JOINT RESPONSE* FROM

the European Pet Organisation (EPO), the Netherlands
and
Ornamental Fish International (OFI), the Netherlands

in relation to a proposed listing for:

- *Pistia stratiotes* (Water Lettuce)
- *Salvinia molesta* (Giant Salvinia)
- *Gymnocoronis spilanthoides* (Senegal tea plant)

*** This response is endorsed by the Sustainable Users Network (SUN), United Kingdom.**

October 2018

Summary of response

We firstly wish to thank the European Commission (EC) for providing us with the opportunity to submit new information (further to the response by OATA (OATA, 2017, unpublished)), at Committee level, in relation to the above named aquatic plant species.

We recognise that the above named plant species have received a positive opinion from the EC IAS Scientific Forum. We are therefore not commenting on the separate Risk Assessments (RAs) *per se* which have been undertaken for these species.
Rather, in relation to risk management, we wish to submit our evidence and rationale as to why we consider that there is justification for a regional listing response to be pursued rather than an outright trade ban across the entire European Union.

Our response, as given below, covers three main areas. A summary of each section is provided below:

- **The socio-economic impacts of an EU wide trade ban** – it is our opinion that an EU wide trade ban is likely to have a severely detrimental impact on the ornamental aquatic plant sector in those Member States outside of the identified endangered area. Given that *Pistia stratiotes* was recommended as the alternative to the now banned *Eichhornia crassipes*, growers and retailers increased their stocks of *P. stratiotes* accordingly. In Member States such as the United Kingdom (UK), there has been an almost 500% percentage increase in sales of *P. stratiotes*. However, despite this, this has not been sufficient to cover overall lost turnover in floating plant sales which have decreased on average by 25% (in the UK) since the ban on *Eichhornia crassipes*.
- **The negative consequences of an EU wide trade ban** – in addition to a detrimental socio-economic impact, we comment on the further negative consequences of an EU wide trade ban. These cover the risks of people 'experimenting' with aquarium only plant species for use as pond plants, some of which may pose an even greater invasive risk. Also that an EU wide trade ban, in our opinion, will create an environment for illegal and illicit activity, as our industry has observed in relation to the (illegal and illicit) sales of *Eichhornia crassipes*. There is also a considerable risk of disengagement and loss of support for the process underpinning the IAS Regulation, from our industry due to the potential for the creation of an environment allowing illegal and illicit activity. Such an environment harms our industry reputationally, commercially and financially.
- **Evidence presented to support restricted distribution** – in relation to the species distribution models (SDM) used in the risk assessments based on climate data, we note that this related to a limited number of variables i.e. air temperature. We have been unable to find any reference in these risk assessment SDM models as to photoperiod, which we consider to be an important variable. We hereby present evidence from the scientific literature on photoperiod to support our belief that these three species have a restricted distribution within the EU and based on the identified endangered area.

Our industry acknowledges however, that should a regional listing response be applied, risk mitigation measures must be in place to protect those Member States in the identified 'endangered area' i.e. the Mediterranean biogeographical region (together with the Continental biogeographical region in relation to *Gymnocoronis spilanthoides*). We therefore outline a potential model based on the EPPO Code of Conduct for horticulture and the Dutch 'Convenant Waterplanten' which could be adopted to permit trade in those Member States where the invasiveness risk is low. We propose the creation of an interim, temporary registration scheme that would assess both the feasibility and viability of a longer term, more formalised covenant.

Further information in relation to the EPO, OFI and SUN is provided in Annexes 1 to 3.

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We wish to reiterate our thanks again to the European Commission in permitting our respective organisations to submit new information, at Committee level, in relation to the three aquatic plant species listed above. It is acknowledged that these three plant species have received a positive opinion from the IAS Scientific Forum.

In relation to risk management, we wish to present our case below as to why we consider there to be justification for a regional listing response to be pursued for these plant species, rather than an outright EU wide trade ban. This is further to the identification by the risk assessment authors of the endangered area i.e. the Mediterranean biogeographical region (and in addition the Continental biogeographical region in relation to *Gymnocoronis spilanthoides*).

Risk Management

Socio-economic costs to the ornamental aquatic plant sector of an EU wide trade ban

Following the IAS listing of the Water Hyacinth (*Eichhornia crassipes*), which resulted in an EU wide trade ban (for the legal and legitimate trade), the suggested alternative by some Member States was the Water Lettuce (*Pistia stratiotes*). As a result, on following this advice, wholesalers and retailers increased their stocks of *Pistia stratiotes* in the wake of the ban on Water Hyacinth. We present evidence below that sales of *P. stratiotes* have increased significantly since the ban on *E. crassipes*, with particular reference to the UK.

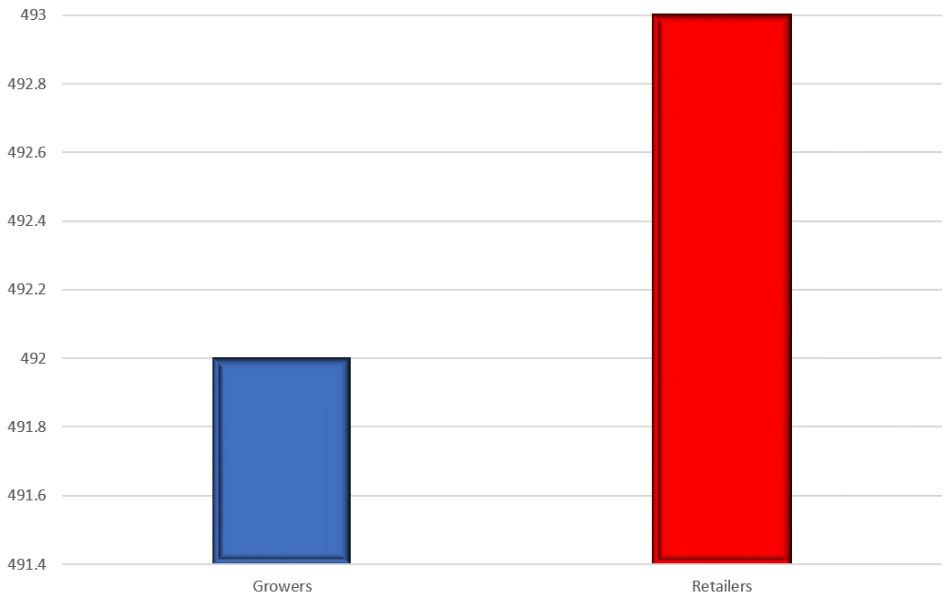

Figure 1: Data from the United Kingdom from aquatic plant growers and retailers of *Pistia stratiotes*. Data represents average percentage increase in sales of *P. stratiotes* for 2018 i.e. since the ban on *Eichhornia crassipes* (Water Hyacinth).
Data source: OATA.

In relation to the UK, Figure 1 indicates that sales of *P. stratiotes* have increased significantly in 2018 following the EU wide ban on *Eichhornia crassipes*. In respect of UK aquatic plant growers, the average percentage increase has been **492%**, whilst for UK aquatic plant retailers, the average percentage increase in sales has been almost the same at **493%**. Growers and retailers have been treated as separate categories in order to avoid double counting i.e. growers selling to wholesalers/retailers, retailers selling to the general public.

With respect to overall sales of floating plants by UK aquatic plant growers and retailers, the general trend reported for 2018 is that since the ban on *Eichhornia crassipes*, overall floating plant sales have fallen by an estimated **25%**. Thus, even with the percentage increase in sales of (predominantly) *P. stratiotes*, such sales have not been sufficient to replace lost turnover incurred directly due to the ban on *Eichhornia crassipes*.

With regard to the wider EU, we note that sales of both *P. stratiotes* and *S. molesta* are banned in Spain. Sales in relation to *Gymnocoronis spilanthoides* in Spain are estimated to be close to, if not, zero. With respect to the Netherlands, the percentage increase in sales following the *E. crassipes* ban appears to be significantly lower than when compared directly to the UK. However, since the ban, sales of *P. stratiotes* in the Netherlands in some instances are estimated to have doubled or even tripled, although the overall picture in relation to the Netherlands is unclear. With respect to estimated data from the combined markets in Belgium and the Netherlands, for the period 2016 to 2018, the estimated average number of plants sold (for each species) was: *P. stratiotes*: 443,000 plants; *S. molesta*: 325,000 plants (Netherlands only); *G. spilanthoides*: 30,400 plants. Each species is typically sold at a retail value of 2 euros per plant.

In relation to Sweden, the average combined value of sales of both *P. stratiotes* and *Salvinia* are estimated as 10,000 euros, with an estimated combined range of 500 to 1000 plants sold per year. Sweden has not reported observing any major increases in the sales of either *Pistia* nor *Salvinia* since the *E. crassipes* ban came into effect. However, in Sweden, *G. spilanthoides* is more popular and for the period 2016 to 2017, sales of this species per annum were estimated to be worth 20,000 euros. These aquatic species are typically imported into Sweden from other Member States such as Denmark and the Netherlands.

Please note that the above information on sales and percentage increase in sales is caveated by the fact that this represents a very small dataset and therefore, due to the variance, such information should be viewed as being purely indicative rather than representative. Due to the variance in the data received in respect to the Belgian/Netherlands markets, the numbers given above should be treated with caution. However, given that this represents a small dataset, this should also be viewed in terms of being a conservative estimate as the true values may be far higher than those indicated here. Due to the highly commercially sensitive nature of this data, we are unable to provide any raw data, which should be considered as being under permanent embargo. We would also request that the information presented here is not to be shared with any third party without prior permission from our respective organisations.

In summary, it is our opinion that an EU wide trade ban on the sale of *Pistia stratiotes*, *Salvinia molesta* and *Gymnocoronis spilanthoides* will be severely detrimental on the ornamental aquatic plant sector in those Member States outside of the identified endangered area. In countries such as the UK, losses in turnover of floating plants have been incurred which have not been recouped even with increased sales in *P. stratiotes*. Given there are no alternatives for these three plant species, the detrimental socio-economic impact will be irreversible by the time of the first review of the List in 2021, if not sooner.

Negative consequences of an EU wide trade ban

With reference to the detrimental (and potentially irreversible) socio-economic impacts of an EU wide trade ban, we highlight that there is a considerable risk that in order to offset financial losses, people will begin to experiment with other plant species e.g. using aquarium only species as pond plants. This potentially provides the possibility that such plant species will present a higher invasiveness risk than those currently under consideration for listing. We would wish the European Commission to note that in this regard our representative organisations have highlighted the risks associated with such 'experimentation' and have advised people not to pursue this route where potential harm may result.

We further highlight that there are likely to be other negative consequences in terms of disengagement and loss of support for the process underpinning the IAS Regulation, together with the creation of an environment that leads to illegal and illicit activity. As an example, since the EU wide trade ban came into effect on *Eichhornia crassipes*, we have identified on a number of occasions, that this species continues to be offered via social media platforms and online auction sites. For example, we have found occurrences that *Eichhornia crassipes* seeds are available for sale from China via ebay and Amazon and that *Eichhornia crassipes* plants are available for sale from the USA via ebay. Where these instances have been occurring, we have reported them to the relevant authorities. More worryingly, since the Water Hyacinth ban came into effect, it is now commanding premium prices. Before the ban, this species was typically sold, for example in the UK, for 2.25 euros per plant (Based on a GBP price of £2 per plant and a currency conversion rate of GBP to Euros of 1.12424 (XE.com as accessed on 2 October 2018). Since the ban came into effect, its price on online auction sites has increased approximately ten-fold. The three aquatic plant species currently under consideration presently sell for similar pre-ban values to *E. crassipes*. We would therefore predict that an EU wide trade ban would result in a similar price premium increase with regards to illegal and illicit activity.

Although we acknowledge that at the EU level, there is an IAS enforcement scheme, this is not yet fully implemented. Thus, without a current IAS enforcement regime in most, if not all, Member States, our concern is that any cessation in the legal and legitimate trade including those Member States where the risk of these plant species becoming invasive is low, would create an environment for illegal and illicit activity. Such consequences have clear parallels to those considered for trade bans made under CITES and as observed by Weber *et al*. (2015). Given the current difficulty and lack in IAS Regulation enforcement both within individual Member States and the collective EU, 'universal' trade bans encompassing those Member States where the risk of invasiveness is low, in our experience, is serving to encourage illegal and illicit activity amongst those so inclined, given there are no present consequences. The rise in such activity capitalises on the fact that with competition from the legal and legitimate trade removed, the value of such species increases significantly on the black market and thus a premium price can be commanded.

The lack of enforcement and the fact that current permitted, alternative species are now themselves being proposed for listing is directly responsible for a growing disengagement and lack of support from those legitimate businesses that we represent that are suffering reputationally, competitively and financially. It is also our observation that the general gardening public in more Northerly European countries are also questioning why laws are banning the keeping of popular 'annual' plant species like *Eichhornia crassipes* when these are plants that they cannot manage to keep through the winter.

Evidence of restricted distribution within the EU

It is noted from the separate risk assessments on these three aquatic plant species, that in their respective sections addressing uncertainty, the authors acknowledge that the models used were based on air temperature. In the case of the model for *Gymnocoronis spilanthoides*, a further variable, soil pH was also considered.

The RA authors acknowledge that additional variables should also have been considered such as water temperature (and their acknowledgement that, in some given circumstances, there may be divergence between air and water temperature). Also, that water pH and nutrient availability should also have been considered. We note that the models used were based on a 'worst-case scenario' i.e. RCP8.5 and incorporated three climatic variables i.e. Mean temperature of the warmest quarter, Mean minimum temperature of the coldest month and Mean annual precipitation.

However, we can find no reference made in these models to photoperiod. We therefore present our evidence below, with particular reference to photoperiod, as to why we believe there is a restricted distribution especially for *P. stratiotes* and *S. molesta*. This is also in recognition of the identified 'endangered area' i.e. the Mediterranean biogeographical region (and the Continental biographical region with respect to *G.spilanthoides*).

It is recognised in the scientific literature that a number of variables (biological and environmental) will influence both plant growth and distribution (Austin and Van Niel, 2010). These can be written as:

$$Species\ abundance = f(light, temperature, nutrients, water, CO_2, disturbance, biota)$$

(Source: Austin and Van Niel, 2010)

With specific reference to *Pistia stratiotes* and *Salvinia molesta*, as reviewed by Cancian (2007) and Eid *et al*. (2016) these factors are: temperature, light (intensity and duration), the availability of nutrients, pH and salinity. Other factors include alkalinity, water

flow, water level and ecological processes (Cancian, 2007) together with plant density, insect grazing and viral pathogens (as reviewed by Eid *et al*., 2016).

If it is assumed that temperature is within that plant species tolerance limit and is therefore met, light (duration and intensity) would then be the limiting factor. As noted by Eid *et al*. (2016) in relation to *P. stratiotes*, conditions which are habitat specific will determine biomass production. Such conditions e.g. temperature, day length, length of growing season and solar irradiance vary with latitude (as reviewed by Eid *et al*., 2016). The importance of light as an environmental predictor is also highlighted by Austin and Van Niel (2010) in that *"light expressed as solar radiation has long been known to influence plant distribution based on known biophysical processes".*

In experimental studies by Cancian (2007). the effect of both temperature and photoperiod were determined on both *P. stratiotes* and *S. molesta*, using a combination of different temperature and photoperiod regimes. These studies concluded that for *P. stratiotes*, growth performance was best at 25°C with a 16 hour photoperiod, whilst for *S. molesta* the conditions were 15°C with a 16 hour photoperiod. In relation to photoperiod (light intensity and duration), Cancian (2007) noted that both low and high light availability and intensity may restrict or inhibit growth in some plant species (Rubim and Camargo, 2001 as cited by Cancian, 2007).

With respect to light intensities, development of *S. molesta* appears to become restricted at a light intensity of 852 μmol/m^2/s (as reported by Cancian, 2007). In relation to *P. stratiotes*, a study by Hui and Rui-jun (2010) determined that the Light Saturation Point (LSP) i.e. the point at which photosynthesis levels off for this species was in the region of 1,383 ± 3.4 μmol/m^2/s. In considering both temperature and photoperiod, Cancian (2007) observed decreased growth rate and notable reduction in plant biomass at both 30°C with a 12 hour photoperiod and 15°C with a 8 hour photoperiod i.e. a reduction in photoperiod. Under the latter conditions, *P. stratiotes* was observed as experiencing yellowing and dieback of its leaves. Cancian (2007) therefore concluded that *P. stratiotes* displayed low tolerance to lower temperature conditions, thus supporting similar findings that *P. stratiotes* does not tolerate low temperature conditions (Mazzeo *et al*., 1993 as cited by Cancian (2007)).

In reference to *S. molesta*, Cancian (2007) found that growth performance at the 'optimum' temperature i.e. 15°C was dependent on the photoperiod i.e. only if the photoperiod was either 12 or 16 hours. When the photoperiod was reduced to 8 hours, no growth in *S. molesta* was observed. Cancian (2007) therefore concluded that growth of *S. molesta* is limited at temperatures below 15°C and above 30°C and as the photoperiod increased above the optimum, a reduction in the plant's biomass became more pronounced. As postulated by Room (1986 as cited by Cancian (2007)), if the requirements of temperature and nutrient availability are met, the limiting factor on growth of *S. molesta* will be (solar) radiation i.e. Photosynthetically Active Radiation (PAR) as both low and high PAR levels will reduce photosynthesis.

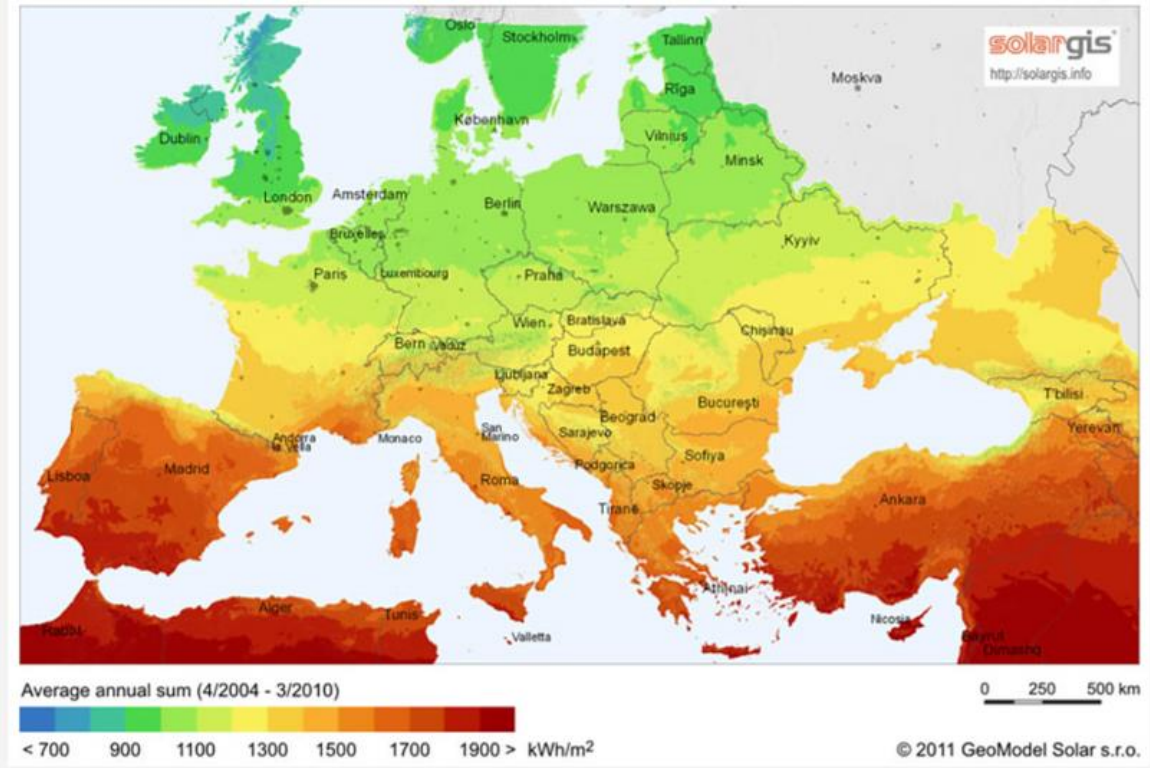

Figure 2: 2011 map of annual global solar irradiance for Europe in Kilowatt hour per square metre (kWh/m^{-2}).
Source: SolarGIS [Online]. Available at: http://www.greenrhinoenergy.com/solar/radiation/empiricalevidence.php (Accessed on 4 October 2018).

With reference to levels of solar radiation altering with latitude, Figure 2 is presented here to illustrate such differences occurring within Europe.

However, given that we recognise that a direct comparison between solar irradiance values of kWh/ m^{-2} and the units used by Cancian (2007) i.e. µmol/m^2/s values is difficult due to no direct conversion being available, a map in comparison of global PAR levels is provided below as Figure 3 for completeness.

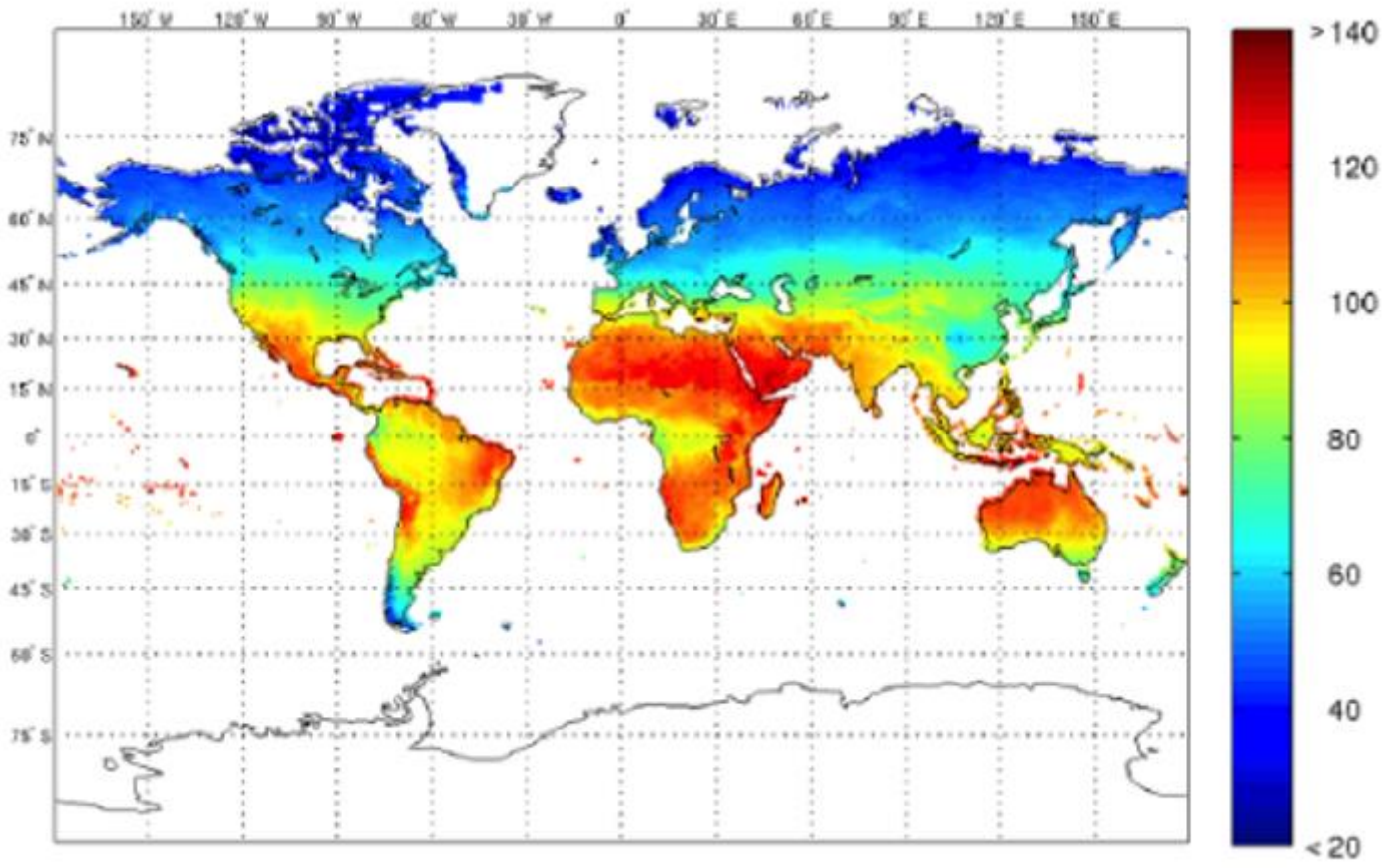

Figure 3: 2005 map of global annual average PAR (Photosynthetically Active Radiation). Source: Sindelarova *et al.* (2014). The authors original Figure 7(b), page 9327.

Both *P. stratiotes* and *S. molesta* are considered to be frost sensitive (CABI, 2018a and Newman, 2015b respectively). In their risk assessment of *P. stratiotes* in relation to the UK, Newman (2015a) states that it "*will not survive winters in the UK"* further "*A very significant rise in average winter temperatures is required to enable this species to overwinter. The average winter temperature must be above 9°C, and preferably above 16°C*" and that "*The minimum water temperature for survival in its invasive range in Europe is 9°C"* (Mazzeo *et al*., 1993 as cited by Newman, 2015). The opinion that this species would not be hardy in colder climates e.g. such as those that occur in the Atlantic and Alpine bioregions is supported by the Dutch invasive species database, Q-bank (2018a). Further, Millane and Caffrey (2014) consider that this species would not have the ability to overwinter in Ireland due to current climatic conditions.

With regard to light, Austin and Van Niel (2010) state that "*local heterogeneity is important for light and for soil properties such as nutrients"*. Further that the influence of light on plant distribution is a critical factor and that additional factors such as local topography must also be taken into account. As an illustration of this, we provide a diagram indicating the differences in PAR levels across the UK as Figure 4.

Figure 4: PAR average distribution in the UK throughout the growing season.
Source: Pankaew *et al*. (2014).

In relation to *S. molesta*, the Dutch invasive species database, Q-Bank (2018b), consider that this species is "*unable to survive the winter in the Netherlands*". With respect to the UK, Newman (2015b) considers that "*it can only survive for one summer and does not overwinter"*. However, we acknowledge from the literature that in relation to *S. molesta* that Mitchell (1972) as cited by Kasselmann (2003) considers that this species is most probably a hybrid of *Salvinia auriculate* and (possibly) *S. biloba*. It is therefore considered by Kasselmann (2003) to be a "*sterile, pentaploid hybrid"*. Therefore, unlike other fertile species, the risk of spores overwintering is avoided. We further acknowledge that as noted by Kasselmann (2003) *S. molesta* will look quite different in lower light conditions, lying flat to the water. Whereas in brighter light conditions it will take on a raised, ruffled appearance. We therefore accept that this will make identification complicated as how it will look in a more southerly Member State e.g. Italy, will be quite different to how it looks in a more northerly Member State e.g. UK. However, this risk may be mitigated if the sale of *S. molesta* is restricted to the more northerly Member States only.

With respect to *Gymnocoronis spilanthoides*, we acknowledge that CABI (2018b) considers that this species appears to be frost tolerant, although as noted by CABI (2018b), its optimum growth appears to be within 15 to 30°C. We are aware that this species is sold for both aquarium and pond use and would suggest that its use is limited solely to aquarium use.

Information on greenhouse conditions

Our respective organisations have sought to collate information from our respective memberships on the greenhouse conditions under which these three plant species are kept. We therefore present this information below but it should be noted that this is in relation to the UK and the Netherlands only.

- *Pistia stratiotes* (Water Lettuce) – under greenhouse conditions, this species although provided with frost protection and additional lighting to increase photoperiod to the equivalent of a bright winter's day, could not survive a UK winter and all plants died. Due to the fact that this species cannot overwinter in the UK due to insufficient temperature and natural light levels, UK suppliers typically do not have fresh stock of this species until around mid-April. When placed on retail in the UK, typically they will not be placed outdoors in a garden centre until frosts have ceased (approximately late April). UK retailers will typically lower their stocks of this species from around August before the temperature drops in the autumn and the plants begin to die off. At water temperatures of approx. 14°C, the plants are observed as starting to discolour and dieback and the usual observation is that all plants kept outside are dead by the end of October in the UK. In relation to the Netherlands, no growth is observed during the winter in naturally lighted greenhouses at estimated light conditions of a minimum 40,000 lux. They are grown typically in a water pH between 5.8 to 6.5 and a nutrient solution strength between 1 to 2 EC (Electrical Conductivity i.e. a measurement of nutrient solution strength).

- *Salvinia molesta* (Giant Salvinia)
  In relation to the Netherlands, under greenhouse conditions, this is typically kept at a temperature range of 20 to 28°C. It is grown under natural light conditions but during the winter months requires artificial lighting (typically using high pressure sodium lights). The minimum PAR level is 3.5, with a photoperiod required of 12 hours. The process water in which these plants are kept has a pH value of between 5.5 to 6.5 and provided with a nutrient solution strength between 1 to 2 EC.

- *Gymnocoronis spilanthoides* (Senegal tea plant)
  In relation to the Netherlands, under greenhouse conditions, this is also typically kept at a temperature range of 20 to 28°C. It is grown under natural light conditions, but provided with the same artificial light conditions during winter months as for *S. molesta* above. PAR, photoperiod, process water pH and nutrient solution strength are also as per *S. molesta* above.

With regard specifically to *P. stratiotes*, this species has been in the ornamental aquatic plant trade for some considerable time. Evidence from the UK, Sweden and Germany suggest that this species has been traded certainly for the past 50 to 70 years. One

German sales sheet on aquarium and terrarium plants mentions this species and dates to 1895, providing evidence that certainly in Germany, it has been traded for over a century. We therefore include in our Figure 5, information on the changes in annual temperature across Europe (sourced from the European Environment Agency) between 1960 and 2017, the approximate length of time that *P. stratiotes* has been in trade.

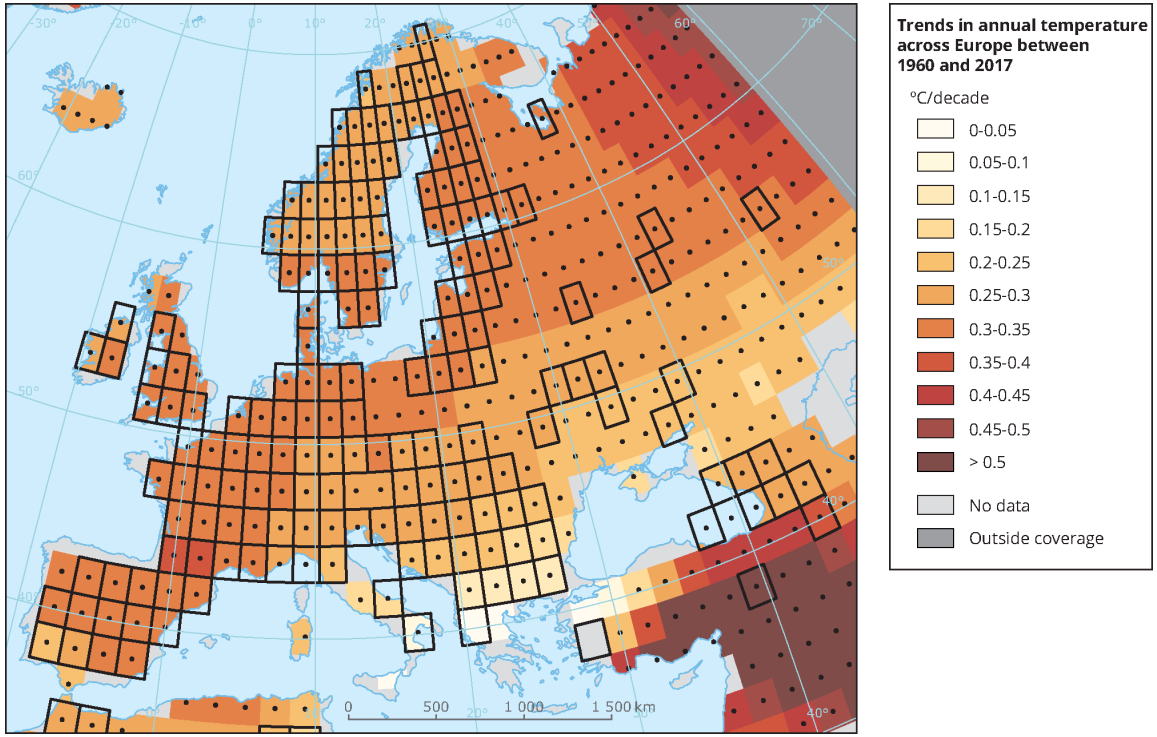

Figure 5: Annual temperature trends between 1960 and 2017 across Europe. Source: European Environment Agency. [Online]. Available at: https://www.eea.europa.eu/data-and-maps/figures/decadal-average-trends-in-mean-8 (Accessed on 4 October 2018).

In relation to the Water Hyacinth (*Eichhornia crassipes*), in consideration of climatic conditions, Kriticos and Brunel (2016), the climate model used i.e. CLIMEX, suggested that, in relation to the UK, at both current and projected climate change (up to 2080),

conditions would not be favourable to the establishment of this species. Given the length of time that *P. stratiotes* has been in the trade, although we acknowledge the potential for lag phase, it has not been reported as having become established in the more northerly Member States such as the UK. If such projected climate conditions are unfavourable to *E. crassipes*, then such modelling should be carried out for these three species but such models should also include parameters such as photoperiod, water temperature and water chemistry. Such parameters would allow a more accurate prediction of where in the EU, species could be predicated as becoming invasive. This would also serve to address calls as made in the scientific literature (such as Araújo and Luoto, 2007) for more stringent evidence as to whether models of species distribution and climate change based purely on climate-based factors are sufficient or should include biotic interactions.

We consider that this is particularly prudent given the risk assessment authors comments that in relation to uncertainty to the risk assessment for *G. spilanthoides* (EPPO, 2017a) this is given as 'high' and that there appears to be discrepancies in its invasiveness distribution given that this species has "*failed to establish in climatically suitable habitats in the USA and South-East Asia despite its presence in the trade"*. Further, that "*conditions in northern Europe are unlikely to become optimal"* (in relation to the RCP8.5 worst-case scenario/most extreme). Also, that in relation to uncertainty for the risk assessments for *P. stratiotes* (EPPO, 2017b) and *S.molesta* (EPPO, 2017c) that uncertainty was moderate and that with respect to *S. molesta* that "*water pH may be a potential limiting factor in the Mediterranean but requires further investigation*" (EPPO, 2017c).

Proposed model for permitted trade in Member States outside of the endangered area

We acknowledge that should a regional listing response be taken in respect of these three plant species, given that there is free trade within the EU and that these plants are sold via e-commerce, measures must be put in place, which mitigate risk. There must be risk mitigation which will safeguard those Member States within the identified endangered area whilst permitting 'licenced' trade within those Member States where the invasiveness risk is low due to unfavourable abiotic and biotic conditions. In this respect, our industry has given due consideration as to how this could be achieved in a manner which could be easily implemented and is workable to all actors involved especially considering that there are no alternative species available.

We have therefore considered a possible model based on existing Codes of Conduct, namely a Code of Conduct recommendation for the horticulture industry (EPPO, 2009) and the Dutch 'Convenant Waterplanten' (2010). The Dutch 'Convenant Waterplanten' is a voluntary agreement between the Dutch government, Dutch water bodies and Dutch plant growers. This agreement undertakes a commitment to protect biodiversity and to reduce the risk of alien plant species. It comprises of eleven Articles and two Annexes. Our understanding is that under Article 1, aquatic plant species listed in Annex 1 are not permitted to be sold to consumers in the Netherlands, nor used by water companies. Those aquatic plant species listed in Annex 2 are permitted to be sold on the proviso

that additional information is provided in the form of labelling. The labelling must state i) the scientific name, ii) that it is a non-native species and iii) that it can pose a threat to native plants and animals (Convenant Waterplanten, 2010). An example of such wording is given in Appendix 2 of the EPPO Horticulture Code of Conduct (2009) i.e. the plant's full scientific name, its common name, information on where the plant is native and where it is invasive and suitable messaging i.e. "*Ensure it does not escape from gardens. Do not plant in or near* (to waterways, surface waters) *where it threatens native plant species and modifies the habitat"/"Only use in aquariums. Do not use outdoors. Do not dispose of any aquarium waste into ponds or watercourses*". Both the EPPO (2009) and Convenant Waterplanten (2010) advocate a commitment from industry on public engagement and outreach.

We acknowledge that Codes of Conduct are largely entered into on a voluntary basis (EPPO, 2009) and therefore there are no mandatory obligations. We would therefore support the creation of a more formalised agreement e.g. a covenant between the European Commission and the ornamental aquatic plant sector. The scope of such a covenant could easily be broadened out not just to the three aquatic plant species under consideration but to all proposed flora and fauna where there is clear evidence of a restricted distribution. Such a covenant could be entered into with appropriate trade associations or directly with individual businesses.

It is therefore our belief that a model whereby the European Commission could issue permits for 'licensed' trade in those Member States where the invasiveness risk is low e.g. those in the Atlantic biogeographical region, could be developed. Using as its template, the existing Dutch 'Convenant Waterplanten' (2010) and the EPPO Code of Conduct for horticulture (2009).

However, we recognise the fact that such a legislative framework would take time to implement and that an entirely voluntary code of conduct may not be sufficient in serving to protect those Member States within the endangered area i.e. principally the Mediterranean biogeographical region. Therefore, if a regional listing response is implemented, we propose and would support the creation of an interim registration scheme. Under such a scheme, anyone wishing to trade in a species which has been identified as being invasive in certain parts of the EU but for which there is evidence of a restricted distribution would have to register with their Member State's Competent Authority. In doing so, the seller would be required to give an undertaking, agreeing to comply with certain requirements on how they trade and what species are traded. If the seller subsequently breaches any of these conditions, they would lose their registration and ability to trade in said species with immediate effect and/or be subject to a fine.

In their evaluation of the effectiveness of the Convenant Waterplanten, Verbrugge *et al*. (2013) make a number of recommendations and which we note as 'lessons learnt' going forward with any covenant between the European Commission and industry i.e.:

I. There should be a proactive attitude and awareness of the joint responsibility between all actors in the covenant;

II. That a consistent and reliable point of contact should be identified. We acknowledge that this would be dependent on the framework which may be used e.g. an 'umbrella' agreement between the European Commission and an industry representative. This could then filter down to individual agreements such as the Convenant Waterplanten (in recognition of national measures e.g. both *P. stratiotes* and *S. molesta* are banned in Spain) between a Member State's Competent Authority and either a trade association or directly with individual businesses;
III. Setting up regular meetings to promote continuous engagement;
IV. Creating a joint communication strategy.

Further recommendations by Verbrugge *et al*. (2013) include sending out information packs to new businesses, industry workshops and IAS courses for industry. In respect of the latter, OATA and OFI are working on developing an online training course to raise awareness amongst our industry on IAS. Such courses could provide information on the importance of correct identification of plant species, appropriate labelling and the consequences of IAS. It is widely recognised that e-commerce is increasingly becoming a major pathway of introduction of IAS influenced by changes in consumer behaviour. We would therefore consider it prudent that for any covenant between a Competent Authority and a business which solely trades via e-commerce, that the criteria for permitted trading be more stringent. This would serve as both an additional safeguard and a strong incentive for compliance.

Given that the Dutch 'Convenant Waterplanten' already exists and provides a template for a more formalised agreement, we consider that, in the event of a regional listing response being implemented, that it would be workable to create an electronic registration licensing system. Businesses that enter into a formalised covenant and are located in those Member States outside of the identified endangered area, would register or apply for a permit to sell relevant species. This in accordance with Article 8 of EU Regulation No. 1143/2014. In recognition of risk mitigation and accounting for/addressing e-commerce, we would consider it necessary for there to be strict obligations placed on 'licensed' sellers, especially those who solely trade via e-commerce. Our suggestions for the scope of such obligations include, but are not limited to, businesses providing undertakings that:

- They will not export/sell to any Member State within the identified endangered area e.g. the Mediterranean biogeographical region;
- That plants sold will bear labelling in compliance with the recommendations as made by the EPPO (2009) and Convenant Waterplanten (2010);
- That no cultivars will be developed that could potentially be 'cold hardy';
- That *Gymnocoronis spilanthoides* will be sold for aquarium use only;
- That they agree to commit to attending regular meetings with a Competent Authority;

- That they agree to commit to public awareness campaigns. Either by supporting individual Member State initiatives e.g. the UK's 'Be Plant Wise' campaign and/or incorporating messaging to raise public awareness on IAS. Such outreach should incorporate messaging on 'keeping it in the aquarium/garden', discouraging the exchange of plant material of unknown provenance, not to translocate plants outside of a contained holding e.g. as identified by Kriticos & Brunel (2016) in relation to those with secondary homes in another Member State and responsible disposal.

As per our comments above, we recognise that such a covenant would take time to both create and implement. We would therefore suggest that if an interim registration scheme is adopted that it would be prudent to i) trial such a scheme with a certain number of species i.e. these three aquatic plant species and ii) that it should be trialled as temporary measures. We would therefore propose that such a suitable timeframe would be until the review of the List is due i.e. until 2021. We consider that this would provide an opportunity for Member States/the European Commission to assess the feasibility and viability of such a scheme. Also, to be able to identify and address any issues with such a scheme prior to the creation of a more formal agreement/covenant.

We fully recognise, and recommend, that if such trade is permitted, registered or 'licensed' businesses must be made aware that there will be consequences in the event of any infringement of the agreement. These consequences could be those as provided under Article 30 of the EU Regulation No. 1143/2014 i.e. fines (under the 'Polluter Pays' principal) and/or the immediate suspension or withdrawal of a permit/registration. We consider it prudent that any such agreement should be reviewed on a regular basis and in the light of any new scientific information. This could be on the basis similar to the Dutch Convenant Waterplanten i.e. every four years, or on the same basis as the List of European Union concern i.e. every six years.

Concluding Remarks

We again thank the European Commission for permitting us to make this submission in support of a regional listing response. We believe that such a proportionate response is fully justified on the grounds of the identified endangered area(s) i.e. the Mediterranean biogeographical region (and the Continental biogeographical region in relation to *G. spilanthoides*). Our opinion is made on the basis that certainly *Pistia stratiotes* and *Salvinia molesta* would have a restricted distribution as they are frost sensitive and that further research is needed in relation to the impact of photoperiod as a variable. In relation to *Gymnocoronis spilanthoides*, we are aware that it is sold as a pond plant but believe that the proportionate response would be that this species must only be sold for use in an aquarium and is not to be used outdoors. Based on the socio-economic data presented and given that *P. stratiotes* is the permitted alternative to *Eichhornia crassipes*, the loss of this species would have an irreversible, detrimental impact to our sector, especially given there are no alternatives.

We consider that regional listing is the proportionate response in this instance and that there is a workable model which would permit licensed continued trade in those Member States outside of the endangered area. We therefore ask the European Commission and the IAS Management Committee to consider adopting such an approach in this instance, subject to the creation of an interim registration scheme/formalised covenant, trade permits and the necessary obligations and penalties. We therefore offer our assistance and stand ready to work with Member States and the European Commission to develop and implement any such new scheme should our proposal be accepted.

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Annex 1

Additional information about EPO

Created in Vienna in April 1990, the European Pet Organization (EPO) is a coalition of parties interested in protecting and promoting the interests of the European pet industry.

EPO represents ten (10) trade associations in ten (10) countries representing thousands of enterprises many of which are SME's or micro businesses.
Its member organizations include for each country:

- Austria: WKO
- France: PRODAF
- Germany: ZZF
- Italy: VIMAX / AIPA
- Norway: NZB
- Spain: AEDPAC
- Sweden: ZOORF
- Switzerland: VZFS
- The Netherlands: DIBEVO
- United Kingdom: OATA

As per its recently adopted charter (May 2018), EPO members:

- *"Promote responsible pet ownership and recognise the social and health benefits of keeping pets;*
- *Promote best practices in the keeping animals by observing the five welfare needs; diet, accommodation; wellbeing; sociability; behaviour;*
- *Believe that keeping pets promotes an understanding and appreciation of nature, biodiversity and conservation;*
- *Believe that pet-related businesses are responsible for the professional care and transfer of ownership of pets, and should promote best practice amongst the pet industry;*
- *Believe that all those involved in the pet trade should abide by all current legislation regarding the trade, ownership and keeping of animals, and reject all illegal practices;*

- *Use the latest scientific and empirical knowledge in providing advice about the keeping of animals;*
- *Do not support the release of pet animals into the wild;*
- *Believe that all those professionally responsible for handling animals should be appropriately trained and have a comprehensive understanding of the animals' welfare needs and the respective legal obligations;*
- *Ensure dissemination of relevant information regarding the trading and keeping of animals within the sector; and,*
- *Strive for good collaboration and exchange of information amongst its members, within the pet sector, and with government."*

Annex 2

Additional information about OFI

Ornamental Fish International (OFI) is the peak international trade association representing the ornamental fish industry since its inception in 1980. OFI represents members from more than 30 countries around the world and include members from all sectors of the industry (producers, exporters, importers and retailers) as well as a number of NGO's and other trade associations. OFI represents and promotes the interests of the industry through lobbying to various institutions around the world; as well as educating industry and hobbyists in responsible and sustainable Best Practices. Last year (2017), OFI members have adopted its new charter guaranteeing the conduct of an ethical, fair and legal trade.

For more information about OFI, please visit its website at www.ofish.org .

The OFI Charter that members subscribe to is as follows:

- *"OFI members promote and support captive breeding, farming and collection of ornamental aquatic animals (hereunder, fish and invertebrates) and aquatic plants with respect for natural populations, the environment and the contribution made to socio-economic benefits for the local population;*
- *OFI members only trade in fishes, corals, other invertebrates, plants, etc. that are legal in their country; they respect national and international laws and regulations;*
- *OFI members prevent the release of specimens into the wild, except for specific nature conservation projects;*
- *OFI uses the latest science for defining its standards and supports scientific work relating to our industry;*
- *OFI members apply proper scientific names to the best of current knowledge;*
- *OFI supports the careful collection of freshwater and marine fish and invertebrates;*
- *OFI supports the education and training of breeders, farmers and collectors to further improve appropriate handling, animal health and welfare protocols, and promoting diver safety (e.g. OFI condemns the use of cyanide or other poisons, coral breaking or trenching, etc,. for the collection of marine organisms);*
- *OFI promotes trade and handling of ornamental aquatic animals with respect for their wellbeing; OFI members pack and transport aquatic animals in accordance with national and international legislation (see OFI Educational Publication 7);*
- *OFI promotes the addressing of biosecurity risks in our facilities and the training of staff in biosecurity practices (see OFI Educational Publication 4); after long-distance transport, or when needed, importers will see to it that fish receive adequate quarantine;*

•OFI members undertake to make every effort to maintain the health of aquatic ornamental animals. They provide proper water quality, implement adequate treatment and feeding protocols and organize regular health inspections. OFI members restrict the use of antibiotics as much as possible, and in accordance with relevant national legislation.
• OFI members operate in a spirit of cooperation with each other and according to honorable standards of trading, both between each other and with non-members of the organization;
• OFI members agree to settle legitimate complaints promptly and satisfactorily".

Annex 3

Additional Information about the Sustainable Users Network (SUN)

The Sustainable Users Network (SUN) is based in the United Kingdom and was established in the late 1980s at the behest of a UK Government agency, the Department for Environment, Food and Rural Affairs (DEFRA).

SUN is an umbrella of UK affiliated organisations who are involved in animal-keeping animal trade and animal use (for non-domesticated species) and horticulture. SUN has an individual membership amongst all of its affiliates totalling approximately 1.2 million members. Affiliation to SUN is only permitted if an organisation is able to sufficiently demonstrate to SUN that they support the concept of sustainable trade in wildlife.