LIFE IAP-RISK

EPPO activities in PRA for invasive alien plants conducted within the framework of an EU funded LIFE Project.

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Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

iPRRG

* And the Panel on Invasive Alien Plants

The EPPO Panel on Invasive Alien Plants

Created in 2002 with the following tasks:

- To collect data on invasive alien plants in the EPPO region,
- To collect information on official control measures existing in the EPPO region for invasive alien plants,
- To conduct studies on pest risk analysis and pest risk management of specific invasive alien plants,

About 20 Panel members nominated by the National Plant Protection Organisations (NPPOs)




Regulation 1143/2014

- Regulation 1143/2014: on the prevention and management of the introduction and spread of invasive alien species, which came into force on the 1st January 2015

- Centred on three main themes (1) prevention, (2) early warning and rapid response, and (3) management.

- A key feature in the Regulation is: list of IAS of Union concern

REGULATION (EU) No 1143/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 22 October 2014
on the prevention and management of the introduction and spread of invasive alien species

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 192(1) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee (1),

After consulting the Committee of the Regions,

Acting in accordance with the ordinary legislative procedure (2),

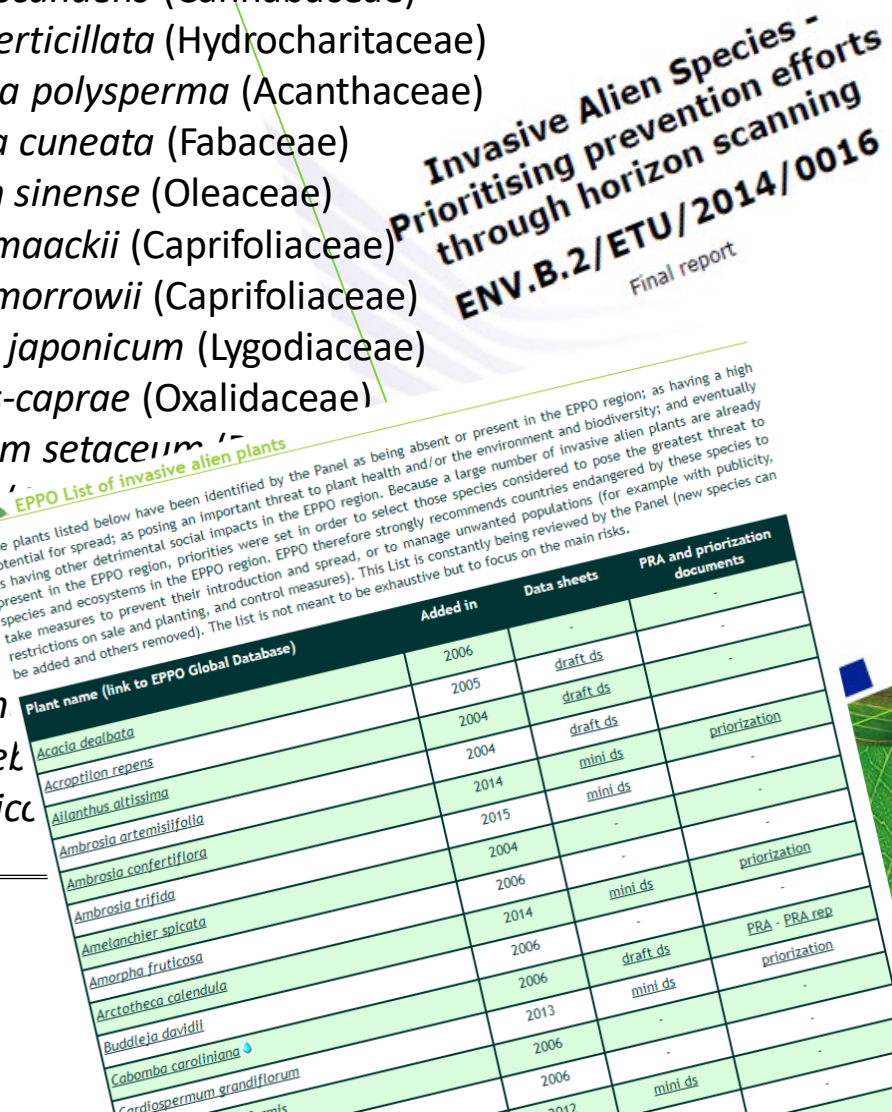
Whereas:

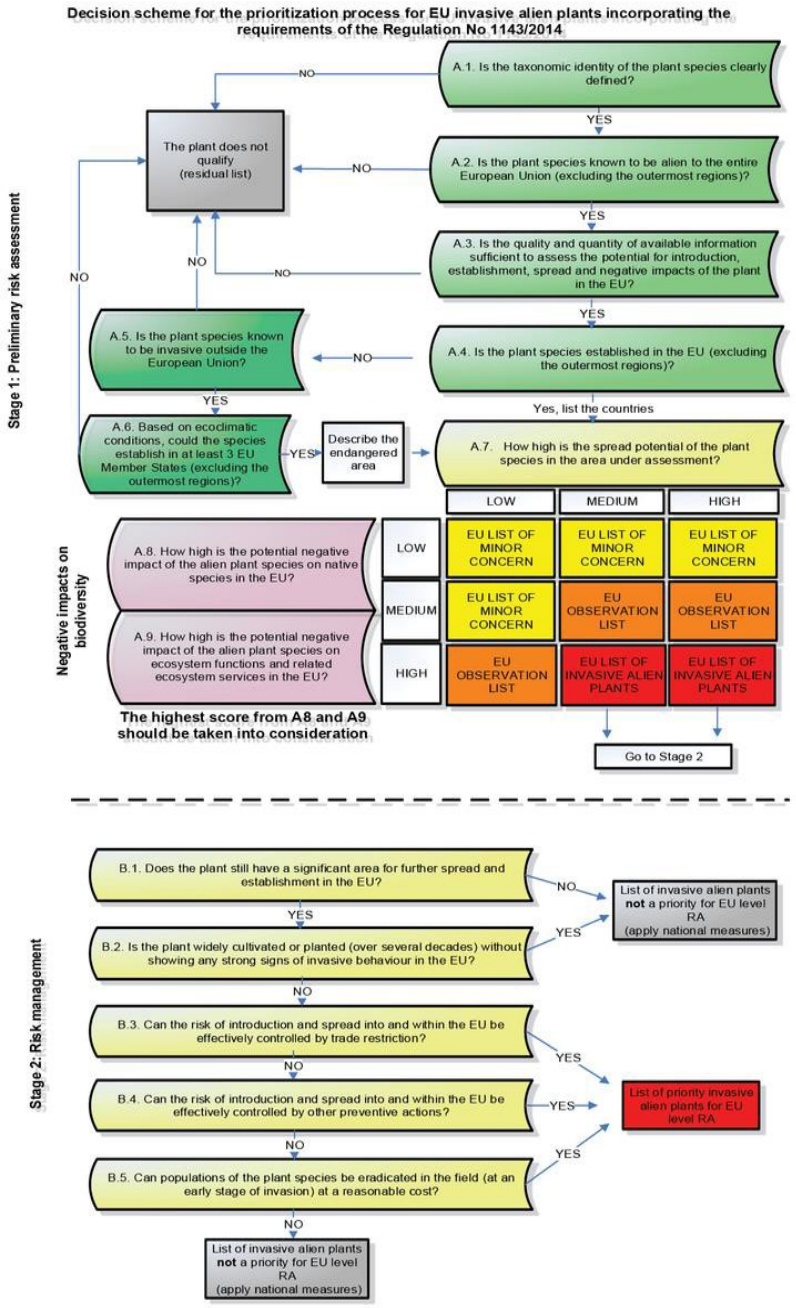
(1) The appearance of alien species, whether of animals, plants, fungi or micro-organisms, in new locations is not always a cause for concern. However, a significant subset of alien species can become invasive and have serious adverse impact on biodiversity and related ecosystem services, as well as have other social and economic impact, which should be prevented. Some 12 000 species in the environment of the Union and in other European

List of 37 species for prioritisation

Species

Acacia dealbata (Fabaceae)
Albizia lebbeck (Fabaceae)
Ambrosia confertiflora (Asteraceae)
Ambrosia trifida (Asteraceae)
Andropogon virginicus (Poaceae)
Cardiospermum grandiflorum (Sapindaceae)
Celastrus orbiculatus (Celastraceae)
Chromolaena odorata (Asteraceae)
Cinnamomum camphora (Lauraceae)
Clematis terniflora (Ranunculaceae)
Cornus sericea (Cornaceae)
Cortaderia jubata (Poaceae)
Cryptostegia grandiflora (Apocynaceae)
Egeria densa (Hydrocharitaceae)
Ehrharta calycina (Poaceae) *Euonymus fortunei* (Celastraceae) *Euonymus japonicus* (Celastraceae) *Fallopia baldschuanica* (Polygonaceae)
Gymnocoronis spilanthoides (Asteraceae)
Hakea sericea (Proteaceae)
Humulus scandens (Cannabaceae)
Hydrilla verticillata (Hydrocharitaceae)
Hygrophila polysperma (Acanthaceae)
Lespedeza cuneata (Fabaceae)
Ligustrum sinense (Oleaceae)
Lonicera maackii (Caprifoliaceae)
Lonicera morrowii (Caprifoliaceae)
Lygodium japonicum (Lygodiaceae)
Oxalis pes-caprae (Oxalidaceae)
Pennisetum setaceum
stratiotes
Prosopis
Prunus c
Rubus ros
Salvinia m
Sapium sel
Sphagnetic





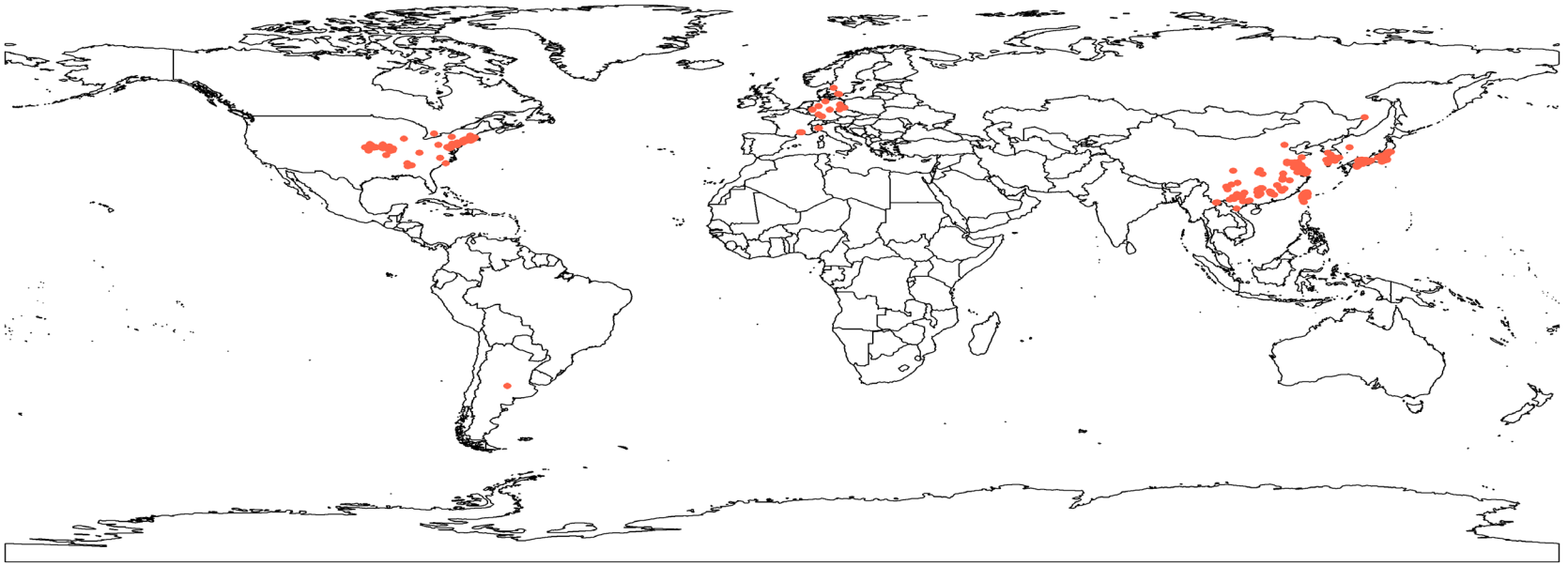
Prioritisation Process for EU invasive alien plants

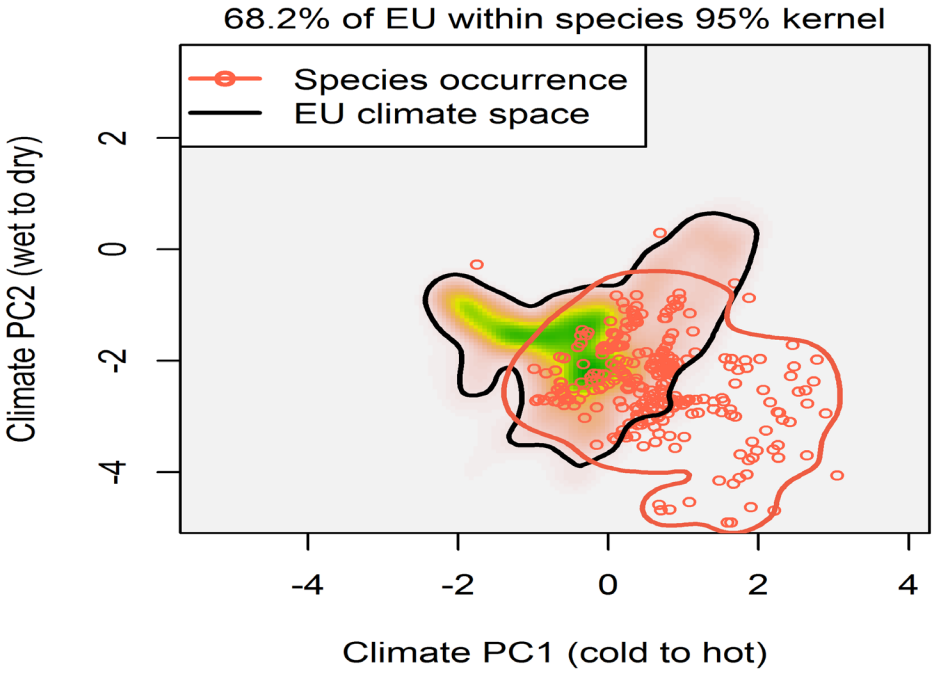
Stage 1: preliminary risk assessment - produces lists of plant species for the EU, the most important being the list of invasive alien plants

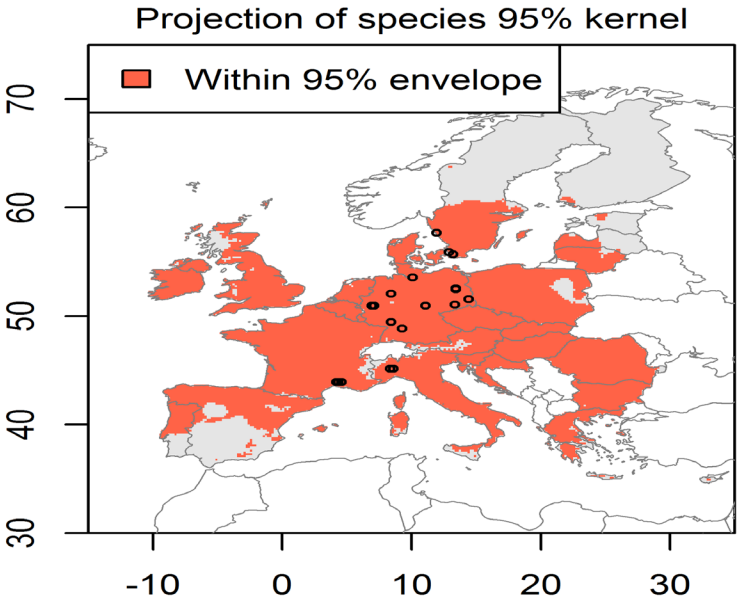
Stage 2: preliminary risk management - to determine which of these IAP have the highest priority for a risk assessment

Table 1. Key information sources. Information resources utilised when collecting information on the species.

Scientific area	Relating to question in EU P. process	Key resources
Stage 1		
Taxonomic identity	A1	The Plant List (http://www.theplantlist.org/)
Geographical origin	*A2*	ARS Grill Taxonomy (http://www.ars-grin.gov/)
Global occurrence	A4	GBIF (http://www.gbif.org), EPPO Global Database (https://gd.eppo.int/), CABI ISC (http://www.cabi.org/isc/) , Q-Bank (http://www.q-bank.eu/)
Global invasive behavior	AS	Scientific literature, reports, expert opinion
Spread potential & areas threatened	A6,A7	Scientific literature, reports, expert opinion
Impacts	A8,A9	Scientific literature, reports, expert opinion
Stage 2		
Current occurrence within theEU	Bl	GBIF (http://www.gbif.org), EPPO Global Database (https://gd.eppo.int/), CABI ISC (http://www.cabi.org/isc/), Q-Bank (http://www.q-bankeu/)
Invasive behavior in the EU	B2	Scientific literature, reports, expert opinion
Trade status	B3	Numerous internet suppliers (e.g. https://www. http://www.ebay.com/; hrtps://www.amazon.co
Phytosanitaty measures	B4,B5	Scientific literature, reports, expert opinion


Humulus japonicus: GBIF records


68.2% of EU within species 95% kernel
Species occurrence
EU climate space
Climate PC2 (wet to dry)
Climate PC1 (cold to hot)
-4
-2
0
2
4


Projection of species 95% kernel
Within 95% envelope
30
40
50
60
70
-10
0
10
20
30

Species	A.1. Clear taxonomy	A.2. Alien in EU	A.3. Quality information	A.4. Established in the EU	A.5. Invasive outside the EU	A.6. Potential establishment in the EU	A.7. Spread	A.8. Impact on native plant species	A.9. Impact on ecosystem functions services	Conclusion of stage 1
Acacia dealbata	Yes	Yes (Aus.)	High	Yes (ES, FR, IT)	Yes (Afr., Asia, Oce.)	38%	Medium	High (M): forms dense stands displaces native species (Lorenzo et al., 2012)	Medium (L): Nitrogen cycle modifications (Weber, 2003)	List IAP
Albizia lebbeck	Yes	Yes (Asia)	Low (STOP)	----	----	----	----	----	----	----
Ambrosia confertiflora	Yes	Yes (N.Am.)	Medium/High	No	Yes (C.Asia, Oce.)	8.80%	High	High (M): forms dense stands displaces native species (EPPO, 2014)	Medium (H): Ecosystem modifier (EPPO, 2014)	List IAP
Ambrosia trifida	Yes	Yes (N.Am.)	Medium/High	Yes (ES, GE, NL, RO, RU, PL, FR, IT, BK, RS)	Yes (Asia, N.Am.)	90%	High	Medium (L): allelopathic and competes with native spp. for nutrients/light	Low (M): No recorded impacts	Obs List
Andropogon virginicus	Yes	Yes (N.Am.)	High	Yes (FR)	Yes (Asia, N.Am., Oce.)	70.10%	High	High (H): Alleopathic impacts (Stone, 1985)	Medium (H): Promotes fire (Stone, 1985)	List IAP
Cardiospermum grandiflorum	Yes	Yes (Afr., S.Am.)	Medium	Yes (IT)	Yes (Afr.)	5.10%	High	High (M):Smothers native spp. (McKay et al., 2010)	Medium (M): Habitat transformer ((Henderson, 2001)	List IAP
Celastrus orbiculatus	Yes	Yes (Asia)	High	Yes (GB)	Yes (N.Am., Oce.)	77%	High	High (H): Suppression native spp. (Fike & Niering, 1999)	Medium (H): Negatively affects aesthetics (CABI, 2016)	List IAP
Chromolaena odorata	Yes	Yes (S.Am.)	High	No	Yes (Afr., N.Am., Oce.)	No (STOP)	----	----	----	----
Cinnamomum camphora (Lauraceae)	Yes	Yes (Asia)	High	Yes (GB, FR, IT)	Yes (N.Am., Oce.)	35.10%	High	High (H): Forms moncultures/ Alleopathic impacts (Firth, 1979)	Medium (H): Ecosystem modifier (CABI, 2016)	List IAP
Clematis terniflora (Ranunculaceae)	Yes	Yes (Asia)	Low (STOP)	----	----	----	----	----	----	----
Cornus sericea (Cornaceae)	No (STOP)	----	----	----	----	----	----	----	----	----
Cortaderia jubata (Poaceae)	Yes	Yes (S. Am.)	High	No	Yes (N.Am., Oce.)	55.80%	High	High (M): Strongly competes for resources (Lambrinos, 2000)	High (M): Alters trophic levels/reduces aesthetics (Bossard et al., 2000)	List IAP
Cryptostegia grandiflora (Apocynaceae)	Yes	Yes (Afr.)	High	No	Yes (Oce., S.Am.)	No (STOP)	----	----	----	----
Egeria densa (Hydrocharitaceae)	Yes	Yes (S. Am.)	High	Yes (FR, BE, IT, NL, UK)		80.90%	High	Medium (H): Displaces native spp. (CABI, 2016)	Medium (H): Reduces recreation actvities (CABI, 2016)	Obs List
Ehrharta calycina (Poaceae)	Yes	Yes (S. Afr.)	High	Yes (ES, PT)	Yes (N.Am.)	15.30%	High	High (M): Outcompetes native plant spp. (Bossard et al., 2000)	Medium (M): Alter fire regimes (Fisher et al., 2006)	List IAP
Euonymus fortunei (Celastraceae)	Yes	Yes (Asia)	High	Yes (FR, LV)	Yes (N.Am.)	70.10%	High	High (M): Outcompetes native plant spp. (Bauer & Reynolds, 2016)	Medium (H): Ecosystem modifier (Bauer & Reynolds, 2016)	List IAP
Euonymus japonicus(Celastraceae)	Yes	Yes (Asia)	Low (STOP)	----	----	----	----	----	----	----
Fallopia baldschuanica (Polygonaceae)	Yes	Yes (Asia)	High	Yes (widespread)	Yes (N.Am.)	67.90%	Medium	Medium (M): Smoothers native	Medium (M): Ecosystem modifier	Obs List

Results from prioritisation process:

Stage 1: EU List of Invasive Alien Species
Stage 2: High priority for PRA

Ambrosia confertiflora
Andropogon virginicus
Cardiospermum grandiflorum
Cinnamomum camphora
Cortaderia jubata
Ehrharta calycina
Gymnocoronis spilanthoides
Hakea sericea
Humulus scandens
Hygrophila polysperma
Lespedeza cuneata
Lygodium japonicum
Pistia stratiotes
Prosopis juliflora
Salvinia molesta
Triadica sebiferum

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RESEARCH ARTICLE

NeoBiota

The prioritisation of a short list of alien plants for risk analysis within the framework of the Regulation (EU) No. 1143/2014

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Expert working groups

- The 16 species were risk analysed in pairs,
- Eight, five day expert working groups (EWG) were conducted,
- In total 26 experts (excluding members of the Panel on IAP) attended EWGs,

Pest Risk Analysis

- The PRA scheme used in the project was specifically amended from the EPPO Decision-Support Scheme for an Express Pest Risk Analysis document PM 5/5(1) to incorporate the minimum requirements for risk assessment when considering invasive alien plant species under the EU Regulation 1143/2014.

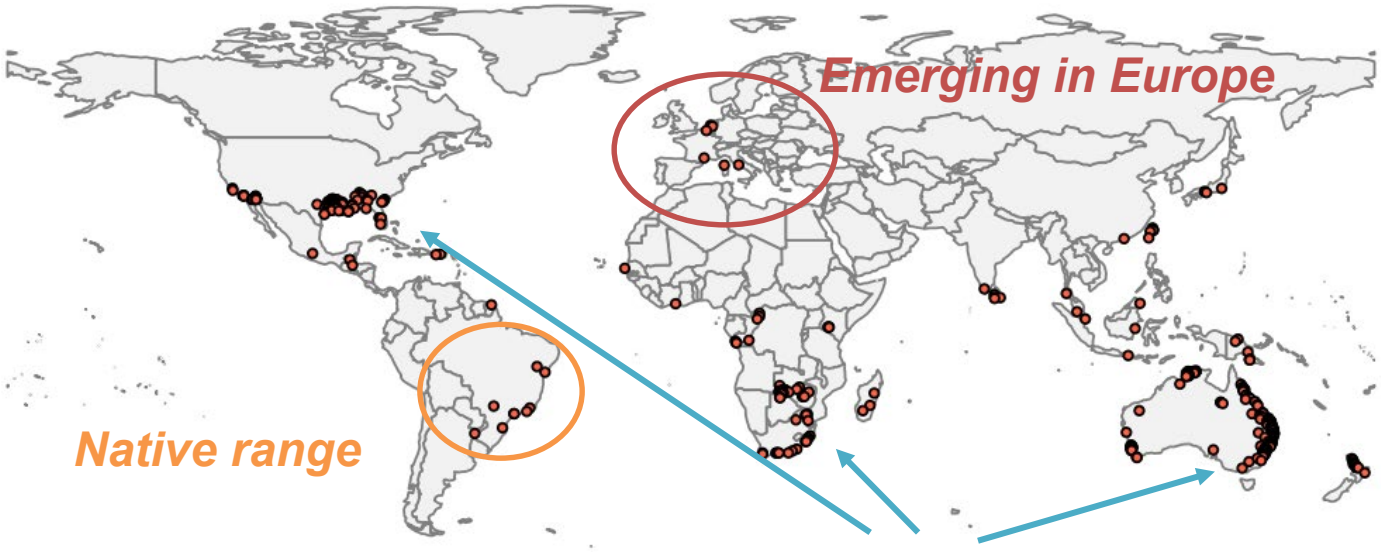
For example:

- Impacts have been divided to reflect the need to score biodiversity, Ecosystem Services and economic impacts separately.

- The user to consider if a new risk and uncertainty score is needed in relation to pathways, establishment, spread and impact considering climate change.

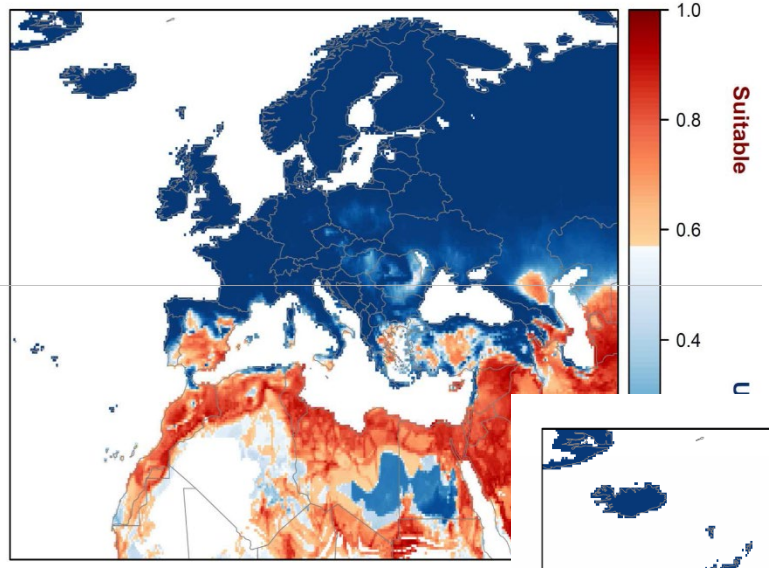
Species distribution modelling

- **Modelling carried out by UK CEH,**
- **Distribution data collected from multiple sources,**
- **Input from EWG critical:**
  - **Best quality (cleaned) distribution data**
  - **Biological knowledge of important climatic drivers and tolerances**
  - **Careful assessment and interpretation of model outputs**

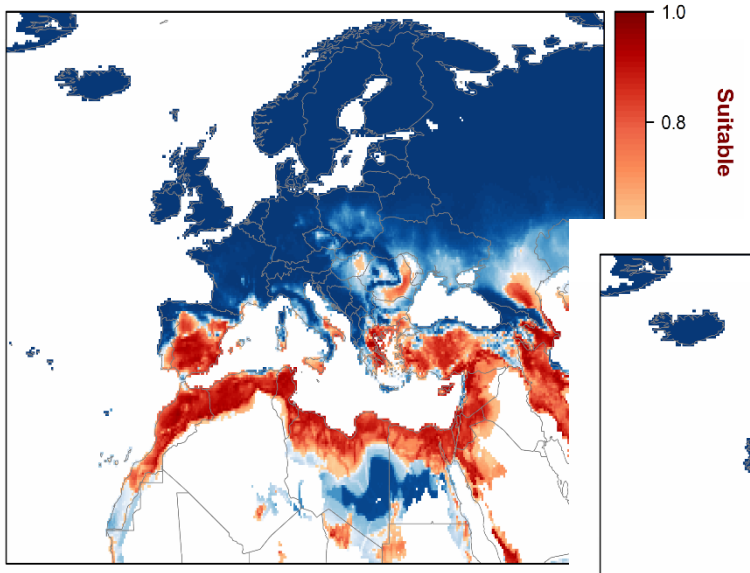


Occurrence data used for modelling *Salvinia molesta*

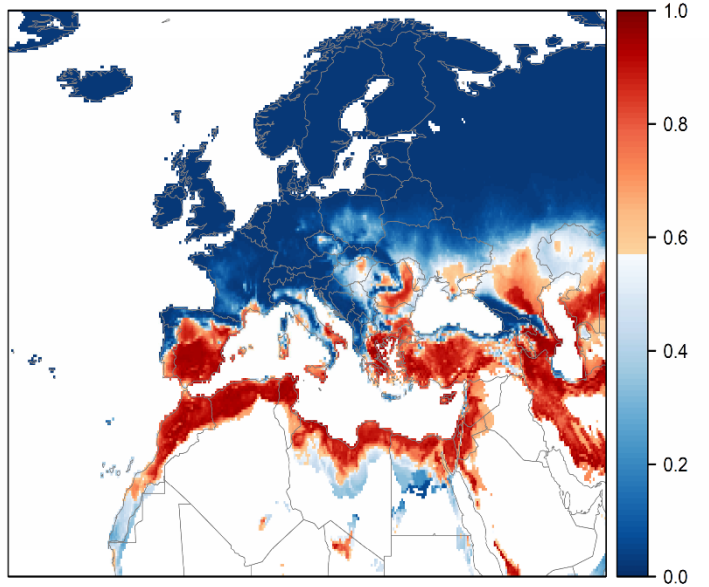
Projected suitability for *Ambrosia confertiflora*



Current



RCP4.5



RCP8.5

Pathways for entry

	Pathways										
Species	Plants for planting	Contaminant of plants for planting	Contaminant of growing medium	Contaminant of wood material	Contaminant of hay material	Contaminant of livestock	Contaminant of animal feed mixture	Hitch-hiker on machinery and equipment	Hitch-hiker on travellers, their clothes and shoes	Hitch-hiking on leisure equipment	Hay and straw imports
Ambrosia confertiflora						*	*	*	*		
Andropogon virginicus	**				**			*	*		
Cardiospermum grandiflorum	**										
Cinnamomum camphora	**										
Cortaderia jubata	*										
Ehrharta calycina	*				*						
Gymnocoronis spilanthoides	***							*		*	
Hakea sericea	*										
Humulus scandens	**										
Hygrophila polysperma	***										
Lespedeza cuneata	*										*
Lygodium japonicum	**		***	*				*	*		
Pistia stratiotes	***	*									
Prosopis juliflora	*										
Salvinia molesta	***	*								*	
Triadica sebifera	***										

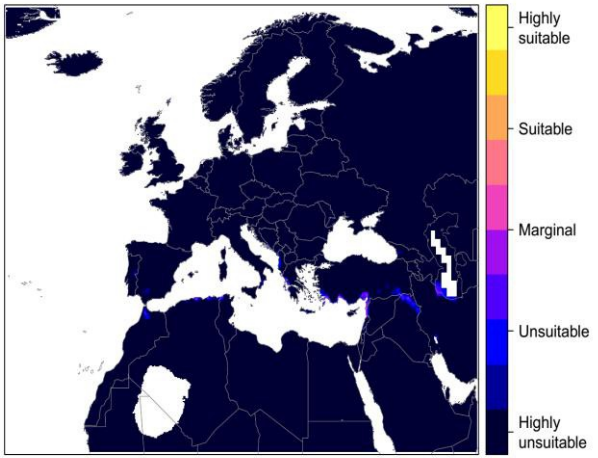
Low likelihood of entry	*
Moderate likelihood of entry	**
High likelihood of entry	***

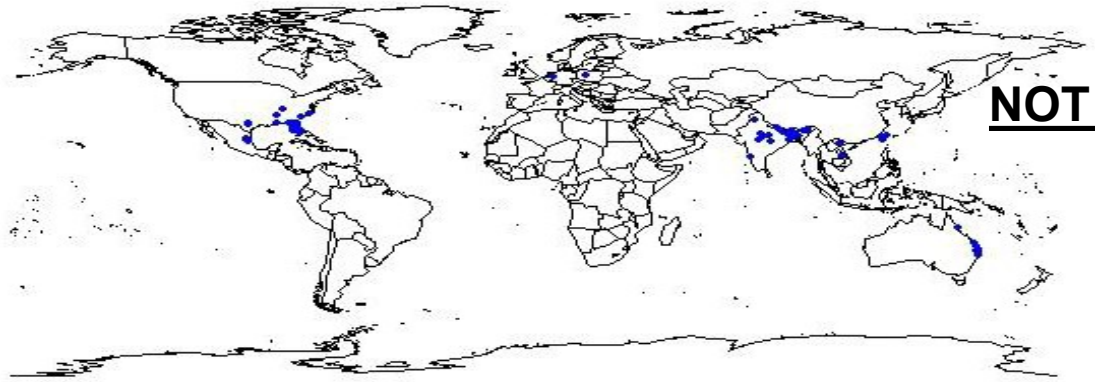
Output of the PRAs

			Potential Impact PRA area			Overall risk	
Species	**Establishment**	**Spread**	**Biodiversity**	**Ecosystem-services**	**Socio-economic**	**Score**	**Uncert.**
Ambrosia confertiflora	High	High	High	High	High	High	High
Andropogon virginicus	High	High	Mod	Mod	Mod	High	Mod
Cardiospermum grandiflorum	Mod	Mod	Mod	Mod	Mod	Mod	Mod
Cinnamomum camphora	Low	Low	Low	Low	Low	Low	Mod
Cortaderia jubata	High	High	Mod	Mod	Mod	Mod	Mod
Ehrharta calycina	High	Mod	High	High	Low	Mod	Mod
Gymnocoronis spilanthoides	High	Mod	High	Mod	Mod	High	High
Hakea sericea	High	High	High	High	Mod	High	Low
Humulus scandens	High	High	High	Mod	Mod	High	Low
Hygrophila polysperma	Low	High	Low	Low	Low	Low	Mod
Lespedeza cuneata	High	High	Mod	Mod	Mod	Mod	Mod
Lygodium japonicum	Low	High	High	Mod	Low	Mod	High
Pistia stratiotes	High	Mod	High	High	High	High	Mod
Prosopis juliflora	Mod	High	High	High	High	Mod	Mod
Salvinia molesta	High	Mod	High	High	High	High	Mod
Triadica sebifera	Mod	High	High	High	Low	High	High

Hygrophila polysperma (Roxb.) T. Anderson

- Native: Asia
- Introduced: North America (Florida), Australia
- EPPO: Austria, Germany, Poland, Hungary (thermally heated waters, introduced)
- Pathways: Plants for planting
- Impacts: Outcompete native spp.





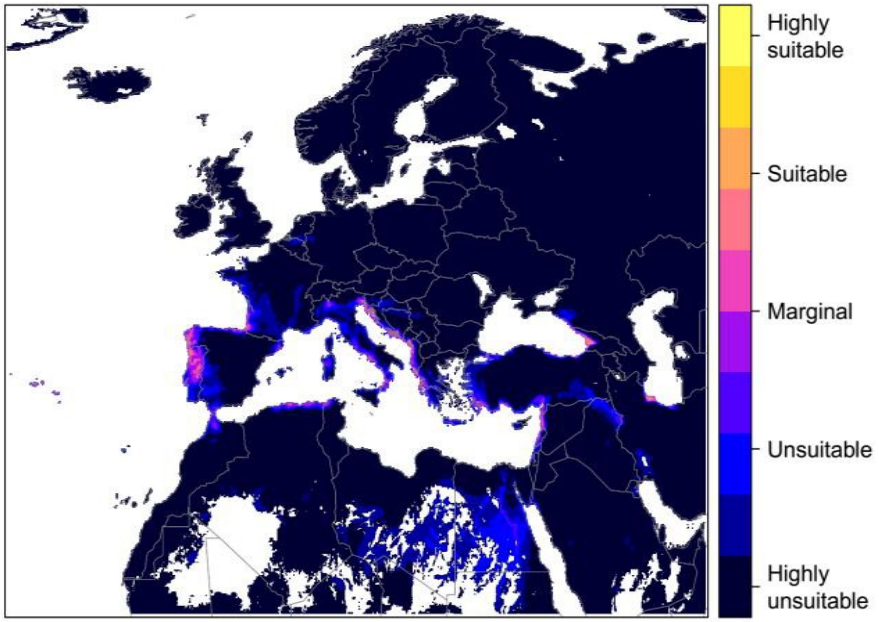
NOT recommended for regulation

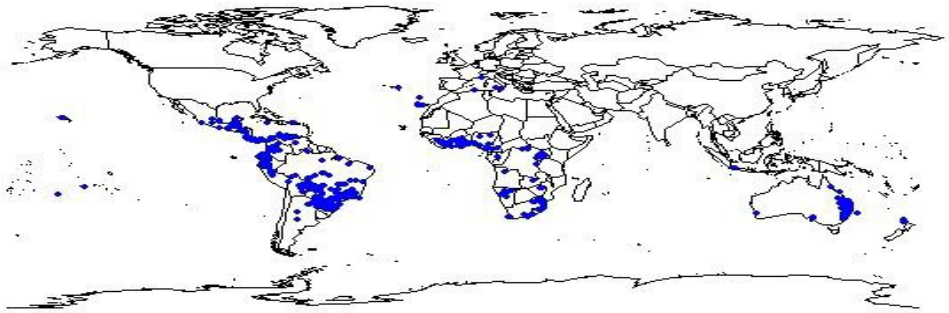
Phytosanitary risk: Low

Uncertainty: Moderate

Cinnamomum camphora L. J. Presl.

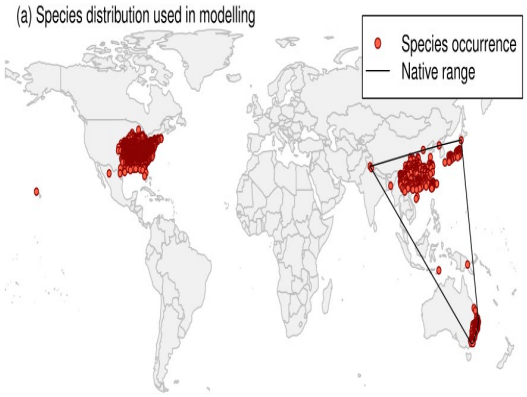
- Native: Asia
- Introduced: Africa, S. America
- EPPO: France, (Netherlands, Italy and Germany as a planted species in botanical gardens)
- Pathways: plants for planting
- Impacts: Ecosystem transformer.

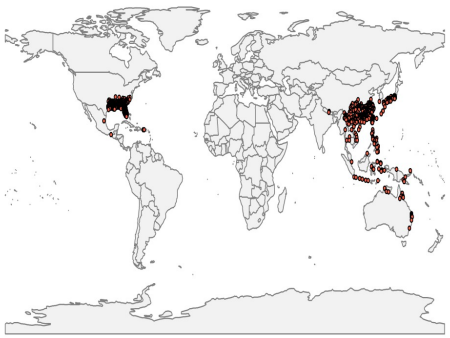


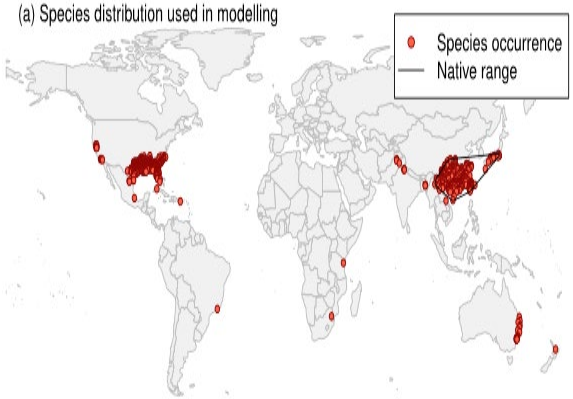


Output of the PRAs

			Potential Impact PRA area			**Overall risk**	
Species	Establishment	Spread	Biodiversity	Ecosystem-services	Socio-economic	Score	Uncert.
Lespedeza cuneata	High	High	Mod	Mod	Mod	Mod	Mod
Lygodium japonicum	Low	High	High	Mod	Low	Mod	High
Triadica sebifera	Mod	High	High	High	Low	High	High







Impacts on ecosystem services

Provisioning services - Fresh water, Genetic resources, Food and Commodity production,

Regulating services - Soil formation, Pollination, Water regulation, Air quality

Cultural services - Aesthetic experiences, Cultural heritage, Tourism, Recreation

Supporting services, Nutrient cycling, Primary production, Habitat stability

Plant species listed as species of Union [European] concern

Acacia saligna	***Hydrocotyle ranunculoides***
Ailanthus altissima	*Impatiens glandulifera*
Alternanthera philoxeroides	*Lagarosiphon major*
Andropogon virginicus	***Lespedeza cuneata***
Asclepias syriaca	***Ludwigia grandiflora***
Baccharis halimifolia	***Ludwigia peploides***
Cabomba caroliniana	***Lygodium japonicum***
Cardiospermum grandiflorum	***Lysichiton americanus***
Cortaderia jubata	***Microstegium vimineum***
Ehrharta calycina	*Myriophyllum aquaticum*
Eichhornia crassipes	***Myriophyllum heterophyllum***
Elodea nuttallii	***Parthenium hysterophorus***
Gunnera tinctoria	*Pennisetum setaceum*
Gymnocoronis spilanthoides	***Persicaria perfoliata***
Heracleum mantegazzianum	***Prosopis juliflora***
Heracleum persicum	***Pueraria lobata***
Heracleum sosnowskyi	***Salvinia molesta***
Humulus scandens	***Triadica sebifera***

Thanks for listening

Acknowledgements to:

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