European and Mediterranean Plant Protection Organization
Organisation Européenne et Méditerranéenne pour la Protection des Plantes

EPPO Prioritization Process for Invasive Alien Plants

14-19390

Gunnera tinctoria (Gunneraceae)

Gunnera tinctoria, © http://es.wikipedia.org/wiki/Gunnera_tinctoria

The prioritization process assessment for *Gunnera tinctoria* (Gunneraceae) has been elaborated by the EPPO Secretariat and was reviewed by the EPPO Panel on Invasive Alien Plants in 2014.

Section A Prioritization process scheme for the elaboration of diffferent lists of invasive alien plants (pests or potential pests) for the area under assessment

Init1 - Enter the name of the pest
Gunnera tinctoria (Molina) Mirbel

Init2 - Indicate the taxonomic position and synonyms
Gunneraceae

Init3 - Clearly define the PRA area
The EPPO region (see map at http://www.eppo.int/ABOUT_EPPO/images/clickable_map.htm).

Init4 - Provide the reasons for performing this assessment, and report any risk analysis available for the assessed species.
Gunnera tinctoria (Gunneraceae) is a large herbaceous plant originating from South America. It is used as an ornamental waterside plant. The plant smothers other plants in riparian habitats and forests, and is considered invasive in New Zealand and in the British Isles. In the EPPO region, it is only established in Azores (Portugal), France, Ireland and the United Kingdom. As *G. tinctoria* still has a limited distribution in the EPPO region and presents an invasive behaviour in areas where it has been introduced, it represents a risk for the EPPO region.

A.1 - Is the plant species known to be alien in all, or a significant part, of the area under assessment?
Yes
The species originates from South America and is alien in the whole EPPO region.

A.2 - Is the plant species established in at least a part of the area under assessment?
Yes (for references and an updated distribution, please, check the EPPO PQR Database https://www.eppo.int/DATABASES/pqr/pqr.htm)

The species is established in the EPPO region: France (Côtes d'Armor), Ireland, Portugal (Azores: São Miguel Island), the United Kingdom (England, Northern Ireland, Scotland, Wales). The species is recorded as present in Spain but not as naturalized.

The species is native to South America: Argentina, Bolivia, Colombia, Chile, Ecuador, Peru, Venezuela.

The species has also been introduced and is established in the United States of America in California (USDA website, McClintock, 1993) as well as in New Zealand (Hawhe's Bay, Taranaki, Wanganui, Banks Peninsula, Dunedin and Steward Island) (Williams *et al.*, 2005).

The GBIF worldwide distribution map of *G. tinctoria* omits some distribution points in South America, France and the Azores (see Figure 1).

Figure 1: GBIF worldwide distribution for *Gunnera tinctoria*. Some records are missing in South America which is the native range of the species and in the EPPO region (the Azores and France).
Biodiversity occurrence data accessed through GBIF Data Portal, data.gbif.org, 2014-03-18.

The GBIF Niche Model, taking all the parameters into account, indicates that the Atlantic European area would be suitable for *G. tinctoria* to establish (Figure 2). This projection underestimates the native distribution of the species in South America. The potential distribution of the species could therefore also be underestimated in thermophilous areas. The distribution in northern Arctic areas such as in Norway may be overestimated. The outcome of this automated projected map is not considered as satisfactory and an accurate projection is necessary (e.g. with CLIMEX).

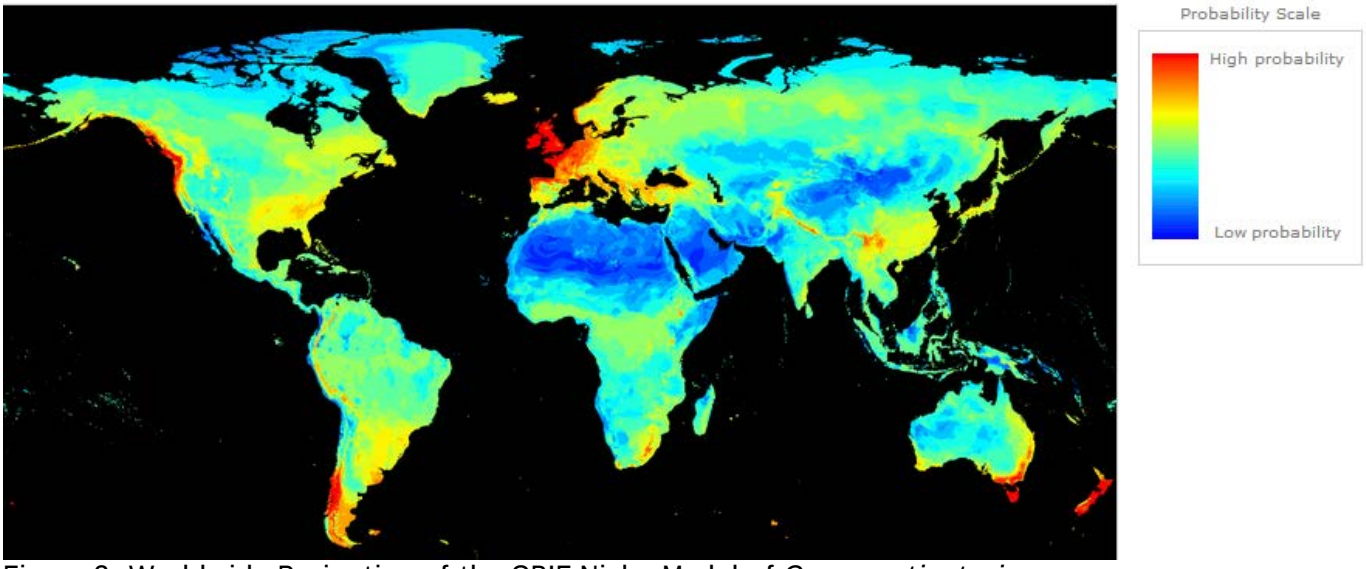

Figure 2: Worldwide Projection of the GBIF Niche Model of *Gunnera tinctoria.*
Biodiversity occurrence data accessed through GBIF Data Portal, data.gbif.org, 2014-03-18.

The Atlantic area is considered to be the most appropriate for the establishment of *G. tinctoria*. Frost and cold temperatures are suspected to be limiting for the establishment of the plant in the rest of the EPPO region. Hot temperature and summer drought would limit its establishment in the Mediterranean part.

Questions A.5, A.6, A.7 and A.8 all have to be assessed independently. The risk should be considered for the area under assessment where the species is able to establish and to cause damage. The risk should not be downgraded by making an average for the entire area under assessment, if it is different from the area of potential establishment.

As far as possible, evidence should be obtained from records of invasive behaviour in the area under assessment or in the EPPO region. Information on invasive behaviour elsewhere may also provide guidance.

It should be ensured that suitable habitats are present in the area under assessment, for instance, mangroves and some specific cropping systems are not found in the EPPO region.

Any impact through hybridization on native plant species, crops or wild crop relatives is also considered in this section.

A.5 - How high is the spread potential of the plant in the area under assessment?
High
Level of uncertainty: Low

A single plant of *Gunnera tinctoria* can produce a large number of seeds, which varies depending on plant size and water availability. Osborne *et al*. (1991 in Gioria & Osbornne, 2013) estimated that circa 750 000 seeds are produced per plant per year in the Irish population. Seeds have a very high germination rate. The species can also grow from stem fragments or from rhizomes. These rhizomes can increase by 15 cm annually when established (Gioria & Osbornne, 2013).
The plant is used as an ornamental waterside plant. The thousands of seeds produced are naturally dispersed by water and birds. Anthropogenic activities such as clearing ditches, road building and movement of soil may also spread the plant (Maguire, 2009).

A.6 - How high is the potential negative impact of the plant on native species, habitats and ecosystems in the area under assessment?

List natural and semi-natural habitats where the species in known to occur. It includes all EUNIS habitat types 1 (http://eunis.eea.europa.eu/habitats-code-browser.jsp), except I (Regularly or recently cultivated agricultural, horticultural and domestic habitats) and J (Constructed, industrial and other artificial habitats).
High
Level of uncertainty: Low

According to the EUNIS nomenclature, the following natural or semi-natural habitats are invaded: Coastal habitats: Rock cliffs, ledges and shores, including the supralittoral [B3]; Inland water surface: Littoral zone of inland surface waterbodies [C3]; Grasslands and lands dominated by forbs, mosses or lichens: Seasonally wet and wet grasslands [E3]; Heathland, scrub and tundra: temperate shrub heathland [F4]; Woodland, forest and other wooded land: Broadleaved evergreen woodland [G2].

The huge leaves of *G. tinctoria* which grows in colonies shade out any plant or animal present beneath. The formation of almost monospecific stands of *G. tinctoria* leads to changes in plant communities in Western Ireland, and the species-rich native grasslands are replaced by a sparse cover of dicotyledonous plants (which are not found in uninfested grasslands) (Maguire, 2009). *G. tinctoria* has also been observed to replace *Salix cinerea* (Salicaceae) in Great Britain, thus altering the process of natural vegetation succession (Gioria & Osborne, 2013). In New Zealand, *G. tinctoria* is reported to affect nationally threatened plant species or uncommon species on coastal cliffs (Williams *et al*., 2005). When it grows on soft coastal cliffs it contributes to erosion and loss of native maritime species when plants fall down to the bottom due to their great weight, carrying soil and rock with them (Maguire, 2009). The plant has a symbiotic relationship with nitrogen-fixing cyanobacteria in its rhizomes and this may confer an advantage to young plants growing in nitrogen-deficient soils (Gioria & Osborne, 2013).

Furthermore, *G. tinctoria* colonizes habitats of high ecological importance. In New Zealand, as well as in the United Kingdom it occurs in mires, heaths, wet grasslands and along watercourses, including habitats which are of patrimonial value (Williams *et al*., 2009; Gioria & Osborne, 2013). In the Azores, it is found in nature reserves and colonizes conservation habitats: the Macaronesian laurel forest and the endemic forests with *Juniperus* spp. (Silva *et al*., 2008).

A.7 - How high is the potential negative impact of the plant on agriculture, horticulture or forestry in the area under assessment?

The habitats and the situations in which the species has negative impact on agriculture, horticulture or forestry should be listed. It includes EUNIS habitat (http://eunis.eea.europa.eu/habitats-code-browser.jsp) I (Regularly or recently cultivated agricultural, horticultural and domestic habitats) and J (Constructed, industrial and other artificial habitats).
Medium
Level of uncertainty: Low

According to the EUNIS nomenclature, the following habitats are invaded: Regularly or recently cultivated agricultural, horticultural and domestic habitats : Cultivated areas of gardens and parks [I2]; Constructed, industrial and other artificial habitats: Extractive industrial site [J3]; Transport networks and other constructed hard-surfaced areas [J4]; Highly artificial man-made waters and associated structures [J5]; Waste deposit [J6].

The species can block drains and streams and obstruct access to natural and recreational areas (Maguire, 2009; Gioria & Osborne, 2013). It may cause erosion when colonizing steep areas, and increase the risk of flooding (Maguire, 2009).
In Ireland, the species also forms extensive stands on farmland which are very difficult and costly to eradicate (Pilkington, 2009).

A.8 - How high are the potential additional impacts (e.g. on animal and human health, on infrastructures, on recreational activities, other trade related impacts such as market losses)?
Medium
Level of uncertainty: Low

The leaf blade and stem of *G. tinctoria* bear stiff bristles which can scratch skin (Pilkington, 2009).
The species is also reported to create a negative visual impact on the landscape (Maguire, 2009). There have been reports that decaying leaves sometimes cause an unpleasant odour (Maguire, 2009). Extensive stands on farmland can depress land and property values (Pilkington, 2009).

Responses to questions on impacts (A.6, A.7 and A.8) should be reported in the matrix in Fig. 2 in order to categorize the species. The highest score should be considered; however, impacts listed in question A.8 cannot be taken on their own as the highest impacts. Only if A.6 and/or A.7 is medium and A.8 is high should the overall impact be considered high.
Those species that have both a high spread potential and a high impact (either on cultivated or uncultivated ecosystems) are included in the list of invasive alien plants. Species with either medium spread or impacts are included in the observation list of invasive alien plants. Species with low spread and high impact are included in the observation list of invasive alien plants. All other species are registered on the list of minor concern.
The conclusions of the process can be presented in a matrix (see Fig. 2).

		A5 -Spread potential		
		Low	Medium	High
Adverse impacts (maximum rating from questions A6, A7. and A.8)	Low	List of minor concern	List of minor concern	List of minor concern
	Medium	List of minor concern	Observation list of invasive alien plants	Observation list of invasive alien plants
	High	Observation list of invasive alien plants	Observation list of invasive alien plants	List of invasive alien plants

Fig. 2 matrix combining spread potential and adverse impacts.

The answer provided to question A.5 on the spread potential of the species assessed was:
High
The answer provided to question A.6 on negative impact on native species, habitats and ecosystems was:
High
The answer provided to question A.7 on negative impact on agriculture, horticulture or forestry was:
Medium
The answer provided to question A.8 on additional impacts was:
Medium

According to the ratings provided, the assessed species falls into the:
List of invasive alien plants

A.9 - The overall uncertainty for Part A of the EPPO prioritization process for invasive alien plants should be summarized:
Low
Impacts have been very accurately reported from the United Kingdom. The behavior of the species in other places such as the Azores or in France is reported as well, although in less detail.

Section B Prioritization process scheme for the identification of invasive alien plants for which a PRA is needed

B.1 - Is the plant species internationally traded or are there other existing or potential international pathways?
List the pathway(s) as justification.
Yes, at least one international pathway is identified.

The species is known to be used as a waterside ornamental plant. It escaped from gardens in Ireland and in the United Kingdom (Gioria & Osborne, 2013). The PPP Index reports 34 sellers for this plant (PPP Index website, consulted in September 2014). There are various websites selling this plant.

B.2 - Is the risk of introduction by these international pathways identified to be superior to natural spread?
Yes

G. tinctoria still has a limited distribution in the EPPO region as it is so far only present in 4 countries, and voluntary introduction for ornamental use and the consequent escape of the plant to unintended habitats remains superior to natural spread.

B.3 - Does the plant species still have a significant area suitable for further spread in the area under assessment?
Medium suitable for further spread.

The species is established in a limited number of countries in the EPPO region (Azores (PT), France, Ireland, the United Kingdom) and could potentially extend its distribution in the Atlantic part of the EPPO region (France, Portugal, Spain). Its climatic potential range remains uncertain and could be wider considering the native distribution of the species in South America. The area of potential establishment would nevertheless remain moderate. The species still has a medium for further spread but the uncertainty on this point remains high.

The species assessed is a lower priority for PRA.

The guidelines on pest risk analysis of EPPO Standard PM 5/3 *Decision-support scheme for quarantine pests* **should be followed to perform of a PRA.**

References

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