Review of species selected on the basis of the analysis of 2018 CITES export quotas. Part II

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UN environment WCMC 40 years

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Contents

Introduction

This report provides in-depth reviews of seven species selected on the basis of the *Analysis of 2018 CITES export quotas*.

National export quotas for CITES-listed taxa are an important tool to manage and monitor international wildlife trade. According to Resolution Conf. 14.7 (Rev. CoP15), the establishment or revision of an export quota should be based on a non-detriment finding (NDF) by the Scientific Authority of the exporting country, and the NDF should be reviewed annually. Once such annual quotas are established, the need for an NDF for each individual shipment of the species concerned is eliminated. The EU, through stricter measures outlined in the EU Wildlife Trade Regulations, requires an NDF by importing Member States and therefore monitors newly-established quotas and changes to previous quota levels to assess the situation where necessary, or to reassess SRG opinions or EU decisions.

Export quotas are usually established by each Party to CITES unilaterally on a voluntary basis, but quotas can also be set by the Conference of the Parties, or result from recommendations of the Animals and Plants Committees. To ensure that national quotas are effectively communicated and implemented on permits and certificates, countries should inform the CITES Secretariat when they establish national export quotas for CITES species (Resolution Conf. 12.3 (Rev. CoP17)). In turn, the Secretariat informs the Parties by publishing a list of national export quotas of which it has been informed on the CITES website. Once published, quotas can also be accessed online via Species+.

UNEP-WCMC analysed the 2018 CITES export quotas to identify:

a) Quotas that were newly established in 2018 (i.e. 2018 quotas for particular taxon/country/term/source combinations that have not previously been subject to a quota, or have not been subject to a quota since 2013);
b) Quotas that increased in 2018 compared with 2017 quotas (or compared with the most recent quota since 2013 if no quota was published in 2017);
c) Quotas that decreased in 2018 compared with 2017 quotas (or compared with the most recent quota since 2013 if no quota was published in 2017).

Five species/country combinations, agreed as priorities for review, were assessed for SRG 86 as part of the *Review of species selected on the basis of the analysis of 2018 CITES export quotas. Part I*. The following species/country combinations were selected for review for SRG 87:

- *Trioceros bitaeniatus/* Democratic Republic of the Congo (DRC) (new quota, 3000 live individuals)
- *Trioceros ituriensis/* DRC (new quota, 2000 live individuals)
- *Varanus albigularis/* DRC (new quota, 2000 live individuals)
- *Varanus ornatus/* Benin (new quota, 500 ranched) and DRC (new quota, 2000 live individuals)
- *Kinixys spekii/* DRC (new quota, 1000 live individuals)
- *Cycloderma aubryi/* DRC (new quota, 1000 live individuals)
- *Caecobarbus geertsi/* DRC (new quota, 70 live individuals)

An assessment of one additional species/country combination, *Trioceros bitaeniatus/*United Republic of Tanzania, has also been included in this report. This combination was selected for review on the basis of the report *Taxon/country combinations subject to long-standing positive opinions*. Given that *T. bitaeniatus* was already under review for this report (for DRC), Tanzania was also included to facilitate SRG discussion of this species for two range States.

SAURIA: CHAMAELEONIDAE

Trioceros bitaeniatus II/B

SYNONYMS:	*Chamaeleo bitaeniatus* Fischer, 1884
COMMON NAMES:	Side-striped Chameleon (EN), Caméléon à deux bandes (FR), Camaleón de dos bandas (ES)
RANGE STATES:	Democratic Republic of the Congo (DRC) (?), Ethiopia, Kenya, Somalia (?), South Sudan, Uganda (?), United Republic of Tanzania[1]
UNDER REVIEW:	DRC, Tanzania
EU DECISIONS:	Current no opinion i) for wild specimens from DRC formed on 02/12/2011, replacing a positive opinion formed on 27/01/1999 Current positive opinion for Tanzania formed on 27/01/1999 and confirmed on 29/02/2008, replacing a no opinion ii) formed on 18/11/1998. Current no opinion i) for specimens born in captivity (F1 and subsequent) for Tanzania formed on 27/02/2014. Previous positive opinion for specimens born in captivity (F1 and subsequent) for Tanzania formed on 23/06/1999 Current no opinion i) wild specimens from Ethiopia, Kenya and Somalia formed on 02/12/2011 Current no opinion i) wild specimens from South Sudan formed on 21/06/2017
IUCN:	Least Concern

Taxonomic note

The genus *Chamaeleo* was previously divided into two sub-genera: *Chamaeleo* (*Chamaeleo*) and *Chamaeleo* (*Trioceros*), until Tillbury and Tolley (2009) elevated each subgenus to the separate and distinct genera *Chamealeo* and *Trioceros*. Tilbury and Tolley (2009) was adopted as a CITES Standard Reference at CoP16 in 2013, thus the side-striped chameleon (formerly *Chamaeleo. (T.) bitaeniatus*) became *T. bitaeniatus*. The current CITES Standard Reference (Glaw, 2015) reflects this nomenclature.

T. bitaeniatus is considered to be a species complex (Kořený 2006; Tilbury 2010). Kořený (2006,) noted that populations from diverse localities that were identified as being morphologically *bitaeniatus* were genetically heterogenous, and considered that only topotypic specimens (i.e. from the population around Lake Naivasha in Kenya) could be safely classified as *T. bitaeniatus*. However, because Kořený (2006)'s phylogeny did not include samples from localities outside of Kenya and Sudan, Tolley (2014) noted that it was not yet possible to eliminate them as belonging to the species. Tilbury (2010) and Tolley (2014) consider a taxonomic revision of the species complex to be necessary.

[1] Hereafter referred to as Tanzania

Trade patterns

Trioceros bitaeniatus was listed in Appendix II of CITES on 04/02/1977 and in Annex B of the EU Wildlife Trade Regulations on 01/06/1997, both as part of the genus listing for *Trioceros* (then *Chamaeleo*).

Democratic Republic of the Congo

DRC has submitted all annual reports for 2008-2018. At the time of writing (May 2019), data for 2018 had been received from DRC, but importer-reported data was incomplete. In 2018, DRC published a quota for 3000 live wild-sourced individuals, the first quota it has published for this species. DRC did not report any trade in *T. bitaeniatus* in this year.

There were no direct or indirect exports of *T. bitaeniatus* from, or originating in DRC to the EU-28 2008-2017. Trade to the rest of the world 2008-2017 comprised 16 wild-sourced live individuals for commercial purposes according to DRC (reported in 2009), and 19 wild-sourced specimens for scientific purposes according to the sole importer, the United States (16 specimens in 2009 and three specimens in 2015).

Tanzania

Tanzania published annual export quotas for live, wild-taken and F1 *T. bitaeniatus* for all years 2008-2017, with the exception of 2010 where it did not issue a quota for F1 specimens but published a quota for 84 live, captive-bred individuals (Tables 1 and 2).

Trade in live, wild-sourced individuals was below quota 2010-2017; trade appears to have exceeded the quota by two individuals in 2008 and eight individuals in 2009 according to data reported by importers, but was within quota according to data reported by Tanzania. Trade in F1 specimens was within quota for all years 2008-2017, according to both importer- and exporter-reported data. Tanzania has submitted all annual reports 2008-2017.

Table 1: CITES export quotas for live, wild-sourced *Trioceros bitaeniatus* from Tanzania, 2008-2017, and global direct exports of live, wild-sourced *T. bitaeniatus* reported by countries of import and Tanzania, 2008-2017.

Wild-Sourced	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota	1000*	1000*	1000*	1000*	1000*	1000*	1000	1000	1000	1000
Reported by importers	1002	1008	616	498	23	429	606	713	66	
Reported by Tanzania	649	789	767	317		195	777	596		

* Quota originally established for *Chamaeleo bitaeniatus* which was subject to a taxonomic change at CITES CoP16.

Table 2: CITES export quotas for F1 specimens of *Trioceros bitaeniatus* from Tanzania, 2008-2017, and global direct exports of F1 specimens of *T. bitaeniatus* reported by countries of import and Tanzania, 2008-2017.

F1 specimens	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota	90*	84*	**	84*	100	84*	50	50	84	84
Reported by importers			5							
Reported by Tanzania		5	30							

*Quota originally established for *Chamaeleo bitaeniatus* which was subject to a taxonomic change at CITES CoP16.
**Tanzania instead published a quota for 84 live, captive-bred individuals in this year

According to the CITES Trade Database, trade in *T. bitaeniatus* from Tanzania to the EU-28 2008-2017 principally comprised live, wild-sourced individuals for commercial purposes (1962 individuals according to importers, and 1602 individuals according to data reported by Tanzania). The number of individuals traded remained relatively stable during 2008-2011 and 2013-2015, no trade was reported in 2012 or 2017 (Table 3). Trade to the rest of the world 2008-2017 principally comprised live, wild-sourced individuals, totalling 2903 individuals according to importer reported data and 2488 individuals according to exporter-reported data.

Table 3: Direct exports of *Trioceros bitaeniatus* from Tanzania to the EU-28 (EU) and the rest of the world (RoW), 2008-2017. All trade was reported by number. Tanzania has submitted all annual reports 2008-2017.

Importer	Term	Purpose	Source	Reported by	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
EU	live	P	W	Importer		20		20							40
				Exporter											
		T	F	Importer			5								5
				Exporter		5									5
			W	Importer	315	349	302	273		243	239	229	12		1962
				Exporter	220	334	270	188		148	328	114			1602
RoW	live	Q	W	Importer	6										6
				Exporter											
		T	F	Importer											
				Exporter			30								30
			I	Importer							20	10			30
				Exporter											
			W	Importer	631	639	314	205	23	186	367	484	54		2903
				Exporter	429	455	497	129		47	449	482			2488
		Z	W	Importer	50										50
				Exporter											
	specimens	S	W	Importer		9									9
				Exporter											

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 01/05/2019

Indirect trade of *T. bitaeniatus* from Tanzania to the EU-28, 2008-2017, comprised 50 live, wild-sourced individuals for commercial purposes reported in 2015 by the sole importer, Hungary. The re-exporting country was reported to be unknown.

Conservation status

T. bitaeniatus is a small diurnal chameleon (average size 11-14 cm) without horns but with a small crest and/or beard (Spawls *et al.*, 2002, 2014). The species is brown or grey and usually has two distinctive side-stripes (Spawls *et al.*, 2014). It has been noted to be morphologically similar to *T. ellioti* (Spawls, 2002) and it is thought that some records of *T. bitaeniatus* are misidentifications of this species (Tilbury 2010). Tilbury (2010) describes *T. bitaeniatus* as occuring in savannah grassland and acacia scrub from 1500 to 3000 m above sea level (a.s.l.). Spawls *et al.* (2018) additionally note it to occur in woodland and isolated hills, and give a wider altitudinal range of 1000-3000 m a.s.l. Spawls (2014) reported that the species was tolerant of stock farming country in the rift valley and occurred in urban gardens in Kenya.

Individuals of *T. bitaeniatus* tolerate each other and will co-exist in close proximity (Spawls, 2000). The species feeds on invertebrates including grasshoppers (Spawls *et al.*, 2002), beetles, spiders, flies, stick insects and caterpillars (Tilbury, 2010). It is viviparous, giving birth to between 6-15 young (max. 25) (Spawls *et al.*, 2014). Bustard (1966) observed breeding of wild-caught *T. bitaeniatus* kept in captive conditions throughout the six months they were kept, and thought it "possible that they breed throughout the year". A husbandry guide reported that *T. bitaeniatus* reached sexual maturity after one year, had a gestation length of 8-9 months, and could give birth once a year (Brunetti *et al.*, 2017). It also noted that the species was difficult to rear, both because its small size made it difficult to find food items of a suitable size, and because "imported individuals tend to be kept in poor conditions", with individuals being kept in overpopulated conditions, high temperatures, and low humidity (Brunetti *et al.*, 2017).

T. bitaeniatus has been reported to occur in Ethiopia, Kenya, Somalia, Sudan, Tanzania, Uganda and the Democratic Republic of the Congo (Tilbury 2010), although Uganda and DRC are not considered to be range States in a more recent publication by Tilbury (2018). Molecular work has additionally cast doubt on whether any populations except those around Lake Naivasha in Kenya can be safely classified as *T. bitaeniatus* (see *Taxonomic note*). The species' extent of occurrence was estimated to be 870 000 km^2 (Tolley, 2014). Because

the taxonomy of *T. bitaeniatus* remains unresolved, Tolley (2014) noted that the species' area of occupancy could not be reliably estimated.

T. bitaeniatus was classified globally as Least Concern with a stable population trend in a 2013 IUCN Assessment, on the basis of its large distribution and the presumption that it is not heavily impacted by anthropogenic activities (Tolley, 2014). No population estimates could be found, but Tilbury (2010) described *T. bitaeniatus* as "widespread and common", and considered it to be unlikely to be significantly affected by trade. However, he also noted that further resolution of the taxonomy of the *T. bitaeniatus* species complex may falsify that assumption, particularly if a revised taxonomy results in multiple splits. Spawls (2002) noted that *T. bitaeniatus* may be abundant in some areas, but that populations were vulnerable to peaks and crashes, potentially resulting from the fact it is viviparous or predation from birds.

An assessment of the vulnerability of species to climate change in the Albertine rift noted that *T. bitaeniatus* occurred in a relatively small number of microhabitats (a trait that increased its susceptibility to climate change), and that it had a maximum reasonable dispersal distance of >5 km, which may decrease the species' ability to adapt to climate change (Carr *et al.*, 2013). It also classified *T. bitaeniatus* as a species that was important for human use as pets (Carr *et al.*, 2013).

Democratic Republic of the Congo (DRC): It is unclear whether *T. bitaeniatus* occurs in DRC. A map of the species' distribution in Tilbury (2010) indicated that *T. bitaeniatus* occurs at multiple localities in eastern DRC. However, a more recent publication by Tilbury (2018) no longer considers the species to occur in the country, noting alongside Tolley (2014) that records of *T. bitaeniatus* from DRC may actually be misidentified individuals of *T. ellioti* (which bears a strong resemblance to *T. bitaeniatus* (Tilbury, 2010) but was split from *T. bitaeniatus* by Rand (1963)).

T. bitaeniatus was listed as a partially protected species under Appendix II of Ministerial Order No.20/CAB/MIN/ECN-EF/2006 (as *Chamaeleo bitaeniatus*) (République Démocratique du Congo, 2006) relevant to Law N°14/003 (République Démocratique du Congo, 2014). This partial protection recognises that trade in specimens of the species must be regulated to avoid exploitation incompatible with their survival, and as such they cannot be hunted, captured or killed without a licence (République Démocratique du Congo, 2006). *T. bitaeniatus* does not appear in the list of species for which licences for hunting for sport are issued (République Démocratique du Congo, 2004), but partially protected species may be targeted under a tourism licence (article 16) or a licence allowing capture for commercial purposes, which are issued for specific species, sexes and numbers of animals (article 23) (République Démocratique du Congo, 2004).

Within National Parks, Law 14/003 prohibits, *inter alia*, hunting or transport of live animals or their parts or products (République Démocratique du Congo, 2014). However, most protected areas in DRC were reported to be at risk due to inadequate infrastructure, lack of human and financial capacity, and political instability (République Démocratique du Congo, 2016). Within eight protected areas, the main causes of biodiversity loss were reported to be poaching (in all eight) and deforestation (in six of the protected areas) (Sébastien and Kiyulu N'Yanga-Nzo, 2001). Improving management of protected areas and biodiversity research in DRC were included in the list of strategic priorities in the National Biodiversity Strategy and Action Plan 2016-2020 (République Démocratique du Congo, 2016).

Tanzania: Occurs in Tanzania (Spawls 2002, 2018; Tilbury, 2010; Tilbury, 2018), but appears to have a restricted distribution (Tilbury, 2018). Tolley (2014) noted that there are records of *T. bitaeniatus* in northern Tanzania: Rand (1963) examined a specimen of *T. bitaeniatus* collected at "Longido West" and Rand (1971) noted it to be present in the Nguru Mountains (AC20 Doc. 8.5). Spawls (2018) noted there to be sporadic records from Ngorongoro, Arusha, Mt. Longido, and central Serengeti (all in north-eastern Tanzania), as well as isolated records from the west of Lake Victoria (including Bukoba); however this latter specimen was considered by Tilbury (2018) to be a possible misidentification. No data regarding the population size, population density, or captures per unit effort for *T. bitaeniatus* could be located.

Tanzania's Wildlife Conservation Act (2009) banned the capture of any wild animal without a permit which specifies both the species and the areas where capture can take place (United Republic of Tanzania, 2009). Hunting animals within protected areas is also prohibited (Wildlife Conservation Act 2009: United Republic of Tanzania, 2009).

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SAURIA: CHAMAELEONIDAE

Trioceros ituriensis II/B

SYNONYMS:	*Chamaeleo ituriensis* Schmidt, 1919*; Chamaeleo tremperi* Necas, 1994*; Chamaeleon johnstoni affinis* Boulenger, 1901*; Trioceros johnstoni ituriensis* Boulenger, 1901
COMMON NAMES:	Ituri forest chameleon (EN)
RANGE STATES:	Democratic Republic of the Congo (DRC), Kenya (?), Uganda
UNDER REVIEW:	DRC
EU DECISIONS:	No current suspensions or opinions in place
IUCN:	Least Concern

Taxonomic note

The genus *Chamaeleo* was sub-divided into two sub-genera: *Chamaeleo* (*Chamaeleo*) and *Chamaeleo* (*Trioceros*), until Tillbury and Tolley (2009) elevated each subgenus to the separate and distinct genera *Chamaeleo* and *Trioceros*. Tilbury and Tolley (2009) was adopted as a CITES Standard Reference at CoP16 in 2013, thus the Ituri forest chameleon (formerly *Chamaeleo (T.) ituriensis*) became *T. ituriensis*. The current CITES Standard Reference for Chameleonidae, Glaw (2015) (adopted at CoP17 in 2016), reflects this nomenclature.

Glaw (2015) also considers *Chamaeleo tremperi,* a species described on the basis of museum specimens from the 20th century by Necas (1994) with the Eldana River Station, Kenya assigned as the type locality, to be a synonym of *T. ituriensis*. This decision was based on Tilbury (2010), who could find no significant or defining characteristics to separate the type and paratype specimens of *tremperi* from *T. ituriensis*. Tilbury (2010) noted that several subsequent searches of the type locality for *tremperi* and surrounding area failed to find any forms other than *T. hoehnelii*, and suggested that the provenance of *T. tremperi* is most likely erroneous.

Trade patterns

T. ituriensis was listed in CITES Appendix II on 04/02/1977 and in Annex B of the EU Wildlife Trade Regulations on 01/06/1997, both as part of the genus listing for *Trioceros* (then *Chamaeleo*).

DRC has submitted all annual reports for 2008-2018. At the time of writing (May 2019), data for 2018 had been received from DRC, but importer-reported data was incomplete.

In 2018, DRC published a quota for 2000 live wild-sourced individuals, the first quota it has published for this species. According to data reported by DRC, trade in 2018 was within quota.

According to the CITES Trade Database, there were no direct exports of *T. ituriensis* to the EU-28 2008-2017[2]. Direct trade to the rest of the world comprised low levels of wild-sourced live animals and specimens exported to the United States of America[3] in 2009, 2012 and 2015 for scientific purposes (three live animals according to data reported by DRC, and 13 specimens according to data reported by the United States). DRC had submitted

[2] Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 01/05/2019.
[3] Hereafter referred to as the United States

an annual report for 2018 at the time of writing; exports in 2018 comprised 60 wild-sourced individuals for commercial purposes to the Netherlands, and 75 wild-sourced individuals for commercial purposes to the United States.

No indirect trade in *T. ituriensis* originating in DRC was reported to the EU-28 2008-2017.

Conservation status

Trioceros ituriensis is a fairly large, slender chameleon lacking both horns and ear flaps (Spawls *et al.*, 2002). It is considered to be a forest specialist (Tolley and Pumptre, 2014) and is an arboreal species, found in bushes or low trees in forest habitats (Spawls *et al.*, 2002). Females tend to be larger than males, reaching up to 25 cm in length (average 18-22 cm) versus a maximum of 19 cm in length (Spawls *et al.*, 2002). The species' colouring is variable, but is usually light green, yellowish or grey-green (Spawls *et al.*, 2002) with a prominent white mid-ventral line (Tilbury, 2010). *T. ituriensis* feeds on a wide variety of invertebrates including snails, spiders, crickets and ants (Tilbury, 2010). It is oviparous, but the clutch size, periodicity and age of maturity are unknown (Spawls *et al.* 2018).

T. ituriensis principally occurs in northeastern DRC (Tilbury, 2010; Tolley and Pumptre, 2014), but there is a small area of south-central Uganda from which there have been two records: one in Bwamba forest and one in Kibale forest (Spawls *et al.* 2002; Vonesh pers. comm. 2013 in: Tolley and Pumptre, 2014). If valid, the Ugandan records create a distribution gap between previously known records as well as a strong habitat and altitudinal barrier (Tolley and Pumptre, 2014). Acceptance of the validity of the species' occurrence at the Eldana River Station in Kenya (the type locality for *C. tremperi*, which the current CITES Standard Reference considers to be a synonym of *T. ituriensis* - see *Taxonomic note*) would further dramatically expand the species' range. However, it should be noted that the provenance of *C. tremperi* was considered to be erroneous by Tilbury (2010), who failed to find the species in subsequent searches of the area surrounding its type locality. Alternatively, Necas *et al.* (2003) suggested that the absence of *C. tremperi* in subsequent searches could represent an extirpation of the species. Discounting both the Ugandan and Kenyan records, the extent of occurrence of *T. ituriensis* has been estimated at 3 328 550 km^2, of which 75% of the landscape was considered to consist of suitable forest habitat (Tolley and Pumptre, 2014). The IUCN assessment for *T. ituriensis* noted that the area of occupancy was unknown (Tolley and Pumptre, 2014), however a range size of 452 229 km^2 for the species was estimated based on collection localities, personal observations, knowledge of habitats in the region, and specimens from known localities (Lewin *et al.*, 2016). This is substantially lower than the 2 496 412 km^2 area of occupancy which would be inhabited if the species was present in the full 75% of suitable habitat across the extent of occurrence calculated by Tolley and Pumptre (2014).

Democratic Republic of the Congo: Within DRC, *T. ituriensis* was reported to be found at elevations of between 600-2000 m above sea level (Tilbury, 2010). The IUCN Red List assessment of the species noted that there was no quantitative or anectodal information regarding its population size and/or population trend (Tolley and Pumptre, 2014). Spawls *et al.* (2002) noted it was "probably widespread and common in forested country in north-eastern Dem. Rep. Congo", Tilbury (2010) described it as "apparently a common species in the Ituri forest", and Greenbaum (*in litt*. to UNEP-WCMC, 2019) noted it "seems to be relatively common in the low to mid-elevation forests and forest edges of eastern DR Congo". *T. ituriensis* was reported to occur in at least one protected area (Tolley and Pumptre, 2014), and has been encountered in Kahuzi-Beiga National Park (Institut Congolais pour la conservation de la nature, 2009; Greenbaum *in litt.* to UNEP-WCMC, 2019) and the Okapi Wildlife Reserve (Greenbaum *in litt.* to UNEP-WCMC, 2019).

The 2013 IUCN assessment of the species considered DRC to be the only country of occurrence (Tolley and Pumptre, 2014). On the basis of its large extent of occurrence, *T. ituriensis* was categorised as Least Concern (Tolley and Pumptre, 2014). The assessment noted that *T. ituriensis* faced ongoing threats from continuing habitat degradation, landscape transformation, and artisanal mining, but these were thought to be localised in an area where extensive humid forest habitat remains (Tolley and Pumptre, 2014). The ability of the species to

tolerate habitat modification was considered unknown (Tolley and Pumptre, 2014), but an assessment of the vulnerability of species to climate change in the Albertine rift concluded that *T. ituriensis* [*C. ituriensis*] possessed several traits that made it "highly sensitive" to climatic changes (Carr *et al.*, 2013). These included a low probability of dispersal, a low number of habitat types inhabited, a low number of microhabitats inhabited, and a low tolerance to changes in fire regimes (Carr *et al.*, 2013).

Tolley and Pumptre (2014) noted that the species was not known to be present in the captive market, and a study by Carr *et al.* (2013) assessing threats to species in the Albertine Rift did not consider it to be a chameleon species that was "important for human use". These statements are supported by data held by the CITES Trade Database for 2008-2017, but may no longer be the case in view of the recent increase in the number of live individuals exported by DRC for commercial purposes in 2018.

T. ituriensis was listed as a partially protected species under Appendix II of Ministerial Order No.20/CAB/MIN/ECN-EF/2006 (as *Chamaeleo ituriensis*) (République Démocratique du Congo, 2006) relevant to Law N°14/003 (République Démocratique du Congo, 2014). This partial protection recognises that trade in specimens of the species must be regulated to avoid exploitation incompatible with their survival, and as such they cannot be hunted, captured or killed without a licence (République Démocratique du Congo, 2006). *T. ituriensis* does not appear in the list of species for which licences for hunting for sport are issued (République Démocratique du Congo, 2004), but partially protected species may be targeted under a tourism licence (article 16) or a licence allowing capture for commercial purposes, which are issued for specific species, sexes and numbers of animals (article 23) (République Démocratique du Congo, 2004).

Within National Parks, Law 14/003 prohibits, *inter alia*, hunting or transport of live animals or their parts or products (République Démocratique du Congo, 2014). However, most protected areas in DRC were reported to be at risk due to inadequate infrastructure, lack of human and financial capacity, and political instability (République Démocratique du Congo, 2016). Within eight protected areas, the main causes of biodiversity loss were reported to be poaching (in all eight) and deforestation (in six of the protected areas) (Sébastien and Kiyulu N'Yanga-Nzo, 2001). Improving management of protected areas and biodiversity research in DRC were included in the list of strategic priorities in the National Biodiversity Strategy and Action Plan 2016-2020 (République Démocratique du Congo, 2016).

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SAURIA: VARANIDAE

Varanus albigularis II/B

SYNONYMS:	*Monitor exanthematicus capensis* Bosc, 1792*; Tupinambis albigularis* Daudin, 1802; *Varanus exanthematicus albigularis* Bosc, 1792; *Varanus gilli* Smith, 1831
COMMON NAMES:	White-throated Monitor (EN), Varan à gorge blanche (FR)
RANGE STATES:	Angola, Botswana, Democratic Republic of the Congo (DRC), Djibouti, Eritrea, Eswatini, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Somalia, South Africa, South Sudan, Sudan, Uganda, United Republic of Tanzania[1], Zambia, Zimbabwe
UNDER REVIEW:	DRC
EU DECISIONS:	Current no opinion i) for wild specimens from DRC, Djibouti, and Eswatini formed on 07/11/2016. Previous no opinion for DRC formed on 22/02/2000, replacing an Article 4.6(b) import suspension for wild specimens from DRC first applied on 22/12/1997 and last confirmed on 19/09/1999 Current positive opinion for Kenya and Uganda formed on 22/02/2000 Current Article 4.6(b) import suspension for wild specimens from Tanzania first applied on 10/09/2012 and last confirmed on 09/11/2017
IUCN:	Not assessed

Taxonomic note

The current CITES Standard Reference (Böhme, 2003) recognises three subspecies, *Varanus albigularis albigularis, V. a. angolensis* and *V. a. microstictus.*

Trade patterns

V. albigularis was listed in CITES Appendix II on 01/07/1975 and in Annex B of the EU Wildlife Regulations on 01/06/1997, both as part of a genus listing for *Varanus* spp.

DRC have submitted CITES annual reports for all years 2008-2018. At the time of writing (May 2019), data for 2018 had been received from DRC, but importer-reported data was incomplete. In 2018, DRC published a quota for 2000 live individuals of *V. albigularis,* the first quota it has published for this species. DRC did not report any exports of *V. albigularis* in this year.

According to the CITES Trade Database, there were no direct or indirect exports of *V. albigularis* from, or originating in DRC to the EU-28, 2008-2017[2]. Direct trade to the rest of the world comprised solely of two wild-sourced specimens for scientific purposes imported by the United States of America[3] in 2012, as reported by the United States.

[1] Hereafter referred to as Tanzania
[2] Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 31/05/2019.
[3] Hereafter referred to as the United States

Conservation status

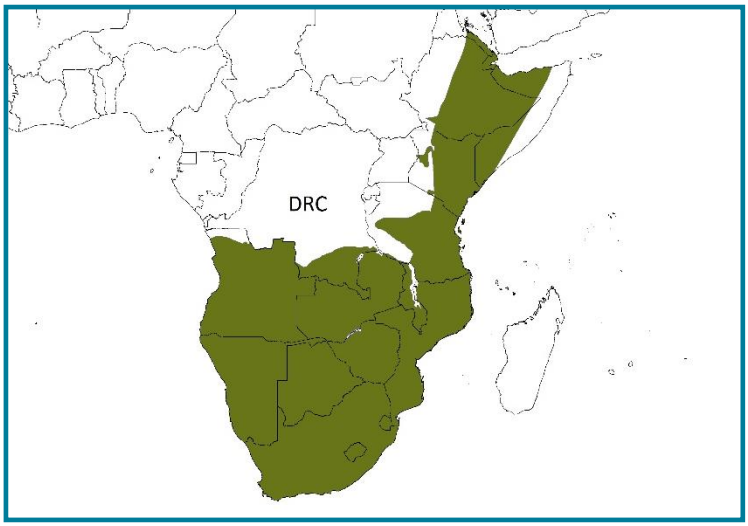

Figure 1: Range of *Varanus albigularis.* Source: Roll *et al.,* 2017.

Varanus albigularis is a large heavy-bodied diurnal monitor lizard, widely distributed throughout southern and eastern Africa (Fig. 1[4]; Phillips, 2004). The species' size was noted to vary with geographic location (Phillips, 2004), reaching up to a maximum of 1.6 m (Spawls *et al.*, 2018). *V. albigularis* inhabits "dry and moist savanna, coastal thicket and woodland and semi-desert" up to approximately 1500 m above sea level (Spawls *et al.*, 2018). Home ranges are reportedly large with males inhabiting an average range of 18.3 km^2 (up to 25 km^2 according to Spawls *et al.*, 2018) and females 6.1 km^2 (Phillips, 1995) or 8-10 km^2 (Spawls *et al.*, 2018) in Namibia. The species is a generalist predator (Dalhuijsen *et al.*, 2015) that feeds on a wide range of vertebrates and invertebrates (Spawls *et al.*, 2018). Alexander and Marais (2007) noted that *V. albigularis* is long-lived and relatively slow growing. In Namibia, both sexes were reported to reach sexual maturity at 50 cm snout vent length (SVL), indicating that *V. albigularis* become reproductively active at 5-6 years of age (Phillips, 1995). Clutches consist of 8-51 eggs (Spawls *et al.*, 2018), with captive-bred individuals noted to lay up to 65 eggs (Eidenmüller, 2007). Incubation takes approximately four months in southern Africa, with hatchlings measuring 23-26 cm total length (Spawls *et al.*, 2018). Spawls *et al.* (2018) noted that the species may aestivate during the dry season.

Of the three subspecies, *V. a. albigularis* was reported to be the most widely distributed, occurring from South Africa north to Angola, Zambia and Mozambique (Böhme, 2003; Phillips, 2004). *V. a. angolensis* was reported to be largely restricted to Angola, but thought also to occur in northern Namibia, western Zambia (Böhme, 2003; Phillips, 2004) and southern DRC (Phillips, 2004). *V. a. microstictus* occurs in east Africa from Tanzania north to Ethiopia and Somalia (Böhme, 2003; Phillips, 2004). According to the distribution map in Phillips (2004), *V. a. microstictus* may also occur as far south as northern Mozambique.

V. albigularis has not been assessed for the IUCN Red List. There are few reports on current population status and trends for *V. albigularis*, although Spawls *et al.* (2018) described localised differences in population status for *V. albigularis*, ranging from "abundant" in some places, in particular in areas with suitable refuges, to "scarce" in others. Alexander and Marais (2007) reported this species was "widely distributed and abundant" in South Africa. In 1994, in a publication by the IUCN/SSC Conservation Breeding Specialist Group, the wild population of *V. albigularis* was estimated at > 1 000 000 individuals and populations were "presumed to be declining" (Hudson *et al.*, 1994). Spawls *et al.* (2018) noted that *V. albigularis* displayed varying levels of tolerance to human presence.

V. albigularis was reported to be exploited to supply demand for the leather trade (Alexander and Marais, 2007; Balsai, 2008), for use in traditional medicine (Alexander and Marais, 2007), as food for human consumption (Balsai, 2008), and for the pet trade (Balsai, 2008). Habitat loss was also considered a threat to the species (Hudson *et al.*, 1994). In Southern Africa the species' skin used to be "highly prized" in the leather industry, while the skin and fat was also used in the muti trade [traditional medicine in southern Africa] (Alexander and Marais, 2007). Smart *et al.* (2005) described *V. albigularis* as a species that is eaten and used in traditional medicine in South Africa, and Moshoeu (2017), reported the use of *V. albigularis* in traditional medicine in Zimbabwe.

In an unpublished pet trade summary, Reptile Traders (2007) wrote of the "Black-throat Monitor", stating that the species was "becoming increasingly popular" in the pet trade and "being bred in captivity in growing numbers". In 2017, Janssen

[4] Disclaimer: The boundaries and names shown and the designations used on maps do not imply official endorsement or acceptance by UN Environment or contributory organisations.

(2018) recorded *V. albigularis* being offered for sale in three Japanese reptile shops, with one individual observed in each shop, priced at an average of USD 529. Balsai (2008) considered that given the lack of population data for monitor species, determing sustainable harvest levels from wild populations was "impossible", and that the levels of exploitation of many monitor species were "very likely" resulting in population declines, although this had not been adequately documented.

Democratic Republic of the Congo: *V. albigularis* occurs in southern DRC (Bayless, 2002; Phillips, 2004; Eidenmüller, 2007), with the subspecies *V. a. angolensis* reported to occur in the southwest (Phillips, 2004; Eidenmüller, 2007) and *V. a. albigularis* in the south (Phillips, 2004). *V. a. angolensis* has previously been recorded from multiple locations within the Upemba National Park in DRC: Bukena, Kabengere, Kabenga village, Kaluwamba River, Kamina, Kande River, Kankunda River, Kanonga River, Kansenia, Kanzenze, Kaswabilenga, Kateke River, Kaziba River, Kiambi, Kikondja, Kilwezi River, Kinda, Lufira, Lukafu, Lukulu, Mokabe-Kasari, Mabwe, Munoi, Mwanza, Pweto, and Sampwe (Witte, 1953). *V. a. angolensis* and *V. a. microstictus* were also reported from Lukulu (Witte, 1933 in: Bayless, 2002), however, no other records of *V. a. microstictus* in DRC could be located.

No population estimates were found for *V. albigularis* in DRC. Historically, *V. a. angolensis* was reported to be common in the lowlands of Upemba National Park (southwest DRC) (Witte, 1953). According to the species' distribution it may also occur within five other protected areas (Bassin de la Lufira – Ramsar site, Kundelungu National Park, Lubudi-Sampwe Hunting Area, Lufira Biosphere Reserve, Tshangalele – Kolwezi National Park; UNEP-WCMC, 2019).

V. albigularis was listed as a partially protected species under Appendix II of Ministerial Decree No.20/CAB/MIN/ECN-EF/2006 (République Démocratique du Congo, 2006) relevant to Law N°14/003 (République Démocratique du Congo, 2014). This partial protection recognises that trade in specimens of the species must be regulated to avoid exploitation incompatible with their survival, and as such they cannot be hunted, captured or killed without a licence (République Démocratique du Congo, 2006). *V. albigularis* does not appear in the list of species for which licences for hunting for sport are issued (République Démocratique du Congo, 2004), but partially protected species may be targeted under a tourism licence (article 16) or a licence allowing capture for commercial purposes, which are issued for specific species, sexes and numbers of animals (article 23) (République Démocratique du Congo, 2004).

Within National Parks, Law 14/003 prohibits, *inter alia*, hunting or transport of live animals or their parts or products (République Démocratique du Congo, 2014). However, most protected areas in DRC were reported to be at risk due to inadequate infrastructure, lack of human and financial capacity, and political instability (République Démocratique du Congo, 2016). Within eight protected areas, the main causes of biodiversity loss were reported to be poaching (in all eight) and deforestation (in six of the protected areas) (Sébastien and Kiyulu N'Yanga-Nzo, 2001). Improving management of protected areas and biodiversity research in DRC were included in the list of strategic priorities in the National Biodiversity Strategy and Action Plan 2016-2020 (République Démocratique du Congo, 2016).

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SAURIA: VARANIDAE

Varanus ornatus II/B

SYNONYMS:	*Tupinambis ornatus* Daudin, 1803; *Varanus niloticus ornatus* Linnaeus, 1766
COMMON NAMES:	Ornate monitor
RANGE STATES:	Angola, Benin, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo (DRC), Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Togo
UNDER REVIEW:	Benin, DRC
EU DECISIONS:	Current no opinion iii) for wild and ranched specimens from Benin formed on 07/11/2016, replacing a no opinion formed on 15/09/2008 No current opinions or suspensions in place for DRC Current positive opinion for wild specimens from Cameroon formed on 25/10/2005 Current no opinion iii) for wild and ranched specimens from Ghana formed on 07/11/2016 Current Article 4.6(b) import suspensions for wild and ranched specimens from Togo first applied on 03/09/2008 and last confirmed on 09/11/2017
IUCN:	Not evaluated

Taxonomic note

Varanus ornatus was considered a subspecies of *Varanus niloticus* until a taxonomic review in 1997 elevated *V. ornatus* to species level (Böhme and Ziegler, 1997). The current CITES Standard Reference for monitor lizards adopted at CoP13 in 2004, Böhme (2003), reflects this nomenclature, recognising *V. ornatus* and *V. niloticus* as separate species. However, a recent molecular analysis found *V. ornatus* to be genetically indistinguishable from *V. niloticus*, and therefore concluded that it should not be considered a distinct species but a phenotypic morph (Dowell *et al.*, 2016). For the purposes of this review, the nomenclature accepted by the CITES Standard Reference is followed, but for clarification, the nomenclature used in the cited source is given in square brackets. It should be noted that it is not always possible to tell whether studies in the literature refer to *V. niloticus sensu stricto* or *sensu lato*.

Trade patterns

Varanus ornatus was listed in CITES Appendix II on 01/07/1975 and in Annex B of the EU Wildlife Trade Regulations on 01/06/1997, in both cases as part of the genus listing for *Varanus* spp.

Benin: CITES annual reports have been submitted by Benin for the years 2008-2016; the report for 2017 had yet to be received at the time of writing (May 2019). Benin published an export quota of 500 ranched *V. ornatus* in 2018, the first quota it has published for this species.

According to the CITES Trade Database, there are no records of direct or indirect trade in *V. ornatus* from, or originating in Benin to the EU-28 or rest of the world for the period 2008-2017[1].

Given the taxonomic complexity of the species, direct trade in *V. niloticus* from Benin to the EU-28 has also been considered. Direct trade in *V. niloticus*[2] from Benin to the EU-28 2008-2017 comprised live, ranched individuals for commercial purposes; Benin reported exports in all years 2008-2016, with the exception of 2010, to a total of 750 individuals, while importers only reported 150 individuals imported in 2013 (100 by Germany and 50 by the United Kingdom).

DRC: DRC has submitted all CITES annual reports for the years 2008-2017. At the time of writing (May 2019), data for 2018 had been received from DRC, although importer-reported data was incomplete.

In 2018, DRC published an export quota for 2000 live individuals, the first quota it has published for *V. ornatus*. According to data reported by DRC, trade was within quota.

According to the CITES trade database, no direct trade in *V. ornatus* from DRC to the EU-28 was reported for the period 2008-2017[1]. Direct trade from DRC to countries other than the EU-28 consisted solely of five wild-sourced specimens imported for scientific purposes by the United States in 2012 (four) and 2013 (one), as reported by the United States. Exports from DRC in 2018 comprised 50 live wild-sourced individuals for commercial purposes to the Netherlands but none to the rest of the world. No indirect trade to the EU-28 in *V. ornatus* originating in DRC was reported 2008-2017.

DRC also published a quota for 1000 live wild-sourced *Varanus niloticus* in 2018. Direct trade in *V. niloticus* from DRC to the EU-28 for the period 2008-2017 consisted of 50 wild-sourced small leather products for commercial purposes reported by Portugal in 2012. At the time of writing (May 2019), DRC reported exports of 50 live wild-sourced individuals for commercial purposes to the Netherlands in 2018; importer-reported data was incomplete for 2018.

Conservation status

Varanus ornatus is a large, stoutly-built diurnal monitor lizard (Böhme and Ziegler, 2004), with an average length of 1.5-2.2 m and a maximum length of approximately 2.5 m (Spawls *et al.*, 2002). It occurs principally in lowland rainforests (Böhme and Ziegler, 2004), as well as in associated gallery forest (Trape *et al.*, 2012), secondary forest, deltaic swamps and mangroves (Böhme and Ziegler, 2004), in habitats closely associated with water (Böhme and Ziegler, 2004; Eidenmüller, 2007). While Böhme and Ziegler (1997) suggested that *V. ornatus* is restricted to forest habitats, surveys undertaken by Angelici and Luiselli (1999) in southeast Nigeria also observed specimens of the form *ornatus* in savannas and on agricultural land. The species is broadly terrestrial but is also reportedly an excellent swimmer and good climber (Spawls *et al.*, 2002; Böhme and Ziegler, 2004). *V. ornatus* was noted to be an active forager (Böhme and Ziegler, 2004) on land and in the water (Spawls *et al.*, 2002), with a varied diet consisting of crabs, insects (Eidenmüller, 2007; Trape *et al.*, 2012), centipedes (Eidenmüller, 2007), spiders (Trape *et al.*, 2012), molluscs, and any suitable small vertebrates (Spawls *et al.*, 2002; Trape *et al.*, 2012). *V. ornatus* [*V. n. ornatus*] was reported to be active throughout the year, but with peaks of seasonal activity during the wet months (Angelici and Luiselli, 1999).

It was reported that *V. ornatus* may be distinguished from *V. niloticus* by its five or fewer dorsal crossbands of yellow ocelli/spots and a light-coloured tongue, whereas *V. niloticus* has six or more dorsal crossbands of yellow ocelli and a dark-coloured tongue (Böhme and Ziegler, 1997). Additionally, *V. ornatus* reportedly has a larger, more robust head (although small sample sizes prevented in depth-analysis of this trait), a higher midbody scale count and a greater number of paryphasmata on the outer genital organs than *V. niloticus*

[1] Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 03/05/2019.
[2] Subject to a current Article 4.6(b) import suspension for wild specimens since 03/09/2008 (last confirmed 09/11/2017) and for ranched specimens greater than 35cm since 22/12/1997 (last confirmed 09/11/2017), as well as a positive opinion for ranched specimens with a total length of 35cm or smaller formed on 03/12/2010.

(Böhme and Ziegler, 1997). Dowell *et al.* (2016) suggested that the colouration patterns used to define *V. ornatus* likely represent a variation within the *V. niloticus* species that is selectively favoured in forested areas, and noted that additional study was required to validate this hypothesis as the ecological context of this variation was poorly understood. Fouchard (pers comm. in: Ineich 2006) noted that the hatching seasons for *V. niloticus* and *V. ornatus* did not overlap: *V. niloticus* eggs were reported to hatch in April while *V. ornatus* eggs were reported to hatch in August-September. Information on the reproduction of *V. ornatus,* however, appears to be conflicting; Angelici and Luiselli (1999) reported gravid *V. ornatus* females in Nigeria between late March and mid-April with hatching eggs in early May, leading them to infer a pronounced reproductive seasonality (although the authors noted that limited data were available).

Toudonou (2011) suggested that *V. ornatus* eggs are buried in termite mounds or burrows, and that juveniles hatch at the beginning of the following rainy season. No information on clutch sizes of *V. ornatus* could be located, however, female *V. niloticus* lay an average of 20 eggs (Cowles, 1930 in: Lenz, 2004), up to a maximum of 60 eggs depending on the size of the female (Buffrénil and Rimblot-Baly, 1999; Lenz, 2004). Reported lengths of incubation vary from 6-9 months (Cowles, 1930 and Cissé, 1971 in: Lenz, 2004) to a year (Spawls *et al.*, 2002); 4-6 months in captivity (Spawls *et al.*, 2018). In *V. niloticus sensu stricto*, sexual maturity was reported to be reached at 3 or 4 years (Lenz, 2004). *V. ornatus* was reported to be commonly kept in captivity (Eidenmüller, 2007).

V. ornatus has a wide distribution across west and central African lowland tropical rainforest (Böhme, 2003; Böhme and Ziegler, 2004). No information could be found on the global population status or trends of *V. ornatus*. The IUCN Red List considers *V. ornatus* to be a synonym of *Varanus olivaceus*, a species endemic to the Philippines (Sy *et al.*, 2009). *V. niloticus* has not been assessed for the IUCN Red List. Population densities for *V. niloticus sensu lato* were reported to be as high as 40-60 individuals per km^2 in northern Kenya (Western, 1974 in: Harwood, 2003). Very high densities were noted in a highly exploited population around Lake Chad (de Buffrénil, 1992 in: Harwood, 2003), and were suggested for the protected populations in parts of Ghana (Bennett, 1995 in: Harwood, 2003).

An assessment of the vulnerability of *V. ornatus* to climate change in the Albertine rift noted that the species has specialised habitat requirements and low probability of dispersal, which, combined with the prediction that it will experience substantial changes in temperature variability and mean precipitation across its range, may decrease the species' ability to adapt to climate change (Carr *et al.*, 2013). The assessment also classified *V. ornatus* as a species that was important for human use as food, in the pet trade, and in the leather industry (Carr *et al.*, 2013). In Togo, *V. ornatus* was reported to be among the most common species collected for the international pet trade (Segniagbeto *et al.*, 2015; Auliya *et al.*, 2016), with *V. ornatus* reportedly exported under the name *V. niloticus* (Segniagbeto *et al.*, 2015). It has also been found on sale in markets for traditional medicinal purposes in Togo (Segniagbeto *et al.*, 2013; Moshoeu, 2017) and was commonly harvested for bushmeat in the Conkouati-Douli National Park in the Republic of Congo (Makosso Vheiye *et al.*, 2011).

Studies comparing individuals of *V. niloticus* from populations subject to different harvesting pressures have suggested that in the more heavily exploited populations, early sexual maturity and a higher reproductive output (Buffrénil and Rimblot-Baly, 1999), as well as more rapid initial growth, may help to mitigate the impacts of exploitation on the species (Buffrénil and Hémery, 2002).

Following the 16th meeting of the Conference of the Parties to CITES (CoP16, Bangkok, 2013), *V. ornatus* was selected at the 27th meeting of the Animals Committee in April 2014 for the Review of Significant Trade (RST) as a priority species for review (all range States) because it met the threshold for high volume of trade for globally threatened species in 2012 (AC27 WG1 Doc. 1; AC27 Summary Record). Subsequent to review of the available information at AC28 the following year, only Togo was retained and all other range States were removed from the RST process (AC29 Doc. 13.2). It was reported in SC70 Doc. 29.2 that Togo were subject to a recommendation to review and revise as appropriate their export quotas for *V. ornatus*. Togo indicated that, with assistance from the CITES Secretariat, it wanted to carry out studies to collect data on the species'

distribution, population size, conservation status, threats, reproductive biology and the potential availability of wild, ranched and captive-bred specimens to inform the establishment of quotas that are non-detrimental (SC70 Doc. 29.2).

Benin: Both *V. ornatus* and *V. niloticus* are known to occur in Benin (Kpera and Sinsin, 2010; Ullenbruch *et al.*, 2010; Toudonou, 2011), with the first published country record for *V. ornatus* in the wild in 2010 (Ullenbruch *et al.*, 2010). The presence of *V. ornatus* was reported in relict forest patches in the south of the country, including Classified Forests: Lama Forest and Dan Forest (Ullenbruch *et al.*, 2010; Toudonou, 2011), the Sitatunga Valley Community Natural Reserve (CREDI-ONG, 2013), and along the Pendjari River in the Pendjari National Park [north-western Benin] (Moritz and Laléyé, 2016), but not in the W Biosphere Reserve [north-east Benin] (Chirio, 2009).

At the time of writing, no quantitative information on the population size and status of *V. ornatus* within Benin could be found. However, in the 2011 National Red List for Benin, *V. ornatus* was classified as vulnerable due to its restriction to tropical forest habitats and its low reported encounter rate (Toudonou, 2011). *V. ornatus* was reported to be rarer than *V. niloticus* in markets in southern Benin; this was considered to be due to the scarcity of relict forest patches in the area (Ullenbruch *et al.*, 2010). Toudonou (2011) reported that *V. ornatus* is often mistaken for *V. niloticus* in the country and the species was “little known to unknown”. According to Kpera and Sinsin (2010), local communities in Benin only recognise two species of monitor lizards in the country, *V. niloticus* and *V. exanthematicus*. Monitor lizard populations in Benin were considered by local communities to be in decline (Kpera and Sinsin, 2010), with species becoming increasingly rare particularly in the North (Kpera and Sinsin, 2010).

According to Toudonou (2011), *V. ornatus* is probably heavily exploited for food and medicinal purposes in Benin. Kpera and Sinsin (2010) reported that demand for monitor lizards for traditional medicine was increasing. *V. niloticus sensu lato* was reported to be widely hunted in Benin, although the subject of taboo in some localities (Buffrénil, 1993 in: Harwood, 2003). According to the most recent global forest assessment, 39% of land area in Benin is forested, and the country experienced a decrease in forest cover of 1.2% for the period 1990-2015 (FAO, 2015).

Toudonou *et al*. (2004) observed *V. niloticus* in four of the ten accredited breeding farms in Benin (Azath Farms, Pazok, Sax Fauna, and WAPP reptiles), with numbers of stock ranging from 500 to 2500 (totalling 5500). *V. ornatus* and *V. niloticus* do not appear to be distinguished in Benin ranching operations (Ineich, 2006), although *V. ornatus* appears to have historically been present in ranching facilities that also breed *V. niloticus*. Photographs of *V. ornatus* in breeding facilities in the sub-region (Benin, Ghana, and Togo) were taken by Buffrénil (1995 in: Ineich, 2006) and in 2004, two of the operational and certified reptile farming facilities in Benin were reported to breed *V. niloticus* and potentially undistinguished *V. ornatus* (Ineich, 2006). It was also considered probable by Ineich (2006) that non-distinguished *V. ornatus* skins were being exported by an official skin traders trading exclusively in wild-sourced skins of *V. niloticus* and *Python sebae*.

In Benin, monitor lizards are listed as non-protected ‘small game’ species under Annex III of the Ministerial Decree N°2011-394 (Government of the Republic of Benin, 2011) relevant to Law 2002-16 (Government of the Republic of Benin, 2004). However, the listing for monitor lizards only details the species *V. niloticus* and *V. exanthematicus*; the status of *V. ornatus* under the legislation is unclear. Article 34 of Law 2002-16 states that hunting and capture of all species not specifically protected under Annexes I and II is carried out in accordance with existing regulations (Government of the Republic of Benin, 2004). In accordance with Ministerial Decree N°2011-394, these species can be kept in captivity as pets or for commercial purposes (article 15), imported and exported for breeding purposes (articles 11 and 12), hunted under traditional hunting practices (article 44) and hunted by villagers in designated hunting areas for food or therapeutic purposes (article 48), hunted for sport, in season and with a licence, within the limits of the yearly hunting management plan (article 66), and captured for commercial purposes in hunting areas with a licence and within the limits of take (article 69) (Government of the Republic of Benin, 2011). According to the 2011

National Red List for Benin, *V. ornatus* is not protected in the country and its harvest is unregulated (Toudonou, 2011).

V. ornatus is known to occur in Classified Forests in the south of Benin (Ullenbruch *et al.*, 2010) as well as the Pendjari National Park (Moritz and Laléyé, 2016). The Lama Classified Forest was reported to be relatively well protected, though most Classified Forests are reportedly subject to deforestation for agriculture and trade of valuable wood (Neuenschwander *et al.*, 2011). In the Pendjari National Park, fishing is restricted by law to the hunting season (December to May) (Moritz and Laléyé, 2016). Regular violation of fishing regulations including use of seine nets, fishing within protected zones, pollution around fishing camps, and consumption of by-catch, including *V. ornatus*, were reported from observation of and interviews with fishermen along the Pendjari River (Moritz and Laléyé, 2016).

Democratic Republic of the Congo: *V. ornatus* and *V. niloticus* are both reported to occur in the Democratic Republic of the Congo (DRC) (Böhme and Ziegler, 1997; Bayless, 2002), and reportedly occur in sympatry in the southwest of the country (Böhme and Ziegler, 1997). Mertens (1942 in: Bayless, 2002) previously recorded *V. ornatus* from Kituri, Loudinia-Niara and Porto de Lenha, while Böhme and Ziegler (1997) recorded *V. ornatus* from Wanie Rukula (central DRC) and potentially from Kilwa on Lake Mweru (south-east) and from Epulu (north-east), though the locality information associated with both of the latter museum specimens studied was incomplete. Museum specimens originating from Avakubi and N'Gayn (Ituri Forest in the north-east), Medje (north-east), Faradje and Niapu (Uelle region in the north), Stanleyville (Kisangani in the north), and Leopoldville (Kinshasa in the southwest) were also attributed by Bayless (2002) to *V. ornatus*. The presence of *V. ornatus* has been recorded near the Lopori and Loleka rivers in the Maringa-Lopori-Wamba landscape of the central Congo Basin area (Lotana Lokasola *et al.*, 2017) and the Lake Tumba landscape bordering the Republic of Congo to the west (Serckx, 2014), but it was not included in an annotated checklist of reptiles inhabiting the Katanga province in southern DRC (knowledge of this area's biodiversity, however, was reported to be incomplete and biased towards protected areas and human settlements; Broadley and Cotterill, 2004). At the time of writing, no quantitative information on the population size and status of *V. ornatus* within DRC could be found.

No information regarding threats to *V. ornatus* specifically within DRC could be located. Monitor lizards were reported to be used for the manufacture of leather items and *V. niloticus* was reported to be used for food (Sébastien and Kiyulu N'Yanga-Nzo, 2001). According to the most recent global forest assessment, 67% of DRC's land area is forested; for the period 1990-2015, the average annual deforestation rate was 0.2% (FAO, 2015). Fragmentation of forested areas was noted as a particular threat to forest ecosystems in DRC (Eba'a Atyi and Bayol, 2009).

In DRC, *V. ornatus* is listed as a partially protected species under Appendix II of Ministerial Order N°020/CAB/MIN/ECN-EF/2006 (République Démocratique du Congo, 2006) relevant to Law N°14/003 (République Démocratique du Congo, 2014). This partial protection recognises that the trade in specimens of the species must be regulated to avoid exploitation incompatible with their survival, and as such they cannot be hunted, captured or killed without a licence (République Démocratique du Congo, 2006). *V. ornatus* does not appear in the list of species for which licences for hunting for sport are issued (République Démocratique du Congo, 2004), but partially protected species may be targeted under a tourism licence (article 16) or a licence allowing capture for commercial purposes, which are issued for specific species, sexes and numbers of animals (article 23) (République Démocratique du Congo, 2004).

Within national parks, Law No. 14/003 prohibits, *inter alia*, hunting or transport of live animals or their parts or products (République Démocratique du Congo, 2014). However, most protected areas in DRC were reported to be at risk due to inadequate infrastructure, lack of human and financial capacity, and political instability (République Démocratique du Congo, 2016). Within eight protected areas, the main causes of biodiversity loss were reported to be poaching (in all eight) and deforestation (in six of the protected areas) (Sébastien and Kiyulu N'Yanga-Nzo, 2001). Improving management of protected areas and biodiversity research in DRC were

included in the list of strategic priorities in the National Biodiversity Strategy and Action Plan 2016-2020 (République Démocratique du Congo, 2016).

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TESTUDINES: TESTUDINIDAE

Kinixys spekii II/B

SYNONYMS:	*Homopus darlingi* Boulenger, 1902; *Kinixys australis* Hewitt, 1931; *Kinixys jordani* Hewitt, 1931; *Kinixys youngi* Hewitt, 1931; *Testudo procterae* Loveridge, 1923
COMMON NAMES:	Speke's Hinged Tortoise (EN)
RANGE STATES:	Angola, Botswana, Burundi, Democratic Republic of the Congo (DRC), Eswatini, Kenya, Malawi, Mozambique, Namibia, Rwanda, South Africa, Uganda (?), United Republic of Tanzania, Zambia, Zimbabwe
UNDER REVIEW:	DRC
EU DECISIONS:	Current Article 4.6(b) import suspension for wild specimens from Mozambique formed on 22/12/1997 and last confirmed on 09/11/2017 Previous Article 4.6(c) import suspension for live, wild specimens from the Democratic Republic of the Congo formed on 19/09/1999 and last confirmed on 18/02/2005
IUCN:	Not evaluated

Taxonomic note

The current CITES Standard Reference, Fritz and Havaš (2007), recognises *Kinixys spekii* as a distinct species; this reference was adopted at CITES CoP14 in 2007. After its "provisional" naming by Gray (1863 in: Crumly, 1988) *K. spekii* was tentatively synonymised with *K. belliana* by Loveridge and Williams (1957 in: Crumly, 1988), but re-elevated to full species status by Broadley (1989 in: Broadley, 1993). Genetic analyses by Kindler *et al.* (2012) confirmed that *K. spekii* is evolutionarily distinct from *K. belliana*.

Trade patterns

Kinixys spekii was listed in CITES Appendix II on 01/07/1975 as part of the genus listing for *Kinixys*, and in Annex B of the EU Wildlife Trade Regulations on 01/06/1997 as part of the family listing for Testudinidae.

DRC has submitted all annual reports for 2008-2018. At the time of writing (May 2019), data for 2018 had been received from DRC, but importer-reported data was incomplete. In 2018, DRC published a quota for 1000 live individuals; DRC did not report any trade in *K. spekii* in this year.

According to the CITES Trade Database, for the period 2008-2017, direct exports of *K. spekii* from DRC to the EU-28 consisted of ten live, wild-sourced individuals to Czech Republic for commercial purposes in 2011, as reported by DRC only[1]. No direct exports to the rest of the world and no indirect exports of *K. spekii* originating in the DRC to the EU-28 were reported 2008-2017.

Direct exports of *K. belliana* from DRC to the EU-28 2008-2017 comprised 50 live, wild-sourced individuals exported for commercial purposes to the Czech Republic in 2010 (40) and 2011 (10), reported by DRC only.

[1] Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 20/05/2019.

DRC has submitted an annual report for 2018 and reported the export of 100 live, wild-sourced *K. belliana* to the Netherlands for commercial purposes.

Conservation status

Kinixys spekii is a medium-sized hinged tortoise, growing up to a carapace length of 20 cm (Bonin *et al.*, 2006; Branch, 2008). The species is widespread throughout tropical Africa (Bonin *et al.*, 2006; Hofmeyr and Boycott, 2017), occurring from Angola in the west to Mozambique and southern Kenya in the east, and as far south as northern South Africa and Eswatini (Fritz and Havaš, 2007; Branch, 2008; Rhodin *et al.*, 2018). *K. spekii* is found at altitudes up to 1600 m above sea level (Spawls *et al.*, 2002), and inhabits savannah (Luiselli *et al.*, 2012; Spawls *et al.*, 2018) and coastal thickets, often in rocky areas (Bonin *et al.*, 2006; Branch, 2008; Spawls *et al.*, 2018). The species is omnivorous, with a varied diet including plants, fungi, insects and molluscs (Hailey *et al.*, 1997; Bonin *et al.*, 2006; Branch, 2008). *K. spekii* is active in the rainy season and aestivates in burrows or rock crevices during the dry season (Bonin *et al.*, 2006; Branch, 2008; Spawls *et al.*, 2018), when individuals may remain dormant for up to eight months (Hailey and Loveridge, 1997). Home ranges are reportedly large (Spawls *et al.*, 2002; Branch, 2008).

Spawls *et al.* (2002) reported that *K. spekii* is morphologically similar to its congener, *K. belliana*; both species are characterised by hinged shells and attain a similar body size. According to Spawls *et al.* (2018), *K. spekii* may "theoretically" be distinguished from *K. belliana* by its zonary pattern and flattened shell, but "intermediate specimens are not uncommon", in particular on the Kenyan coast where both species occur.

K. spekii is sexually dimorphic, with females growing 1.4 cm larger than males on average (Coulson and Hailey, 2001), and males displaying longer and thicker tails than females (Spawls *et al.*, 2018). Females and males reach sexual maturity at the ages of nine (carapace length 14 cm) and seven (carapace length 12 cm) years, respectively (Coulson and Hailey, 2001). Mating occurs September-November and oviposition takes place from November-February (Lambiris *et al.*, 1989). Females may lay several clutches per season, each consisting of two to six eggs (Bonin *et al.*, 2006). Boycott and Bourquin (2000 in: Mifsud and Stapleton, 2014) reported that larger females lay larger clutches. Incubation may take up to a year (Bonin *et al.*, 2006), and hatchlings emerge from November-April (Lambiris *et al.*, 1989). A mark-recapture study conducted by Coulson and Hailey (2001) in Sengwa Wildlife Research Area, Zimbabwe from 1982-1994 estimated an average annual survival rate of 0.74 and observed that "at least" 77% of deaths showed evidence of predation (Coulson and Hailey, 2001). However, the high mortality was reported to be offset by rapid growth of hatchlings (Coulson and Hailey, 2001).

Buhlmann *et al.* (2009) estimated a global range of 2 517 338 km^2 for *K. spekii*, based on available point-locality data combined with coverage of suitable habitat (taking into account elevation and hydrology). The authors stated that their methodology likely resulted in overestimation of actual available habitat (Buhlmann *et al.*, 2009). More recently, based on available data (including published literature, museum records and photo-vouchered observations), Mifsud and Stapleton (2014) estimated the species' global range as 3 531 032 km^2 and the available habitat within this area as 2 096 641 km^2. The authors cautioned that this estimate of global range included historic ranges and therefore was unlikely to represent the current distribution of the species (Mifsud and Stapleton, 2014). Several studies have recorded the species at low densities (Coulson and Hailey, 2001; Lambiris *et al.*, 1989): A mark-recapture study conducted by Lambiris *et al.* (1989) at Boulton Atlantica Research Station, Zimbabwe estimated a total population size of approximately 130 individuals, at an average density of 2.25 individuals per hectare. The aforementioned 12-year study conducted by Coulson and Hailey (2001) in Zimbabwe found a population density of 0.16 sexable individuals (individuals with midline plastron length of ≥10 cm) per hectare. Mifsud and Stapleton (2014) remarked that both population studies (Coulson and Hailey, 2001; Lambiris *et al.*, 1989) were conducted within protected areas, and noted that densities of *K. spekii* outside of these areas could be assumed to be lower as a result of habitat loss and anthropogenic persecution.

K. spekii has not been formally evaluated for the IUCN Red List but, in 2013, it was provisionally assessed as Vulnerable by the IUCN/SSC Turtle and Freshwater Turtle Specialist Group (Rhodin *et al.*, 2018). No population estimates could be found, however, Spawls *et al*. (2002) described *K. spekii* as "very widespread in semi-arid habitats" and Bonin *et al.* (2006) reported that the species "appear to be plentiful in some areas and rare in others, with overall distribution quite fragmented". Mifsud and Stapleton (2014) stated that "extensive data" on *K. spekii* population size was lacking, and commented that the species' small size, cryptic colouration and seasonal inactivity made it difficult to study in the wild.

While Spawls *et al*. (2002) did not consider *K. spekii* under threat from habitat destruction due to its widespread distribution, Mifsud and Stapleton (2014) stated that the species was likely to be in decline throughout its range due to habitat loss, and Hofmeyr and Boycott (2017) considered habitat degradation and loss to be the "most important threat" to the species throughout its range. Frequent, major bushfires were considered to pose a major threat to the species (Bonin *et al.*, 2006), and Branch (2008) noted that some populations were probably in decline due to "increased fire risk associated with human agriculture in savannah habitats". An assessment of the vulnerability of species to climate change in the Albertine rift noted that *K. spekii* has a low reproductive output and is dependent on rainfall to trigger breeding, which may decrease the species' ability to adapt to climate change (Carr *et al.*, 2013).

K. spekii was reported to be subject to wild harvest for use as food (Mifsud and Stapleton, 2014; Mallon *et al.*, 2015), for traditional medicine (Simelane and Kerley, 1997; Mifsud and Stapleton, 2014), and for the international pet trade (Mallon *et al.*, 2015). While Branch (2008) stated that the species was "not significantly harvested" for the pet trade, Mifsud and Stapleton (2014) more recently described the species as "sought after" and reported web prices of "hundreds of US dollars" per individual with *K. spekii* appearing on multiple websites in Japan and the United States of America for sale as pets. The authors further noted that estimating the total numbers of individuals in trade was "challenging due to the relatively recent recognition of *K. spekii* as a full species" (Mifsud and Stapleton, 2014). A 2000-2003 survey of markets in Hong Kong, Special Administrative Region of China (SAR), identified *K. spekii* individuals being sold as pets (Cheung and Dudgeon, 2006). Illegal trade in *K. spekii* has also been reported, with 21 live individuals bound for Thailand from Uganda confiscated at Jomo Kenyatta International Airport in Kenya in 2006 (East African Wild Life Society, 2007).

K. spekii was reported to occur in "numerous" protected areas across its global range, including Kruger National Park in South Africa (Branch, 2008). However, Mifsud and Stapleton (2014) suggested that "poaching likely still happens even within protected areas", and stated that, with the exception of occurrence in protected areas, the species was not the focus of any targeted conservation.

Democratic Republic of the Congo: Within DRC, *K. spekii* is reportedly limited to the south-eastern regions (Mifsud and Stapleton, 2014; Turtle Taxonomy Working Group, 2017[2]). The species was reported to have been observed in Katanga (southeast) and South Kivu (east), and was believed to also occur in Kasai Oriental (south-central) and Maniema (east) (Mifsud and Stapleton, 2014). Additionally, Spawls *et al.* (2018) reported *K. spekii* from Shaba (southeast), as well as isolated records from the Ruzizi Plain (east). *K. belliana* was also reported to occur in DRC, however, distribution maps for both species produced by the Turtle Taxonomy Working Group (2017) did not appear to show sympatry in DRC.

At the time of writing, no information on DRC-specific population estimates, trends, or threats could be identified for the species. *K. spekii* was not listed as a protected or partially protected species in Ministerial Decree No.20/CAB/MIN/ECN-EF/2006 (République Démocratique du Congo, 2006), and the species does not appear to be otherwise protected by law or subject to conservation action in DRC. The Ministerial Decree (République Démocratique du Congo, 2006) does, however, list *K. belliana* as partially protected in DRC.

[2] According to a distribution map for *K. spekii* (based on known point localities connected by GIS-defined hydrologic unit compartments) produced by the Turtle Taxonomy Working Group (2017).

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TESTUDINES: TRIONYCHIDAE

Cycloderma aubryi II/B

SYNONYMS:	*Cryptopus aubryi* Duméril, 1856; *Cryptopodus aubryi* Duméril, 1856; *Heptathyra aubryi* Cope, 1860
COMMON NAMES:	Aubry's Flapshell Turtle (EN), Trionyx à clapets d'Aubry (FR)
RANGE STATES:	Angola, Cameroon (?), Central African Republic, Congo, Democratic Republic of the Congo (DRC), Gabon
UNDER REVIEW:	DRC
EU DECISIONS:	No current suspensions or opinions in place
IUCN:	Vulnerable

Trade patterns

Cycloderma aubryi was listed in CITES Appendix II on 02/01/2017 and in Annex B of the EU Wildlife Trade Regulations on 04/02/2017. Democratic Republic of the Congo (DRC) has submitted all annual reports for 2008-2018. At the time of writing (May 2019), data for 2018 had been received from DRC, but importer-reported data was incomplete. In 2018, DRC published a quota for 1000 live individuals, the first quota it has published for this species. Exports of *C. aubryi* in 2018 did not exceed this quota.

Trade data are only available since 2017, as this was the first year for which CITES Parties were required to report on trade in this species in their annual reports to CITES. According to the CITES Trade Database, there were no direct or indirect exports of *C. aubryi* from, or originating in, DRC to the EU-28 in 2017[1].

Direct exports of *C. aubryi* to countries other than the EU-28 in 2017 comprised live, wild-sourced animals for commercial purposes[1] to the United States of America[2]: 50 reported by DRC and 52 reported by the United States. DRC reported the export of five live, wild-sourced individuals to the United States for commercial purposes in 2018; importer-reported data is incomplete for 2018.

Conservation status

Cycloderma aubryi is a large softshell turtle found in Angola, Central African Republic, Congo, Democratic Republic of the Congo (DRC), and Gabon (Iverson, 1992; Fritz and Havaš, 2007; Turtle Taxonomy Working Group, 2017). It was also reported to occur in Cameroon (Turtle Taxonomy Working Group, 2017) or as likely to occur in the forest tributaries of Cameroon bordering Congo and Central African Republic (Maran and Pauwels, 2009). *C. aubryi* was not found during reptile surveys conducted throughout Cameroon from 1998 to 2001, but was considered likely to be present given its collection in Congolese forests near south-eastern Cameroon (Chirio and LeBreton, 2007). A historical record from the nineteenth century listed *C. aubryi* in Koyom, Chad (Lapparent de Broin, 2000); however, no further records of the species' occurrence in the country could be identified.

[1] Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 29/04/2019.
[2] Hereafter referred to as the United States.

C. aubryi inhabits rivers, isolated pools, swamps, and marshes of humid tropical rainforests (Maran and Pauwels, 2005; Bonin *et al.*, 2006; Branch, 2008), with a preference for muddy areas with reeds and submerged vegetation (Gramentz, 1999). *C. aubryi* is a nocturnal feeder, preying on small crustaceans and fish (Bonin *et al.*, 2006; Branch, 2008). The species grows to a maximum carapace length of 61 cm and weight of approximately 18 kg, and females are larger than males (Maran and Pauwels, 2005; Branch, 2008). Individuals were considered likely to reach sexual maturity at a carapace length of 30-32 cm (Gramentz, 1998). Females lay a minimum of two clutches per year of 17-34 eggs in shallow nests near water (Maran and Pauwels, 2005). In Gabon, eggs were reported to be laid in the dry season from December to January (Gramentz, 1999) or from January to March (Maran and Pauwels, 2005). Hatchlings were noted to emerge in the wet season from March to April (Bonin *et al.*, 2006; Branch, 2008) or to the end of May (Maran and Pauwels, 2005) and inhabit temporarily-flooded areas in the forest (Gramentz, 1999).

In an analysis of chelonian distributions, the total range for *C. aubryi* was estimated as 2 133 976 km^2, based on available point-locality data combined with coverage of suitable habitat (taking in account elevation and hydrology) (Buhlmann *et al.*, 2009). The authors noted that their methodology likely resulted in overestimation of actual habitat (Buhlmann *et al.*, 2009). In Gabon, *C. aubryi* was reported to have a more localised distribution and more restrictive habitat preferences than sympatric turtle species (Maran and Pauwels, 2005).

C. aubryi is categorised as Vulnerable in the IUCN Red List as, whilst it has a large range with "little to moderate habitat degradation", exploitation for local consumption was "intensive enough to have led to documented declines at least locally, and possibly across much of its range" (Chirio *et al.*, 2017). *C. aubryi* qualified as Vulnerable on the basis that a 30% overall range-wide decline of the species was likely to be exceeded (Chirio *et al.*, 2017). The species was last assessed as Least Concern in 1996 (Chirio *et al.*, 2017). Few population studies have been conducted for softshell turtles and scarce information on trade volumes or market availability for African softshell turtles makes inferring population size difficult (CoP17 Prop. 36). Furthermore, softshell turtles rarely bask, making them difficult to detect in the wild (CoP17 Prop. 36).

The main threat to wild populations of *C. aubryi* was reported to be collection of eggs and adults for local and commercial consumption (Chirio *et al.*, 2017). A recent increase in the availability of *C. aubryi* individuals in the pet trade in the United States has also been reported (Baker pers. comm. in: Chirio *et al.*, 2017), and juveniles in the United States' markets have reportedly been sold for over USD 2000 (Horne pers. comm. in: Chirio *et al.*, 2017). Harvesting was identified as a detrimental activity for wild populations in both Gabon and Congo (Maran and Pauwels, 2005, 2009). In Gabon, *C. aubryi* was reported to be an important protein source for many villages with fishermen catching up to 30 turtles per week, which were sold as either whole bodies or in weight (Maran and Pauwels, 2005). Population declines in multiple localities in Gabon were reported as a result of extensive collection (Maran, 2002 in: Maran and Pauwels, 2005). In Congo, the species was frequently found at markets throughout the country and was the target species for markets in Brazzaville and Pointe Noire (Maran and Pauwels, 2009). Compared to other species of turtle that are hunted in Congo, collection was identified as most detrimental for *C. aubryi* and one other softshell species (*Trionyx triunguis*), and local fisherman reported increasing difficulty in capturing these two species over the past ten years (Maran and Pauwels, 2009). Chirio *et al.* (2017) considered that extrapolation of the "quantitative data and estimation of impact of extensive exploitation" available for Gabon (Maran, 2002; Maran and Pauwels, 2005) to include most of the species' range was "reasonable based on anecdotal observations elsewhere". The Turtle Conservation Fund Global Action Plan (2002) specified an urgent need to investigate the turtle bushmeat trade in West and Central Africa, particularly as knowledge of the region's *Cycloderma* species was considered to be limited.

In the proposal to list the species in CITES Appendix II (CoP17 Prop. 36), it was noted that international trade in softshell turtles, particularly to Asian markets, is typically non-species specific, as they are interchangable as sources of food and medicine. Trade in turtle species was reported to follow a "boom and bust" pattern whereby trade shifts from one species to another as species become depleted and/or subject to higher levels of protection (CoP17 Prop. 36). In CoP17 Prop. 36, concerns were raised that the depletion of Asian softshell turtle species, as well as the increasing regulation and restrictions on trade in these species, would shift

harvesting pressure from Asian to African populations of softshell turtles. Luiselli (2009) modelled the conservation threats for freshwater turtles based on six risk variables, and considered *C. aubryi* to be "vulnerable to decline" due to risks associated with extent of distribution, habitat breadth, and body size.

Illegal trade in *C. aubryi* has been reported: four *C. aubryi* specimens were confiscated by the United States Fish and Wildlife Service (Wildlife Conservation Society, 2015) and specimens of adult *C. aubryi* that were designated as captive-bred but with signs of being wild-caught, were confiscated at a United States airport (Horne pers. comm. in: Chirio *et al.*, 2017).

Democratic Republic of the Congo (DRC): *C. aubryi* occurs in DRC (Fig. 1[3]; Diagne *et al.*, 2013; Turtle Taxonomy Working Group, 2017). Based on specific locality points, the Turtle Taxonomy Working Group (2017) depicted the species' occurrence in DRC as predominantly in the north-west of the country, as well as extending into DRC's most western region bordering Angola and Congo. In an unpublished report of a rapid biodiversity survey in the western provinces of Bandundu and Bas-Congo and the northwestern province of Equateur, Shumway *et al.* (2003) remarked that *C. aubryi* was recorded only in Equateur. *C. aubryi* was not listed in an annotated checklist of reptiles inhabiting the Katanga province in southern DRC, but knowledge of this area's biodiversity was reported to be incomplete and biased towards protected areas and human settlements (Broadley and Cotterill, 2004). At the time of writing, no quantitative information on the species' population size and status within DRC could be found. However, Chelonian surveys in Salonga National Park in central DRC between April and August 2011 found *C. aubryi* to be relatively common in the study area, with 145 specimens recorded during several surveys of the Luilaka River (Diagne *et al.*, 2013). Areas along the Congo and Kasai rivers in the west of DRC were identified as areas of high conservation priority for African freshwater turtles in a continental analysis (Bombi *et al.*, 2011).

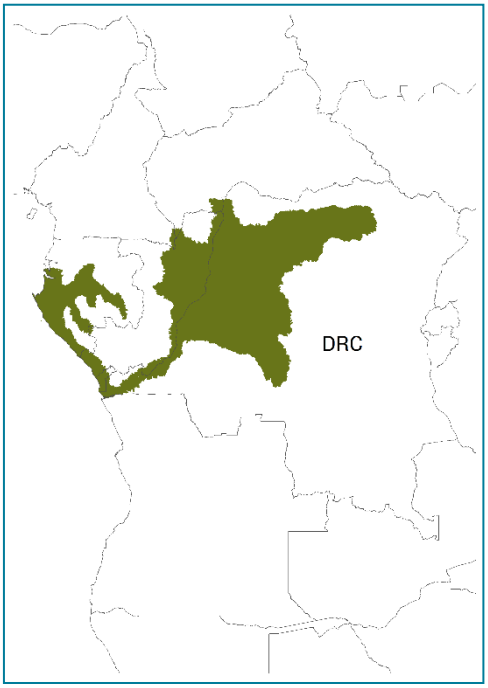

Figure 1: Range of *Cycloderma aubryi.* Source: IUCN (2017).

No information regarding threats to *C. aubryi* within DRC specifically could be located. Surveys by Diagne *et al.* (2013) in 2011 recorded six *C. aubryi* specimens in a bushmeat market near Goma, on the country's eastern border with Rwanda. In the past, hunting wild game was reported to be a traditional activity widespread throughout the DRC (Doumenge, 1990) with wild game constituting 75% of the protein consumed by an average person (Hazelwood, 1981, and Lanjouw, 1987 in: Doumenge, 1990). At the time, Doumenge (1990) considered local consumption to be sustainable, but stated that it risked becoming detrimental to wildlife when hunting occurred alongside destruction of natural habitats or when harvested species could be transported to urban areas for commercial trade.

No information regarding management of *C. aubryi* within DRC could be located. The species was not listed as a protected or partially protected species by Ministerial Order N°020/CAB/MIN/ECN-EF/2006 (République Démocratique du Congo, 2006).

Biodiversity in DRC was reported to be threatened by habitat degradation and the effects of repeated armed conflicts (République Démocratique du Congo, 2016), the latter of which was reported to have led to increased consumption of wild meat (Draulans and Van Krunkelsven, 2011; République Démocratique du Congo, 2016).

[3] Disclaimer: The boundaries and names shown and the designations used on maps do not imply official endorsement or acceptance by UN Environment or contributory organisations.

Protected areas cover approximately 13% of the country's territory (République Démocratique du Congo, 2016). Within national parks, Law No. 14/003 prohibits, *inter alia*, hunting or transport of live animals or their parts or products. However, Bombi *et al.* (2011), using three different approaches to map the species distribution, found *C. aubryi* to be under-represented in Africa's protected areas.

Biodiversity management in the DRC was reported to be constrained by issues associated with institutional capacity, legislation, protected area management, and forest planning (Sébastien and N'yanga-Nzo Kiyulu, 2001). Most protected areas were reported to be at risk due to inadequate infrastructure, lack of human and financial capacity, and political instability (République Démocratique du Congo, 2016). Poaching was reported as a problem in seven of eight protected areas, and loss of biodiversity was reported in five of eight protected areas (Sébastien and N'yanga-Nzo Kiyulu, 2001). Improving management of protected areas and biodiversity research in the DRC were included in the list of strategic priorities in the National Biodiversity Strategy and Action Plan 2016-2020 (République Démocratique du Congo, 2016).

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CYPRINIFORMES: CYPRINIDAE

Caecobarbus geertsii II/B

COMMON NAMES:	Congo Blind Barb (EN), Barbu aveugle (FR)
RANGE STATES:	Democratic Republic of the Congo (DRC)
UNDER REVIEW:	DRC
EU DECISIONS:	No current suspensions or opinions in place
IUCN:	Vulnerable

Trade patterns

Caecobarbus geertsii was listed in CITES Appendix II on 06/06/1981, and in Annex B of the EU Wildlife Trade Regulations on 01/06/1997. In 2018, DRC published a quota for 70 live individuals, the first quota the country has published for this species. At the time of writing (May 2019), data for 2018 had been received from DRC; importer-reported data for 2018 were incomplete.

According to the CITES Trade Database, for the period 2008-2017, direct exports of *C. geertsii* from DRC to the EU-28 consisted of 16 wild-sourced bodies in 2008 and 29 wild-sourced bodies in 2015[1]. All trade was imported by Belgium for scientific purposes and reported by Belgium only. There were no direct exports of *C. geertsii* from DRC to the rest of the world 2008-2017, while data received from DRC for 2018 included the direct export of seven live, wild-sourced individuals to Japan for commercial purposes. However, the CITES Management Authority (MA) of DRC clarified that those seven live individuals were erroneously recorded as being for commercial rather than scientific purposes, and were ultimately not exported (CITES MA of DRC, pers. comm. to UNEP-WCMC, 2019).

There were no indirect exports of *C. geertsii* originating in DRC to the EU-28, 2008-2017.

Conservation status

Caecobarbus geertsii is a blind cyprinid fish (Azab *et al.*, 2010) endemic to the Congo Basin (Lévêque and Daget, 1984; Nampindo, 2014), where it has been recorded at fewer than ten locations (Moelants, 2010)**.** The species is physiologically adapted to the subterranean environment, possessing only vestigial eyes, lacking pigmentation, and avoiding light (Proudlove and Romero, 2001). The species is known from the Mbanza-Ngungu (formerly Thysville) subterranean cave complex situated near to Kinshasa in western DRC (Sterba, 1966; Lévêque and Daget, 1984; Proudlove and Romero, 2001; Noakes and Bouvier, 2013; Decru *et al.*, 2018). *C. geertsii* is slow-growing (Vreven *et al.*, 2011) and individuals may live for over 15 years (Proudlove and Romero, 2001). Adults attain a total length of approximately 80-120 mm (Vreven *et al.*, 2011). Average growth rate was estimated at 0.25 to 0.60 mm per month, and was found to vary between subpopulations (Heuts, 1952 in: Trajano, 2001). The species lays demersal, adhesive eggs and young have only been observed after the rainy season (Proudlove and Romero, 2001). Vreven *et al.* (2011) reported that “available data suggest a very low reproduction rate”. The food chain of the cave system relies on nutrients from the surface that are carried underground by tributaries of the Lower Congo River (Azab *et al.*, 2010; Mamonekene *et al.*, 2013). *C. geertsii*

[1] Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 21/05/2019.

is thought to be "entirely dependent" on this external food supply (Vreven *et al.*, 2011), although it has been suggested that the species may also feed on small crustaceans living within the caves (Moelants, 2010).

The Mbanza-Ngungu cave complex sits approximately 600-800 m above sea level within the Lower Congo wetland ecoregion (Mamonekene *et al.*, 2013). It covers 750 km^2 (Azab *et al.*, 2010) and is known to contain at least 45 caves in two series on different river tributaries (CoP3 Prop. 71). *C. geertsii* was originally described from Lukatu Cave (formerly Grotte de Thysville) near Mbanza-Ngungu (Decru *et al.*, 2018). Early explorations in 1949 reported by Heuts (1952 in: Decru *et al*., 2018) and Heuts and Leleup (1954 in: Decru *et al.*, 2018), defined three zones within the Mbanza-Ngungu cave complex: Mbanza-Ngungu (Zone I), Nkyende (Zone II), and Lovo (Zone III). *C. geertsii* was found to occur in seven of the 25 caves in Zone I, but was absent in the four Zone II and 20 Zone III caves that were explored during these early surveys (Heuts, 1952 in: Decru *et al.*, 2018; Heuts and Leleup, 1954 in: Decru *et al.*, 2018). The species was found to inhabit only those caves characterised by a specific suite of ecological conditions, namely: high calcium bicarbonate concentrations and distinct periodic fluctuations in water flow (Heuts and Leleup, 1954 in: Vreven *et al.*, 2011). Water and nutrient influx to the caves populated by *C. geertsii* is seasonal, with weak inflow during the dry season and heavy inflow leading to total cave submergence during the rainy season (Berti and Messana, 2010). More recent explorations in 2007, 2015 and 2017 revealed the species to be more widely distributed than previously thought, as it was found in a total of 15 caves in Zone I and a further two caves (Muisi and Mambuela Caves) in Zone II (see Fig. 1[2]; Decru *et al.*, 2018). The surveys carried out in 2007 confirmed the species' occurrence in four of the caves previously reported by Heuts (Kimbembi ma Ibaka 2007 in: Vreven *et al.*, 2011), and noted a further seven caves containing "small populations". Two of the occupied caves discovered in 2007 were located in the Inkisi River Basin, one on the Tubulu River and the second on the Uombe or possibly Kela River, extending the total known distribution of *C. geertsii* to an area of approximately 120 km^2 (Kimbembi ma Ibaka, 2007 in: Vreven *et al.*, 2011).

As there is no known continuity between cave complexes, Berti and Messana (2010) stated that it was unknown whether the populations of different caves were connected. A recent study in 2017 by Decru *et al.* (2018) discovered that, although *C. geertsii* individuals did not differ morphologically between Zones, individuals at Zone II had divergent haplotypes from those of Zone I. The authors concluded that further research was needed to determine whether subpopulations at Zones I and II were distinct species (Decru *et al.*, 2018).

[2] Disclaimer: The boundaries and names shown in the designations used on maps do not imply official endorsement or acceptance by UN Environment or contributory organisations.

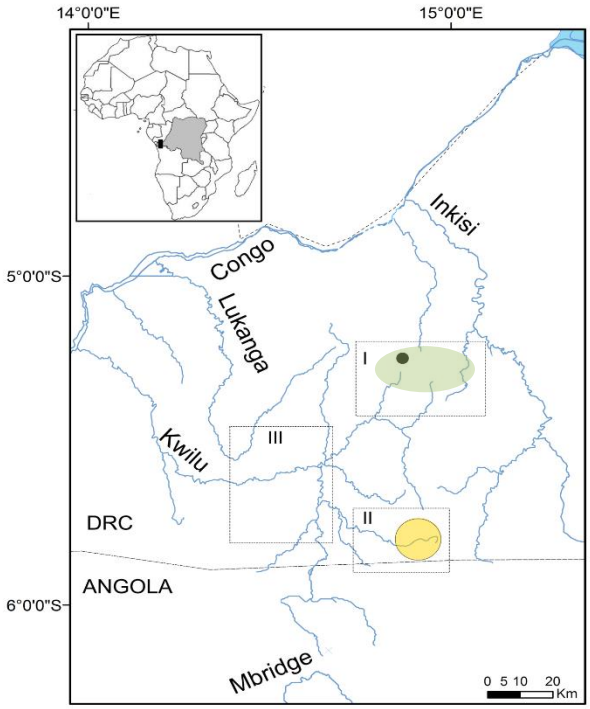

Figure 1: Map of the Lower Congo Basin (DRC) indicating the three cave formation zones demarcated by Heuts and Leleup (1954), the type locality (black dot at Zone I) of *C. geertsii*, and an indication of the species' occurrence as of 2017 (green and yellow ellipses). Figure adapted from Decru *et al.* (2018).

C. geertsii was listed as Vulnerable in the IUCN Red List in 2009 on the basis of small and declining range size (IUCN Red List sub-criterion B1 (b)) and occurrence at a number of locations greater than five but smaller than ten (Moelants, 2010). The assessment also noted that the size of the species' extent of occurrence and area of occupancy were estimated to be "far less than the criteria for the Vulnerable status" but added that, since the species was thought to occur in more than five locations and the threshold for Endangered status is less than five locations, the "assessment possibilities for this species [were restricted] to the Vulnerable status" (Moelants, 2010). At the time of the 2010 assessment, the definition of "location" in the context of the IUCN Red List was taken to mean *locality*, rather than *an area of the species' range that may be subject to a single threat event* (the current IUCN Red List definition of "location") (Snoeks, pers. comm. to UNEP-WCMC, 2019). This change in terminology, together with recently recorded population declines and genetic differences, led Snoeks (pers. comm. to UNEP-WCMC, 2019) to conclude that a re-assessment of *C. geertsii* is necessary.

During the original cave explorations in 1949, visual census was used to estimate *C. geertsii* population size, with high numbers of individuals observed in three of the seven occupied caves (1000, 2000 and 4000 individuals respectively), and very few individuals in the remaining four occupied caves (Heuts, 1952 in: Trajano, 2001). Based on these observations, Proudlove and Romero (2001) estimated a total population of 7000 individuals, 4000 of which were reported from Lukatu Cave (Decru *et al.*, 2018). However, several more recent surveys recorded severe declines in number of individuals (Decru *et al.*, 2018). Leleup (1956 in: Vreven *et al.*, 2011) reported that *C. geertsii* had been extirpated from one cave due to limestone excavation; this extirpation was confirmed by a visit to the cave in 2005 (Vreven *et al.*, 2011). Decru *et al.* (2018) stated that the Grotte de Gaz "no longer exists" due to quarrying, with the loss of the resident population of approximately 1000 individuals of *C. geertsii*. As both accounts describe extirpation due to quarrying/excavation, it seems likely that the Grotte de Gaz was the cave referred to by Leleup (1956 in: Vreven *et al.*, 2011) and Vreven *et al.* (2011). Decru *et al.* (2018) reported that surveys in 2014 and 2017 found no individuals in Lukatu, Kambu, or Ebeya Caves, and stated that declines in Zone I represented the loss of two of the three largest subpopulations

and two smaller subpopulations of *C. geertsii*, amounting to 65-75% of the estimated total population. However, the authors additionally reported that "several" smaller new populations had been discovered, and that a subpopulation of c. 1900 individuals in Kiamvu Cave was found to be persisting in a good condition as of 2017, adding that, of the three largest populations, Kiamvu Cave is located furthest from Mbanza-Ngungu town (Decru *et al.*, 2018).

Moelants (2010) considered the main threat to *C. geertsii* to be sediment flowing into the Mbanza-Ngungu cave system, followed by the possibility of habitat destruction due to cave collapse, noting that "at least one" cave was used as a quarry. More recently, Decru *et al.* (2018) stated that the extensive population declines in the Mbanza-Ngungu area (Zone I) were mainly caused by human population growth and associated land use in the area. The human population in the Mbanza-Ngungu region was reported to be increasing, with associated increases in agricultural activity, deforestation and development (Thieme *et al.*, 2005; Brooks *et al.*, 2011; Vreven *et al.*, 2011). Vreven *et al.* (2011) stated that agricultural intensification on the hillsides above the caves increased the incidence of erosion and landslides. Additionally, Thieme *et al.* (2005) noted that changes in the local groundwater-surface water hydrology threatened the species' groundwater-dependent habitat. Decru *et al.* (2018) reported water extraction from Vungu Cave (Zone I) to irrigate cultivated land in Ntandalaga village. The ongoing development of dams on the Inkisi and Djoue Rivers was considered a further threat to fish species in the Lower Congo ecoregion (Brooks *et al.*, 2011). Furthermore, the Mbanza-Ngungu caves were reported to have become popular as a tourist destination (Thieme *et al.*, 2008; Brooks *et al.*, 2011).

C. geertsii has in the past been targeted for wild collection for the aquarium trade (Proudlove, 2001; Proudlove and Romero, 2001) and, in 1981, the Government of DRC (then Zaire) proposed listing the species in CITES Appendix I on the basis that it was being "taken illegally from Zaire for commercial purposes" at levels that threatened the species (CoP3 Prop. 71). Snoeks (pers. comm. to UNEP-WCMC, 2019) stated that "at the moment, [there are] no indications that these fish are regularly caught". Attempts to breed the species in captivity were reported to have been unsuccessful (Proudlove and Romero, 2001; Romero and Paulson, 2001).

C. geertsii was listed as a totally protected species in DRC by Ministerial Decree No. 014/CAB/MIN/ENV/2004 (République Démocratique du Congo 2004). The CITES MA of DRC (pers. comm. to UNEP-WCMC, 2019) stated that the 2018 quota for 70 live individuals of *C. geertsii* is for the purposes of scientific research, noting that the species' nationally protected status means that it cannot be traded for commercial purposes and that "DRC has no interest in trading *Caecobarbus geertsii* [commercially]". Collection of *C. geertsii* requires a scientific license and, before a trade permit can be signed, a Legal Acquisition Notice verifying legality and traceability must be issued (CITES MA of DRC, pers. comm. to UNEP-WCMC, 2019). The MA further noted that the CITES Scientific Authority for DRC had used "trend studies" to determine that a quota of 70 live individuals would not be detrimental to the persistence of *C. geertsii* in the wild, and stated that non-detriment research was ongoing. However, in addition to existing legal protections, Decru *et al.* (2018) recommended that *in situ* conservation measures were necessary for the long-term survival of the species.

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Appendix

Table 1: Purpose of trade

Code	Description
B	Breeding in captivity or artificial propagation
E	Educational
G	Botanical garden
H	Hunting trophies
L	Law enforcement / judicial / forensic
M	Medical (including bio-medical research)
N	Reintroduction or introduction into the wild
P	Personal
Q	Circus and travelling exhibitions
S	Scientific
T	Commercial
Z	Zoos

Table 2: Source of specimens

Code	Description
W	Specimens taken from the wild
R	Specimens originating from a ranching operation
D	Annex A animals bred in captivity for commercial purposes and Annex A plants artificially propagated for commercial purposes in accordance with Chapter XIII of Regulation (EC) No 865/2006, as well as parts and derivatives thereof
A	Annex A plants artificially propagated for non-commercial purposes and Annexes B and C plants artificially propagated in accordance with Chapter XIII of Regulation (EC) No 865/2006, as well as parts and derivatives thereof
C	Annex A animals bred in captivity for non-commercial purposes and Annexes B and C animals bred in captivity in accordance with Chapter XIII of Regulation (EC) No 865/2006, as well as parts and derivatives thereof
F	Animals born in captivity, but for which the criteria of Chapter XIII of Regulation (EC) No 865/2006 are not met, as well as parts and derivatives thereof
I	Confiscated or seized specimens (to be used only in conjunction with another source code)
O	Pre-Convention (to be used only in conjunction with another source code)
U	Source unknown (must be justified)
X	Specimens taken in “the marine environment not under the jurisdiction of any State”