

Information on measures and related costs in relation to species considered for inclusion on the Union list: *Ambrosia confertiflora*

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*Van Valkenburg, J.L.C.H 2018. Information on measures and related costs in relation to species considered for inclusion on the Union list: *Ambrosia confertiflora*. Technical note prepared by IUCN for the European Commission.*

Date of completion: 24/10/2018

Comments which could support improvement of this document are welcome. Please send your comments by e-mail to ENV-IAS@ec.europa.eu.

Species (scientific name)	<i>Ambrosia confertiflora</i> DC.
Species (common name)	Burr ragweed
Author(s)	J.L.C.H. van Valkenburg, National Plant Protection Organization, Netherlands
Date Completed	24/10/2018
Reviewer	Jean-Marc Dufour-Dror

Summary

Highlight of measures that provide the most cost-effective options to prevent the introduction, achieve early detection, rapidly eradicate and manage the species, including significant gaps in information or knowledge to identify cost-effective measures.

Ambrosia confertiflora is a perennial herb native to northern Mexico and to the southwestern United States. It has been introduced in Australia and Israel, where it invades both natural and disturbed habitats including degraded pastures, orchards, summer field crops, riverbanks, wadi’s, dry valleys, roadsides and wasteland. At present there are no reports for any EU member state.

Prevention

Presently *A. confertiflora* does not occur in the European Union, and there definitive information on how the species was introduced in Israel, which is the geographically nearest potential source for infestation for the EU. In addition, to date the species has not been intercepted along any of the most feasible pathways for entry into the European Union, i.e. as a contaminant of animal feed mixtures, machinery and equipment, and travellers.

Early detection

Early detection of established populations will require diligent scouting by natural resource professionals, supported by citizen scientists. However, training is needed to identify *A. confertiflora*, but experienced individuals can readily detect new populations. Smartphone and tablet applications can be effective for citizen science reporting of new *A. confertiflora*, but people would need to be aware of the species and educated on identification, and natural resource professionals, botanists, or ecologists would need to confirm identification.

Rapid eradication

A. confertiflora is not effectively controlled by cultural practices. Cultural practices can make the infestation worse by spreading pieces of the perennial root and stimulating development of root buds. Uprooting may only be effective against very young plants (less than 10 cm tall) otherwise it is likely that the root remains in the soil and the plant regenerates. Available (limited) information regarding efficacy of broad spectrum herbicide application are contradictory, but unpublished work on the use of Imazapyr and Aminopyralid appear to be promising.

Management

As large infestations of *A. confertiflora* defy mechanical control, the only option is for an integrated approach using public awareness programmes in combination with strict containment measures of infested areas and application of herbicides.

As there are no occurrences of *A. confertiflora* in the European Union, in the natural environment, implementation costs for Member States would be relatively low. The cost of inaction could significantly increase potential costs in the future as any management programme would have to take place on a larger scale and this would reduce the cost-effectiveness of any measures.

Prevention of intentional introductions and spread – measures for preventing the species being introduced intentionally. **This table is repeated for each of the prevention measures identified.**

<p>Measure description Provide a description of the measure, and identify its objective</p>	<p>The species is not known to be introduced intentionally therefore no measures are recommended.</p>
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<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed?</p> <p>Please select one of the categories of effectiveness (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p>Effectiveness of measures</p>	<p><i>Effective</i></p>	<p><i>Neutral</i></p>	<p><i>Ineffective</i></p>	
<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p> <p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p>Environmental effects</p>	<p><i>Positive</i></p>	<p><i>Neutral or mixed</i></p>	<p><i>Negative</i></p>	
	<p>Social effects</p>	<p><i>Positive</i></p>	<p><i>Neutral or mixed</i></p>	<p><i>Negative</i></p>	
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<p>Additional cost information¹ When not already included above, or in the species Risk Assessment.</p> <ul style="list-style-type: none"> - the cost of inaction - the cost-effectiveness - the socio-economic aspects 	<p><i>Rationale:</i></p>				

Include quantitative &/or qualitative data, and case studies (incl. from countries outside the EU).								
Level of confidence on the information provided ² Please select one of the confidence categories along with a statement to support the category chosen. See <i>Notes</i> section at the bottom of this document. NOTE – this is not related to the effectiveness of the measure	<i>Inconclusive</i>		<i>Unresolved</i>		<i>Established but incomplete</i>		<i>Well established</i>	
<i>Rationale:</i>								

Prevention of <u>un-intentional</u> introductions and spread – measures for preventing the species being introduced un-intentionally (cf. Article 13 of the IAS Regulation). This table is repeated for each of the prevention measures identified.	
Measure description Provide a description of the measure, and identify its objective	Inspection of contaminated animal feed. The introduction of invasive alien plants as contaminants of animal feed for caged or wild birds is relatively common (Vitalos & Karrer, 2008), especially when invader seed closely resembles species intended for bird seed mixes. So far the species has not been detected on the pathway, and while the seeds are small (3-4 mm in diameter) considering their physical appearance should be easily detectable. The species seeds can survive for over 12 months, making it likely that they will survive transport and there is significant potential for large volumes of animal feed entering the region (EPPO, 2018). Measures already exist to address this pathway. As of January 1 st 2012 <i>Ambrosia</i> spp. have been added to the list of harmful botanical impurities that are included in Directive 2002/32/EC ¹ of the European Parliament and of the Council on undesirable substances in animal feed. Feed material and compound feed containing unground grains and seeds can contain up to a maximum of 50 mg of seeds of <i>Ambrosia</i> spp. per kg (relative to a feed with a moisture content of 12%). Exceptions apply to millet (grains of <i>Panicum miliaceum</i>) and sorghum (grains of <i>Sorghum bicolor</i>) that are not directly fed to animals and which may contain a maximum of 200 mg of seeds of <i>Ambrosia</i> spp. per kg (relative to a feed with a moisture content of 12 %). Commission Regulation (EU) 2015/186 ² amending Annex I to Directive 2002/32/EC provides a footnote addressing seeds intended for milling or crushing that contain high levels of <i>Ambrosia</i> , it states “in case unequivocal evidence is provided that the grains and seeds are intended for milling or crushing, there is no need to perform a cleaning of the grains and seeds containing con-compliant levels of seeds of <i>Ambrosia</i> spp. before milling or crushing on the condition that:

¹ Directive 2002/32/EC <https://eur-lex.europa.eu/eli/dir/2002/32/oj>

² Commission Regulation (EU) 2015/186² amending Annex I to Directive 2002/32/EC <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32015R0186>

	<p>– the consignment is transported as a whole to the milling or crushing plant, and – the milling or crushing plant is informed in advance of the presence of high level of <i>Ambrosia</i> spp. seeds in order take additional prevention measures to avoid dissemination into the environment, and</p> <p>– solid evidence is provided that prevention measures are taken to avoid dissemination of <i>Ambrosia</i> spp. seeds into the environment during transport to the crushing or milling plant, and</p> <p>–the competent authority agrees to the transport, after having ensured that the abovementioned conditions are fulfilled.</p> <p>In case these conditions are not fulfilled, the consignment must be cleaned before any transport into the EU and the screenings must be appropriately destroyed.”</p>																					
<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>	<p>EU wide as a regulation on <i>Ambrosia</i> spp. as contaminants in animal feed is already in place.</p>																					
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<p>Effort required e.g. period of time over which measure need to be applied to have results</p>	<p>The measure would need to be put in place permanently.</p>																					
<p>Resources required¹ e.g. cost, staff, equipment etc.</p>	<p>Any resources required should already be in place in all EU Member States to implement Directive 2002/32/EC.</p>																					
<p>Side effects (incl. potential) – both positive and negative</p>	<table border="1" data-bbox="645 1303 1888 1401"> <tr> <td><i>Environmental effects</i></td> <td><i>Positive</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> <tr> <td><i>Social effects</i></td> <td><i>Positive</i></td> <td><input type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> <tr> <td><i>Economic effects</i></td> <td><i>Positive</i></td> <td><input type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> </table>	<i>Environmental effects</i>	<i>Positive</i>	<input checked="" type="checkbox"/>	<i>Neutral or mixed</i>	<input type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>	<i>Social effects</i>	<i>Positive</i>	<input type="checkbox"/>	<i>Neutral or mixed</i>	<input checked="" type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>	<i>Economic effects</i>	<i>Positive</i>	<input type="checkbox"/>	<i>Neutral or mixed</i>	<input checked="" type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>
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<p>i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p> <p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p><i>Rationale:</i> It is unlikely there will be any social side effects resulting from the control of bird feed mixtures. Some extra costs are involved in monitoring the quality of bird feed mixtures. However, this measure is already operational in the EU.</p>															
<p>Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.</p> <p>Please select one of the categories of acceptability (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="645 491 1888 552"> <tr> <td data-bbox="645 491 925 552">Acceptability to stakeholders</td> <td data-bbox="925 491 1151 552"><i>Acceptable</i></td> <td data-bbox="1151 491 1211 552" style="text-align: center;">X</td> <td data-bbox="1211 491 1509 552"><i>Neutral or mixed</i></td> <td data-bbox="1509 491 1570 552"></td> <td data-bbox="1570 491 1832 552"><i>Unacceptable</i></td> <td data-bbox="1832 491 1888 552"></td> </tr> </table> <p><i>Rationale:</i> As of January 1st 2012 <i>Ambrosia</i> spp. are included in Directive 2002/32/EC of the European Parliament and of the Council on undesirable substances in animal feed.</p>								Acceptability to stakeholders	<i>Acceptable</i>	X	<i>Neutral or mixed</i>		<i>Unacceptable</i>		
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<p>Level of confidence on the information provided ²</p> <p>Please select one of the confidence categories along with a statement to support the category chosen. See</p>	<table border="1" data-bbox="645 1185 1924 1246"> <tr> <td data-bbox="645 1185 913 1246"><i>Inconclusive</i></td> <td data-bbox="913 1185 965 1246"></td> <td data-bbox="965 1185 1171 1246"><i>Unresolved</i></td> <td data-bbox="1171 1185 1227 1246"></td> <td data-bbox="1227 1185 1509 1246"><i>Established but incomplete</i></td> <td data-bbox="1509 1185 1570 1246" style="text-align: center;">X</td> <td data-bbox="1570 1185 1868 1246"><i>Well established</i></td> <td data-bbox="1868 1185 1924 1246"></td> </tr> </table> <p><i>Rationale:</i> The Directive has been in place since 2002, however there is little information on its implementation and effectiveness in relation to preventing <i>Ambrosia</i> introductions.</p>								<i>Inconclusive</i>		<i>Unresolved</i>		<i>Established but incomplete</i>	X	<i>Well established</i>	
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Prevention of un-intentional introductions and spread – measures for preventing the species being introduced un-intentionally (cf. Article 13 of the IAS Regulation). This table is repeated for each of the prevention measures identified.					
Measure description Provide a description of the measure, and identify its objective	Thorough inspection of tourists entering the EU from areas where <i>A. confertiflora</i> occurs. The potential pathway ‘tourists’ was identified in the EPPO PRA (EPPO, 2018), however measures to address this risk are not feasible. The species has not been intercepted on this pathway and considering the sheer volume of passengers from countries where <i>A. confertiflora</i> is present, this measure is considered disproportionate and not further detailed.				
Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km ² or ha) if possible.					
Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed? Please select one of the categories of effectiveness (with an ‘X’), and provide a rationale, with supporting evidence and examples if possible.	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;"><i>Effectiveness of measures</i></td> <td style="width: 33%;"><i>Effective</i></td> <td style="width: 33%;"><i>Neutral</i></td> <td style="width: 33%;"><i>Ineffective</i></td> </tr> </table> <i>Rationale:</i>	<i>Effectiveness of measures</i>	<i>Effective</i>	<i>Neutral</i>	<i>Ineffective</i>
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Effort required e.g. period of time over which measure need to be applied to have results					
Resources required ¹ e.g. cost, staff, equipment etc.					

<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p> <p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p><i>Environmental effects</i></p>	<p><i>Positive</i></p>	<p><i>Neutral or mixed</i></p>	<p><i>Negative</i></p>
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Prevention of un-intentional introductions and spread – measures for preventing the species being introduced un-intentionally (cf. Article 13 of the IAS Regulation). **This table is repeated for each of the prevention measures identified.**

<p>Measure description Provide a description of the measure, and identify its objective</p>	<p>Inspection and cleaning of used machinery and equipment.</p> <p>Although <i>Ambrosia confertiflora</i> has never been intercepted on this pathway it is suspected to be the source of the infestation in Israel, and also its secondary spread. According to EPPO (2017) the small seeds of <i>A. confertiflora</i> are likely to be transported by mud on machinery.</p> <p>It is only recently, that an ISPM Standard, no. 41 (IPPC, 2017) has been drafted and adopted on ‘International movement of used vehicles, machinery and equipment’. This focuses on reducing the risks of transporting contaminants (soil, seeds, plant debris, pests) associated with the international movement (either traded or for operational relocation) of vehicles, machinery and equipment (VME) that may have been used in agriculture, forestry, as well as for construction, industrial purposes, mining and waste management, and military.</p> <p>For those VMEs that represent a contaminant risk the phytosanitary measures recommended are detailed in the ISPM, and cover cleaning, prevention and disposal requirements. These include cleaning using pressure washing or compressed air cleaning, chemical or temperature treatments, storing and handling VMEs that prevent contact with soil, keeping vegetation short around storage areas of ports.</p>						
<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>	<p>The measure would need to be applied across the EU, as once VME have been imported into the EU they could be moved to high risk areas.</p>						
<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed?</p> <p>Please select one of the categories of effectiveness (with an ‘X’), and provide a rationale, with supporting evidence and examples if possible.</p>	<p>Effectiveness of measures</p>	<p>Effective</p>		<p>Neutral</p>	<p>X</p>	<p>Ineffective</p>	
<p>Rationale:</p> <p>It is difficult to assess whether VMEs present a risk, and therefore when to apply the relevant phytosanitary measure (IPPC, 2017). The ISPM provides a number of elements to consider when assessing risk; distance of movement (shorter distances are a lower risk), complexity of VME structure (more complex are a higher risk), origin and prior use (VME in close proximity to vegetation a higher risk), storage (VME stored outside near vegetation are a higher risk), intended location or use (VME for use in agriculture, forestry, or close proximity to vegetation are a higher risk).</p> <p>In addition the inspection, cleaning and treatment will normally take place in the exporting country to meet import requirements, however there are no EU regulations on phytosanitary requirements for imports of VMEs. Therefore, for the measure to be</p>							

	effective either regulations need to be developed to regulate VME imports, or inspections and phytosanitary measures would need to be applied at EU ports and also at EU/non-EU border facilities.																					
Effort required e.g. period of time over which measure need to be applied to have results	The measure would need to be in place permanently.																					
Resources required ¹ e.g. cost, staff, equipment etc.	Facilities required for the inspection, cleaning, and treatment of VME may include: surfaces that prevent contact with soil, including soil traps and wastewater management systems - temperature treatment facilities - fumigation or chemical treatment facilities (IPPC, 2017). In addition trained staff are needed to undertake the inspections and phytosanitary measures, and suitable disposal facilities especially if implemented within the EU.																					
Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc. For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.	<table border="1"> <tr> <td>Environmental effects</td> <td><i>Positive</i></td> <td></td> <td><i>Neutral or mixed</i></td> <td>X</td> <td><i>Negative</i></td> <td></td> </tr> <tr> <td>Social effects</td> <td><i>Positive</i></td> <td></td> <td><i>Neutral or mixed</i></td> <td>X</td> <td><i>Negative</i></td> <td></td> </tr> <tr> <td>Economic effects</td> <td><i>Positive</i></td> <td></td> <td><i>Neutral or mixed</i></td> <td></td> <td><i>Negative</i></td> <td>X</td> </tr> </table> <p><i>Rationale:</i> There would likely be unintentional economic impacts to operators involved in moving VME into the EU, but there are no positive or negative social side effects expected with this measure. These measures would however, cover a broad variety of potential invasive alien species not just <i>A. confertiflora</i>. Also if suitable disposal facilities are not installed there is a risk of environmental impacts, e.g. to freshwater systems, in the local area from cleaning and treatment processes.</p>	Environmental effects	<i>Positive</i>		<i>Neutral or mixed</i>	X	<i>Negative</i>		Social effects	<i>Positive</i>		<i>Neutral or mixed</i>	X	<i>Negative</i>		Economic effects	<i>Positive</i>		<i>Neutral or mixed</i>		<i>Negative</i>	X
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<p><i>Rationale:</i> No detailed information available.</p>								

Prevention of un-intentional introductions and spread – measures for preventing the species being introduced un-intentionally (cf. Article 13 of the IAS Regulation). **This table is repeated for each of the prevention measures identified.**

<p>Measure description Provide a description of the measure, and identify its objective</p>	<p>Inspection of livestock from infested areas A contaminant of livestock is identified as a potential pathway in the EPPO PRA as living sheep are shipped to Israel from Australia, no such trade could be documented between Australia or Israel and the EU. Therefore this prevention measure is further ignored.</p>						
<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>							
<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed? Please select one of the categories of effectiveness (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p><i>Effectiveness of measures</i></p>	<p><i>Effective</i></p>		<p><i>Neutral</i></p>		<p><i>Ineffective</i></p>	
	<p><i>Rationale:</i></p>						
<p>Effort required e.g. period of time over which measure need to be applied to have results</p>							
<p>Resources required¹ e.g. cost, staff, equipment etc.</p>							
<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p>	<p><i>Environmental effects</i></p>	<p><i>Positive</i></p>		<p><i>Neutral or mixed</i></p>		<p><i>Negative</i></p>	
	<p><i>Social effects</i></p>	<p><i>Positive</i></p>		<p><i>Neutral or mixed</i></p>		<p><i>Negative</i></p>	
	<p><i>Economic effects</i></p>	<p><i>Positive</i></p>		<p><i>Neutral or mixed</i></p>		<p><i>Negative</i></p>	
	<p><i>Rationale:</i></p>						

<p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>										
<p>Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.</p> <p>Please select one of the categories of acceptability (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p>Acceptability to stakeholders</p>	<p><i>Acceptable</i></p>		<p><i>Neutral or mixed</i></p>		<p><i>Unacceptable</i></p>		<p><i>Rationale:</i></p>		
<p>Additional cost information ¹ When not already included above, or in the species Risk Assessment.</p> <ul style="list-style-type: none"> - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects <p>Include quantitative &/or qualitative data, and case studies (incl. from countries outside the EU).</p>										
<p>Level of confidence on the information provided ²</p> <p>Please select one of the confidence categories along with a statement to support the category chosen. See <i>Notes</i> section at the bottom of this document.</p> <p>NOTE – this is not related to the effectiveness of the measure</p>	<p><i>Inconclusive</i></p>		<p><i>Unresolved</i></p>		<p><i>Established but incomplete</i></p>		<p><i>Well established</i></p>		<p><i>Rationale:</i></p>	

Prevention of secondary spread of the species – measures for preventing the species spreading once they have been introduced (cf. Article 13 of the IAS Regulation). This table is repeated for each of the prevention measures identified.

<p>Measure description Provide a description of the measure, and identify its objective</p>	<p>Inspection and cleaning of used machinery and equipment. The objective is to prevent secondary spread from infested areas. So far the species is not yet present in the EU. However, overland transport of contaminated machinery is suspected as the source of secondary spread in Israel. While there are well-developed Best Management Practices that putatively prevent the spread of invader propagules (e.g., “Equipment Cleaning to Minimize the Introduction and Spread of Invasive Species: Heavy Equipment used on Land” (Department of Natural Resources, 2018)), a specific cleaning protocol that addresses the characteristics of <i>Ambrosia confertiflora</i> would still be needed.</p>							
<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>	<p>The measure would need to be applied at a local/site scale to prevent spread from infested areas, taking into consideration areas where the machinery have been operating (however, as the species is not yet recorded in the EU it does not yet apply).</p>							
<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed? Please select one of the categories of effectiveness (with an ‘X’), and provide a rationale, with supporting evidence and examples if possible.</p>	<p><i>Effectiveness of measures</i></p>	<p><i>Effective</i></p>	<p>X</p>	<p><i>Neutral</i></p>		<p><i>Ineffective</i></p>		
	<p><i>Rationale:</i> Although little research has quantified the effectiveness of equipment cleaning procedures for preventing the spread of invasive species, it is believed they can be effective if correctly and consistently applied. The key to effective equipment cleaning to prevent the spread of any species is diligent cleaning by trained individuals of equipment used in invaded areas.</p>							
<p>Effort required e.g. period of time over which measure need to be applied to have results</p>	<p>All equipment coming from invaded areas should be inspected and cleaned before leaving the infested area. The measure would need to be implemented until populations of the invasive species have been confirmed to be eradicated.</p>							
<p>Resources required¹ e.g. cost, staff, equipment etc.</p>	<p>Pressure washing equipment in a quarantined area, staff to conduct inspections and cleanings, and preferably equipment and facilities for collecting material to test if the practice is preventing the introduction of seed. Collected material would need to be placed in a glasshouse under ideal growing conditions to germinate seed and identify and count species. Such data could be very useful for determining if the measure is cost-effective.</p>							

<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p> <p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="645 188 1888 292"> <tr> <td><i>Environmental effects</i></td> <td><i>Positive</i></td> <td></td> <td><i>Neutral or mixed</i></td> <td>X</td> <td><i>Negative</i></td> <td></td> </tr> <tr> <td><i>Social effects</i></td> <td><i>Positive</i></td> <td></td> <td><i>Neutral or mixed</i></td> <td>X</td> <td><i>Negative</i></td> <td></td> </tr> <tr> <td><i>Economic effects</i></td> <td><i>Positive</i></td> <td></td> <td><i>Neutral or mixed</i></td> <td>X</td> <td><i>Negative</i></td> <td></td> </tr> </table> <p><i>Rationale:</i> Equipment cleaning sites should be located where runoff would not enter streams or other waterways because washing water could contain pollutants such as engine or hydraulic oil. Ideally, water would remain on site or would be directed into wastewater treatment facilities. These measures would however, cover a broad variety of potential invasive alien species not just <i>A. confertiflora</i>.</p>	<i>Environmental effects</i>	<i>Positive</i>		<i>Neutral or mixed</i>	X	<i>Negative</i>		<i>Social effects</i>	<i>Positive</i>		<i>Neutral or mixed</i>	X	<i>Negative</i>		<i>Economic effects</i>	<i>Positive</i>		<i>Neutral or mixed</i>	X	<i>Negative</i>	
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<p>Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.</p> <p>Please select one of the categories of acceptability (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="645 595 1888 659"> <tr> <td><i>Acceptability to stakeholders</i></td> <td><i>Acceptable</i></td> <td></td> <td><i>Neutral or mixed</i></td> <td>X</td> <td><i>Unacceptable</i></td> <td></td> </tr> </table> <p><i>Rationale:</i> The cost of cleaning equipment could be substantial for some operators, but might be highly effective. Stakeholders may be reluctant to implementing such measures depending on the associated costs and location of cleaning facilities, which might introduce transportation costs. Costs should not be prohibitive, although disposal of wash water may require construction of specialized facilities so water can be transported to wastewater treatment facilities or treated onsite.</p>	<i>Acceptability to stakeholders</i>	<i>Acceptable</i>		<i>Neutral or mixed</i>	X	<i>Unacceptable</i>															
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<p>Level of confidence on the information provided ²</p>	<table border="1" data-bbox="645 1297 1924 1361"> <tr> <td><i>Inconclusive</i></td> <td></td> <td><i>Unresolved</i></td> <td>X</td> <td><i>Established but incomplete</i></td> <td></td> <td><i>Well established</i></td> <td></td> </tr> </table> <p><i>Rationale:</i></p>	<i>Inconclusive</i>		<i>Unresolved</i>	X	<i>Established but incomplete</i>		<i>Well established</i>														
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<p>Please select one of the confidence categories along with a statement to support the category chosen. See <i>Notes</i> section at the bottom of this document.</p> <p>NOTE – this is not related to the effectiveness of the measure</p>	<p>Very little specific data is available on how much seed and how far seed is transported by equipment, so the effectiveness of this measure for prevention is difficult to quantify.</p>
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Prevention of <u>secondary spread</u> of the species – measures for preventing the species spreading once they have been introduced (cf. Article 13 of the IAS Regulation). This table is repeated for each of the prevention measures identified.	
<p>Measure description Provide a description of the measure, and identify its objective</p>	<p>Inspection and cleaning of outdoor recreation equipment, including hiking shoes and mountain bikes, and horse hooves etc. Although the measure is not documented specifically to address <i>A. confertiflora</i>, the pathway has been documented for the species (EPPO, 2018). Observations on another grass species of EU concern can be taken as a proxy.</p> <p>The transport of <i>Microstegium vimineum</i> seed by recreational activities has not been well researched but recent surveys demonstrate that populations in South Carolina, USA are associated with trail heads and near trails in forests used by hikers, bikers, and horseback riders. More generally, it is well-known that recreation and travel can result in movement of viable plant seeds, including invasive species (Flory, 2017).</p> <p>Cleaning recreation equipment can be as simple as installation of boot brush stations at trail heads or more involved by installing bike washing stations (which would need monitoring so they don't facilitate establishment of invasive plants) or facilities for cleaning hooves of horses near camp sites or at trail heads. Such measures would benefit from local awareness campaigns to increase public participation in required measures.</p>
<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>	<p>Local scale to prevent spread from infested areas.</p>

<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed?</p> <p>Please select one of the categories of effectiveness (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="638 150 1883 220"> <tr> <td>Effectiveness of measures</td> <td><i>Effective</i></td> <td><input type="checkbox"/></td> <td><i>Neutral</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Ineffective</i></td> <td><input type="checkbox"/></td> </tr> </table> <p><i>Rationale:</i> The use of boot brush stations are widespread in natural areas subjected to frequent recreation activities but little quantitative information is available on their effectiveness. Anecdotally, natural areas managers indicate that such practices often result in removal of many invasive plant seeds, but little is known about the proportion of seeds removed. That is, are enough seeds removed to prevent the spread of invasions to other areas (Flory, 2017)?</p>	Effectiveness of measures	<i>Effective</i>	<input type="checkbox"/>	<i>Neutral</i>	<input checked="" type="checkbox"/>	<i>Ineffective</i>	<input type="checkbox"/>														
Effectiveness of measures	<i>Effective</i>	<input type="checkbox"/>	<i>Neutral</i>	<input checked="" type="checkbox"/>	<i>Ineffective</i>	<input type="checkbox"/>																
<p>Effort required e.g. period of time over which measure need to be applied to have results</p>	<p>Boot brush stations and facilities to clean bikes and horse hooves would only need to be used for <i>A. confertiflora</i> specifically when recreational users are coming from infested areas (which so far is not the case for the EU).</p>																					
<p>Resources required¹ e.g. cost, staff, equipment etc.</p>	<p>Knowledge of travel patterns would be helpful for determining where and when boot brush cleaning stations, and bike and horse cleaning facilities are needed. Given the absence of <i>A. confertiflora</i> in Member States, such facilities would receive little use specifically for <i>A. confertiflora</i> but would likely prevent the spread of other invasive alien species. Staff would be needed to construct and maintain the facilities, and ideally to collect data on seeds removed by these measures.</p>																					
<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p> <p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="638 751 1883 858"> <tr> <td>Environmental effects</td> <td><i>Positive</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Social effects</td> <td><i>Positive</i></td> <td><input type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Economic effects</td> <td><i>Positive</i></td> <td><input type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> </table> <p><i>Rationale:</i> A positive environmental side effect would be the prevention of spread of other invasive alien plant species that are spread in the same way. Social and economic side effects are not expected.</p>	Environmental effects	<i>Positive</i>	<input checked="" type="checkbox"/>	<i>Neutral or mixed</i>	<input type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>	Social effects	<i>Positive</i>	<input type="checkbox"/>	<i>Neutral or mixed</i>	<input checked="" type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>	Economic effects	<i>Positive</i>	<input type="checkbox"/>	<i>Neutral or mixed</i>	<input checked="" type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>
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<p>Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.</p> <p>Please select one of the categories of acceptability (with an 'X'), and</p>	<table border="1" data-bbox="638 1155 1883 1225"> <tr> <td>Acceptability to stakeholders</td> <td><i>Acceptable</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input type="checkbox"/></td> <td><i>Unacceptable</i></td> <td><input type="checkbox"/></td> </tr> </table> <p><i>Rationale:</i> The public may be resistant or ambivalent about the use of boot brush stations and other cleaning facilities. However, with proper signage, and public awareness campaigns, such facilities alternatively could provide a good opportunity for education about invasive plant species.</p>	Acceptability to stakeholders	<i>Acceptable</i>	<input checked="" type="checkbox"/>	<i>Neutral or mixed</i>	<input type="checkbox"/>	<i>Unacceptable</i>	<input type="checkbox"/>														
Acceptability to stakeholders	<i>Acceptable</i>	<input checked="" type="checkbox"/>	<i>Neutral or mixed</i>	<input type="checkbox"/>	<i>Unacceptable</i>	<input type="checkbox"/>																

provide a rationale, with supporting evidence and examples if possible.									
<p>Additional cost information ¹</p> <p>When not already included above, or in the species Risk Assessment.</p> <ul style="list-style-type: none"> - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects <p>Include quantitative &/or qualitative data, and case studies (incl. from countries outside the EU).</p>	<p>Boot brush stations and facilities to clean bikes and horse hooves are relatively inexpensive.</p>								
<p>Level of confidence on the information provided ²</p> <p>Please select one of the confidence categories along with a statement to support the category chosen. See <i>Notes</i> section at the bottom of this document.</p> <p>NOTE – this is not related to the effectiveness of the measure</p>	<i>Inconclusive</i>		<i>Unresolved</i>	<i>X</i>	<i>Established but incomplete</i>		<i>Well established</i>		
		<p><i>Rationale:</i></p> <p>Few data exist on the effectiveness of boot brush stations and bike and horse cleaning stations for preventing the spread of invasive plants, although it is understood that people and horses often disperse grass species and other invaders with light weight seed that easily adhere to people’s clothes and animals.</p>							

Surveillance measures to support early detection - Measures to run an effective surveillance system for achieving an early detection of a new occurrence (cf. Article 16). This section assumes that the species is not currently present in a Member State, or part of a Member State’s territory. **This table is repeated for each of the early detection measures identified.**

<p>Measure description Provide a description of the measure, and identify its objective</p>	<p>Terrestrial land surveys, ensuring inclusion of high risk areas. Early Detection, followed by Rapid Eradication (EDRE), can detect and eradicate incipient populations of invasive species before they have a chance to become widely established, thus eliminating the need for costly and resource-intensive control programs. If prevention fails, early detection and rapid eradication are the next and most cost-effective line of defence against invasive alien species.</p> <p>Early detection measures for <i>A. confertiflora</i> should be included in a general active surveillance programme concerning a selected group of invasive alien plant species that might be introduced by the same pathways, invade similar habitats and spread along corridors such as roadside verges and rivers, or disturbed land. Citizen science programmes can be used to support such processes, as the species should be relatively easy to identify as there are no native European <i>Ambrosia</i> species.</p> <p>Although not specifically planned for <i>A. confertiflora</i>, Harris et al. (2001) provide guidance and a model for New Zealand on time intervals for active weed and invasive alien plants surveillance and they distinguish active surveillance from fortuitous surveillance.</p>							
<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>	<p>This would need to be applied across the high risk areas as identified by EPPO (2017) in the species risk assessment, which include natural wetlands, natural drylands with non-forest vegetation structures.</p>							
<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed?</p> <p>Please select one of the categories of effectiveness (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="640 879 1888 946"> <tr> <td data-bbox="640 879 927 946"><i>Effectiveness of measures</i></td> <td data-bbox="927 879 1151 946"><i>Effective</i></td> <td data-bbox="1151 879 1211 946">X</td> <td data-bbox="1211 879 1509 946"><i>Neutral</i></td> <td data-bbox="1509 879 1570 946"></td> <td data-bbox="1570 879 1832 946"><i>Ineffective</i></td> <td data-bbox="1832 879 1888 946"></td> </tr> </table> <p><i>Rationale:</i> In the Netherlands there is anecdotic evidence that early detection, followed by rapid eradication has prevented so far the establishment of <i>Bachcharis halimifolia</i> (van Valkenburg et al., 2017). Using citizen science/public participation in detecting invasive species can increase the available "eyes and ears" searching for identified targets. However, data collected through citizen science need to be carefully screened to avoid false-positives.</p>	<i>Effectiveness of measures</i>	<i>Effective</i>	X	<i>Neutral</i>		<i>Ineffective</i>	
<i>Effectiveness of measures</i>	<i>Effective</i>	X	<i>Neutral</i>		<i>Ineffective</i>			
<p>Effort required e.g. period of time over which measure need to be applied to have results</p>	<p>Early detection (ED) of <i>A. confertiflora</i> will require a dedicated effort in the EU. Therefore, ED of <i>A. confertiflora</i> should be included in a general surveillance programmes concerning a selected group of invasive alien plant species that might be introduced by the same pathways, invade similar habitats and spread along corridors such as roadside verges and rivers or disturbed land. The surveillance system would need to be carried out indefinitely.</p>							
<p>Resources required¹ e.g. cost, staff, equipment etc.</p>	<p>The surveillance needs to be undertaken by trained staff, and they could be supported by non-governmental organisations and "citizen science" activities. Additional methods such as remote sensing techniques, will require additional resources (e.g., GIS</p>							

	software and imagery, unmanned aerial vehicles (UAV)) but these are more effective for mapping existing areas of infestation and not for early detection.												
<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p> <p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1"> <tr> <td>Environmental effects</td> <td>Positive</td> <td>X</td> <td>Neutral or mixed</td> <td></td> <td>Negative</td> <td></td> </tr> </table>	Environmental effects	Positive	X	Neutral or mixed		Negative						
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Economic effects	Positive		Neutral or mixed	X	Negative								
	<p><i>Rationale:</i> A potential positive environmental side effect might be the detection of other invasive alien species. No social and economic side effects are expected.</p>												
<p>Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.</p> <p>Please select one of the categories of acceptability (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1"> <tr> <td>Acceptability to stakeholders</td> <td>Acceptable</td> <td>X</td> <td>Neutral or mixed</td> <td></td> <td>Unacceptable</td> <td></td> </tr> </table>	Acceptability to stakeholders	Acceptable	X	Neutral or mixed		Unacceptable						
Acceptability to stakeholders	Acceptable	X	Neutral or mixed		Unacceptable								
	<p><i>Rationale:</i> Such surveillance programmes are likely to be acceptable to most stakeholders.</p>												
<p>Additional cost information¹ When not already included above, or in the species Risk Assessment.</p> <ul style="list-style-type: none"> - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects <p>Include quantitative &/or qualitative data, and case studies (incl. from countries outside the EU).</p>	<p>The cost for aerial and land surveys are reported for Australia, for <i>Cenchrus ciliaris</i>, by Friedel et al. (2006). Some information is available for Hawaii (Tunison, 1992).</p>												

<p>Level of confidence on the information provided ²</p> <p>Please select one of the confidence categories along with a statement to support the category chosen. See <i>Notes</i> section at the bottom of this document.</p> <p>NOTE – this is not related to the effectiveness of the measure</p>	<i>Inconclusive</i>	X	<i>Unresolved</i>		<i>Established but incomplete</i>		<i>Well established</i>	
	<p><i>Rationale:</i> No species specific information available.</p>							

<p>Rapid eradication for new introductions - Measures to achieve eradication <u>at an early stage of invasion</u>, after an early detection of a new occurrence (cf. Article 17). This section assumes that the species is not currently present in a Member State, or part of a Member State's territory. This table is repeated for each of the eradication measures identified.</p>	
<p>Measure description Provide a description of the measure, and identify its objective</p>	<p>Manual & mechanical Plants are uprooted manually or with some mechanical aid and, if flowering, subsequently bagged to avoid any potential spread of seed. However, the manual control of established plants will encourage regeneration from root fragments that remain in the soil.</p>
<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>	<p>Relevant for infestations formed of few dozens of individuals, not more.</p>

<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed?</p> <p>Please select one of the categories of effectiveness (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="640 153 1888 220"> <tr> <td>Effectiveness of measures</td> <td><i>Effective</i></td> <td><input type="checkbox"/></td> <td><i>Neutral</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Ineffective</i></td> <td><input type="checkbox"/></td> </tr> </table> <p><i>Rationale:</i> Uprooting may only be effective against very young plants, uprooting established plants (over 10cm high) is not effective as the root remains in the soil and the plant regenerates (Israel Ministry of Environmental Protection, 2013).</p>	Effectiveness of measures	<i>Effective</i>	<input type="checkbox"/>	<i>Neutral</i>	<input checked="" type="checkbox"/>	<i>Ineffective</i>	<input type="checkbox"/>														
Effectiveness of measures	<i>Effective</i>	<input type="checkbox"/>	<i>Neutral</i>	<input checked="" type="checkbox"/>	<i>Ineffective</i>	<input type="checkbox"/>																
<p>Effort required e.g. period of time over which measure need to be applied to have results</p>	<p>Uprooting all plants at an early infestation followed by monthly control efforts over a 5 year span should be effective.</p>																					
<p>Resources required¹ e.g. cost, staff, equipment etc.</p>	<p>Dedicated staff and volunteers, a spade, gloves, and strong plastic bags.</p>																					
<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p> <p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="640 655 1888 762"> <tr> <td>Environmental effects</td> <td><i>Positive</i></td> <td><input type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Social effects</td> <td><i>Positive</i></td> <td><input type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Economic effects</td> <td><i>Positive</i></td> <td><input type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Negative</i></td> <td><input type="checkbox"/></td> </tr> </table> <p><i>Rationale:</i> Physically removing a small number of plants will result in a relatively limited level of disturbance.</p>	Environmental effects	<i>Positive</i>	<input type="checkbox"/>	<i>Neutral or mixed</i>	<input checked="" type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>	Social effects	<i>Positive</i>	<input type="checkbox"/>	<i>Neutral or mixed</i>	<input checked="" type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>	Economic effects	<i>Positive</i>	<input type="checkbox"/>	<i>Neutral or mixed</i>	<input checked="" type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>
Environmental effects	<i>Positive</i>	<input type="checkbox"/>	<i>Neutral or mixed</i>	<input checked="" type="checkbox"/>	<i>Negative</i>	<input type="checkbox"/>																
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<p>Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.</p> <p>Please select one of the categories of acceptability (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<table border="1" data-bbox="640 1062 1888 1129"> <tr> <td>Acceptability to stakeholders</td> <td><i>Acceptable</i></td> <td><input checked="" type="checkbox"/></td> <td><i>Neutral or mixed</i></td> <td><input type="checkbox"/></td> <td><i>Unacceptable</i></td> <td><input type="checkbox"/></td> </tr> </table> <p><i>Rationale:</i> Physically removing a small number of plants will result in a relatively limited level of disturbance.</p>	Acceptability to stakeholders	<i>Acceptable</i>	<input checked="" type="checkbox"/>	<i>Neutral or mixed</i>	<input type="checkbox"/>	<i>Unacceptable</i>	<input type="checkbox"/>														
Acceptability to stakeholders	<i>Acceptable</i>	<input checked="" type="checkbox"/>	<i>Neutral or mixed</i>	<input type="checkbox"/>	<i>Unacceptable</i>	<input type="checkbox"/>																
<p>Additional cost information¹</p>	<p>No information available.</p>																					

<p>When not already included above, or in the species Risk Assessment.</p> <ul style="list-style-type: none"> - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects <p>Include quantitative &/or qualitative data, and case studies (incl. from countries outside the EU).</p>									
<p>Level of confidence on the information provided²</p> <p>Please select one of the confidence categories along with a statement to support the category chosen. See <i>Notes</i> section at the bottom of this document.</p> <p>NOTE – this is not related to the effectiveness of the measure</p>	<i>Inconclusive</i>	<i>X</i>	<i>Unresolved</i>		<i>Established but incomplete</i>		<i>Well established</i>		
	<p><i>Rationale:</i> No species specific information is available.</p>								

<p>Rapid eradication for new introductions - Measures to achieve eradication <u>at an early stage of invasion</u>, after an early detection of a new occurrence (cf. Article 17). This section assumes that the species is not currently present in a Member State, or part of a Member State's territory. This table is repeated for each of the eradication measures identified.</p>	
<p>Measure description</p> <p>Provide a description of the measure, and identify its objective</p>	<p>Application of broad-spectrum plant protection products (PPP).</p> <p>PPPs can be applied with hand pump sprayers, backpack sprayers, or CO2 or gas-powered sprayers mounted on ATVs or trucks. Any PPP should be applied according to manufacturer's instructions and in accordance with EU and national regulations. It is important to not over apply and be as selective with applications as possible. Parsons & Cuthbertson (2001) recommend to spray at the budding stage with low volatile esters of 2,4-D or with triclopyr, dicamba or picloram +2,4-D.</p> <p>It is important to note that EU/national/local legislation on the use of plant protection products and biocides needs to be respected and authorities should check to ensure chemicals are licensed for use in their respective countries/regions.</p>

<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>	<p>The relevant scale is the scale of the infestations that can be eradicated through targeted chemical control, i.e. roughly less than 1 ha (pers. comm. J-M Dufour-Dror).</p>						
<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed? Please select one of the categories of effectiveness (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p>Effectiveness of measures</p>	<p><i>Effective</i></p>		<p><i>Neutral</i></p>	<p>X</p>	<p><i>Ineffective</i></p>	
<p>Effort required e.g. period of time over which measure need to be applied to have results</p>	<p>No details available</p>						
<p>Resources required¹ e.g. cost, staff, equipment etc.</p>	<p>Application of any type of herbicide requires staff who are trained in how to apply herbicides safely, equipment (e.g., backpack sprayers, ATV sprayers), herbicides, and potentially surfactants depending on the product being used and the specific formulation.</p>						
<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc. For each of the side effect types please select one of the impact categories (with an 'X'), and provide a</p>	<p>Environmental effects</p>	<p><i>Positive</i></p>		<p><i>Neutral or mixed</i></p>		<p><i>Negative</i></p>	<p>X</p>
	<p>Social effects</p>	<p><i>Positive</i></p>		<p><i>Neutral or mixed</i></p>	<p>X</p>	<p><i>Negative</i></p>	
	<p>Economic effects</p>	<p><i>Positive</i></p>		<p><i>Neutral or mixed</i></p>	<p>X</p>	<p><i>Negative</i></p>	
	<p>Rationale: By definition, broad-spectrum herbicides (e.g. glyphosate, imazapyr) can kill most types of vegetation and should be applied with care so sensitive and desirable vegetation is not damaged. Non-target effects on other species, including via herbicide drift and runoff may also be of concern. It is important to follow manufacturer guidelines and government regulations. The effect of herbicides that target broadleaved herbs and woody plants (e.g., dicamba, fluroxypyr, picloram, triclopyr, 2,4-D) should be considered favourable for application in pastures. An important side effect, as far as Imazapyr is considered for use, is</p>						

<p>rationale, with supporting evidence and examples if possible.</p>	<p>the quite long half-life of imazapyr (3 months to 9 months) and the fact that it also prevent germination. Therefore its use in habitat restoration may be a concern. An important side effect here, as far as Imazapyr is considered for use, is the quite long half-life of imazapyr (3 months to 9 months) and the fact that it also prevent germination. Therefore its use in habitat restoration may be a concern (pers. comm. J-M Dufour-Dror).</p>								
<p>Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.</p> <p>Please select one of the categories of acceptability (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p>Acceptability to stakeholders</p>		<p><i>Acceptable</i></p>	<p><i>Neutral or mixed</i></p>	<p>X</p>	<p><i>Unacceptable</i></p>			
<p><i>Rationale:</i> Given that mechanical control is only suitable to young plants (below 10 cm high), herbicides are virtually the only option for rapid eradication for emerging, small invasive populations, and stakeholders may therefore find them acceptable. However, because of the many potential side effects (e.g., non-target effects on desirable vegetation, and wetlands), the stigma surrounding the use of herbicides, and the “scorched earth” appearance of treated areas, this measure may not be acceptable to some stakeholder groups, particularly in natural areas used for recreation or those containing threatened or endangered species.</p>									
<p>Additional cost information¹ When not already included above, or in the species Risk Assessment.</p> <ul style="list-style-type: none"> - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects <p>Include quantitative &/or qualitative data, and case studies (incl. from countries outside the EU).</p>	<p>No information available.</p>								
<p>Level of confidence on the information provided²</p> <p>Please select one of the confidence categories along with a statement to support the category chosen. See <i>Notes</i> section at the bottom of this document.</p> <p>NOTE – this is not related to the effectiveness of the measure</p>	<p><i>Inconclusive</i></p>	<p>X</p>	<p><i>Unresolved</i></p>	<p><i>Established but incomplete</i></p>		<p><i>Well established</i></p>			
<p><i>Rationale:</i> The information on some of the PPPs as presented in the EPPO PRA (2018) contradicts the information as provided for Australia (Parsons & Cuthbertson, 2001) irrespective of the regulation in place in various countries that may prohibit the application in certain habitats.</p>									

Management - Measures to achieve management of the species once it has become widely spread within a Member State, or part of a Member State's territory. (cf. Article 19), i.e. **not** at an early stage of invasion (see Rapid eradication table above). These measures can be aimed at eradication, population control or containment of a population of the species. **This table is repeated for each of the management measures identified.**

<p>Measure description Provide a description of the measure, and identify its objective</p>	<p>Integrated management As large infestations of <i>A. confertiflora</i> defy mechanical control, therefore public awareness programmes in combination with strict containment measures of infested areas, along with application of herbicides is the only option to manage established populations (measures described above). All measures as highlighted to prevent secondary spread need to be applied.</p> <p>It is important to note that EU/national/local legislation on the use of plant protection products and biocides needs to be respected and authorities should check to ensure chemicals are licensed for use in their respective countries/regions.</p>							
<p>Scale of application At what scale is the measure applied? What is the largest scale at which it has been successfully used? Please provide examples, with areas (km² or ha) if possible.</p>	<p>No information available.</p>							
<p>Effectiveness of the measure Is it effective in relation to its objective? Has the measure previously worked, failed? Please select one of the categories of effectiveness (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	<p><i>Effectiveness of measures</i></p>	<p><i>Effective</i></p>		<p><i>Neutral</i></p>	<p>X</p>	<p><i>Ineffective</i></p>		
	<p><i>Rationale:</i> In terms of containment, a dedicated team on control of <i>A. confertiflora</i> in Israel has successfully eradicated hundreds of new infestations, particularly in regions recently infested (pers. comm. J-M Dufour-Dror).</p>							
<p>Effort required e.g. period of time over which measure need to be applied to have results</p>	<p>No information available</p>							
<p>Resources required¹ e.g. cost, staff, equipment etc.</p>	<p>See above tables. There are many LIFE projects that can provide information on awareness campaign concerning other invasive alien plants.</p>							

<p>Side effects (incl. potential) – both positive and negative i.e. positive or negative side effects of the measure on public health, environment including non-targeted species, etc.</p> <p>For each of the side effect types please select one of the impact categories (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	Environmental effects		Positive		Neutral or mixed	X	Negative		
	Social effects		Positive		Neutral or mixed	X	Negative		
	Economic effects		Positive		Neutral or mixed	X	Negative		
	<p><i>Rationale:</i> See tables above.</p>								
<p>Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.</p> <p>Please select one of the categories of acceptability (with an 'X'), and provide a rationale, with supporting evidence and examples if possible.</p>	Acceptability to stakeholders		Acceptable		Neutral or mixed	X	Unacceptable		
	<p><i>Rationale:</i> See above tables.</p>								
<p>Additional cost information¹ When not already included above, or in the species Risk Assessment. - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects</p> <p>Include quantitative &/or qualitative data, and case studies (incl. from countries outside the EU).</p>	<p>As there are no occurrences of <i>A. confertiflora</i> in the EU, in the natural environment, implementation costs for Member States would be relatively low. The cost of inaction could significantly increase potential costs in the future as any management programme would have to take place on a larger scale and this would reduce the cost-effectiveness of any measures.</p>								
<p>Level of confidence on the information provided²</p>	Inconclusive	X	Unresolved		Established but incomplete		Well established		
	<p><i>Rationale:</i> Too little and conflicting information is available for this species that appears to defy management measures (in Israel).</p>								

Please select one of the confidence categories along with a statement to support the category chosen. See *Notes* section at the bottom of this document.

NOTE – this is not related to the effectiveness of the measure

Bibliography³

See guidance section

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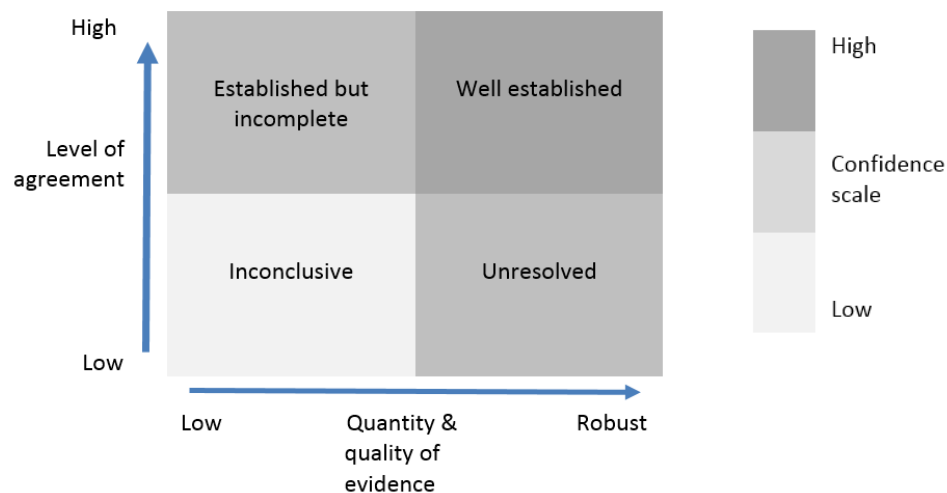
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Notes

1. Costs information. The assessment of the potential costs shall describe those costs quantitatively and/or qualitatively depending on what information is available. This can include case studies from across the Union or third countries.

2. Level of confidence³: based on the quantity, quality and level of agreement in the evidence.



- **Well established:** comprehensive meta-analysis⁴ or other synthesis or multiple independent studies that agree.
- **Established but incomplete:** general agreement although only a limited number of studies exist but no comprehensive synthesis and, or the studies that exist imprecisely address the question.
- **Unresolved:** multiple independent studies exist but conclusions do not agree.
- **Inconclusive:** limited evidence, recognising major knowledge gaps

3. Citations and bibliography. The APA formatting style for citing references in the text and in the bibliography is used.

e.g. Peer review papers will be written as follows:

In text citation: (Author & Author, Year)

In bibliography: Author, A. A., & Author, B. B. (Publication Year). Article title. *Periodical Title*, Volume(Issue), pp.-pp.

(see <http://www.waikato.ac.nz/library/study/referencing/styles/apa>)

³ Assessment of confidence methodology is taken from IPBES. 2016. Guide on the production and integration of assessments from and across all scales (IPBES-4-INF-9), which is adapted from Moss and Schneider (2000).

⁴ A statistical method for combining results from different studies which aims to identify patterns among study results, sources of disagreement among those results, or other relationships that may come to light in the context of multiple studies.

