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AND NATURAL HABITATS

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GUIDANCE DOCUMENT ON E-COMMERCE AND IAS

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(The opinions expressed in this work are the responsibility of the author and do not necessarily reflect the official policy of the Council of Europe)

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SUMMARY

The present document aims at providing guidance on voluntary measures to limit the role of e-commerce as pathway for introduction of invasive alien species (IAS) at national and regional scale. Scientific literature and surveys of commercial websites worldwide reveal a wide range of invasive alien species for sale, including many species regulated by national laws or international treaties. Identifying and managing the risks associated with e-commerce is particularly challenging, as e-commerce is not a physical pathway for introduction of IAS, but rather simply serves as a mechanism for processing commercial and non-commercial transactions between groups and individuals. The Guidance is thus addressed to those that can contribute to the enforcement of an effective management and regulation of this pathway. It also aims at raising awareness on the dangers related to this threat, and at improving the information on this issue. The support of national authorities in implementing the code is pivotal to ensure the effectiveness of the measures envisaged.

1. INTRODUCTION

Over the past 25 years the Council of Europe has been working to support Bern Convention Contracting Parties in designing and implementing control measures for invasive alien species, with the aim to reduce their negative impacts on native biodiversity in Europe. The Council has produced a number of reports and policy documents in the field and, above all, has developed the European Strategy on Invasive Alien Species (IAS) endorsed by the Bern Convention in 2003, as well as numerous voluntary guidance or codes of conduct addressed to various sectors of activity which are potential pathways for the spread of non-endemic species in Europe.

The European Strategy on Invasive Alien Species (IAS) paved the road for the adoption of the EU Regulation 1143/2014, leading to concerted action on a list of invasive alien species of Union concern. The voluntary codes of conduct and best practices are valuable complementary tools. They are considered as fundamental flexible "implementation" tools which could be strengthened with the support from public bodies, industry federations, user groups and/or NGOs as appropriate, with the aim of ensuring responsible, proactive policies, and applying these in a coherent manner across Europe (Shine et al. 2010).

For this reason, the Bern Convention, with the technical support of the IUCN SSC Invasive Species Specialist Group, has started to develop a series of voluntary instruments (codes of conduct and guidelines) covering several industries, activities or contexts potentially responsible for the introduction of alien species (*e.g.* horticulture, hunting, pet industry, botanical and zoological gardens, aquaria and protected areas).

The development of these instruments can play an important role in building awareness among key societal sectors, and is fully in line with Aichi Target 9 of the Strategic Plan for biodiversity 2011–2020 (CBD-COP, Nagoya, 2010, Decision X/38): "by 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures

are in place to manage pathways to prevent their introduction and establishment", and with Target 5 of the EU Biodiversity strategy to 2020.

In light of the above and considering the activities of the Convention of Biological Diversity in relation to IAS and the implementation of the EU Regulation 1143/2014, the Council of Europe has the intention to develop a guidance document on e-commerce and IAS. Indeed, the considerable increase of e-commerce over the past years, its major role as IAS introduction pathway and the difficulties encountered in regulating this trade, call for development of such guidance. The present guidance is also expected to provide useful cues and suggestions to support the processes of prioritization and implementation of the EU Regulation 1143/2014.

2. E-COMMERCE OF INVASIVE ALIEN SPECIES

E-commerce ("*the activity of buying or selling of products on online services or over the Internet*" from Wikipedia) is a growing and vital part of the global economy. Globally, e-commerce is expected to amount to more than $ 6 trillion and 21,8% of total retail in yearly sales by 2024 (Fig. 1). A portion of this activity includes the sale and trade of living organisms, IAS included.

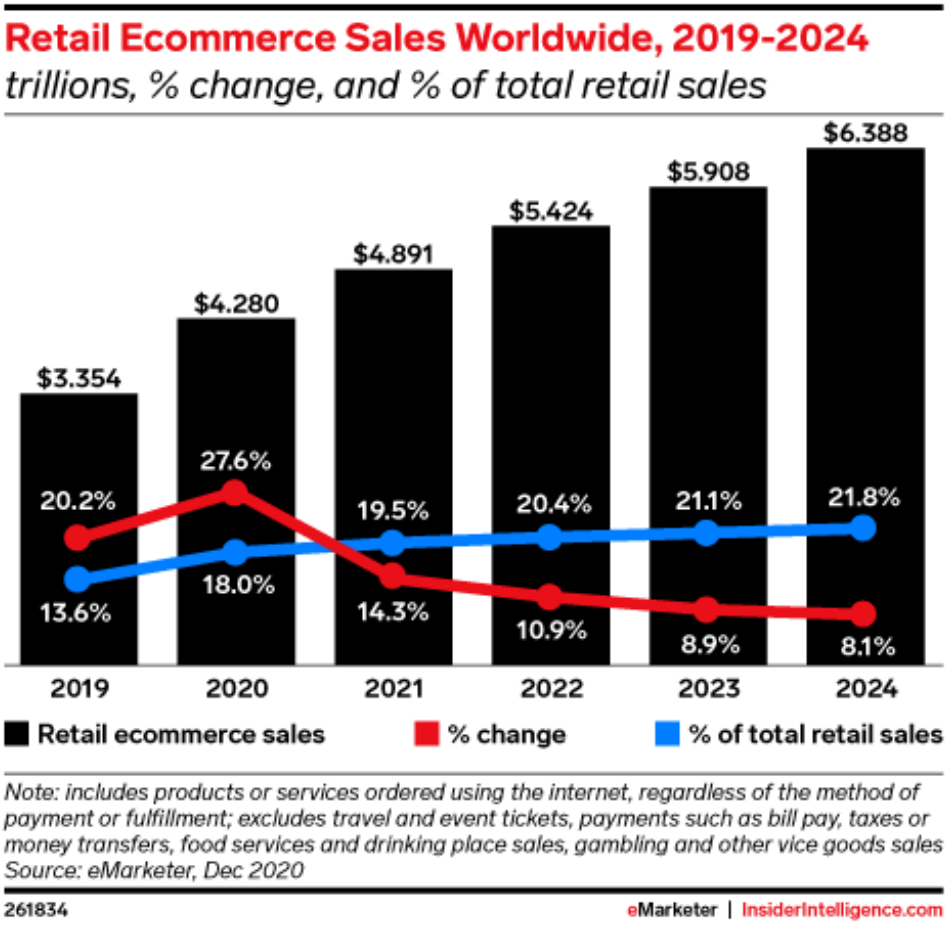

Figure 1. *Prediction of Retail Ecommerce Sales Worldwide. Source: eMarketer December 2020.*

In the last decades, internet has become an invaluable tool for facilitating commerce and communication worldwide, therefore the opportunities to trade in live animals and plants have hugely increased.

The range of sectors and species relevant for the e-commerce of living organisms is wide: e.g. pet and aquarium species, horticultural and agricultural species (plants, cuttings, seeds, soils), live food and bait, scientific and educational supplies, firewood and other biofuel stocks, and herbal or medicinal products.

The rise of internet-based commerce in living organisms is expected to contribute to the spread of invasive alien species and can be considered among the main driver of IAS introduction and a major biosecurity concern (Ricciardi et al., 2017). The online trade of living organisms is poorly regulated and, being accessible to all, it has increased considerably in the recent past, making the purchase of invasive species "just a mouse click away" from any home (Mazza et al., 2015; Figs. 2 and 3). Being so easy to sell or buy a plant or an animal coming from all over the word, an internet seller can directly approach a global clientele at low costs and provide instant satisfaction. This further accelerates the global trade of live plants or animals, with the risk of bypassing traditional border controls and biosecurity regulations, aimed at reducing the risk of spreading diseases and pests. Indeed, since these commodities are often marketed by means of small and uneasily recognizable consignments, overlook by border controls is a concrete risk that has to be taken in consideration.

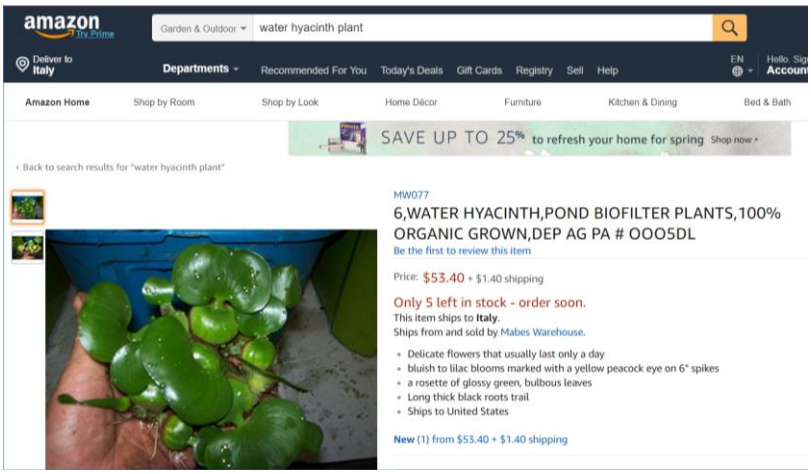

Figure 2. *Water hyacinth, one of the 23 listed plants of Union concern that can be easily bought on internet. Access date 10 September 2018.*

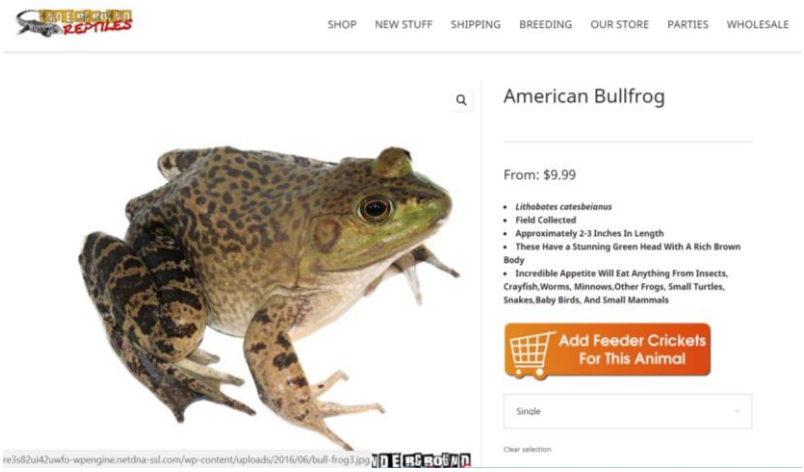

Figure 3. *American bullfrog, one of the 26 listed animals of Union concern that can be easily bought on internet. Access date 10 September 2018.*[1]

The recent COVID-19 pandemic has had a marked impact on consumer's purchasing behaviour, encouraging to online shopping at the expense of traditional sales. According to experts the e-commerce global market saw a spike during the COVID-19 pandemic, jumping from 16% in its share of all retail sales in 2019 to 19% in 2020 (China from 20.7 to 24.9%, US from 11 to 14%, Australia from 6.3 to 9.4%, UK from 15.8 to 23.3%; source United Nation Conference on Trade and Development 2021).

The increase in online sales during the pandemic affected many product categories, including pets and ornamental plants (in addition to their related products; Fig. 4). With physical stores closed and people confined to home, or with severe restrictions on movement, many retailers in the sector have had to drastically increase their online offer and adapt logistical aspects to survive.

Figure 4. *The top 10 Product Categories in online sales during COVID-19. Source: Wix eCommerce Growth Report, May 15, 2020.*

[1] US website, the possibility of shipment to EU was unclear at the access date.

In the future it is likely that this shift towards online shopping will consolidate, increasing the risk of introduction and spread of pest and IAS worldwide (https://www.ippc.int/en/core-activities/capacity-development/e-commerce/). A recent study, based on an online survey, aimed to understand whether the pandemic altered how consumers will shop for plants after the pandemic compared with pre-pandemic shopping behaviour in the U.S. (Campbell et al., 2021). The study showed that the Coronavirus has changed the way consumers approach shopping; about 43% of the respondents stated that they are planning to change their plant- purchasing habits in the future and respondents who have converted to buying plants online are more likely to continue shopping online, rather than going back to the pre-pandemic shopping behaviour.

The growing economic importance and an expanding globalization of e-commerce results in a greater diversity and complexity of the trade market, making increasingly difficult to adopt effective prevention and control strategies. For instance, invasive species for sale can be offered online in a number of different ways: auction sites, large marketplaces, large and small producers or growers, e-catalogue of brick-and-mortar shops, hobbyist sites.

Individuals and small companies that sell through internet may not be legally registered and often do not disclose their specific location of operation; moreover, sellers can use a high level of anonymity to circumvent accountability and taxes (ISAC 2012).

In parallel, sellers who don't have any expertise in the plant and animal they sell, may be ignorant or misinformed on potential dangers and biosecurity regulations or may incorrectly identify their product (Walters et al, 2006; Giltrap et al., 2009). In these cases, raising awareness to adopt preventive measures is much more difficult than in the case of professional sellers.

Misidentification of species is a major issue in both traditional and electronic commerce of living organisms. ISAC (2012) identifies several possible problems concerning the proper naming of items sold online:

- the exact species may not be known to science;
- taxonomic classifications and scientific names can change over time;
- new or little-know species are often particularly sought after;
- species may be incorrectly or insufficiently (ex. higher taxonomic level than species) identified, intentionally or unintentionally;
- a trade or common name used that does not refer unambiguously and consistently to any species.

Despite a number of government entities have jurisdiction over specific aspects of e-commerce (often with an overlapping mandate too, Fig. 5), this sector is evolving and expanding in volume at a rate that may exceed the capacities of these entities to address the associated risks of introduction and spread of invasive species. Especially when the import channel or the supplier is located outside of the jurisdiction of a regulatory body (ex. NPPO, National Plant Protection Organization) national biosecurity regulations may be eluded (Humair et al, 2014).

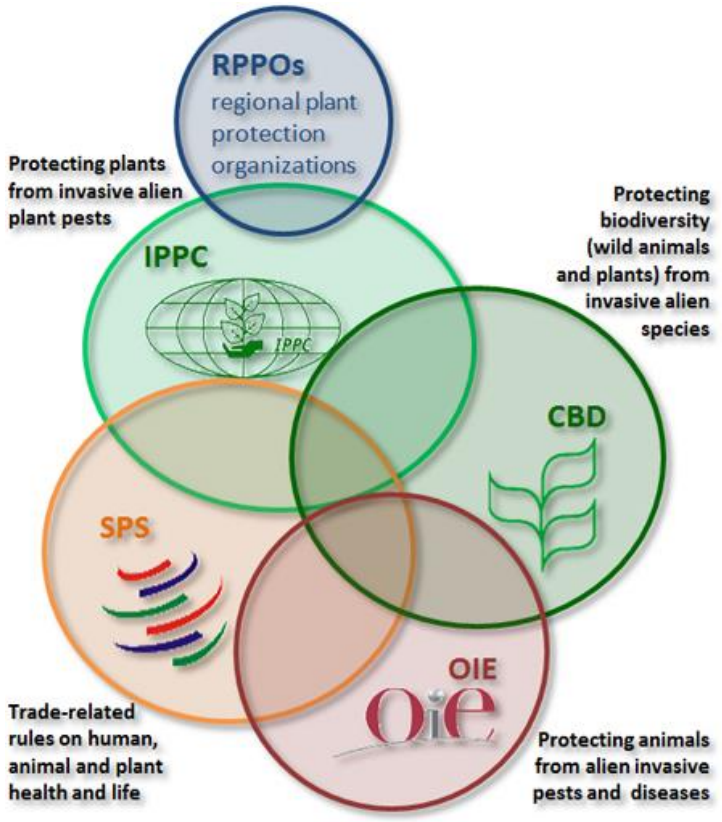

Figure 5. *International Trade and Invasive Species: overlapping mandates. Source: Lopian 2005.*

A challenging issue for detecting IAS at the border is that often the custom declaration on a mail package intentionally or unintentionally fails to accurately disclose its content, increasing the difficulty in halting the entry of consignments containing invasive alien species (Derraik and Phillips, 2010; ISAC 2012). Also shipping agents or companies may not necessarily know they are transporting living and harmful organisms.

Another critical point is that living organisms are often sent using directly the mail service (Morrisey et al., 2011) that, unlike express delivery services (e.g. DHL, UPS), does not generally require any electronic declaration about the content of the packages. This precludes substantially the possibility to effectively inspect consignments because inspections may or not occur depending on volume of mail, availability of personnel or other variables (ISAC, 2012).

Some authors, considering all these critical issues, highlight the pivotal role of raising awareness among customers and stress the need of encouraging them to take voluntary actions to mitigate the risk of IAS introduction and spread (Giltrap et al., 2009; Martin and Coetzee, 2011).

A review of existing relevant legislation in Europe on the sale of exotic pets at national level (27 EU Member States and Norway, Switzerland, Croatia[2] and Turkey) found big gaps in current national legislation for what concern specific restrictions on internet sales (Eurogroup for animals, 2013[3]).

[2] The analysis was released on July 2013 and the Croatia become the European Union's 28th MS on 1 July 2013.
[3] https://www.eurogroupforanimals.org/wp-content/uploads/Eurogroup-for-Animals-Exotic-Pet-Report-FINAL.pdf

To respond to this growing problem, several countries and organisations are developing measures specifically designed to control the e-commerce of invasive alien species. For example, Canadian authorities developed a tool (the Great Lakes Detector of Invasive Aquatics in Trade – or GLDIATR) employing advanced technology to scan internet pages to identify sellers of invasive species[4]. Launched in 2015, GLDIATR is an innovative software program developed by the Great Lakes Commission (Michigan, USA) that uses advanced technology to search the internet for sites where aquatic invasive species can be purchased and shipped to the Great Lake region. By automatically identifying sales pages, GLDIATR simplifies the process of removing these invasive species from trade. This software enables managers to quickly identify sellers offering regulated species for sale and notify those sellers to remove regulated species from their offer. In the first 30 days of full- scale testing alone, GLDIATR scanned over 300,000 web pages and identified 200 websites with invasive species for sale, including 56 regulated species. In response, the Great Lakes Commission contacted website owners with information about invasive species regulations and best practices and observed changes to stock and/or shipping restrictions in 27 cases. A critical point about this approach is that its effectiveness strictly depends on the ability (or willingness) of website owners to correctly identify the species they offer.

An Expert Workshop organised by the Convention on Biological Diversity[5] in preparation for the 22th meeting of the SBSSTA[6] (Montreal, 2018) recognised the serious threat posed via e-commerce to biodiversity, highlighting that the primary way of addressing the risk associated with e-commerce is the development of national regulations, to assist national customs agencies to enforce halting entries of invasive alien species. The Expert Workshop also stressed the importance of data sharing and information flow on invasive alien species to facilitate the national process above. It also stressed the need to engage with national Customs authorities (the Customs Administration designated to the World Customs Organization) to raise the issue of invasive alien species among the users and operators of e-commerce.

A number of scientific analyses and reports has addressed various aspects and sectors of e-commerce and other forms of trade in relation to invasive or potentially invasive species. For instance, Derraik and Phillips (2010) provide several examples and a broad overview of the issue in New Zealand and ISAC (2012) provides a general analysis and several recommendations for what concern the e-commerce in the U.S.

Great attention is paid to horticultural trade, recognised as a major pathway of IAS introduction: Peters et al. (2006) examine the horticultural trade in Minnesota and Dehnen-Schmutz et al. (2010) in Britain; Giltrap et al. (2009) describe a couple of significant examples on internet sales of plants in the UK; Humair et al. (2014) automatically surveyed the global e-commerce of invasive plants to determine its importance as pathway; Lenda et al. (2014) focused on the role of internet sale in the long distance dispersal and spread of invasive plants in Poland.

[4] https://www.glc.org/work/gldiatr/about
[5] https://www.cbd.int/meetings/IASEM-2017-01
[6] Subsidiary Body on Scientific, Technical and Technological Advice, an open-ended intergovernmental scientific advisory body established under Article 25 of the Convention on Biological Diversity

For what concern the aquarium trade and ornamental aquaculture, Mazza et al. (2015) provided an overview of the aquarium e-trade in Italy; Peres et al. (2018) focused on the threat of aquarium plants e-commerce in Brazil; Chucholl (2012) analysed the e-commerce of ornamental freshwater crayfish in Germany, Papavlasopoulou et al. (2014) in Greece and Patoka et al. (2014) in the Czech Republic. Kay and Hoyle (2001) examined aquatic weeds sold through internet and mail, and Stam et al. (2006) and Walters et al. (2006) focused on the sale of *Caulerpa* spp. in Florida. Barroso de Magalhães and Jacobi (2010) analysed the role of e-commerce in the spread of introduced freshwater aquarium fish in Brazil and Martin and Cotzee (2011) the role of internet in introduction and spread of macrophytes in South Africa.

Finally, an examination of the internet pet trade has been done for the UK by Parrott and Roy (2009) and for New Zeland by Kikillus et al. (2012) that used *Trachemys scripta elegans* as representative species.

A comprehensive analysis on e-commerce of plants (Humair et al., 2014), performing 50 days of automated search on 10 major online auction sites (including eBay), found very significant results:

- ✓ 41 out of the 100 most-offered species were classified as invasive,
- ✓ 13 out of the 35 plant species on the IUCN's "100 of the World's Worst Invasive Alien Species" list, were on sale.

A lot of invasive and worst invasive plant offers were found on sale on the web and the authors suggest that their results perhaps underestimate the true scale of the problem, highlighting that biosecurity is not effectively regulating online plant trade. As pivotal action to prevent the spread of invasive plant species, the authors suggest implementing an automated system to monitor e-commerce. They also suggest that paying particular attention to social media could help identifying changing tastes in consumers purchasing plants, and that could help researchers and governments with the early detection of new invaders.

In a study on the online commerce of aquarium species conducted in Italy (Mazza et al., 2015) freshwater fish and plants were the most frequently sold aquarium taxa on internet, probably because their easy maintenance and their cheaper price compared to marine species. Analysing the biological features of the traded species, the authors found that most of them have characteristics that can favour their survival and spread in the wild, once released or escaped. Half of the traded plants are already introduced outside of their native range and some of them are well-known as highly invasive and harmful (ex. *Caulerpa* genus, water lettuce *Pistia stratiotes*, water hyacinth *Eichhornia crassipes*, parrot's feather *Myriophillum aquaticum*). The study also highlighted a general low level of information on biology of species traded and a high level of incorrect or poor identification (ex. species are often identified only at genus level).

Internet sales can also affect the dispersal models of invasive alien species, as pointed out by a study on plants commerce in Polish gardening shops that sold both via internet and traditional customer sales (Lenda et al., 2014). Comparing data on thirteen among the most harmful invasive plants in Europe, the authors found that IAS sold by internet were transported at a distance several times larger than the ones sold by traditional sales. While traditional sales, involving almost only

visiting customers, resembled more natural dispersal modes with a few individual travelling very long distances, the e-commerce changed the dispersal patterns of invasive alien plants, increasing the number of long-distance dispersal events and the rate of geographical range spread. The study also pointed out a huge (over one-hundred-fold from 2006 to 2011) increase of the invasive alien plants sold via internet by the Polish gardening shops, resulting in a massive increasing of potential propagule pressure and colonization of new areas.

Many authors highlighted also the risk that IAS sold in the internet may become vectors of alien parasites or pathogens harmful for native organisms and for human health (Derraik and Philips, 2010; Lenda et al., 2014, Mrugala et al., 2014), as in the case of the chytrid fungus *Batrachochytrium dendrobatidis*, a pathogenic agent responsible for the global decline of amphibians, which seems to have spread also through the international trade of experimental and ornamental amphibians (Fisher & Garner 2007).

3. E-COMMERCE OF INVASIVE ALIEN SPECIES OF UNION CONCERN: AN UPDATED GLOBAL PICTURE FROM A WEB SURVEY

To collect information to develop the present guidance document and to support the proposed key recommendations with some updated quantitative information, as a sample, a desktop systematic research of species listed on the Union list for sale on the web has been performed. Similar analysis could be made for e.g. species on national lists, like the Spanish Catalogue on invasive alien species. The research was not aimed at achieving a comprehensive analysis on sellers offering EU listed IAS for sale, but rather to test banned species availability through e-trade.

3.1 Methods

Sellers were identified by performing a Google search for each of fourty-eight invasive alien species of Union concern[7] using the following standardised search terms: "*name of species* **for sale**". All searches were done using the English language. The search for each species was repeated twice, the first time using the Latin name (ex. *Nasua nasua*) and the second time using the common English name (ex. South American coati). Only the first fifty results of each Google search were considered for the scope of the author's research. In total, about 5,000 Google results were examined, and more than 1,100 were verified to check the availability of a species for sale.

Both **online shops** (pet, aquarium, horticulture, etc.) and **large e-commerce on line retailers** (ex. Amazon, Mercado Libre, Jumia or AliBaba) were considered as "**sellers**". Peer-to-peer platforms were excluded and only a rough assessment (reported on a 4-point scale) of the frequency of this kind of trade was carried out. Once the seller was identified, its stock lists were surveyed to search the species and check: (1) the availability in stock, (2) the deliverability to Europe (in case of non-European seller), (3) the presence of a warning advertisement on the risks to purchase an alien invasive species. Sellers having invasive species in store but not for sale or not currently in

[7] *Nyctereutes procyonoides* was not part of the list yet.

stock, were excluded by the survey results as a precaution, hypothesizing, at least for European-based sellers, a recent exclusion due to the entry into force of the EU Regulation 1143/14. According to the art. 32 of the EU Re. 1143/14 «*The sale or transfer of live specimens to non-commercial users shall be allowed for one year after inclusion of the species on the Union list* […] ». Considering that the first update of the List of IAS of Union concern entered into force on 2 August 2017, at the time of the survey the sale of fourty-eight listed IAS of Union concern could be considered forbidden. Moreover, several sellers were excluded when the correct species identification was not certain.

The survey was performed from 10.09.2018 to 05.10.2018. The following information has been collected, synthesized and stored in an excel spreadsheet:

A	**Species name**	genus, species
B	**Common name**	common English name
C	**Taxa group**	amphibians, aquatic plants, birds, crabs, crayfish, terrestrial dicotyledons, fish, insects, mammals, terrestrial monocotyledons, reptiles
D	**Kingdom**	*animalia, plantae*
E	**Environmental system**	freshwater, terrestrial, terrestrial/freshwater
F	**N total of sellers**	sum of the columns: H+I
G	**N total of sellers with warning advertisement**	total number of sellers with warning advertisement on the risks to purchase an alien invasive species
H	**N of sellers based in Europe**	number of sellers based in Europe
I	**N of sellers based out of Europe**	number of sellers based out of Europe
L	**N of sellers based out of Europe delivering in Europe**	number of sellers based out of Europe but delivering in Europe
M	**N total of sellers delivering in Europe**	sum of the columns: H+L
N	**N sellers delivering Europe for each country**	countries with at least 1 seller delivering in EU: China, USA, France, Germany, Italy, UK, India, Israel, the Netherlands (and undetermined)
O	**P2P rough assessment**	4-point scale (1=lowest to 4=highest) evaluation of the frequency of the peer-to-peer trade

To highlight possible relevant differences, the analysis was performed also on data aggregated for « kingdom», «taxa group» and «environmental system».

3.2 Results

Two hundred and seventeen sellers offering IAS of Union concern for sale were recorded. Sellers offering IAS of Union concern for sale and delivering in Europe were ninety-two (42%), both based in Europe (n=36) and out of Europe but delivering in Europe (n=54); for two sellers delivering in Europe it was not possible to identify the country they were based in. Sellers offering IAS of Union concern for sale resulted based in nine different countries (Figure 6); the highest number of sellers was found in the USA (34%, n=31), followed by China (18%, n=17), Germany (16%, n=15) and the UK (12%, n=11).

A total of twenty-nine IAS of Union concern were recorded for sale on internet (60% of the 48 IAS of Union concern) but only nineteen for sell in or to Europe (Table 1; 40% of the 48 IAS of Union concern). Plants were more commonly recorded for sale (Table 1; n=13, 68%) than animals (n=6, 32%), and accounted for the 57% of the twenty-three plants species of Union concern, against the 24% of the twenty-five EU listed animals. Plants also showed a three-fold higher mean number of sellers than animals (Table 2). Plants species were available on at least one web site for each of the nine countries recorded (Figure 7); on the contrary, listed animals were found on sale only in the USA (n=10, 71%), the Netherlands (n=3, 21%) and the UK (n=1, 7%).

Concerning the availability on internet of different «taxa group» (Table 3), the high number of dicots (67% of species found) and the low number of mammals (10% of species found) should be highlighted. As of the mean number per species of sellers based or delivering in Europe (Table 4), the highest availability is recorded for aquatic plants (8,3 sellers), followed by dicotyledons, monocotyledons and reptiles. Availability for each taxa group by country is showed in Figure 8.

Regarding data aggregated for "environmental systems", similar rates of availability were found for species belonging to different systems (Table 5), except for the lowest mean number of sellers recorded for species belonging to the mixed terrestrial/freshwater environment (Table 6).

Twelve out of the nineteen IAS of Union concern recorded were available from sellers based in Europe (Table 7) and sixteen from sellers based out of Europe but delivering in Europe. Nine out of the nineteen available species (eight plants and one crayfish) were found on sale both by sellers based in and out of Europe (*Asclepias syriaca, Cabomba caroliniana, Gunnera tinctoria, Impatiens glandulifera, Lysichiton americanus, Myriophyllum aquaticum, Pennisetum setaceum, Pueraria lobata* and *Pacifastacus leniusculus*). Among the nineteen listed species sold in or to Europe, *Asclepias syriaca* was the species most commonly found (Figure 9; 21% of all sellers, 32% based out of Europe) followed by *Cabomba caroliniana* (12% of all sellers, 73% based out of Europe) and *Eichhornia crassipes* (12% of all sellers, 100% based out of Europe), *Impatiens glandulifera* (8%, 71% based out of Europe), and *Pennisetum setaceum* (8%, 14% based out of Europe). Only two animals resulted on sale at more than one seller: *Trachemys scripta* (five sellers, all based out of Europe) and *Eriocheir sinensis* (two sellers based in Europe).

Only seventeen sellers out of ninety-two (Table 8, 18%) warned on their website on the risks of purchasing an invasive alien species of Union concern. Warning advertisement were present in the 21% (16 sellers out 78) of websites offering plants of Union concern and only one advertisement was recorded when simulating to purchase an EU listed animal (7% of sellers). Presence of warning advertisements resulted very differently for different taxa (Table 9). Regarding animals, except for

a single seller offering the Chinese mitten crab *Eriocheir sinensis,* no warning advertisements were recorded on the websites selling crayfish, amphibians, reptiles or mammals of Union concern. The results for plant taxa were marginally better, with the highest frequency of advertisements recorded for aquatic plants (36%, n=9); only seven out forty-three (16%) sellers of listed dicots warned about the risks of purchasing an IAS and no warning messages were found in the ten websites offering monocotyledons. Looking at the differences among species (Figure 10), the highest frequency of warning advertisements regarding two plants, *Baccharis halimifolia* (66%, n=2) and *Cabomba caroliniana* (45%, n=5), should be highlighted.

Finally, the rough assessment of the frequency of peer-to-peer trade, pointed out *Trachemys scripta* as the most commonly (4 out of a 4-point scale) IAS of Union concern offered on specialized platforms. A quite high frequency of trade was recorded also for *Eichhornia crassipes* (3 out of 4) and *Asclepias syriaca* (2 out of 4). *Nasua nasua,* a frequently traded species on peer-to-peer platforms, was not considered in the present analysis because delivery outside the US was not available.

3.3 Results in a nutshell

- Two hundred and seventeen sellers offering IAS of Union concern for sale were recorded. Sellers offering IAS of Union concern for sale and delivering in Europe were ninety-two (42%), both based in Europe (n=36) and out of Europe but delivering in Europe (n=54); for two sellers it was not possible to identify the country they were based in.
- Sellers offering IAS of Union concern for sale resulted to be based in nine different countries; the highest number of sellers was found in the US (34%, n=31), China (18%, n=17), Germany (16%, n=15) and the UK (12%, n=11).
- Twenty-nine species of Union concern were recorded for sale on internet (60% of the 48 EU listed species) but only nineteen were sold in or to Europe (40% of the 48 listed species).
- Plants were most commonly recorded for sale (n=13, 68%) than animals (n=6, 32%), and accounted to the 57% of the twenty-three listed plants species, against the 24% of the twenty-five listed animals.
- Among the nineteen listed species sold in or to Europe *Asclepias syriaca* was the species most commonly found on sale (21% of all sellers, 32% based out of Europe), followed by *Cabomba caroliniana* (12% of all sellers, 73% based out of Europe) and *Eichhornia crassipes* (12% of all sellers, 100% based out of Europe).
- Among different «taxa group», the high number of dicotyledons (67% of species found) and the low number of mammals (10% of species found) should be highlighted. Aquatic plants showed the highest mean number of sellers per species (8.3 sellers).
- Similar rates of availability were found for species belonging to different «environmental systems».
- Only seventeen sellers out of ninety-two (18%) warned on their website on the risks to purchase an invasive alien species of Union concern. The highest frequency of advertisements was recorded for plants (21% of websites offering plants of Union concern), in particular for

aquatic plants. Only one advertisement was recorded when simulating to purchase a listed animal (7%).

- On a rough assessment, *Trachemys scripta* resulted the most commonly IAS of Union concern offered on specialized platforms of peer-to-peer trade, followed by *Eichhornia crassipes* and *Asclepias syriaca.*
- Results obtained are an underestimation because the search was only performed in English and using the English common name of IAS of Union concern.

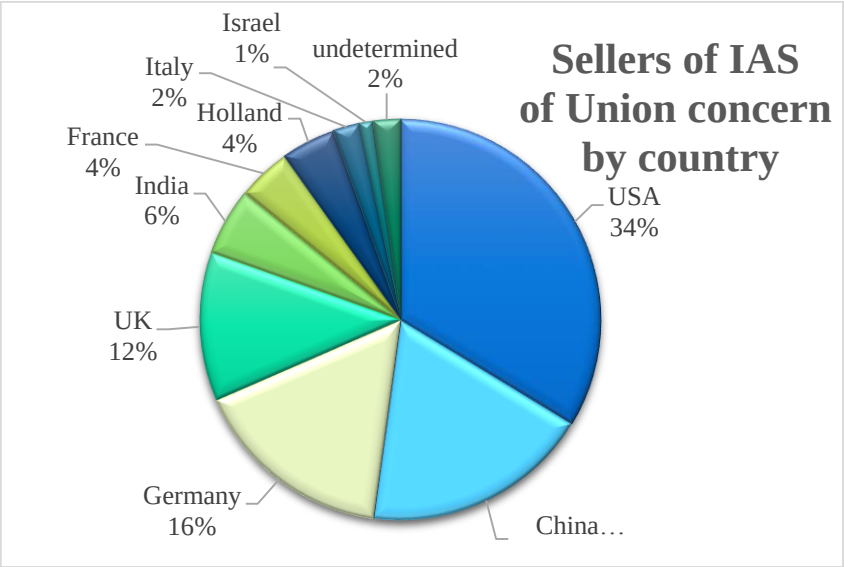

Figure 6*. Sellers of IAS of Union concern by country (%) recorded in the on-line survey. Data not aggregated (survey performed from 10.09.2018 to 05.10.2018).*

Table 1. *IAS of Union concern recorded on sale in Europe in the on-line survey. Data aggregated for "Kingdom" (survey performed from 10.09.2018 to 05.10.2018).*

Kingdom	IAS of Union concern on sale	IAS of Union concern	% IAS of Union concern on sale
Animalia	6	25	24%
Plantae	13	23	57%
Total	***19***	***48***	***40%***

Table 2*. Sellers of IAS of Union concern recorded on sale in Europe in the on-line survey. Data aggregated for "Kingdom" (survey performed from 10.09.2018 to 05.10.2018).*

Kingdom	IAS of Union concern on sale	Sellers	Mean number of sellers per species
Animalia	6	14	2,3
Plantae	13	78	6,0
Total	***19***	***92***	***4,8***

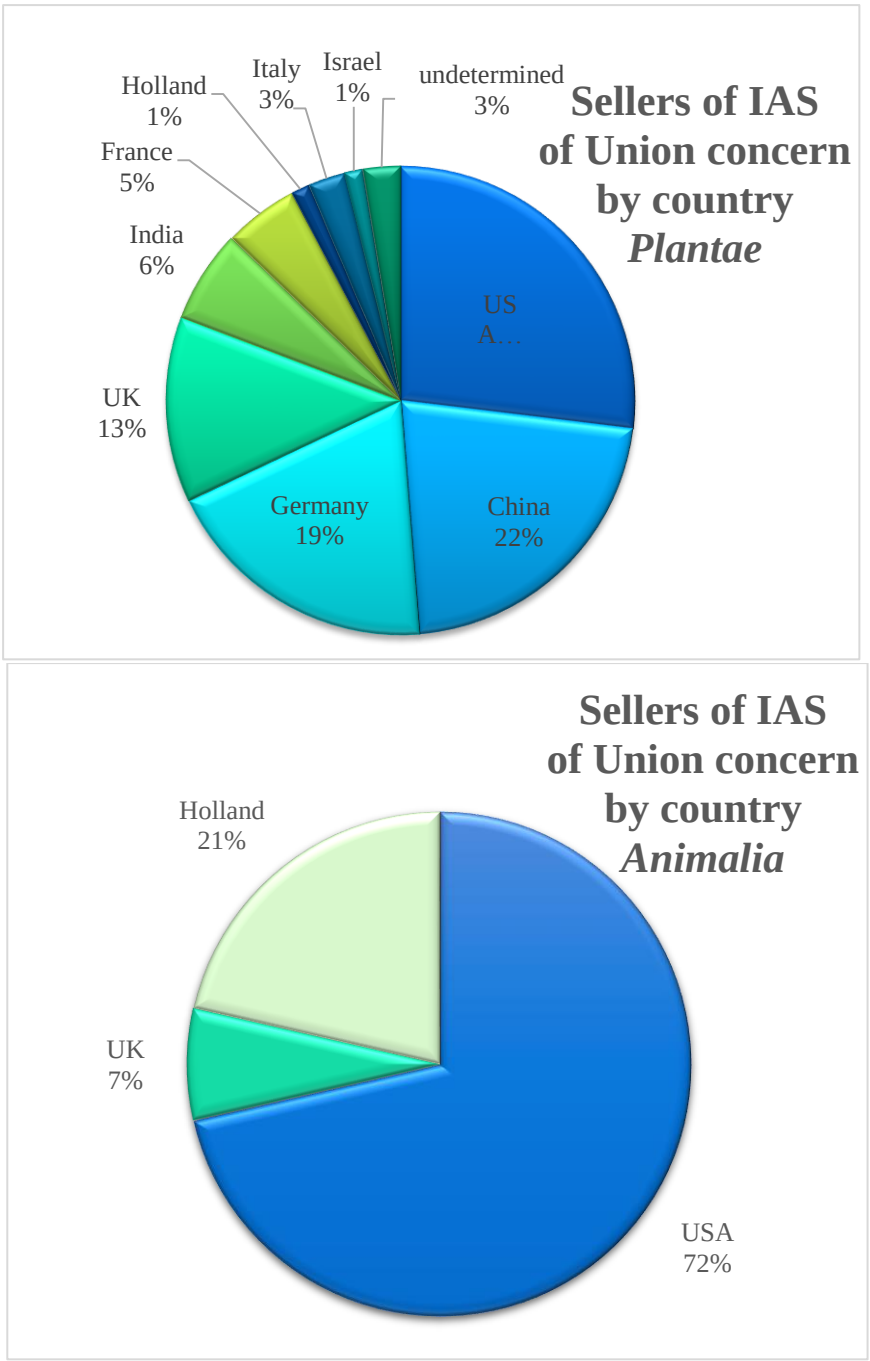

***Figure 7**. Sellers of IAS of Union concern by country (%) recorded in the on-line survey. Data aggregated for "Kingdom" (survey performed from 10.09.2018 to 05.10.2018).*

***Table** 3. Sellers of IAS of Union concern recorded on sale in Europe in the on-line survey. Data aggregated for "Taxa group" (survey performed from 10.09.2018 to 05.10.2018).*

Taxa group	IAS of Union concern on sale	IAS of Union concern	% IAS of Union concern on sale
Amphibians	1	1	100%
Aquatic plants	3	8	38%
Birds	0	4	0%
Crabs	1	1	100%
Crayfish	2	5	40%
Dicotyledons	8	12	67%
Fish	0	2	0%
Insects	0	1	0%
Mammals	1	10	10%
Monocotyledons	2	3	67%
Reptiles	1	1	100%

***Table 4.** Sellers of IAS of Union concern recorded on sale in Europe in the on-line survey. Data aggregated for "Taxa group" (survey performed from 10.09.2018 to 05.10.2018).*

Taxa group	IAS of Union concern on sale	sellers	mean number of sellers per species
Amphibians	1	1	1,0
Aquatic plants	3	25	8,3
Crabs	1	2	2,0
Crayfish	2	5	2,5
Dicotyledons	8	43	5,4
Mammals	1	1	1,0
Mono cotyledons	2	10	5,0
Reptiles	1	5	5,0

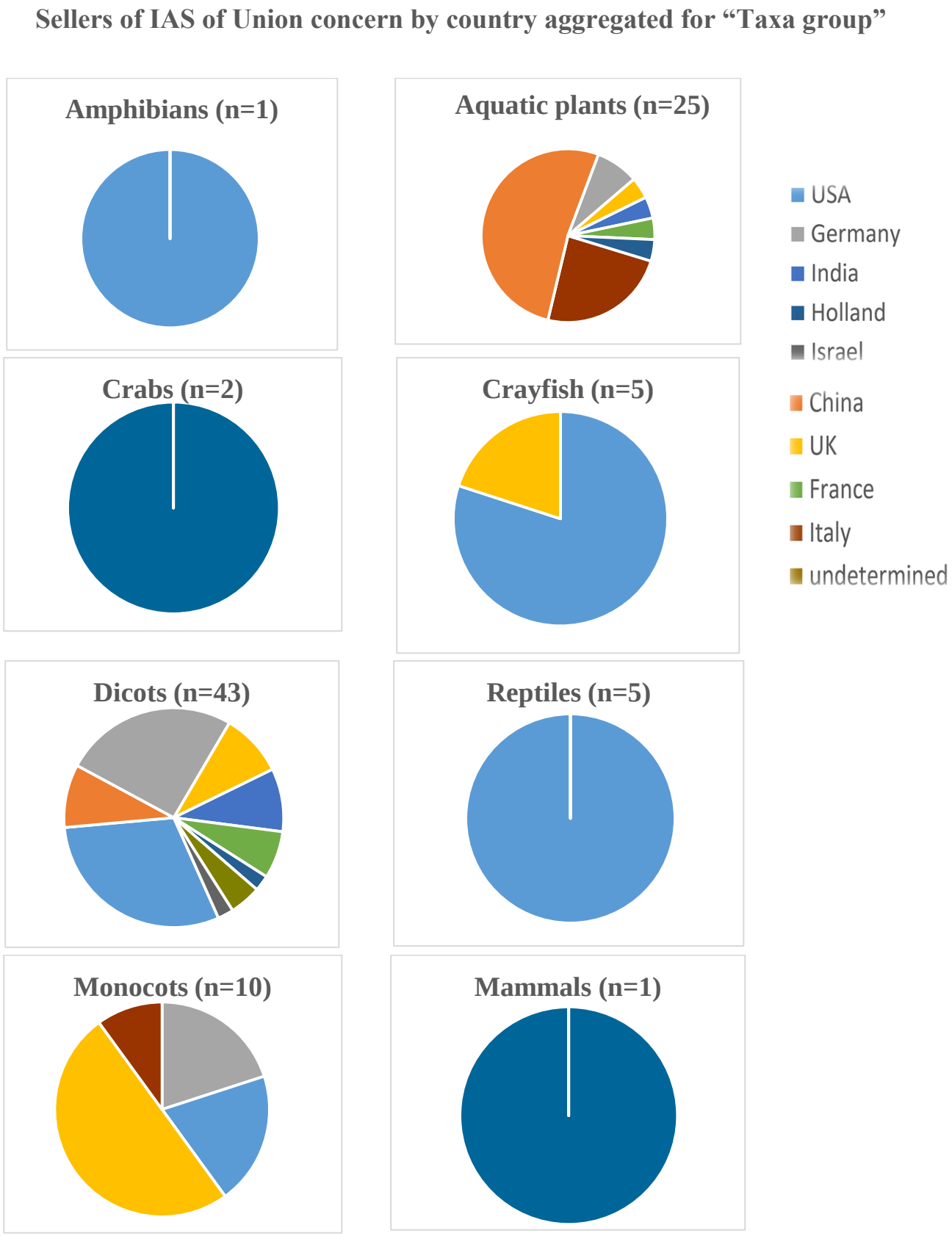

***Figure 8**. Sellers of IAS of Union concern by country (%) recorded in the on-line survey. Data aggregated for "Taxa group" (survey performed from 10.09.2018 to 05.10.2018).*

***Table 5**. Sellers of IAS of Union concern recorded on sale in Europe in the on-line survey. Data aggregated for "Environment system" (survey performed from 10.09.2018 to 05.10.2018).*

Environment system	IAS of Union concern on sale	IAS of Union concern	% IAS of Union concern on sale
Freshwater	6	17	35%
Terrestrial	11	27	41%
Terrestrial/Freshwater	2	5	40%

***Table 6.** Sellers of IAS of Union concern recorded on sale in Europe in the on-line survey. Data aggregated for "Environment system" (survey performed from 10.09.2018 to 05.10.2018).*

Environment system	IAS of Union concern on sale	sellers	mean number of sellers per species
Freshwater	6	32	5,3
Terrestrial	11	54	4,9
Terrestrial/Freshwater	2	6	3,0

***Table 7.** IAS of Union concern recorded on sale in or to Europe in the on-line survey (1=on sale; 0=not for sale). (Survey performed from 10.09.2018 to 05.10.2018).*

Species name	on sale in Europe	on sale to Europe
Alternanthera philoxeroides	0	1
Asclepias syriaca	1	1
Baccharis halimifolia	0	1
Cabomba caroliniana	1	1
Eichhornia crassipes	0	1
Eriocheir sinensis	1	0
Gunnera tinctoria	1	1
Heracleum persicum	0	1
Heracleum sosnowskyi	1	0
Impatiens glandulifera	1	1
Lithobates catesbeianus	0	1
Lysichiton americanus	1	1
Myriophyllum aquaticum	1	1
Nasua nasua	1	0
Pacifastacus leniusculus	1	1
Pennisetum setaceum	1	1
Procambarus clarkii	0	1
Pueraria lobata	1	1
Trachemys scripta	0	1

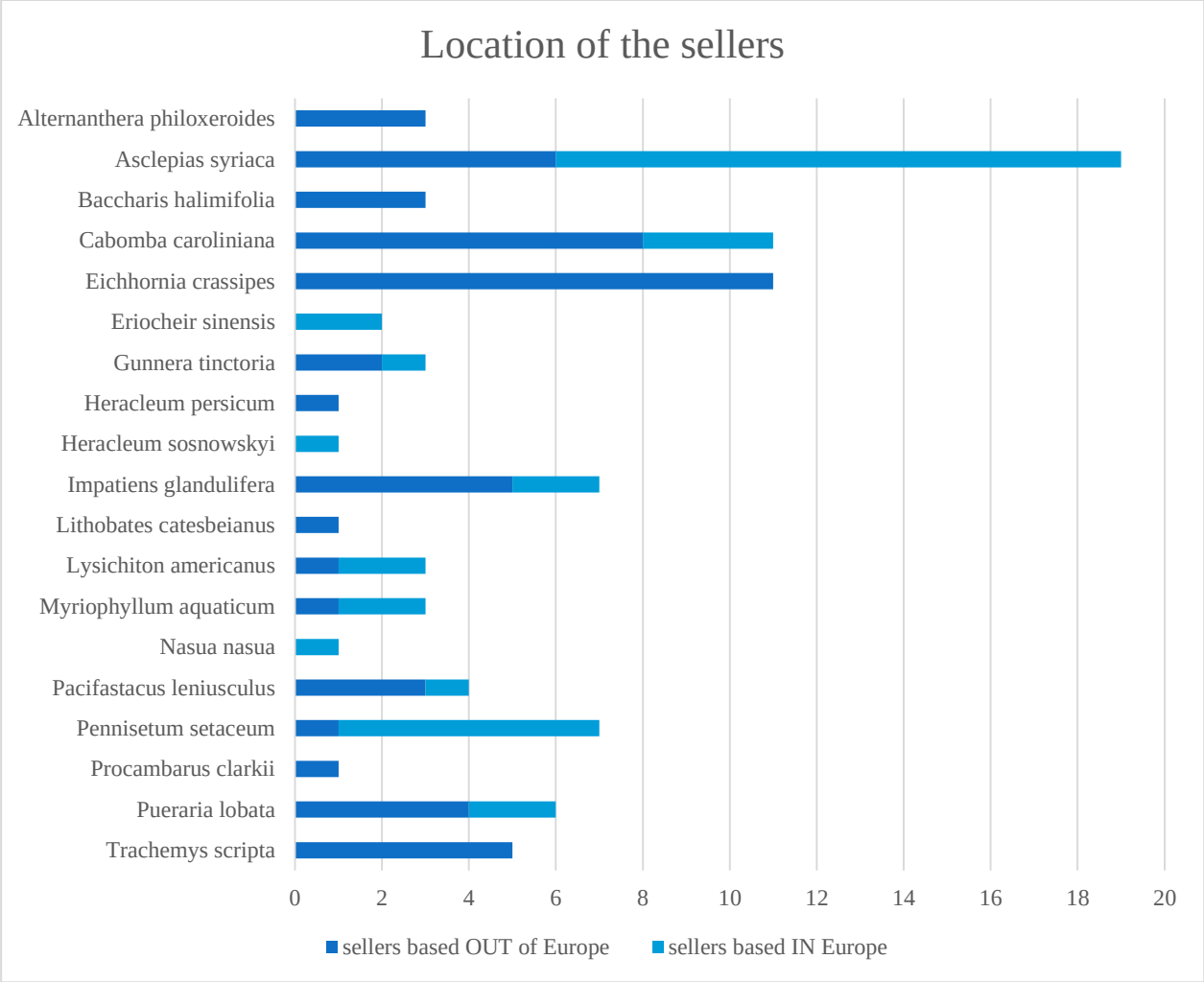

***Figure 9**. IAS of Union concern recorded on sale in or to Europe in the on-line survey. Location of the sellers (survey performed from 10.09.2018 to 05.10.2018).*

***Table 8**. Sellers of species of Union concern recorded in the on-line survey. Presence of warning advertisement within the web site. Data aggregated for "Kingdom" (survey performed from 10.09.2018 to 05.10.2018).*

Kingdom	IAS of Union concern on sale	sellers	sellers with warning advertisement	% sellers with warning advertisement
Animalia	6	14	1	7%
Plantae	13	78	16	21%
Total	**19**	**92**	**17**	**18%**

***Table 9**. Sellers of IAS of Union concern recorded in the on-line survey. Presence of warning advertisement within the web site. Data aggregated for "Taxa group" (survey performed from 10.09.2018 to 05.10.2018).*

Taxa group	IAS of Union concern on sale	sellers	sellers with warning advertisement	% sellers with warning advertisement
Amphibians	1	1	0	0%
Aquatic plants	3	25	9	36%
Crabs	1	2	1	50%
Crayfish	2	5	0	0%
Dicotyledons	8	43	7	16%
Mammals	1	1	0	0%
Monocotyledons	2	10	0	0%
Reptiles	1	5	0	0%

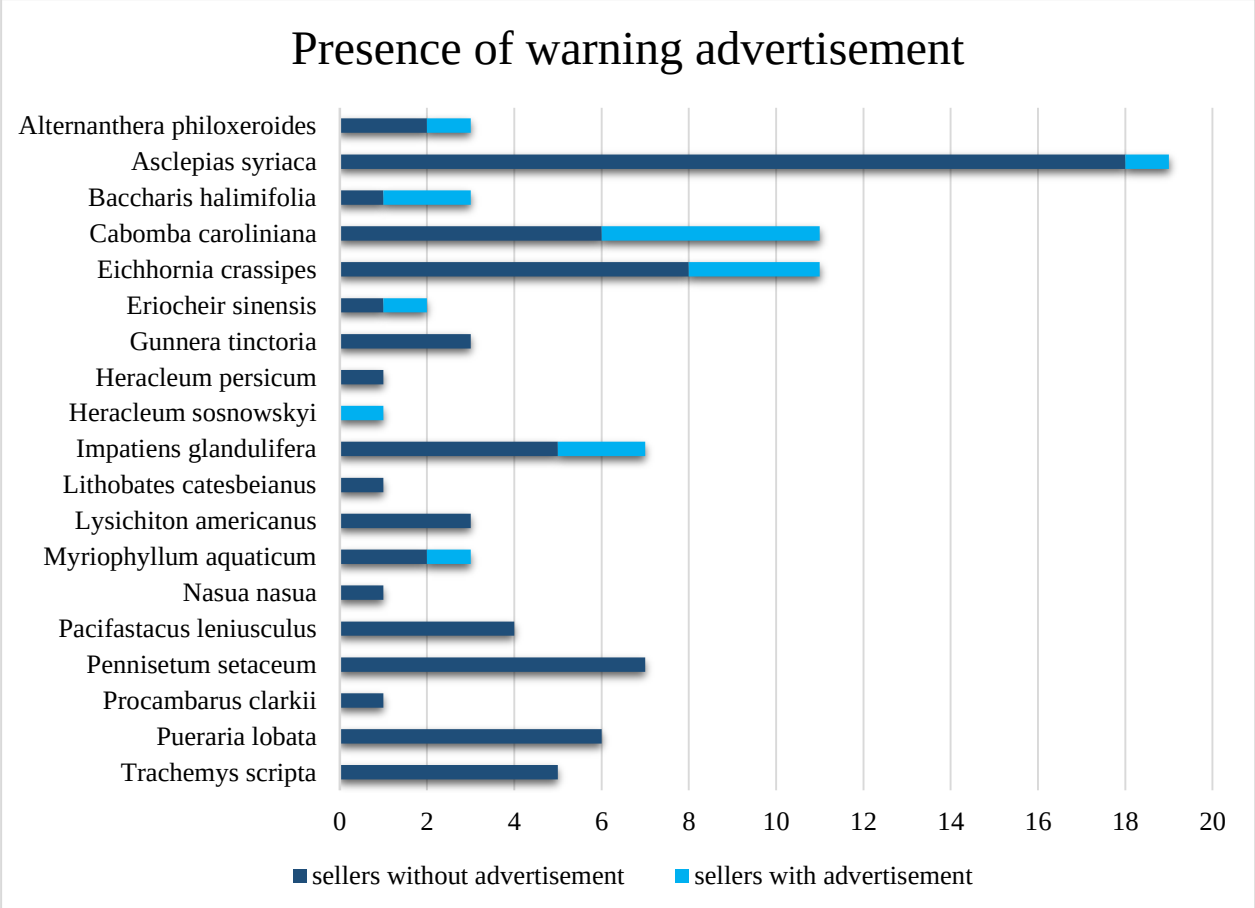

***Figure 10**. IAS of Union concern recorded on sale in Europe in the on-line survey. Presence of warning advertisement within the web site (survey performed from 10.09.2018 to 05.10.2018).*

4. THE LEGAL AND POLICY CONTEXT

Because of the substantial increase of the e-commerce, in recent years some international treaties, policies and position statements on the risk of biological invasion associated with trade in wildlife via e-commerce have been adopted.

4.1 The international context

Convention on Biological Diversity (CBD)

The CBD acknowledges the impacts caused by IAS at Article 8.h, calling parties to "prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats and species".

At the 12th Conference of the Parties (COP) in Pyeongchang (2014) the CBD adopted a couple of decisions dealing with e-commerce of IAS:

1. the **Decision XII/16** *Invasive alien species: management of risks associated with introduction of alien species as pets, aquarium and terrarium species, and as live bait and live food, and related issues* and his annex *Guidance on devising and implementing measures to address the risks associated with the introduction of alien species as pets, aquarium and terrarium species, and as live bait and live food,* that includes voluntary measures that apply to e-commerce as much as any other form of trade;
2. the **Decision XII/17** *Invasive alien species: review of work and considerations for future work,* that at the point 9 (d) request the Executive Secretary " […] to explore with relevant partners, including the standard-setting bodies recognized by the World Trade Organization (the International Plant Protection Convention, the World Organisation for Animal Health (OIE), and the Codex Alimentarius Commission) and other members of the inter-agency liaison group on invasive alien species, **methods of alerting suppliers and potential buyers to the risk posed by invasive alien species sold via e-commerce** […]".

Pursuant the Decision XII/17, a **technical note** *Methods of alerting suppliers and potential buyers to the risk posed by invasive alien species sold via e-commerce* was prepared by the CBD Secretary to the "Expert meeting on alien species in wildlife trade, experiences in the use of biological control agents and development of decision support tools for management of invasive alien species" held in Montreal (2015). The conclusions of the technical note were adopted by the CBD Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) at its 20th Meeting (2016) with the **Recommendation XX/7** *Invasive Alien Species.*

Welcoming the Recommendation XX/7 *Invasive Alien Species* adopted by the SBSTTA, at the 13th COP in Cancun (2016), the CBD adopted the **Decision XIII/13***"Invasive alien species: addressing risks associated with trade, experiences in the use of biological control agents, and decision support tools* that at point 7 "Encourages Parties, and invites other Governments, relevant international organizations, consumers, regular mail and express delivery service providers and e

commerce traders and managers, as appropriate**, to reduce the risk of biological invasion associated with trade in wildlife via e commerce** by:

a. **Promoting greater awareness among consumers, e-commerce traders and managers and other stakeholders** about the risk of biological invasions, and the relevant international standards and national regulations through, inter alia, e-commerce market places and related social media, including by using information made available through the Global Invasive Alien Species Information Partnership;

b. **Reviewing the risk of biological invasions, and associated sanitary and phytosanitary risks**, posed by some forms of distance selling and, as appropriate, endeavour **to develop suitable measures and guidance to minimize the risks** of introduction of invasive alien species, consistent with international obligations;

c. **Using or promoting the use of the Single Window approach** of the United Nations Centre for Trade Facilitation and Electronic Business in order to facilitate reporting on the trade in regulated live species via e-commerce;

d. **Collaborating with e-commerce traders and managers in developing measures to reduce the risk** of potentially invasive alien species from e-commerce";

Point 8 of the Decision XIII/13 "Invites Parties and other Governments **to take into account or review, as appropriate, legislation relevant to trade in wildlife to reduce the risk of biological invasion associated with trade in wildlife via e-commerce**, also noting relevant decisions adopted under the Convention on International Trade in Endangered Species of Wild Fauna and Flora".

Point 9 requests the Executive Secretary "To explore with the World Customs Organization, as well as member organizations of the inter-agency liaison group on invasive alien species, **the need for tools or guidance for Parties that may assist national customs authorities in facilitating the necessary control of live alien species via e-commerce**, building on the national experience or legislation related to the Convention on International Trade in Endangered Species of Wild Fauna and Flora and its enforcement, and to develop such tools or guidance where appropriate […]".

At the 14th COP in Sharm El-Sheikh (2018), the CBD, "recognizing the growth in e-commerce in invasive alien species and the need for collaboration to minimize the associated risks", adopted the **Decision XI/14** *Invasive alien species* that at point 5 states to establish an Ad Hoc Technical Expert Group aimed, among other things, to provide advice or develop elements of technical guidance on "methods, tools and measures for identification and minimization of additional risks associated with cross-border e-commerce in live organisms and the impacts thereof".

As requested, the Ad Hoc Technical Expert Group developed a guidance document[8] that is under discussion for adoption at the next 24th Meeting CBD SBSTTA (2021). The guidance document consists of four sections:

1. *"*Suggested actions for national authorities/border agencies"
2. "Suggested actions for web marketplaces (sale platforms) and e payment service providers, postal and express courier services"
3. "Suggested actions for international bodies/agreements and cross jurisdictional collaboration"
4. "Suggested actions for relevant international expert organizations"

Convention on International Trade in Endangered Species in Wild Fauna and Flora (CITES)

Although the regulatory framework under the CITES does not contain measures to reduce the risk of biological invasion as a consequence of trade in wildlife, at the 13th COP held in Bangkok (2004) CITES adopted the **Resolution 13.10** that recommends that parties:

a. "consider the problems of invasive species when developing national legislation and regulations that deal with the trade in live animals or plants";
b. "consult with the Management Authority of a proposed country of import, when possible and when applicable, when considering exports of potentially invasive species, to determine whether there are domestic measures regulating such imports";
c. "consider the opportunities for synergy between CITES and CBD and explore appropriate cooperation and collaboration between the two Conventions on the issue of introductions of alien species that are potentially invasive".

In that context, some countries and regions have included invasive alien species of concern in wildlife trade regulations as part of the implementation of the CITES framework at the national or regional level. No specific regulations referring to the e-commerce of IAS listed in Appendices I-III of CITES were found.

At its 58th meeting (Geneva, 2009), the Standing Committee of the CITES established a working group on e-commerce of specimens of CITES-listed species. The Working Group on E-commerce of Specimens of CITES-Listed Species was focused on two main topics: (i) the technical infrastructure of internet which is evolving rapidly and offers a variety of different mechanisms to conduct trade; and (ii) the legal framework required to ensure sustainable, legal and traceable trade through internet.

The CITES Secretariat is developing an internet portal as part of the CITES website to compile, publish and disseminate information submitted by parties and stakeholders related to e-commerce

[8] https://www.cbd.int/doc/c/4e0e/0677/296c40f85b26a582b8116160/sbstta-24-10-en.pdf

of CITES-listed species (http://www.cites.org/eng/prog/e-commerce.php) in accordance with Decisions 15.57, 16.62 and Resolution Conf. 11.3 (Rev. CoP15) on e-commerce.

WTO - Agreement on the Application of Sanitary and Phytosanitary Measures (SPS)

The Agreement on the Application of Sanitary and Phytosanitary Measures (the "SPS Agreement") entered into force with the establishment of the World Trade Organization in 1995. It concerns the application of food safety and animal and plant health regulations and it allows countries to set their own standards. Regulations must be based on scientific findings and should be applied only to the extent that these are necessary to protect human, animal or plant life or health. All countries maintain measures to ensure that food is safe for consumers, and to prevent the spread of pests or diseases among animals and plants.

A workshop on "*International Trade and Invasive Alien Species"* organized in 2012 by the Standard and Trade Development Facility (STDF), the IPPC and the World Organization for Animal Health (OIE), underlined that strengthening SPS capacity is the first line of defence in managing the risks linked to invasive alien species. Several key actions were identified to control such species more effectively, including:

a. "boosting continuing efforts to improve the way the relevant international organizations work together, support each other and strengthen each other's ability to implement the SPS Agreement and global biodiversity conventions";

b. "ensuring existing international standards are implemented better, to prevent trade from spreading harmful alien species — and developing new standards where needed";

c. "boosting countries' ability to undertake scientific risk analysis and other studies, particularly in developing countries";

d. "improving coordination between ministries and other agencies within countries, between countries and within regions — the agencies' concerned have diverse responsibilities, from law enforcement, customs and trade to agriculture, fisheries, forestry and environmental protection";

e. "enhancing cooperation between governments and industry";

f. "raising public and political awareness";

g. "**studying potential risks associated with the growth in internet trade, and how to address them**".

Food and Agriculture Organization (FAO)/International Plant Protection Convention (IPPC).

The formal trade of plants and plant products has been the traditional target for phytosanitary measures by national plant protection organizations (NPPO) that have frameworks for regulation by customs authorities for revenue collection and NPPOs for phytosanitary risks. The frameworks are

primarily geared to manage bulk shipment of consignments of commodities moving through these traditional transportation pathways. Sales of plants and plant products ordered through the e-commerce has increased significantly over the years and internet has become a pathway by which many small and often uneasily recognizable consignments of plants and plant products move across international borders into countries and across continents.

To respond to this developing situation the Commission on Phytosanitary Measures (CPM) of IPPC adopted in 2014 (published in 2017) the ***Recommendation R05-2017 on Internet trade (e-commerce) in plants and other regulated articles***[9]. The Recommendation, not specifically directed to IAS, applies to a variety of products ordered and delivered through e-commerce: plants for planting or consumption, soils, growing media, and living organisms that are known or have the potential to be plant pests and are sold to and exchanged by hobbyists, collectors, researchers, etc. Many of these articles may be sold in a variety of product configurations that may incorporate or be infused with plants for planting though the product itself may not be recognized immediately to contain them (e.g. articles of clothing, footwear, packaging, greeting cards, paper products, home accessories or novelty products). Contracting parties, NPPOs and RPPOs are encouraged to:

a. "**develop mechanisms for identifying e-commerce traders based within their countries and regions**";

b. "**establish mechanisms to identify products of concern that may be purchased via e-commerce, with a focus on potential high-risk pathways** such as plants for planting, soils and growing media, living organisms etc. and **to explore options ensuring they comply with appropriate phytosanitary regulations** based on risk assessment";

c. "**promote compliance by customers and traders operating through e-commerce** with the phytosanitary import requirements of importing countries and provide adequate information on the risks posed by bypassing such requirements";

d. "**strengthen coordination with postal and express courier services** to ensure that relevant information of the phytosanitary risks and phytosanitary measures are conveyed to e-commerce traders";

e. "investigate the phytosanitary risks posed by all forms of distance selling and if necessary to include these purchasing methods in their risk management activities".

The management of e-commerce and the postal and courier pathways have also been identified as one of eight development agenda items in the IPPC Strategic Framework 2020–2030. An IPPC e-commerce programme was launched and includes the following key elements:

1. "establishing an informal network of e-commerce experts to enhance collaboration among the participants, facilitate the exchange of information about e-commerce initiatives that are already underway and identify opportunities for addressing the phytosanitary risks associated with cross-border e-commerce;"

[9] https://www.ippc.int/static/media/files/publication/en/2017/04/R_05_En_2017-04-26_Combined_dBxiOPB.pdf

2. "strengthening collaboration and partnerships between the IPPC Secretariat and the WCO and other key international organizations[10];"
3. "gathering existing information and technical resources relevant to the IPPC community on the subject of e-commerce and making these contributed resources available on the IPPC website;"
4. "developing a new IPPC Guide on e-Commerce (2017-039)."

4.2 The European context

The Bern Convention

Article 11.2.b of the Convention of Conservation of European Wildlife and Natural Habitats ("Bern convention", 1979) requires parties to promote the reintroduction of native species and strictly control the introduction of non-native species.

In 2003 the Bern Convention adopted a European Strategy on Invasive Alien Species. The strategy identifies priorities and key actions to prevent or minimise adverse impact of IAS, and proposes measures required to recover species and natural habitats affected by IAS. The Strategy also seeks to engage stakeholders involved in the movement, use and control of potentially invasive alien species (industry and trade, transporters, retailers, resource managers, the public etc.). Since the adoption of the European Strategy on Invasive Alien Species, the Bern Convention developed numerous voluntary Codes of conduct addressed at various sector of activity which are potential pathways for the spread of IAS in Europe.

In 2011 the Bern Convention adopted the "European Code of conduct on Pets and Invasive Alien Species", addressed primarily at the pet industry (including importers, breeders, retailers, keepers and owners). One of the key themes highlighted by the Code is specifically focused on e-commerce:

10. Promote awareness of IAS and the internet

"Trade via the internet is as yet largely unregulated. The following are suggestions for guidance on best practice for all stakeholders. Key points would be an insistence that websites":

• "Identify the country in which they are based and should state (and be able to be able to provide documentary evidence to establish) the country of origin of any animals offered for sale".

• "Accurately identify the animals offered for sale".

[10] In March 2019, the Secretariats of the IPPC and the World Customs Organization (WCO) signed a joint work plan that addresses several major areas for bilateral cooperation, including cross-border e-commerce.

• "Should remind customers that they must check all import rules (e.g. CITES, health and other controls) in the country to which the animal is taken (if different from the source). Where possible this should be facilitated by drop down menus of official sources of information".

• "Ensure that information, as outlined above for retailers, should be made available to customers".

The EU Regulation No. 1143/2014 on Invasive Alien Species

The EU Regulation on IAS entered into force on 1st January 2015. This Regulation is based on the CBD Guiding Principles of prevention, prioritisation and coordination and it is aimed at protecting native biodiversity and ecosystem services, as well as at minimising and mitigating IAS potential impact on human health or the economic.

Even if the EU Regulation does not explicitly refer to e-commerce, it creates a pivotal legal framework to deal with the risk of biological invasion associated with online trade. The core of the system is an open list of IAS of Union concern for which a general ban from the EU is established with the provisions of article 7:

"Article 7. Restrictions

1. Invasive alien species of Union concern shall not be intentionally:
   (a) brought into the territory of the Union, including transit under customs supervision;
   (b) kept, including in contained holding;
   (c) bred, including in contained holding;
   (d) transported to, from or within the Union, except for the transportation of species to facilities in the context of eradication;
   (e) placed on the market;
   (f) used or exchanged;
   (g) permitted to reproduce, grown or cultivated, including in contained holding
   (h) released into the environment."

Article 15 of the EU regulation on IAS includes provisions on official controls that shall take place when goods are brought into the Union, and underlines the needs to strengthen the co-operation and coordination among Member States, to improve the effectiveness of controls:

"Article 15. Official controls

7. Member States shall put in place procedures to ensure the exchange of relevant information and the efficient and effective coordination and cooperation between all authorities involved for the verification referred to in paragraph 2.

8. Based on best practices, the Commission, together with all Member States, shall develop guidelines and training programmes to facilitate the identification and detection of invasive alien species of Union concern and the performance of efficient and effective controls."

To conclude, key points of the EU Regulation on the management of e-commerce pathway can be found in articles 31 and 32 of the Regulation. These provide transitional measures for non-commercial owners and for commercial stocks of EU listed alien species:

"Article 31. Transitional provisions for non-commercial owners

1. By way of derogation from points (b) and (d) of Article 7(1), owners of companion animals not kept for commercial purposes that belong to the invasive alien species included on the Union list shall be allowed to keep them until the end of the animals' natural life, provided the following conditions are met:

   (a) the animals were kept before their inclusion on the Union list;

   (b) the animals are kept in contained holding and all appropriate measures are put in place to ensure that reproduction or escape are not possible.

2. Competent authorities shall take all reasonable steps to inform non-commercial owners of the risks posed by keeping the animals referred to in paragraph 1 and of the measures to be taken to minimise the risk of reproducing and escaping through awareness-raising and education programmes organised by Member States.

3. Non-commercial owners who cannot ensure that the conditions set out in paragraph 1 are met, shall not be permitted to keep the animals concerned. Member States may offer them the possibility of having their animals taken from them. Where this occurs, due regard to animal welfare shall be given.

4. The animals referred to in paragraph 3 of this Article may be kept by the establishments referred to in Article 8 or in facilities established by Member States for that purpose."

"Article 32. Transitional provisions for commercial stocks

1. Keepers of a commercial stock of specimens of invasive alien species acquired before their inclusion on the Union list shall be allowed up to two years after inclusion of the species on that list to keep and transport live specimens or reproducible parts of those species in order to sell or transfer them to the research or ex-situ conservation establishments and for the purposes of medicinal activities referred to in Article 8, provided that the specimens are kept and transported in contained holding and all appropriate measures are put in place to ensure that reproduction or escape are not possible; or in order to slaughter or humanely cull those specimens to exhaust their stock.

2. The sale or transfer of live specimens to non-commercial users shall be allowed for one year after inclusion of the species on the Union list provided that the specimens are kept and

transported in contained holding and all appropriate measures are put in place to ensure that reproduction or escape are not possible."

5. AIM OF THE "GUIDANCE DOCUMENT ON E-COMMERCE AND IAS"

The Guidance document aims at drawing a set of key recommendations to be adopted to limit the role of e-commerce as pathway of introduction of invasive alien species at national and regional scale. The Guidance document is addressed at national authorities and institutions, and at different subjects or stakeholders (importers, domestic breeders, resale entities, retailers, e-tailers, shipping agents, collectors, specialist, NGOs and the public) that can contribute to the enforcement of an effective management and regulation of this pathway. It also aims at raising awareness on this threat, and at improving the information on this issue.

The Guidance document is focused both on "conventional" and "unconventional" commodities (e.g. seed-infused greeting cards, bookmarks, clothes), which often bypass traditional border control screening and for which no effective detection mechanism still exist.

Like other similar codes of conduct, also the present guidance is addressed to all the fifty countries which, by signing up to the Bern Convention, committed to implement appropriate measures to guarantee the conservation of biodiversity - and particularly the protection of wild fauna and flora in Europe – including by mitigating the problems related to the introduction and spread of IAS.

The framework of actions to implement this guidance is voluntary and, therefore, strictly dependent on the level of self-regulation by different subjects involved. In this context, the support of relevant authorities is pivotal to ensure that appropriate measures are established to facilitate the implementation of the guidance and the change of people's attitudes toward the IAS problem.

The Guidance document is also expected to provide useful suggestions in support of the processes of prioritization and implementation of legal provisions at a national, regional and EU scale.

The Guidance document takes into account existing initiatives and relevant obligations and principles of the EU Regulation 1143/14 on invasive alien species, the Directive 92/43/EEC (the Habitat directive), the Directive 79/409/EEC (the Birds Directive), the Bern Convention, the Ramsar Convention and the Convention on Biological Diversity (CBD).

6. GUIDANCE DOCUMENT

6.1 Guiding principle 1: Raise awareness on biological invasion risks associated with e-commerce, among all relevant subjects and institutions

The methods of transaction and the subjects that operate in the field of e-commerce are very diversified and not always explicit. It is important to consider that there are often other subjects, in addition to the seller and the buyer, who play a role in the commercial transaction.

In general, especially for small-scale retailers, the economic interest impairs the compliance with the voluntary standards and codes of conduct, as these are not perceived as a priority. However, if on the one hand there are communities of very well-informed enthusiasts, on the other hand, in many cases, both sellers and buyers are ignorant or misinformed, rather than intentionally attempting to breach legislation. This makes complex the definition and implementation of standardized approaches to increase awareness at all levels.

An information campaign should be aimed at informing both sellers and buyers, focusing on their, also legal, responsibility. Both social media and specialized media, such as pet magazines/journals/books, should be used to disseminate correct information, aiming to shift consumer values (e.g. toward native and alien non-invasive species) and to change behaviors (e.g. to prevent impulsive purchase of IAS). Also, e-commerce sites can provide opportunities for potential buyers to learn about the IAS issue and responsible behaviors (ex. alternatives to release the unwanted organisms into the wild). Some campaigns on consumers' smart behavior can have a much greater chance of success if organized through the vendors' network or industries in collaboration with invasive alien species management authorities. A good example of collaboration is *Habitatattitude*™[11], a national initiative developed by a task force between Pet Industry Joint Advisory Council, National Sea Grant College and the U.S. Fish and Wildlife Service, aimed at increasing awareness among aquarium hobbyists, backyard pond owners, water gardeners and others who are concerned about aquatic resource conservation. Another good example is *Plantwise*[12], a joint program of the Invasive Species Council of British Columbia and plant growers and retailers, that supports the (ornamental) horticulture industry's transition to become invasive-free.

Making information (biological and legal) more accessible to layperson could be crucial to increase awareness. This can be achieved for instance by establishing a clearing-house constantly updated with any kind of useful resources: e.g. lists, laws, best practices, factsheets, information on the risks and care of species, information for discarding undesired pet or plant, app (ex. NYIS.INFO, the New York State's gateway to science-based invasive species information[13] or the GB non-native species secretariat website[14]). New communication tools can also be developed to provide

[11] http://www.habitattitude.net/
[12] http://beplantwise.ca/
[13] http://nyis.info/
[14] http://www.nonnativespecies.org/

connection with hobbyists and the wider public (e.g., WhatsApp Messenger or other smartphone apps).

Relevant authorities involved in different roles in the regulation and control of e-commerce may not be aware on the risks related to trade of invasive alien species. Therefore, information on this issue should be provided also to all relevant national and regional authorities: ministers, custom authorities, and border control authorities.

6.2 <u>Guiding principle 2:</u> Adopt and enforce national legislations regulating invasive alien species, including the further development and implementation of the list of invasive alien species of Union concern, and make the lists of regulated species easily accessible to all subjects (sellers, buyers, platforms, custom organisations, environmental protection agencies, etc.).

A legislative basis is essential for an effective regulation of the e-commerce of invasive alien species. EU countries regulate the species included in the list of invasive alien species of Union concern and have the possibility to also develop national or regional lists.

Some European countries not in the EU system have adopted a "white list" approach (Iceland, Norway); also, some EU countries (Belgium, the Netherlands, Luxembourg, Malta) have adopted a "white list" approach for pet species[15], regulating all species but those included in a so-called "positive list" of alien species, posing limited risks of environmental impact, that are the only ones that can be freely traded.

As suggested also in the guidance document under discussion for possible adoption at the next 24th Meeting CBD SBSTTA, a "white list" approach probably offers better risk mitigation potential than a "black list" because little is known about the ecology and because the invasiveness of most of the imported species and species traded changes very fast (Chucholl, 2012, Hulme 2015). In addition, a concise list of animals that may be kept and traded provides clarity to owners and enforcing agencies and create less regulatory bureaucracy for governments. On the other hand, a black list is considered a cost-effective means to limit the importation of invasive alien species (Essl et al., 2011). In any case, both black and white lists, particularly in the face of increasing e-commerce of IAS, can be easily bypassed without compliance check mechanisms in place (Hulme et al., 2017).

Consistently with the previously cited CBD guidance document, in order to minimize the risks associated with e-commerce of IAS, it is pivotal to share information on national regulations as well as regional regulations and lists on invasive alien species. Therefore, once a legislative basis is adopted at a national or regional level, lists of regulated species should become easily accessible to all relevant subjects (sellers, buyers, platforms, custom organisations, environmental protection agencies, etc.). Harmonisation of legislation among neighbouring countries would also facilitate enforcement. National or regional authorities should also ensure the maintenance and updating of

[15] The purpose of the adoption of the white lists goes beyond the issue of invasive alien species and aims at improving also animal welfare, animal and human health, species and biodiversity conservation.

shared data infrastructures, expert curation and building capacity in use of data-sharing tools and information on best practices.

A possible approach to enhance the efficient exchange of information between trade and government, the *Single Window*, has been developed by The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) and evaluated by the CBD Experts[16] as method of alerting suppliers and potential buyers of the risks posed by invasive alien species sold via e-commerce. The *Single Window* approach allows the lodging of standardized information and documents with a single-entry point to fulfil all import, export and transit-related regulatory requirements. Its implementation at national level may facilitate reporting on regulated articles (including live alien organisms with phytosanitary and sanitary risks, and risks to biological diversity).

6.3 Guiding principle 3: Collaborate with the main platforms and actors of e-trade of plants and animals to prevent the e-commerce of invasive alien species.

It is essential to seek the collaboration of the main players in the trade of plants and animals, including large platforms (e.g.: Amazon, Alibaba) and online auctions sites (e.g. ebay), in order to prevent sales and auctions of species into countries where these are regulated, and to improve correct labelling of traded species and ensure the traceability of sellers.

Monitoring compliance with national and international legislation should also be a clear responsibility of online platforms. Stimulating large platforms to actively search listings for potential culprits and proactively comply with the EU regulation and individual countries' invasive species laws can be a very cost-effective prevention measure. In addition, dissuasive measures should be adopted in case of infraction of the existing legislation.

An example concerning the wildlife trade of endangered and threatened species, is the agreement (2018) between the world's leading e-commerce and social media companies (Alibaba, eBay, Facebook, Google, Instagram, Microsoft, Pinterest, etc.) and some environmental organizations (TRAFFIC, WWF, IFAW) to make online platforms and apps inoperable for wildlife traffickers wishing to trade endangered and threatened species. In collaboration with WWF, TRAFFIC, and IFAW, each company developed and implemented policies to reduce wildlife trafficking across platforms. By March 2020, Coalition companies working with WWF, TRAFFIC and IFAW reported removing or blocking more than 3 million endangered species listings from their platforms[17].

[16] https://www.cbd.int/meetings/IASEM-2015-01
[17] https://www.worldwildlife.org/pages/coalition-to-end-wildlife-trafficking-online

6.4 Guiding principle 4: Ensure that sellers and buyers are provided with key information and warnings on the species they sell or buy, including on their potential invasiveness.

An informed trade is an essential condition for preventing the unwanted movement of goods, including species. It is therefore important that sellers and buyers are provided with the key and correct information on the species they sell or buy, including taxonomy, biology and ecology, as well as on the potential invasiveness of these species and appropriate measures that should be used to prevent a species escape or release.

All this information needs to be made accessible to the competent authorities, and it is therefore important to cooperate with online retailers and catalogue sellers to ensure a correct and consistent identification and labelling of all traded species (also stated in the Guiding Principle 3). An example could be the Walloon Region (Belgium) that has recently adopted a legislation that allows only specialised websites to sell animals.

An international labelling system, to be used for all species sold via internet (but also physical stores), should indicate which animals and plants are safe for biodiversity and provide guidance on the handling and care of organisms, while taking into consideration, in case of animals, also their species-specific welfare requirements. As also mentioned by the CBD expert, the use of labelling on consignments of live alien species to identify it as a potential hazard for biodiversity (e.g. based on the IUCN standard EICAT[18]) and the proper identification of species (e.g. scientific name, taxonomic serial number or its equivalent) would both be useful tools for custom authorities. The label would easily inform custom authorities of invasive alien species that threaten biodiversity.

6.5 Guiding principle 5: Monitor e-commerce of invasive alien species at all scales.

In the current globalized market, new species are integrated into global trade on a daily basis and for such species often no information or experience exists on their invasiveness outside of their native range. To develop effective responses, it is essential to monitor current introductions and examine data for emerging risk species. For example, timely identification of new traded invasive alien species can help focus prevention efforts, as well as early detection and rapid response to new incursions.

Monitoring the internet trade of IAS could help identifying changing buyers' preferences for particular plants or animals and to forecast new possible invaders, in order to target preventive management measures. Monitoring online sales (both in pet shops and on auction sites) can also provide a rough minimum estimate of the propagule pressure related to a specific invasive species.

Monitoring should be done constantly, toward external and internal markets, and using both major international languages and the local ones, as sellers can use vernacular name or local synonyms.

Effective monitoring of e-commerce can be very difficult and resource-consuming to put into practice, especially if done on a regular basis, due to its heterogeneity and its dynamism. Therefore,

[18] https://www.iucn.org/theme/species/our-work/invasive-species/eicat

international, regional and national institutions and organisations should invest in the monitoring of e-commerce, including through the development of automated tools.

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