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

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

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

To list *Physignathus cocincinus* in CITES Appendix II, in accordance with Article II, Paragraph 2 (a) of the Convention satisfying criterions A and B, Annex 2(a) of Resolution Conf. 9.24 (Rev. CoP17). It is known, or can be inferred or projected, that the regulation of trade in the following species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future; and it is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

B. Proponent

European Union and Viet Nam*

C. Supporting statement

1. Taxonomy

1.1 Class: Reptilia

1.2 Order: Squamata

1.3 Family: Agamidae

1.4 Genus, species or subspecies, including author and year: *Physignathus cocincinus* Cuvier, 1829

No subspecies recognised.

1.5 Scientific synonyms:

Physignathus cocincinus Cuvier, 1829 was assigned with different names in literature: such as *Lophura cuvieri* by Gray 1831; *Istiurus cochinsinensis* by Cuvier 1837; *Istiurus physignathus* by Duméril & Bibron 1837; *Dilophyrus mentager* by Günther 1861; *Physignathus cochinchinensis* by Boulenger 1885; *Physignathus mentager* by Boulenger 1885; *Physignathus cocincinus caudicinctus* by Barbour 1912; *Physignathus cocincinus mentager* by Barbour 1912.

1.6 Common names:

English: Indo-Chinese Water Dragon, Asian Water Dragon, Green Water Dragon

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

Chinese: 长鬣蜥
Viet Namese: Rồng đất
German: Grüne Wasseragame
French: Dragon d'eau chinois, Dragon d'eau vert
Spanish: dragón de agua chino, dragón verde

1.7 Code numbers: NA

2. Overview

The Indo-Chinese Water Dragon, *Physignathus cocincinus* Cuvier, 1829, is widely distributed in Southeast Asia from southern China through Viet Nam, Lao People's Democratic Republic (hereafter referred to as Lao PDR), Cambodia to eastern Thailand (Das 2010; Nguyen et al. 2009). The semiaquatic species is associated with rocky streams in undisturbed evergreen lowland forests at elevations from 50 to 820 m a.s.l (Das 2010; Gewiss et al. 2020; Nguyen et al. 2018a; Ziegler 2002). Therefore, the actual area of occupancy (AOO) is assumed to be much smaller than the total extent of occurrence (EOO) (Nguyen et al. 2018a). The species was listed as Vulnerable (VU) by the IUCN (International Union for Conservation of Nature) Red List of Threatened Species in 2019 (Stuart et al. 2019). Additionally, *P. cocincinus* was nationally assessed as Endangered (EN) in the Red Lists of China and Thailand and listed in the Red Data Book of Viet Nam as Vulnerable (VU) (Dang et al. 2006; Jiang et al. 2016; Nabhitabhata & Chan-ard 2005). The species is a common target in both the domestic and international trade because of its attractive appearance, semi-aquatic lifestyle and relatively large size (for the local food consumption). Since water dragons are sedentary and very easy to collect, the harvest of wild specimens poses a serious threat to the survival of wild populations. In fact, more than 1.4 million live specimens of *P. cocincinus* were recorded to be imported into the EU and US during the period from 1999 to 2020, and most of them originated from the wild populations in Viet Nam (Gewiss et al. 2020; CITES Trade Database 2021; USFWS 2018). Besides the international and domestic pet trade, harvest of water dragons for consumptive use (mainly food consumption) has been documented and identified as a significant threat in the past, but has not yet been quantified. Considering the international trade in addition to domestic trade volumes, the pressure from harvesting on wild populations is likely very high.

Recent studies on the population status of *P. cocincinus* in northern, central and southern Viet Nam revealed that water dragons currently inhabit these areas in low population densities, and population sizes were estimated to be overall very small, especially in disturbed populations (see Gewiss et a. 2020; Nguyen et al. 2018a; Truong Q. Nguyen pers. comm.). Due to the extremely high export numbers of about 70,000 individuals per year from Viet Nam during the last 20 years, and at the same time low population sizes of the species in this country, it is most likely that specimens in the international trade originate from other range States than Viet Nam as well. It can be assumed that trade will cause population declines, and even local extinctions if trade volumes remain at current levels. In addition to the trade in *P. cocincinus*, habitat degradation and fragmentation due to agriculture, industry and infrastructure development are considered a threat to the survival of the species in its natural distribution range. Therefore, this proposal seeks to list the Indo-Chinese Water Dragon, *Physignathus cocincinus* in CITES Appendix II in accordance with Article II, Paragraph 2 (a) of the Convention satisfying criterions A and B, Annex 2(a) of Resolution Conf. 9.24 (Rev. CoP17).

3. Species characteristics

3.1 Distribution

P. cocincinus is widely distributed in Southeast Asia from southern China through Viet Nam, Lao PDR, Cambodia to eastern Thailand (Das 2010; Nguyen et al. 2009). Das (2010) indicated an occurrence of the species in Myanmar, which has not been confirmed in recent studies. Additionally, *P. cocincinus* has been introduced to Hong Kong (Special Administrative Region of China) (Mo 2019; To 2005), Taiwan (Province of China) (Lee et al. 2019), peninsular Malaysia (Grismer 2011; Grismer & Quah 2019) and Florida, United States of America (USA) (Ferriter et al. 2009).

In more detail, the Asian Water Dragon has been recorded from the following provinces in its natural range States:

China: Guangdong, Guangxi and Yunnan provinces (Das 2010; KFBG 2002; Nguyen et al. 2009)

Viet Nam: Lao Cai, Ha Giang, Cao Bang, Yen Bai, Bac Kan, Thai Nguyen, Lang Son, Vinh Phuc, Quang Ninh, Ninh Binh, Bac Giang, Hai Duong, Son La, Hoa Binh, Thanh Hoa – northern provinces, Nghe An, Ha Tinh, Quang Binh, Quang Tri, Thua Thien Hue, Da Nang, Quang Nam, Kon Tum, Gia Lai, Lam Dong – central provinces, Phu Yen, Binh Phuoc, Dong Nai and Kieng Giang – southern provinces (Dang et al. 2006; Gewiss et al. 2020; Nguyen et al. 2009)

Lao PDR: Vientiane, Sekong (Suzuki et al. 2015), Savannakhet, Champasak (Duckworth et al. 1999), Khammouane (Stuart 1998), Bolikhamsai (Manthey & Manthey 1998), Xieng Khouang provinces (ABP 2013)

Cambodia: Provinces of Koh Kong, Pursat, Kampot, Kampong Speu, Mondulkiri, Ratanakiri, Stung Treng provinces, Battambang, Pailin, Preah Sihanouk and Kratié (Grismer et al. 2008, (Stuart et al. 2006; Stuart & Emmett 2006; CITES Management Authority (MA) of Cambodia *in litt.* to the European Commission, 2021).

Thailand: Sakon Nakhon, Sisaket Nakhon, Ratchasima Nakhon, Nayok, Ubon Ratchathani, Chanthaburi, Trat, Chon Buri, Sa Kaew, Rayong, Prachin Buri, Chachoengsao and Saraburi provinces (Hawkeswood & Sommung 2017; Hawkeswood et al. 2019; Nabhitabhata & Chan-ard 2005; Taylor 1963)

Myanmar: No detailed or regional information available.

3.2 Habitat

Physignathus cocincinus inhabits riparian areas along rocky streams in evergreen lowland forests mixed with deciduous and bamboo forests at elevations from 43 up to 820 m above the sea level (Gewiss et al. 2020; Nguyen et al. 2018a; Ziegler 2002; Nguyen et al. in prep.). Undisturbed, natural areas are the preferred habitat, but water dragons can also be found in densely vegetated streams nearby villages and agricultural areas (Ziegler 2002) or urban areas where the species has been introduced (Chan et al. 2020; Mo 2019). The availability of woodlands with a dense canopy coverage next to streams appears to be a crucial criterion for the habitat selection of *P. cocincinus* (Chang et al. 2020). In Viet Nam, water dragons were mainly observed to rest on hardwood, leaves, and vines-shrubs (Nguyen et al. 2017). In Thailand, the species is found in moist evergreen forests. Adult water dragons were usually recorded to occupy perches with heights over 3 m, while juveniles and sub-adults are resting at lower heights mostly below 2 m above the water surface (Nguyen et al. 2017). Due to its close association to freshwater habitats, the area of occupancy (AOO) is considered to be much smaller than the total extent of occurrence (EOO) (IUCN 2012; Nguyen et al. 2018a). Regarding microhabitat conditions, a mean air temperature of 29.1 ± 2.8 ℃ and a relative humidity of 66.4 ± 5.8 % during the daytime, and 25.7 ± 1.8 ℃ and 78.6 ± 9.5 % at night was recorded in summer in Viet Nam (Nguyen et al. 2017).

3.3 Biological characteristics

Physignathus cocincinus is a semiaquatic and arboreal lizard inhabiting the riparian vegetation along freshwater streams (Werning 2010; Ziegler 2002). Water dragons are diurnal with a sedentary behaviour (Nguyen et al. 2018a). Nguyen (2018) reported a relatively small movement range of 4.7 ± 6.1 m for the species in natural habitats in central Viet Nam. Chan et al. (2020) reported an extensive use of nearby habitats next to streams with a mean home range of 1,793 ± 1,604 m^2 and a mean daily movement range of 5.13 ± 3.68 m in the wet season for an introduced *P. cocincinus* population in Hong Kong (SAR). During the active season, water dragons were recorded to be most abundant and active between ten and thirteen o'clock in Viet Nam (Nguyen et al. 2017). During night, animals are usually resting on branches above the water (Gewiss et al. 2020; Nguyen et al. 2017; Nguyen et al. 2018a). Being disturbed, animals show a distinct escape behaviour by jumping into the water or by running quickly, just bipedally on their hindlegs into the bushes (Chan et al. 2020; Das 2010; Manthey & Schuster 1992; Ziegler 2002). The species is known as an excellent swimmer and diver (Manthey & Schuster 1992; Werning 2010). Water dragons are oviparous and generally reach maturity in 6 to 12 months with a snout-vent-length (SVL) of about 150-170 mm (Werning 2010). In the wild, females regularly lay and bury about 5 – 16 eggs in sandy soil at the end of the dry season and the beginning of the rainy season (Das 2010; Ziegler 2002). In captivity, water dragons mate without specific induction and females can lay multiple clutches per year (Manthey & Schuster 1992; Werning 2010). The incubation period of eggs is 60 to 100 days (Das 2010; Manthey & Schuster 1992; Ziegler 2002). A case of facultative parthenogenesis has been documented recently (Miller et al. 2019). In captivity, *P. cocincinus* can reach an age of 15 to 25 years (Werning 2010). The species is omnivore, with the diet consisting mostly of invertebrates, but also including fish, small mammals, birds and reptiles, as well as a certain fraction of plants (Das 2010; Taylor 1963; Werning 2010; Ziegler 2002). Nguyen et al. (2018b)

examined the stomach content of wild water dragons and documented different undetermined insect larvae, as well as parts of specimens from the groups Isoptera, Formicidae, Achatinidae, Orthoptera, Araneae, Lepidoptera, Coleoptera, other Hymenoptera and Lumbriculida as the most common prey organisms. The authors also reported only a very small proportion of vegetarian diet (Nguyen et al. 2018b), while Ziegler (2002) documented a vegetarian food portion of up to 1/3 in mature animals. Research on *P. cocincinus* as an invasive species in Taiwan (China) documented the predation on agamid lizards (*Diploderma swinhonis* or *D. polygonata*), frogs (*Buergeria robusta*), snakes (*Calamaria pavimentata*), and mice (Ciou 2015 in Lee et al. 2019). In captivity, water dragons are known to feed also on mice, bovine heart, fish, dog and cat food, and vegetarian food such as sweet fruits (Manthey & Schuster 1992; Werning 2010).

3.4 Morphological characteristics

The Asian Water Dragon has a green to brownish-greyish body coloration, which serves as a camouflage within the natural habitat of the species. The scales of the mandibular and cheek regions are white, blueish or reddish to orange. Males have sometimes a yellowish, orange to white coloured axilla, gular or thoracic region (Manthey & Schuster 1992; Werning 2010; Ziegler 2002; Nguyen 2018). The body and tail are laterally compressed, and water dragons have very strong extremities, whereby they are perfectly adapted to their arboreal lifestyle (Werning 2010). The shape of the snout varies between distribution areas. Adult lizards have continuous crests from the neck to the dorsum and separated crests at the front region of the tail. Crests develop with increasing age and are more pronounced in males (Werning 2010). The tail shows transversal dark bandings. In juveniles, the whole body has some bright horizonal stripes along the flanks which fade with increasing age (Das 2010; Werning 2010). From the back of the eye to the ear opening extends a dark longitudinal band (Ziegler 2002). There is a distinct sexual dimorphism in adult animals. Males have an enlarged head and swollen cheeks (Das 2010). The general appearance of the females in comparison to the males is more diminutive (Manthey & Schuster 1992). *P. cocincinus* can reach a snout-vent-length (SVL) up to 250 mm and a total length including the tail up to 900 mm (Manthey & Schuster 1992; Smith 1935; Werning 2010; Nguyen 2018). In general, male water dragons are larger (SVL 170 – 250 mm) than females (SVL 160 – 200 mm) (Manthey & Schuster 1992). Likewise, Ziegler (2002) reported a mean SVL of about 220 mm for males and about 140 mm for females in natural habitats in Viet Nam. The length of the tail averaged about 550 mm for males and 350 mm for females (Ziegler 2002). Males reach a weight of about 600 g and females of about 250 g (Werning 2010). Hatchlings have a SVL of 45 – 53 mm and a tail length of 86 – 100 mm (Manthey & Schuster 1992).

3.5 Role of the species in its ecosystem

According to its diet and movement pattern, *P. cocincinus* is considered as a “wide forager”, hunting its prey actively (Nguyen 2018). While the diet of wild water dragons from Viet Nam has been reported to consist mainly of invertebrates such as insects, arachnids and earthworms (Nguyen et al. 2018b), the predation of other reptiles, amphibians, small mammals and fish has been also reported and described in literature (Ciou 2015 in Lee et al. 2019; Werning 2010, see also 3.3). Water dragons, especially males, are reported to be very territorial and aggressive towards conspecifics in captivity (Manthey & Schuster 1992; Werning 2010). In accordance with these observations, males were recorded to have no overlapping home ranges in natural habitats (Chan et al. 2020), while juveniles, subadults and adult females have been observed in close proximity to other individuals (van Schingen-Khan et al. pers. obs.). *P. cocincinus* occasionally co-occurs with other freshwater associated lizards such as *Shinisaurus crocodilurus*, *Sphenomorphus cryptotis* or *Acanthosaura* spp. (van Schingen-Khan et al. pers. obs). Snakes are considered as natural predators of *P. cocincinus* (Werning 2010).

4. Status and trends

4.1 Habitat trends

The habitat of *P. cocincinus*, the primary and secondary tropical forests in continental Southeast Asia, are heavily affected by deforestation (e.g. Stibig et al. 2014). After decades of forest loss in Viet Nam, a forest transition took place starting in the late 1990s, resulting in a net forest increase in the 21st century (Meyfroidt & Lambin 2008). However, the increase in forest cover varied among regions. While some regions such as the northern mountain areas benefited from reforestation, other regions such as the Central Highlands of Viet Nam still suffered forest losses (Cochard et a. 2017). Moreover, the increase in forest cover in Viet Nam was often due to plantations and secondary forests of poor quality providing no suitable habitat for most species, while the deforestation of natural forests is still ongoing (Asian Development Bank 2013; Cochard et al. 2017). In general, habitat degradation and fragmentation for agriculture, industrial plantations, infrastructure development and the exploitation of timber and non-forest timber products contribute to the loss of biodiversity in Viet Nam (MONRE 2014). Forest degradation for infrastructure development for

tourism and religious sites and for industrial activities (timber logging, coal mining), as well as forest land conversion for cultivation have been reported from several natural habitats of *P. cocincinus* in northern Viet Nam (Gewiss et al. 2020; van Schingen et al. 2014). Road building and illegal timber logging affecting habitats were also documented in distribution sites in central Viet Nam (Nguyen et al. 2018a). In Lao PDR, there has been a decline in forest cover mainly due to timber logging, slash and burn shifting cultivation and conversion of forest lands for multiple purposes despite recent governmental efforts to decrease the forest loss (e.g. Kim & Alounsavath 2014; Koch 2017). Accordingly, extensive habitat loss was reported as a result of agriculture and development in Lao PDR and as well in Cambodia (T. Neang & B. Stuart pers. comm. 2017 in Stuart et al. 2019). In China, habitat loss was documented due to urban development, hydropower development and tourism (D.Q. Rao pers. comm. 2018 in Stuart et al. 2019). In general, habitat fragmentation is considered as a serious threat, due to the close association of the species to freshwater habitats and its sedentary behaviour lacking the ability to migrate long distances (Gewiss et al. 2020; Nguyen et al. 2018).

As a semiaquatic species, the impact of water pollution on *P. cocincinus* has to be considered but has not yet been studied (Gewiss et al. 2020).

As ectothermic animals, reptiles are considered to be particularly susceptible to climate change (e.g. Fitzgerald et al. 2018; Powers and Jetz 2019). In fact, studies on two sympatric lizards of *P. cocincinus* in northern Viet Nam, namely *Goniurosaurus lichtenfelderi* and *Shinisaurus crocodilurus*, predicted that their suitable habitats will decrease significantly under scenarios of climate change (Ngo et al. 2022; van Schingen et al. 2016). Furthermore, climate change has been considered as the main cause of increasing the number of natural catastrophes in Southeast Asia, especially in Viet Nam in recent years. In October 2020, two storms and floods took place in central Viet Nam, where natural populations of *P. cocincinus* were recorded in the past (Ngo pers. com.). Therefore, suitable habitats in the distribution range of *P. cocincinus* might be negatively affected by climate change in the future.

4.2 Population size

Detailed information on the population size of *P. cocincinus* is lacking for all range States except for Viet Nam.

In Viet Nam, two studies were carried out estimating the population size of *P. cocincinus* using capture-mark-recapture methods (Gewiss et al. 2020; Nguyen et al. 2018a). Nguyen et al. (2018a) conducted field surveys at 14 different sites located in three protected areas (Phong Dien Nature Reserve, Sao La Nature Reserve, Bach Ma National Park) in Thua Thien Hue Province, central Viet Nam in April and June 2016 and 2017. The species was absent at three of the surveyed sites. The authors estimated a total population size of 232 to 250 individuals at all remaining survey sites (Nguyen et al. 2018a). The mean population density was between 1.98 and 2.64 individuals per 100 m of surveyed stream (range of 0.8 to 6.6 ind./ 100 m depending on the survey site). Population densities were highest at lower elevations and decreased with higher elevations (Nguyen et al. 2018a). Moreover, Nguyen et al. (2018a) assessed the level of anthropogenic impact of harvest and habitat degradation for each locality, demonstrating lower population densities at stronger impacted sites. Gewiss et al. (2020) conducted field surveys at 15 different sites in northern Viet Nam, in Vinh Phuc Province, Ha Giang Province (Bac Me Nature Reserve), Quang Ninh Province (Dong Son-Ky Thuong Nature Reserve) and Bac Giang Province (Tay Yen Tu Nature Reserve), between 2014 to 2016. The authors failed to observe any water dragons at eight of the 15 surveyed sites. The total population was estimated to consist of 80 individuals at all remaining sites (Gewiss et al. 2020). Population densities were between 0.07 and 0.95 ind./ 100 m of streams inhabited by *P. cocincinus*, being significantly higher at a single, strongly protected and undisturbed survey site (0.83 and 0.95 ind./ 100 m) than at the remaining sites (mean of 0.25 ind./ 100 m) (Gewiss et al. 2020).

Most recently, surveys were conducted in suitable habitats in southern Viet Nam, viz. Phu Quoc National Park (NP) in Kien Giang Province, Bu Gia Map National Park in Binh Phuoc Province and three districts in Phu Yen Province, by scientists of the Institute of Ecology and Biological Resources, Hanoi (IEBR) and Phu Yen University in April 2022. *Physignathus cocincinus* was encountered in 2 of 5 surveyed streams in Phu Quoc NP and 2 of 3 surveyed streams in Bu Gia Map NP and in all six surveyed streams in Phu Yen Province. A total of 97 individuals were observed during 25 nights of surveys, whereas 77 individuals were found in six surveyed streams of Phu Yen Province, 11 individuals were found in two streams of Bu Gia Map NP and nine individuals were found in two streams of Phu Quoc NP. The population sizes were estimated to consist of 170 individuals in Phu Yen, 14 individuals in Bu Gia Map and 15 individuals in Phu Quoc, respectively. Population densities ranged between 0.07 and 1.73 individuals per 100 m of surveyed streams (Truong Q. Nguyen pers. comm.).

Although these studies do not encompass all existing subpopulations of *P. cocincinus* in Viet Nam, they reveal that the species occurs in relatively low population densities with a small total population size. The authors of both published studies emphasize the potential negative anthropogenic impact of harvest and habitat loss on wild populations (Gewiss et al. 2020; Nguyen et al. 2018a).

Self-sustaining and viable introduced populations have been reported from Hong Kong (SAR) and Taiwan (PoC) (Lee et al. 2019; Mo 2019). According to 54 citizen-reports, a total of 62 *P. cocincinus* specimens were observed across different locations of Hong Kong (SAR) between 2004 and 2019 (Mo 2019). Intensive surveys to remove the species from its introduced habitats in Taiwan (PoC) documented capturing about 880 water dragons between 2013 and 2017 (Lee et al. 2019).

In Thailand, recent studies indicate that the population is small and restricted to eastern Thailand (CITES MA 2021, *in litt* to the CITES Management Authority (MA) of Germany).

4.3 Population structure

Nguyen et al. (2018a) reported large proportions of juveniles (60 % in April and 30 % in June) and subadults (18 % in April and 50 % in June) in the wild population from Thua Thien Hue Province, central Viet Nam. Only a minor proportion of the investigated subpopulations consisted of adults (21 % in April and 17 % June). Likewise, Gewiss et al. (2020) recorded subpopulations consisting mostly of juveniles (between 25 and 64 %) and subadults (between 18 and 41 %), while adults accounted only for max. 34 % of the population in northern Viet Nam. Recent field work in southern Viet Nam in April 2022 documented a similar population structure to that found in central Vietnam, comprising mostly of juveniles and subadults (55 % in Bu Gia Map NP, 78 % in Phu Quoc NP and 87 % in Phu Yen Province). Adults made up a considerable proportion accounting for 46 % of observed animals only along four surveyed streams in Bu Gia Map NP (Nguyen et al. in prep.). Nguyen et al. (2018a) indicated that adult lizards are the primary target of locals hunting for food consumption, explaining low percentages of mature water dragons. A low proportion of mating individuals may have a negative impact on the population development due to a loss of genetic diversity and reproductive capacity (Nguyen et al. 2018a).

The introduced water dragon population in Hong Kong (SAR) consists mainly of adult males (47 %), followed by adult females (36 %) and juveniles (18 %) (Mo 2019).

4.4 Population trends

According to Stuart et al. (2019) the wild population is in decline, due to a decrease of habitat quality in parts of the distribution range (see also 4.1). The CITES MA of Cambodia (*in litt.* to the European Commission, 2021) considered the species to be in decline as a result of traditional hunting and habitat loss; while no numerical estimates were available of the scale of decline overall, there is evidence for an apparent decline of about 50 % in 18 years (corresponding to about three generations) at least at one site in the country, based on interviews with local hunters (T. Neang, unpublished data in Stuart et al. 2019). In Viet Nam, the species has been listed as Vulnerable in 2007 in the Viet Nam Red Book based on an estimated 20 % decline over 10 years across the country (Stuart et al. 2019). Field surveys in Viet Nam between 2014 and 2017 revealed that populations are extremely small and that mature individuals were not recorded at some sites (see 4.2 for more details). If harvest levels will remain at present magnitudes, further population declines, and potential local extirpations are expected to occur in the near future. In Thailand, a preliminary study conducted recently revealed that only a small population of *P. cocincinus* was found in the eastern part of Thailand (CITES MA Thailand, *in litt*. to the CITES MA of Germany, 2021).

4.5 Geographic trends

Since *P. cocincinus* is a habitat specialist which is adapted to unique freshwater habitats within evergreen forests, the actual area of occupancy (AOO) is considered to be much smaller than the total extent of occurrence (EOO) (Nguyen et al. 2018a). Previous observations have documented severe degradation and fragmentation of suitable habitats of the water dragon by direct anthropogenic activities (Gewiss et al. 2020; Nguyen et al. 2018a; van Schingen et al. 2014). Habitat fragmentation likely creates barriers that prevent genetic exchange and dispersal capability among populations of *P. cocincinus*. Comparable to other sympatric lizards, *P. cocincinus* is predicted to be affected negatively by climate change in the future (Ngo et al. in press; van Schingen et al. 2016), Due to the synergetic effects of habitat fragmentation and climate change, *P. cocincinus'* suitable distribution is predicted to considerably contract in the near future.

5. Threats

The species was listed as Vulnerable (VU) by the IUCN Red List of Threatened Species in 2019 (Stuart et al. 2019). Harvest of specimens for local food consumption and to supply the domestic and international pet trade poses a serious threat to the survival of wild populations of *P. cocincinus*. Besides, the use of the species in the traditional medicine (eggs soaked in rice wine) (Nguyen et al. 2018a; Annex I, Fig. 5D) and the trade in derivatives of this species (CITES Trade Database 2021) have been reported. Harvest of wild water dragons for food consumption is a common issue and has been documented from local food markets and restaurants from nearly all range States except Thailand (e.g. Duckworth et al. 1999; Lee et al. 2004; Nguyen et al. 2018a; Stuart et al. 2006; Ziegler 2002).

Due to their attractive appearance and interesting lifestyle, water dragons have been coveted objects in the national and especially the international pet trade for decades (Gewiss et al. 2020; Nguyen et al. 2018a; Werning 2010). According to the recorded trade numbers, overharvesting is considered the major threat to the survival of the species in the wild (Nguyen et al. 2018a; Stuart et al. 2019, see also 6.2 and 6.4). Although the species can be bred in captivity without any major difficulties, the harvest of wild specimens is still more convenient and cheaper, explaining why most internationally traded water dragons still originate from wild populations rather than from captive breeding facilities (Gewiss et al. 2020; Nguyen et al. 2018a; USFWS LEMIS 2018). According to Gewiss et al. (2020) and Nguyen et al. (2018a) the trade in *P. cocincinus* is assumed to be unsustainable and to have a negative impact on wild populations in Viet Nam.

In addition to harvest, habitat loss and degradation threatens wild populations of *P. cocincinus* throughout its distribution range (Stuart et al. 2019, see also chapter 4.1). Considering the level of deforestation and environmental pollution in Southeast Asia and the close association of water dragons to freshwater streams in densely vegetated evergreen forests, the impact of habitat loss has to be considered a serious threat (see also 4.1 for more details). The impacts of habitat degradation on wild *P. cocincinus* populations through timber logging, cultivation, tourism and coal mining have been reported from Viet Nam (Gewiss et al. 2020; Nguyen et al. 2018a) and Cambodia (CITES MA of Cambodia *in litt.* to the European Commission, 2021).

6. Utilization and trade

6.1 National utilization

In Viet Nam, the use of *P. cocincinus* in the traditional medicine seems to be negligible since there is only one record of water dragon eggs soaked in rice wine from Viet Nam (Nguyen et al. 2018a; Annex 1, Fig. 5D). In contrast, the collection and sale of the species for food consumption at local food markets and restaurants is a well-documented issue in Viet Nam (Dang 2009; Gewiss et al. 2020; Nguyen & Bain 2006; Nguyen et al. 2018a; Ziegler 2002). The supply of the species at local food markets has been occasionally documented in southern Viet Nam (Dang 2009), as well as in central Viet Nam (Nguyen & Bain 2006; Ziegler 2002). An intensive study by Nguyen et al. (2018a) recorded the harvest of 1,000 kg of animals corresponding to more than 2,000 individuals of *P. cocincinus* by local hunters in Thua Thien Hue Province, central Viet Nam in 2016. Prices ranged from 250,000 Viet Nam Dong (about USD12) per kg in remote localities to 450,000 Viet Nam Dong (about USD20) per kg in restaurants in Hue City. In comparison, Nguyen & Bain (2006) documented the sale of water dragons for food and trade for prices between 50,000 and 70,000 Viet Nam Dong (about USD2–3) per kg in central Viet Nam ten years before. Gewiss et al. (2020) reported the offer of *P. cocincinus* for food consumption throughout Viet Nam. Recent field surveys in southern Viet Nam (April 2022) also documented the exploitation of wild water dragons for food consumption in this region (Phan T.Q. pers. obs.). Prices for the targeted harvest of adult individuals can reach 300,000 Viet Nam Dong (about USD15/individual). Harvest of the species mainly occurs in April to July, during the rainy season. In addition to the purpose of food consumption, water dragons are collected and offered as pets in local shops, at markets and on internet platforms in Viet Nam (Gewiss et al. 2020; Nguyen et al. 2018a; Annex 1, Fig. 5, 6, 7). As a rather popular pet, the lizards fetch prices ranging from 150,000 to 450,000 Viet Nam Dong (about USD7-20) per individual (Nguyen et al. 2018a). Gewiss et al. (2020) documented similar online prices ranging from 60,000 to 480,000 Viet Nam Dong (USD3-21) per individual. The authors also reported large cities such as Ha Noi and Ho Chi Minh City as important destinations with a large number of dealers trading water dragons (Gewiss et al. 2020). In Phu Yen and Binh Phuoc provinces, juveniles were sold for 20,000 Viet Nam dong (USD1) per individual by local dealers in April 2022 (Nguyen T.Q. pers. obs.). Although the total extent of the use of *P. cocincinus* as food and pet in Viet Nam remains not quantified, the domestic trade is relatively well documented compared to the other range States.

In China, the species is reported to be popular in the domestic pet trade, as food and in the traditional medicine (Stuart et al. 2019). In southern China, *P. cocincinus* has been reported as common at local food markets in provinces of Guangdong and Guangxi (Lee et al. 2004; Li et al. 1996; Li & Li 1998). Wild caught

water dragons were offered for an average price of 160 RMB¥ (about USD24) per kg at food markets in Guangzhou (Lee et al. 2004).

In Lao PDR, the harvest and sale of adult water dragon as well as eggs have been documented at local food markets in provinces of Khammouane, Vientiane and Sekong (Duckworth et al. 1999; Kasper et al. 2020; Suzuki et al. 2015). Water dragons were frequently sold at local markets in the Lao – Viet Nam border area (Gewiss et al. 2020).

In some rural areas in Cambodia, adults and eggs were reported to be collected by local hunters for household food consumption (Stuart et al. 2006; CITES MA of Cambodia *in litt.* to the European Commission, 2021).

6.2 Legal trade

The species is nationally traded in considerable numbers for local consumption and for the pet trade. The sale of the species at local markets is reported from Cambodia, Lao PDR, China and Viet Nam (see also chapter 6.1). In Viet Nam, domestic online adverts of the species are recorded frequently (see Annex 1, Fig. 7 and Table 2 for examples).

Besides domestic trade, large volumes of *P. cocincinus* are reported in the international pet trade, which is considered a major threat to wild populations. Official import data of *P. cocincinus* into the EU have been available since the inclusion of the species in Annex D of the Council Regulation (EC) No. 338/97 in 2010; these identify Indonesia, Thailand, the United States of America and Viet Nam as recent exporters (Annex 1, Table 1). The CITES MA of Cambodia (*in litt.* to the European Commission, 2021) confirmed that the species was not exported from their country; however it remains unclear if China and Lao PDR are international exporters of the species.

According to the CITES Trade Database[1], 82,255 live *P. cocincinus* were imported directly by the EU-27 and the United Kingdom of Great Britain and Northern Ireland (hereafter referred to as UK)[2] in the period 2010-2020 as reported by importers[3] (Annex 1, Table 1). Annual imports were variable over the 10-year period but peaked in 2019 with the import of 10,652 live individuals (Annex 1, Fig. 1 and 2). Fifty-eight percent of live *P. cocincinus* were imported for commercial purposes, and the remainder were reported without a purpose code specified. For the majority of imported individuals, the source was documented as “unknown” (41 %) or not specified (43 %), with 7 % recorded as wild-sourced and 9 % as captive-produced (Annex I, Fig. 3). In the EU, Germany has been the biggest importer (41%) followed by the Netherlands (23%), Spain (16 %) and the UK (16 %). Viet Nam was by far the major exporter to the EU with almost 76 000 individuals corresponding to 92 % of all imports in live individuals 2010-2020 (Annex 1, Fig. 1).

Import of the species to Europe from Thailand has been documented by dealer lists at least since 1975 (see Annex 1, Fig. 8). At that time, prices were between 75 and 95 DM (today about EUR 38 and 49) per individual. Nowadays, *P. cocincinus* is assessed as Endangered (EN) in the Red List of Thailand (Nabhitabhata and Chan-ard 2005) and there have been minimal exports from the country (150 live individuals were exported in 2012) (CITES Trade Database 2021).

Nguyen et al. (2018a) argued that most individuals exported from Viet Nam probably originate from the wild, since there is no knowledge about any breeding facilities in Viet Nam being capable of producing such large quantities of water dragons for the pet trade. Additionally, the collection of wild animals is still more convenient and cheaper (Nguyen et al. 2018a), providing few incentives to breed the species. During a recent study by Altherr et al. (2020), a total of 53 online adverts recorded the species for sale between September 2017 and September 2018 in Germany, with prices between EUR 20-125 per individual. None of these adverts included a source code.

In 2020, wild caught *P. cocincinus* individuals were offered in Germany in various sizes (baby, small, medium, subadult). Prices usually range between EUR 49 and 149 per individual depending on the size. As a “special offer”, wild caught lizards were offered for cheaper prices than captive bred specimens (see Annex 1, Fig. 9). While import levels into Germany remain rather high, few online adverts can be currently found in the country. In the past, specimens were regularly offered on various internet platforms, particularly on eBay

[1] Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, accessed 24 August 2021

[2] The United Kingdom of Great Britain and Northern Ireland was subject to EU Council Regulation (EC) No. 338/97 until its exit from the European Union on 31 January 2020, and as such its trade up to and including 2019 in *P. cocincinus* (as listed in Annex D) was included in this analysis.

[3] EU importer data for 2020 is incomplete

Kleinanzeigen (Laurenz Gewiss pers. comm.). To improve animal welfare, the trade in live animals has recently been restricted by popular internet platforms such as Facebook and eBay Kleinanzeigen.

According to the USFWS Law Enforcement Management Information System (LEMIS), import numbers of *P. cocincinus* into the US were much higher than into the EU (Gewiss et al. 2020). A total number of more than 1.4 million live individuals have been imported between 1999 and April 2018 into the US (Annex 1, Fig. 4). The number of traded wild sourced water dragons declined in the past 10 years and reached a level of about 42,000 to 55,000 individuals per year. Between 2002 and 2011 an average of about 81,000 individuals were imported annually. The source of the imported water dragons was documented for 98 % of all imports. The majority, about 1,332,000 individuals (almost 95 %), were wild sourced, while almost 47,000 captive bred individuals were imported into the US, corresponding to less than 4 %. Just as it is the case for the EU, the majority (99.8 %) of the imported individuals originated from Viet Nam.

Due to very high export numbers from Viet Nam, it is likely that individuals also originate from other range states using Viet Nam only as transit hub (Gewiss et al. 2020).

6.3 Parts and derivatives in trade

The Asian Water Dragon is known to be internationally traded mainly as live individuals. However, imports of 1,608 skins, 406 small leather products and 277 other derivatives of *P. cocincinus* into the EU were recorded between 2010 and 2020 (CITES Trade Database 2021). Domestically, meat or dead individuals are traded for consumption (see also 6.1).

6.4 Illegal trade

In Viet Nam, the collection of wild animals including *P. cocincinus* (non-CITES and the Viet Nam Governmental Decree 06/2019/ND-CP) is illegal, if wild animals are collected without respective permits within protected areas, such as national parks and nature reserves. However, it is very difficult for local rangers and other related authorities to identify the origin of specimens in trade and conduct penalties, as water dragon populations are located in both unprotected and protected areas (Gewiss et al. 2020; Nguyen et al. 2009).

In Thailand, international trade in the species is prohibited according to national law (see 7.1). Since 2010, 39 live specimens subject to illegal international trade were seized and eight cases of domestic poaching were recorded (CITES MA Thailand 2021, *in litt.*to the CITES MA of Germany). Illegal trade in *P. cocincinus* in Thailand is reported from both, physical and online markets.

6.5 Actual or potential trade impacts

According to extremely high export numbers of mostly wild caught animals, the international pet trade is considered to be unsustainable and to threaten wild populations of *P. cocincinus* at least in Viet Nam (Gewiss et al. 2020; Nguyen et al. 2018a). Gewiss et al. (2020) did not observe any water dragons at eight of 15 survey sites in northern Viet Nam, although the species was observed at these localities in the past. Due to the high export numbers from Viet Nam, it is likely that individuals also originate from Lao PDR or other neighbouring/ range States implying wild populations in Viet Nam`s neighbouring states are being affected by the international pet trade as well (Gewiss et al. 2020). Although the species is internationally very common in husbandry and captive breeding in the species does not pose any difficulties with adequate housing conditions, a large portion of the international trade in water dragons is still sourced from the wild. Likewise, harvest for local consumption is considered to negatively affect wild populations. Even though cross-border trade between range States is less documented, the use of the species for food consumption likely also contributes to international trade between range States.

7. Legal instruments

7.1 National

P. cocincinus is listed as Endangered (EN) in the Red List of China (Jiang et al. 2016). In China, the species is listed as state key protected wild fauna, and thus under strict protection. According to the Law of the People's Republic of China on the Protection of Wildlife, anyone who intends to hunt or catch wildlife that is not under special state protection must obtain a hunting license and observe the hunting quota assigned. In nature reserves, the hunting and catching of wildlife and other activities, which are harmful to the survival of wildlife, are prohibited.

In Viet Nam, the species has not been included yet in any wildlife protection laws. However, the collection of wild specimens without governmental permits is strictly restricted within protected areas such as national parks and nature reserves in Viet Nam. Due to the listing of *P. cocincinus* as Vulnerable (VU) in the Red Data Book of Viet Nam (Dang et al. 2007) and in the IUCN Red List (Stuart et al. 2019), any advertising media activities for the species are strictly restricted in Viet Nam. Recently, the Vietnamese Prime Minister announced a plan together with Ministries of Agriculture and Rural development, and Information and Communications to control the online trade in wild animals with stricter national laws.

In Thailand, *P. cocincinus* has been listed as protected species under the national wildlife protection law since 1992 and is currently one of the protected species under the Wild Animal Conservation and Protection Act B.E.2562 (2019). According to this legislation, hunting, possessing, breeding, as well as importing or exporting the species is prohibited. Furthermore, *P. cocincinus* is listed as Endangered (EN) in the Red List of Thailand (Nabhitabhata and Chan-ard 2005).

In Cambodia, *P. cocincinus* was categorised as 'Common' under a declaration by the Ministry of Agriculture, Forestry and Fisheries (MAFF) on 25 January 2007 (Prakas No. 020 PRK). The species is legally protected under the Forestry Law (2002), in which stocking, maintaining, hunting, harm, harassment, transport and trade in amounts exceeding the necessity for customary use are prohibited.

The conservation status has not been evaluated yet by Lao PDR and Myanmar; no information on national legal instruments was located for these range States.

7.2 International

The species was included in Annex D of the EU Council Regulation (EC) No. 388/97 in 2010 to monitor trade volumes of trade into and from the EU.

8. Species management

8.1 Management measures

Several *P. cocincinus* populations occur inside protected areas. The hunting and collecting of the wildlife within these areas are strictly controlled and forbidden without govermental permits according to the Law in the Protection of Wildlife and the Regulations in the Nature Reserves of the People's Republic of China and the Socialist Republic of Viet Nam.

8.2 Population monitoring

First population estimates have been carried out in Viet Nam between 2014 and 2017 (Nguyen et al. 2018a; Gewiss et al. 2020), while long-term data on population dynamics are lacking.

8.3 Control measures

8.3.1 International

None.

8.3.2 Domestic

According to domestic legislation, the collection of *P. cocincinus* is restricted at least in protected areas in China and Viet Nam (see 7.1). In Thailand, *P. cocincinus* has been listed as protected species under the national wildlife protection law since 1992 and is currently protected under the Wild Animal Conservation and Protection Act B.E.2562 (2019), see 7.1. In Lao PDR, the species is listed in the Protected/ Management Category II under Lao wildlife laws.

8.4 Captive breeding and artificial propagation

Dealer lists attest that *P. cocincinus* has been kept in Europe at least since 1975 (Annex 1, Fig. 8). First captive breeding has been recorded at least centuries ago. In Europe, husbandry in 151 zoological institutions is reported according to zootierliste.de (accessed 09th February 2021). According to the ZIMS

(Zoological Information Management Software) database[4], the husbandry of 268 animals is documented from 63 zoological institutions in Europe, 69 water dragons are documented 10 zoological institutions in Asia and 15 animals are documented from 11 zoological institutions in North America (accessed 08th February 2021).

The species is being kept by many hobbyists in Europe, America and Asia and captive breeding does not pose any difficulties with adequate housing conditions and proper nutrition (Manthey & Schuster 1992; Werning 2010). However, international trade still occurs mainly in wild sourced animals. Difficulties in keeping wild sourced specimens have been frequently reported. Due to their distinct escape behaviour, wild animals frequently get injuries while running into glass panes (e.g. Manthey & Schuster 1992; Werning 2010). It is considered that mortality rates in wild specimens during or after transport might be rather high (see 6.2). Nevertheless, imported wild caught water dragons are regularly offered in Europe, occasionally for cheaper prices than domestic captive bred individuals (see Annex I, Fig. 9). According to the CITES Trade Database, captive bred water dragons have been imported into the EU between 2010 and 2020 directly from Viet Nam (in total more than 7,500 specimens, Annex 1, Table 1), while there is no evidence for captive breeding facilities in Viet Nam which are actually able to provide such a large number of water dragons (Nguyen et al. 2018a).

8.5 Habitat conservation

Several *P. cocincinus* populations occur inside of protected areas. However, habitat destruction and fragmentation have been reported even within protected areas in Viet Nam, and population densities were observed to be relatively low (Gewiss et al. 2020; Nguyen et al. 2018a; van Schingen et al. 2016).

8.6 Safeguards

9. Information on similar species

The Eastern water dragon *Intellagama lesueurii*, formerly *Physignathus lesueurii*, is a water dragon species distributed in Australia. The genus *Physignathus* has been recovered as a paraphylum in phylogenetic studies (Amey et al. 2012, Hugall et al. 2008, Townsend et al. 2011), which resulted in the resurrection of the genus *Intellagama* (Gray 1845) by Amey et al. (2012). Despite a similar ecology both water dragon species, *Physignathus cocincinus* and *Intellagama lesueurii*, are clearly distinguishable from each other by morphologic characteristics.

10. Consultations

A consultation was distributed by Viet Nam and the European Union to all range States during October and November 2021.

11. Additional remarks

12. References

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[4] managed by Species 360

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Annex 1

Table 1: Direct imports of live *Physignathus cocincinus* to the EU-27 and the United Kingdom of Great Britain and Northern Ireland, 2010-2020. All data was reported by number and by EU importers only.

Exporter	Purpose	Source	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Indonesia	-	-			450	12								462
Thailand	-	-			150									150
United States of America	T	F									50			50
		U	20	20	14									54
	-	-	12		1245	904	778	818	1112	220	106	112	20	5327
Unknown	-	-								370				370
Viet Nam	T	C							1855	654	822	3433	751	7515
		U	100	5828	6625	5516	4014		2794	2285	2662	1310	2526	33660
		W					1047	1751			1867	725		5390
	-	-	1528	1866	868	941	3089	1829	2232	2131	4758	5072	4963	29277

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, accessed 24 August 2021

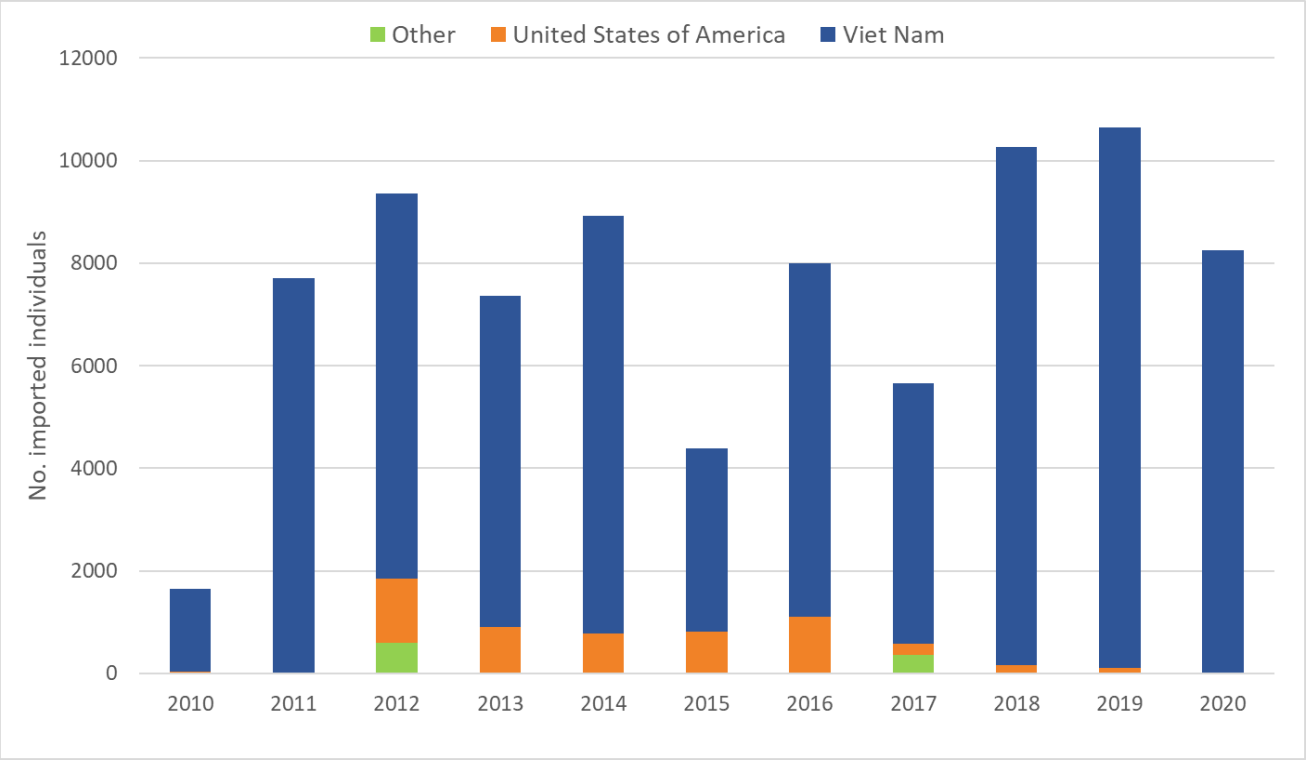


Figure 1. Direct imports of live *Physignathus cocincinus* by the EU-27 and the United Kingdom from various exporters 2010-2020, according to importers. Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, accessed [24 August 2021].

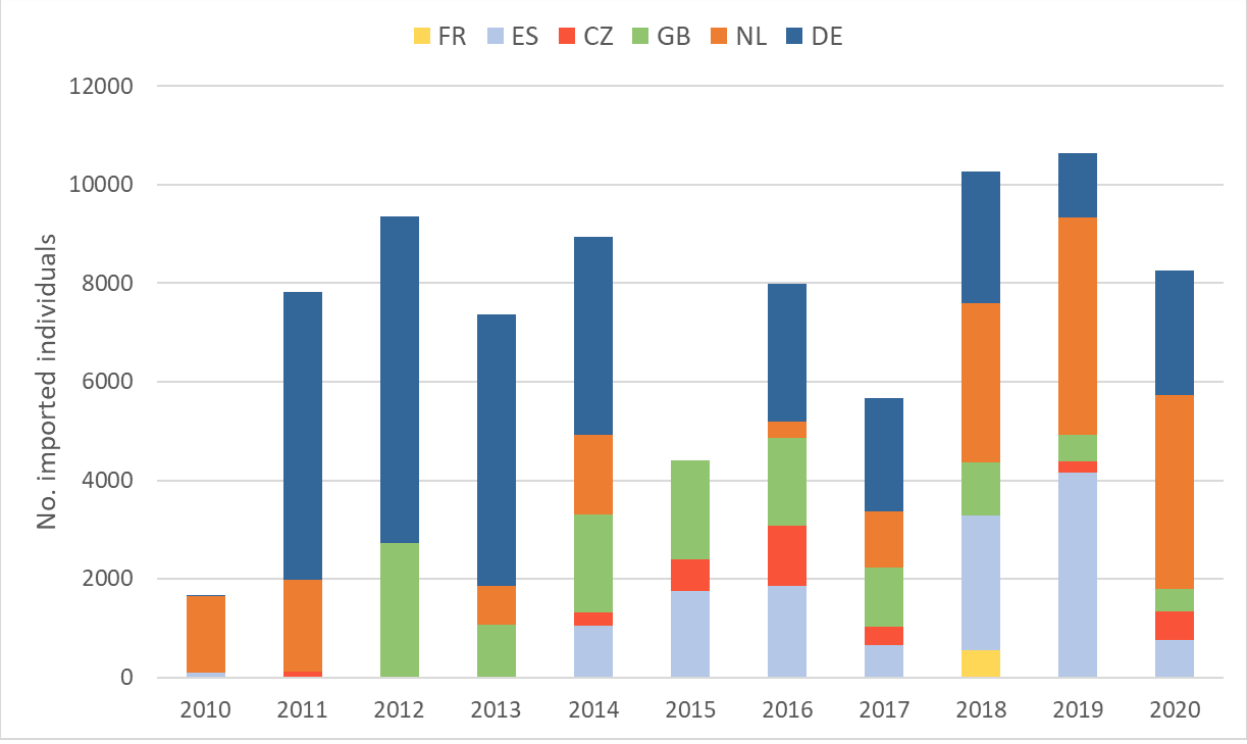


Figure 2. Direct imports of live *Physignathus cocincinus* by the EU-27 and the United Kingdom from 2010-2020 (FR = France, ES = Spain, CZ = Czech Republic, GB = United Kingdom of Great Britain and Northern Ireland, NL = Netherlands, DE = Germany). Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, accessed [24 August 2021].

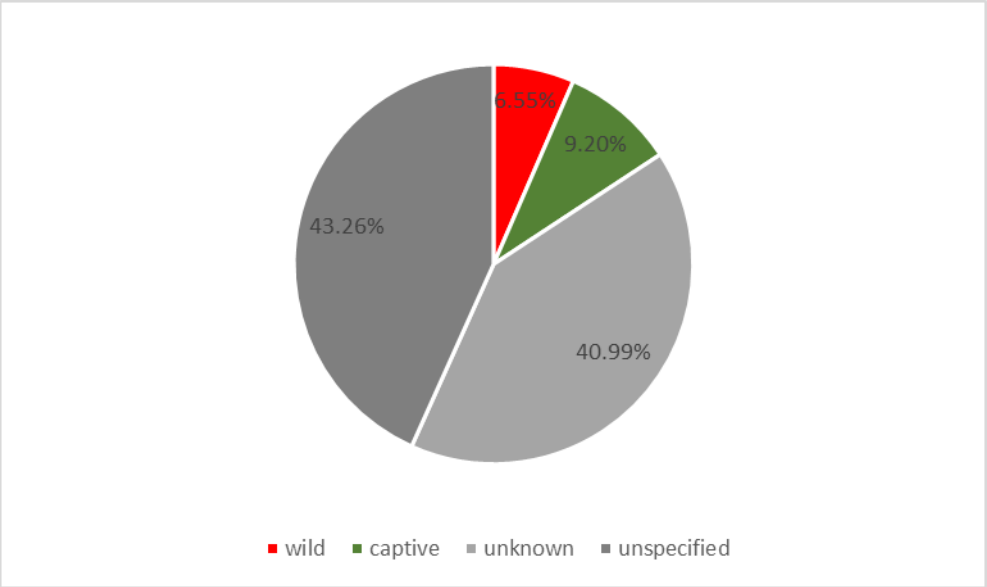


Figure 3. Source of live *Physignathus cocincinus* individuals imported into the EU between 2010 and 2020. Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, accessed [24 August 2021].

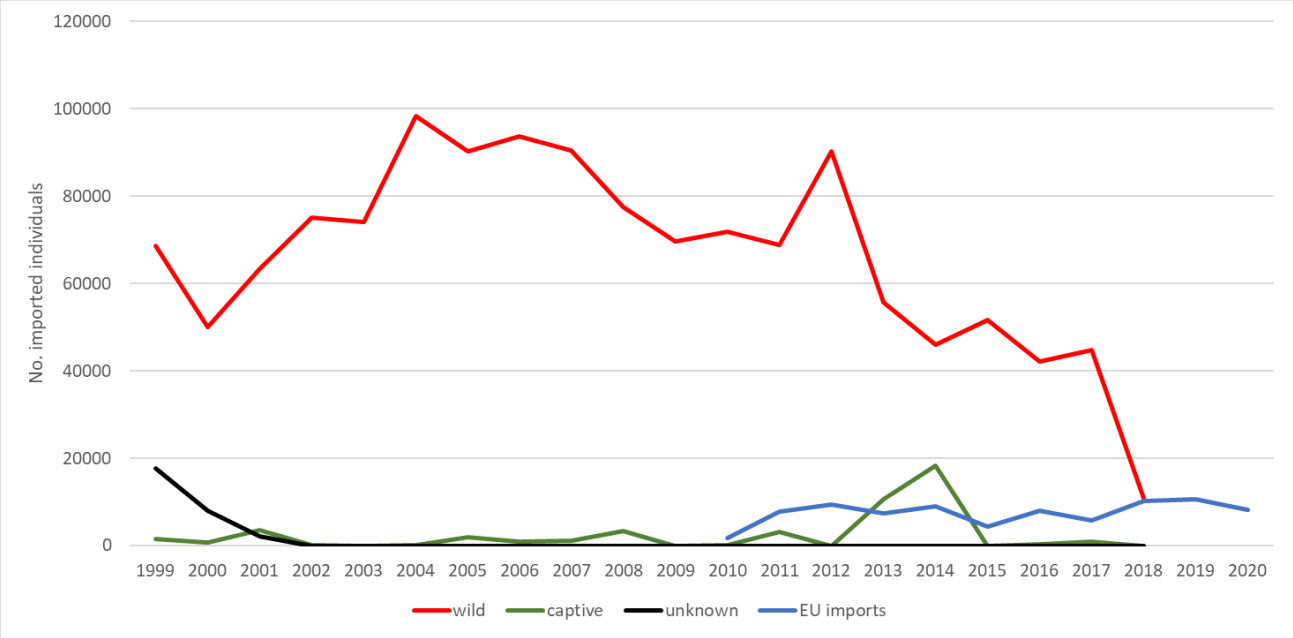


Figure 4. Number of *Physignathus cocincinus* live individuals imported into the US between 1999 and April 2018 and into the EU between 2010 and 2020. Data obtained from the CITES Trade Database (2021) and the U.S. Fish & Wildlife Service (USFWS) LEMIS database (2018).

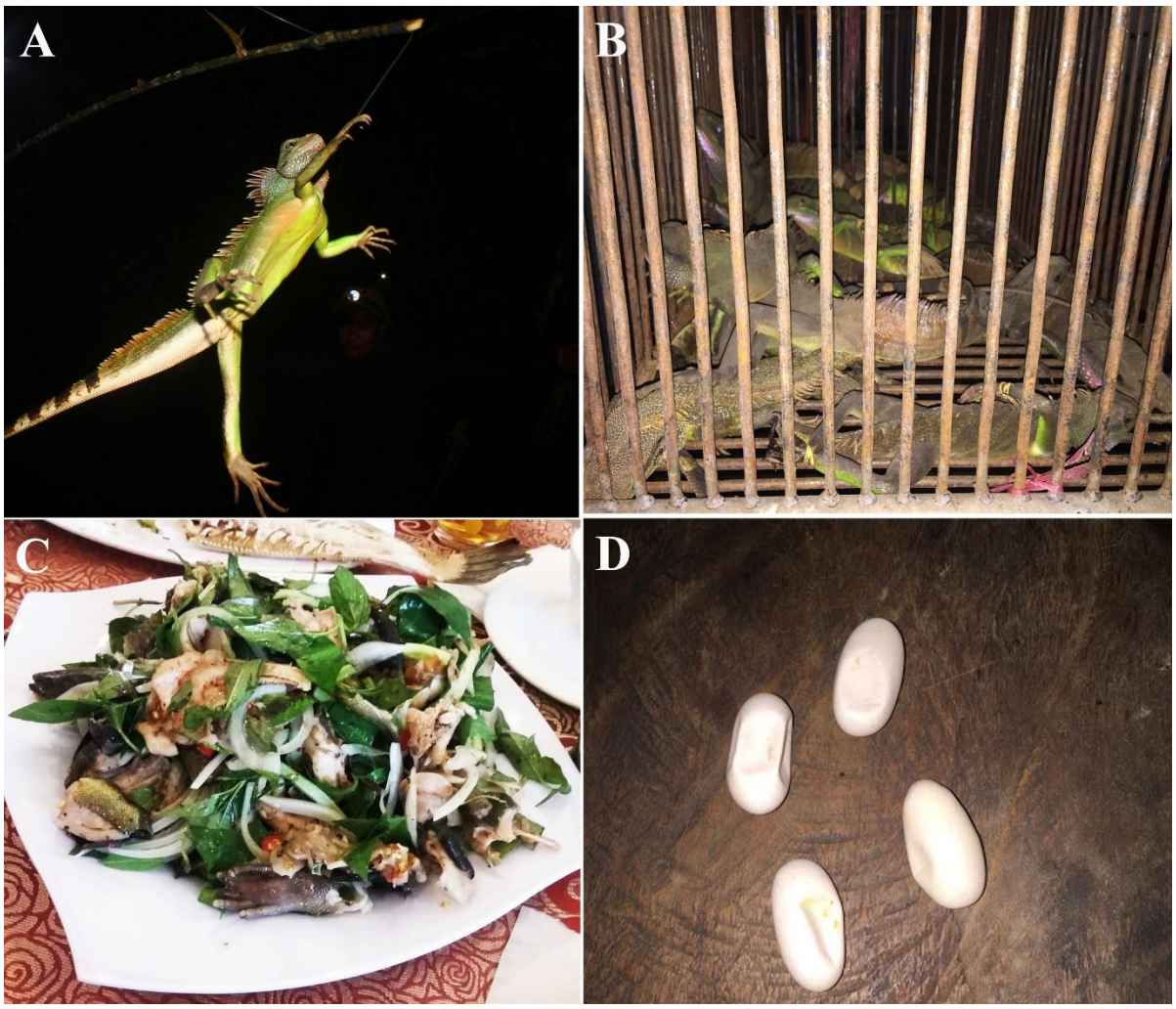


Figure 5. Examples for domestic threats to *Physignathus cocincinus* from Thua Thien Hue Province, central Viet Nam: A) Trapped individual in Nam Dong District B) Live individuals collected for food in Hue City C) Water dragon meat served as food in a restaurant in Hue City D) Eggs of the species preserved in alcohol in Nam Ding District (obtained from Nguyen et al. 2018a).

Figure 6. Collected live specimens of *Physignathus cocincinus* in central Viet Nam.

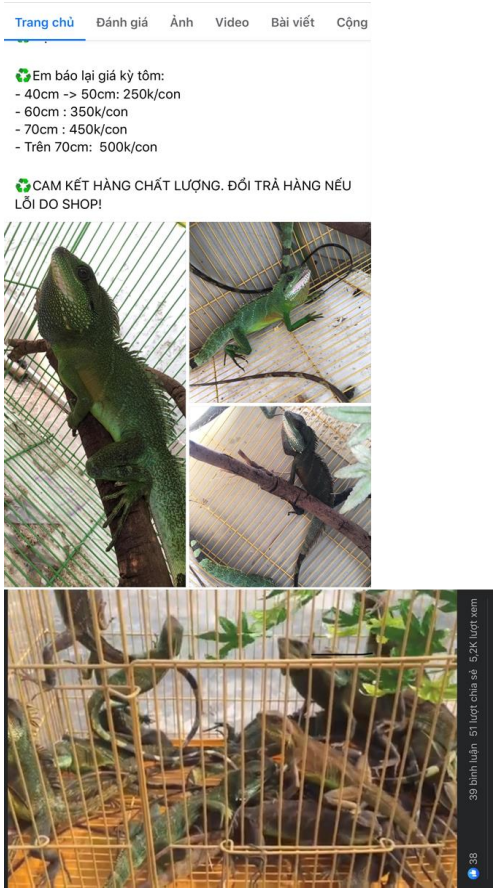
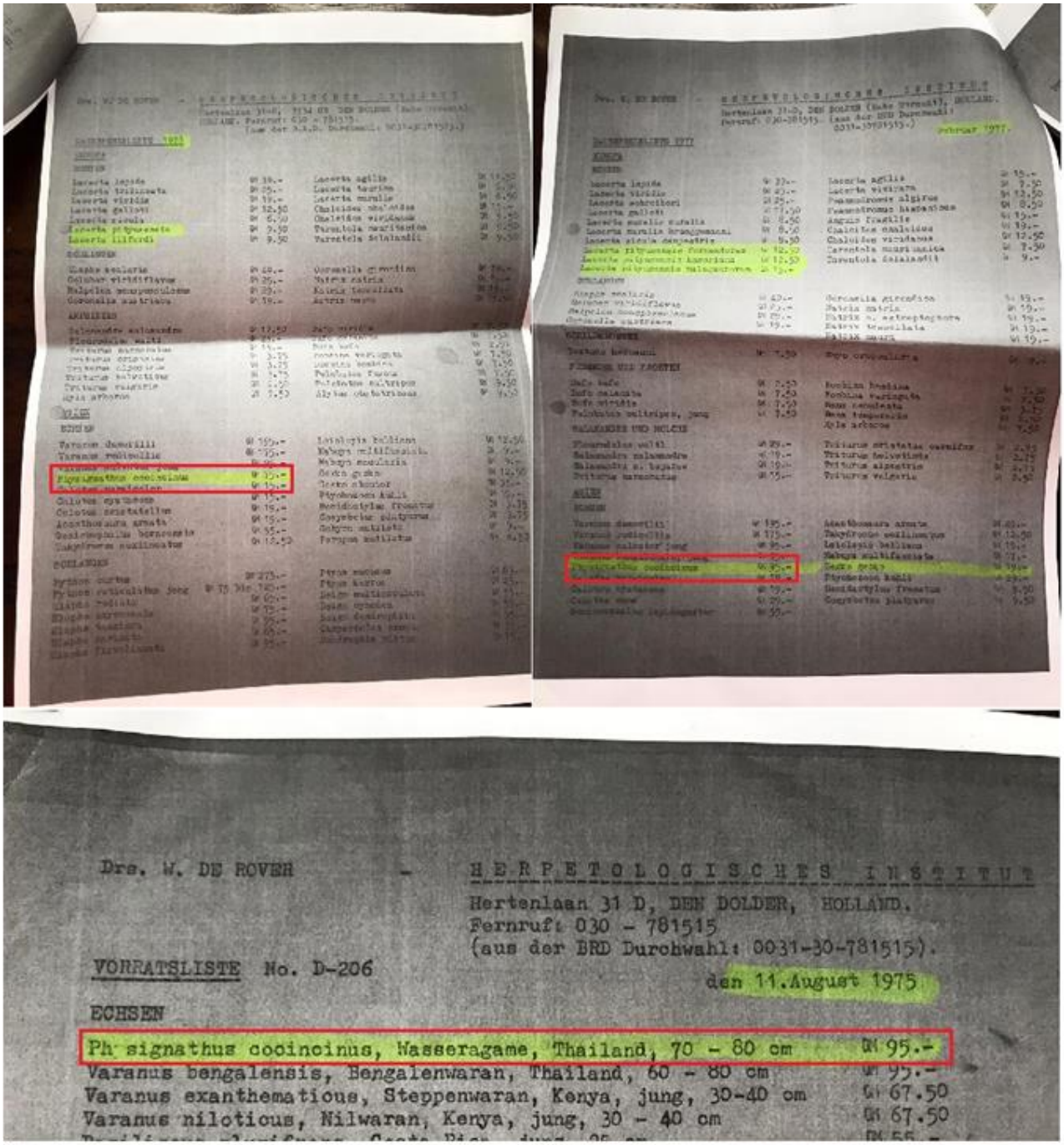


Figure 7. Examples for online advertisements of *Physignathus cocincinus* from Viet Nam.



Drs. W. DE ROVER – HERPETOLOGISCHES INSTITUT

Hertenlaan 31 D, DEN DOLDER, HOLLAND.
Fernruf: 030 - 781515
(aus der BRD Durchwahl: 0031-30-781515).

VORRATSLISTE No. D-206

den 11.August 1975

ECHSEN

Ph signathus cocincinus, Wasseragame, Thailand, 70 - 80 cm	DM 95.-
Varanus bengalensis, Bengalenwaran, Thailand, 60 - 80 cm	DM 95.-
Varanus exanthematicus, Steppenwaran, Kenya, jung, 30-40 cm	DM 67.50
Varanus niloticus, Nilwaran, Kenya, jung, 30 - 40 cm	DM 67.50

Figure 8. Dealer lists from 1975 and 1977 documenting the offer of *Physignathus cocincinus* from Thailand in Europe.

A

Agamen				
Bartagame NZ 12-15 cm	Pogona vitticeps	NZ	99,00	
Bartagame farbig DNZ klein	Pogona vitticeps	DNZ	149,00	
Bartagame farbig DNZ 15-20 cm	Pogona vitticeps	DNZ	169,00	Quarantäne bis 13.07.2020
Bartagame farbig EUNZ klein ca. 15 cm	Pogona vitticeps	EUNZ	149,00	
Zwergbartagame NZ klein	Pogona henrylawsoni	NZ	149,00	
Somalische Dornschwanzagame DNZ klein	Uromastyx princeps	DNZ	1999,00	
Schmetterlingsagame	Leiolepis belliana	WF	59,00	
Reeves Schmetterlingsagame	Leiolepis reevesii	WF	35,00	Sonderangebot
Hardun DNZ klein	Stellagama stellio picea	DNZ	179,00	Quarantäne bis 13.07.2020
Hardun DNZ mittel - groß	Stellagama stellio picea	DNZ	199,00	Quarantäne bis 13.07.2020
Wasseragame Baby	Physignatus cocincinus	WF	35,00	Sonderangebot
Wasseragame klein	Physignatus cocincinus	WF	79,00	
Wasseragame mittel	Physignatus cocincinus	WF	99,00	
Wasseragame subadult	Physignatus cocincinus	WF	149,00	
Vietnam-Nackenstachler	Acanthosaura capra	WF	69,00	
Natalia's Nackenstachler	Acanthosaura nataliae	WF	199,00	

B

Gestreifte Hausschlange White Line NZ klein	Lamprophis lineatus	EUNZ	149,00	
Indische Schmucknatter DNZ klein	Coelognathus (Elaphe) helena	DNZ	199,00	
Rauhe Grasnatter	Opheodrys aestivus	WF	129,00	
Westliche Waldfeilennatter DNZ Weibchen	Gonionotophis poensis	DNZ	699,00	
Hakennasennatter Albino Superconda het snow DNZ 20	Heterodon nasicus	DNZ	999,00	
Agamen				
Bartagame NZ 12-15 cm	Pogona vitticeps	DNZ	99,00	
Bartagame farbig DNZ klein	Pogona vitticeps	DNZ	149,00	
Bartagame farbig DNZ 15-20 cm	Pogona vitticeps	DNZ	169,00	
Zwergbartagame NZ klein	Pogona henrylawsoni	DNZ	149,00	
Somalische Dornschwanzagame DNZ klein	Uromastyx princeps	DNZ	1999,00	
Wasseragame Baby	Physignatus cocincinus	WF	35,00	Sonderangebot
Wasseragame klein	Physignatus cocincinus	WF	79,00	
Wasseragame mittel	Physignatus cocincinus	WF	99,00	
Wasseragame DNZ klein	Physignatus cochinchinus	DNZ	79,00	
Australische Wasseragame NZ klein	Physignatus leseurii	NZ	499,00	
Natalia's Nackenstachler	Acanthosaura nataliae	WF	199,00	
Leguane				

C

D

E

Bartagame farbig DNZ 15-20 cm	Pogona vitticeps	DNZ	169,00	
Bartagame farbig EUNZ klein ca. 15 cm	Pogona vitticeps	EUNZ	149,00	
Zwergbartagame NZ mittel	Pogona henrylawsoni	NZ	199,00	
Zwergbartagame NZ klein	Pogona henrylawsoni	DNZ	149,00	
Somalische Dornschwanzagame DNZ klein	Uromastyx princeps	DNZ	1999,00	
Wüstenagame Männchen	Trapelus mutabilis	WF	69,00	
Wasseragame Baby	Physignatus cocincinus	WF	49,00	
Wasseragame klein	Physignatus cocincinus	WF	49,00	Sonderangebot
Wasseragame mittel	Physignatus cocincinus	WF	99,00	
Wasseragame DNZ klein	Physignatus cochinchinus	DNZ	79,00	
Australische Wasseragame NZ klein	Physignatus leseurii	NZ	499,00	
Natalia's Nackenstachler	Acanthosaura nataliae	WF	199,00	
Grüne Segelechse s-m	Hydrosaurus weberi	WF	299,00	

Figure 9. Example for online adverts (special offer) of wild caught *Physignathus cocincinus* individuals in Germany from July (A), October (B and C) and November (D and E) 2020; WF = wild caught; NZ = bred/ born in captivity; DNZ = bred/ born in captivity in Germany.

Table 2. Domestic trade in *Physignathus cocincinus* in Viet Nam based on online investigations (obtained from Gewiss et al. 2020)

Areas	Provinces	Number of dealers	Number of shops and markets	Purposes	Prices (USD) per specimen
Northern Viet Nam	Ha Noi	5	5	Pet trade	3-16
	Hai Phong	1	1	Pet trade	3-11
	Ha Giang	1	0	Pet trade and food	USD14/ kg
	Nam Dinh	1	0	Pet trade	4-8
	Phu Tho	3	0	Pet trade	*
	Quang Ninh	1	0	Pet trade	*
	Yen Bai	1	0	Food	*
Central Viet Nam	Binh Dinh	2	0	Pet trade and food	4-18
	Da Nang	3	0	Pet trade	4-9
	Nha Trang	3	0	Pet trade	7-11
	Quang Nam	1	0	Food	*
Southern Viet Nam	Ba Ria - Vung Tau	1	0	Pet trade	*
	Binh Duong	1	0	Pet trade	10
	Binh Phuoc	1	0	Pet trade	14
	Dong Nai	2	1	Pet trade	3-20
	Gia Lai	1	0	Pet trade and food	7-22
	Ho Chi Minh	17	2	Pet trade and food	3-16 or USD 6/ kg
	Unknown	6	0	Pet trade	6-18 or USD 16 per pair