. defensor*	1	2	5
2013	*C. pectinata*	3	6	2639
2014	*C. pectinata*	2	2	54
2015	*C. pectinata*	2	5	774
2016	*C. pectinata*	4	4	310
2017	*C. pectinata*	2	5	760
2018	*C. pectinata*	1	1	80
Totales			53	8927

Cuadro 2. Consulta de los datos de comercio (periodo 2010-2018) de la base de datos UNEP-WCMC para las especies de *Ctenosaura*. Los códigos propósito y origen son los empleados por la UNEP-WCMC (Propósito: T = comercial, S = científico, Z = zoológicos; Origen: U = desconocido, C= reproducidos en cautiverio, I = confiscados, W = medio silvestre.

*Especie no incluida en la CITES.

Especie	Periodo	Exportadores	Importadores	País de origen	No. de ejemplares	Propósito	Origen
*C. quinquecarinata**	2011-2017	Estados Unidos, Nicaragua, Canadá, Emiratos Árabes	Dinamarca, Países Bajos, República Checa, España, Gran Bretaña	Estados Unidos, Nicaragua	1006	T	U (36.3%), C (4.5%), W (4.5%), sin información (54.5%)
C. palearis	2015	Estados Unidos	Canadá		5	T	I
C. oedirhina	2011-2013	Estados Unidos	Honduras		399	S	W
C. bakeri	2011-2015	Gran Bretaña, Honduras, Países Bajos	Países Bajos, Estados Unidos	Honduras	87	Z y S	O (25%), W (25%), F (25) y sin información (25%)

Cuadro 3. Información de comercio internacional de Alemania, Austria, El Salvador, España, Países Bajos y Reino Unido, recibida en respuesta a la Consulta de la Autoridad Científica de México. Las abreviaciones indican: Ind=Individuos, Imp=Importados, Exp=Exportados, los códigos de país: DE = Alemania, AT = Austria, ES = España, NL = Países Bajos, SV = El Salvador, UK = Reino Unido, MX = México, US = Estados Unidos, NI = Nicaragua, HN = Honduras; códigos de origen: U = desconocido, B = reproducido en cautiverio, F = especímen nacido en cautiverio, W = vida silvestre, y códigos de propósito: T = comercial, Z = zoológico, S = científico (abreviaciones empleadas por la UNEP-WCMC)

País que respondió	Especies en comercio (se indica su distribución nativa)	Países de origen, destino; fuente y propósito del comercio internacional							
		Periodo	País de origen	Origen	País que importa	Ind. Imp.	País que exporta	Ind. Exp.	Propósito
DE	*C. defensor (MX)*	2008-2018	MX	U	ES	1*	XX		Sin información
AT	*C. oedirhina*	2008-2018	US	U	XX	1	XX		Sin información
	C. *alfredschmidti*	2008-2018	XX	U	XX		XX		Sin información

	C. oaxacana	2008 - 2018	XX	U	XX		XX		Sin información
	C. pectinata,	2008 - 2018	XX	U	XX		XX		Sin información
	C. defensor	2008 - 2018	XX	U	XX		XX		Sin información
ES	*C.quinquerinata*	2016 y 2018	NI	B	ES	680	NI		T
	*C.bakeri**	2008 - 2018	XX	U	XX		XX		Z
	*C. palearis***	2008 - 2018	XX	U	XX		XX		Z
NL	*C. alfredschmidti, C. clarki,* *C. defensor,* *C. bakeri,* *C. melanosterna, C. oaxacana,* *C. pectinata,* *C. quinquecarinata, C. similis,* *C. oedirhina,* *C. palearis****		HN, US	F	NL	No especifica		18 ejemplares de *C. bakeri*	T, Z
SV	*C. similis*	2002 - 2005	SV	U	DE, ES, US		SV	3960	Sin información
UK	*C. bakeri*	2013 - 2017							
	C. quinquecarinata	2013 - 2017	HN	W	UK	800 muestras de sangre 150 espinas dorsales	HN		S

	NI	U		78 ejemplares	NI	Sin información
2014 - 2017	US, NI	U	UK	561 ejemplares adultos		

*Especie importada ilegalmente acorde a lo especificado en la información por Alemania.
**España reporta pocos ejemplares (no especifica cuántos) dentro de zoológicos.
***No proporciona más información para las demás especies.

Cuadro 4 Autorizaciones de aprovechamiento y exportación de ejemplares de México del género *Ctenosaura* para diferentes periodos: extracción de vida silvestre, 2000-2015; cría en cautiverio, 2005-2015 (SEMARNAT 2015).

Especie	Aprovechamiento autorizado		Exportaciones legales		
	TOTAL de Ejemplares	Origen de los ejemplares (# de UMA)	**TOTAL** Ejemplares	Origen*	Propósito*
Ctenosaura pectinata	7,142	14 (*4 vida libre, 10 cautiverio*)	1,493	C (317); NE (1,176)	T
Ctenosaura defensor	7	1 (*cautiverio*)	5	C	T
C. hemilopha	-	*Colecta científica*	46	W	S
C. conspicuosa	-	*Colecta científica*	4	W	S
GRAN TOTAL	**7,151**		**1,548**		

*****Los códigos de origen son: C = Criado en cautiverio, W = Vida libre y NE= Desconocido; los códigos de propósito son: T= Comercial y S= Científico

Cuadro 5. Venta de especies de *Ctenosaura* en los Estados Unidos y Europa mediante anuncios de Internet. Terraristic.com ofrecen productos de diversas partes de Europa para venta en la feria de Hamm, Alemania.

País	**Casa**	**Página Web**	**Especie**	**Precio USD**	**Comentario**
Alemania	Terraristik: Alexandra Lickert (Alemania)	http:terraristik.com/tb/list_classifieds_int.php	*C. quinquecarinata*	80	Juvenil
	Terraristik: Dennise Bock (Alemania)		*C. quinquecarinata*	57	
			C. similis	100	
	Terraristik: Herr Ransopan (Alemania)		*C. similis*	159 /pareja	Crías
	Terraristik: Klaus		*C. quinquecarinata*	50	Juvenil

	Kirchenhelm (Alemania)				
	Terraristik: Nicole Müller (Alemania)		*C. palearis*		
	Terraristik: Sunshine (Alemania)		*C. quinquecarinata*		
			C. clarki		
	Terraristik: Kamaleon Hasset (Bélgica)		*C. similis*	74	Crías
	Terraristik: Carlos Mr Mojo (España)		*C. oaxacana*		
	Terraristik: Espiné Bet (France)		*C. defensor*		
	Terraristik: Mikael Noel (Francia)		*C. defensor*	1140	Adulto
	Terraristik: CMP (Gran Bretaña)		*C. similis*		Crías
	Terraristik: Dan Morris (Gran Bretaña)		*C. defensor*	285 a 740	Adulto, juvenile
	Terraristik: Giacomo Ceccareli (Italia)		*C. defensor*		Adulto
	Terraristik: Marco Carrosi (Italia)		*C. pectinata*	272	Juvenil
	Terraristik: El Locco (Polonia)		*C. pectinata* (jaspeada)	227 a 512	Crías
	Terraristik: Flip Simnit (Polonia)		*C. quinquecarinata*	35	Hembras
	Terraristik: Giri Korchov (República Checa)		*C. similis*		
	Terraristik: Thomas Scmidth (Suiza)		*C. defensor*		Crías
	Terraristik: Bion Terrarium		*C. pectinata (jaspeada)*		Solicitud de intercambio

	Center (Ucrania)				
Austria	Cyclura.info	http://www.cyclura.eu/en/available/	*C. defensor*		Crías sin sexar
Canada	Port Credit Pets.	https://portcreditpets.com/product-category/lizards/page/2/	*C. pectinata*	60 a 280	Cría / no indica procedencia
			C. quinquecarinata	120	Adulto / no indica procedencia
	Thunder Bay Reptiles	http://www.thunderbayreptiles.com/lizards/Iguana	*C. pectinata*	45	
			C. similis	40	
	Magazoo	https://www.magazoo.com/iguane-noir-mexicain-a-queue-epineuse-femelle.html	*C. similis*	75	Juvenile
España	DNAT ecosistemas	http://www.dnatecosistemas.es/tienda-reptiles-y-anfibios/reptiles/lagartos-y-saurios/	*C. quinquecarinata*	51.73	Adulto / no indica procedencia
Francia	Le Ferme Tropicale	https://www.lftshop.com/iguanes,fr,3,35.cfm	*C. clarki*	450	Adulto. No vende hembra sola
			C. pectinata	200	Juveniles
			C. quinquecarinata	56	Juveniles
			C.similis	80	Juveniles
Mexico	REPTILE TRADE	https://www.reptiletrade.mx/collections	*C. bakeri*	650	
Países Bajos	Reptilia.NL	http://reptilia.nl/dierenOverview.php?amount=1&sorteer=&zoeken=&land=&categorie=&maand=	*C.quinquecarinata*	34 a 56	Cría, juvenil, subadulto
			C. similis	68	
UK	Exotic Pets	https://www.exotic-pets.co.uk/club-tailed-iguana.html	*C. quinquecarinata*	S/P	Indican que dejes datos y ellos se comunican
	Privado	https://www.preloved.co.uk/adverts/show/118083194/mexican-spiny-tail-iguana-ctenosaura-pectinata.html	*C. pectinata*	257	Juveniles, no señalan sexo, indicant que no requiere certificado CITES
USA			*C. pectinata*	39.9	

	Backwater Reptiles, Inc	https://www.backwaterreptiles.com/iguanas-for-sale.html	*C. quinquecarinata*	29.9	No hacen envíos internacionales
			C. similis	39.9	
	Deer Fern Farms	http://deerfernfarms.com	*C. pectinata*	300	Crías / cautiverio
	Exotic Pets	http://exoticpetslv.com/iguanas/	*C. acanthura*	400	Adulto / no indica procedencia
			C. melanosterna	160	Crías / cautiverio
	FaunaClassifieds	http://www.faunaclassifieds.com	*C. pectinata*	125 a 300	Crías y juvenile / no indica procedencia
	Garrett Smith	http://market.kingsnake.com/detail.php?cat=114&de=1214083	*C. bakeri*	3500	Dos hembras / cautiverio
			C. pectinata	3500	Adulto / cautiverio, pie de cría
	HaHaReptiles	http://www.hahareptiles.com/Merchant2/merchant.mvc?Screen=PROD&Store_Code=haha&Product_Code=C15&Category_Code=L	*C. quinquecarinata*	20	Adulto / no indica procedencia.
	Keven vogenberger	http://market.kingsnake.com/detail.php?cat=114&de=1211602	*C. pectinata*	159.99	Juvenil
	LLLReptile and Supply Co	https://www.lllreptile.com/	*C. pectinata*	189.99	
	Lynn Peterson	http://market.kingsnake.com/detail.php?cat=114&de=1214300	*C. conspicuosa*	2500	Hembra y macho adulto / cautiverio
			C. oedirhina	1500	Macho adulto de dos años de edad
			C. defensor		Adulto / no indica procedencia
	Morph Mania Reptiles	https://www.morphmaniareptiles.com	*C. defensor*	369.99	Adulto / cautiverio
			C. similis	59.99	Adulto / capturado en campo
	Reptile City	http://www.reptilecity.com/Merchant2/merchant.mvc?Screen=CTGY&Store_Code=reptiles&Category_Code=LIZARDS	*C. quinquecarinata*	29.99	Adulto / no indica procedencia
	Reptile Rapture	http://reptilerapture.net/lizards.html	*C. pectinata*	S/P	Cautiverio

	ReptilesNCritters	https://www.reptilesncritters.com/pacific-club-iguanas.html	*C. quinquecarinata*	44.99	No hacen envios internacionales
			C. similis	44.99	Crías / no indica procedencia
	Reptmart	https://reptmart.com/lizards-1/iguanas-for-sale/	*C. clarki*	79	Adulto / no indica procedencia
			C. quinquecarinata	29.9	Adulto / no indica procedencia
	SailfinDragon	http://www.sailfindragon.com	*C. melanosterna*	250	Crías / criadas en cautiverio
	Snakes at Sunset	http://snakesatsunset.com/iguanas-for-sale/	*C. melanosterna*	149.99	
			C. pectinata	399.99	
			C. quinquecarinata	39.99	
			C. similis	39.99	
	Strictly Reptiles	https://strictlyreptiles.tv/product/clubtail-iguana-babies-to-small/	*C. quinquecarinata (ofrecida como Ctenosaura sp.)*	S/P	Adulto / no indica procedencia
	Ty Park & Ty's Lizards	https://www.facebook.com/tyslizards/photos/pcb.1894681310568960/1894680980568993/?type=3&theater	*C. bakeri*	300	Cría / no indica procedencia
			C. conspicuosa	800	Cría / no indica procedencia
			C. clarki	400	
			C. oedirhina	600	Cria / no inidca procedencia
			C. melanosterna	350	Indica que no puede ser exportada
			C. pectinate (var. azul y cría verde)	200 y 350	Cría / no indica procedencia
			C. similis	40	
	Underground Reptiles	https://undergroundreptiles.com/product-category/animals/lizards/iguanas/	*C. defensor*	349.99	Hembras y machos / cautiverio
			C. pectinata	399.99	Hembras y machos / cautiverio
			C. quinquecarinata	24.99	Hembra adulta / recogida en el campo

			C. similis	19.99 y 49.99	Cría, hembra y macho / recogidos en el campo

Cuadro 6. Venta de especies de *Ctenosaura* en los Estados Unidos y Europa mediante anuncios personales de Facebook.

País	Casa	Especie	Precio USD	Página Face	Comentario
España	Juan Rando	*C. oaxacana*	S/P	https://www.facebook.com/jrando27/photos	Adulto / no indica procedencia
Indet.	Ben Suiegel-Reptiles	*C. melanosterna*	149	https://www.facebook.com/reptileshop2/photos	Crías / cautiverio
Indet.		*C. quinquecarinata*	25	https://www.facebook.com/pg/reptileshop2/photos/?ref=page_internal	Adulto / no indica procedencia
Indet.	GHC Exotics	*Ctenosaura*	S/P	https://www.facebook.com/ghcpets/	Hembras adultas / no indica procedencia
Indet.	Reptiles. INC	*C. pectinata*	S/P	https://www.facebook.com/ReptilesInc/	Macho adulto / no indica procedencia
Indet.	Two Rivers Reptile Ranch	*C. palearis*	S/P	https://www.facebook.com/Two-Rivers-Reptile-Ranch-320181822081764	Crías / cautiverio
Indet.		*Ctenosaura*	S/P	https://www.facebook.com/Two-Rivers-Reptile-Ranch-320181822081764	
Indet.	Undefeated Reptiles	*C. melanosterna*	S/P	https://www.facebook.com/UndefeatedReptiles	Adulto hembra, machos y crias / no indica procedencia
Indet.		*C. palearis*	S/P	https://www.facebook.com/UndefeatedReptiles	Adulto / no indica procedencia
Indet.		*C. pectinata*	S/P	https://www.facebook.com/UndefeatedReptiles	Adulto, no indica procedencia
Indonesia	Surya Js	*C. similis*	S/P	https://www.facebook.com/surya.js.56	
Indonesia	Tetrapod	*C. pectinata*	S/P	https://www.facebook.com/Tetrapod-1692760090807190	Juvenil / no indica procedencia
Indonesia		*C. similis*	S/P	https://www.facebook.com/Tetrapod-1692760090807190	Hembra adulta / no indica procedencia
UK	Tom Middlebrook	*C. palearis*	S/P	https://www.facebook.com/tmiddlebrook	Crías / cautiverio
USA	Amir Soleymani	*C. bakeri*	499	https://www.facebook.com/amir.soleymani.142	Juvenil / no indica procedencia
USA	Eternal Reptiles	*C. pectinata*	130	https://www.facebook.com/EternalReptiles/	Crías / no indican procedencia

USA		*C. quinquecarinata*	35	https://www.facebook.com/EternalReptiles/	Adultos / no indican procedencia
USA		*C. similis*	15	https://www.facebook.com/EternalReptiles/	Crías. No indican procedencia
USA		*Ctenosaura*	S/P	https://www.facebook.com/EternalReptiles/	Adultos y crías / capturados en campo
USA	GISHerps	*C. bakeri*	S/P	https://www.facebook.com/gisherps	Adultos y crías / cautiverio
USA	Joey Burnette	*C. pectinata*		https://www.facebook.com/joey.burnette	Crías. No indican procedencia
USA		*C. similis*	S/P	https://www.facebook.com/joey.burnette	Juvenil. Capturada en campo
USA	Jordan Rossell	*C. alfredschmidti*	S/P	https://www.facebook.com/ocelaigh/photos	Alduto. No indica procedencia
USA	Josua Marki	*C. alfredschmidti*	1200	https://www.facebook.com/MarkiReptiles/	Alduto. Criado en cautiverio
USA		*C. defensor*	800	https://www.facebook.com/MarkiReptiles/	Crías, producidas en cautiverio
USA	Reptile Function	*Iguanas*	S/P	https://www.facebook.com/pg/ReptileFunction/posts/	Adultos y crías en cautiverio
USA	William Johnathon	*C. pectinata*	60	https://www.facebook.com/william.johnathon	Adulto. No indica procedencia

Cuadro 7. Importaciones de iguanas *Ctenosaura* registradas en México desde 2000 a 2015 (DGVS-SEMARNAT, 2015).

Año	**Especie**	**Cantidad**	**País de Origen**
2004	*C. similis*	400	E.U.A.
2006	*C. similis*	2102	E.U.A.
2007	*C. similis*	1000	Gutemala
2008	*C. similis*	2000	Guatemala
2009	*C. similis*	3000 (imp. definitiva)	Guatemala
2010	*C. similis* *C. palearis,* *C. pectinata*	2224 24 74	Guatemala y E.U.A EUA Guatemala y E.U.A
2011	*C. similis* *C. pectinata*	2000 100	Guatemala Guatemala
2012	*C. similis* *C. pectinata*	1000 150	Guatemala Guatemala
2013	*C. pectinata*	50	Guatemala
2014	*C. similis*	500	Nicaragua
2015	*C. alfredschmidti*	20	Alemania
Total	*C. similis* *C. palearis,* *C. pectinata* *C. alfredschmidti*	14,226 24 374 20	
Gran Total		14,644	

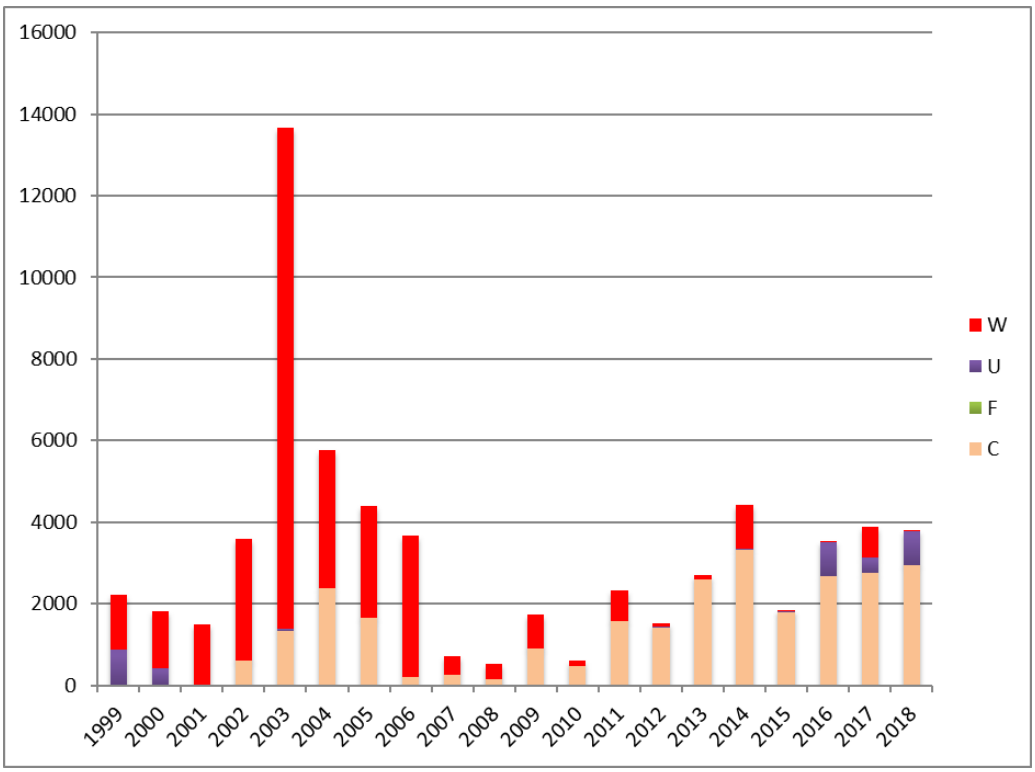

Figura 2. Actividad de importación de *Ctenosauras* por año a Estados Unidos, de acuerdo con el reporte interno de la USFWS, 2018.

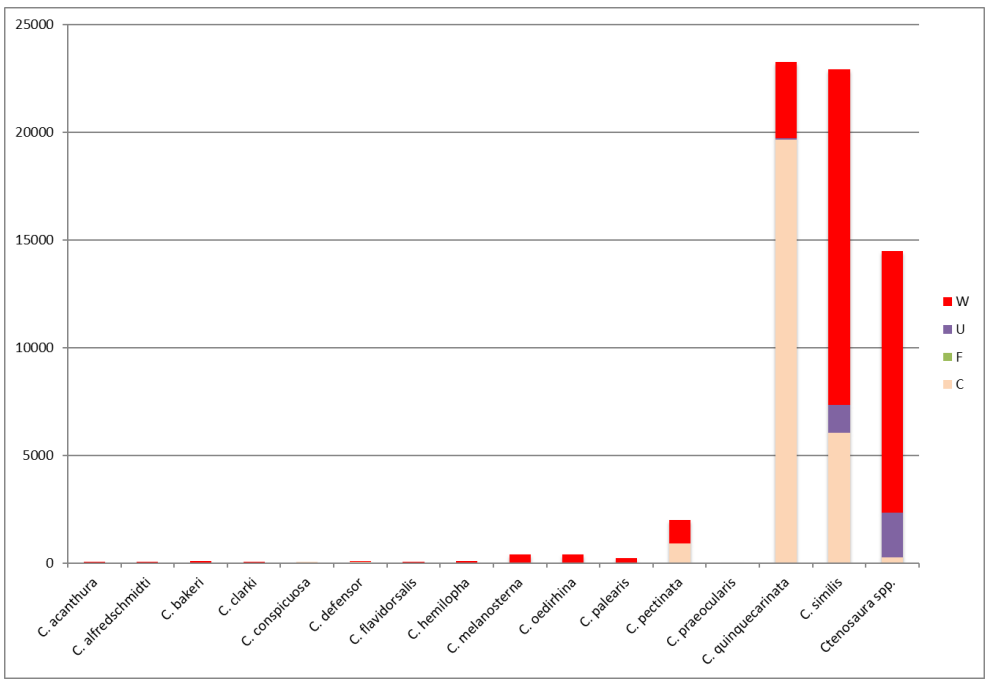

Figura 3. Actividad de importación a Estados Unidos por especie de *Ctenosaura,* de acuerdo con reporte interno de la USFWS, 2018.

Cuadro 8. Decomisos de iguanas *Ctenosaura* en México registrados por la PROFEPA (2013-2018). BC, Baja California; GTO, Guanajuato; GUE, Guerrero; JAL, Jalisco; MICH, Michoacán; MOR, Morelos; OAX, Oaxaca, CDMX/MX, Ciudad de México y Estado de México.

Especie	BC	GTO	GUE	JAL	MICH	MOR	OAX	CDMX/MX	Total
C. defensor								8	8
C. pectinata	1	1	5		6	22	41	55	131
C. quinquecarinata				11				5	16
C. similis								4	4
Total	**1**	**1**	**5**	**11**	**6**	**22**	**41**	**72**	**159**

*Los decomisos se efectuaron en: Predios e instalaciones que Manejan Vida Silvestre (PIMVS), para Baja California; Local comercial para Guanajuato; Zoológico para Guerrero y Michoacán; producto de una negociación en Jalico, en Oficinas de la PROFEPA en Morelos, en las Oficinas de PROFEPA, PGR y una UMA en Oaxaca y en el Aeropuerto Internacional de la Ciudad de México (AICM), comercializadoras, puestos ambilatnes y oficinas de la PROFEPA en la CDMX/MX.

Cuadro 9. Eventos de decomiso registrados para iguanas del género *Ctenosaura,* de acuerdo con las consultas a los países exportadores/importadores (Consulta Autoridades CITES 2018).

*Información porporcionada por España.

**Información de PROFEPA (2018).

País de decomiso	Especie	Número de ejemplares
El Salvador	*C. similis*	226
México**	*C. pectinata*	381
	C. defensor	8
	C. similis	26
	C. quinquecarinata	16
Países Bajos*	*C. pectinata*	16
	C. oaxacana	2
	C. conspicuosa	24

Anexo VI

Relación de revisores de la propuesta de inclusión del género Ctenosaura al Apéndice II de la CITES

NOMBRE	INSTITUCIÓN
Dra. Eugenia Zarza	ECOSUR, Tapachula
Dr. Víctor Aguirre-Hidalgo	Universidad de la Sierra de Juárez, Oax.
Dr. Germán Mendoza	Universidad Autónoma Metropolitana, Xochimilco
Dra. Carmen Blázquez	CIBNOR, La Paz
Dra. Tamara Rioja	UNICACH, Chiapas
Dra. Pilar Rueda	UAM Xochimilco
M. en C. Laura Briseño	Animal World & Snake Farm, New Braunfels
M. en C. María Reyna Felix Ortíz	Universidad del Mar, Puerto Escondido, Oax
M. en C. Nohelia Pacheco Hoyos	Universidad de Sonora, Son
Biól. Milton Ubeda	Universidad Autónoma de Nicaragua
Biól. Emilio Suárez	Universidad Veracruzana
Biól.Hugo Salinas Matus	Facultad de Ciencias, UNAM
Biól. Marta Pastrana	SERVIOTAC
Biól. Víctor Hernández	SERVIOTAC
Biól. Ahmed Bello	Universidad Veracuzana
Biól. Corina Rodríguez	CINVESTAV, Irapuato
Biól. Wendy Moral	Instituto de Biología, UNAM
Biól. Amaya González	Petmmal
Sandra Alther	ProWildlife Alemania
Revisores externos	
Dra. Stesha Pasachnick	Zoológico de Forth Worth; Chair, Iguana Specialists Group, IUCN
Evert Henningheim	IUCN Iguana Specialist Group, Trade
Dr. Jorge Morales Mávil	Universidad Veracruzana, Ver. Presidente del Subcomité de Iguanas, México