THE TRADE IN NATIONALLY PROTECTED LIZARDS FROM AUSTRALIA, CUBA, AND MEXICO AND THE EU'S ROLE AS A MAIN DESTINATION

Report by Sandra Altherr, Katharina Lameter and Juan Carlos Cantu

Santiago Grass Anole *Anolis rejectus*, a Cuban endemic species.

Introduction

Its broad geographical extent, large number of wealthy consumers and the absence of internal trade barriers make the European Union (EU) a coveted market for smuggled live animals (Auliya *et al.*, 2016a,b). The demand from certain consumers is aimed at "special species" that are characterised, for example, by their rarity (in the wild or in trade), endemicity, or morphological characteristics such as striking colours and patterns or other special features, such as vivipary (Brook and Sodhi, 2006; Canlas *et al*., 2017; Ngo *et al.*, 2019). Those clients—high-end hobbyists, breeders and wildlife dealers—are willing to pay up to several thousand Euros per animal, making trade in such species highly lucrative (Nijman and Stoner, 2014; Altherr *et al.,* 2016). Among such limited available species are those that are strictly protected from capture, sale and export in their country of origin, but which are not covered by the international trade controls of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora). Therefore, once they have entered the EU, there are no obvious legal grounds for stopping their trade. This questionable business is therefore a highly profitable activity, with much lower risks and penalties compared with the illegal trade in CITES-listed species (Altherr, 2014; Auliya *et al.,* 2016).

This study focuses on online trade in the EU in non-CITES, endemic lizard species from Australia, Mexico and Cuba. All three countries are biodiversity hotspots (Mittermeier and Mittermeier, 1997; Myers *et al.,* 2000), have strict national legislation restricting or prohibiting the export of native wildlife for commercial purposes, and were therefore selected as case studies. This report reviews the range of species on sale in Europe, prices, how this special type of wildlife crime is organised and investigates how the EU and other destinations can regulate this trade.

Methods

Over a period of six months (mid-September 2017 to mid-March 2018) online surveys on five European online platforms and in five Facebook groups (both open and closed) were conducted. Closed groups are more resistant to surveillance by law enforcement agencies in source and market countries. The species names follow the Reptile Database by Uetz and Hošek (1995–2019).

The range of species, number of individuals, prices, as well as the sellers' indicated nationalities were recorded. In cases where no number was given but offers for sale indicated more than one specimen, two individuals were counted, prices for groups were converted into price/individual. In addition, the species' status in the IUCN Red List of Threatened Species and national protection status were determined. Two Australian endemic species (bearded dragons *Pogona henrylawsoni* and *P. vitticeps*) were excluded from this analysis due to large-scale captive-breeding, which fully meets demand for these species.

Statistical information on Mexico's legal exports for the period 2000–2016 was received from the country's CITES Management Authority; data on reptile seizures in Mexico were received from the Federal Office of Environmental Protection (PROFEPA *in litt.* to J.C. Cantu, 2019).

Common name	Scientific name	IUCN	Price €	No. specimens	EU Traders	Non-EU Traders
Chameleon Gecko	*Carphodactylus laevis*	LC	1,000	4	DE	CA
Marbled (Southern) Gecko	*Christinus marmoratus*	LC	10–49	2	DE	
Pink-tongued Skink	*Cyclodomorphus gerrardii*	LC	60–125	52	AT;DK;DE;FR;HU;NL;IT;UK	
Forked Gecko	*Diplodactylus furcosus*	LC	120	3	DE	
Helmeted Gecko	*D. galeatus*	LC	350–500	15	BE;DE;FR;HU;SK;SE	
Western Stone Gecko	*D. granariensis*	LC	90–250	2	DE	
Fine-faced Gecko	*D. pulcher*	LC	600	1	DE	
Eastern Stone Gecko/Wood Gecko	*D. vittatus*	LC	185–300	7	AT;DE	
Cunningham's Skink	*Egernia cunninghami*	LC	500–800	4	DE;PL	UA
Western Pilbara Spiny-tailed Skink	*E. cygnitos*	LC	5,000	2	DE	
Pygmy Spiny-tailed Skink	*E. depressa*	LC	1,900	13	AT;DE;ES;FR;SE;SI;SK	MY
Central Pygmy Spiny-tailed Skink	*E. eos*	LC		2	DE	
Eastern Pilbara Spiny-tailed Skink	*E. epsisolus*	LC	2,100–3,000	37	DE;ES;UK	CH;HK
Hosmer's (Spiny-tailed) Skink	*E. hosmeri*	LC	250–500	2	DE;	RU
King's Skink	*E. kingii*	LC		2		MY
Pilbara Crevice Skink	*E. pilbarensis*	LC	2,500	3	DE	
Black Crevice Skink	*E. saxatilis*	LC		2	DE	
Gidgee (Spiny-tailed) Skink	*E. stokesii*	LC	350–750	2	CZ;DE;IT;UK	
Tree Crevice Skink	*E. striolata*	LC	165–200	10	CZ;DE;IT	
Dubious Four-clawed Gecko	*Gehyra dubia*	LC	40	2	NL	
Bynoe's Gecko	*Heteronotia binoei*	LC	55–81	89	CZ;DE;FR;NL;UK	CH;US
Boyd's Forest Dragon	*Lophosaurus boydii*	LC	750–800	42	DE;SK;UK	
Beaded Gecko	*Lucasium damaeum*	LC	150	8	AT;CZ	
Robust Velvet Gecko	*Nebulifera robusta*	LC	125–150	1	CZ;DE	
Centralian Rough Knob-tail Gecko	*Nephrurus amyae*	LC	230–1,000	61	CZ;DE;DK;ES;FR;NL;PL;UK	CH;US
Rough Knob-tail	*N. asper*	LC	1,500	10	DE;ES;UK;	US
Pernatty Knob-tail	*N. deleani*	LC	250–290	42	CZ;DE;ES;NL;PL;SK;UK	US
Smooth Knob-tail	*N. laevissimus*	LC	500	2	CZ;ES;NL	
Three-lined Knob-tail	*N. levis*	LC	250–500	106	AT;BE;CZ;DE;ES;FR;IT;NL PL;SK;UK	CH;RU;US
Kimberley Rough Knob-tail	*N. sheai*	LC	750	2	SK	
Stellate Knob-tail	*N. stellatus*	LC	1,250–1,400	27	DE;ES;NL;UK	
Midline Knob-tail	*N. vertebralis*	LC	220	5	AT;CZ;DE;ES;NL;PL;UK	US
Banded Knob-tail	*N. wheeleri*	LC	50–300	192	BE;CZ;DE;ES;FR;IT;NL;PL;SK	CA;CH;US
Northern Velvet Gecko	*Oedura castelnaui*	LC	80–150	13	AT;CZ;DE	RU
Western Marbled Velvet Gecko	*O. fimbria*	LC	90–250	2	CZ;DE	
Marbled Velvet Gecko	*O. marmorata*	LC	100	4	CZ;DE	
Ocellated Velvet Gecko	*O. monilis*	LC	40–200	70	CZ;DE	
Southern Spotted Velvet Gecko	*O. tryoni*	LC	150	5	HU	
Mount Elliot Leaf-tailed Gecko	*Phyllurus amnicola*	NT	1,250–2,030	45	CZ;DE;FR;SK	RU;US
Ringed Thin-tail Gecko	*P. caudiannulatus*	NT	500–800	2	DE	
Broad-tailed Gecko	*P. platurus*	LC	420–950	10	CZ;PL	
Eastern Bearded Dragon	*Pogona barbata*	LC	220	18	IT	
Western Bearded Dragon	*P. minor*	LC	120–220	21	CZ;DE;ES;FR	CH
North-west Bearded Dragon	*P. mitchelli*	NE	950	2	DE	
Kate's Leaf-tailed Gecko	*Saltuarius kateae*	LC		13	DE	
Rough-throated Leaf-tail Gecko	*S. salebrosus*	LC	2,000	15	DE;DK;	CA;CH;RU;US
(Wyberba) Leaf-tailed Gecko	*S. wyberba*	LC	350–1,500	5	CZ;DE;FR;NL;UK	RU;US
Goldfields Spiny-tailed Gecko	*Strophurus assimilis*	LC		4	DE	
(Northern) Spiny-tailed Gecko	*S. ciliaris*	LC	170–550	143	CZ;DE;FR;NL;PL;SK;UK	JP
Jewelled Gecko	*S. elderi*	LC	2,100	11	DE	
Southern Spiny-tailed Gecko	*S. intermedius*	LC	80–120	4	CZ;DE;PL	
Kristin's Spiny-tailed Gecko	*S. krisalys*	LC	350–520	4	CZ;PL;	US
Exmouth Spiny-tailed Gecko	*S. rankini*	LC	350	33	DE;FR;SI	
Soft Spiny-tailed Gecko	*S. spinigerus*	LC	190–203	15	DE;HU;NL;SK	
Western Spiny-tailed Gecko	*S. strophurus*	LC	600	2	DE	
Golden Spiny-tailed Gecko	*S. taenicauda*	LC	90–300	41	DE;FR;IT;HU;SK;UK	
Western Shield Spiny-tailed Gecko	*S. wellingtonae*	LC	650	2	CZ	
Eastern Spiny-tailed Gecko	*S. williamsi*	LC	120–203	72	CZ;DE;HU;NL;PL;SI;UK	US
Pygmy Bluetongue Lizard	*Tiliqua adelaidensis*	EN	at least 150	17	DE;UK	RU
Centralian Bluetongue	*T. multifasciata*	LC		2	CZ;NL;UK	MY
Blotched Bluetongue	*T. nigrolutea*	LC		2	CZ,ES	MY
Shingleback Lizard	*T. rugosa*	LC	400–7,900	21	AT;CZ;DE;ES;FR;SE;HK;MY	
Common or Eastern Bluetongue	*T. scincoides**	LC	100–6,000	83	AT;BE;CZ;DK;DE;FR;HU;IT NL;SK;UK	CA;MY;UA
Eyrean Earless Dragon	*Tympanocryptis tetraporophora*	LC	80	12	DE;NL	
Thick-tailed or Barking Gecko	*Underwoodisaurus milii*	LC	50–465	132	AT;CZ;DE;HU;PL;SK;UK	CA;US
Border Thick-tailed Gecko	*Uvidicolus sphyrurus*	LC		2	DE	

Table 1. List of lizard species endemic to Australia and not protected by CITES that were found on sale at surveyed online platforms and in social media groups in Europe. All native species are protected nationally in Australia's *Environment Protection and Biodiversity Conservation Act 1999*. IUCN: EN = Endangered, LC = Least Concern, NE = Not Evaluated. Key for country codes, page 63.
*The Indonesian subspecies *Tiliqua scincoides chimaera* has been excluded from these figures.

Legislation

In Australia, the commercial export of live native reptiles is strictly prohibited by the federal *Environment Protection and Biodiversity Conservation Act 1999*.

Cuba's threatened species are protected via federal Resolution No. 160/2011 (and previous versions), which in its Appendix I lists those species strictly protected (i.e. prohibiting capture and export for commercial purposes) and in its Appendix II protected species (commercial exports only authorised via special permits); these national Appendix listings, reflecting the rarity of a species, are not identical to the CITES Appendices.

In Mexico, any capture or commercial activity involving reptiles that are endemic, in danger of extinction ("P"), threatened ("A"), or subject to special protection ("Pr") is prohibited without a permit. Those species are listed in federal law *NORMA Oficial Mexicana NOM-059* as of 2010. Mexico's Criminal Code, article 420 sets penalties of up to nine years for any illegal use of endemic species.

Within the EU, the EU Wildlife Trade Regulations (EU WTR) implement the provisions of CITES and go beyond the requirements of the Convention in several respects. Under *Council Regulation (EC) No 338/97*, import permits are required for imports of species listed on Annex A of the Regulation (equivalent to CITES Appendix I but with some additional species) and those listed on Annex B (approximately equivalent to CITES Appendix II). An import notification is required for the importation of Annex C species (Appendix III equivalent) and for those on Annex D (an annex which lists those species in which trade into the EU is deemed to warrant monitoring). Otherwise, the regulation does not provide any legal basis to counter trade. The EU only prohibits and sanctions the purchase etc. of Annex A and B species from illegal sources, not for Annex C or Annex D (see Article 8 and 16 of EU Council Regulation 338/97). For Annex C species, only the lack of an appropriate certificate for import/export can be sanctioned in the EU. Beyond these provisions, there is no general import declaration requirement for non-CITES species.

Results

In total, 2,167 individuals of 104 species were recorded, which are endemic either to Australia, Cuba or Mexico. Almost 73% of the individuals (1,581 animals) were Australian, 12.6% (n=274) Cuban, and 14.4% (n=312) Mexican species (Tables 1–3).

Almost 70% of online posts did not indicate whether the animals were wild-caught or captive-bred. Online offers for sale were made by traders from 15 EU Member States and nine non-EU countries; by being represented in the sale of almost all offered species, Germany has a central role (Tables 1–3). Furthermore, most online offers refer to the German city of Hamm (examples are given in Fig. 1) and Houten in the Netherlands, both of which host reptile trade fairs.

Australian species

The online survey identified 66 lizard species that are endemic to Australia and not protected by CITES (Table 1). Price offers ranged from between EUR10 and EUR7,900 (USD11–8,800), with some species in the genera *Egernia* (Fig. 1a), *Nephrurus, Saltuarius*, and especially *Tiliqua,* among the most expensive. Posts claimed to be from 15 EU Member States and eight non-EU countries (Table 1). During the authors' survey, a Russian trader offered *Tiliqua adelaidensis*, likely for the first time in Europe, provoking intense discussions

◄ **Facebook post from a trader in Spain offering adult *Egernia epsisolus*, with reference to Europe's largest reptiles trade show in Hamm, Germany.**

► **Post on terraristik.com by a trader in Russia offering adult *Tiliqua adelaidensis* and other Australian endemic lizards for sale in Hamm.**

Fig. 1a (left); 1b. Screenshots of online posts.

◄ **Facebook post reported by a trader in Sweden offering Frilled Lizard *Chlamydosaurus kingii*. The species is restricted to New Guinea and Australia. The post states the origin as Australia.**

▲ **Trader in the Czech Republic offering various endemic Cuban *Chamaeleolis* (syn. *Anolis)* species on Facebook, including a new species; handover in Hamm offered.**

Fig. 1c (left); 1d. Screenshots of online posts.

amongst conservationists about the evident illegal origins of these animals (Fig. 1b).

In addition to endemic species from Australia, the authors also noticed several offers for *Chlamydosaurus kingii*, which is native to Australia, Indonesia, and Papua New Guinea. While there are legal exports from Indonesia, some traders highlight the (illegal) origin from Australia (Fig. 1c).

Cuban species

On the online platforms surveyed, the authors identified 23 non-CITES lizard species endemic to Cuba, of which at least 18 are covered by national legislation (Table 2): 10 of these are strictly protected and their capture and export for commercial purposes is prohibited; commercial export of the other eight species requires special permits. For another eight species commercial exports are only authorised with special permits. The legal status of two species is unclear due to taxonomic uncertainties (Table 2).

Prices for Cuban species range from EUR10 to EUR3,000 (USD11–3,340), with higher prices often correlating with a higher protection level: the three by far the most expensive species listed in Table 2 are all strictly protected in Cuba. Online posts for Cuban endemic lizards were recorded from 12 EU Member States, and from Switzerland as the only non-EU country.

Five Cuban lizard species are classified by the IUCN Red List as Endangered (Table 2). In addition, six species listed by the IUCN Red List as being either of Least Concern or which have not been assessed, are classified in Cuba's national Red List as Endangered (*Anolis barbatus, A. guamuhaya, A. imias* and *Sphaerodactylus siboney*) or Vulnerable (*Anolis allogus, A. rejectus*) (Gonzales Alonso *et al*., 2012). Fig. 1d shows online offers for some of these rare *Anolis* species and for a new, undescribed species. Cuban conservation authorities were not aware of the large range of Cuban endemic species offered in the European pet trade (Alvarez, 2018). In reaction to these findings and after consultation with herpetologists and enforcement staff, the Cuban Government has requested the listing of 20 endemic species in CITES Appendix III (Alvarez *in litt.* to Altherr, May 2019).

Mexican species

The survey identified 15 non-CITES-species endemic to Mexico, 11 of which are nationally protected (Table 3). One third of these 15 species are threatened, according to the IUCN Red List.

Ctenosaura was the most diverse group of Mexican species offered in Europe, with four species for sale. According to official export data for the period 2000–2016 (SEMARNAT, 2019), Mexico allowed exports for commercial purposes of only two species relevant to this report. With more than 1,740 specimens, *Ctenosaura pectinata* comprised the vast majority of official commercial exports; five specimens of *C. defensor* were also legally exported for trade. For all other species in Table 3, no export permits were issued for commercial purposes. Accordingly, there are questions regarding the legal origin of those species, including *Ctenosaura conspicuosa,* which was the most expensive Mexican species, selling for up to EUR1,500 (USD1,600).

Posts involving trade in Mexican endemic species to the European market were reported from 12 EU Member States and six non-EU countries. It is remarkable that a trader from Mexico placed online posts for four species, none of which has been granted a commercial export permit since 2000 (Table 3).

Common name	Scientific name	Res. No. 160/2011 National	IUCN Global/ national*	Price €	No. of specimens	Traders EU	Traders non-EU
Cuban Worm Lizard	*Amphisbaena cubana*	App. I	LC	100	6	DE	
Bueycito Anole	*Anolis allogus*	unclear	LC/VU*	50	1	DE	
Blue-eyed Grass-bush Anole	*A. alutaceus*	-	LC		6	DE	
Guantanamo Anole	*A. argenteolus*	App. II	NE	30–80	39	DE	
Baracoa Anole	*A. baracoae*	App. II	NE	50–70	28	CZ;FR;IT;SK	
Western Bearded Anole	*A. barbatus*	App. I	NE/EN*	60–300	41	BE;CZ;DE;NL;PL	CH
West Cuban Anole	*A. bartschi*	App. II	NE	10	12	DE;NL	
Short-bearded Anole	*A. chamaeleonides*	App. I	NE	1,250	6	CZ;DE	
Cabo Cruz Banded Anole	*A. guafe*	App. II	EN/VU*	100	1	DE	
Escambray Bearded Anole	*A. guamuhaya*	App. I	NE/EN*	700	4	CZ;DE;DK	
Habana Anole	*A. homolechis*	App. II	NE	60–80	8	DE	
Imias Anole	*A. imias*	App. II	NE/EN*	100	1	DE	
Peach Anole	*A. loysiana*	App. II	NE	250	2	DE	
Cave Anole	*A. lucius*	-	NE	80–120	8	CZ;DE	
Holguin Anole	*A. noblei*	unclear	NE	150	1	DE;ES	
Oriente Bearded Anole	*A. porcus*	App. I	NE	145	11	CZ;DE;IT;NL;PL	
Santiago Grass Anole	*A. rejectus*	App. II	NE/VU*	200	14	DE	
Smallwood's Anole	*A. smallwoodi*	-	NE	200	2	DK;SI	
Guantanamo Coastal Gecko	*Sphaerodactylus armasi*	App. I	EN/EN*	80–200	8	DE	
Santiago de Cuba Least Gecko	*S. dimorphicus*	App. I	EN/EN*	200	2	DE	
Mantanzas Least Gecko	*S. intermedius*	App. I	EN/EN*	180–3,000	18	DE;FR;PL	CH
Siboney Least Gecko	*S. siboney*	App. I	LC/EN*		10	DE	
Barbour's Least Gecko	*S. torrei*	App. I	EN	100–200	45	DE;ES;NL;UK	

Table 2. List of lizard species endemic to Cuba and not protected by CITES on sale at surveyed online platforms and in social media groups in Europe. National protection via Cuba's Resolution No. 160/2011. * = species classification in Cuba's national Red List. IUCN: EN = Endangered, LC = Least Concern, VU = Vulnerable, NE = Not Evaluated. Key for country codes below.

Common name	Scientific name	NOM-059	IUCN	Price €	No. of specimens	Traders EU	Traders non-EU
Yucatán Spiny-tail Iguana	*Cachryx defensor*	P	VU	200–330	14	AT;DE;ES;FR, PL;SE;UK	
Tiburon Collared Lizard	*Crotaphytus dickersonae*	-	LC	250–300	14	CZ;DE;ES	UA
Eastern Collared Lizard	*C. insularis*	-	LC	20–90	2	ES	
Balsas Armed Lizard	*Ctenosaura clarki*	A	VU	300–750	12	CZ;DE;NL;PL	MX
San Esteban Spinytail Iguana	*C. conspicuosa*	Pr	NE	800–1,500	6	DE	
Oaxaca Spiny-tailed Iguana	*C. oaxacana*	A	CR	750–950	2	CZ;DE;ES;PL	
Guerreran Spiny-tailed Iguana	*C. pectinata*	A	NE	180–1,200	25	BE;DE;ES;IT; PL;SE;UK	
Gadow's Alligator Lizard	*Mesaspis gadovii*	Pr	LC		2		MX
Baja (California) Rock Lizard	*Petrosaurus thalassinus*	Pr	LC	60–135	115	AT;CZ;DE;ES, FR;NL;PL;UK	
Mountain Horned Lizard	*Phrynosoma orbiculare*	A	LC	100–200	66	DE	
Mexican Horned Lizard	*P. taurus*	A	LC	500	2	DE;ES;FR	MX
Minor Lizard	*Sceloporus minor*	-	LC	240–400	26	BE;CZ;DE;DE	MX, UA
Teapen Rosebelly Lizard	*S. teapensis*	-	LC		1	DE	
Newman's Knob-scaled Lizard	*Xenosaurus newmanorum*	Pr	EN	100–250	23	DE;FR;IT;NL	
Flathead Knob-scaled Lizard	*X. platyceps*	Pr	EN	150–350	2	DE;FR;IT;NL	

Table 3. List of lizard species endemic to Mexico and not protected by CITES on sale at surveyed online platforms and in social media groups in Europe. National Protection via NORMA Oficial Mexicana NOM-059 as of 2010: A=threatened, P=in danger of extinction, PR=special protection. IUCN: CR=Critically Endangered, EN=Endangered, VU=Vulnerable, LC=Least Concern, NE=Not Evaluated. KEY for country codes: *EU countries*: AT=Austria, BE=Belgium, CZ=Czech Republic, DE=Germany, DK=Denmark, ES=Spain, FR=France, HU=Hungary; IT=Italy, NL=Netherlands, PL=Poland, SE=Sweden, SI=Slovenia, SK=Slovakia; UK=United Kingdom; *Non EU countries*: CA=Canada, CH=Switzerland, JP=Japan, MY=Malaysia, MX=Mexico, RU=Russia, UA=Ukraine, US=United States of America

Discussion and Conclusions

The internet has become a major channel for wildlife trade, facilitating global contact between exporters, traders and clients, and resulting in an increased diversity of species being offered in the international exotic pet trade (Lavorgna, 2014; Jensen *et al.,* 2019). Online surveys are a simple and efficient source to illustrate the species composition and volumes in trade (Canlas *et al*., 2017; Wakao *et al.,* 2018). Several studies document the high demand in the international pet trade for rare, newly discovered or even nationally protected species (Nijman and Stoner, 2014; Janssen and Leupen, 2019; Janssen and Shepherd, 2019; Ngo *et al.*, 2019; Shepherd *et al.,* 2019). Many of the targeted species are threatened in the wild and illegal offtakes further imperil their survival (Auliya *et al.,* 2016). The EU market has a central role as a consumer of those species (Altherr, 2014; Janssen and da Silva, 2019). Prices are often as high as for CITES-listed species, but risks for the smugglers and their clients are much lower (Altherr, 2014).

The smuggling of endemic and nationally protected species from Australia and Mexico for the international commercial trade has been documented before (Fitzgerald *et al*., 2004; Altherr, 2014; Menagh, 2015; Altherr *et al.,* 2016; Albaladejo, 2019). Furthermore, official data from Mexico document regular seizures of *Ctenosaura*, *Sceloporus, Phrynosoma, Xenosaurus, Crotaphytus,* and *Mesaspis* species (PROFEPA *in litt.* to J.C. Cantu, 2019). These seizures confirm ongoing illegal exports from Mexico, including to Europe.

Data on wildlife trafficking from Cuba are limited, with only anecdotal reports (Neme, 2015), while reptile smuggling in the region, e.g. in the Caribbean Lesser Antilles, has been documented (Noseworthy, 2017).

The present report provides the first systematic picture of the trade in endemic, nationally protected lizards from Australia, Cuba, and Mexico to Europe, and the number of animals found during the online surveys (which were limited in terms of time and the number of platforms selected), is probably just the tip of the iceberg. That most online offers recorded refer to Hamm, Germany, and Houten in the Netherlands, both of which host reptile trade fairs, indicates that most sales and purchases of specimens are arranged via the internet, while the physical transfer of the reptiles occurs at the trade fairs.

The EU's significant role as a hub and destination for the exotic pet trade is by no means limited to species from the three countries under discussion (Altherr *et al.,* 2016; Auliya *et al.,* 2016; Janssen and de Silva, 2019; Ngo *et al.,* 2019). The trafficking of wildlife from countries where species are protected should not be tolerated in consumer countries, as it undermines national protection efforts and tolerates a business model that relies on poaching and trafficking, and often corruption and financial crimes.

A proposal submitted by Mexico and El Salvador to the 18th meeting of the Conference of the Parties to CITES in August 2019 to include all non-listed *Ctenosaura* species in Appendix II was accepted (CITES, 2019). While this is highly commendable, given the broad range of species targeted by wildlife traffickers, high end commercial hobbyists, breeders, and wildlife dealers, a great deal more needs to be done.

For several species from Australia, Mexico and Cuba, captive-breeding has been successful in Europe and for these a considerable proportion of the specimens recorded in this study were probably captive-bred. However, for some 70% of specimens offered for sale, information on origin was lacking and for many the possibility that the animal itself or the founder or breeding stock was originally trafficked from their countries of origin cannot be ruled out. Furthermore, many individuals in trade were offered as adults or sub-adults, which may be an indication that a high proportion of animals are caught from the wild. For other species, including those that are new in international trade or for which records for captive-breeding is lacking, the mislabelling of wild-caught animals as captive-bred is commonplace. According to Auliya *et al.* (2016) and Weissgold (pers. comm. to Altherr, 2019), authorities should be aware that smugglers may especially target gravid females—the most valuable animals in conservation terms—and sell their offspring as "captive-bred".

The process of listing species in CITES Appendix I (which prohibits international commercial trade in wild specimens) or Appendix II (trade in which requires permits and the making of a non-detriment finding) is slow, with meetings of the Conference of the Parties taking place every three years and listings often hampered by lack of data or commercial interests. Accordingly, highly threatened species may remain internationally unprotected or CITES-listings come too late to prevent large-scale trafficking (Frank and Wilcove, 2019; Janssen and Shepherd, 2019).

Another solution that has been suggested is the listing of nationally protected species in CITES Appendix III (CITES CoP17 Doc. 80; Shepherd *et al*., 2019). This Appendix contains species that are nationally protected in at least one range State which has asked other Parties for assistance in controlling the trade. However, few countries have used Appendix III listings and only for a limited number of species. Moreover, the EU neither prohibits nor imposes penalties for the sale, purchase and ownership of illegally-sourced animals listed in Annex C; only imports or exports without an appropriate certificate may be subject to penalties. Given this, in combination with the massive profit margins for rare species, Appendix III does not seem to be an appropriate solution.

One option would be to make use of the existing legislation and list nationally protected species in Annex B of the EU WTR in consultation with relevant range States and supported by listings in Appendix III by the range States, while the Annex B listing is decided and comes into force. However, so far the EU has not been making use of this option—with the exception of one species, *Lygodactylus williamsi*, that was included in Annex B in 2015 (Client Earth, 2018), a process that took three years to be concluded. Given that there was much controversy within the EU about inclusion of non-CITES species and the lengthy process, the authors believe it is questionable whether listing on Annex B provides a viable option for the considerable number of nationally protected species that are in trade in the EU.

Another option would be legislation, such as the US *Lacey Act,* which prohibits the import, sale and possession

of all species that were illegally caught, transported, sold or exported in their range State. While initial development and adoption of new legislation would require time, it would provide a framework that can be applied to all nationally protected species traded illegally within the EU. A legal analysis by Client Earth (2018) has confirmed that such legislation would not conflict with EU *Council Regulation (EC) No 338/97*. Considering its central role as a consumer of illicit wildlife, similar legislation for the EU is recommended by an increasing number of scientists, conservationists and institutions (DNR, 2019; EFFACE, 2016; EU Parliament, 2016; UNODC, 2016).

Recommendations

In 2017, the UN General Assembly passed Resolution 71/L88, which "*… urges Member States to take decisive steps at the national level to prevent, combat and eradicate the illegal trade in wildlife, on both the supply* ***and demand sides*** *[bold type by authors], including by strengthening their legislation and regulations necessary for the prevention, investigation, prosecution and appropriate punishment of such illegal trade.*" To meet these duties, range and consumer States need to strengthen efforts to enforce their national legislation, intensify controls and impose deterrent fines for the trafficking of specimens taken and exported in violation of the country of origin's legislation.

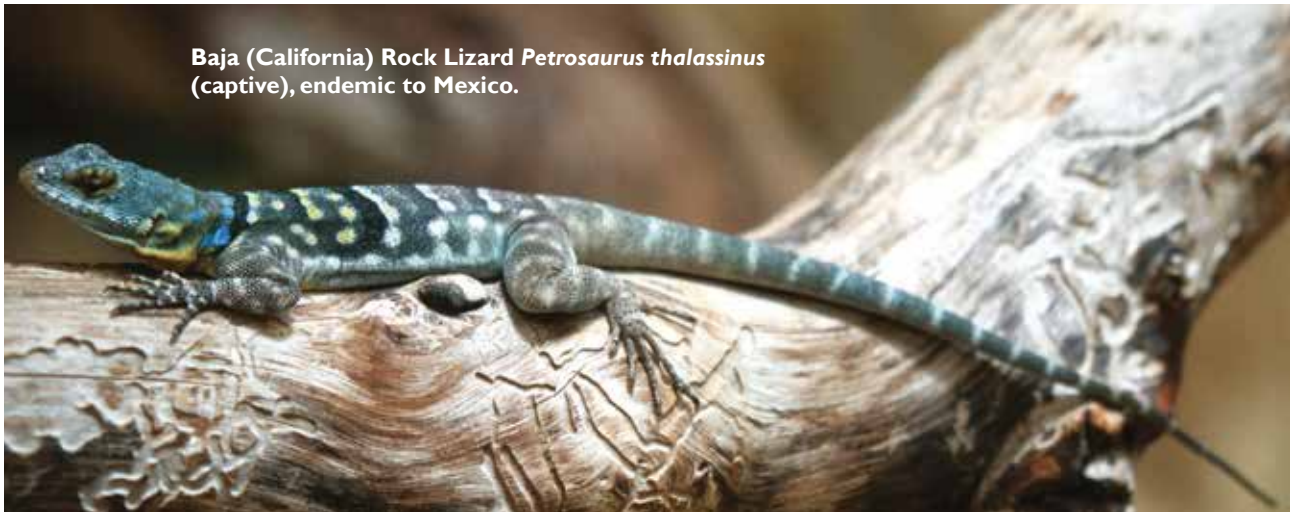
Those countries that are the main consumers of trafficked specimens should therefore take responsibility and support national conservation measures of the countries of origin. Important consumer markets, such as the EU, with its central role as a destination and hub for trade in such species, should develop legal measures to combat this form of wildlife crime. Passing legislation comparable to the US *Lacey Act*, making import, sale and purchase of specimens illegally acquired in range States a criminal act in their countries, would be a proven and meaningful option. Examples of how the US *Lacey Act* is enforced are given e.g. by Global Trade Expertise (2018). Furthermore, in order to prevent the unsustainable offtake from populations in the wild, it is imperative that EU countries assist range States in order to prevent illegal harvest and trade in these species.

© DCOETZEE / WIKIMEDIA

Australian endemic species: Shingleback Lizard *Tiliqua rugosa*.

Acknowledgements

The authors thank the following for their helpful comments on an early draft of this manuscript: Bruce Weissgold (former CITES Management Authority, US Fish & Wildlife Service), José Alberto Alvarez (Cuban CITES Management Authority), Maria Elena Sanchez (Teyeliz, Mexico), Katalin Kecse-Nagy (TRAFFIC), Jenny Daltry and Isabel Vique (Fauna and Flora International), Chris R. Shepherd and Jordi Janssen (Monitor Conservation Research Society), Mark Auliya (Helmholtz Centre for Environmental Research GmbH—UFZ), Antonio Galilea (Ministry of Industry, Commerce and Tourism, CITES Management Authority, Spain), Ulrich Schepp (Federal Agency for Nature Conservation (BfN), CITES Scientific Authority, Germany), Sabine Vinke (Chaco Wildlife, Paraguay), and an anonymous reviewer. They also thank Active Philanthropy (Germany) for providing financial support to this project.



Baja (California) Rock Lizard *Petrosaurus thalassinus* (captive), endemic to Mexico.

© CHRIS MARTIN BAHR / WWF

References

Albaladejo, A. (2018). Spain dismantles cold-blooded wildlife trafficking ring. *InsightCrime*, 13 March; Viewed in April 2019. https://bit.ly/2Dpwiwd

Altherr, S. (2014). *Stolen Wildlife—Why the EU Needs to Tackle Smuggling of Nationally Protected Species*. Pro Wildlife (Ed.), Munich, 32 pp.

Altherr, S., Schuller, A. and Fischer, A. (2016). *Stolen Wildlife II—Why the EU Still Needs to Tackle Smuggling of Nationally Protected Species.* Pro Wildlife (Ed.), Munich, 40 pp.

Alvarez, J.C. (2018). Cuba's nationally protected species on sale at the European pet market. Presentation at a side event of CITES 30th Animals Committee Meeting, 18 July, Geneva.

Auliya, M., Altherr, S., Ariano-Sanchez, D., Baard, E., Brown, C ... Ziegler, T. (2016a). Trade in live reptiles, its impact on wild populations, and the role of the European market. *Biological Conservation* 204, Part A: 103–119. DOI: 10.1016/j.biocon.2016.05.017

Auliya, M., Garcia-Moreno, J., Schmidt, B., Schmeller, D., Hoogmood, M. … Martel, A. (2016b). The global amphibian trade flows through Europe: the need for enforcing and improving legislation. *Biodiversity and Conservation*, 25(13):2,581–2,595.

Brook, B.W. and Sodhi, N.S. (2006). Rarity bites. *Nature* 444:555–557.

Canlas, C., Sy, E. and Chng, S. (2017). A rapid survey of online trade in live birds and reptiles in the Philippines. *TRAFFIC Bulletin,* 29(2):58–63.

CITES (2016). Seventeenth meeting of the Conference of the Parties. Doc. 80. CITES App. III—an added value for the conservation of threatened wildlife with restricted distribution. https://bit.ly/2QpalFI

CITES (2019). Consideration of proposals to amend CITES I and II. Prop. 31 for inclusion of the genus *Ctenosaura* in Appendix II of CITES. https://bit.ly/2MaBsWq

Client Earth (2018). Illegal wildlife trade and the EU: legal approaches. Legal analysis commissioned by Pro Wildlife. Brussels, 21 pp. https://www.prowildlife.de/wp-content/uploads/2016/11/Illegal-wildlife-trade-and-the-EU_legal-approaches.pdf

DNR (Deutscher Naturschutzring) (2019). Environmental demands with regard to the 2019 European elections, 10 pp.

EFFACE (European Union Action to Fight Environmental Crime) (2016). Conclusions and Recommendations. Research project conducted in collaboration with 11 European universities, 36 pp.

EU-Parliament (2016a). Wildlife Crime. Study by Policy Department A at the request of the Committee on the Environment, Public Health and Food Safety. 122 pp.

Fitzgerald, L.A., Painter, C.W., Reuter, A. and Hoover, C. (2004). *Collection, Trade, and Regulation of Reptiles and Amphibians of the Chihuahuan Desert Ecoregion*. TRAFFIC North America, 113 pp.

Frank, E.G. and Wilcove, D.S. (2019). Long delays in banning trade in threatened species—scientific knowledge should be applied with more urgency. *Science,* 363(6428):686–688.

Global Trade Expertise (2018). *Consequences of non-compliance—Lacey Act enforcement*, News Release, 19 July, http://www.globaltradeexpertise.com/news/2018/8/23/consequences-of-non-compliance-lacey-act-enforcement.

González Alonso, H., Mancina, C.A., Ramos García, I.R., Schettino, L. and Rodríguez, A. (2012). *Libro rojo de los vertebrados de Cuba.* Editorial Academia, La Habana, 304 pp.

Janssen, J. and de Silva, A. (2019). The presence of protected reptiles from Sri Lanka in international commercial trade. *TRAFFIC Bulletin,* 31(1):9–15.

Janssen, J. and Leupen, B.T.C. (2019). Traded under the radar: poor documentation of trade in nationally-protected non-CITES species can cause fraudulent trade to go undetected. *Biodiversity and Conservation,* https://doi.org/10.1007/s10531-019-01796-7

Janssen, J. and Shepherd, C. (2019). Trade in endangered and critically endangered Japanese herpetofauna endemic to the Nansei Islands warrants increased protection. *Current Herpetology,* 38(1):99–109.

Jensen, T., Auliya, M., Burgess, N.D., Aust, P.W., Pertoldi, C. and Strand, J. (2019). Exploring the international trade in African snakes not listed on CITES: highlighting the role of the internet and social media. *Biodiversity & Conservation,* 28(1):1–19.

Lavorgna, A. (2014). Wildlife trafficking in the Internet age. *Crime Science,* 3:5.

Menagh, J. (2015). Four foreigners face court accused of trying to export hundreds of native animals. *ABC News*, 10 April.

Mittermeier, R. and Mittermeier, C. (1997). Megadiversity: Earth's Biologically Wealthiest Nations. CEMEX (ed.), 501 pp.

Neme, L. (2015). Latin American illegal wildlife trade exploding in scope and scale. *Mongabay*, 4 November. https://news.mongabay.com/2015/11/latin-american-illegal-wildlife-trade-exploding-in-scope-and-scale/

Ngo, H.N., Nguyen, T.Q., Phan, T.Q., van Schingen, M. and Ziegler, T. (2019). A case study on trade in threatened Tiger Geckos (*Goniurosaurus*) in Vietnam including updated information on the abundance of the Endangered *G. catbaensis*. *Nature Conservation,* 33:1–19.

Nijman, V. and Stoner, S.S. (2014). *Keeping an Ear to the Ground: Monitoring the Trade in Earless Monitor Lizards*. TRAFFIC Petaling Jaya, Selangor, Malaysia.

Noseworthy, J. (2017). Cold-blooded conflict: Tackling the illegal trade in endemic Caribbean Island reptiles. Dissertation, Dept. of Geography, University of Cambridge. 112 pp.

SEMARNAT (Secretariat of Environment and Natural Resources) (2016). Export of Live Reptiles from 2000–2016 Official Number UCPAST/UE/16/3265. Environment Ministry, Mexico.

Shepherd, C., Janssen, J. and Noseworthy, J. (2019). A case for listing the Union Island Gecko *Gonatodes daudini* in the Appendices of CITES. *Global Ecology and Conservation,* 17:e00549.

Uetz, P. and Hošek, J. (1995–2019). The Reptile Database, http://www.reptile-database.org/

UNODC (United Nations Office on Drugs and Crime) (2016). *World Wildlife Crime Report: Trafficking in protected species.* 100 pp.

Wakao, J., Janssen, J. and Chng, S. (2018). Scaling up: the contemporary reptile pet market in Japan. *TRAFFIC Bulletin,* 30(2):64–71.

***Sandra Altherr**, Pro Wildlife, Germany*
Email: sandra.altherr@prowildlife.de
***Katharina Lameter**, Pro Wildlife, Germany*
Email: katharina.lameter@prowildlife.de
***Juan Carlos Cantu**, Defenders of Wildlife, Mexico*
Email: jccantu@defenders.org