◀ **A selection of dried seahorses used in traditional Chinese medicines to treat infertility, erectile dysfunction, and arthritis, amongst other ailments.**

Seahorse trade dynamics from Africa to Asia

Report by Simone Louw and Markus Bürgener

Introduction

Seahorses are part of the family Syngnathidae, along with pipefish, pipehorses and seadragons. This family represents marine species that are vulnerable to habitat loss and overexploitation (Vincent *et al.,* 2011). Seahorses belong to the genus *Hippocampus* and have suffered worldwide population declines in recent decades (Evanson *et al.,* 2011). The biology, ecology, and life history (i.e. low population densities, parental care, low fecundity and small home ranges) renders them particularly vulnerable to population declines (Foster and Vincent, 2004) and their shallow coastal habitats (seagrass beds, mangroves, coral reefs) are amongst the most threatened habitats in the world (Vincent *et al.,* 2011).

Seahorses are threatened by three main anthropogenic factors: targeted exploitation, accidental capture in non-selective fishing gear (retained bycatch) and habitat degradation (Otero-Ferrer *et al.,* 2017). Direct exploitation involves the targeting of seahorses by local fishermen to supply the dried seahorse trade (Giles *et al.,* 2006). The fishing methods used for large industrial scale fishing—primarily the trawl gears—significantly damages the vulnerable coastal habitats of seahorses across the world, further contributing to their declining habitats (Kuo and Vincent, 2018). The principal source of seahorses destined for international trade is from bycatch, mainly from trawling vessels (Kuo and Vincent, 2018). The extraction of seahorses as bycatch is large and unsustainable, estimated at tens of millions of seahorses each year (Vincent *et al.,* 2011). The vast number of seahorses removed from the sea, coupled with increased habitat degradation, is hampering the ability for seahorse populations to recover and is resulting in global declines (Vincent *et al.,* 2011).

The international trade in seahorses mainly involves the sale of dried seahorses for traditional Chinese medicines (TCM), live seahorses for ornamental display in the aquarium trade, and curiosities (Vincent, 1996). The trade in dried seahorses for TCM accounts for the largest consumption of seahorses—approximately 95% of the global trade (Vincent *et al.,* 2011) and targets large, pale and smooth seahorses, which are believed to have higher medicinal value (Vincent *et al.,* 2011). The specimens are ground to powder, which may be consumed directly as the sole ingredient or in combination with other products, for treatment of infertility, erectile dysfunction, and arthritis, amongst other ailments (Chang *et al.,* 2013).

All seahorse species *Hippocampus* spp. were listed in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) in 2002. The Appendix II listing was adopted in 2004 and requires all nations that are signatories to CITES to submit export and import records for trade in seahorses. These records can be accessed through a centralised database which can be used as a basis for assessing patterns in global trade, although, as with many other CITES-listed species, the official records of trade may not represent the actual trade volumes (Vincent *et al.,* 2014). There has been a history of variation in the reporting competency between importing and exporting CITES Parties (Vincent *et al.,* 2013), however, they are the best available data on the international reported trade of CITES-listed species. This rapid assessment aims to evaluate the trade dynamics of dried seahorses from Africa to Asia by investigating the volumes of seahorses traded; identifying the main countries of export and import; and revealing any discrepancies between the volumes and value traded.

Methods

CITES Trade Database

Data for all seahorse species *Hippocampus* spp. traded from Africa over an 11-year period (2008–2018) were downloaded from the CITES Trade Database (https://trade.cites.org, accessed 2 February 2020), in a comparative tabulation report. A total of 314 records were extracted which include data that are reported by importers (importer reported quantities) and exporters (exporter reported quantities). In the database, trade terms were filtered to records labelled as "skeletons" and "bodies" to encompass the dried seahorse trade in kilogrammes. The global trade in dried seahorses is predominantly reported in weight (Vincent, 1996). However, in cases where units were not provided (30% of records), they were

assumed to represent individuals (UNEP-WCMC, 2013), in which case figures were converted to kilogrammes using published conversion rates for the global estimated weight of dry seahorses (2.69 g/seahorse), as determined by Evanson *et al*. (2011). However, in the case of the West African Seahorse *H. algiricus*, the conversion for dry seahorses was estimated at 5.6 g/seahorse based on unpublished field studies conducted in West Africa (West *et al.,* 2012). The purpose of the trade was filtered to extract records labelled "T" (commercial use) and "P" (personal use) to cover the global dried trade for TCM and curios. The source of the trade was filtered to extract records labelled "W" (wild) for analysis of wild dried seahorses. The data were then transferred into pivot tables, where only direct trade was analysed (i.e. originating from the country of export), to avoid double counting of re-exported individuals.

Hong Kong Special Administrative Region (SAR) Trade Statistics

Hong Kong SAR (hereafter Hong Kong) is a major transit hub and the world's largest importer and re-exporter of dried seafood products, including seahorses. Accordingly, this analysis focuses on reported imports from Hong Kong, provided by the Hong Kong Bureau of Statistics (accessed 3 September 2019), with a focus on the mass (kg) and trade value (USD) of seahorses over the time period 2008–2018. Specific codes were developed by Hong Kong in 2008 to encompass the live and dried seahorse trade (03011910 covering individual live and ornamental seahorses; 03055930 which includes dried seahorses recorded in kilogrammes). A total of 55 records were reported between 2008 and 2018, of which 50 records related to dried seahorses.

Results

CITES Trade Database

Using data extracted from the CITES Trade Database, reported volumes of seahorse trade and the countries involved were analysed. There are major discrepancies between the reported exports and imports for dried seahorses (Table 1), with imports showing considerably higher volumes than the exports. Over the 11-year period, the total global number of exported dried seahorses is estimated at 11,259,098 individuals and the total global number of imported dried seahorses is estimated at 15,772,838 individuals. The top five countries/territories accounting for 99% of the global reported exports in dried seahorses (Fig. 1) include: Thailand, representing 71% of the total world exports, followed by mainland China (15%), Senegal (10%), Malaysia (2%) and Hong Kong (1%). The top countries/territories accounting for 99% of the global reported imports of dried seahorses include Hong Kong (88%), mainland China (11%), and Singapore (1%). According to CITES records, there were no reported exports of live seahorses from African countries for commercial purposes. Additionally, the majority of dried seahorse exports from Africa (97%) were reportedly destined for import by countries in Asia. Therefore, the next section of this report will focus on the dried seahorse trade between Africa and Asia.

Kg/individuals	Reported exports	Reported imports
Dried (kg)	32, 058	42, 429
Dried (individuals)	11, 259, 098	15, 772, 838

Table 1. The total reported exports vs. imports from all countries trading in dried seahorses (kg) and the conversion to no. of individuals, 2008–2018.
Source: CITES Trade Database

According to the CITES Trade Database, the African countries reporting dried seahorse exports between 2008–2018 are Senegal, Guinea, and Togo. There are major discrepancies between the quantities reported as exported from Africa and the importer reported quantities of dried seahorses originating from African countries (Table 2). Senegal reported the highest number of exports (98%) of dried seahorses in Africa, amounting to approximately three tonnes by the end of 2016, however countries reporting imports from Senegal showed significantly lower quantities of imports, and reported imports in the years 2017 and 2018 indicate that Senegal reported no exports (Fig. 2). Between 2008–2018, Guinea reported one export in 2008; however, countries reported importing dried seahorses from Guinea in several years and in much higher quantities (Table 2). Togo reported a small quantity of dried seahorse exports to Hong Kong in 2011, however, no imports were reported by Hong Kong. All the seahorses exported from Africa were sourced from the wild and comprised almost exclusively *H. algiricus*, listed as Vulnerable, with populations decreasing (Pollom, 2017a). Hong Kong was the only Asian importer reporting dried seahorses from Africa, despite Africa reporting exports of dried seahorses to Hong Kong, mainland China and Taiwan (Fig. 3). For this reason, the rest of the report will show the trade between Africa and Hong Kong.

Countries Totals: kg/ individuals	Exporter reported quantity	Importer reported quantity
Senegal	3,354	2,220
Togo	30	0
Guinea	23	2,024
Total dried seahorses (kg)	3,407	4,244
Individuals (5.6 g/seahorse)	608,393	757,857

Table 2. Exporter reported quantities (kg) of dried seahorses from African countries vs. importer reported quantities (kg) of dried seahorses originating from African countries, with the conversion to no. of individuals for the West African Seahorse *H. algiricus*, 2008–2018. *Source: CITES Trade Database*

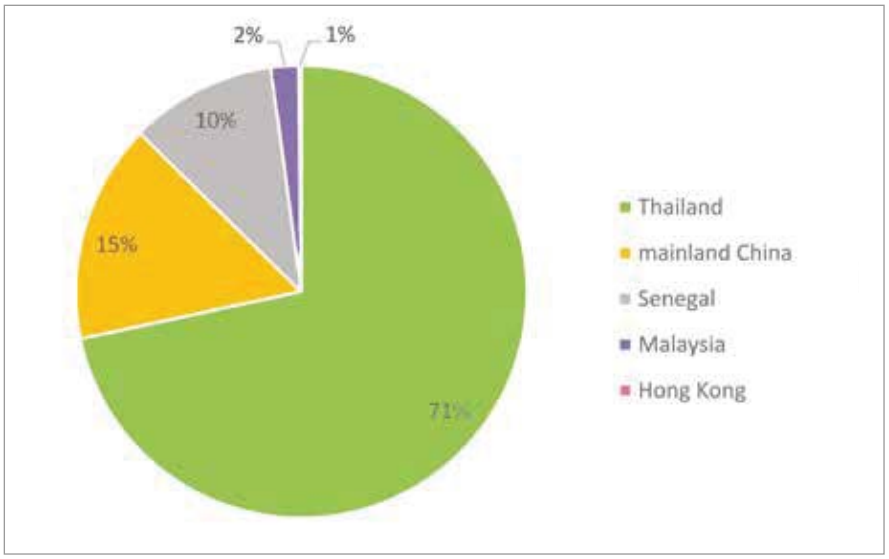

Fig. 1. The top five countries/territories accounting for 99% of the reported global exports for dried seahorses, 2008–2018.

Source: CITES Trade Database

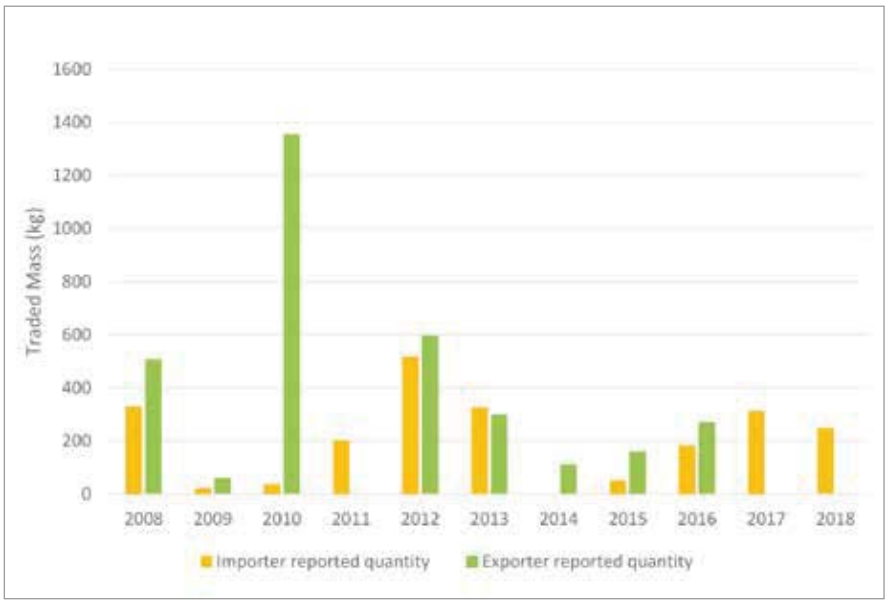

Fig. 2. The total reported quantities exported from Senegal vs. the importer reported quantities of dried seahorses reported as originating from Senegal, 2008–2018.

Source: CITES Trade Database

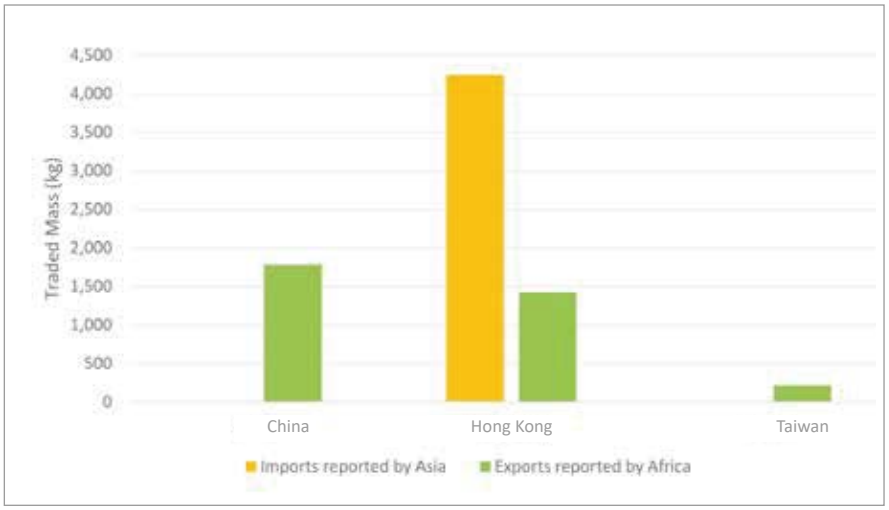

Fig. 3. The total reported exports of dried seahorses from Africa to Asia vs. the total reported imports of dried seahorses by countries/territories in Asia that originated from Africa, 2008–2018.

Source: CITES Trade Database

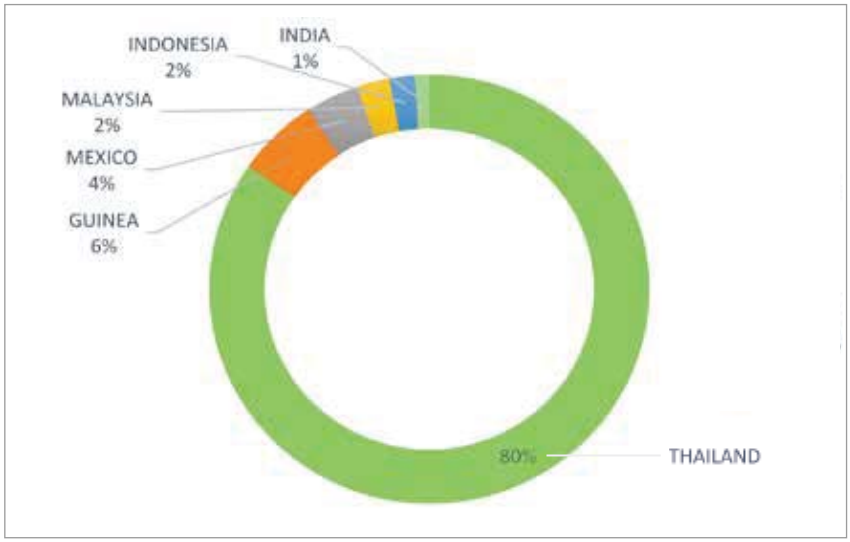

Fig. 4. The main countries of origin accounting for 95% of dried seahorses (HS Code 03055930) imported by Hong Kong between 2008–2018.

Source: Hong Kong Bureau of Statistics

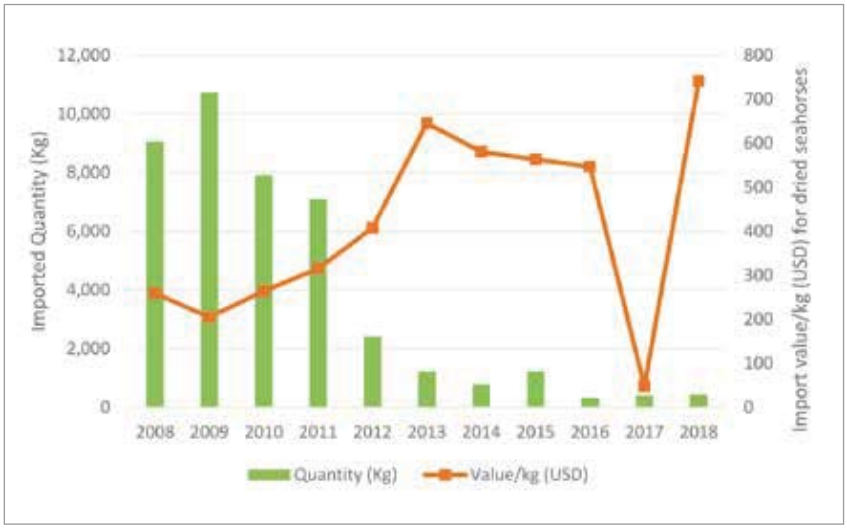

Fig. 5. Total mass of dried seahorses (HS Code: 03055930) imported by Hong Kong and the total import value/kg between 2008–2018.

Source: Hong Kong Bureau of Statistics

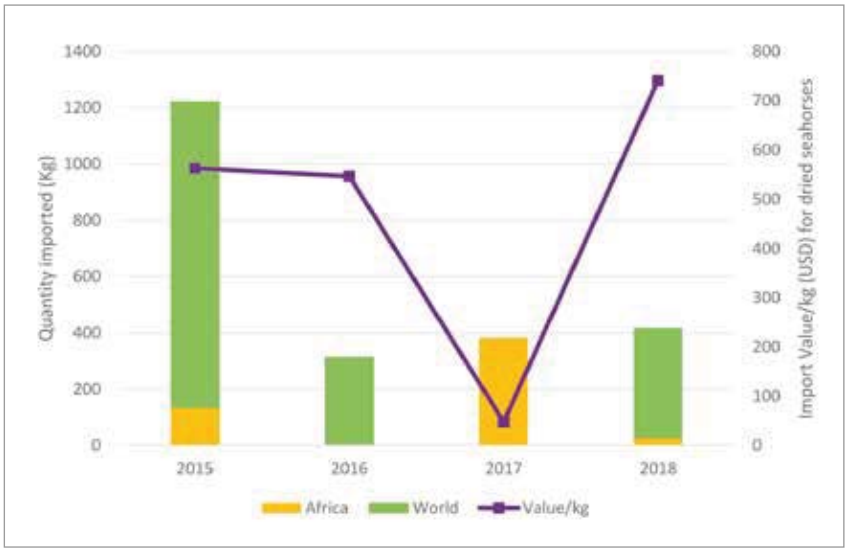

Fig. 6. Hong Kong imports of dried seahorses from 1) non-African countries and 2) all African countries, plus the import value/kg (USD) of dried seahorses represented by the purple line plotted on the secondary axis, 2015–2018.

Source: Hong Kong Bureau of Statistics

Hong Kong Trade Statistics

Hong Kong is the largest global importer of dried seahorses (Table 3) for use in TCM across Asia. According to Hong Kong's import records, Thailand accounts for 80% of the dried seahorse exports to Hong Kong, followed by Guinea (6%), Mexico (4%), Malaysia (2%), and Indonesia (2%) (Fig. 4). The volume of dried seahorses imported by Hong Kong peaked in 2009 at approximately 10 t, after which imports declined in 2012 to approximately two tonnes (Fig. 5). The sharp decline in imports from 2012 may be the result of Thailand implementing a maximum export quota of 1,500 kg per annum, following a 2012 CITES Significant Trade Review recommendation to address their unsustainable trade in dried seahorses (Kuo and Vincent, 2018). The import value per kg of dried seahorses increased from approximately USD250/kg in 2008 to approximately USD600/kg in 2013 (Fig. 5). Hong Kong's import value showed a sharp decline in 2017 to less than USD50/kg of dried seahorses, after which the import value increased to above USD700/kg in 2018 (Fig. 5). A closer look at the significant decline in 2017 (Fig. 6) showed that Hong Kong only imported dried seahorses from African countries for that year. In 2018, similar quantities of dried seahorses were imported by Hong Kong; however, the import value/kg increased significantly, and Africa represented only a small proportion of those imports (Fig. 6).

Africa accounts for 7.2% of the total dried seahorses imported by Hong Kong, from a total of five countries (Fig. 7): Guinea is the largest exporter, followed by Senegal and South Africa (Fig. 8). The results for Senegal and South Africa are particularly concerning for the following reasons: in 2016, the CITES Standing Committee recommended a suspension of trade of *H. algiricus* from Senegal for its failure to meet the Significant Trade Review process (CITES, 2019). However, Hong Kong import records indicate continued exports of seahorses from Senegal in 2017 and 2018. Additionally, the imports of dried seahorses from South Africa are also concerning, given that all syngnathids are listed as protected species under South Africa's *National Environmental Management: Biodiversity Act (No. 10)* of 2004. Ghana and Mauritania account for a small number of dried seahorses exported from Africa. According to Hong Kong's import records, the main method of transporting dried seahorses to Hong Kong is by air (Table 4), followed by a small number of seahorses transported by "other" methods, which includes hand carrier or post. Africa exported a total of 2,969 kg of dried seahorses to Hong Kong between 2008 and 2018, which is equivalent to approximately 583,688 seahorses according to the median weight of *H. algiricus* for West African countries and the average global estimated weight (2.69 g/seahorse) for the dried seahorses exported from South Africa (Evanson *et al.,* 2011; West *et al.,* 2012). There are major discrepancies in what Hong Kong has reported to CITES and the Customs data of Hong Kong's imports (Table 5), including the number of African countries from which Hong Kong has reported importing dried seahorses and differences in the reported quantities of dried seahorses imported by Hong Kong.

HKHS Code	Hong Kong imports	Unit
03011910 (live)	489	No. of individuals
03055930 (dried)	41,506	kg

Table 3. Total live seahorses vs. dried seahorses imported by Hong Kong SAR, 2008–2018.
Source: Hong Kong Bureau of Statistics

Illegal Seahorse Trade From Africa to Asia

According to media reports sourced online between 2010–2019, a number of African countries were implicated in reported seahorse seizures (Fig. 9) (TRAFFIC, 2020). Madagascar illegally exported the highest quantities of seahorses from Africa. Belgium emerged as a major transit location for a number of West African countries (Guinea, Congo, Senegal, Sierra Leone, Liberia) and all the exports were destined for import by Asian countries/territories. A seizure in South Africa had no trade route reported as the seahorses were seized on land, through joint operations, before they could be transported out of the country (TRAFFIC, 2020).

A recent study showed that 95% of global dried seahorse exports are coming from countries that are prohibited from exporting seahorses (Foster *et al.,* 2019). Despite the recommendation not to import *H. algiricus* from Senegal since 2016, it appears to remain a key exporter of dried seahorses in Africa (Foster *et al.,* 2019). The Knysna Seahorse *H. capensis*, endemic to South Africa, is a protected species under

Country	Air	Others	Total (kg)	No. of individuals
Ghana		14	14	2,500
Guinea	2,209	130	2,339	417,679
Mauritania	2		2	357
Senegal	337		337	60,179
South Africa	277		277	102,974
Total	**2,825**	**144**	**2,969**	**583,688**

Table 4. The total quantity (kg) of dried seahorses imported by Hong Kong from African countries and the conversion amount to no. of individual seahorses (5.6 g/seahorse for West African countries and 2.69 g/seahorse for South Africa), along with the main methods of transport as reported by Hong Kong imports, 2008–2018. *Source: Hong Kong Bureau of Statistics.*

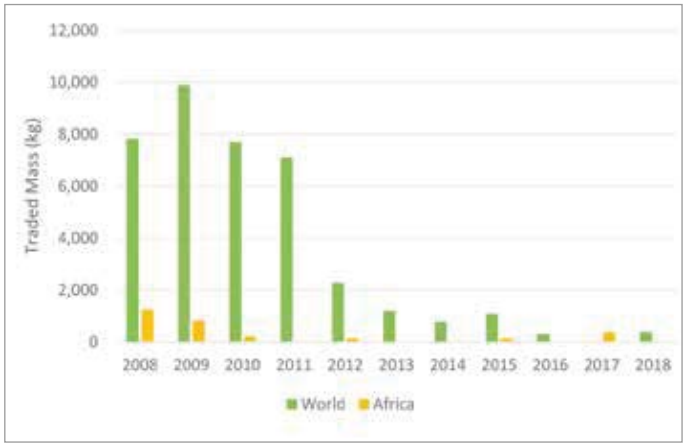

Fig. 7. The total mass of dried seahorses imported from Africa vs. the rest of the world as reported by Hong Kong, 2008–2018. *Source: Hong Kong Bureau of Statistics*

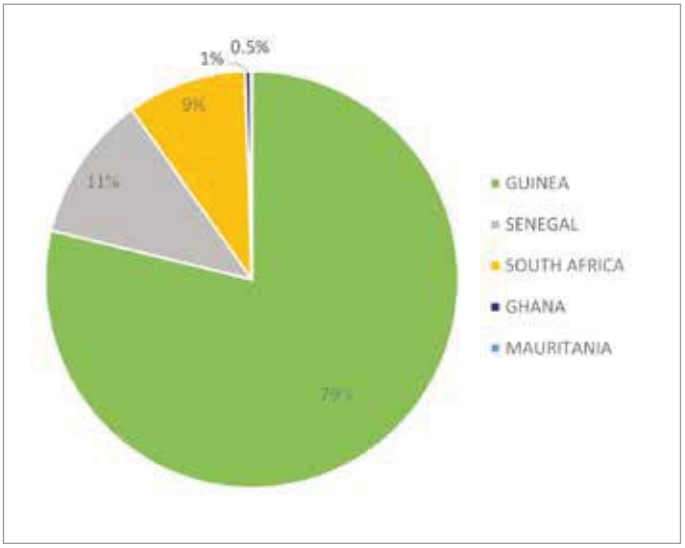

Fig. 8. Hong Kong imports of dried seahorses from African countries, 2008–2018.
Source: Hong Kong Bureau of Statistics.

	CITES (kg)	HK Customs (kg)
Senegal	2,220	337
Guinea	2,024	2,339
South Africa	0	277
Ghana	0	14
Mauritania	0	2
Total	**4, 244**	**2, 969**

Table 5. A comparison of the Hong Kong imports (kg) from African countries, 2008–2018.
Sources: CITES annual reports and Hong Kong Customs data.

the *Biodiversity Act* of 2004 and listed as Endangered according to the IUCN Red List of Threatened Species (Pollom, 2017b). Nevertheless, Hong Kong has reported imports of seahorses originating from South Africa. The illegal trade in seahorses is negatively impacting wild populations, as can be seen with the declining populations of *H. algiricus* along the coasts of Guinea, Senegal, and Mauritania, according to the IUCN Red List of Threatened Species (Pollom, 2017a).

This report focuses on recent trends in the seahorse trade using CITES data and Hong Kong import statistics (2008–2018); it is important to note, however, that studies conducted in East Africa found that seahorses were reportedly traded in high quantities from Kenya and Tanzania for TCM markets in Hong Kong (Mcpherson and Vincent, 2004; Vincent, 1996). Since the CITES listing of seahorses in 2014, there have been no reports of legal seahorse trade from East Africa, in both the CITES data and Hong Kong import records, despite anecdotal evidence of seahorse confiscations and known harvesting occurring in the region.

Conclusions

The reported trade in dried seahorses has shown major declines since 2012, but this may not be a true reflection that the international trade has actually declined. In 2011, the CITES Significant Trade Review process led to a number of recommendations to suspend trade with the major seahorse exporting countries, including Thailand, Viet Nam, Senegal and Guinea, which at the time made up 98% of the total trade (CoP18, Doc. 72). These trade suspensions resulted in sharp declines in the reported exports from 2012 onwards; however, a recent analysis of Hong Kong's import records has shown continued exports in high quantities from these major source countries, despite suspensions being recommended (Foster *et al.,* 2019). The global declines in seahorse populations as a result of incidental capture (retained bycatch) by trawling vessels and the increased degradation of threatened habitats, have also contributed to localised declines in trade volumes (Vincent *et al.,* 2011). However, the demand for dried seahorses to supply the TCM markets across Asia continues to drive the exploitation of seahorses from a growing number of source countries.

The seahorse trade in Africa has been comparatively under-studied in recent years, and this rapid assessment shows that countries in Africa play a key role in the global

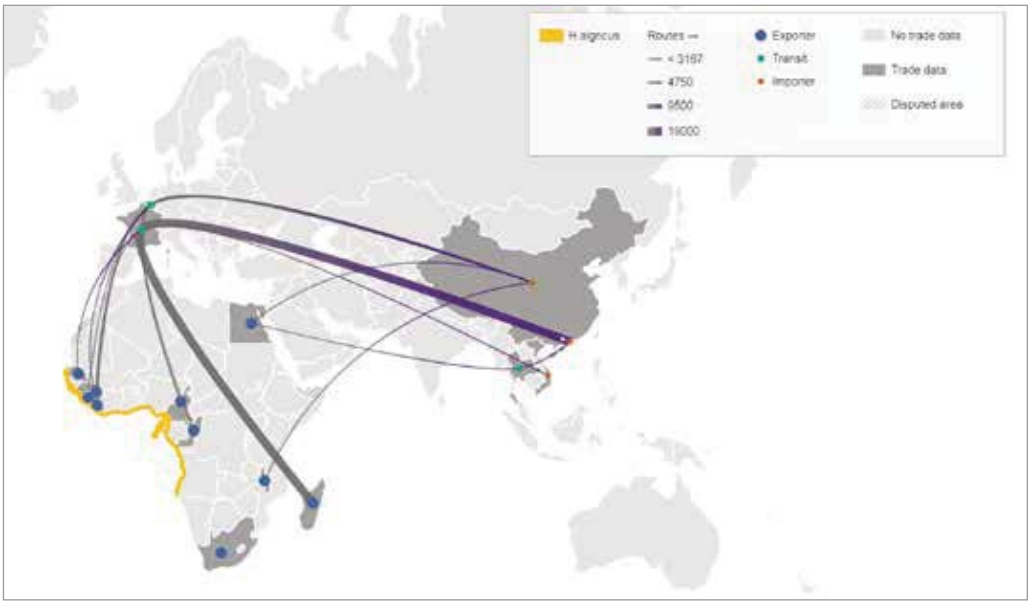

Fig. 9. Seahorse seizures implicating African countries between 2010–2019 and the range of West African Seahorse *H. algiricus*. *Source: TRAFFIC (2018) TradeMapper, a tool for visualising trade data. Available at www.trademapper.co.uk.*

Disclaimer for TRAFFIC's seizure data: *The datasets used to collate this information consist of reported wildlife trade seizures. Whilst seizure data are a vital source of information, it should not be inferred that there is a direct correlation between seizures and the overall illegal wildlife trade or that information over time is consistent. The ability and willingness of a country to target illegal wildlife trade may vary over time due to a variety of factors. The volume of seizures is not in direct proportion to the amount of illegal wildlife trade. Reported seizures are therefore an imperfect proxy for the volume of illegal wildlife trade, though they do give a good insight into what is being seized.*

dried seahorse trade, notably the emergence of West African countries such as Guinea and Senegal. Major discrepancies in reported trade volumes and the lack of regulations are contributing to unsustainable levels of seahorse exports from Senegal and Guinea. Hong Kong reported imports of 102,974 individual seahorses originating from South Africa. This result is particularly concerning since the seahorse species occurring in South Africa—*H. capensis*—is protected under South Africa's *Biodiversity Act* of 2004 and is one of the most threatened seahorse populations in the world (Lockyear *et al.,* 2006).

This report highlights several significant findings: high levels of illegal trade in dried seahorses is occurring in Africa; there is a lack of compliance with CITES trade bans for seahorses as well as a lack of enforcement to implement legislation protecting seahorses; and the current levels of seahorse harvesting are most likely unsustainable and will lead to further population declines.

Recommendations

- Future studies should investigate seahorse trade in East Africa, as there has been no legal trade following the CITES Appendix II listing in 2004, despite confiscations and known harvesting. Marine scoping studies conducted in the region by TRAFFIC will aim to investigate this trade.
- Governments and Customs agencies need to improve trade regulation of seahorses exported from Senegal, Guinea and South Africa to limit opportunities for seahorses sourced from illegal operations entering international trade.
- Capacity building and training is needed for Customs and law enforcement (fisheries compliance officers, port officials, and border police) in Senegal, Guinea and South Africa to support CITES implementation. This supports Outcome 4 of the UNODC indicators for strengthened law enforcement in response to fisheries crimes in West Africa (UNODC, 2016)
- Increased awareness is required within law enforcement (fisheries compliance officers, port officials, and border police) and Customs agencies in Senegal and Guinea of the potential for illegal seahorse products to be smuggled through borders, either with, or concealed as, legal seahorse shipments. This supports the recommendations agreed by ECOWAS Member States, in 2018, on developing a co-ordinated response to wildlife trafficking in West Africa (ECOWAS, 2018).
- Law enforcement agencies in Southern Africa wishing to share information on the illegal trade in seahorses would benefit from making use of the SADC-TWIX platform (https://www.sadc-twix.org/).

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▲ Dried seahorses that had been concealed in a package for export to China, and seized in 2016 by the South African Post Office; they were handed over to the Department of Agriculture, Forestry and Fisheries, Cape Town.