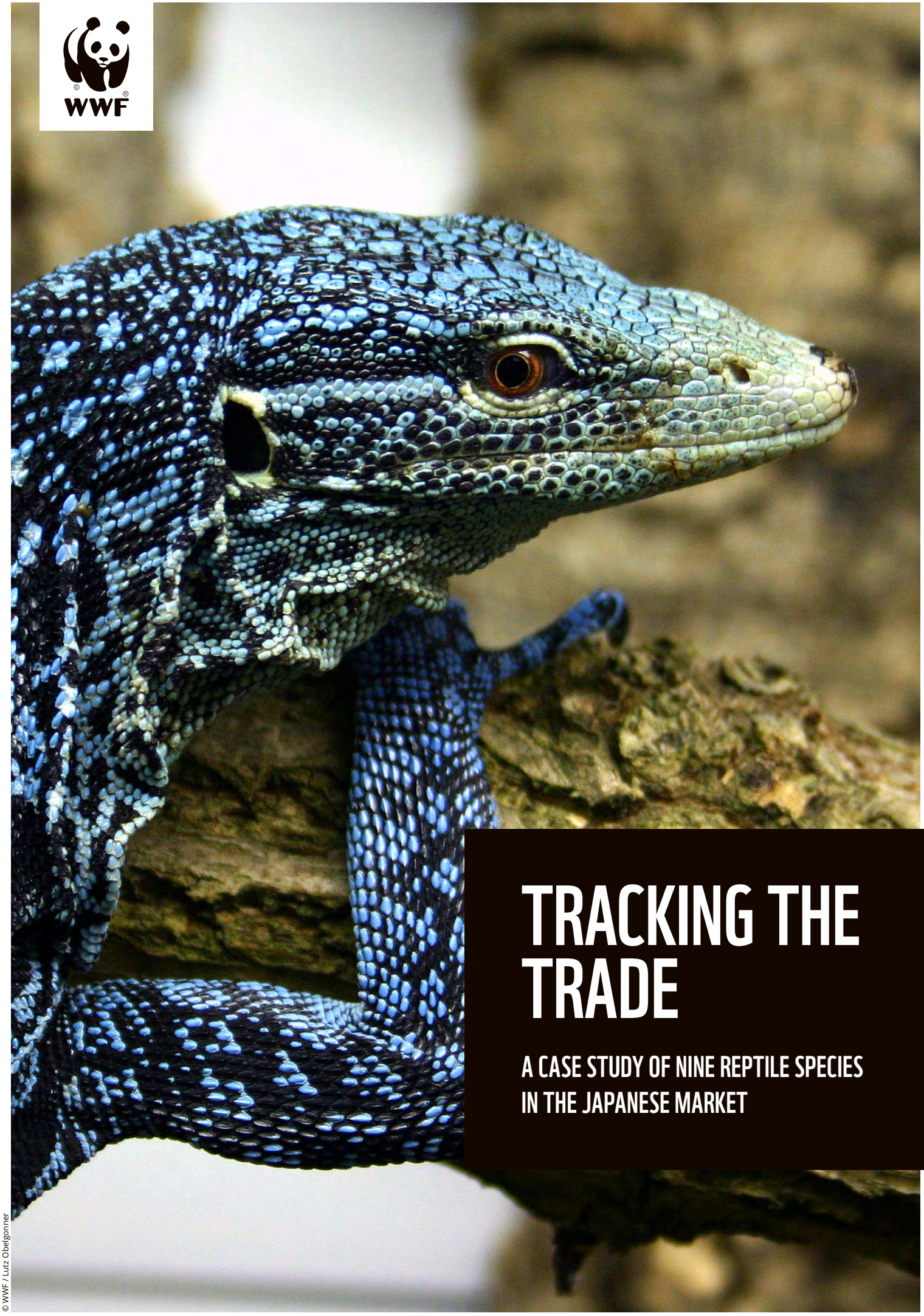

TRACKING THE TRADE

A CASE STUDY OF NINE REPTILE SPECIES IN THE JAPANESE MARKET

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WWF-Japan

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Wildview Analytics

Wildview Analytics is a Brazil-based consultancy specializing in advanced data analysis and intelligence to combat wildlife crime and human–wildlife conflict. Wildview Analytics partners with governmental and non-governmental organizations worldwide to apply a problem-oriented and interdisciplinary approach for real-world conservation impact.

CONTENTS

ACRONYMS AND ABBREVIATIONS

$	United States Dollar
¥	Japanese Yen
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EU	European Union
HS	Harmonized System Codes
IUCN	International Union for Conservation of Nature
LEMIS	Law Enforcement Management Information System
SRG	European Union Scientific Review Group
SVL	Snout-Vent Length
TL	Total Length
T-	Tyrosinase enzyme negative albinism
T+	Tyrosinase enzyme positive albinism
UNEP	United Nations Environment Programme
USFWS	United States Fish and Wildlife Service
WCMC	World Conservation Monitoring Centre

EXECUTIVE SUMMARY

The global reptile trade has grown into a multibillion-dollar industry but remains poorly regulated and insufficiently studied. Reptiles are widely traded for pets, skins, meat, and traditional medicine, sourced both from the wild and through captive breeding. Between 1975 and 2014, over 152 million CITES-listed reptiles were legally exported, with substantial additional trade in unlisted species. In 2022, global imports of live reptiles (HS6 01.06.20) were valued at $72.8 million — up 38% since 2003. Japan being the 2nd importer in terms of value globally.

Scope and Methods

This report examines legal and illegal trade in nine reptile species frequently observed in the Japanese market. The focal species are: *Varanus macraei*, *Varanus exanthematicus*, *Varanus salvator*, *Cordylus niger*, *Cordylus tropidosternum*, *Tribolonotus gracilis*, *Tribolonotus novaeguineae*, *Gekko gecko* and *Testudo horsfieldii*.
For each species the global trade is investigated, including Japan's role in this trade. The breeding availability is investigated and open-source seizure data collected to assess the illegal trade in these species. Data sources include:

- UNEP-WCMC CITES Trade Database (2000–2023)
- Online Spot Survey (12–18 March 2025; 41 websites)
- Physical Spot Survey (Nagoya Reptiles World, 29 March 2025; >90 vendors)
- Open-source seizure data

Key Findings

Japan ranks as one of five the most important importers for six of the nine focal species. For four species Japan even ranks as the 2nd most important importer globally. Small quantities are exported for several of the focal species, suggesting that import is primarily meant for the Japanese domestic market. Both *Varanus macraei* and *Varanus exanthematicus* show strong indications of illegal or unsustainable sourcing. *V. macraei* is legally exported from Indonesia, yet several studies point to large-scale wild harvesting that far exceeds legal allowances for breeding stock. Similarly, *V. exanthematicus* is rarely successfully bred in captivity; gravid females are often captured to produce offspring sold as captive-born, but instead of being released, they are sold for meat, or skins. Trade in *Cordylus* species also raises concerns: *C. niger* has appeared in Japan without import records, and *C. tropidosternum* imports from the Democratic Republic Congo highlight a rapidly shifting trade route and potentially unsustainable sourcing, despite no historic exports prior to 2021. Both *Tribolonotus gracilis* and *T. novaeguineae* are increasingly traded despite limited biological capacity for commercial exploitation and rising harvest quotas in Indonesia. Of particular concern is the harvest quota for *T. gracilis* which has more than doubled in recent years. Japan is the second-largest importer of live *Gekko gecko*, with a strong market demand for high-value color morphs. Of 29 captive-bred advertisements surveyed, 22 featured color morphs, with prices reaching up to ¥1,800,000. Harvest quota of *Gekko gecko* for consumption are magnitudes higher, and population declines have been documented. *Testudo horsfieldii* has seen high historic demand from Japan, though imports have decreased in recent years. New restrictions following the CITES Significant review prevent the harvest in Uzbekistan for wild and ranched animals. Japan continues to import significant numbers of *Varanus salvator*, including morphs. Several former subspecies, for which no harvest quotas or import records exist, were observed in the Japanese market, i.e. *V. togianus*, and *V. nuchalis*.

Conservation Implications

The findings in this report show that Japan is an increasingly important destination for live reptiles. While a large part of this documented trade is legal and consists of species with a well-established breeding practice, illegal and unsustainable trade is still taking place. It is recommended that the following actions are taken:

Japanese Authorities:

1. Strengthen the implementation of import confirmation for Appendix II species

- Japanese authorities should utilize the current import confirmation system more effectively to check and scrutinize export permits of high-risk reptile species.

2. Establish size limits for imported reptiles of high-risk species

- Japanese CITES authorities should set enforceable size thresholds (e.g., maximum SVL or TL) for imported captive-bred or ranched animals of high-risk species, particularly for *V. macraei*. Size limits can help ensure that only genuinely captive-bred specimens are imported, and to distinguish between genuinely captive-bred juveniles and laundered wild adults.

3. Restrict Imports of Specific Source Codes from High-Risk Countries

- Japanese CITES authorities should suspend imports of species with documented laundering issues (e.g., *V. macraei* from Indonesia with source codes F or C) until independent breeding audits confirm legitimate captive breeding.
- Japanese CITES authorities should consult with the CITES Management and Scientific Authorities of exporting Parties when there are concerns regarding the sustainability and legality of an import, thereby actively taking responsibility for ensuring the sustainability of the trade.

4. Improved Reporting and Databasing

- Japanese authorities should monitor the trade in live reptiles, in particular non-CITES listed, more closely, thereby developing a detailed database of all imported reptiles, on species level, including source country, source code, to enhance transparency and accountability.

Japanese Consumers and Business:

5. Improved self-regulation of the market

- Japanese consumers and reptile businesses should take a role in self-regulating the market for live reptiles and ensure the trade is not detrimental to wild populations.
- Japanese consumers and reptile business should refuse the sale or buying of animals for which the trade is detrimental to wild populations, or for which the animals do not correspond with the reported source (e.g. laundering of wild caught animals).

6. Improved coordination with Japanese authorities

- Japanese reptile businesses should coordinate efforts with Japanese authorities to ensure that trade is not detrimental to wild populations.

Exporting Parties:

7. Scrutinize export permits

- Exporting parties should scrutinize export permits more carefully to ensure that the animals match the reported species, and source of the animals.
- Exporting parties should refuse export permits for species that have not legally been imported into that country or have no harvest quota e.g. *V. nuchalis* and *V. marmoratus* for the Philippines, and *V. togianus* for Indonesia.

CITES Secretariat:

8. Consider a Review of Significant Trade

- Due to the increasing evidence of large-scale wild harvest and laundering of wild specimens, the CITES Secretariat should consider initiating a Review of Significant Trade for *Varanus macraei* to ensure that trade in this species is sustainable.

1. INTRODUCTION

The international trade in reptiles represents one of the most complex dimensions of the global wildlife trade. Each year, millions of reptiles are harvested from the wild or bred in captivity to meet global demand for food, skins, medicine or to be kept as pets (Janssen, 2021; Robinson et al., 2015). Despite their ecological importance and vulnerability to overexploitation, the global trade in reptiles remains chronically under-monitored (Janssen & Leupen, 2019).

Global Trade in Reptiles

Reptiles are among the most heavily traded vertebrate groups, both legally and illegally (Scheffers et al. 2019; Marshall et al. 2020; Janssen 2021). Between 1975 and 2014 over 152 million CITES-listed reptiles alone were legally exported (Harfoot et al., 2018), with many more non-CITES listed species traded, or traded through unregulated or illicit channels. Although the trade in reptile products (in particular reptile skins) is by far the largest in volume, the trade in live reptiles affects significantly more species (Janssen, 2021). Many are sourced directly from the wild, often under dubious claims of captive breeding (Janssen & Chng, 2018; Lyons & Natusch, 2011), a practice that has become a common cover for laundering wild-caught animals (Lyons & Natusch, 2011).
In 2022, the global import of live reptiles (HS6 01.06.20) reached an annual trade value of at least $72.8M, (Observatory of Economic Complexity [OEC], 2025). This is a 38% increase compared to 2003, when the trade value of imported live reptiles reached $52.5M (OEC, 2025). The primary destinations for these animals are consumer markets in North America (Herrel & van der Meijden, 2014), Europe (Auliya et al., 2016), and increasingly, Asia (Nijman & Shepherd, 2010; 2011; Robinson et al., 2015; Wakao et al., 2018). Japan has emerged as a significant player in this trade (Digirolamo, 2025; Janssen, 2018; Wakao et al., 2018). While it is often overshadowed by the United States of America (Herrel & van der Meijden, 2014; Janssen, 2021; Watters et al., 2022) or Europe (Auliya et al., 2016), Japan's import volumes, species diversity, and role in the exotic pet markets make it a critical country of concern for reptile conservation (Wakao, 2024; Wakao et al., 2018). The value of Japan's live reptile import totaled $3.95M in 2003 (OEC, 2025). This increased to $13.5M in 2021, before slightly decreasing again in 2022 ($12.5M), and 2023 ($9.6M). Since 2020, Japan is the second largest importer of live reptiles by reported trade value, behind the United States of America (OEC, 2025).

Japanese Reptile Market

Japan's reptile market seems to be characterized by a unique blend of consumer preferences, with the most popular species being easy-to-maintain species (Digirolamo, 2025) to an audience that seeks rare and unique taxa (Janssen, 2018; Wakao et al., 2018). Kanari and Auliya (2011) found 410 species for sale in a 2007 survey of the reptile pet market in Japan. Wakao et al. (2018) found 606 taxa, including 63 that were traded at subspecies level, for sale in merely 16 pet stores and one reptile expo. When online trade was included, a total of 743 taxa were observed: –7% of all known reptile species at the time.

Driven by a combination of aesthetic appreciation, novelty, and status symbolism, Japanese consumers often favor rare species, color variants, or species with perceived prestige. This goes further than merely pet keeping, reptiles were for instance the second most common group found in Japanese animal café's (Sigaud et al., 2023). This desire for rare species results in species for sale in Japanese reptile shops that are rarely seen in international trade, frequently fetching extraordinarily high prices (Janssen, 2018). For several of these species no import records were available. Heinrich et al. (2022) found that Japan plays an

important role in the trade of Australian endemic *Tiliqua rugosa* both in number of seizures and advertisements available. The most popular pet reptiles are also species traded in large quantities e.g. *Eublepharis macularius* or *Pogona vitticeps* (Digirolamo, 2025). Species that were the most frequently observed in trade by e.g. Wakao et al. (2018). Digirolamo (2025) highlighted that of the 11 most popular reptile species, five were endemic to Japan. Wakao et al. (2018) also observed 16 species native to Japan, of which 10 species are endemic. Japan is not only an important destination for live reptiles, but Japanese native or endemic reptiles are also wanted in other markets like the EU, US and China (Janssen & Shepherd, 2019; Kanari & Xu, 2012).

Legislation in Japan

The reptile trade in Japan is regulated through several national legal instruments. The primary legislative framework is provided by the Law for the Conservation of Endangered Species of Wild Fauna and Flora, which governs the trade in CITES Appendix I-listed species once they are present within Japanese territory. This law also covers the capture and trade of native species designated as "nationally endangered wild fauna and flora." CITES Appendix II and III species already within the country fall outside the scope of this legislation.

Additional regulatory mechanisms include the Foreign Exchange and Foreign Trade Law and the Customs Law, both of which manage the import and export of CITES-listed species at Japan's borders. The Invasive Alien Species Act further complements this framework by prohibiting the import, trade, and possession of certain non-native species identified as ecologically harmful.

Under the Act on Welfare and Management of Animals, individuals or entities intending to engage in the commercial sale of live reptiles are required to register as Type I Animal Handling Business Operators. Since 2013, the direct online sale of live reptiles has been expressly prohibited under Article 21–4 of the same Act.

Aim of this Report

This report aims to quantify the role of Japan within the global trade of nine focal species. It aims to assess the scale of the trade that occurs globally, the role of Japan in this trade, and addresses issues regarding breeding availability, and illegal trade for each of the nine species.

2. METHODS

This report provides an in-depth analysis of the legal and illegal trade in nine reptile species (Table 1) frequently found in the Japanese pet trade or of particular concern, using available trade data, spot market surveys, and open-source seizure information.

Table 1 Overview of the nine focal species, their scientific name, Japanese names, CITES Appendix listing (year of listing) and status on the IUCN Red List version 2025-1.

Scientific name	Japanese name	CITES	IUCN RL
Varanus salvator	サルバトールモニター ミズオオトカゲ	II (1975)	LC
Cordylus niger	クロヨロイトカゲ	II (2017)	LC
Varanus macraei	コバルトツリーモニター アオホソオオトカゲ	II (1975)	EN
Testudo horsfieldii	ホルスフィールドリクガメ ロシアリクガメ	II (1975)	VU
Tribolonotus gracilis	アカメカブトトカゲ		LC
Varanus exanthematicus	サバンナモニター サバンナオオトカゲ	II (1975)	LC
Gekko gecko	トッケイヤモリ	II (2019)	LC
Cordylus tropidosternum	ネッタイヨロイトカゲ ヒナタヨロイトカゲ トロピクスヨロイトカゲ	II (2017)	LC
Tribolonotus novaeguineae	モトイカブトトカゲ		LC

Spot Market Survey

Online

A spot survey was conducted on Japanese online trading platforms between 12 and 18 March 2025. For the spot survey, online websites of 41 known reptile shops were visited. Each website was manually searched for the focal species. In addition to the reptile shops, Google was searched for additional advertisements.

Search terms included the scientific and Japanese name (s) + the following terms 販売 (sale), 価格 (price), ショップ (shop), and 入荷 (arrival of goods in stock), and any combination of these terms.

Species shown on advertisement photos were identified by a species expert to ensure that the advertisement matched the photo. Advertisements without photos were included as is, with the assumption the seller accurately identified the species.

Advertisements posted in 2024 or 2025 were included in the dataset. Advertisements posted prior to 2024 were only included when the specific animal was still for sale. The price was recorded in Japanese Yen (¥) for each animal (price including taxes), and it was recorded if the animal was sold or not. In addition, details regarding the origin and sex of the animal were recorded. Color morphs were recorded where possible.

Reptile trade fair

In addition to the online spot survey, the Nagoya Reptiles World Spring Fair (https://nagorep.com/) was visited in Nagoya, Japan, on March 29, 2025. This fair hosts over 90 pet shops and reptile breeders. The researcher visited the fair and recorded the names, quantities, prices, origin and sources (Table 2) of the nine focal species. Species were not identified by experts; the researcher recorded the name described by the shops and breeders.

Japan's Act on the Welfare and Management of Animals requires pet dealers to provide information regarding the place of origin of the animal with the sale. However, this can be interpreted in different ways, e.g. either the origin as country of export or as range state. Within this survey it was interpreted as being the country of export.

All prices were converted from Japanese Yen (JPY) to US Dollar (USD) using a conversion rate of USD1 = JPY144.991 (https://www.oanda.com/currency-converter/), accessed on 20 May 2025.

Market Analysis

To analyze the global trade in the focal species, and Japan's role in this trade, trade data was retrieved from the UNEP-WCMC CITES Trade Database (https://trade.cites.org/) for the period 2000–2023. Trade data is submitted to the CITES Secretariat through CITES annual reports. The deadline for these reports is 31 October of the year following the year for which the report is due (CITES Resolution Conf. 11.17 Rev. CoP19). Trade reports covering trade in 2024 are not due until 31 October 2025. Hence the limitation of this dataset to 2023.

For the focus of this report, data was filtered to only cover trade in live animals (Term: LIV). Trade in other products (e.g. skins or dried animals) is only covered when these trade volumes have a significant impact on the focal species.

For this report the export-reported quantities were used. All the focal species listed on the CITES appendices are listed on Appendix II, for which an export permit is required (Article IV CITES Convention). Import permits are only required when Parties implement stricter domestic measures (allowed under Article XIV CITES Convention), e.g. by the European Union. Therefore, importing parties do not always report the import of CITES Appendix II species, resulting in under-reporting of imported animals. However, caution should be considered, as exporter-reported quantities likely represent an over-estimation of the actual trade. Although trade should be reported based on the actual number traded (Annex to CITES Notification 2017/007), not all Parties do, and sometimes report data based on the permits issued (Robinson & Sinovas, 2018). Where there are notable differences between importer- and exporter-reported quantities, these will be reported as well. Source codes mentioned in this report corresponds to the source codes used by CITES (Lyons et al., 2017).

For the non-CITES listed species the US Fish and Wildlife Service (USFWS) Law Enforcement Management Information System (LEMIS) for the period 2000–2021 was used to gain more information on the trade in these species. Although the use of LEMIS data is not without its challenges and the data can contain a variety of errors, biases, omissions, and data quality issues (Weissgold, 2024; Goodman & Kolby, 2024; Kolby et al. 2022), for non-CITES species it is likely the best data available (Janssen & Leupen, 2019). It is therefore used as an indication of the global trade in these species.

Table 2 Source codes used by CITES and as applied in this report.
Source: Lyons et al., 2017.

Source code	Description	Definition
W	Wild	Animals taken from the wild.
R	Ranched animal	Animals reared in a controlled environment, taken as eggs or juveniles from the wild, where they would otherwise have had a very low probability of surviving to adulthood.
C	Bred in captivity	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.),
F	Born in captivity	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.),
U	Unknown	Source of the animal is unknown, but must be justified.
I	Confiscated or seized	Animals that have been confiscated or seized, this source code must be used in conjunction with another source code.
O	Pre-Convention	Animal acquired before the provisions of the Convention applied to it.

Breeding Availability

To see if reported numbers of animals bred in captivity are realistic and can be achieved, data regarding the reproduction of each species is gathered through Google Scholar, but also alternative sources like herpetoculture magazines. Where possible the realistic quantity bred in captivity with the available breeding stock is calculated.

Illegal Trade

Open-source data on the illegal trade in the nine focal species was collected with a particular focus on the markets in the United States of America, European Union and South Korea. However, if data was available for other locations, this was included as well.
The Wildlife Trade Portal (TRAFFIC International, 2025; Available at www.wildlifetradeportal.org) was searched in March 2025, for open -source seizures regarding the focal species using the scientific name as a search term.
We searched the quarterly released bulletin On the Trail (edition 1-44) by Robin des Bois foundation (available at: https://robindesbois.org/en/a-la-trace-bulletin-dinformation-et-danalyses-sur-le-braconnage-et-la-contrebande/) for each species. This quarterly bulletin documents open-source reports of the poaching and smuggling of wildlife globally.
In addition, Google was searched for open-source references to seizures using the scientific name of the species in combination with the terms "seized", "confiscated".
Note that the reasons for seizure can vary, and are not always clear from open-source data. Reasons for seizure may include missing, incomplete or fraudulent paperwork, violations of animal welfare (e.g. IATA standards) during transport, as well as violations of national regulations regarding the possession, transfer or handling of species, or a combination of these.

Data Analysis

All data was analyzed using R Studio 2024.12.1 Build 563 (Posit team, 2025).

3. SPECIES

Asian Water Monitor — *Varanus salvator*

© Carlos Delgado

Scientific name	***Varanus salvator***
Japanese name	**サルバトールモニター ミズオオトカゲ**
Distribution	**South and Southeast Asia**
IUCN Red List status	**Least Concern**
CITES	**Appendix II**

Background

Varanus salvator or the Asian Water monitor is a large lizard species found throughout Asia. Several subspecies are currently recognized (Figure 1), including *V.s. salvator*, *V.s. andamanensis*, *V.s. bivittatus*, *V.s. macromaculatus*, *V.s. ziegleri* and *V.s. celebensis*. Former subspecies *V. cumingi*, *V. marmoratus*, *V. nuchalis* and *V. togianus* are now classified as separate species. Here we also look at the trade in these former subspecies, as these were observed in the Japanese market before (Janssen, 2018). *Varanus palawanensis* used to be considered *V. salvator marmoratus*, and *V. samarensis* used to be considered a subspecies of *V.*

cumingi (Koch et al., 2010). Yet, these three are rarely seen in trade.
The melanistic Asian water monitor found in Satun Province (Thailand) and the Thai Malaysian border area, which was previously considered to be a subspecies (*V.s. komaini*) is here regarded as melanistic population of *V.s. macromaculatus* (Koch, 2007). Besides being popular pets, these species are widely traded for their skins (Janssen, 2021).

Distribution of (former) *Varanus salvator* Taxa

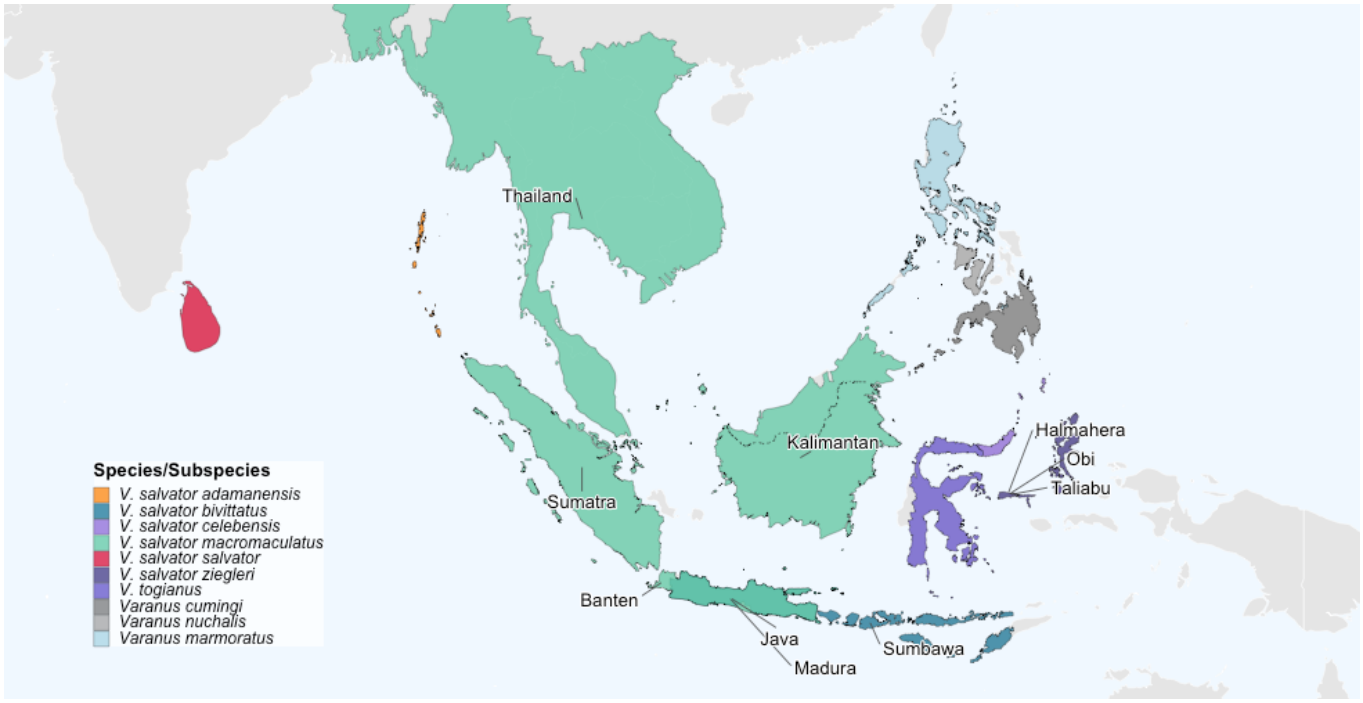

Figure 1 Approximate distribution of current and former subspecies of *Varanus salvator*.
Highlighted countries or (approximate) islands refer to recorded localities during the spot survey.

Spot Survey

A total of 133 advertisements were found, advertising 140 animals, were observed that were either posted in 2024 or to date (18 March) in 2025. These included 16 advertisements for *V. cumingi*, 2 for *V. togianus* and one for *V. nuchalis* (Figure 2). For 89 advertisements for *V. salvator* the origin was reported in the advertisements. Asian water monitors from the island of Sumbawa (Indonesia) were most popular with 15 advertisements, followed by Sumatra (7) and Java (6). Other origins mentioned were Indonesia (Banten [1], Kalimantan [1], Halmahera [1], Madura [1], Obi [1], Taliabu [1]), and Thailand (2). Several crosses were available, primarily Madura x Sumbawa/Java or *V. cumingi* x Sumbawa. Two advertisements were found for *V.s. celebensis*. Thirty-three of the advertisements were so-called color morphs; sulfur (12), axantic (7), albino (1), caramel albino (1), T+ albino (7), T- Albino (1) and 9 for melanistic animals. Five advertisements stated the animals were wild caught.
Apart from *V.s. andamanensis*, this accounts for all recognized subspecies, as 2 albino lizards were said to be of the *V. salvator salvator* subspecies.

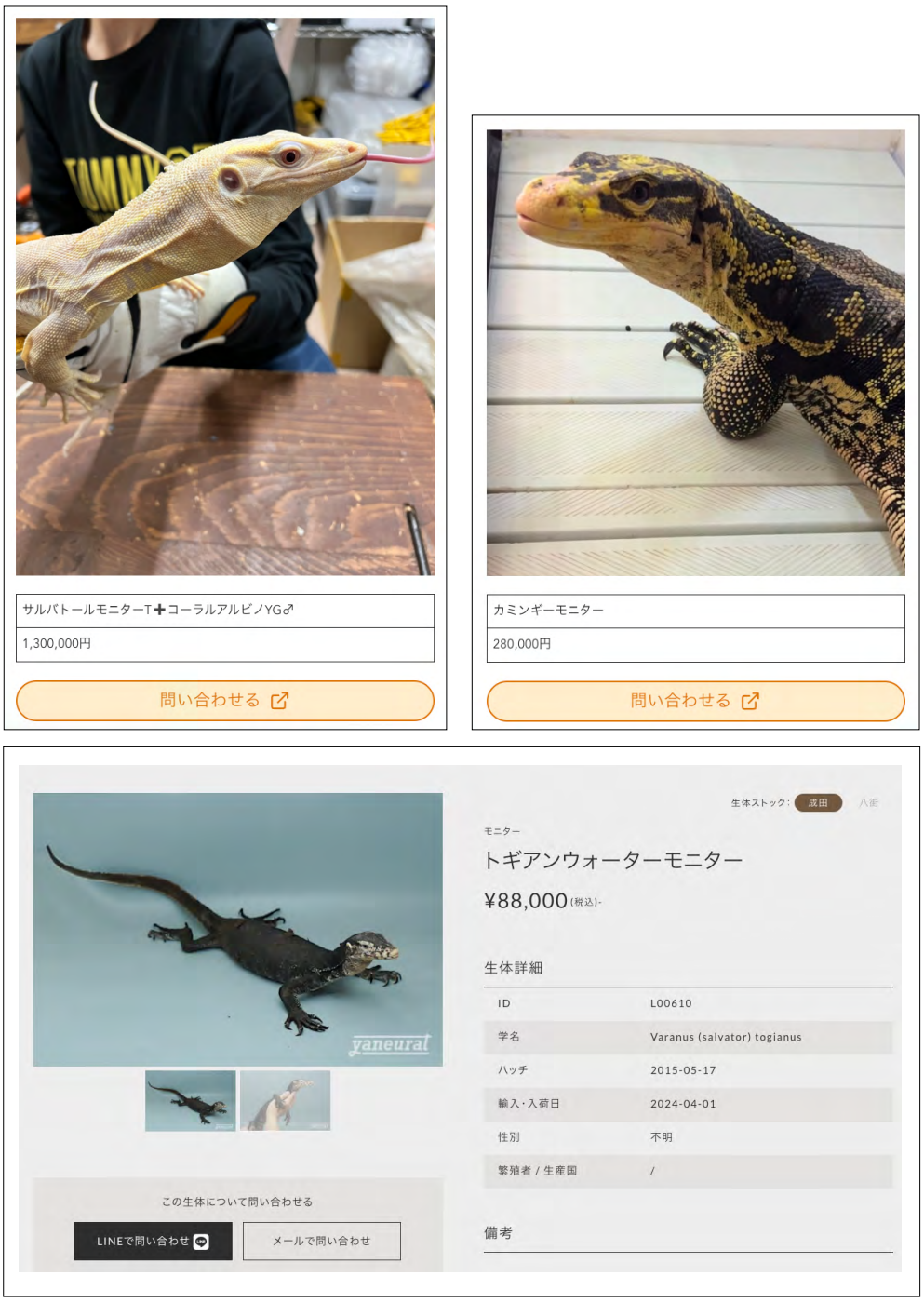

Figure 2 Advertisements for *Varanus salvator* T+ albino (top left), *Varanus cumingi* (top right) and *Varanus togianus* (bottom) in Japan.
Source: https://reppbuddy.com (V.salvator T+ albino and V.cumingi); https://yaneurat.com (V.togianus).

The average Asian Water Monitor was advertised for ¥275,634 ($1,901) (range ¥7,980–¥1,300,000 ($55–$8,965). The T+ albino being the most expensive animal advertised. Cuming's Water Monitor was advertised for slightly lower prices ¥225,416 ($1,554) (range ¥87,780–¥480,000 ($605–$3,310)). The Large-scaled Water Monitor (*Varanus nuchalis*) was advertised for ¥154,000 ($1,062) (Figure 3).

Figure 3 Advertisement for Philippine endemic *Varanus nuchalis* in Japan.
Source: https://mameo.ocnk.net/product/995

During the physical survey at the Nagoya Reptile World Spring fair, seven-teen animals were observed. This included two animals of *Varanus cumingi*, with the remaining animals being *V. salvator*. *V. cumingi* was offered for sale for ¥158,000 ($1,090) and ¥200,000 ($1,379), with one of the animals claimed to be of Indonesian origin. Several color morphs of *V. salvator* were observed, with T+ albino (1), axantic (1), axantic x sulfur (1), and marble Madura (2). Localities mentioned were Sumbawa (2), Sumatra (1), Java (1), and Halmahera (1). One vendor sold *V.s. celebensis*, which originates from the island of Sulawesi. Non-locality specific or color morph animals were advertised for respectively ¥23,000 ($159) and ¥28,000 ($193). This coincides with the observations during the online spot survey. For color morphs the advertised price was much higher ranging from ¥62,000 ($428) for an Axantic x Sulfur animal to ¥880,000 ($6,069) for a T+ albino. Remaining color morphs fetched on average ¥208,000 ($1,434). Prices were lower for locality specific animals, ranging from ¥20,000 ($138) for an animal from Java, to ¥188,000 ($1,296) from Halmahera. *V.s. celebensis* was advertised for ¥78,000 ($538), and animals from Sumatra and Sumbawa for ¥148,000 ($1,021) and ¥168,000 ($1,159) respectively.
No confirmation was made regarding the illegality of the advertised animals.

Market Analysis

Global trade

The UNEP-WCMC CITES Trade Database reports on the trade of 479,723 live *Varanus salvator* between 2000 and 2023 (Figure 4). Of this, 99.9% is traded for commercial purposes (code T). The largest exporter of live *V. salvator* is Vietnam, with a reported export of 269,810 animals, followed by Malaysia (172,915 animals) and Indonesia (135,580 animals). However, nearly all animals exported by Vietnam originate

from Laos (269,500 animals). These three range states account for 99.7% of the global export. The main importer of live *V. salvator* is China, with 279,025 animals. Accounting for nearly half (48%) of all imports. Other important importers are Hong Kong (158,449; 27%) and the United States of America (88,418; 15.3%).

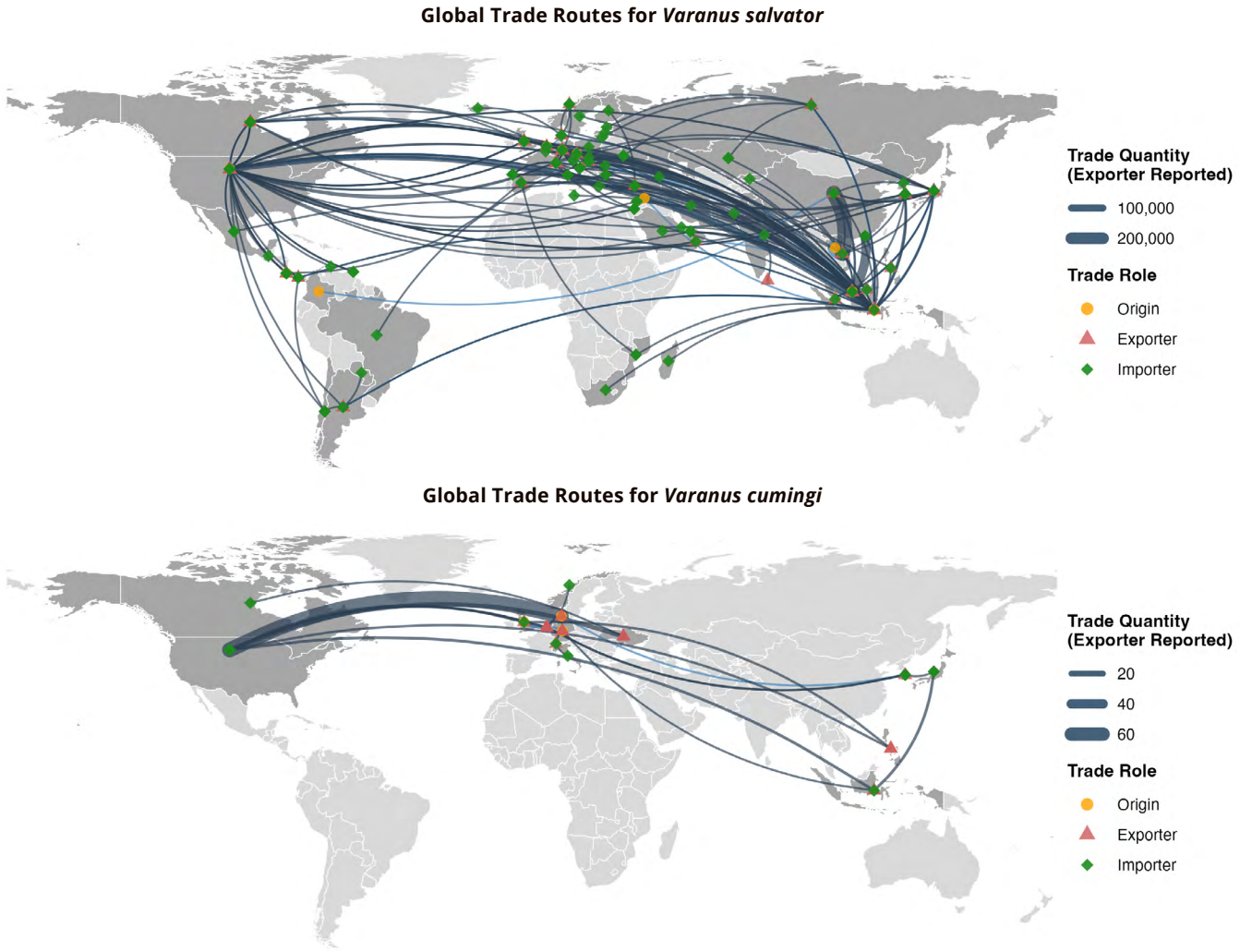

Figure 4 Global trade routes for *Varanus salvator* (top) and *Varanus cumingi* (bottom) in the period of 2000–2023.

The majority of *V. salvator* have a wild origin (51.3%, Figure 5), closely followed by ranched animals (40.1%). Captive born and captive-bred animals only make up a small percentage with respectively 1.6% and 0.8%. Interestingly, there is a huge spike in ranched animals in the year 2012, whereas the number of wild animals traded remains relatively stable over the years. Nearly all ranched animals (269,503) originate from Laos and were reportedly exported via Vietnam to China. Apart from 3 animals that were exported by Canada to South Korea but originated in Indonesia. All commercial trade in CITES listed species from Laos has been suspended since 19 March 2015 (CITES Notif. 2015/013).

There are no trade records for *V. togianus* in the CITES Trade Database. For *V. marmoratus*, several records could be found for 2011, 2012. 2014, With 8 captive born animals reportedly exported from range state the Philippines to the Czech Republic, 6 to the United States of America, and 4 to Great Britain. Only the 6 animals imported by the United States of America were documented for commercial purposes, others were for breeding purposes (code B). Although the Philippines declared those 6 animals as for breeding purposes as well. This is similar for *V. nuchalis*, for which trade is documented between 2011 and 2012.

With 8 animals reportedly imported by the Czech Republic from the Philippines, and 3 by the United States of America.
More trade is reported for *Varanus cumingi*, with 131 animals over the same time period, with 118 reportedly exported for commercial purposes. Main exporter of *V. cumingi* is Denmark with 68 animals, accounting for >50% of the reported export (Figure 4). Other important exporters are Ukraine with 16 animals, and the Netherlands with 15 animals. Together these countries account for over 70% of the reported trade in *V. cumingi*. Interestingly, range state Philippines only reported the export of 8 animals in total. Hong Kong reported the import of 21 animals, although exporting parties report no export to Hong Kong. The primary importer of *V. cumingi* is the United States of America with 104 animals, accounting for almost 80% of all imports. Japan is the 2nd largest importer of this species with 8 animals, followed by South Korea with 6 animals.
Nearly all traded *V. cumingi* reportedly have a captive bred origin (96%), followed by animals born in captivity (3.8%). This is the same for *V. marmoratus* and *V. nuchalis*, were all animals had a captive-born or -bred origin.

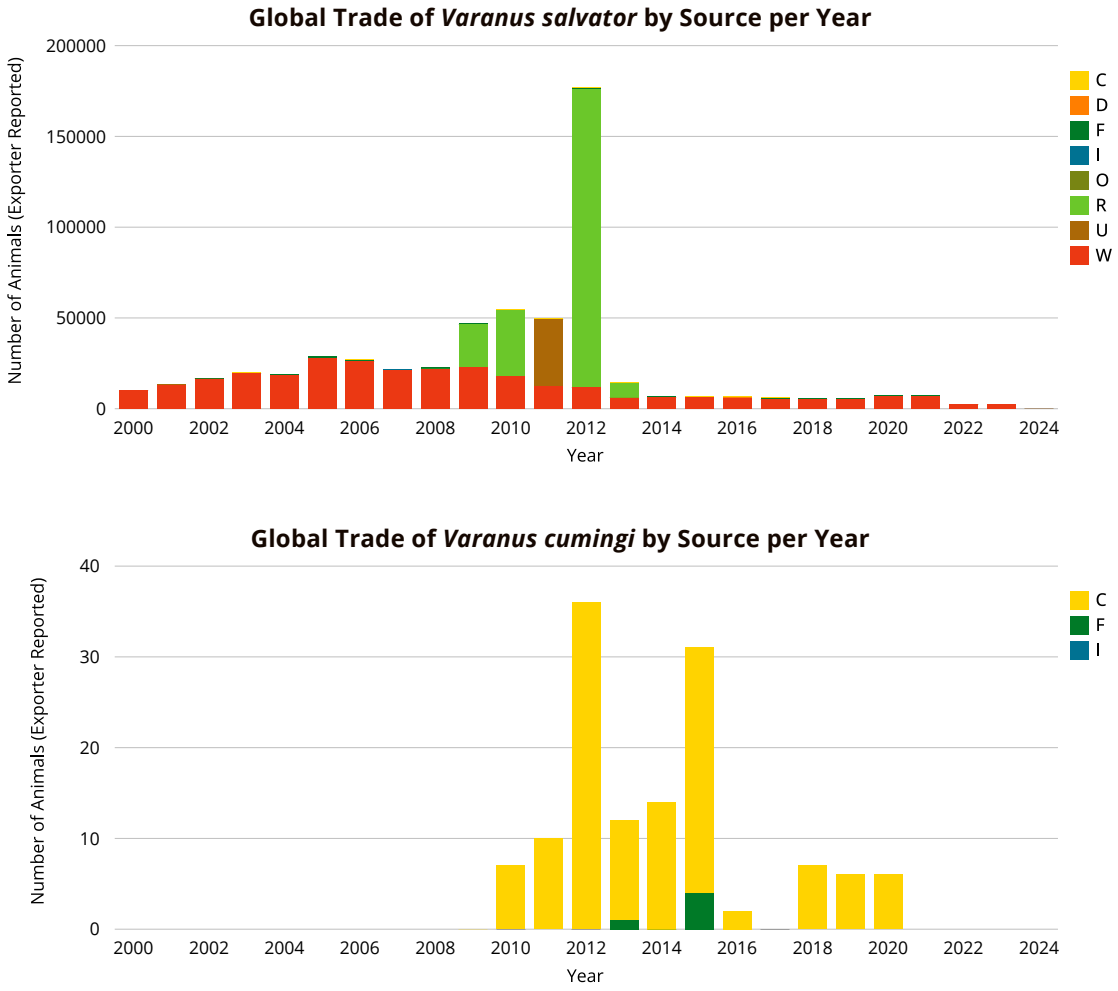

Figure 5 Global trade in *Varanus salvator* (top) and *Varanus cumingi* (bottom) in the period of 2000–2023 by source per year.

Japan's role in the trade

Japan is the fourth largest importer of live *V. salvator*, accounting for 17,225 animals or 3% of the global trade Figure 5. The primary source of the imported *V. salvator* is Indonesia, with 94% of all imported

animals. Other important source countries are Malaysia (720 animals), and non-range state Taiwan (120 animals). A further 89 animals were imported from Indonesia via other countries like Singapore, South Korea and United States of America.
Japan imported *Varanus cumingi* primarily from non-range state Indonesia (6 animals), and 2 animals from South Korea, which originated from Denmark (Figure 6). The other former subspecies were not imported by Japan. The UNEP-WCMC CITES Trade Database does not contain records that *V. nuchalis*, *V. marmoratus* or *V. togianus* were imported by Japan.

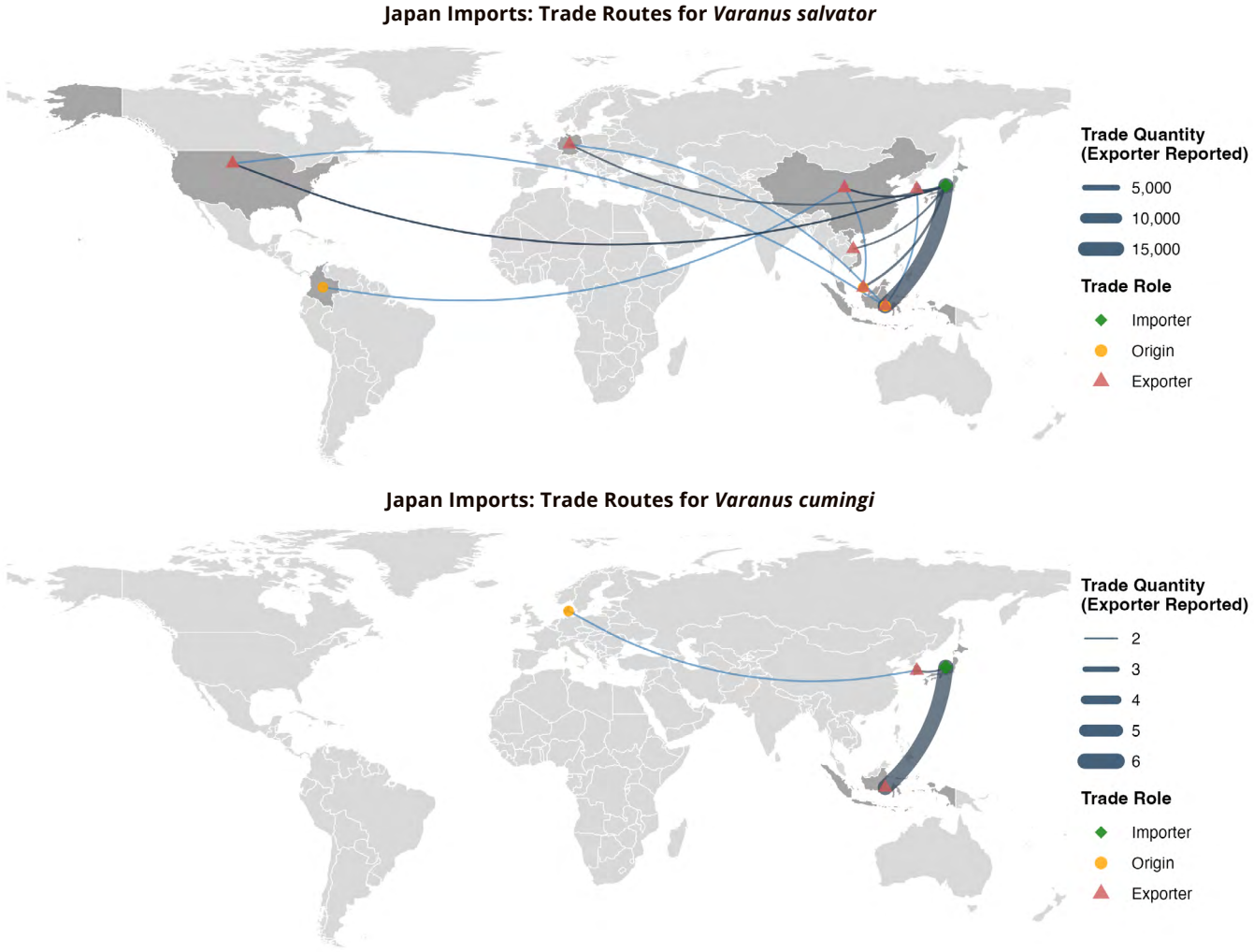

Figure 6 Trade routes for the import of *Valanus salvator* (top) and *Varanus cumingi* (bottom) by Japan in the period of 2000–2023.

Japan also exported *V. salvator*, primarily to the Czech republic (30), United States of America (5), and China (2). South Korea also reported receiving 768 animals from Japan, however, this is not reported by Japan. All exported specimes were of wild origin.
Imported animals consisted primarily of wild animals too, with only a mere 194 reportedly bred in captivity, and a further 764 born in captivity (Figure 7). For *Varanus cumingi*, all eight animals were reportedly bred in captivity (Figure 8).

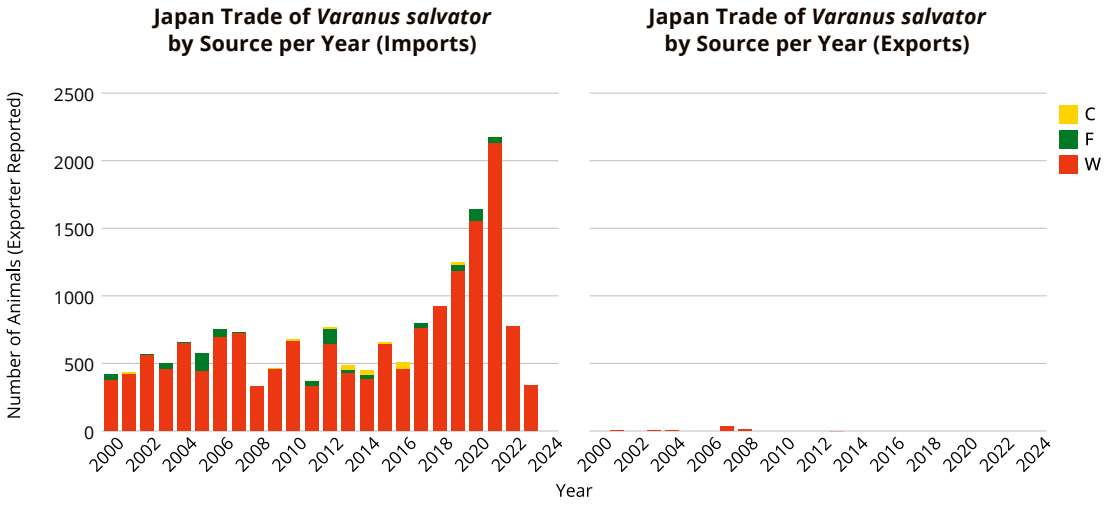

Figure 7 Import (left) and export (right) of *Varanus salvator* by Japan in the period of 2000–2023 by source per year.

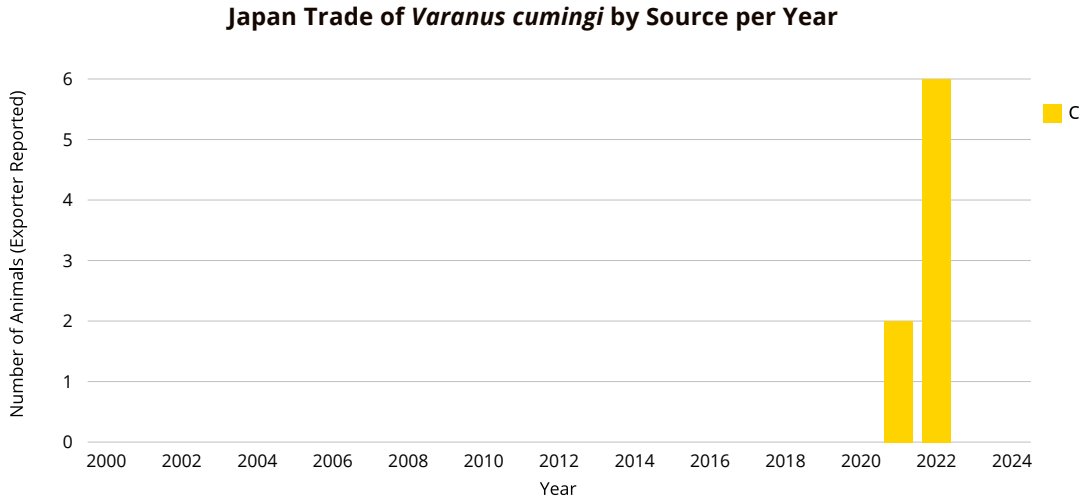

Figure 8 Import of *Varanus cumingi* by Japan in the period of 2000–2023 by source per year.

Export Quotas

Both Indonesia and Malaysia have disseminated export quotas pertaining to this species, accessible via Species+ (UNEP, 2025) (Table 3). Furthermore, the Non-Detriment Finding (NDF) for the export of *V. salvator* from Peninsular Malaysia is obtainable through the CITES website (AC31 Doc 14.2; Khadiejah et al., 2020). Malaysian authorities project that an area of 81,083 km² within Peninsular Malaysia constitutes suitable habitat for *V. salvator*. Densities of *V. salvator* across Southeast Asia exhibit a range from 4.5 to 2,400 individuals per km², demonstrating variability contingent upon habitat type (Khadiejah et al., 2020). By employing diverse density estimates based on habitat classification, Malaysian authorities approximate the population of *V. salvator* in Peninsular Malaysia to be between 4,223,384 and 31,191,505 individuals. Annual offtake rates are derived from the population estimates across four states (Kedah, Pahang, Perak, and Selangor), which collectively account for 99% of the annual *V. salvator* harvested in Malaysia, resulting in a population estimate ranging from 1,571,625 to 5,516,434 individuals. Malaysia posits that, predicated on an annual offtake rate of 10% of the conservative population estimate, the quota for Peninsular Malaysia could be established at 157,162, encompassing both the harvest of live animals and skins. Nevertheless, quotas are established at lower levels owing to a diminished global demand for skins, as indicated by Khadiejah et al., (2020). The current export quota of 83,000 seems to be sustainable based upon the data provided by Khadiejah et al. (2020). Between 1990 and 2000, Malaysia exported

approximately 200,000 skins of *V. salvator* annually; however, this figure declined to around 100,000 due to a reduction in demand (Khadiejah et al., 2020). The export of skins from Indonesia fluctuated from nearly 700,000 in the early 1990s to approximately 400,000 annually by the year 2020. The statistically significant increase in mean body size across all regions documented by Khadiejah et al. (2020) aligns with the commercially preferred dimensions (<700mm SVL and 5,000g), indicating substantial pressure on this younger, yet fully reproductive, age cohort.

There is no information on how Indonesia calculates the export quotas for either live animals or what can be harvested for the skin trade. There have not been any harvest quotas for *Varanus togianus*, although in 2025, Indonesian authorities allowed the harvest of 10 animals for breeding purposes (KSDAE, 2025). It is illegal to harvest *V. cumingi*, *V. nuchalis* and *V. marmoratus* from the wild under the Wildlife Resources Conservation and Protection Act of 2001, or the Re-public Act No. 9147 in the Philippines (Sy and Lorenzo II, 2020). No permits have been issued to collect and trade these species since 2001 (Sy and Lorenzo II, 2020), although some permits have been issued for commercial facilities breeding since 2021. The Bureau of Animal Industry, part of Department of Agriculture, reports 27 Registered Captive Wildlife Facilities as of May 31, 2024, at least 10 classify themselves as reptile farm (Bureau of Animal Industry, 2025). Although these facilities are allowed to export captive bred animals, no export has been documented in the UNEP-WCMC CITES Trade Database besides the mentioned above.

Table 3 Export quota for *Varanus salvator* in the period of 2000–2025. Specific quota for the purpose of skins or meat were removed.
Source: Species+ (UNEP, 2025)

Year	Indonesia	Malaysia
2025		83,000 (Peninsular Malaysia); 3,000 (Sabah)
2024	7,067 (Live)	3,000 (all, wild-taken - Sabah);
2023	6,687 (Live (pets))	83,000 (all, wild-taken - Peninsular Malaysia)
2022	7,600 (Live (pets))	83,000 (all, wild-taken - Peninsular Malaysia); 3,000 (all, wild-taken - Sabah)
2021	7,601 (Live (pets))	3,000 (All. Wild animals - Sabah)
2020	7,008 (live, wild-taken)	3,000 (All. Wild animals - Sabah)
2019	5,288 (live)	18,000 (all, wild-taken - Peninsular Malaysia); 3,000 (all, wild-taken - Sabah)
2018	5,288 (live)	165,000 (all, wild-taken - Peninsular Malaysia); 3,000 (all, wild-taken - Sabah); 0 (all, wild-taken - Sarawak)
2017	5,288 (live)	3,000 (all, wild-taken - Sabah)
2016	5,288 (live)	3,000 ([Quota for GENUS Varanus] all - Sabah)
2015	5,400 (live)	3,000 ([Quota for GENUS Varanus] all - Sabah)
2014	5,400 (live)	18,000 (live, wild-taken - Peninsular Malaysia)
2013	5,400 (live)	18,000 (live (Note: applies to Peninsular Malaysia only))
2012	432,000 (skins and skin products/live)	15,000 (all (Note: applies to Sabah only))
2011	5,400 (live)	15,000 (all (Note: applies to Sabah only))
2010	5,400 (live)	
2009	5,400 (live)	
2008	5,400 (live)	
2007	9,000 (live)	
2006	9,000 (live)	
2005	5,400 (live)	
2004	5,400 (live)	
2003	6,000 (live)	
2002	5,400 (live)	12,000 (live (Note: applies to Peninsular Malaysia only))
2001	5,400 (live)	
2000	471,200 (live)	

Breeding Availability

Varanus salvator reaches sexual maturity around two to three years of age, depending on local circumstances like food availability (Andrews & Gaulke, 1990). Males tend to reach sexual maturity around 400 mm SVL, and an approximate weight of 1kg, while females reach sexual maturity slightly later around 470 mm SVL (Shine et al., 1990).

This species can reproduce year-round, which is triggered by heavy rains (Cota, 2011), and decreases during the dry season (Shine et al., 1996). Egg-laying season is generally be assumed to be between April to October, with females laying multiple clutches, averaging 13 eggs (range 5–22). Clutch sizes of up to 40 eggs are possible (Erdelen, 1989). Clutch sizes are positively correlated with size in this species (Shine et al., 1996).

Incubation times vary between 180 to 327 days depending on the environmental circumstances (Das, 2006).

Similar data is available for other former *V. salvator* subspecies, with up to two or three clutches annually of two to ten eggs reported for *V. cumingi* (Koch et al., 2010). The other species of the former *V. salvator* complex exhibit likely similar reproductive strategies.

Illegal Trade

Open-source references resulted in over 50 seizures totaling at least 1,969 animals of *V. salvator* and former subspecies (Table 4). This included large seizures of 500 animals in Vietnam in 2014, and 450 animals in Thailand in 2016. Former subspecies of *V. salvator* remain a popular target for smuggle. Several people were convicted in the United States of America for smuggling in particular the Philippine species. In 2020, A. Akram was sentenced to serve a four-year term of federal probation for trafficking 20 water monitors from the Philippines, in violation of the Lacey Act (Justice.gov, 2020). In 2019, D. Semedo was sentenced to two years of probation and 120 hours of community service for trafficking monitor lizards that were exported illegally from the Philippines (Justice.gov, 2019). In 2018, another American national, G. Simpson was sentenced to six months house arrest for smuggling five monitor lizards from the Philippines into the country (APnews.com, 2018).

Table 4 Over view of siezed animals of *Varanus salvator*, including former subspcies from open sourced data.

Country	Year	Species	Quantity	Source
Vietnam	2010	*Varanus salvator*	1	Wildlife Trade Portal
Vietnam	2010	*Varanus salvator*		Wildlife Trade Portal
Thailand	2011	*Varanus salvator*	93	Wildlife Trade Portal
Hong Kong	2012	*Varanus cumingi*	19	Wildlife Trade Portal
Hong Kong	2013	*Varanus salvator*	288	Wildlife Trade Portal
Philippines	2013	*Varanus marmoratus*	5	Robin des Bois #3
Vietnam	2014	*Varanus salvator*	500	Wildlife Trade Portal
Philippines	2014	*Varanus cumingi*	1	Wildlife Trade Portal
Philippines	2014	*Varanus cumingi*	15	Wildlife Trade Portal
China	2014	*Varanus salvator*	3	Robin des Bois #6
Mexico	2015	*Varanus salvator*	3	Robin des Bois #8
Vietnam	2016	*Varanus salvator*	7	Wildlife Trade Portal
United States of America	2016	*Varanus salvator*	20	Wildlife Trade Portal
Indonesia	2016	*Varanus salvator*	8	Wildlife Trade Portal
Thailand	2016	*Varanus salvator*	450	Wildlife Trade Portal
Thailand	2016	*Varanus salvator*	3	Robin des Bois #14
Japan	2017	*Varanus salvator*		WiTIS
Malaysia	2017	*Varanus salvator*	86	Wildlife Trade Portal
Cambodia	2017	*Varanus salvator*	1	Wildlife Trade Portal
Thailand	2017	*Varanus salvator*	104	Wildlife Trade Portal
Vietnam	2017	*Varanus salvator*	12	Robin des Bois #19
Vietnam	2017	*Varanus salvator*	2	Robin des Bois #17
Mexico	2018	*Varanus salvator*	1	Wildlife Trade Portal
Cambodia	2018	*Varanus salvator*		Wildlife Trade Portal
Cambodia	2018	*Varanus salvator*	70	Wildlife Trade Portal
Vietnam	2018	*Varanus salvator*	1	Wildlife Trade Portal
Vietnam	2018	*Varanus salvator*	1	Wildlife Trade Portal
Cambodia	2018	*Varanus salvator*	58	Robin des Bois #23
Cambodia	2018	*Varanus salvator*	17	Robin des Bois #22
United States of America	2018	*Varanus cumingi*		Robin des Bois #20
Vietnam	2019	*Varanus salvator*	2	Wildlife Trade Portal
Vietnam	2019	*Varanus salvator*	4	Wildlife Trade Portal
Austria	2019	*Varanus salvator*	18	Wildlife Trade Portal
Cambodia	2019	*Varanus salvator*	57	Wildlife Trade Portal
Vietnam	2019	*Varanus salvator*	1	Wildlife Trade Portal
Cambodia	2019	*Varanus salvator*	8	Robin des Bois #27
Spain	2019	*Varanus salvator*	1	Robin des Bois #24
Philippines	2020	*Varanus marmoratus*	11	Wildlife Trade Portal
Vietnam	2020	*Varanus salvator*	1	Wildlife Trade Portal
Vietnam	2020	*Varanus salvator*	1	Wildlife Trade Portal
Vietnam	2020	*Varanus salvator*	1	Wildlife Trade Portal
Vietnam	2020	*Varanus salvator*	2	Wildlife Trade Portal
Vietnam	2020	*Varanus salvator*	1	Wildlife Trade Portal
Vietnam	2020	*Varanus salvator*	2	Wildlife Trade Portal
Cambodia	2020	*Varanus salvator*	9	Robin des Bois #31
Philippines	2021	*Varanus marmoratus*	1	Wildlife Trade Portal
Vietnam	2021	*Varanus salvator*	2	Robin des Bois #34
Indonesia	2021	*Varanus salvator*	5	Robin des Bois #32
Thailand	2022	*Varanus salvator*	39	Wildlife Trade Portal
Vietnam	2022	*Varanus salvator*	12	Robin des Bois #38
India	2022	*Varanus salvator*	18	Robin des Bois #38
United States of America	2023	*Varanus salvator*	2	Robin des Bois #40
Philippines	2024	*Varanus marmoratus*	1	Wildlife Trade Portal
Philippines	2024	*Varanus cumingi*	1	DENR Soccsksargen
Philippines	2025	*Varanus nuchalis*		TRAFFIC

Conclusion

The Japanese market for *Varanus salvator* and its former subspecies presents a dynamic and complex picture that warrants closer regulatory scrutiny and ongoing monitoring. All currently recognized subspecies of *V. salvator*, except for *V.s. andamanensis*, were observed in the market, alongside at least three former subspecies now treated taxonomically as distinct species: *V. cumingi*, *V. nuchalis*, and the Indonesian *V. togianus*. The documented presence of the former Philippine taxa is highly concerning, as no legal exports from the Philippines have been recorded since the enactment of the Wildlife Resources Conservation and Protection Act of 2001 (Sy & Lorenzo II, 2020), which prohibits wild harvest and trade in these species. In addition, no harvest quota for commercial export have been issued by Indonesian authorities for *V. togianus*. Despite this, animals of *V. cumingi* have appeared in trade with questionable origin declarations, and at least one individual each of *V. togianus* and *V. nuchalis* were advertised in Japan during the survey period.
The Philippines did reportedly export several animals of *V. cumingi* to the United States of America and Great Britain. Yet, Great Britain only exported *V. cumingi* to the United States of America, and there are no export records for the United States of America of this species. While it is plausible that some animals may have been imported in 2024, data for which are not yet available, historical records already indicated their presence in the Japanese market as early as 2018 (Janssen, 2018). This strongly suggests that the Japanese animals of these species arrived in Japan illegally, either through the laundering of these taxa under outdated or incorrect taxonomic names (*V. salvator*), or have been smuggled into the country. This laundering loophole may also enable the appearance of *V. marmoratus*, *V. samarensis* and *V. palawanensis* in trade, even though they were not directly observed in the current survey.

Further underscoring these concerns is the reappearance of *V.s. salvator*, the Sri Lankan subspecies, which was also recorded in 2018 and again during the most recent market survey. Yet, the legal export of *V.s. salvator* from Sri Lanka is prohibited (Janssen & De Silva, 2019). The recurrence of such cases could illustrate a continued pattern of regulatory evasion that undermines both national and international conservation efforts.

While trade in live animals, particularly in Japan, represents only a small fraction of the global trade in *Varanus salvator*, it remains significant. The global trade is overwhelmingly dominated by animals destined for the leather industry, especially skins sourced from Malaysia and Indonesia. Malaysia's current harvest levels appear to be sustainable, supported by robust population estimates and formal non-detriment findings (NDF). However, the situation in Indonesia is less transparent, with no publicly available methodology detailing how harvest quotas are established. Continued, rigorous monitoring is essential in both countries to ensure long-term population viability, particularly considering changing demand dynamics and pressures on subadult individuals, the preferred cohort for the skin trade.

Another trend that merits attention is the increasing popularity of color morphs in the pet trade. The presence of sulfur, axanthic, albino, caramel albino, T+ and T– albino, and melanistic variants suggests a growing market segment that may encourage intensified breeding and selective practices.
In sum, the Japanese market functions as both a consumer and transit point for a broad array of *Varanus* taxa, including species whose trade is restricted or prohibited. The evidence suggests persistent gaps in enforcement and traceability, particularly with respect to animals originating from with the Philippines and Sri Lanka. Taxonomic reclassification has not been followed by enforcement reforms, creating exploitable regulatory grey zones. Stronger international collaboration, improved origin verification mechanisms, and enhanced scrutiny of declared captive-breeding operations are essential to curtail illegal trade and ensure the sustainability of legitimate operations. Without targeted enforcement and transparent reporting, the legal trade risks becoming a cover for continued exploitation of vulnerable wild populations.

Black Girdled Lizard — *Cordylus niger*

© Bernard Dupont

Scientific name	***Cordylus niger***
Japanese name	**クロヨロイトカゲ**
Distribution	**South Africa**
IUCN Red List status	**Least Concern**
CITES	**Appendix II**

Background

Despite being described as *Cordylus niger* by Cuvier in 1829, subsequently, until 1993 this species was considered to be a subspecies of *Cordylus cordylus*. The species is restricted to five isolated subpopulations in the coastal region of Western Cape Province in South Africa.

Spot Survey

A total of four advertisements, advertising 7 animals, were observed that were either posted in 2024 or to date (18 March) in 2025 (Figure 9). Four different vendors advertised the species. Of the four advertisements, 2 mentioned the animals were already sold. Only 2 advertisements mentioned the origin of the animal, which were bred in captivity: one in the EU. No prices were mentioned for this species.

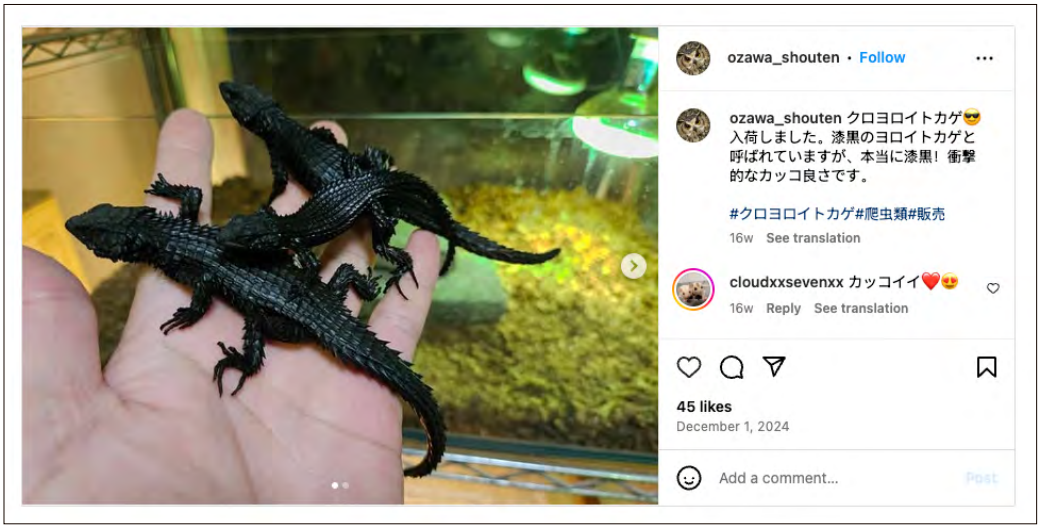

Figure 9 An advertisement for *Cordylus niger* in Japan posted on 1 December 2024.
Source: https://www.instagram.com/ozawa_shouten/p/DDCyy_RTW1L/?img_index=1

During the physical survey at the Nagoya Reptile World Spring Fair, no animals were observed. No confirmation was made regarding the illegality of the advertised animals.

Market Analysis

Global trade

The UNEP-WCMC CITES Trade Database only reports three instances were *Cordylus niger* were exported. In 2001, four animals were exported from South Africa to the United States of America, according to South Africa for purpose B (Figure 10). The United States of America reports on the import of four animals for commercial purposes (T). For 2003 both the US and South Africa report the transaction of three wild animals for scientific purposes (S).
A strange occurrence is the reported import of 30 animals of *Cordylus niger* by Saudia Arabia in 2021, reportedly bred in captivity, and originating from Malaysia. However, there are no records of this species being imported into Malaysia.

Figure 10 Global trade routes in *Cordylus niger* in the period 2000–2023.

Japan's role in the trade

There are no records of Japan every importing this species. However, in both 2024 and 2025 they were observed for sale on the Japanese market. There are several explanations for this. First, import might have occurred in 2024 or 2025, this data is currently unavailable (see methods). However, when searching for advertisements pre-2024, we still found several advertisements (Figure 11). While it is possible that these individuals were obtained from private keepers or domestic breeders, considering the species' lifespan, it is unlikely that they were imported prior to the listing under CITES (i.e., before 1981). Thus they had to be imported between 1981 and the year the advertisement was published, and such transactions should be documented in the UNEP-WCMC CITES Trade Database.

Figure 11 Advertisements of *Cordylus niger* for 2013 and 2023.
Source: http://blog.livedoor.jp/hachikura_ohmiya/archives/51439448.html (left) and https://x.com/dizzyask (right)

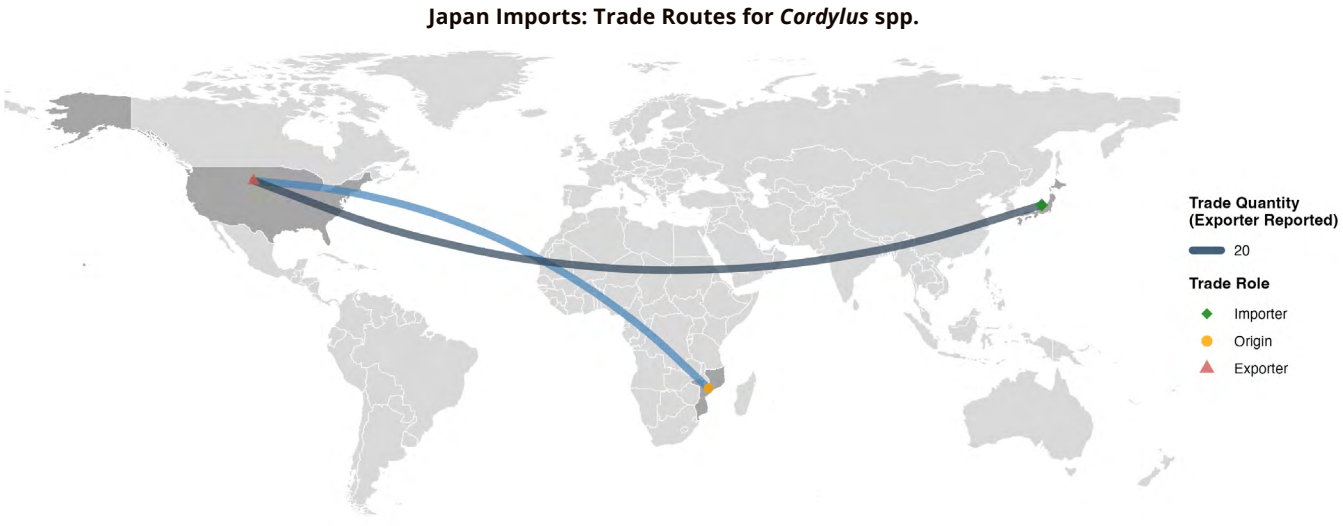

Figure 12 Trade routes for the import of *Cordylus* spp. by Japan in the period of 2000–2023.

The 2nd potential explanation is that this species has been traded as *Cordylus* spp. as no imports of *Cordylus cordylus* have been recorded (Figure 12).
Although South Africa did not report any export of *Cordylus* spp. to Japan, Japan did report the import from South Africa in 2008 (n=14), 2011 (n=22), 2014 (n=5), and 2015 (n=2). It is possible that these shipments included *Cordylus niger*, but that these were reported under a different species name by South Africa. The United States of America, as the only receiver of the species from South Africa, did report the export *Cordylus* spp. to Japan. Other shipments with *Cordylus* spp. primarily arrived from Mozambique, which is home to several other *Cordylus* spp. South Africa is home to multiple *Cordylus* spp. (and related genera like Smaug or Pseudocordylus), and for instance reported the export of 230 Smaug warreni to Japan, which formerly belonged to the *Cordylus* spp.
The last remaining option for the presence of *Cordylus niger* in Japan is that they have been smuggled into the country.

Harvest Quotas

There are no harvest quotas issued for this species in its range state.

Breeding Availability

Cordylus niger is an ovoviviparous species, meaning the female retains fertilized eggs inside her body until they hatch, giving birth to live young. This typically occurs in autumn, with females producing one to three offspring that are immediately independent, as there is no parental care. These lizards are generally solitary, only interacting during the breeding season. They are diurnal, spending much of their day basking in the sun and ambushing passing insects. However, there is some information of this species being bred in captivity. Bustard (1955) reports on receiving this species (at the time received as *Cordylus cordylus niger*) in 1954, with two young being born in the enclosure shortly after. The female was gravid at the time of arrival and died approximately one week after the birth. Bustard (1995) reports several other births, including that females frequently died shortly after giving birth. Suggesting that at least a pre-Convention population could be present in captivity. However, the sheer lack of international trade in this species suggests that either these animals rarely move between markets (e.g. only traded in the EU or US internal markets), or this population is very small.

Illegal Trade

Open-source references did not result in any documented seizures of *Cordylus niger*.

Conclusion

The presence of *Cordylus niger* in the Japanese pet trade, despite the absence of official import records, raises questions about its origin. While no imports into Japan are recorded in the CITES Trade Database, this may be due to the reporting deadline, meaning 2024 imports would not yet be reflected. Alternatively, animals may have entered under a different taxonomic name, as past trade data suggest similar discrepancies. The possibility of smuggling cannot be ruled out, given the species' restricted distribution and limited legal trade.
The last two options are more likely as advertisements were present for other years.
International trade in *Cordylus niger* appears minimal. The UNEP-WCMC CITES Trade Database records only a few exports from South Africa, primarily for scientific or commercial purposes. The most unusual record is a 2021 report of 30 captive-bred animals imported by Saudi Arabia from Malaysia, despite no

prior records of the species entering Malaysia. These inconsistencies highlight potential misreporting or illicit trade routes.

Although there is little evidence of widespread captive breeding, historical accounts indicate the species has been in captivity since at least the 1950s. Reports suggest that *C. niger* has occasionally reproduced in captivity, though with high female mortality post-birth. This, combined with the lack of formal breeding programs, suggests that many individuals in the pet trade likely originate from wild sources, whether through misidentified legal exports or illegal channels. Given its limited distribution and fragmented populations, monitoring trade activity is essential to assess potential conservation risks associated with ongoing demand. The large number of *Cordylus* spp. traded on genus level instead of species level is of conservation concern, it does not merely undermine conservation as specificity of available data is reduced and trade data will be skewed, it also enables laundering and illegal trade. Both compromise the effectiveness of CITES listings.

Blue-speckled Tree Monitor — *Varanus macraei*

© Greg Hume

Scientific name	***Varanus macraei***
Japanese name	**コバルトツリーモニター** **アオホソオオトカゲ**
Distribution	**Indonesia (Batanta island)**
IUCN Red List status	**Endangered**
CITES	**Appendix II**

Background

The Blue-speckled Tree Monitor *Varanus macraei* (Böhme & Jacobs, 2001) was first described in 2001 based upon animals present in the wildlife trade and is named after a wildlife trader (Bennet, 2015). The species is endemic to Indonesia where it occurs on the island of Batanta, and several nearby offshore islets. The species is not listed as a protected species in Indonesia (Regulation of the Minister of Environment and Forestry No. P.106/MENLHK/SETJEN/KUM1.1/12/2018). Indonesia has an extensive harvest and export quota system for non-protected species to supply both domestic and international markets that stipulates which species may be harvested, how many can be harvested, where they can be harvested from and in what form (e.g. live for the pet trade) (Soehartono & Mardiastuti, 2002; Nijman et al., 2012). As there have been no harvest quota established for the capture of wild individuals, the export of wild individuals is not possible (Shepherd, 2022), but this species can be exported when they have been bred in captivity. The United States Fish and Wildlife Service (USFWS) has proposed an emergency listing for this species on the Endangered Species Act (Federal Register, 2024).

Spot Survey

A total of 28 advertisements (Figure 13), advertising 34 animals, were observed that were either posted in 2024 or to date (18 March) in 2025. Sixteen different vendors advertised the species. Of all 28 advertisements, 15 (54%) mentioned the animals were already sold. Only five advertisements mentioned the origin of the animal, which were all reported as wild caught, apart from one individual, which was reportedly bred in captivity.
The average price for males and females was ¥285,333 ($1,968), although the range for males was wider (¥180,000–¥380,000 ($1,241–$2,621)) compared to females (¥230,000–¥328,000 ($1,586–$2,262)).

Figure 13 Two advertisements for adult Blue-speckled Tree Monitors in Japan.
Note that the right advertisement reports a wild origin (WC) for the animal.
Source: https://www.loj25.com/p/14/ (left) and https://www.kawaiiikimono.com/pets/reptiles/148/ (right).

During the physical survey at the Nagoya Reptile World Spring fair, seven animals were observed. One vendor sold pairs for ¥599,980 ($4,138), while two other vendors sold individual animals for ¥298,000 ($2,055) and ¥278,000 ($1,917) respectively. This coincides with the observations during the online spot survey, which provided nine advertisements posted in March 2025 alone. The prices for animals observed during the reptile fair were consistent with prices observed online.
No confirmation was made regarding the illegality of the advertised animals.

Market Analysis

Global trade

Over the period 2000–2023, a total of 5,862 animals were reportedly exported from range state Indonesia, range state from *Varanus macraei* (Figure 14). The United States of America is the main importer with 2,778 animals reported. Although true numbers are likely to be lower (see methods). The United States of America only reports the import of 1,605 animals. Japan is the second importer of this species with 1,197 animals, followed by France with 406 animals. Together these three countries account for >75% of the global trade.

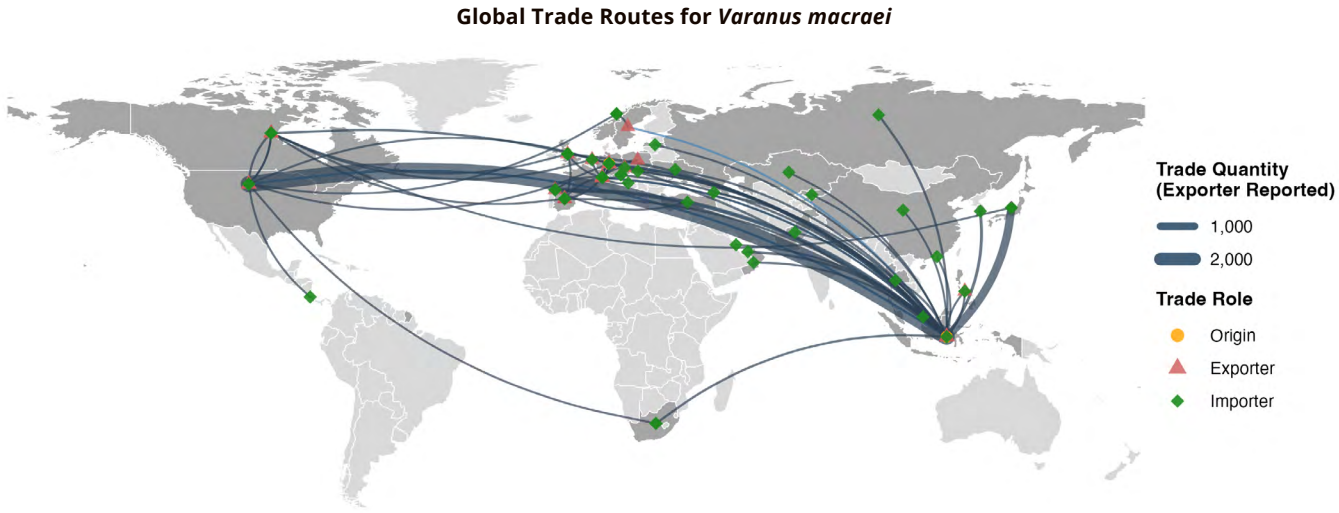

Figure 14 Global trade routes in *Varanus macraei* in the period of 2000–2023.

The total global trade in live animals is slightly higher with 6,057 animals over that period. Of these, 6,023 (99.4%) are reportedly traded for commercial purposes (Code T), and the remainders for Zoological purposes (30), personal (1) or law enforcement (1). Interestingly, the UNEP-WCMC CITES Trade Database contains records for animals with source code W, both in 2022 and 2023 (Figure 15). The United States of America reported on the import of 69 wild caught animals from Indonesia, while Indonesia did not report the export of wild caught animals. The only animals with a wild origin reported by Indonesia were reportedly exported to Japan and Taiwan.

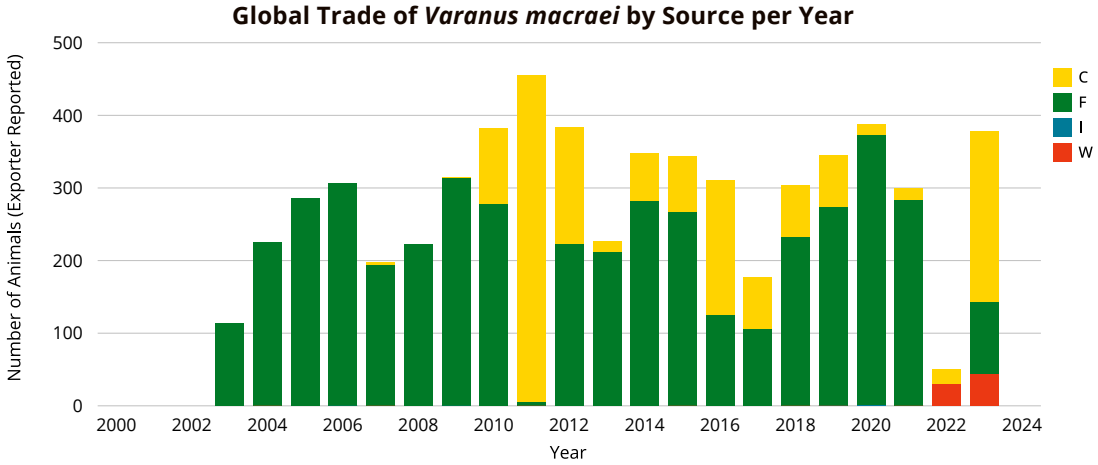

Figure 15 Global trade in *Varanus macraei* in the period of 2000–2023 by source per year.

Japan's role in the trade

Japan plays a significant role in the international trade of *Varanus macraei* from Indonesia. Japan is the 2nd importer, behind the United States of America (2,778 animals), accounting for over 20% of exported animals. Japan only imported this species, with no recorded export in the CITES Trade Database (Figure 16). Between 2000 and 2023, Indonesia exported 1,197 animals to Japan. The only animal not originating from Indonesia came from Canada. However, Japan only reported on the import of 702 animals (see methods).

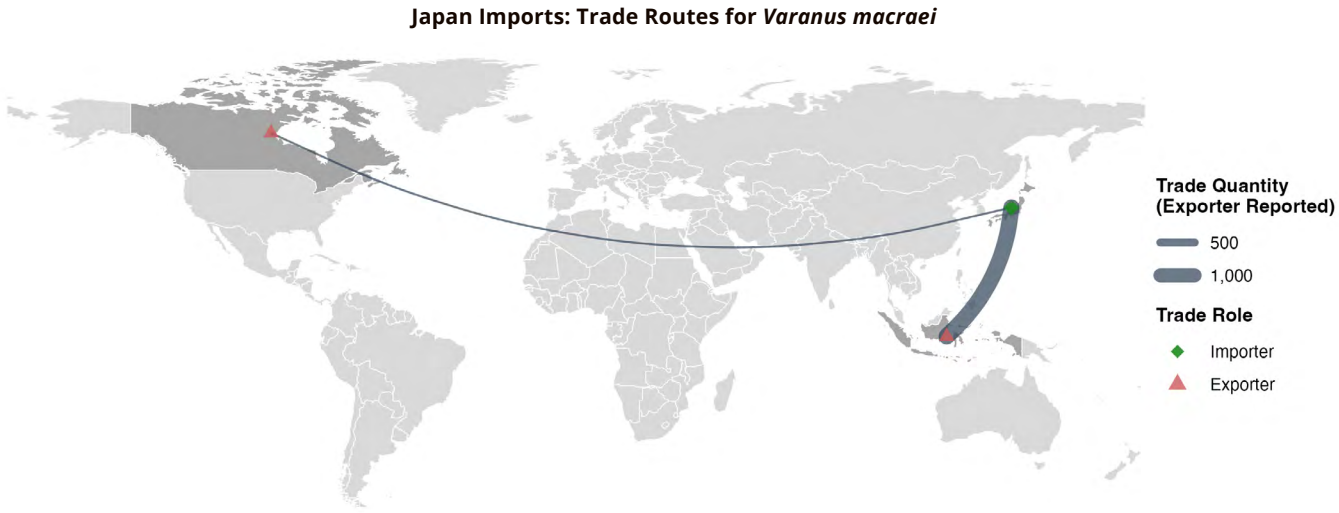

Figure 16 Trade routes for the import of *Varanus macraei* by Japan in the period of 2000–2023.

Import of this species started in 2003, which coincides with the first time this species was observed in international trade (Bennet, 2015). Import averaged 38 animals per year between 2003 and 2018, but strongly increased in 2019–2021, with a maximum of 226 animals reportedly imported in 2020. While importer-reported quantities were consistently lower compared to exporter-reported numbers, this was not the case for the years 2003, 2006 and 2022. Japan reported the import of 37 *V. macraei* in 2006, compared to Indonesia reporting the export of 21 animals. In 2022 this difference was higher, with Japan reporting the import of 62 animals, while Indonesia merely reported the export of five.

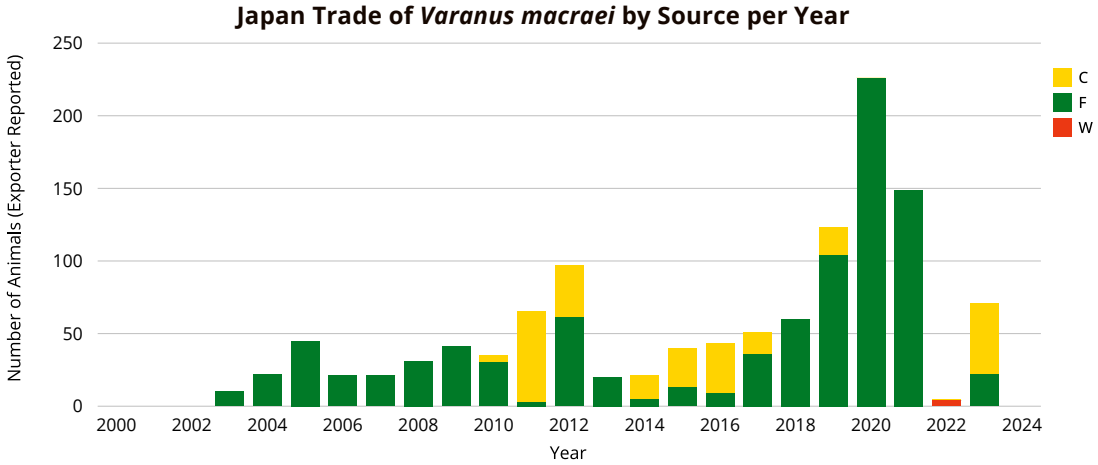

Figure 17 Import of *Varanus macraei* by Japan in the period of 2000–2023 by source per year.

Apart from four individuals, with a reported wild origin (source code W), reportedly exported to Japan in 2022, all remaining animals had a captive origin (Figure 17). Of these 264 were reported to be bred in captivity (source code C), and the remaining 929 born in captivity (source code F)

Harvest Quotas

Officially there are no commercial harvest quotas for this species, which consists of a percentage for the domestic market, and a percentage for the international market (KSDAE, 2025). Meaning that export of

wild animals is not allowed. However, harvest quotas can be allocated to specific farms to obtain breeding stock from the wild population. Arida et al. (2021) states that hunters usually go out in groups of four to five people for overnight trips of approximately one week, before returning with the caught animals. Hunters could catch up to 20 lizards a week if the weather conditions would allow (Arida et al. 2021). Applin (2025) states that up to 10 lizards can be harvested per excursion. However, between 2021 and 2025, only in 2024, a quota was allocated for 6 males and 12 females for a single breeding facility (KSDAE, 2024). This harvest quota is the equivalent of one good week or two successful hunting trips according to Applin (2025) or Arida et al. (2021). Some of the hunters have been targeting this species since 1990s, with 30 people in the town of Amdui solely relying on the collection of this species (Applin, 2025). Suggesting that many more animals are illegally harvested from the wild than quotas for breeding stock allow, which is consistent with previous observations by Bennet (2015) and Shepherd (2022). Rahmanto et al. (2022) et al. also reports the observation that wild-caught individuals are still available for the reptile keeping community in Indonesia. It is likely that these also make it to the overseas markets.

Breeding Availability

Literature on the captive reproduction of *V. macraei* has been expanding over recent years. Jacobs (2002) was one of the first publishing the captive breeding of this species in a private collection. Similar reports from private collections were published by Dedlmar (2007, 2008) and Moldovan (2008). Mendyk (2007) reported on dizygotic twinning in this species. Ziegler et al. (2009) reported on the captive breeding of this species at Plzen Zoo, and the 2019 cover of *Biawak* Vol 19 (2) shows a hatchling *V. macraei* from Bristol Zoo Gardens. In Japan, Maruyama Zoo has reported breeding success as early as 2013 (Honda, 2013).

This species reaches sexual maturity around two years of age (Ziegler et al., 2009). Clutch sizes in captivity range from 2–7 eggs, with an average of 3.9 ± 1.2 eggs per clutch (Ziegler et al., 2009). Mendyk (2007) reported that up to four clutches may be laid throughout a year, with 95 days being the shortest time reported between successive clutches from the same breeding pair (Ziegler et al., 2009). Incubation periods range from 154 days (Ziegler et al., 2009) to 240 days (Dedlmar, 2007).

Both Bennet (2015) and Rauhaus et al. (2014) stated that although anecdotal information is available that this species is bred in captivity with F1 generation offspring, claims about F2 generation animals are rare. A search online however does discover several advertisements of reported F2 generation offspring in the EU and US. Which is, considering the biological characteristics of the species, and previous reports not unlikely. Bennet (2015) mentioned that although several papers were published, highlighting the captive breeding of this species, all reports came from Europe or North America, with no available evidence for captive breeding in Indonesia. Rahmanto et al. (2022) reports on the captive breeding of this species in an Indonesian commercial farm. Although Rahmanto et al. (2022) claims this species has been bred in Indonesian facilities since 2003, the only captive breeding occurrence reported in this paper is from 2020. Indonesian captive breeding facilities have been scrutinized globally for a lack of evidence of captive breeding (Auliya, 2009; Lyons & Natusch, 2011; Natusch & Lyons, 2012; Nijman & Shepherd, 2010) and the laundering of wild animals to circumvent legislation (Janssen & Chng, 2018). In 2016 (Janssen & Chng, 2018) the breeding stock of Indonesian commercial farms consisted of 81 *Varanus macraei*, which was insufficient to fulfil the quota for captive bred animals to be exported.
It is difficult to calculate exactly how large the breeding population within Indonesian commercial farms would need to be as many factors come into play. Indonesia exported on average 234.5 animals a year (range: 114–453) between 2000 and 2023. Using the data obtained above, considering a proportion of 1 male per 2 females, and an 80% survival rate, a rough calculation suggests that to export 300–400 *V. macraei* annually, 21–188 breeding adults are needed, depending on clutch size and frequency. In poor conditions (low clutch size and low clutch frequency), 94–125 females and 47–63 males are required, while optimal breeding (max clutch size and frequency) needs just 14–18 females and 7–9 males. Of course this does not consider non-breeding animals, breeding failures or higher mortality rates. These calculations are for sexually mature animals. Since the species takes two years to reach maturity, a larger overall

population is needed when raising animals from hatchlings to replace or grow the breeding stock. It is unknown how large the population at Indonesian commercial facilities is at the moment.

Illegal Trade

Few seizures are reported for the reptile markets, of the EU, US and South Korea. Ziegler et al. (2009) reports on confiscated animals in the Czech Republic and Germany. While a report by the foundation Robin des Bois mentions a confiscated animal in Spain. The Center for Biological Diversity (2022) reports that 17 transactions are reported in the UNEP-WCMC CITES Trade Database where it concerns animals previously seized (Code I), which also concerns animals in the United States of America. A more detailed search for seized animals results in seized animals in Singapore, Australia, Philippines, India and Indonesia (Table 5). Of particular concern is the large recent seizures in Indonesia consisting of 21 and 56 animals.

Table 5 Overview of seized animals of *Varanus macraei* from open-source data.

Seizure location	Number	Year	Origin	Source
Singapore	Unknown	2021–2023		Begum, 2024
Australia	5	2015/2016	Indonesia	Robin des Bois #22
Czech Republic	2	2004	Indonesia	Ziegler et al. 2009
Czech Republic	unknown	2004		Hroudova, 2004
Germany	2	2007		Ziegler et al. 2009
Indonesia	2	2011		TRAFFIC, 2011
Japan	4	2015		Kitade and Naruse, 2020
Indonesia	2	2017		Wildlife Trade Portal
Indonesia	2	2017		Robin des Bois #16
Indonesia	1	2018		WiTIS
Philippines	1	2019		Wildlife Trade Portal
India	2	2019	Malaysia	Robin des Bois #27
Philippines	1	2022	Indonesia	TRAFFIC
Indonesia	21	2022		Medcom.id, 2021
Indonesia	3	2022		Voi.id, 2022
Spain	1	2022		Robin des Bois, #35
Indonesia	56	2023		Betahita.id, 2023
Indonesia	Unknown	2025		Detik, 2025

Conclusion

The international trade of the Endangered, Blue-speckled Tree Monitor (*Varanus macraei*) presents a significant conservation concern, with legal export channels seemingly exploited to facilitate illegal trade. Indonesian regulations permit the export of genuinely captive-bred individuals (classified under Source C/F) while prohibiting commercial wild harvesting, except for limited quotas to replenish breeding stock. The overwhelming majority of exported animals are declared as captive-bred under questionable circumstances. Several studies challenge these claims, including historically insufficient breeding stock, a lack of verifiable large-scale breeding success (although some captive breeding is taking place), and previous investigations revealing laundering of wild-caught animals through captive breeding facilities.

Recent studies (Applin, 2025; Arida et al., 2021) detailing the modus operandi of harvesters and first

presented evidence by breeding facilities (Rahmanto et al., 2022) unintentionally provided evidence in support of ongoing large-scale illegal wild harvesting, far exceeding the minimal allowances for breeding stock replenishment. Regular seizures within Indonesia confirm that illegal collection and trafficking networks continue to operate, sourcing animals directly from the wild. The discrepancy between the high volume of declared captive-bred exports and the unknown capacity for legitimate large-scale breeding, combined with reports of persistent illegal collection, strongly suggests that systematic laundering is taking place. In effect, the legal framework intended to regulate captive-bred exports is being exploited to mis declare illegally harvested *V. macraei*, effectively bypassing Indonesia's prohibition on commercial wild trade in this species. This creates a false sense of security as the impact on wild populations won't be noticed until it might be too late. The export of animals with source code W to Japan should not have been possible under Indonesian legislation.
The available data indicate that current regulations and enforcement efforts are failing to protect *V. macraei* from unsustainable trade pressures, driven by persistent demand and the likely laundering of wild-caught individuals. Reports suggest that overharvesting for the pet trade has already led to the species' extirpation from at least one offshore islet (Del Canto, 2013). Additionally, Arida et al. (2021) and Applin (2025) note that harvesters now struggle to find these lizards, often resorting to traveling by boat to more remote areas — whereas in the 1990s, *V. macraei* was commonly encountered, even in backyards.

The European Union established negative opinions for this species with source code F and C for animals with a snout-vent-length >15 cm in 2020 (UNEP, 2025). Up to this date, between 2003 and 2009, the EU imported approximately 46 animals annually from Indonesia (Indonesia reports the export of 56 animals annually). Yet, since the negative opinion for larger animals, EU countries only reported the total import of 18 animals with Indonesia reporting the export of 55 animals. EU countries need issue import permits for CITES Appendix II species as a stricter measurement. Therefore, it's more likely that for EU countries importer reported numbers are more accurate. Although the COVID pandemic certainly had an influence on these numbers, it seems these measures are indeed preventing larger and laundered animals to enter the EU. Based on the available data, this species seems to meet the biological criteria (Annex 1 of Resolution Conf. 9.24 (Rev. CoP17)) for listing on CITES Appendix I (Ai, Bi, iv and Cii). It should be kept in mind that the primary issue for *Varanus macraei* lies in the laundering of wild animals through breeding facilities, as nearly all exported animals are reported to be of captive origin. There is ample evidence that large numbers of wild-caught individuals are still harvested and make it into trade, despite the lack of harvest quotas. Parties should scrutinize any import of this species, to ensure the animals match the reported source code. Implementing size limits for animals of source code C and F could be an effective additional tool to reduce the laundering of wild animals. Wild-caught animals are typically larger than animals from captive-bred source, as raising captive-bred individuals to adult size requires significant time and resources, which is undesirable for breeders. By setting enforceable size thresholds, authorities can better distinguish between legally bred animals and illegally sourced wild specimens, helping to ensure that only authentic captive-bred individuals are imported.

Horsfield's Tortoise — *Testudo horsfieldii*

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Scientific name	***Testudo horsfieldii***
Japanese name	**ホルスフィールドリクガメ** **ロシアリクガメ**
Distribution	**Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Iran, Afghanistan, Pakistan, and China**
IUCN Red List status	**Vulnerable**
CITES	**Appendix II**

Background

Horsfield's Tortoise, or also called Steppe Tortoise, Afghan Tortoise, Russian Tortoise or Four-toed tortoise is a small Asiatic species. *Testudo horsfieldii* consists of five different subspecies: *T.h. horfieldii*, *T.h. bogdanovi*, *T.h. kazachstanica*, *T.h. kuznetzovi* and *T.h. rustamovi*. The species was listed on the CITES Appendices as of 1 June 1975 with the genus listing for *Testudo* spp. This species is also traded under the name *Agrionemys horsfieldii*.

Spot Survey

A total of 73 advertisements, advertising 126 animals, were observed that were either posted in 2024 or to date (18 March) in 2025 (Figure 18). Thirty-eight different vendors advertised the species. Of the 73 advertisements, six mentioned the animals were already sold. Only 16 advertisements mentioned the origin of

the animal, of which 15 were reportedly bred in captivity (C), and one born in captivity (F). Of these, one was reportedly bred in the European Union, and eight advertisements reported Uzbekistan as the origin (including two for which the animals were not reported as bred in captivity). The average price for captive born/bred animals was ¥18,907 ($130) (range ¥9,000–¥35,000 ($62–$241)). For the animals with no reported origin, the average price was ¥29,574 ($204) (range ¥9,800–¥328,000 ($68–$2,262)). This is skewed towards the one animal with an asking price of ¥328,000 ($2,262). Without this animal the average price would be ¥21,721 ($150).
No confirmation was made regarding the illegality of the advertised animals.

Figure 18 Advertisements of *Testudo (Agrionemys) horsfieldii* in Japan.
Source: https://maniacreptiles.com/list/?category=4

Market Analysis

Global trade

Between 2000 and 2023, exporting parties reported the trade of 1,921,293 *Testudo horsfieldii*. Nearly all (99.8%) traded animals were for commercial purposes. The Unites States is the primary importer of *Testudo horsfieldii*, with reportedly 666,777 animals imported, accounting for almost 35% of all import (Figure 19). Both Italy and Great Brittain follow this at a distance with respectively 270,298 and 206,779 animals. In total 95 countries have reported the import of this species or have reported the export to these countries.

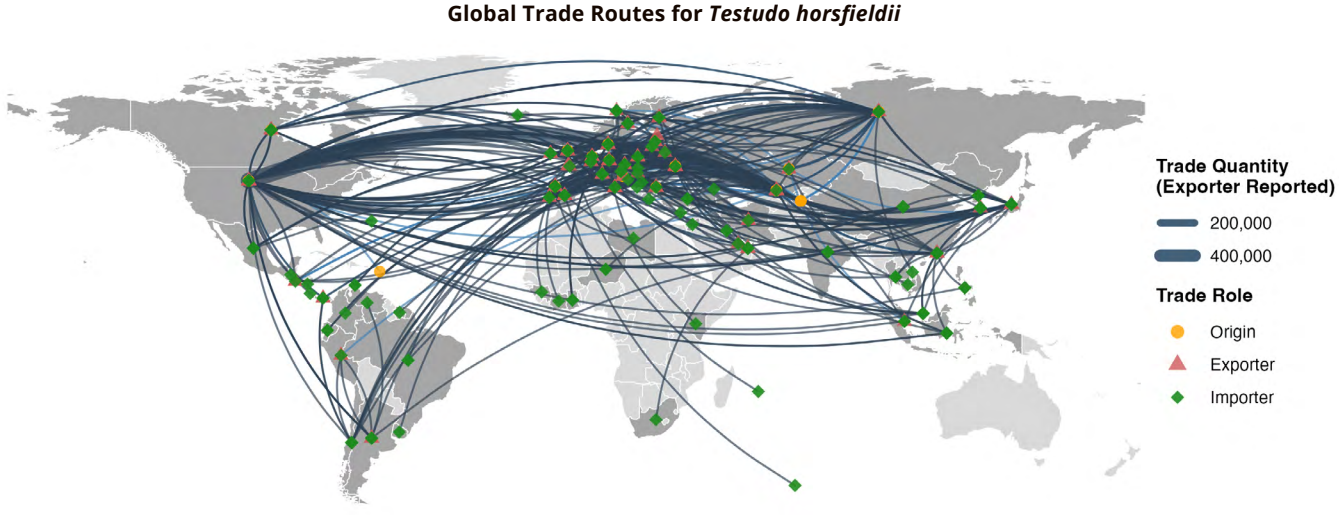

Figure 19 Global trade rutes in *Testudo horsfieldii* in the period of 2000–2023.

Uzbekistan is the primary exporter of *Testudo horsfieldii* accounting for almost 80% (1,520,879 animals) of all export. Together with Ukraine (14.7%; 283,310 animals) these two countries account for nearly 95% of all recorded export in the CITES Trade Database. Kazakhstan, Russia and Hong Kong complete the top 5 of exporters accounting for nearly 4.5% of the export. Interestingly, range state Tajikistan did not report the export of *Testudo horsfieldii*, although importing parties reported over 21,000 animals imported from Tajikistan. Similarly, when looking at importer-reported statistics, Afghanistan, Vietnam, Lebanon and South Korea all reported no or minimal (1 animal) *Testudo horsfieldii* exported, yet importing parties report quantities up to 2,000 animals. For Appendix II species, CITES only requires an export permit, import permits are only required parties implement stricter domestic measures (allowed under Article XIV). Therefore, these exporting parties should have reported this trade. A CITES trade suspension is in place for export from Afghanistan (CITES Notif. No. 2005/054).

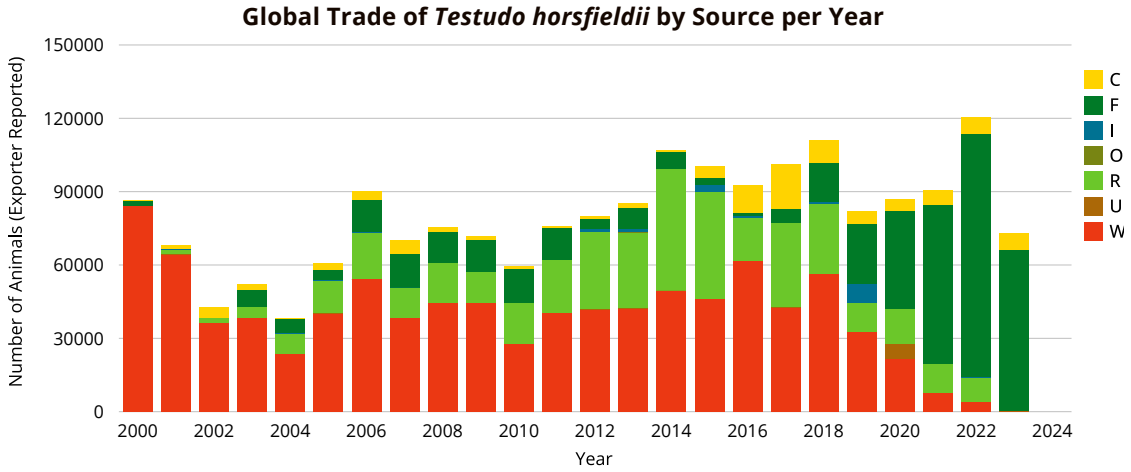

Figure 20 Global trade in *Testudo horsfieldii* in the period of 2000–2023 by source per year.

The primary source for these *Testudo horsfieldii* is the wild, accounting for 48.9% of all traded animals (Figure 20). The portion of wild animals in the annually traded quantities has been decreasing strongly after 2018, being replaced by animals born in captivity (Source F; 22.9% of total). The number of animals Ranched (Source R) is the third largest source accounting for 21.5% of all traded animals. However, where the portion of Ranched animals slowly grew after 2004, this has gone down after 2018 as well. The number of animals reportedly bred in captivity accounts for only 5.5% of all traded animals (105,574).

Japan's role in the trade

Based on the exporter-reported quantities, Japan is the fifth largest importer of *Testudo horsfieldii* accounting for 146,574 animals, and 7.6% of the total animals traded. Between 1995 and 1999, Japan was considered as one of the primary importers of this species (more than 67,000 animals), accounting for over 50% of the tortoises imported by Japan, United States of America and European Union combined (TRAFFIC, 2000). Uzbekistan was the primary source (Figure 21) for these tortoises, with 81,050 said to originate from there (71%), followed by Ukraine (23,093; 20%) and Russia (6,045; 5.3%). However, tortoises imported through Russia originated in Tajikistan (5,445) and Kazakhstan (600). Of the animals imported through Ukraine, 5,000 also originated in Uzbekistan, and 3,270 came from Tajikistan. Animals originating in Uzbekistan were also imported via Hong Kong (1,040), Germany (102) and United States of America (75).

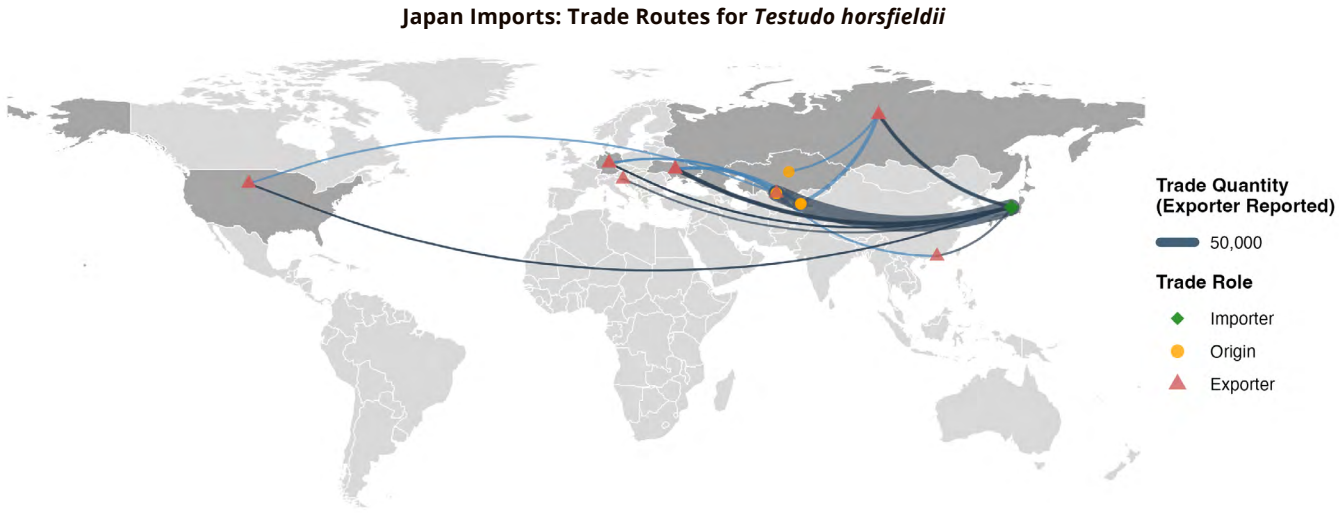

Figure 21 Trade routes for the import of *Testudo horsfieldii* by Japan in the period of 2000–2023.

Most tortoises imported into Japan stayed in the Japanese market, with only 599 animals reportedly exported again (Figure 22). The exported animals originated from Uzbekistan, Ukraine and Russia. Whereas after 2008 tortoises with a ranched origin became more prevalent, the last few years (>2020) tortoises imported have nearly all a captive born origin. The number of tortoises imported strongly decreased after the year 2000, and subsequently the number of tortoises with a wild origin also decreased strongly (Figure 22). This follows a similar pattern to the one found by Wakao (2024), who noticed a strong decrease in the import of Testudines. Although the trend strongly decreased, the import of *Testudo horsfieldii* seem to have stabilized since.

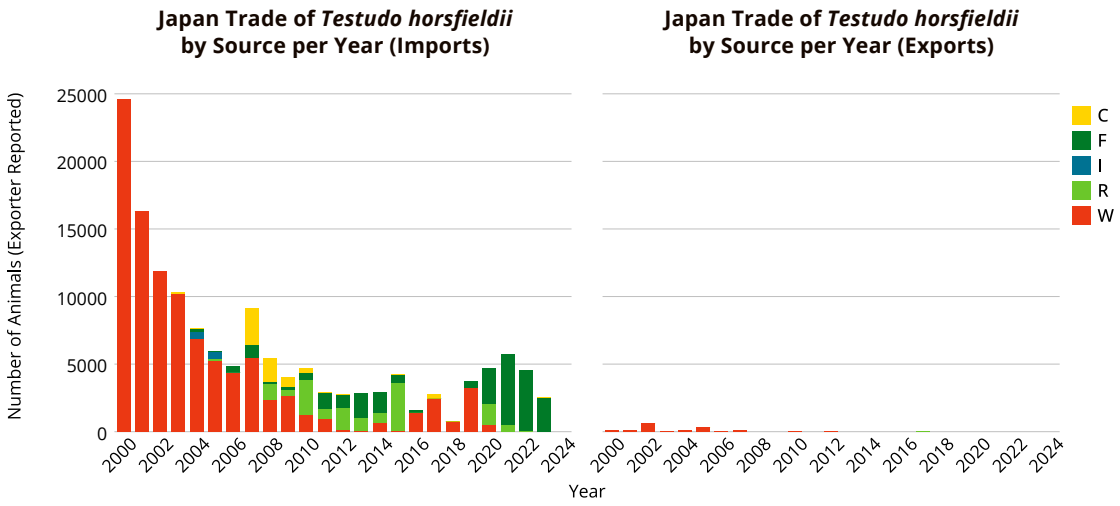

Figure 22 Import (left) and export (right) of *Testudo horsfieldii* by Japan in the period of 2000–2023 by source per year.

Export Quotas

Since 2000, quotas are almost exclusively set by Uzbekistan (Figure 23), with some exceptions for Tajikistan (2001, 2007–2009) and Kazakhstan (2000–2002). Note that Tajikistan only became a signatory to CITES on 31 December 2015.

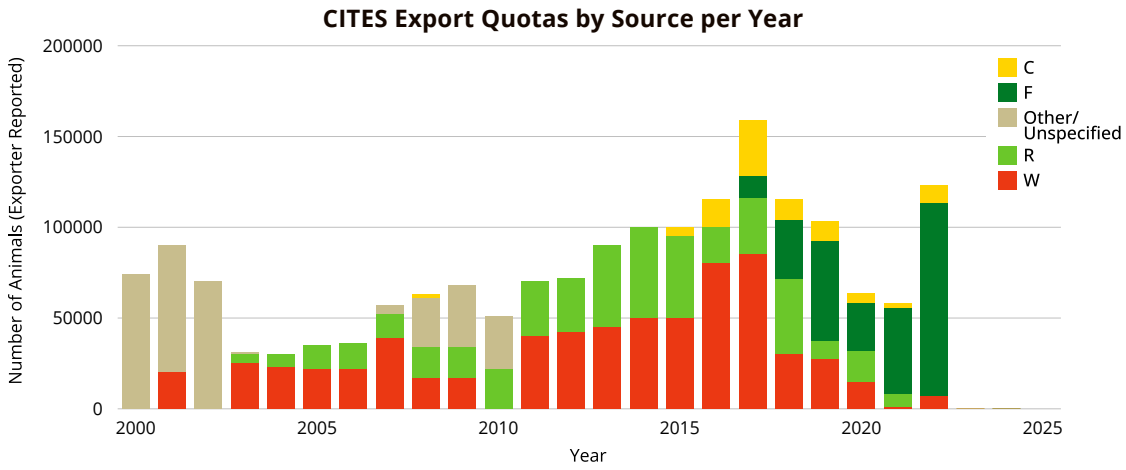

Figure 23 CITES export quotas for *Testudo horsfieldii* in the period of 2000–2023.
Source: Species+ (UNEP, 2025)

Export quotas for this species slowly increased after 2003 towards the peak in 2017 with and annual quota of over 150,000 animals. A shift is seen in the source for the different quotas, with the quotas for wild sources animals decreasing after 2017, and making place for animals with a captive-born/bred (F and C) origin. Uzbekistan set a zero quota for the years 2024 and 2025.
Resolution Conf. 12.8 (Rev. CoP18) on Review of Significant Trade was designed to identify CITES Appendix II species which may be the subject of unsustainable harvesting practices, and identify the problems and solutions to ensure effective implementation of the Convention. Following a Review of Significant Trade for this species by CITES, three recommendations were issued with a deadline of 11 November 2024. This included the establishment of an annual zero export quota for the source codes W and R. No exports are allowed until these quotas have been published. In addition, any further changes to the quota need to be communicated to the CITES Secretariat and Chair of the Animals Committee for their agreement, including a justification that the proposed offtake is sustainable and conservative. Wild tortoises will no longer be harvested for export (CITES AC33 14-03R1)

Breeding Availability

Testudo horsfieldii, like other chelonians shows a rapid juvenile growth, after which this slows down before they reach sexual maturity. Sexual maturity is reached around 7 years of age for males, and around 10 years for females (Lagarde et al., 2001). Although some even report the first breeding to occur between 11 and 14 years old (TRAFFIC, 2000). In the former Soviet Union, mating takes place immediately after brumation (Hempel, 1988), between March and June, with the eggs laid between May and the first weeks of June (Terentjef & Chernov, 1949).
Females lay two to four clutches per season, which range from 3–9 eggs (Sergeev 1941; Hempel, 1988) One study even reported a female laying up to 20 eggs in one season, spread over three clutches (Mylnarski & Mertens, 1971). Eggs hatch after approximately 80–110 days in the wild (Theile, 2000), but can be faster in captivity with 61–75 days (Tortoise trust, 2024).

In response to the CITES Significant Trade Review, Uzbekistan, as the primary source for this species, provided information (Table 6) discussed at the 78th CITES Standing Committee (February 2025) regarding the breeding and status of this species (SC78 35-01 A5e; available at https://cites.org/sites/default/files/documents/E-SC78-35-01-A5e.pdf). According to their authorities there are currently 16 breeding facilities for *Testudo horsfieldii* in the country. Within these facilities are 43,957 tortoises, consisting of 74% females, 23% males and 3% unknown. A reproductive rate of 1.8–2.3 juveniles per adult females is reported by the authorities of Uzbekistan. This is very low compared to the numbers reported by other studies (3–9 eggs).

According to the authorities, 10% of the juveniles is returned to the wild after they reach 6 cm of age. The released tortoises are said to have a survival rate in the wild of 70–96%.

Table 6 Numbers bred by commercial breeding facilities in Uzbekistan.
Source: CITES SC78 35-01 A5e

	Ranched	Captive born	Captive Bred
2020	17,100	26,446	6,000
2021	7,125	47,198	2,500
2022		106,081	
2023		70,959	

Based on the provided population data from the 16 breeding facilities, there are 43,957 *Testudo horsfieldii*, with 74% being female. Assuming all 32,528 females are of breeding age, their potential annual offspring production can be estimated.

Females lay between two to four clutches per season, with each clutch containing three to nine eggs (see Henen et al., 2002; Hempel, 1988; Sergeev, 1941), the minimum annual egg production per female is thus 6, and the maximum reported is 20. *Testudo horsfieldii* is exported above >5 cm carapace length (Theile, 2000), as the survival rate is too low below this.
Theile (2000) reports that only 65% of the eggs hatch, 5–12% of the F1 animals dies at the breeding centers, and a further 10–15% does not survive the first year. It takes between 1–2 years for these tortoises to reach the length of 5 cm, and even close to six years (Lagarde et al., 2001) before they meet the size restrictions of four-inch (~10 cm) in the United States of America (Hoss et al., 2015).
When using the conservative numbers of 5% of hatchlings that die at the breeding centers, and a further 10% does not survive the first year, and 10% is returned to the wild, between 85,402 and 325,394 tortoises can be produced each year. When using the reproductive rate reported by Uzbekistan authorities, this means that 51,242–149,682 tortoises can be produced.
Note it takes 10 years before females reach sexual maturity. Authorities in Uzbekistan report that before 2017, only approximately 10,000 adults were taken from the wild (Figure 6 of SC78 35-01 A5e) yet do not specify exactly in what year they were harvested. This accounts to 25% of the total number of adult tortoises in captive breeding facilities (SC78 35-01 A5e). In order to breed the 6,000 tortoises reportedly bred in captivity (Conf. 10.16 (Rev. CoP19) states “offspring of second generation (F2) or subsequent generation”) in 2020 (Table 6), between 417–1,389 adult females would have needed to be in captivity before 2010. When using the reproductive rates reported by Uzbekistan authorities, this increases to 2,609–3,334 adult females. It was reported that UzZookomplex Center, in 1999, was home to 671 adult females as permanent breeding stock (Theile, 2000).

Illegal Trade

Open sources show that considerable numbers are being confiscated, a total of 9,318 animals (Table 7). Of primary concern are the large numbers seized in Russia and/or originating from range states of this species. This is likely a severe underestimation of what is truly being smuggled. The UNEP-WCMC CITES Trade Database reports 16,352 animals were traded with source I, which means these animals were previously confiscated or seized.
Theile (2000) reports in a report regarding the ranching and breeding of this species in Uzbekistan, that annually 7,000 *Testudo horsfieldii* are illegally exported from Uzbekistan. These numbers are larger for Kazakhstan (25,000) and other central-Asian countries (40,000). Although it is unclear what this

information is based upon, reports of large-scale poaching are not new (see Mitropolski & Kashkarov, 2000 in Theile, 2000).

Table 7 Over view of siezed animals of *Testudo horsfieldii* from open sourced data.

Seizure location	Number	year	Origin	Source
Pakistan	500	2009		Dawn.com, 2009
Poland	1	2011		Wildlife Trade Portal
Poland	197	2012		Wildlife Trade Portal
Russia	2,650	2013		Wildlife Trade Portal
Poland	2	2013		Wildlife Trade Portal
Poland	59	2015		Wildlife Trade Portal
Poland	1	2015		Wildlife Trade Portal
Pakistan		2015		Robin Des Bois #11
United Kingdom	400	2015	Uzbekistan/ Turkmenistan	Robin Des Bois #9
Mexico	8	2017		Wildlife Trade Portal
Italy		2017		Wildlife Trade Portal
Mexico	1	2017		Wildlife Trade Portal
Mexico	1	2017		Wildlife Trade Portal
France	436	2018		Wildlife Trade Portal
Spain	1	2018		Robin Des Bois #24
Russia	4,100	2019	Kazakhstan	Robin Des Bois #25
China	8	2020		Wildlife Trade Portal
China		2020		Wildlife Trade Portal
United States of America	2	2020		Robin Des Bois #29
Poland	1	2021	Ukraine	Robin Des Bois #34
Uzbekistan	700	2021		Robin Des Bois #33
Spain	2	2022		Robin Des Bois #38
United States of America	2	2022	Mexico	Robin Des Bois #37
Poland	1	2022	Ukraine	Robin Des Bois #37
China	5	2022		Robin Des Bois #36
Spain	116	2022	Uzbekistan	TRAFFIC, 2023
France	4	2023		Wildlife Trade Portal
Spain	4	2023		Robin Des Bois #43
Kyrgyzstan	83	2023		Robin Des Bois #42
Poland	1	2023	Ukraine	Robin Des Bois #40
Kyrgyzstan	32	2023		Robin Des Bois #40
Italy	4	2024		Robin des Bois #44

Conclusion

The international trade in *Testudo horsfieldii* remains substantial and complex. Uzbekistan's dominant role as a supplier — accounting for nearly 80% of exports — has shaped both the legal and illegal markets. While there has been a notable shift from wild-caught to captive-born and ranched animals over the past decade, concerns persist regarding the validity and transparency of these sourcing claims. It was estimated that the annual overexploitation in Uzbekistan could consists of 20,000–30,000 tortoises (Smith &

Porsch, 2015). Uzbekistan even mentioned that in 200,735,000 animals were not accounted for in trade statistics (Smith & Porsch, 2015).

In 2000, the number of *Testudo horsfieldii* in Uzbekistan was estimated to be between 20–35 million individual tortoises. Other unpublished estimates from 1997 and 2011 suggest that Uzbekistan is home to approximately 20 million individual tortoises (Smith & Porsch, 2015). However, these numbers were produced by commercial exporters of the species. A reduction of more than 25% in areas where commercial collecting was taking place was also recorded (Bozhansky & Polinova, 2000 in Theile, 2000). *Testudo horsfieldii* occurs in densities between 0.5 to 43 tortoises per hectare, although in most of the range this does not exceed 1.5 ind./ha. Harvest occurs in areas with densities of higher than 10 ind./ha. In very rare cases the densities go to above 70 ind./ha and can even reach 200 ind./ha. Kazakhstan, another important origin of *Testudo horsfieldii*, between 5–72 ind./ha are found, although a more recent survey found only 3.9–10.3 ind./ha in the same area. The recent actions following the CITES Significant Trade Review, allocating zero quotas for wild and ranched animals will help to reduce pressure on the wild. However, this cannot be done without strong checks regarding the captive population to prevent wild animals from being laundered.

Japan has historically played a significant role as an importer, though its demand has declined in recent years. The shift toward animals of captive origin is encouraging, yet the continuing importation of tortoises from countries with questionable trade transparency, such as Uzbekistan and Ukraine, raises red flags — especially considering documented cases of mis declared origins and ongoing illegal trade.

The recent zero export quota from Uzbekistan for wild and ranched animals (2024–2025) is a positive regulatory response under CITES but will require stringent enforcement and independent monitoring to be effective. Uzbekistan's reported breeding figures, while sufficient on paper, do not align well with established biological knowledge or the historical timeline of captive stock establishment, raising concerns of potential laundering of wild-caught animals through captive facilities.

Furthermore, significant seizure data underscores that illegal trade remains rampant, with thousands of tortoises confiscated across Europe and Asia. These figures are almost certainly underestimates and suggest continued poaching pressures in the species' native range. Without robust verification mechanisms, better enforcement, and improved traceability from source to market, *Testudo horsfieldii* will continue to face unsustainable exploitation, undermining conservation efforts and the credibility of the legal trade framework.
In sum, the case of *Testudo horsfieldii* illustrates the precarious balance between commercial use and species survival. If legal trade is to continue, it must be underpinned by independently verified breeding operations, stringent control measures, and a commitment to enforcing both national and international regulations.

Red-Eyed Crocodile Skink — *Tribolonotus gracilis*

© Riziki Supendi

Scientific name	***Tribolonotus gracilis***
Japanese name	**アカメカブトトカゲ**
Distribution	**New Guinea**
IUCN Red List status	**Least Concern**
CITES	**Not Listed**

Background

Tribolonotus gracilis is native to the island of New Guinea, with the western half belonging to Indonesia and Papua New Guinea in the east. This species is only exported from range state Indonesia. The species is not listed in the appendices of CITES, but is listed on EU Annex D, meaning an import notification is required. Subsequently, this trade is recorded in the CITES Trade Database.

Spot Survey

A total of 31 advertisements, advertising 107 animals, were observed that were either posted in 2024 or to date (18 March) in 2025 (Figure 24). Twenty-four different vendors advertised the species. Of the 31 advertisements, only eight mentioned the animals were already sold. Four advertisements mentioned the origin of the animal, all four reported the animals originated from the wild. Animals were sold for an average of ¥18,140 ($125) (range ¥9,800–¥26,000 ($68–$179)).

Figure 24 An advertisement for *Tribolonotus gracilis* in Japan.
Source: https://petshop-kanedai.jp/comec/products/detail/34393

During the physical survey at the Nagoya Reptile World Spring Fair, 108 animals were observed. One vendor sold pairs for ¥39,800 ($274), while other vendors sold individual animals for an average of ¥18,238 ($126) (range ¥9,800–¥23,000 ($68–$159)). The prices for animals observed during the reptile fair were consistent with prices observed online. Seven vendors reported the wild origin (Indonesia) of the animals.
No confirmation was made regarding the illegality of the advertised animals.

Market Analysis

Global trade

Due to their status as not listed in the CITES Appendices, little data regarding the trade is present. When looking at exporter reported quantities, the largest quantities are 329 animals to the United States of America (Figure 25 top). However, as the species is listed on EU Annex D, import data for EU countries is registered in the CITES Trade Database. When looking at importer reported quantities (Figure 25, bottom), Germany reported the import of 6,297 animals, followed by Czech Republic with 6,214 animals. Other important countries of import are Great Britain (2,267 animals) and Italy (1,640 animals). However, this data is severely limited. The US Fish and Wildlife Service Law Enforcement Management Information System (LEMIS) covering the period 2000–2014 already reported the import of 10,421 *Tribolonotus* spp., and 3,527 *T. gracilis* into the United States of America (Janssen & Shepherd, 2018). More recent LEMIS data showed that between 2015–2021, an additional 16,139 *Tribolonotus* spp. have been imported, which included 12,522 *T. gracilis*. The majority of these originated directly from Indonesia (8,547), with an additional 1,732 arriving via Hong Kong. The second largest exporter of *T. gracilis* to the US was Hong Kong with 3,914 animals in total.

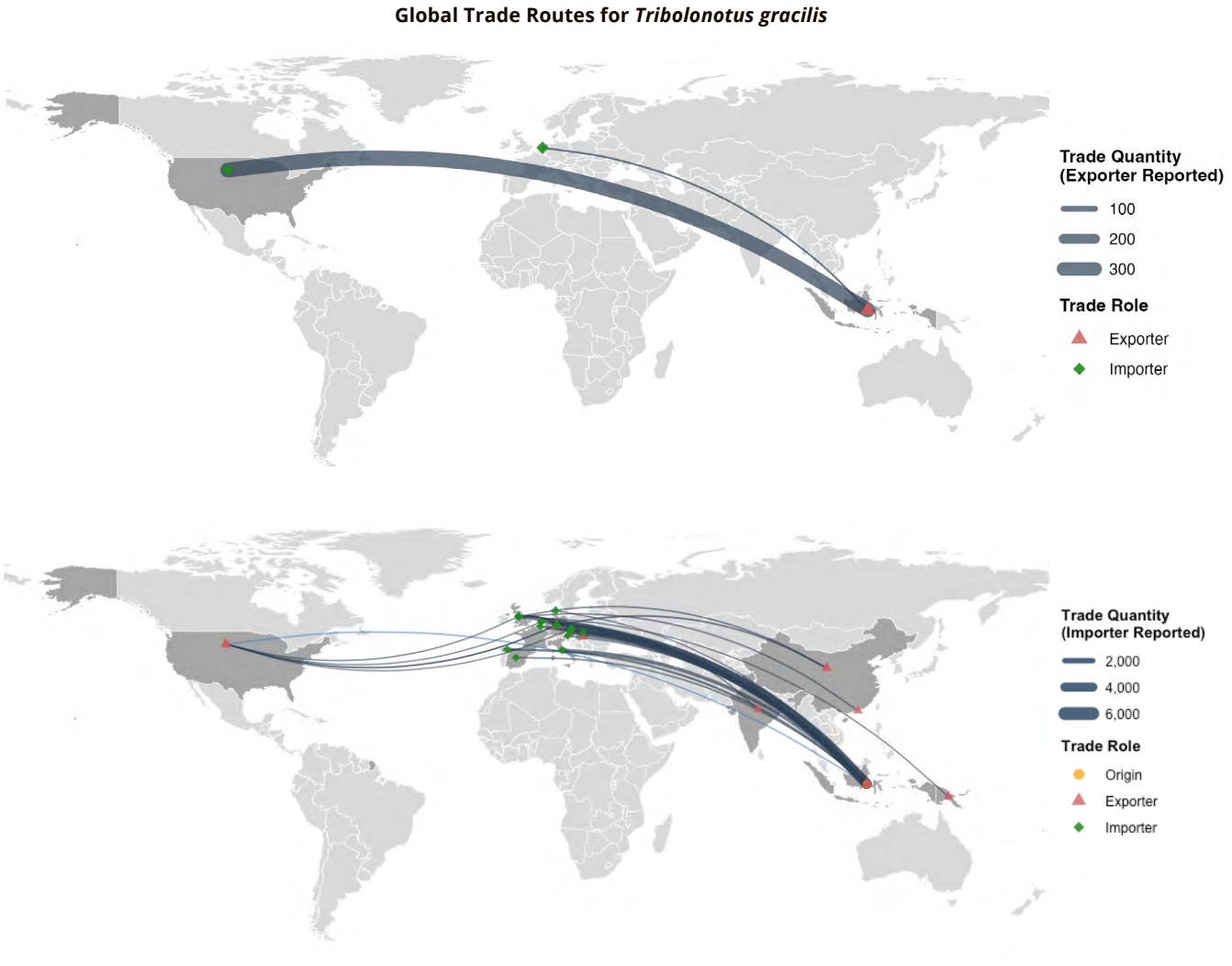

Figure 25 Global trade routes in *Tribolonotus gracilis* in the period of 2000–2023.
Top map shows exporter-reported quantities, below importer-reported quantities.

Due to their non-CITES listed status, there is a lack of data on the quantities traded for this species, or their origin. Available data (Figure 25 and Figure 26) on the import of *Tribolonotus gracilis* shows that the majority has an unknown origin (source U) or no reported origin at all (Unknown). LEMIS data over the period 2015–2021 shows that *T. gracilis* is still primarily traded with a wild origin (10,892 out of 12,522 animals). With captive bred animals only making up 12% of the imported animals (1,577 animals). A total of 53 animals was reportedly born in captivity.

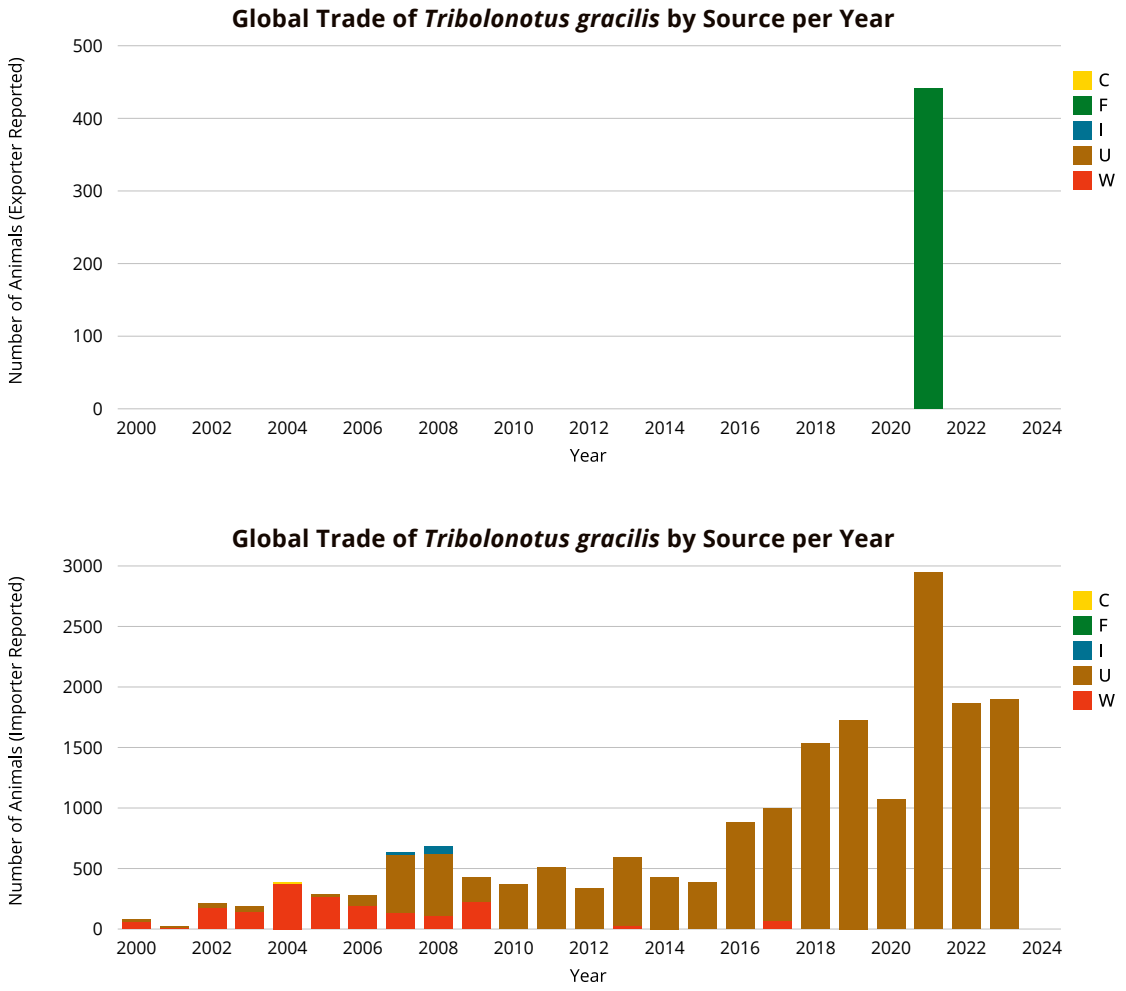

Figure 26 Global trade in *Toribolonotus gracilis* reported by exporter (top) and importer (bottom) in the period of 2000–2023 by source per year.

Japan's role in the trade

There are no records of this species being imported into Japan. Trade statistics for Japan (Ministry of Finance; http://www.customs.go.jp/) are only available on the descriptive level of "lizards" (Tariff 0106.20-031).

Statistics show that Japan imported 41,381 lizards from Indonesia between 2005 and 2017 (Janssen & Shepherd, 2018). Since then, the number of lizards imported from Indonesia increased. Whereas in 2015 Japan imported 2,324 lizards from Indonesia, in 2017 this was 9,856 lizards, and grew to 27,718 lizards in 2021. In total, since 2005, Japan has now imported 150,411 live lizards from Indonesia (until the end of 2023). Over the same period, 44,958 live CITES-listed lizards were reportedly imported into Japan (CITES Trade Database). The proportion of CITES-listed species compared to the total number of lizards imported has reduced since 2017, suggesting that the market for non-CITES listed species has grown since 2017 (now 70% compared to 66% in Janssen & Shepherd, 2018).

However, it is impossible to know how many *Tribolonotus gracilis* there would be among these lizards and thus also how large the Japanese role is in this trade.

Harvest Quotas

Harvest quota for *Tribolonotus gracilis* have remained relatively stable between 2012 and 2019, however increased strongly, with the 2025 harvest quota increasing another 1,000 animals from the previous year

(Figure 27). The current quota is set at 5,000 animals. All harvest originates from the Indonesian provinces Papua and West-Papua, with 95% set for export. Previous work (Janssen & Shepherd, 2018) have shown that between 80% and 94% of the harvest quotas is realized, with the animals being exported (period 2012–2015).

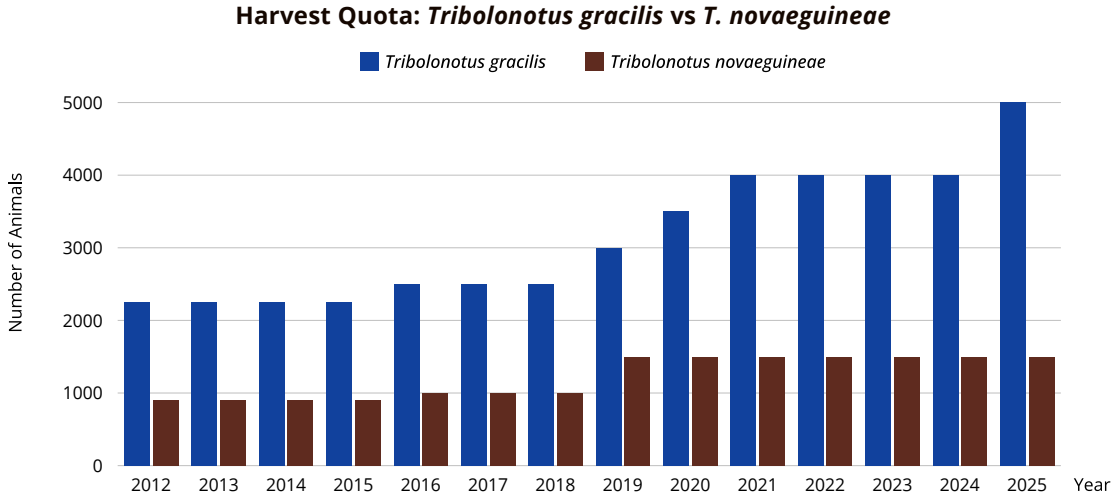

Figure 27 Harvest quota for *Tribolonotus gracilis* and *Tribolonotus novaeguineae* in the period of 2012–2025.
Source: Hariyadi, 2015; KSDAE, 2016-2025

Breeding Availability

In the early 2000s, when this species was still a recent introduction to the pet trade, all available animals originated from the wild (Miralles, 2004; Wellehan, 2005). This species was said not to survive well in captivity and captive breeding was rare according to the IUCN Red List (Allison et al., 2022). Miralles (2004) estimated that less than 30% of the animals survives the trip. This species be common locally but is assumed to be uncommon on the mainland of New Guinea (Allison et al., 2022). This species is shy and when disturbed they vocalize, similarly to a young crocodile (Hartdegen et al., 2001). Wild caught animals can have difficulty acclimating to captivity as they are very sensitive for dehydration (Miralles, 2004).

The first reproduction of this species in captivity happened in the second half of the 1990s (Franklin, 2001; Meyer, 2002), with more and more keepers being successful in breeding this species. Currently this species is bred in captivity in moderate numbers.
Tribolonotus gracilis lays two eggs per cycle, first one egg, with the 2nd egg around two months after the first (e.g. Franklin, 2001). These cyclic can follow each other, with some females recorded to lay up to 4 eggs over an 8-month period (Miralles, 2004). Eggs hatch after around 60 days (52–73 days). This species exhibits parental care like egg brooding, nest guarding and offspring protection (including vocalizations) and shows social associations between the adults and the young (Hartdegen et al., 2001). Males tend to be less involved compared to females (Hartdegen et al., 2001).

While these species are bred in captivity in moderate numbers (Miralles, 2004) in contrast to what is re-ported in the IUCN Red List, a previous study stated that the captive breeding quota in Indonesia were based on biologically unrealistic numbers (Janssen & Chng 2018), significantly exceeding the potential breeding results of Indonesian commercial facilities.

Illegal Trade

Open-source references did result in a few documented seizures of *Tribolonotus gracilis* (Table 8). The largest seizures were made in range state Indonesia.

Table 8 Overview of open-source seizures for *Tribolonotus gracilis*.

Seizure location	Number	year	Origin	Source
Thailand	15	2016		Wildlife Trade Portal
Indonesia	56	2017		Wildlife Trade Portal
Indonesia	20	2018		Wildlife Trade Portal
Brazil	1	2018		Wildlife Trade Portal
Indonesia	52	2018		WiTIS
Indonesia	>1	2023	Papua	Antarafoto, 2023
Indonesia	327	2024		Kurita, 2024

Conclusion

The Red-eyed Crocodile Skink (*Tribolonotus gracilis*) remains a species of concern despite its IUCN status of Least Concern. Although now commonly found in the international pet trade, its natural biological characteristics make it ill-suited for heavy commercial exploitation. This species reproduces slowly, laying a maximum of just four eggs over an 8-month period, with each egg requiring up to 73 days to hatch. It also exhibits high sensitivity to captivity, with early reports noting survival rates during transport as low as 30%. Despite these biological limitations, Indonesia's harvest quota for *T. gracilis* has more than doubled in recent years, reaching 5,000 animals in 2025. This is a stark contrast to earlier reports that the species was difficult to find in the wild. The fact that 80–94% of harvest quotas are fulfilled suggests sustained, intensive collection pressure — likely impacting wild populations.

Compounding these concerns is the lack of transparency in global trade data. While CITES does not list the species, EU Annex D does require import notification, providing partial insight into trade flows. Still, significant gaps remain, as species-level import data for non-CITES species is unavailable. Captive breeding does occur, but only in moderate numbers, and prior analyses have shown that breeding quotas in Indonesia far exceed realistic reproductive outputs. These factors point to a mismatch between the species' biology and the scale of trade, raising serious questions about the long-term sustainability of current harvest levels and the reliability of quota-setting processes in source countries.

Savannah Monitor — *Varanus exanthematicus*

© Lawrence Harman

Scientific name	***Varanus exanthematicus***
Japanese name	**サバンナモニター** **サバンナオオトカゲ**
Distribution	**West, Central and East Africa**
IUCN Red List status	**Least Concern**
CITES	**Appendix II**

Background

This medium sized monitor lizard can be found in West, Central and East Africa. The species is not legally protected throughout its range and is widely used for domestic purposes in addition to international trade. The white throat monitor (*Varanus albigularis*) used to be considered a subspecies (*V. exanthematicus albigularis*).

Spot Survey

A total of 51 advertisements, advertising 139 animals, were observed that were either posted in 2024 or to date (18 March) in 2025 (Figure 28). With 40 advertisements (115 animals) posted between 17 February 2025 and 18 March 2025. Suggesting recent arrival of shipments in Japan. Twenty-nine different vendors advertised the species. Of all 51 advertisements, 16 mentioned the animals were already sold. Only 14

advertisements mentioned the origin of the animal, of which seven were reported as wild caught, and the remaining seven as born in captivity (source code F). Of the 139 advertised animals, only five were adults, five were considered sub-adult, and the remainder were juveniles.
The average price for adults was ¥79,266 ($547) (¥69,800–¥98,000 ($481–$676)), for subadults, this was lower with ¥19,030 ($131) (¥16,280–¥21,780 ($112–$150)) and the lowest price was observed for juveniles with ¥11,387 ($79) (¥5,950–¥27,280 ($41–$188)).
For seven advertisements the country of origin was specified, which as Togo. Two color morphs were offered for sale, one animal reportedly a T+ albino (Tyrosinase positive albinism), and one melanistic animal.

Figure 28 Two advertisements for juvenile *Varanus exanthematicus* in Japan.
Source: https://x.com/FReptiles/status/1895451111106240595 (left) and https://gallery.rockstar-group.jp/products/list?category_id=43 (right)

During the physical survey at the Nagoya Reptile World Spring Fair, 59 animals were observed. Prices were on average ¥12,673 ($87) (range ¥5,500–¥68,000 ($38–$469)). For only four animals the recorded price was above ¥10,000 ($69). One vendor reported that Japan was the origin of captive-born animals. Remaining vendors reporting the origin stated that they were either wild caught or captive born, with seven vendors claiming Togo as the origin. Togo as the primary origin of the animals traded in Japan coincides with our observations during the online spot survey.
No confirmation was made regarding the illegality of the advertised animals.

Market Analysis

Global trade

The UNEP-WCMC CITES Trade Database contains data for 735,326 *Varanus exanthematicus* traded between 2000 and 2023. Trade in this species is dominated by the United States of America, which imported 61% (446,676) animals as reported by exporting countries (Figure 29). However, the United States of America reports merely the import of 524,155 animals. After the United States of America, Japan is the 2nd largest importer with 38,207 animals imported and followed by Taiwan with 36,099 animals and Great Britain (32,189). However, the fact that 82 countries reportedly imported this species shows that this is a popular pet world-wide. Almost all the trade in these live animals is for commercial purposes (purpose code T), accounting for 99.7%. The remaining animals are for zoological or breeding purposes, law enforcement or scientific purposes.

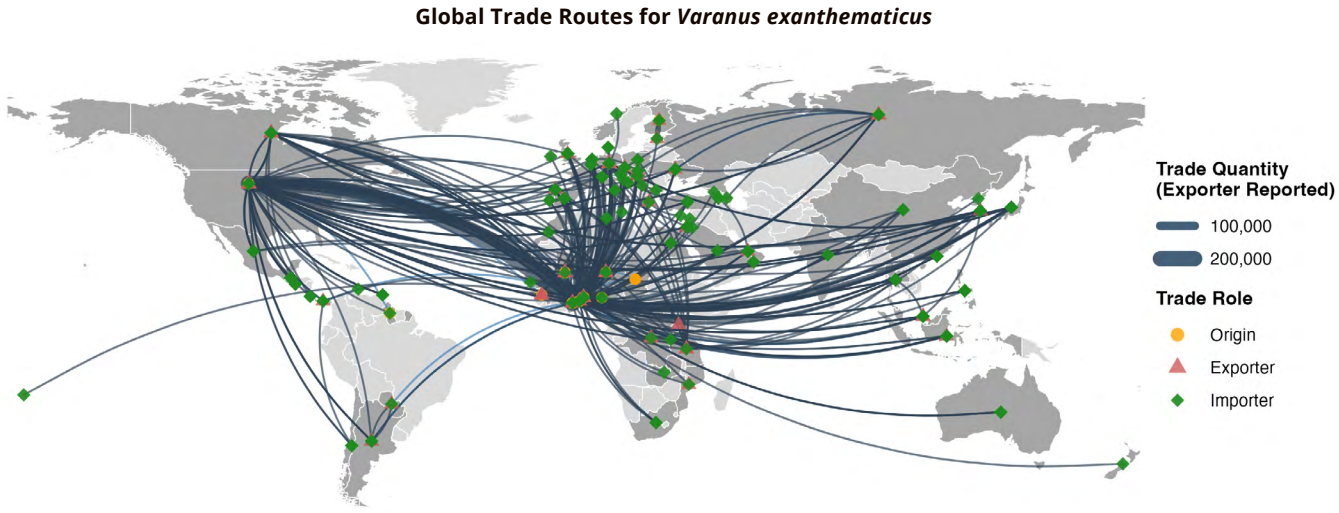

Figure 29 Global trade routes in *Varanus exanthematicus* in the period of 2000–2023

Between 2000 and 2023, wild animals (source W) made up for 55.3% of all live *Varanus exanthematicus traded*. However, the proportion of wild caught animals traded on a yearly basis has been slowly decreasing (Figure 30). In contrast, the percentage of Ranched (R) and Captive born (F) animals has been increasing. Captive-bred animals were only reported between 2006 and 2017, although in low percentages.

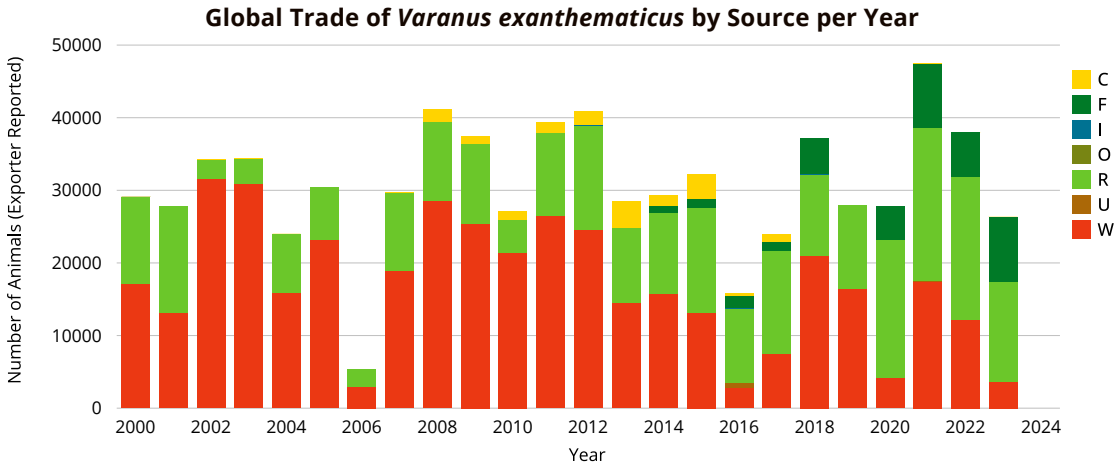

Figure 30 Global trade in *Varanus exanthematicus* in the period of 2000–2023 by source per year.

Japan's role in the trade

In the global trade in *Varanus exanthematicus*, Japan is the 2nd largest importer, accounting for 5.2% of the global trade, and importing 38,207 animals between 2000–2023. Togo is the main source for the animals imported into Japan with a total of 25,124 animals imported from there (Figure 31). Followed by range states Ghana (9,308) and Benin (2,550).

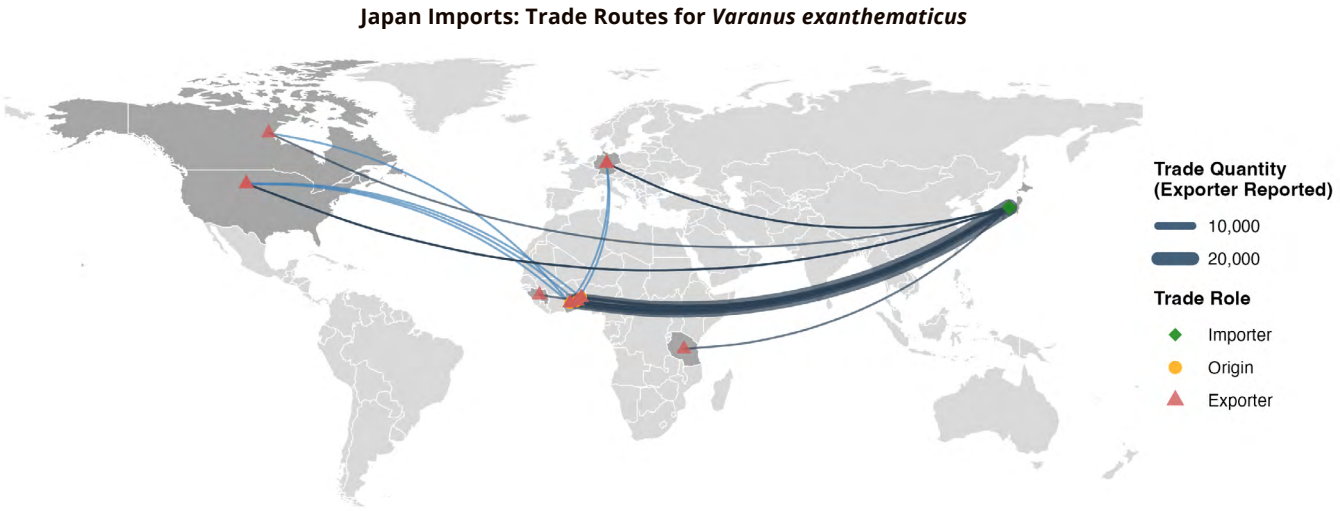

Figure 31 Trade routes for the import of *Varanus exanthematicus* by Japan in the period of 2000–2023.

The import has strongly increased in recent years, with import levels being 4x–5x higher post 2020, compared to before. Imports primarily constitutes of captive born (F) and Ranched (R) animals (Figure 32). The reduced number of wild animals is interesting, since the spot survey showed that half of the advertisements reporting an origin, reported it as wild. Currently, CITES trade data for 2024 and 2025 are unavailable (see methods). Also, the reported origin by traders can differ from what is reported on the CITES export permits.

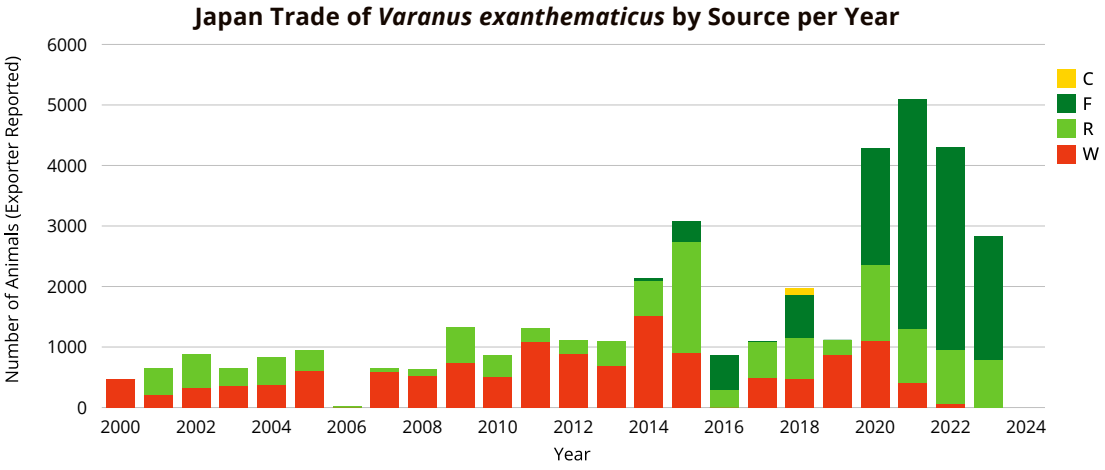

Figure 32 Import of *Varanus exanthematicus* by Japan in the period of 2000-2023 by source per year.

Export Quotas

Export quotas have been established for this species for Benin, Ethiopia, Ghana, Togo, and Democratic Republic of the Congo (DRC) (Table 9). In the past, quotas were also established for Chad (e.g. 5,000 animals in 2011), and Niger (2,000 live, wild animals in 2011). Quotas are relatively stable, although the number of ranched animals doubled for Togo between 2019 and 2020. Quotas for Ghana were only established for 2023 and later, vary strongly, and include size limits. Several trade restrictions are in place for this species, primarily from the EU. The EU suspend imports from Benin with source W and R (>= 20 cm SVL), has a negative opinion in place for Togo source R (>= 20 cm SVL) and source W, and several

Scientific Review Group (SRG) referrals in place for Ghana (source R, F and C). Positive opinions are in place for Togo for source R (<= 20 cm SVL), Ghana (source W <= 20 cm SVL), Benin (source R, <= 20 cm SVL).

Table 9 Export quota for *Varanus exanthematicus* in the period of 2015–2025.
Source: Species+ (UNEP, 2025)

Year	Benin	DRC	Ethiopia	Ghana	Togo
2025	5,000 (R)	50 (Live)	500 (Live)	5,000 (R)	15,000 (R), 4,000 (Wild)
2024	5,000 (R)	50 (Live)	500 (Live)	3,000 (W, ≤25cm SVL), 9,000 (R, ≤25cm SVL)	15,000 (R), 4,000 (W)
2023	5,000 (R)	50 (Live, W)	500 (Live, W)	9,000 (R), 3,000 (W)	15,000 (R), 4,000 (W)
2022	500 (C), 5,000 (R), 0 (W)	–	500 (Live, W)	–	15,000 (R), 4,000 (W)
2021	500 (C), 5,000 (R), 0 (W)	50 (Live, W)	500 (Live, W)	–	15,000 (R), 4,000 (W)
2020	5,000 (R), 0 (W)	2,000 (Live, W)	–	–	15,000 (R), 4,000 (W)
2019	5,000 (R), 0 (Skins), 0 (W)	2,000 (Live)	500 (Live, W)	–	7,500 (R), 4,000 (W)
2018	5,000 (R), 1,000 (Skins), 500 (W)	2,000 (Live)	500 (Live)	–	7,500 (R), 4,000 (W)
2017	5,000 (R), 1,000 (Skins), 500 (W)	500 (Live)	500 (Live)	–	7,500 (R), 3,000 (W)
2016	5,000 (R), 1,000 (Skins), 500 (W)	500 (Live)	500 (Live)	–	7,000 (R), 3,000 (W)
2015	5,000 (R), 1,000 (Skins), 500 (W)	–	500 (Live)	–	7,000 (R), 3,000 (W)

Breeding Availability

This terrestrial species is relatively inactive and appear to only be active part of the year (Cissé, 1971). The species shows a strong seasonal cycle, stopping all its activity towards the end of December (dry season) in Senegal. Spending the rest of the time hiding in a nest, and remains inactive for about six months without food or water.

This species reaches sexual maturity between the second or third year. The breeding season differs throughout its range with breeding in Senegal occurring around September, and in Ghana in November or December. This species can lay large clutches, up to 50 eggs have been reported (Branch, 1988). Although the average seems to be between 12–20 (Sprackland, 2011). Under optimal circumstances, multiple clutches can be laid by females (Retes & Bennett, 2001), with large females able to produce up to 120 eggs per year. Coiro (2007) reports successive clutches at 32 and 55 days after the initial clutch was laid. However, under natural conditions, breeding seems to be limited to one or two months annually. Eggs are laid in locations with sandy soils receiving plenty of sun, up to 30 cm deep. In Senegal, the eggs laid in September will hatch in July, and in Ghana a slightly shorter incubation time has been documented with eggs hatching in March and April. Hatching of the eggs seems to be triggered by the arrival of the rain. Bennett and Thakoordyal (2023) report that harvesters sometimes find nests full of hatched juveniles waiting for the rain, before they climb their way to the surface.

Although *Varanus exanthematicus* is one of the most traded monitor lizards in the pet trade, documentation on its reproduction and behavior in captivity remains limited (Bayless & Huffaker, 1992; Bayless & Reynolds, 1992; Reinshagen, 1993; Bayless, 1994; Bennett & Thakoordyal, 2003; Wesiak, 2006; Coiro, 2007). Successful captive breeding is rare and not consistently achieved (Bennett & Thakoordyal, 2003).

Harvesting Techniques

Only a very small portion of the trade consists of captive-bred animals (in accordance with Resolution Conf. 10.16 [Rev. CoP19]). The majority is documented as captive-born (F) or Ranched (R). Here we look at the available evidence to see if these numbers are realistic and can be supported by the wild population.

This species can be common throughout its range, depending on the habitat. In Ghana the species is most found on sandy soils, in particular with agriculture or uncultivated land around (Bennett, 2004). Although total population sizes are unknown, densities of up to 357 juveniles per km² have been reported (Bennett, 2000). Which would correspond to approximately 24 adult females per km². However, Bennett (2004) reports that densities might vary strongly between range states, with indications that the species is considered rare in the DRC. Average encounter rates of 0.43 ± 0.28 adults and 0.54 ± 0.47 juveniles per hour have been recorded for this species in good habitat (Bennett, 2004). A rapid assessment provided by the Ghana Scientific Authority in 2022 (KNUST Scientific Authority of Ghana, 2022) provides more detail about harvest practices. Ghanian export companies hire four to six collectors, who could gather eggs from up to 20 breeding sites, stating an average clutch size of 21–25 eggs. Interestingly, the image provides shows the egg collection sites to be outside the range reported in the image (Figure 1 in KNUST Scientific Authority of Ghana, 2022). According to the collectors, approximately 30% of nests are identified. This percentage was confirmed by Bennett and Thakoordyal (2003), which states that experienced collectors remove roughly 30% of the juvenile population.
Each company could collect between 2,000–6,000 eggs, with an average of 3,600 per year. Resulting on approximately 21,857 eggs annually. The collectors reported a 75–80% hatch rate, leading to the availability of 16,393–17,486 juveniles per year. Ten percent of these is subsequently released back to the wild. Ghanian export requirements do not allow export of juveniles larger than 25 cm SVL, which are returned to the wild. Ghana subsequently set the export quota to 9,000, to account for 10% mortality of hatchlings. However, the report also states that incidental exporters or less active companies were not included. At the time, (2023 and 2024), Ghana also had a lower quota for wild animals, according to the scientific authority to reduce pressure on the wild population. This quota was not set again in 2025.
Bennett and Thakoordyal (2003) states that gravid females are frequently captured to lay eggs, so the juveniles can be sold as captive-born (F). After which they are supposedly should be returned to the wild. but due to the conditions in which they are housed, they often are in bad shape, and more frequently than should, they are not released, but instead sold off to the pet trade, or sold for its skin and/or meat. They furthermore highlight the destructive impact of removing adult females entirely from the reproductive population compared to removing a portion of the juveniles. Bennett (2000) highlights the lack of reproduction in captivity as the primary conservation concern for this species, and suggests that only a small percentage survives. Stating that juvenile animals often appear dehydrated and malnourished, while deceased adults are frequently obese (Savmom.org, 2018).

Illegal Trade

Open-source references to seizures result in 26 seizures, with a total of 122 animals (Table 10).
Interestingly, Mexico and China are frequently mentioned as a seizure location. Records state that this species is introduced into Mexico (Cupul-Magana 2010), the United States of America (Florida) and South Africa (GBIF, 2025).

Table 10 Overview of seized animals of *Varanus exanthematicus* from open-source data.

Seizure location	Number	year	Origin	Source
Belgium	20	2013		Wildlife Trade Portal
Canada	1	2013		Wildlife Trade Portal
Mexico	1	2014		Robin des Bois, #07
Vietnam	4	2015		Wildlife Trade Portal
Vietnam	4	2015		Robin des Bois, #11
Italy	1	2015	Germany	Robin des Bois, #11
Mexico	3	2017		Wildlife Trade Portal
Indonesia	6	2017		Wildlife Trade Portal
Philippines	2	2017		Wildlife Trade Portal
Mexico	2	2017		Wildlife Trade Portal
Mexico	5	2017		Robin des Bois, #17
Mexico	1	2018		Wildlife Trade Portal
China	15	2019		Robin des Bois, #27
China	15	2019	Taiwan	Robin des Bois, #26
Mexico	10	2020		Robin des Bois, #29
China	15	2020		Robin des Bois, #29
France	1	2020		Robin des Bois, #28
Philippines	8	2021	Malaysia	Robin des Bois, #33
Serbia	1	2022		Robin des Bois #38
Germany	1	2022		Robin des Bois #37
Spain	1	2022		Robin des Bois, #35
Peru	unknown	2023		Wildlife Trade Portal
China	2	2023		Robin des Bois #43
Sweden	1	2023		Robin des Bois #39
United States of America	1	2024		NJ.com, 2024
India	1	2024		New Indian express, 2024

Conclusion

The commercial exploitation of *Varanus exanthematicus* in Ghana does not currently appear to be an immediate conservation concern. Despite the large number of individuals harvested annually, the species remains widespread and abundant in its natural range. However, a primary issue arises from the limited success of captive breeding efforts and high mortality rates in captivity, which could have long-term implications for sustainability. More information on population densities and harvest practices from other range states (especially Togo) is necessary.

Trade data indicates that Japan is the second-largest importer of this species, with a strong reliance on animals from Togo, Ghana, and Benin. The recent surge in imports post-2020 suggests a growing market demand. While wild-caught animals constituted a significant proportion of the trade historically, the prevalence of ranched and captive-born animals has increased. Discrepancies between reported trade origins and observed market trends raise concerns about potential mislabeling of wild-caught individuals. Harvest quotas are in place for key range states, but enforcement and monitoring remain critical to ensuring sustainable practices. The harvesting of gravid females to facilitate the trade in captive-born (F) animals is of conservation concern, as it removes reproductive individuals from the wild population. This is especially of concern as reports suggest that not all females or juveniles are successfully returned to the wild, increasing the potential for localized population declines.

While international trade in this species continues at high volumes, long-term sustainability will depend on enhanced monitoring of wild populations, enforcement to ensure adult females are released, reduced demand for this species and addressing the high mortality rates in captivity.

Tokay — *Gekko gecko*

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Scientific name	***Gekko gecko***
Japanese name	**トッケイヤモリ**
Distribution	**South & South-east Asia**
IUCN Red List status	**Least Concern**
CITES	**Appendix II**

Background

The Tokay *Gekko gecko* is one of the most intensively harvested gecko species in the world, primarily for the demand of traditional Chinese Medicine (Nijman & Shepherd, 2015). However, besides their widespread and large-scale use for traditional medicine, this species is also traded live to supply the international pet trade. This chapter solely focusses on the trade in live animals. This species was listed on CITES Appendix II in 2019, any trade data is limited to after this date.

Gekko gecko is legally protected to varying degrees across Asia, with countries like Bangladesh, China, India, Malaysia, and the Philippines enforcing strict permit-based systems or outright bans on hunting, trade, or possession. In contrast, Indonesia and Thailand allow trade under regulation, with Indonesia applying annual quotas and Thailand requiring permits for export/import but lacking national protection. Several countries (e.g., Cambodia, Lao PDR, Viet Nam) allow limited customary use or collection with permits, often contingent on local authority approval, while Myanmar applies blanket protections only within designated protected areas (CITES CoP18. Prop. 28).

Spot Survey

A total of 59 advertisements were found for *Gekko gecko*, advertising 80 animals. Twenty-six different vendors advertised the species. Of the 59 advertisements, nine mentioned the animals were already sold. Ten advertisements reported that the animals originated from the wild, 29 advertisements reported a captive bred origin of the animals. Specific origin locations mentioned were Hong Kong, Thailand and Vietnam. Wild caught animals were sold for an average of ¥16,930 ($117) (range ¥4,500–¥33,000 ($31–$228)). Captive bred animals sold for a much higher average of ¥243,108 ($1,677) (range ¥15,000–¥630,000 ($103–$4,345), excluding one individual priced at ¥1,800,000 ($12,413). A leucistic, reduced pigmentation, *Gekko gecko* was the most expensive gecko with an asking price of ¥1,800,000 ($12,413) (Figure 33) Although the advertisement was posted on 24 October 2023, the animal was still for sale (March 2025), and it was possible to make the reservation. The high price for captive-bred animals was primarily due to different color morphs of this species (Figure 34).

Figure 33 An advertisement for *Gekko gecko* morph (Leucistic) in Japan.
Source: Nakajimado.com

Figure 34 An incomplete overview of some different color morphs encountered for *Gekko gecko*, available and sold in Japan.
Source: Nakajimado.com

During the physical survey at the Nagoya Reptile World Spring fair, 41 animals were observed. The average price for a tokay gecko at the reptile fair was ¥10,317 ($71) (range ¥3,800–¥19,800 ($26–$137)), which is lower than found through the online spot survey. Two vendors reported their animals to be of wild origin (Indonesia), one vendor claimed a captive born origin (Indonesia), and seven vendors claimed a captive bred origin (EU, Indonesia and Japan).
No confirmation was made regarding the illegality of the advertised animals.

Market Analysis

Global trade

The United States of America is the main importer of *Gekko gecko*, with a reported 45,028 live animals (Figure 35). They are followed by Japan with a reported import of 11,823 live animals. Combined these two countries imported 75% of all live *Gekko gecko*. Other important importers are South Korea with 5,140 animals, and the Czech Republic and Canada with respectively 2,438 and 2,432 animals.

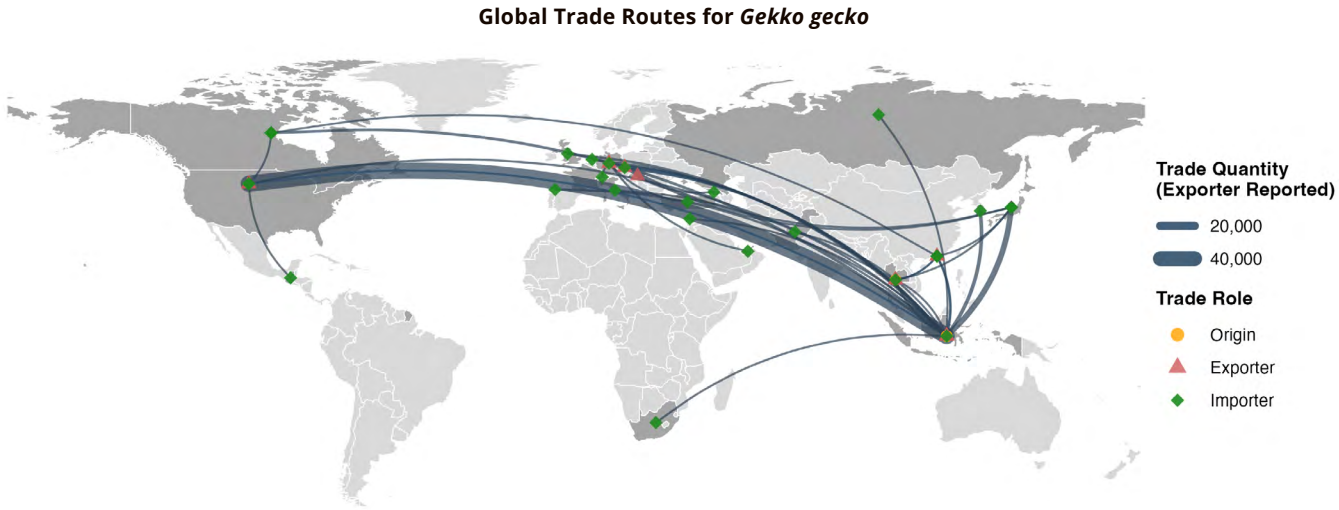

Figure 35 Global trade routes of *Gekko gecko* in the period of 2000–2023.

Indonesia is the largest exporter of *Gekko gecko*, with a reported export of 73,559 animals, accounting for almost 98% of all exported live Tokay geckos. Other important exporters were Thailand (1,259 animals), Germany (107 animals) and Czech Republic (103 animals). On 30 September 2024, the European Union adopted a negative opinion for the import of animals with a wild origin from Indonesia (SRG 102/4)

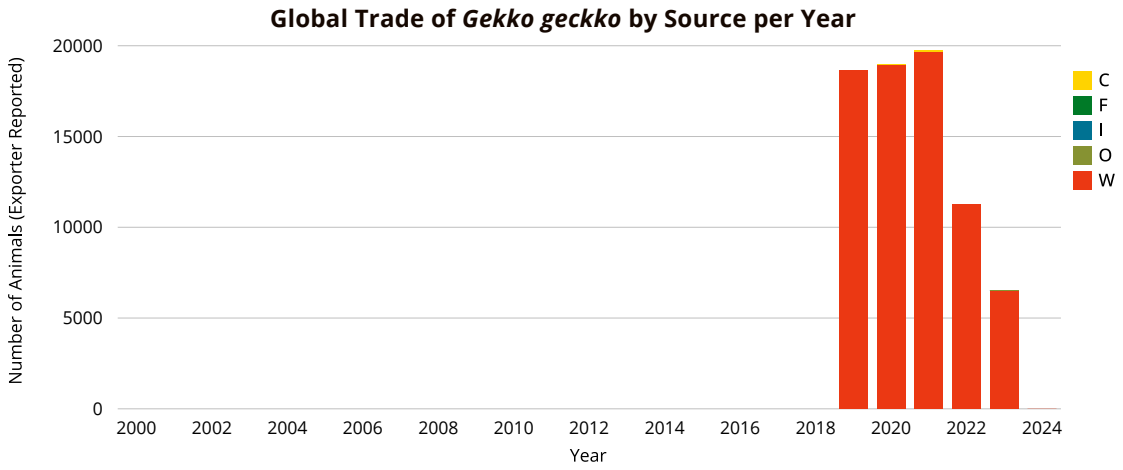

Figure 36 Global trade in *Gekko gecko* in the period of 2000-2023 by source per year.

Nearly all live *Gekko gecko* were said to originate from the wild (99.8%/74,933), with only a few reported as captive bred (149) (Figure 36). Interestingly though, importer reported quantities mention a much larger number of geckos with a captive bred origin, namely 1,977 animals. Importer-reported quantities also include 400 animals with source I (previously seized animals), and source O (112 animals, pre-convention).

Japan's role in the trade

Japan is the 2nd largest importer of live *Gekko gecko* with a total of 11,823 live animals. Indonesia is the main exporter of live animals to Japan accounting for almost 98% (11,546 animals; Figure 37). Remaining *Gekko gecko* originated from Thailand (120), Czech Republic (93), Hungary (44) and Hong Kong (origin Thailand; 20). There is no recorded export of this species from Japan in the CITES Trade Database, suggesting that all animals are meant for Japan's internal market.

Figure 37 Trade routes for the import of *Gekko gecko* by Japan in the period of 2000–2023.

Nearly all animals imported by Japan were reportedly of a wild origin (source W), only the animals imported from Czech Republic, Hungary, and Hong Kong were reportedly bred in captivity (source C) (Figure 38).

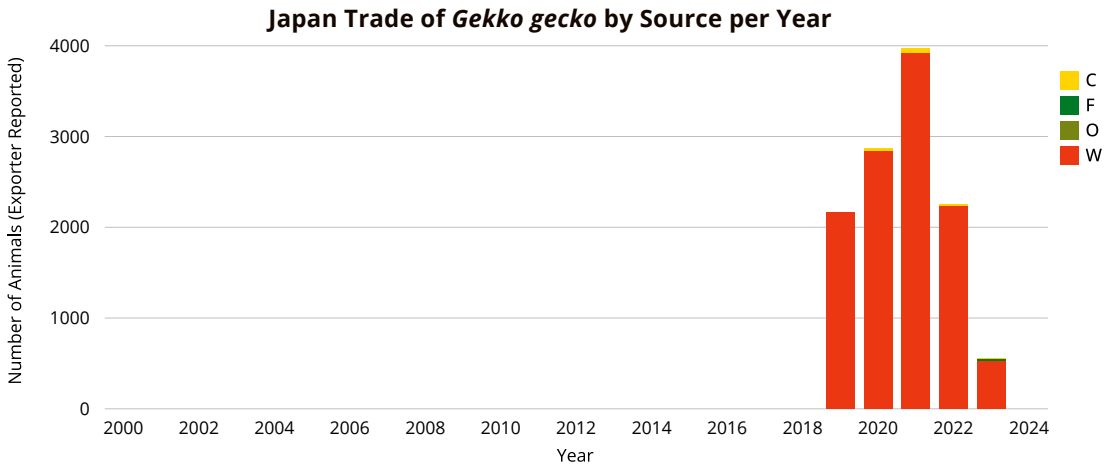

Figure 38 Import of *Gekko gecko* by Japan in the period of 2000-2023 by source per year.

Harvest Quotas

Little is known about harvest quota for the majority of its range states, with the exception for Indonesia (Table 11). Indonesian harvest quotas for *Gekko gecko* generally consists of two different components, one for live animals to be sold as pets, and for human consumption, which includes for medicinal purposes (Nijman & Shepherd, 2015)). Although this chapter primarily considers the trade in live *Gekko gecko* for pets, the quota for consumption must be taken into consideration when determining the potential impact of harvest.

Harvest quotas for live *Gekko gecko* remained relatively similar since 2012, with a few real outliers (e.g. 2012, 2013 and 2022) (Table 8). In these years harvest quotas were significantly higher. Quotas for consumption are a magnitude higher and have only been issues in 2019 and later. This quota increased from 1.8 million animals in 2019 to over 8 million in 2022. Currently, in 2025, the quota for consumption has been reduced again to a little over 2.5 million *Gekko gecko*. The harvest quota for 2025 reports a size restriction for harvest for both categories; ≥15 snout-vent-length (KSDAE, 2025).

Little information is known about the extent to which these quotas are realized, with the exception for the years 2012–2015. During those years only between 32%–41% of the quota were realized. Indonesia reports export realization data in their NDF for *Gekko gecko* for the period 2013–2018) (Kurniati et al, 2021). For the years after the species got listed on the CITES appendices, exporter-reported quantities can give an indication. Based on the quantities reportedly exported by Indonesia in the years 2020 and 2021, the harvest quota for live animals was exceeded by approximately 50%. However, this requires more nuances. First, of all, only 95% of harvest quotas are destined for export. In addition, animals exported does not necessarily translate to being harvest in the same year. Animals might have been harvested under quota for previous years.

Table 11 Harvest quotas for *Gekko gecko* in the period of 2012–2025 in Indonesia. Note that these are harvest quotas, of these 95% are destined for export. On the right it shows the realized export for live individuals.
Source: Hariyadi, 2015; KSDAE 2016-2025

Year	Consumption	Live (pets)	Live Export	
2025	2,510,500	22,750		
2024	3,484,077	21,895		
2023	6,128,300	21,897	10,559	(48%)
2022	8,073,000	36,550	14,125	(39%)
2021	1,879,813	20,188	30,300	(150%)
2020	1,689,813	20,180	30,165	(149%)
2019	1,800,000	21,250	18,830	(89%)
2018		25,250	19,664	(78%)
2017		26,500	20,083	(76%)
2016		26,500	14,476	(55%)
2015		23,850	13,595	(57%)
2014		34,200	12,386	(36%)
2013		40,500	16,442	(41%)
2012		45,000	14,546	(32%)

In addition to harvest quota for wild animals, the Indonesian government can allocate quota for the commercial captive breeding of *Gekko gecko*. Although these breeding quotas are carefully hidden, there is information for a few years. In 2014, Indonesia authorized the export of three million captive-bred animals (Partono, 2014 in Nijman & Shepherd, 2015), and in 2016, this was 2.8 million captive-bred animals (Janssen & Chng, 2018). Yet investigations found no evidence these companies bred geckos at such scale, and suspected widespread laundering of wild-caught animals (Nijman & Shepherd, 2015). Considering all export from Indonesia, as reported by Indonesia, is currently reported as caught from the wild, it can be assumed that little to no captive-breeding takes place in Indonesian commercial facilities.

Breeding Availability

Gekko gecko is a solitary, nocturnal species (Aowphol et al., 2006; Manthey & Grossmann, 1997 in Caillabet, 2013) with a six-month breeding season during which males and females briefly pair (Manthey & Grossmann, 1997 in Caillabet, 2013). Clutches typically contain one to two eggs, deposited in tree holes and guarded by both parents (Das, 2010). Females can produce up to four clutches a year (roughly every 30 days).

While the species has been successfully bred in captivity and can live up to 23 years under such conditions (Snider & Bowler, 1992), large-scale commercial breeding remains highly limited. Most individuals used in traditional medicine are believed to be harvested from the wild (Caillabet, 2013; Nijman & Shepherd, 2015).

Captive breeding has been reported in China (Yinfeng et al., 1997 in Caillabet, 2013), Viet Nam (Nguyen & Nguyen, 2008; CITES MA of Viet Nam in litt. to the CITES SA of the United States of America in CITES CoP18. Prop. 28), and Indonesia (Nijman & Shepherd, 2015), where the practice is promoted by the Directorate General of Forest Protection and Nature Conservation (PHKA). However, the low market value of the species and high costs of maintaining breeding operations have rendered large-scale production economically unviable (Nijman et al., 2012; Caillabet, 2013; Nijman & Shepherd, 2015). No breeding was reported

in Myanmar (CITES MA of Myanmar in litt. to SA of United States of America, 2018), and fewer than 10 captive-bred individuals were reported in the Philippines as of 2012 (CITES MA of the Philippines in litt. to the CITES SA of the United States of America, in CITES CoP18. Prop. 28).

Color morphs seem to be an important part of captive breeding, fetching significantly higher prices compared to non-color morph or wild caught individuals. Of all observed advertisements in the Japanese market, 22 out of 29 advertisements for captive-bred animals consisted of a color morph. With ¥1,800,000 ($12,413) as the highest price, and magnitudes higher compared to non-morph or wild animals.

Illegal Trade

Open-source references did result in many documented seizures for *Gekko gecko* (Table 9). As the focus of this chapter lies with trade in live animals, only seizures of live individuals are reported. Interestingly, many live animals are seized consistently in India and Bangladesh. These often comprise seizures of several to a dozen animals each.

Table 12 Over view of siezed animals of *Gekko gecko* from open sourced data.

Country	Year	Number	Source(s)
Philippines	2011	41	Wildlife trade Portal
China	2011	Unknown	Wildlife trade Portal
China	2012	51	Wildlife trade Portal
India	2012	42	Wildlife trade Portal
Myanmar	2013	1	Wildlife trade Portal
Bangladesh	2015	15	Wildlife trade Portal
Vietnam	2016	3	Wildlife trade Portal
India	2017	69	Wildlife trade Portal
Indonesia	2017	7	Wildlife trade Portal
Vietnam	2017	12	Wildlife trade Portal
India	2018	35	Wildlife trade Portal
Bangladesh	2019	28	Wildlife trade Portal
Vietnam	2019	9	Wildlife trade Portal
India	2020	50	Wildlife trade Portal
Bangladesh	2020	1	Wildlife trade Portal
India	2021	19	Wildlife trade Portal, Robin des Bois #33, #34
Vietnam	2021	1	Robin des Bois #34
Spain	2021	2	Robin des Bois #34
India	2022	12	Wildlife trade Portal, Robin des Bois #35, #37
Bangladesh	2022	3	Wildlife trade Portal
India	2023	6	Wildlife trade Portal, Robin des Bois #42, #43
Bangladesh	2023	1	Robin des Bois #42
India	2024	4	Wildlife trade Portal

Conclusion

The live trade in *Gekko gecko* — the Tokay gecko — reveals a complex, and inconsistently reported market that continues to raise serious conservation, enforcement, and welfare concerns. Although the species is currently listed as Least Concern on the IUCN Red List and is included in CITES Appendix II, the scale of

trade and persistent discrepancies in data highlight the need for a far more rigorous and transparent regulatory framework.

Where previously the EU and USA were the main destination for live individuals (Cailabet, 2013), our data shows that Japan plays a prominent role in this trade as the second-largest importer of live animals globally, with nearly all imports originating from Indonesia and nearly all reportedly wild-sourced.
In contrast, market dynamics in Japan, indicate a shift towards high-end consumerism within the pet trade, driven by the popularity of color morphs. Captive-bred morphs command prices order of magnitude higher than wild-type individuals, with some fetching well over ¥1 million. The volume of captive-bred individuals reported in trade remains small, further suggesting that most breeding activity is small-scale or hobbyist-based and unable to satisfy market demand at commercial levels. Whereas pre-listing on CITES, large numbers were exported as captive bred, and the subsequent publication suggesting large scale laundering in Indonesia (Nijman & Shepherd, 2018), trade now consists almost exclusively of wild caught animals.

Despite CITES regulations and national controls in many range states, illegal trade remains pervasive. Numerous seizures across South and Southeast Asia — especially in South Asia — illustrate ongoing poaching and trafficking. While often involving small numbers of animals, the frequency of these incidents signals sustained pressure on wild populations.

In the past, Lao PDR, Myanmar, Peninsular Malaysia, Cambodia and the Philippines have been highlighted as important source countries for the trade in this species (Shepherd & Nijman, 2007; Caillabet, 2013; Rahman, 2014). However, our data shows that this is not the case when it concerns live animals. Thailand reported exports of over a million geckos between 2014 and 2018, which underscores the historical scale of trade and the challenge of transitioning such high-volume exploitation into a controlled, sustainable model. However, when it concerns live animals, Thailand merely plays a marginal role. Where Vietnam used to be a large exporter of live individuals to the United States of America, since the species was listed on CITES, no exports have been recorded from Vietnam (CITES Prop 28, CoP18). It should be noted that animals with a reported origin from Vietnam were recorded during the spot survey. These animals could have been imported before the species was listed on the CITES appendices, however, an illegal origin cannot be ruled out either.

Indonesia's harvest quota system, though formally structured, suffers from poor transparency, inconsistent enforcement, and a lack of reliable realization data. Evidence that export volumes have exceeded quota allocations by 50% in certain years is potentially reason for concern. The issuance of massive consumption quotas — reaching over 8 million individuals in 2022 — while focusing primarily on dried or processed forms, further complicates traceability and the likelihood of regulatory loopholes being exploited. This quota must be considered when determining the impact of trade on *Gekko gecko* wild populations. The Indonesian NDF for *Gekko gecko* provides concerning information, stating that harvesters claimed that instead of 50 animals per week five years ago, they can now only catch 5–10 of smaller sizes (Kurniati et al, 2021). This provides evidence that the *Gekko gecko* population in Java (Indonesia) seem to be reducing quickly under the severe pressure of harvesting. There is a serious risk that continued exploitation will undermine the long-term sustainability of *Gekko gecko* populations, despite its current "Least Concern" status.

Tropical Girdled Lizard — *Cordylus tropidosternum*

© Bernard Dupont

Scientific name	***Cordylus tropidosternum***
Japanese name	**ネッタイヨロイトカゲ** **ヒナタヨロイトカゲ** **トロピクスヨロイトカゲ**
Distribution	**Sub-Saharan Africa**
IUCN Red List status	**Least Concern**
CITES	**Appendix II**

Background

This lizard can be found in sub-Saharan Africa, from Mozambique to eastern Kenya, and Tanzania to the Katanga province of Democratic Republic of the Congo (DRC), Malawi and northeastern Zimbabwe (Broadley & Branch, 2002). This species used to include former subspecies *C. jonesii*, *C.t. frenatus*, and *C.t. parkeri* (Broadley & Branch, 2002).

Spot Survey

A total of 37 advertisements, advertising 122 animals, were observed that were either posted in 2024 or to date (18 March) in 2025 (Figure 39). Twenty-nine of 37 advertisements were posted in March 2025. Thirty-one different vendors advertised the species. Of the 37 advertisements, only 3 mentioned the animals were already sold. Nineteen advertisements mentioned the origin of the animal, six claimed a captive bred origin, two a captive-born origin, and 11 stated the animals originated from the wild. For four

advertisements, the Democratic Republic of the Congo (DRC) was reported as the origin of the wild animals. Juveniles were sold for an average of ¥21,426 ($148) (range ¥12,000–¥27,280 ($83–$188)). Adult animals were sold for higher prices with on average ¥ 33,397 ($230) (range ¥22,000–¥45,000 ($152–$310)).

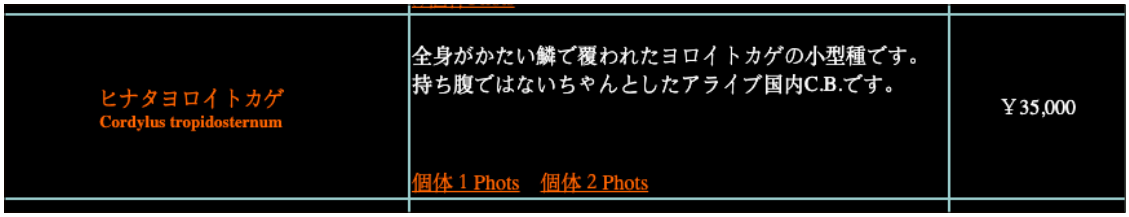

Figure 39 An advertisement for *Cordylus tropidosternum* in Japan.
Source: http://www.alive-rep.jp/lizards.htm

During the physical survey at the Nagoya Reptile World Spring fair, 58 animals were observed. Pairs were sold for ¥43,000 ($297) and ¥50,000 ($345), while individual animals sold for an average of ¥27,025 ($186) (range ¥19,800–¥33,000 ($137–$228)). Prices were slightly higher than observed during the online spot survey. By three vendors, a wild origin was reported. However, more vendors highlighted the reported origin of the animals. One stated the animals originated from Japan. Three reported Congo (referring to DRC) as the origin. What is of concern is that three vendors reported the origin as Togo, which is not a range state for any *Cordylus* sp. (Broadley, 2006). There is no reported export of *Cordylus* sp. by Togo in the UNEP-WCMC CITES Trade Database (2000–2023). While it is possible that this is a mistake made by the vendors, it is of potential concern and would warrant further investigation once Togo and Japan submit their annual trade reports in 2026.
No confirmation was made regarding the illegality of the advertised animals.

Market Analysis

Global trade

Cordylus tropidosternum is a popular lizard in international pet trade with exporting parties reporting the commercial trade of 71,242 animals between 2000–2024 (Figure 40). Only 90 animals were traded for other purpose (e.g. Z, P, S or Q) according to exporter-reported quantities. The number of animals reported by importing parties is higher with 99,922 animals traded according to data reported by importing countries. The main exporter of this species is Tanzania, which reportedly exported 79.4% of all the animals (n= 56,616), followed by DRC (n=11,580; 16.2%) and the United States of America (n=1,324, 1.9%). Interestingly, DRC has not exported this species before 2021. Through direct export (DRC as exporter) or as origin (DRC as origin) in 2021 1,117 animals were exported, in 2022 this were 7,094 animals, in 2023 950 animals and in 2024 2,450 animals.
The main importer of this species is the United States of America, which imported 38,259 animals, although importer reported statistics are higher with 57,536 animals. This accounts for 53%–57% of all traded animals globally. This is followed by Japan with the import of 9,806 animals (13.7%). Yet, importer-reported statistics for Germany place them in 2nd place with the import of 13,003 animals.

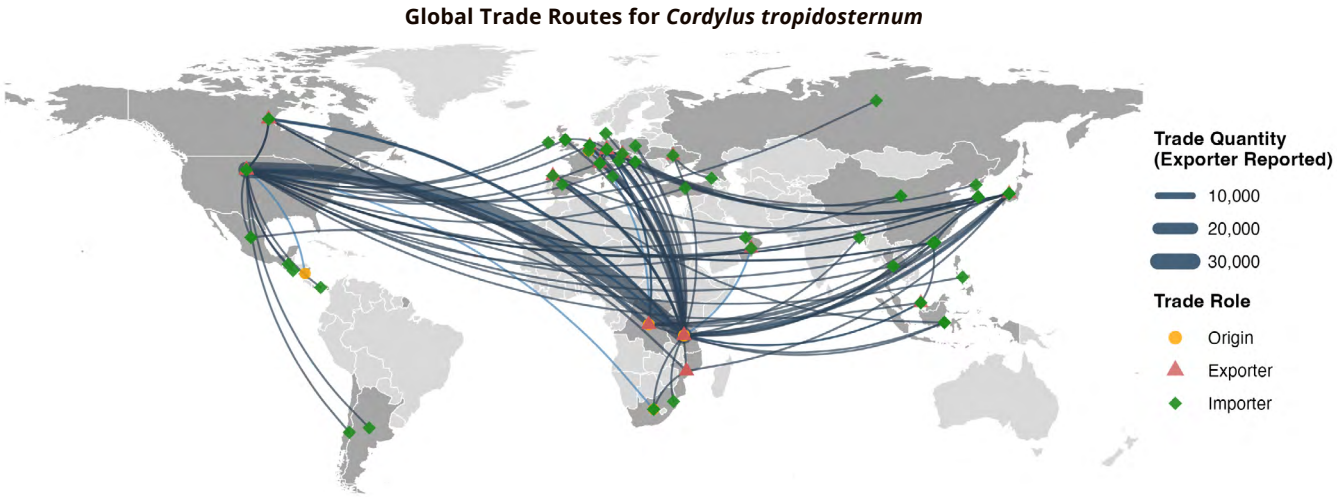

Figure 40 Global trade routes in *Cordylus tropidosternum* in the period of 2000–2023.

Only a mere 1.1% of all animals traded did not originate from the wild (source code W), but were reportedly captive bred (n=120) or captive-born (n=10; see Figure 41). Importing countries also report the import of 109 animals with source I (animals that have been confiscated or seized in the past).

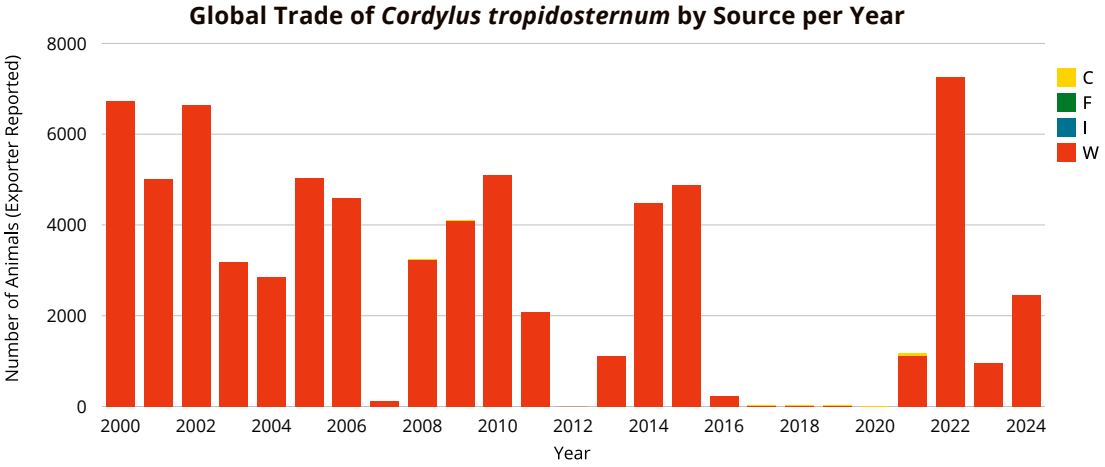

Figure 41 Global trade in *Cordylus tropidosternum* in the period of 2000–2023 by source per year.

Japan's role in the trade

When looking at the exporter-reported quantities, Japan is the 2nd largest importer of *C. tropidosternum*. Like the global pattern, Tanzania was the largest exporter of this species to Japan with 5,254 animals (Figure 42). This was followed by DRC with 3,900 animals. Animals arriving from Europe, e.g. The Netherlands, also originated from DRC. Similarly, animals imported from the US, also originated from a range state (Tanzania).

Only 69 animals exported by Germany did not originate from a range states and were reportedly bred in captivity.

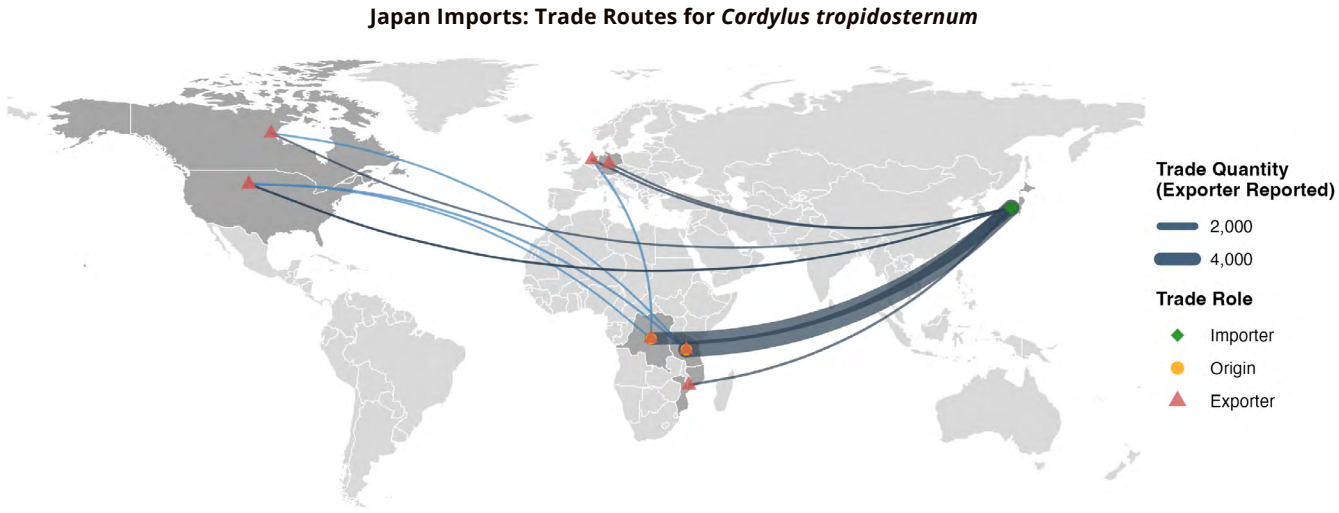

Figure 42 Import of *Cordylus tropidosternum* by Japan in the period of 2000–2023 by source per year.

Although Japan primarily imported this species, export of this species has been documented (Figure 43). In 2011, Japan exported 30 wild animals obtained from Tanzania to Hong Kong. No further export has been documented, suggesting that the imports are primarily intended for the domestic Japanese market.

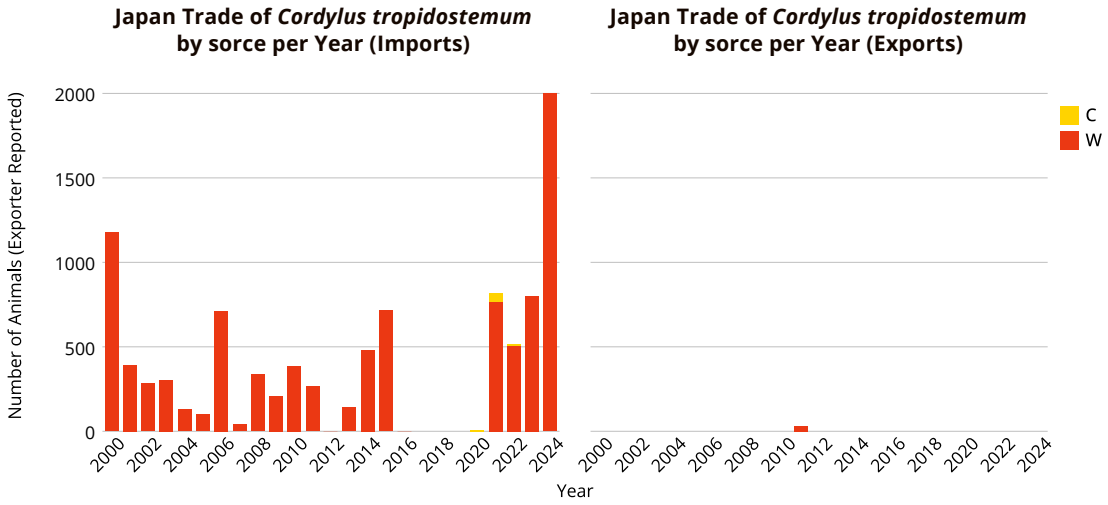

Figure 43 Import (left) and export (right) of *Cordylus tropidosternum* by Japan in the period of 2000–2023 by source per year.

Export Quotas

Only a few range states have or set annual exporting quota for this species (Table 13). Ethiopia is one of the few countries that set annual export quota for *C. tropidosternum*. However, Ethiopia is not a range state for this species (Greenbaum et al., 2012). Despite being a range state for *C. rivae*, the Ethiopian Girdled Lizard, there is no export of any *Cordylus* sp. from Ethiopia in the CITES Trade Database. It is unclear why Ethiopia keeps setting export quota for a species for which it is not a range state, nor exports any *Cordylus* species.

Tanzania was the primary global exporter of this species until 2016, when the government imposed a ban on the export of wildlife. This ban was briefly lifted in 2022 to allow commercial farms to clear remaining stock.

Mozambique, the other range state that allocated export quota in the past (only in 2000 and 2001), has been subjected to a CITES suspension for all exports since 25 September 2012 (CITES Notif. No 2012/059). DRC, which recently has taken the place of Tanzania as the primary exporter of *Cordylus tropidosternum*, has not published open-source export quotas for this species. Nor is there any public information regarding population densities in the DRC.

Table 13 Export quotas for *Cordylus tropidosternum* in the period of 2000–2025.
Source: Species+ (UNEP, 2025)

Year	Ethiopia (Quota)	Mozambique (Quota)	Tanzania (Quota)
2025	1,500 (Live)	–	–
2024	1,500 (Live)	–	–
2023	1,500 (Live, Wild)	–	–
2022	1,500 (Live, Wild)	–	–
2021	1,500 (Live, Wild)	–	–
2019	1,500 (Live, Wild)	–	–
2018	1,500 (Live)	–	–
2017	1,500 (Live)	–	910 (F1), 5,000 (Live, Wild)
2016	3,000 (Live)	–	910 (F1), 5,000 (Live, Wild)
2015	3,000 (Live)	–	50 (F1), 5,000 (Live, Wild)
2014	3,000 (Live)	–	50 (F1), 5,000 (Live, Wild)
2013	In Prep.	–	110 (F1), 5,000 (Live, Wild)
2012	In Prep.	–	110 (F1), 5,000 (Live, Wild)
2011	In Prep.	–	99 (F1), 5,000 (Wild)
2010	–	–	99 (Live, Captive-bred), 5,000 (Wild)
2009	3,000 (Live)	–	99 (F1), 5,000 (Wild)
2008	3,000 (Live)	–	123 (F1), 5,000 (Wild)
2007	3,000 (Live)	–	160 (F1), 5,000 (Wild)
2006	–	–	45 (F1), 5,000 (Wild)
2005	3,000 (Live)	–	50 (F1), 5,000 (Wild)
2004	In Prep.	–	52 (F1), 5,000 (Wild)
2003	3,000 (Live)	–	120 (F1), 5,000 (Wild)
2002	3,000 (Live)	–	81 (F1), 5,000 (Wild)
2001	3,000 (Live)	1,000 (Live)	25 (F1), 5,000 (Wild)
2000	3,000 (Live)	1,000 (Live)	20 (F1), 5,000 (Wild)

Breeding Availability

Despite its popularity in the global pet trade, little is known about the actual breeding of this species. Reported trade in the UNEP-WCMC CITES Trade Database consists almost solely of wild-caught animals. Mating takes place in the spring, after a cooler period during winter, and the gestation period is approximately four months. The species, which is ovoviviparous, seems, like other Cordylidae, to synchronize the birth of offspring with the raining season (Van Wyk, 1989, 1990, 1991, 1992, and 1995). In the southern part of the DRC, where this species occurs, this is from November to March. The ovoviviparous nature of *Cordylus tropidosternum* represents a significant investment of energy and resources by the female parent over an extended gestation period. By retaining the developing embryos within her body, the female provides a stable and protected environment for the embryos to develop. This higher level of parental

investment might contribute to a trade-off with the frequency of reproduction, limiting females to a single reproductive event, giving birth to 1–5 young per year, or even biannually (Broadley & Branch, 2002).

Illegal Trade

Open-source references did not result in any documented seizures of *Cordylus tropidosternum*.

Conclusion

The trade dynamics of *Cordylus tropidosternum* present several emerging concerns, particularly with the increasing role of the Democratic Republic of the Congo (DRC) as an exporter. Despite no historical records of export prior to 2021, DRC has quickly become the second-largest exporter, accounting for 16% of all traded animals since 2000. This rapid rise raises questions about the sustainability of harvesting practices and the potential impact on local populations. Given the limited range of *Cordylus tropidosternum* in the country, and the presence of the endangered endemic *Cordylus marunguensis*, which coexists with *C. tropidosternum* in the DRC, there is a legitimate fear that this endemic species could be affected by misidentification or unregulated trade.

Another issue is the discrepancy between importer and exporter-reported trade volumes, with importers frequently documenting higher numbers than exporting parties. This inconsistency could suggest under-reporting by exporters or issues related to laundering of wild-caught animals under legal frameworks. Moreover, the timing of trade activity, particularly to the months of November–March, raises concerns that gravid females may be disproportionately collected, leading to the birth of offspring in captivity and potentially false claims of captive breeding. Bustard (1955) documented one such case for *C. niger*, also stating that plenty of females died soon after giving birth. The practice of selling such offspring as captive-born or -bred could obscure the true scale of wild harvesting and hinder effective conservation management.

Given these concerns, further monitoring of trade routes and collection practices is essential. Improved transparency in trade reporting, stricter enforcement of existing regulations, and additional research on population sustainability within the DRC are necessary steps to ensure that the trade in *C. tropidosternum* does not threaten its long-term viability or impact other vulnerable species in the region.

White-Eyed Crocodile Skink — *Tribolonotus novaeguineae*

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Scientific name	***Tribolonotus novaeguineae***
Japanese name	**モトイカブトトカゲ**
Distribution	**New Guinea**
IUCN Red List status	**Least Concern**
CITES	**Not Listed**

Background

Like the Red-eyed Crocodile skinks (*Tribolonotus gracilis*), the White-eyed Crocodile Skink (*Tribolonotus novaeguineae*) can be found on the island of New Guinea, with the western half belonging to Indonesia and Papua New Guinea in the east. This species is only exported from range state Indonesia. The species is not listed in the appendices of CITES, but is listed on EU Annex D (Regulation 339/97), which includes non-CITES listed species, for which the import volumes warrant monitoring. EU importers of these species are required to give an import notification when the animals are introduced into the EU. Subsequently, this trade is recorded in the CITES Trade Database, but solely what is reported by EU importing Parties.

Spot Survey

Compared to *Tribolonotus gracilis*, fewer advertisements were found for *Tribolonotus novaeguineae*, a total of 17 advertisements, advertising 50 animals (Figure 44). Sixteen different vendors advertised the species. Of the 17 advertisements, only two mentioned the animals were already sold. Five advertisements mentioned the origin of the animal, all reported that the animals originated from the wild. Animals were sold for an average of ¥20,243 ($140) (range ¥10,780–¥36,080 ($74–$249)).

Figure 44 An advertisement for *Tribolonotus novaeguinea*e in Japan.
Source: https://www.instagram.com/p/DHIZ9mSvCjY/

During the physical survey at the Nagoya Reptile World Spring Fair, 47 animals were observed. The average price was ¥16,340 ($113) (range ¥12,800–¥20,000 ($88–$138). The prices for animals observed during the reptile fair were slightly lower compared to prices observed online. Nine animals were of a wild origin (Indonesia), and 3 animals were reportedly captive born, but also originated from Indonesia. Vendors had up to 10 animals available, suggesting recent shipments of this species. This seems to be confirmed based upon the fact that 11/17 online advertisements were placed in March 2025.
No confirmation was made regarding the illegality of the advertised animals.

Market Analysis

Global trade

Due to their status as not listed in the CITES Appendices, little data regarding the trade is present. When looking at exporter-reported quantities, the largest quantities are 46 animals to the United States of America (Figure 45). However, as the species is listed on EU Annex D, import data is registered in the CITES Trade Database. When looking at importer reported quantities (Figure 46), Czech Republic reported the import of 822 animals, followed by Germany with 762 animals. Other important countries of import are Great Britain (459 animals) and Italy (174 animals). The main exporter was Indonesia with 2,294 animals, followed by China (22 animals), United States of America (26 animals) and Hong Kong (20 animals).

The US Fish and Wildlife Service Law Enforcement Management Information System (LEMIS) covering the period 2000–2014 already reported the import of 10,421 *Tribolonotus* spp., and 1,588 *T. novaeguineae* into the United States of America (Janssen & Shepherd, 2018). Although it I not unlikely that part of the *Tribolonotus* spp. consisted of *T. novaeguineae*. More recent LEMIS data showed that between 2015–2021, an additional 16,139 *Tribolonotus* spp. have been imported, which included 2,348 *T. novaeguineae*. The

majority of these originated directly from Indonesia (2,329), with an additional 19 arriving via Canada. Although here it should also be mentioned that most of the imported animals were not on species level, so the true number is likely higher.

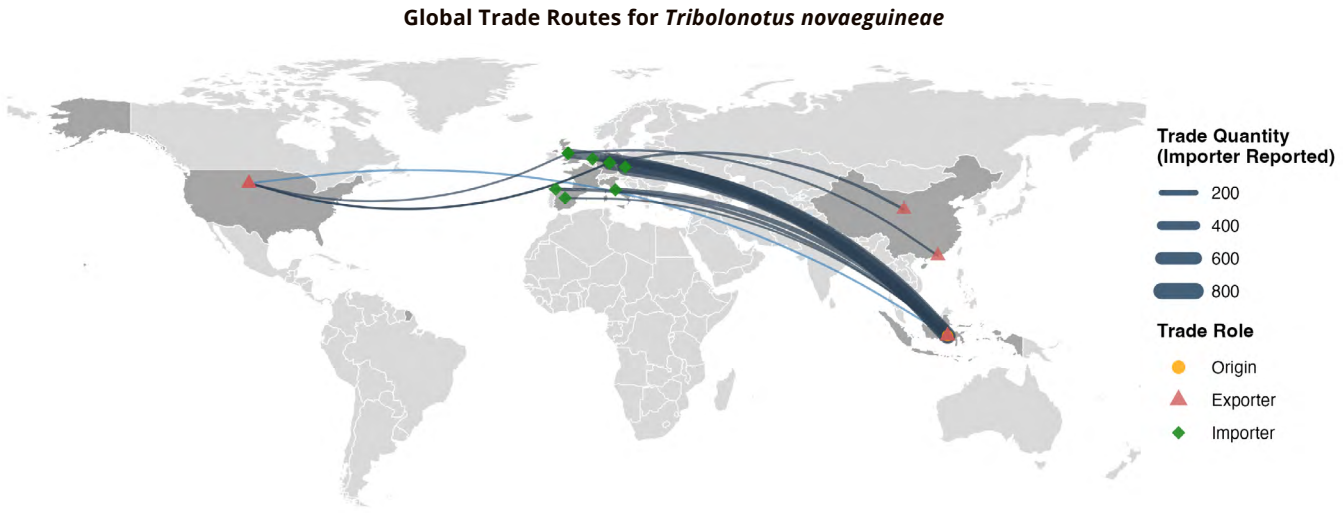

Figure 45 Global trade routes in *Tribolonotus novaeguineae* in the period of 2000–2023.

Due to their non-CITES listed status, there is a lack of data on the quantities traded for this species, or their origin. Available data (Figure 45 and Figure 46) on the import of *Tribolonotus novaeguineae* shows that the majority has an unknown origin (source U) or no reported origin at all (Unknown). LEMIS data over the period 2015–2021 shows that *T. novaeguineae* is still primarily traded with a wild origin (2,329 of 2,348 animals). Only the 19 animals allegedly imported from Canada were declared as captive bred.

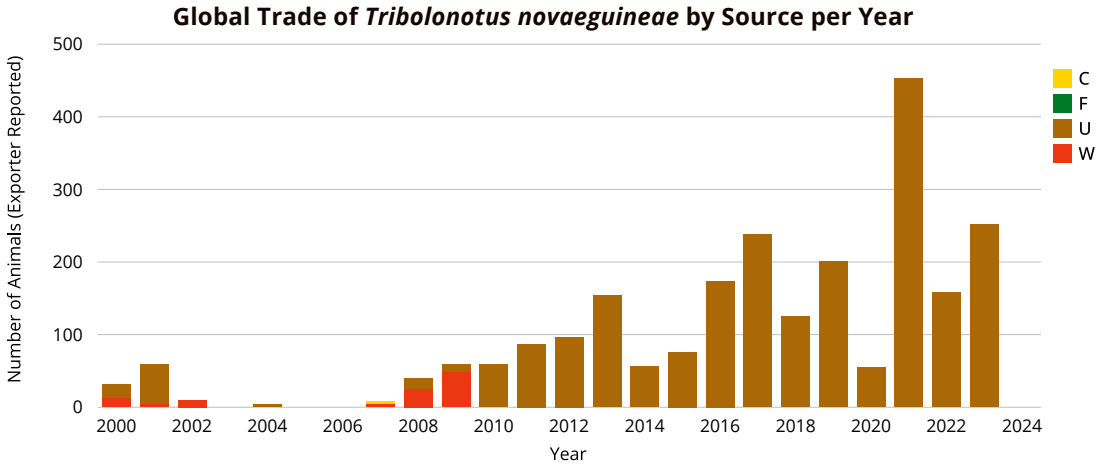

Figure 46 Global trade in *Tribolonotus navaeguineae* in the period of 2000–2023 by source per year.

Japan's role in the trade

There are no records of this species being imported into Japan. Trade statistics for Japan (Ministry of Finance; http://www.customs.go.jp/) are only available on the descriptive level of "lizards" (Tariff 0106.20-031).

Statistics show that Japan imported 41,381 lizards from Indonesia between 2005 and 2017 (Janssen & Shepherd, 2018). Since then, the number of lizards imported from Indonesia increased. Whereas in 2015

Japan imported 2,324 lizards from Indonesia, in 2017 this was 9,856 lizards, and grew to 27,718 lizards in 2021. In total, since 2005, Japan has now imported 150,411 live lizards from Indonesia (until the end of 2023). Over the same period, 44,958 live CITES-listed lizards were reportedly imported into Japan (CITES Trade Database). The proportion of CITES-listed species compared to the total number of lizards imported has reduced since 2017, suggesting that the market for non-CITES listed species has grown since 2017 (now 70% compared to 66% in Janssen & Shepherd, 2018).
However, it is impossible to know how many *Tribolonotus novaeguineae* there would be among these lizards and thus also how large the Japanese role is in this trade.

Harvest Quotas

Harvest quota for *Tribolonotus novaeguineae* have remained relatively stable between 2012 and 2018, with an annual harvest of 900–1,000 animals (Figure 27). After 2018 the harvest quota increased to 1,500 animals, and it has remained at this level since. All harvest originates from the Indonesian province of Papua, with 95% set for export. Previous work (Janssen & Shepherd, 2018) have shown that between 80% and 94% of the harvest quotas is realized, with the animals being exported (period 2012–2025).

Breeding Availability

The reproductive strategies of *Tribolonotus gracilis* (Red-Eyed) and *Tribolonotus novaeguineae* (White-Eyed Crocodile Skink) are fundamentally similar, although detailed information on *T. novaeguineae* is less common because the species is less common in the global pet trade compared to *T. gracilis*. Historically, especially in the early 2000s when reliant on wild-caught imports, both species faced challenges acclimating to captivity, noted for shyness, sensitivity to dehydration, and potentially low import survival rates.

Both species are oviparous egg-layers. While the genus is widely known for single-egg clutches, linked to females possessing only one functional oviduct, Franklin (2001) mentions a cycle involving two eggs: one laid initially, followed by a second approximately two months later. Incubation for *T. novaeguineae* averages around 60 days (ranging 52–73 days), comparable to *T. gracilis*. Significant parental care is a hallmark of both; *T. novaeguineae* females engage in egg brooding, nest guarding, and offspring protection, utilizing vocalizations and forming social bonds with young, although males are reportedly less involved (Hartdegen, 2001). Sex determination in both species is genetic, not dependent on incubation temperature like is the case with many other lizard species. The fewer reported captive breeding successes for *T. novaeguineae* likely reflect its overall rarity in herpetoculture rather than a vastly different reproductive biology.

Illegal Trade

Open-source references did not result in documented seizures of *Tribolonotus novaeguineae*.

Conclusion

The White-Eyed Crocodile Skink (*Tribolonotus novaeguineae*), despite its formal IUCN classification as ‘Least Concern’ and absence from CITES appendices, faces international trade pressure primarily originating from Indonesia. Although comprehensive trade data is limited due to its non-CITES status, partial monitoring via EU Annex D listings and US LEMIS data reveals substantial trade volumes. Thousands of animals have been documented entering key markets in Europe and the United States of America, largely sourced from Indonesia, with indications suggesting many are wild caught. The true numbers are likely even higher, masked by frequent reporting only at the genus level (*Tribolonotus* spp.).

While specific data comparing harvest quotas to biological output, like that raising alarms for the closely related *T. gracilis*, isn't presented here for *T. novaeguineae*, the scale of documented wild offtake is concerning. This species likely shares biological traits that increase vulnerability, such as sensitivity to capture and transport, and possesses a relatively slow reproductive rate inherent to the genus (even considering specific reports of a two-stage egg-laying cycle). Like the situation observed with *T. gracilis*, there appears to be a potential conflict between the high volume of *T. novaeguineae* extracted from the wild and the species' capacity to sustainably support such levels. Therefore, irrespective of its current conservation status, the significant trade in *T. novaeguineae*, combined with limited oversight due to its non-CITES listed status, warrants attention and reassessment of harvest management practices in Indonesia to ensure the long-term persistence of wild populations.

4. CONCLUSION

The findings of this report reveal that Japan is not just a passive participant in the global reptile trade, Japan is a major importer, with evidence suggesting the laundering and/or smuggling of several of these species.

Japan's Prominent Role in Reptile Trade

Japan consistently ranks among the top five global importers for six out of nine species reviewed in this study. For the remaining species no data was available. Japan is the second-largest importer of *Cordylus tropidosternum*, *Gekko gecko*, *Varanus exanthematicus*, and *Varanus macraei*. While these figures on their own may not indicate wrongdoing, deeper analysis uncovers concerns. The spot market surveys conducted in March 2025 identified a high volume of animals offered for sale within Japan, many of which were explicitly advertised as wild-caught, even where national legislation prevents the export of animals with this source.

For instance, *V. macraei*, listed as Endangered on the IUCN Red List and in the absence of Indonesian harvest quotas, appears regularly in Japanese online and physical marketplaces, including animals explicitly labeled as wild-caught. Indonesia's national regulations do not allow commercial export of wild animals of *V. macraei*; only limited numbers may be harvested for breeding stock. Yet, Indonesia reported four wild-caught individuals exported to Japan in 2022 — an export that should not have legally occurred under its own regulations. Several animals with a reported wild origin were observed during the spot surveys. In addition, the large number of wild animals seized by Indonesian authorities, reports of large numbers of hunters relying on catching these animals, and the limited evidence for large scale captive breeding of this species, suggest systematic laundering of wild caught animals of this species. This discrepancy highlights not only weaknesses in source-country enforcement but also a lack of due diligence on Japan's part.
Similarly, for *V. exanthematicus*, although the trade has shifted toward ranched and captive-born animals, our survey found multiple instances of wild-caught individuals for sale in Japan. Exporting countries like Ghana and Togo continue to harvest thousands of animals annually, often from wild populations, with little monitoring of sustainability. In particular, the use of gravid females to produce so-called captive-born offspring is problematic, as it removes key reproductive individuals from the wild, undermining the long-term viability of populations. Especially since these individuals are often not released back into the wild.

In the case of *Cordylus tropidosternum*, the Democratic Republic of the Congo (DRC) has emerged as a major exporter in just a few years, despite a lack of published population assessments or harvest quotas. Nearly all animals are declared as wild-caught, raising concerns about the impact on local populations and possible confusion with similar endemic species like the Endangered *Cordylus marunguensis*. Japan has received thousands of these lizards from the DRC, yet there is no evidence that this trade is being monitored or questioned by Japanese authorities.

Species-Level Concerns and Conservation Risks

Some species analyzed in this report, such as *Tribolonotus gracilis* and *Cordylus niger*, are either not listed under CITES or have limited legal trade records. In the case of *T. gracilis*, harvest quotas in Indonesia have increased significantly despite the species' low reproductive output and sensitivity to captivity. Given the species' biology — laying a maximum of four eggs per year — and continued seizures in Indonesia, it is

likely that wild populations are being overharvested.
Cordylus niger presents a different challenge: its presence in the Japanese market cannot be explained by any legal trade data. The species has extremely limited international trade history, yet was observed for sale multiple times in Japan. The likeliest explanations are taxonomic misreporting (i.e., under *Cordylus* spp.) or smuggling. The risk here is compounded by the species' restricted range in South Africa, fragmented subpopulations, and lack of formal protection.

Other species in this report, such as *Gekko gecko*, *Testudo horsfieldii*, and *Varanus salvator*, also show evidence of poor trade monitoring. Although they are listed under CITES Appendix II and are more widespread, the trends noted for these species in Japan mirror the broader pattern: a high volume of trade, a lack of origin transparency, and inconsistencies between declared and observed sources. For *Gekko gecko*, localities are reported by sellers for which no export records to Japan exist (e.g. Vietnam). Several of the former *V. salvator* species are present in the Japanese market despite the lack of export records or harvest quota from their range state (e.g. *V. nuchalis* and *V. marmoratus* for the Philippines, and *V. togianus* for Indonesia). It is likely that these former subspecies (including *V. cumingi*) were smuggled to Japan under disguise of former taxonomy (*V. salvator*).

The high volume of trade in *T. horsfieldii* is concerning as reports of population reductions are not new. The recent zero export quota from Uzbekistan for wild and ranched animals (2024–2025) is a positive regulatory response under CITES but will require stringent enforcement and independent monitoring to be effective.

Weaknesses in Regulation and Enforcement

For several of the focal species' issues emerge with regards to misreporting, loopholes, and insufficient verification. Resulting in the presence of species in the Japanese market for which there is no legal explanation on how they arrived in Japan. Enhancing species identification capacity among law enforcement officers would strengthen the detection of laundering attempts. Targeted training and access to reliable identification tools can support officers in distinguishing between legally protected and non-protected species, thereby improving compliance with national and international conservation commitments. Investing in this area would also help reduce the risk of misidentification, which can lead to enforcement gaps or unintended legal challenges.
Although Japanese regulations do not currently require CITES import permits for CITES Appendix II species, regulations require import confirmation documents for live CITES specimens of Appendix II and III, which is a procedure required pursuant to the publication of import-related matters under the Import Trade Control Order under the Foreign Exchange and Foreign Trade Act Art. III 7 (4) of the Import Announcement. In addition, Japan does not document trade at species-level for non-CITES species. This hampers any serious effort to monitor trends, assess conservation risks, or comply with global commitments on wildlife trade.

Implications and Urgency for Action

The findings in this report illustrate how potential legal loopholes, regulatory blind spots, and inconsistent enforcement are undermining conservation efforts for several reptile species. Vulnerabilities within the regulatory systems of countries of origin, e.g. issuing fraudulent export permits for species for which national law does not allow export, present a significant challenge to global conservation efforts. This allows animals to enter the international trade without robust verification of their legal and sustainable sourcing. Consequently, consumer markets like Japan, become unwitting or complicit hubs for laundered wildlife. Addressing these upstream challenges is crucial for preventing the flow of illegally obtained reptiles into consumer markets and strengthening the overall effectiveness of international trade conventions like CITES. Japan's demand for rare and exclusive reptiles, combined with its permissive regulatory structure, has effectively made it a hub for laundered wildlife. Enhancing Japan's regulatory framework for

the reptile trade presents a significant opportunity to strengthen conservation efforts for wild populations across Asia and Africa. This report highlights that several species face considerable pressure, and challenges remain in ensuring that trade, particularly for vulnerable species like *V. macraei*, is sustainable and does not contribute to local declines. Strengthening current systems would further support efforts to prevent biodiversity loss and help Japan meet its commitments under international conventions like CITES. Moving towards a more precautionary, evidence-based regulatory approach, combined with proactive enforcement and transparency, offers a path forward.

5. RECOMMENDATIONS

The global reptile market, where Japan is a major player, is growing and includes many rare and endangered species and accelerating the biodiversity crisis. The findings in this report show that Japan is an increasingly important destination for live reptiles. While a large part of this documented trade is legal, illegal and unsustainable trade is still taking place. The conclusions drawn by Wakao et al. (2018) remain valid. The Japanese authorities, businesses and consumers should recognize the scale of the Japanese reptile market, its recent development, and desire for exclusive and rare species.
It is recommended that the following actions are taken:

Japanese Authorities

1 | Strengthen the implementation of import confirmation for Appendix II species

- Japanese authorities should utilize the current import confirmation system more effectively to check and scrutinize export permits of high-risk reptile species.

2 | Establish size limits for imported reptiles of high-risk species

- Japanese CITES authorities should set enforceable size thresholds (e.g., maximum SVL or TL) for imported captive-bred or ranched animals of high-risk species, particularly for *V. macraei*. Size limits can help ensure that only genuinely captive-bred specimens are imported, and to distinguish between genuinely captive-bred juveniles and laundered wild adults.

3 | Restrict Imports of Specific Source Codes from High-Risk Countries

- Japanese CITES authorities should suspend imports of species with documented laundering issues (e.g., *V. macraei* from Indonesia with source codes F or C) until independent breeding audits confirm legitimate captive breeding.
- Japanese CITES authorities should consult with the CITES Management and Scientific Authorities of exporting Parties when there are concerns regarding the sustainability and legality of an import, thereby actively taking responsibility for ensuring the sustainability of the trade.

4 | Improved Reporting and Databasing

- Japanese authorities should monitor the trade in live reptiles, in particular non-CITES listed, more closely, thereby developing a detailed database of all imported reptiles, on species level, including source country, source code, to enhance transparency and accountability.

Japanese Consumers and Business

5 | Improved self-regulation of the market

- Japanese consumers and reptile businesses should take a role in self-regulating the market for live reptiles and ensure the trade is not detrimental to wild populations.
- Japanese consumers and reptile business should refuse the sale or buying of animals for which the trade is detrimental to wild populations, or for which the animals do not correspond with the reported source (e.g. laundering of wild caught animals).

6 | Improved coordination with Japanese authorities

- Japanese reptile businesses should coordinate efforts with Japanese authorities to ensure that trade is not detrimental to wild populations.

Exporting Parties

7 | Scrutinize export permits

- Exporting parties should scrutinize export permits more carefully to ensure that the animals match the reported species, and source of the animals.
- Exporting parties should refuse export permits for species that have not legally been imported into that country or have no harvest quota e.g. *V. nuchalis* and *V. marmoratus* for the Philippines, and *V. togianus* for Indonesia.

CITES Secretariat

8 | Consider a Review of Significant Trade

- Due to the increasing evidence of large-scale wild harvest and laundering of wild specimens, the CITES Secretariat should consider initiating a Review of Significant Trade for *Varanus macraei* to ensure that trade in this species is sustainable.

REFERENCES

Allison, A., Shea, G., O'Shea, M., & Tallowin, O. (2022). *Tribolonotus gracilis* (amended version of 2015 assessment). The IUCN Red List of Threatened Species 2022, e.T42485132A217798035. https://doi.org/10.2305/IUCN.UK.2022-1.RLTS.T42485132A217798035.en

Andrews, H. W., & Gaulke, M. (1990). Observations on the reproductive biology and growth of the water monitor (*Varanus salvator*) at the Madras Crocodile Bank. Hamadryad, 15(1), 1–5.

Antara Foto. (2023, March 14). Penyelundupan satwa liar di Papua. https://www.antarafoto.com/id/view/2027328/penyelundupan-satwa-liar-di-papua

Aowphol, A., Thirakhupt, K., Nabhitabhata, J., & Voris, H. K. (2006). Foraging ecology of the Tokay gecko, *Gekko gecko* in a residential area in Thailand. *Amphibia-Reptilia*, 27(4), 491–503.

Applin, C. (2025). Searching for blue tree monitors in the wild. Exotics Keeper. https://exoticskeeper.com/blog/searching-for-blue-tree-monitors-in-the-wild/

Arida, E. A., Herlambang, A. E., & Mulyadi, M. (2021). The hunt for the blue tree monitor on Batanta Island, Indonesia: Subsistence on a treasure? *Journal of Tropical Ethnobiology*, 4(2), 111–117.

Associated Press. (2018, March 1). Lizard smugglers sentenced to house arrest in Los Angeles. https://apnews.com/article/a1cca2391b794e6d850114a199619607

Auliya, M. (2009). A controversial enterprise: Bridging commercial breeding operations of reptiles and parrots in Indonesia and EU pet markets. Internal report. TRAFFIC Southeast Asia.

Auliya, M., Altherr, S., Ariano-Sanchez, D., Baard, E. H., Brown, C., Brown, R. M., … Ziegler, T. (2016). Trade in live reptiles, its impact on wild populations, and the role of the European market. *Biological Conservation*, 204, 103–119. [Note: Full author list needed to confirm ellipsis placement]

Bayless, M. K. (1994). Zur Fortpflanzungsbiologie des Steppenwarans (*Varanus exanthematicus*). *Salamandra*, 30(2), 109–118.

Bayless, M. K., & Huffaker, R. (1992). Observations of egg deposition and hatching of the savannah monitor (*Varanus exanthematicus* Bosc, 1792) in captivity. *VaraNews*, 3(1), 5–6.

Bayless, M. K., & Reynolds, T. (1992). Breeding of the savannah monitor lizard in captivity (*Varanus exanthematicus*). *Herpetology*, 22(1), 12–14.

Begum, S. (2024). Could animals seized from the illegal wildlife trade strain Singapore's capacity to keep them here? The Straits Times. https://www.straitstimes.com/singapore/could-animals-seized-from-the-illegal-wildlife-trade-strain-s-pore-s-capacity-to-keep-them-here

Bennett, D. (2000). The density and abundance of juvenile *Varanus exanthematicus* (Sauria: Varanidae) in the coastal plain of Ghana. *Amphibia-Reptilia*, 21, 301–306.

Bennett, D. (2004). *Varanus exanthematicus*. In E. R. Pianka & D. King (Eds.), *Varanoid lizards of the world* (pp. 95–103). Indiana University Press.

Bennett, D. (2015). International trade in the blue tree monitor lizard *Varanus macraei*. *Biawak*, 9(2), 50–57.

Bennett, D., & Thakoordyal, R. (2003). *The savannah monitor lizard: The truth about Varanus exanthematicus*. Viper Press.

Branch, W. R. (1988). Life history note: *Varanus exanthematicus* albigularis: Reproduction. *Journal of the Herpetological Association of Africa*, 35, 39.

Broadley, D. G. (2006). CITES standard reference for the species of Cordylus (Cordylidae, Reptilia), compiled by Donald G. Broadley, at the request of the CITES Nomenclature Committee, Update 2006. Self-published.

Broadley, D. G., & Branch, W. R. (2002). A review of the small east African Cordylus (Sauria: Cordylidae), with the description of a new species. *African Journal of Herpetology*, 51(1), 9–34.

Bureau of Animal Industry. (2025). Registered animal facilities. Retrieved April 18, 2025, from https://www.bai.gov.ph/stakeholders?Rep=Registered%20Animal%20Facilities

Bustard, R. (1955). Observations on the birth of two species of lizard in the vivarium. *British Journal of Herpetology*, 2, 6–9.

Caillabet, O. S. (2013). The trade in Tokay geckos *Gekko gecko* in Southeast Asia: With a case study on novel medicine claims in Peninsular Malaysia. TRAFFIC.

Center for Biological Diversity. (2022). Emergency petition to list the blue tree monitor lizard (*Varanus macraei*) as endangered under the Endangered Species Act. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/petition/3995.pdf

Cissé, M. (1971). La diapause chez les varanides du Sénégal. *Notes Africaines*, 131, 57–67.

Coborn, J. (1994). *Savannah monitors*. TFH Publications.

Coiro, J. (2007). Captive breeding of *Varanus exanthematicus*. *Biawak*, 1(1), 29–33.

Cota, M. (2011). Mating and intraspecific behavior of *Varanus salvator* macromaculatus in an urban population. *Biawak*, 5(1/2), 17–23.

Cupul-Magaña, F. G. (2010). *Varanus exanthematicus* (Bosc, 1792), *Apalone spinifera emoryi* (Le Sueur, 1827) y *Gopherus berlandieri* (Agassiz, 1857): Reptiles exóticos en el área urbana de Puerto Vallarta, Jalisco, México. *Cuadernos de Herpetología*, 26(1), 59–60.

Das, I. (2006). A photographic guide to snakes and other reptiles of Borneo. New Holland.

Das, I. (2010). A field guide to the reptiles of South-east Asia. New Holland Publishers.

Dedlmar, A. (2007). Haltung, Pflege und Nachzucht von *Varanus macraei*. *Reptilia*, 12(1), 39–41.

Dedlmar, A. (2008). Eine kleine Sensation. *Reptilia*, 13(1), 8.

Del Canto, R. (2013). Field observations on *Varanus macraei*. *Biawak*, 7(1), 18–20.

DENR CALABARZON. (2024, April 16) Personnel from PENRO Cavite conducted monitoring and inspection of wildlife permits issued to Tierpark Incorporated located at Barangay Salaban [Photo]. Facebook. https://www.facebook.com/photo.php?fbid=930514389118907&id=100064810632312&-set=a.224423159728037

Detikcom. (2025) Badan Karantina gagalkan penyelundupan 243 reptil langka di Pelabuhan Ternate. https://www.detik.com/sulsel/hukum-dan-kriminal/d-7814136/badan-karantina-gagalkan-penyelundupan-243-reptil-langka-di-pelabuhan-ternate [Note: Exact date needs verification]

Digirolamo, R. (2025). Understanding pet reptile preferences in Japan: An analysis using Yahoo! Chiebukuro and Google Trends. *Herpetological Journal*, 35, 146–154.

Erdelen, W. (1989). Survey of the status of the water monitor lizard (*Varanus salvator*; Reptilia: Varinidae) in southern Sumatra. In R. Luxmoore & B. Groombridge (Eds.), Asian monitor lizards: A review of distribution, status, exploitation and trade in four selected species (Annex 3). World Conservation Monitoring Centre.

Fed. Reg. 2024, Endangered and Threatened Wildlife and Plants; Endangered Species Status for the Blue Tree Monitor, 89 (2024, December 26). https://www.federalregister.gov/documents/2024/12/26/2024-30376/endangered-and-threatened-wildlife-and-plants-endangered-species-status-for-the-blue-tree-monitor.

Franklin, C. J. (2001). Notes on the natural history and husbandry of the New Guinea crocodile skink *Tribolonotus gracilis*. *Reptile & Amphibian Hobbyist*, 7(1), 38–43.

Global Biodiversity Information Facility. (2025). *Varanus exanthematicus (Bosc, 1792)*. Retrieved April 18, 2025, from https://www.gbif.org/species/2470729

Goodman, O., & Kolby, J. E. (2024). Concerning data absent from LEMIS wildlife trade records. Conservation Letters, 17(5).

Greenbaum, E., Stanley, E. L., Kusamba, C., Moninga, W. M., Goldberg, S. R., & Bursey, C. R. (2012). A new species of Cordylus (Squamata: Cordylidae) from the Marungu Plateau of south-eastern Democratic Republic of the Congo. *African Journal of Herpetology*, 61(1), 14–39.

Harfoot, M., Glaser, S. A., Tittensor, D. P., Britten, G. L., McLardy, C., Malsch, K., & Burgess, N. D. (2018). Unveiling the patterns and trends in 40 years of global trade in CITES-listed wildlife. *Biological Conservation*, 223, 47–57.

Hariyadi. (2015) Rekapitulasi Realisasi Jenis Tumbuhan Dan Satwa Periode Tahun2012–2015. In: Konservasi DJPHd, editor. Direktorat Konservasi KeanekaragamanHayati, Jakarta, Indonesia.

Hartdegen, R. W., Russell, M. J., & Young, B. (2001). Vocalization of the crocodile skink, *Tribolonotus gracilis* (De Rooy, 1909), and evidence of parental care. *Contemporary Herpetology*, 1–6.

Heinrich, S., Toomes, A., Shepherd, C. R., Stringham, O. C., Swan, M., & Cassey, P. (2022). Strengthening protection of endemic wildlife threatened by the international pet trade: The case of the Australian shingleback lizard. *Animal Conservation*, 25(1), 91–100.

Hempel, W. (1988). Haltung und Nachzucht von *Agrionemys horsfieldi*. *Elaphe*, 10(2), 21–24.

Henen, B. T., Nagy, K. A., Bonnet, X., & Lagarde, F. (2002). Clutch size and fecundity of wild Horsfield's tortoises (Testudo horsfieldi): Time and body size effects. *Chelonii*, 3, 135-143.

Herrel, A., & van der Meijden, A. (2014). An analysis of the live reptile and amphibian trade in the USA compared to the global trade in endangered species. *The Herpetological Journal*, 24(2), 103–110.

Honda N., (2013). Hatching of a blue monitor lizard (*Varanus macraei*).http://sapporo.100miles.jp/zoohonda/2013/02/12/%E3%82%A2%E3%82%AA%E3%83%9B%E3%82%BD%E3%82%AA%E3%82%AA%E3%83%88%E3%82%AB%E3%82%B2%EF%BC%88varanus-macraei%E3%81%AE%E5%AD%B5%E5%8C%96%E3%80%82/, Accessed 8 May 2025.

Hoss, A., Benken, D. E., & Penn, M. S. (2015). Menu of state turtle-associated salmonellosis laws. Public Health Law Program (Centers for Disease Control and Prevention (U.S.); Centers for Disease Control and Prevention (U.S.). Office for State, Tribal, Local and Territorial Support. Published April 30, 2015; https://www.cdc.gov/phlp/docs/turtle-menu.pdf

Hroudova, Z. (2004). Czech Republic. In K. Kecse-Nagy, D. Papp, C. Raymakers, A. Steiner, & S. Theile (Eds.), Proceedings of the Enforcement of Wildlife Trade Controls in Central Eastern Europe (pp. 34–36). Traffic Europe.

Jacobs, H. J. (2002). Erstnachzucht von *Varanus macraei*. *Herpetofauna*, 24(141), 29–33.

Janssen, J. (2018). Valuable varanoids: Surveys of reptile traders in Japan reveal monitor lizards without import records. *Biawak*, 12(2), 84–90.

Janssen, J. (2021). A primer to the global trade of reptiles: Magnitude, key challenges, and implications for conservation. In Underkoffler, S.C. & Adams, H.R. (Eds.), *Wildlife biodiversity conservation: Multidisciplinary and forensic approaches* (pp. 439–461). Springer International Publishing.

Janssen, J., & Chng, S. C. (2018). Biological parameters used in setting captive-breeding quotas for Indonesia's breeding facilities. *Conservation Biology*, 32(1), 18–25.

Janssen, J., & de Silva, A. (2019). The presence of protected reptiles from Sri Lanka in international commercial trade. *Traffic Bulletin*, 31(9).

Janssen, J., & Shepherd, C. R. (2018). Challenges in documenting trade in non CITES-listed species: A case study on crocodile skinks (*Tribolonotus* spp.). *Journal of Asia-Pacific Biodiversity*, 11(4), 476–481.

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

Kanari, K., & Auliya, M. (2011). A review of the live pet reptile trade of Japan. TRAFFIC East Asia–Japan.

Kanari, K., & Xu, L. (2012). Trade in Japanese endemic reptiles in China and recommendations for species conservation. TRAFFIC East Asia–Japan.

Khadiejah, S., Abu-Hashim, A. K., Musa, F. H., Abdul-Patah, P., Abdul-Rahman, M. T., Ismail, H. I., Wahab, A., & Razak, N. A. (2020). *Management and trade in Asian water monitors (Varanus salvator) in Peninsular Malaysia*. Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN).

Kitade, T. & Naruse, Y. (2020). Crossing the red line: Japan's exotic pet trade. TRAFFIC, Japan Office, Tokyo, Japan.

KNUST Scientific Authority of Ghana. (2022). *Rapid assessment of Varanus exanthematicus in Ghana*. https://cites.org/sites/default/files/documents/E-AC33-15-01.pdf

Koch, A. (2007). Morphological studies on the systematics of South East Asian water monitors (*Varanus salvator* complex): Nominotypic populations and taxonomic overview. *Mertensiella*, 16, e80.

Koch, A., Gaulke, M., & Böhme, W. (2010). Unravelling the underestimated diversity of Philippine water monitor lizards (Squamata: *Varanus salvator* complex), with the description of two new species and a new subspecies. *Zootaxa*, 2446(1), 1–54.

Kolby, J. E., & Weissgold, B. J. (2022). Exaggeration of the US role in the international tiger trade: Response to Khanwilkar et al. (2022). *Conservation Science and Practice*, 4(7).

KSDAE (2016–2025). Kuota Pengambilan Tumbuhan Alam dan Penangkapan satwa liar — Periode tahun 2016–2025. Jakarta, Indonesia: Direktorat Jenderal Konservasi Sumber Daya Alam Dan Ekosistem.

Kurita, P. N. (2024, August 29). Tanpa dokumen, ratusan reptil diamankan petugas Avsec Bandara Sentani. Tribun Papua News. https://papua.tribunnews.com/2024/08/29/tanpa-dokumen-ratusan-reptil-diamankan-petugas-avsec-bandara-sentani

Kurniati, H., Sidik, I., Riyanto, A., & Hamidy, A. (2021). NDF (Non-Detriment Findings): House gecko on the island of Java (Gekkonidae: *Gekko gecko*). Indonesian Institute of Sciences, Research Center for Biology (LIPI).

Lagarde, F., Bonnet, X., Henen, B. T., Corbin, J., Nagy, K. A., & Naulleau, G. (2001). Sexual size dimorphism in steppe tortoises (Testudo horsfieldi): Growth, maturity, and individual variation. *Canadian Journal of Zoology*, 79(8), 1433–1441.

Lalitha, S. (2024, December 27). *Three exotic species seized at SMVT in Baiyappanahalli*. The New Indian Express. https://www.newindianexpress.com/cities/bengaluru/2024/Dec/27/three-exotic-species-seized-at-smvt-in-baiyappanahalli

Lyons, J. A., & Natusch, D. J. (2011). Wildlife laundering through breeding farms: Illegal harvest, population declines and a means of regulating the trade of green pythons (*Morelia viridis*) from Indonesia. *Biological Conservation*, 144(12), 3073–3081.

Lyons, J.A., Natusch, D.J.D., & Jenkins, R.W.G. (2017) A Guide to the application of CITES source codes. CITES Secretariat, Genève, Switzerland.

Manthey, U., & Grossmann, W. (1997). *Amphibien und Reptilien Südostasiens*. Natur und Tier – Verlag.

Marshall, B. M., Strine, C., & Hughes, A. C. (2020). Thousands of reptile species threatened by under-regulated global trade. *Nature Communications*, 11(1), 4738. https://doi.org/10.1038/s41467-020-18553-5

Medcom.id. (2022, March 5). BBKSDA Papua Barat gagalkan penyeludupan satwa langka di Bandara Sorong.https://www.medcom.id/nasional/daerah/MkMD4emb-bbksda-papua-barat-gagalkan-penyeludupan-satwa-langka-di-bandara-sorong [Note: Exact date needs verification]

Mendyk, R. (2007). Dizygotic twinning in the blue tree monitor, *Varanus macraei*. *Biawak*, 1(1), 26–28.

Miralles, A. (2004). Biologie, ecologie en verzorging van de Krokodilskink van Nieuw-Guinea, *Tribolonotus gracilis*. *Lacerta*, 62(4), 166–173.

Moldovan, D. (2008). Haltung und Zucht von *Varanus (Euprepiosaurus) macraei* Böhme & Jacobs, 2001. *Sauria*, 30(4), 5–10.

Mylnarski, M., & Wermuth, H. (1971). Order: Testudines. In B. Grzimek (Ed.), *Grzimek's animal life encyclopedia*: Vol. 6. Reptiles. Van Nostrand Reinhold.

Natusch, D. J. D., & Lyons, J. A. (2012). Exploited for pets: The harvest and trade of amphibians and reptiles from Indonesian New Guinea. *Biodiversity and Conservation*, 21, 2899–2911.

Nguyen, D. N. V., & Nguyen, T. (2008). An overview of the use of plants and animals in traditional medicine systems in Viet Nam. TRAFFIC Southeast Asia, Greater Mekong Programme, Ha Noi, Viet Nam.

Nijman, V., & Shepherd, C. R. (2010). The role of Asia in the global trade in CITES II-listed poison arrow frogs: Hopping from Kazakhstan to Lebanon to Thailand and beyond. *Biodiversity and Conservation*, 19, 1963–1970.

Nijman, V., & Shepherd, C. R. (2010). Wildlife trade from ASEAN to the EU: Issues with the trade in captive-bred reptiles from Indonesia. TRAFFIC Europe, Brussels, Belgium.

Nijman, V., & Shepherd, C. R. (2011). The role of Thailand in the international trade in CITES-listed live reptiles and amphibians. *PLoS ONE*, 6(3), e17825. https://doi.org/10.1371/journal.pone.0017825

Nijman, V., & Shepherd, C. R. (2015). Adding up the numbers: an investigation into commercial breeding of Tokay geckos in Indonesia. TRAFFIC. Petaling Jaya, Selangor, Malaysia.

Nijman, V., Shepherd, C. R., Sanders, K. L., & Sanders, M. (2012). Over-exploitation and illegal trade of reptiles in Indonesia. *Herpetological Journa*l, 22, 83–89.

NJ.com. (2024, November 15). *Jersey City raids illegal breeding facility and seizes dogs, reptiles: Authorities*. https://www.nj.com/hudson/2024/11/jersey-city-raids-illegal-breeding-facility-and-seizes-dogs-reptiles-authorities.html

Observatory of Economic Complexity. (2025). Reptiles; live (including snakes and turtles). Retrieved April 21, 2025, from https://oec.world/en/profile/hs/reptiles-live-including-snakes-and-turtles?selector1013id=2022&selector1140id=Importer

Partono, S. (2014). Rencana produksi reptile, amphibian dan mamalia (RAM) pet hasil penangkaran tahun 2014. Ministry of Forestry, Jakarta, Indonesia.

Posit team (2025). RStudio: Integrated Development Environment for R. Posit Software, PBC, Boston, MA. http://www.posit.co/.

Rahman, S. A. (2014, April 18). Hunting the Tokay gecko. The Diplomat. https://thediplomat.com/2014/04/huntingthe-to-kay-gecko/

Rahmanto, B., Arida, E., Fithria, A., & Soendjoto, M. A. (2022). Mating behavior and breeding of the blue tree monitor, *Varanus macraei* in an in-country facility in Indonesia: A preliminary note. *Treubia*, 49(1), 15–24.

Rauhaus, A., Gutjahr, L., Oberreuter, J., & Ziegler, T. (2014). 7 Jahre Haltung und Nachzucht des Blaugefleckten Baumwarans (*Varanus macraei*) im Kölner Zoo: Ein Rück- und Ausblick. *Terraria/Elaphe*, 50, 32–37.

Reinshagen, S. (1993). Pflege und Zucht von *Varanus exanthematicus*. *Monitor*, 2(2), 7–9.

Retes, F., & Bennett, D. (2001). Multiple generations, multiple clutches, and early maturity in four species of monitor lizards (Varanidae) bred in captivity. *Herpetological Review*, 32(4), 244.

Robinson, J. E., Griffiths, R. A., John, F. A. S., & Roberts, D. L. (2015). Dynamics of the global trade in live reptiles: Shifting trends in production and consequences for sustainability. *Biological Conservation*, 184, 42–50.

Savmon.org, 2018, Why do Savannah Monitors Fail in Captivity; http://www.savmon.org/index.php/2018/03/18/why-do-savannah-monitors-fail-in-captivity [accessed through wayback machine]

Scheffers, B. R., Oliveira, B. F., Lamb, I., & Edwards, D. P. (2019). Global wildlife trade across the tree of life. *Science*, 366(6461), 71–76. https://doi.org/10.1126/science.aav5327

Sergeev, A. M. (1941). On the biology and reproduction of the steppe tortoise (Testudo horsfieldi Gray). *Zoologicheskii Zhurnal*, 20, 118–133.

Shepherd, C. R. (2022). Notes on trade in *Varanus macraei* in response to 'The hunt for the blue tree monitor on Batanta Island, Indonesia: Subsistence on a treasure?'. *Journal of Tropical Ethnobiology*, 5(1), 47–51.

Shepherd, C. R., & Nijman, V. (2007). An assessment of wildlife trade at Mong La market on 1 the Myanmar-China border. *Traffic Bulletin*, 21(2), 85–88

Shine, R., Harlow, P. S., Keogh, J. S., & Boeadi. (1996). Commercial harvesting of giant lizards: The biology of water monitors *Varanus salvator* in southern Sumatra. *Biological Conservation*, 77, 125–134.

Smith, L. O., & Porsch, L. (2015). *Evaluation of the costs and impacts of environmental crime: CITES trade of the Horsfieldii tortoise*. Ecologic Institute. (EFFACE Project Deliverable).

Snider, A. T., & Bowler, J. K. (1992). *Longevity of reptiles and amphibians in North American collections* (2nd ed.). Society for the Study of Amphibians and Reptiles. (Herpetological Circular No. 21).

Sprackland, R. G. (2011). *Breeding savannah monitors*. Reptiles Magazine. https://reptilesmagazine.com/breeding-savannah-monitors/ Accessed April 2025.

Sy, E. Y., & Lorenzo, A. N., II. (2020). The trade of live monitor lizards (Varanidae) in the Philippines. *Biawak*, 14(1&2), 35–44.

Terent'ev, P. V., & Chernov, S. A. (1965). *Key to amphibians and reptiles*. Israel Program for Scientific Translations. (Original work published 1949)

Theile, S. (2000). Ranching and breeding of Horsfield tortoises (*Testudo horsfieldii*) in Uzbekistan, 2000. TRAFFIC Europe, Brussels, Belgium

Tortoise Trust. (2024). *Captive care of the Russian tortoise Testudo horsfieldii*. https://www.tortoisetrust.com/post/captive-care-of-the-russian-tortoise-testudo-horsfieldii

TRAFFIC. (2021, March 10). *Philippines' unique monitor lizards threatened by illegal trade*. https://www.traffic.org/news/philippines-unique-monitor-lizards-threatened-by-illegal-trade/

TRAFFIC. (2021, May 21). *Philippines busts established online wildlife trader with dozens of endangered animals*. https://www.traffic.org/news/philippines-busts-established-online-wildlife-trader-with-dozens-of-endangered-animals-1/

TRAFFIC. (2022). Seizure of Indonesian reptiles in the Philippines makes case for greater cross-border cooperation. https://www.traffic.org/news/seizure-of-indonesian-reptiles-in-the-philippines-makes-case-for-greater-cross-border-cooperation/

U.S. Department of Justice. (2019, December 11). *New Hampshire man sentenced for trafficking in protected wildlife*. https://www.justice.gov/usao-ma/pr/new-hampshire-man-sentenced-trafficking-protected-wildlife

U.S. Department of Justice. (2020, February 19). *Florida man sentenced for trafficking in protected water monitor lizards*. https://www.justice.gov/usao-mdfl/pr/florida-man-sentenced-trafficking-protected-water-monitor-lizards

United Nations Environment Programme. (2025). Species+ Website. UNEP-WCMC. Retrieved April 18, 2025, from https://www.speciesplus.net/

Van Wyk, J. H. (1989). The female reproductive cycle of the lizard *Cordylus polyzonus polyzonus* (Sauria: Cordylidae) in the Orange Free State. *South African Journal of Zoology*, 24, 263–269.

Van Wyk, J. H. (1990). Seasonal testicular activity and morphometric variation in the femoral glands of the lizard, *Cordylus polyzonus polyzonus* (Sauria: Cordylidae). *Journal of Herpetology*, 24, 405–409.

Van Wyk, J. H. (1991). Biennial reproduction in the female viviparous lizard *Cordylus giganteus*. *Amphibia-Reptilia*, 12, 329–342.

Van Wyk, J. H. (1992). *Life history and physiological ecology of the lizard Cordylus giganteus* [Unpublished doctoral dissertation]. University of Cape Town.

Van Wyk, J. H. (1995). The male reproductive cycle of the lizard, *Cordylus giganteus* (Sauria: Cordylidae). *Journal of Herpetology*, 29, 522–535.

VOI.ID. (2022, March 7). Terkejutnya petugas saat pemeriksaan di Pelabuhan Sorong, temukan ular sanca, biawak, burung nuri yang diselundupkan. https://voi.id/berita/140358/terkejutnya-petugas-saat-pemeriksaan-di-pelabuhan-sorong-temukan-ular-sanca-biawak-burung-nuri-yang-diselundupkan

Wakao, K. (2024). Review of import trends and trade regulations of live Testudines in Japan. *Chelonian Conservation and Biology*, 23(2), 169–175.

Wakao, K., Janssen, J., Chng, S. (2018) Scaling up: The contemporary reptile pet market in Japan. *Traffic Bulletin* 30 (2), 64-71.

Weissgold, B. J. (2024). US wildlife trade data lack quality control necessary for accurate scientific interpretation and policy application. *Conservation Letters*, 17(2), e13005. https://doi.org/10.1111/conl.13005

Wellehan, J. F. X. (2005). *Emerging trends in herpetoculture: New species, their husbandry and medicine* [Conference presentation]. The North American Veterinary Conference – 2005 Proceedings

Wesiak, K. (2006). Zur Pflege und Nachzucht des westafrikanischen Steppenwarans, *Varanus (Polydaedalus) exanthematicus* (Bosc, 1792). *Elaphe*, 14(3), 21–34.

Wicaksono, R. A. (2023, April 11). Ratusan reptil asal Tanah Papua diselundupkan. Betahita.id. https://betahita.id/news/detail/8663/ratusan-reptil-asal-tanah-papua-diselundupkan.html?v=1681254558

Yinfeng, G., Xueying, Z., Yan, C., Di, W., & Sung, W. (1997). *Sustainability of wildlife use in Traditional Chinese Medicine.* http://www.zd.brim.ac.cn/bwg-cciced/english/bwg-cciced/tech-34.htm

Ziegler, T., Strauch, M., Pes, T., Konas, J., Jirasek, T., Rütz, N., ... Holst, S. (2009). First captive breeding of the blue tree monitor *Varanus macraei* Böhme & Jacobs, 2001 at the Plzen and Cologne Zoos. *Biawak*, 3(4), 122–133.

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