

Russian Vine (*Fallopia baldschuanica*)

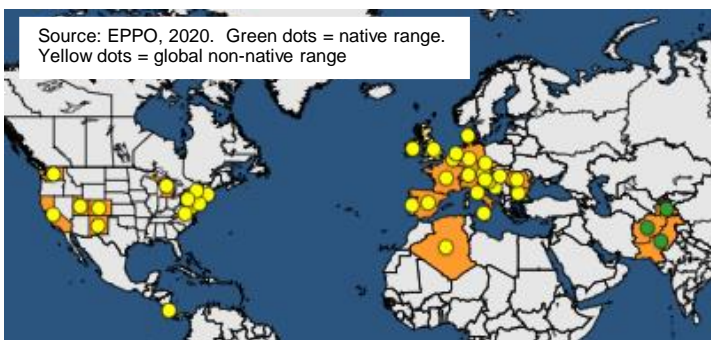
- A vigorous deciduous climber with heart shaped leaves and panicles of pink-white flowers in summer.
- A popular garden plant, from which escapes and throw-outs occur.
- Widespread in lowland GB but relatively scarce in Wales, Northern England and Scotland.
- Rapidly grows over other vegetation and hard surfaces - impact largely limited to anthropogenic habitat, but could have wider impacts if it spreads to areas of higher conservation value.



History in GB

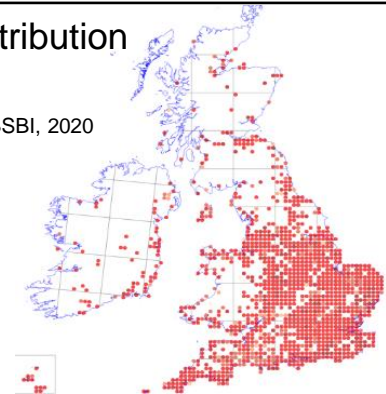
Introduced into British gardens in about 1894, but not recorded as established in the wild until 1936. Widely planted and has spread rapidly to over 717 10km squares in GB, less than 10% of which occurred before 1970. Known as 'mile-a-minute' by gardeners due to very fast growth.

Global Distribution



GB Distribution

Source: BSBI, 2020



Impacts

Currently mainly restricted to anthropogenic habitats, but widespread planting combined with the vigorous smothering growth and spread in garden waste could result in impacts in areas of higher conservation value.

Environmental: (moderate, medium confidence)

- None reported in GB, but likely to be having negative impacts upon plant diversity in some urban areas.
- Contains oxalates that may be toxic to animals if consumed in large quantities, but unlikely in areas where the species occurs.

Economic: (minor, low confidence)

- None reported in GB.
- Evidence suggests infestations are largely on abandoned land, in hedges. However, lacking quantified evidence in monetary terms.

Societal: (minimal, high confidence)

- None reported.

Introduction pathway

Introduced for the ornamental garden plant trade and still popular, sold by multiple nurseries.

Spread pathway

Natural: (minimal, medium confidence) – spreads vegetatively, seed are not thought to be viable in GB; to date has not spread far from human habitation.

Human: (major, medium confidence) – the primary cause of spread in GB and elsewhere is escape from gardens and dumping of garden waste.

Summary

	Response	Confidence
Entry	VERY LIKELY	VERY HIGH
Establishment	VERY LIKELY	VERY HIGH
Spread	SLOWLY	HIGH
Impact	MODERATE	MEDIUM
Overall risk	MEDIUM	MEDIUM

RISK ASSESSMENT COVERING PAGE - ABOUT THE PROCESS

It is important that policy decisions and action within Great Britain are underpinned by evidence. At the same time it is not always possible to have complete scientific certainty before taking action. To determine the evidence base and manage uncertainty a process of risk analysis is used.

Risk analysis comprises three component parts: risk assessment (determining the severity and likelihood of a hazard occurring); risk management (the practicalities of reducing the risk); and risk communication (interpreting the results of the analysis and explaining them clearly). This tool relates to risk assessment only. The Non-native Species Secretariat manages the risk analysis process on behalf of the Programme Board for Non-native Species. During this process risk assessments are:

- Commissioned using a consistent template to ensure the full range of issues is addressed and maintain comparable quality of risk and confidence scoring supported by appropriate evidence.
- Drafted by an independent expert in the species and peer reviewed by a different expert.
- Approved by the NNRAF (an independent risk analysis panel) only when they are satisfied the assessment is fit-for-purpose.
- Approved by the Programme Board for Non-native Species.
- Placed on the GB Non-native Species Secretariat (NNSS) website for a three month period of public comment.
- Finalised by the risk assessor to the satisfaction of the NNRAF and Programme Board if necessary.

Common misconceptions about risk assessments

The risk assessments:

- Consider only the risks (i.e. the chance and severity of a hazard occurring) posed by a species. They do not consider the practicalities, impacts or other issues relating to the management of the species. They also only consider only the negative impacts of the species, they do not consider any positive effects. They therefore cannot on their own be used to determine what, if any, management response should be undertaken.
- Are advisory and therefore part of the suite of information on which policy decisions are based.
- Are not final and absolute. They are an assessment based on the evidence available at that time. Substantive new scientific evidence may prompt a re-evaluation of the risks and/or a change of policy.

Period for comment

Once placed on the NNSS website, risk assessments are open for stakeholders to provide comment on the scientific evidence which underpins them for three months. Relevant comments are collated by the NNSS and sent to the risk assessor for them to consider and, if necessary, amend the risk assessment. Where significant comments are received the NNRAF will determine whether the final risk assessment suitably takes into account the comments provided.

To find out more: published risk assessments and more information can be found at <http://www.nonnativespecies.org/index.cfm?pageid=143>

GB NON-NATIVE ORGANISM RISK ASSESSMENT SCHEME

Name of organism: *Fallopia baldschuanica*, Russian Vine

Author: Wayne Dawson, Durham University

Risk Assessment Area: Great Britain

Version: Draft 1 (Dec 2020), NNRAP 1 (Mar 2021), Draft 2 (May 2021), NNRAF 2 (Jul 2021).

Signed off by NNRAF: July 2021

Approved by Programme Board: January 2023

Placed on NNSS website: January 2024

What is the principal reason for performing the Risk Assessment?

This species was identified as a potential threat by horizon scanning in 2020 and therefore prioritised for risk assessment.

SECTION A – Organism Information	
Stage 1. Organism Information	RESPONSE and COMMENT
1. Identify the organism. Is it clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank?	<p>Yes</p> <p>The species has the following synonyms that are still used in some sources: <i>Bilderdykia baldschuanica</i> (Regel) D.A.Webb <i>Polygonum baldschuanicum</i> Regel <i>Reynoutria baldschuanica</i> (Regel) Moldenke <i>Tiniaria baldschuanica</i> (Regel) Hedberg ex Janch.(Plants of the World Online 2019)</p> <p>In older horticultural and botanical literature, this species is sometimes known as <i>F. aubertii</i> – this is sometimes treated as another species that is native to China; it does not appear to be in general cultivation (RHS Plant Finder – searched 10/02/2021). <i>F. aubertii</i> is not known as a garden escape in the PRAA. However, the current British and Irish Flora (Stace ed. 4) treats <i>aubertii</i> as a synonym of <i>baldschuanica</i>. In the context of this PRA, I believe <i>aubertii</i> should be treated as a synonym until consensus is reached [Note: Plants of the World Online, probably following the online Flora of China, treat the two names as separate taxa; searched 10/02/2021]</p> <p><i>Fallopia aubertii</i> (L. Henry) Holub <i>Polygonum aubertii</i> L. Henry <i>Bilderkykia aubertii</i> (L. Henry) Moldenke <i>Reynoutria aubertii</i> (L. Henry) Moldenke <i>Tiniaria aubertii</i> (L. Henry) Hedberg ex Janchen (Flora of China; http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=242321901; accessed 27.05.21)</p>
2. If not a single taxonomic entity, can it be redefined? (if necessary use the	NA

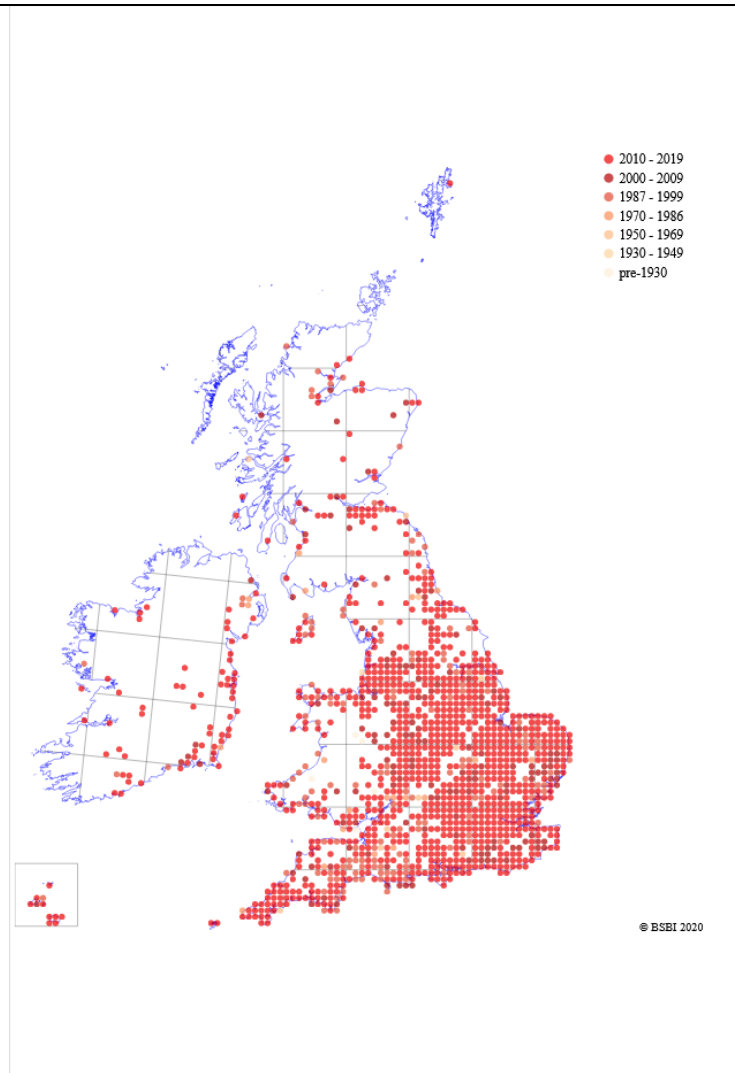
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<p>response box to re-define the organism and carry on)</p>	
<p>3. Does a relevant earlier risk assessment exist? (give details of any previous risk assessment)</p>	<p>Yes</p> <p>EU (EPPO 2012): https://gd.eppo.int/reporting/article-1963 On list of invasive alien plants: lower priority (2012-) Spain (EPPO 2014): https://gd.eppo.int/reporting/article-2689 Regulated invasive plant: potentially invasive (2014-) Island of Ireland: Medium invasive species impact risk (Kelly et al. 2013)</p>
<p>4. If there is an earlier risk assessment is it still entirely valid, or only partly valid?</p>	<p>NA</p> <p>While EPPO has the species listed as a low priority IAS, EPPO does not provide an accessible, regional breakdown of risk. As a near neighbour with partially similar climate and environment, the RA for Ireland may be informative for GB, but again, the details of the RA are not accessible online; only the outcome (National Biodiversity Data Centre, Ireland 2020; https://species.biodiversityireland.ie/profile.php?taxonId=29164&taxonDesignationGroupId=26).</p> <p>The species has been added to the catalogue of invasive alien species for Spain: (“Revision of the Spanish legislation on invasive alien species including plants”; EPPO 2013 and references therein).</p>
<p>5. Where is the organism native?</p>	<p>Asia: Afghanistan, Pakistan, Tadjhikistan (POWO 2019).</p> <p>Asia: Afghanistan, Tajikistan, China [Henan Sheng, Hunan Sheng (possibly), Hubei Sheng, Gansu Sheng, Guizhou Sheng, Shanxi Sheng, Shaanxi Sheng, Sichuan Sheng, Qinghai Sheng, Yunnan Sheng, Nei Mongol Zizhiqu, Ningxia Huizi Zizhiqu, Xizang Zizhiqu], Pakistan (USDA Agricultural Research Service (2015)).</p> <p>Native range may be wider than these sources describe, due to under-recording.</p>
<p>6. What is the global distribution</p>	<p>In addition to native range in q5:</p>

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<p>of the organism (excluding the risk assessment area)?</p>	<p>Introduced to Alabama, Austria, California, Colorado, Czechoslovakia, Eritrea, Great Britain, Kenya, Maryland, Massachusetts, Michigan, New Jersey, New Mexico, New York, Pennsylvania, Romania, Spain, Utah, Virginia, Washington, Zimbabwe (POWO 2019)</p> <p>Naturalized in New Zealand, USA (Massachusetts, Michigan, New Jersey, New York, Pennsylvania, Colorado, Washington, Maryland, Virginia, New Mexico, California, Utah), Costa Rica (USDA Agricultural Research Service (2015)).</p> <p>Due to historic confusion, records for <i>F. aubertii</i> outside of China are probably <i>F. baldschuanica</i> (POWO searched 10/01/2021)</p> <p>Introduced/naturalised range provided by sources is unlikely to be complete.</p>
<p>7. What is the distribution of the organism in the risk assessment area?</p>	<p>Widespread, particularly in England to the South. Only localised where it occurs according to Atlas of British and Irish Flora (UK Biological Records Centre 2020).</p> <p>Online Atlas of British and Irish Flora describes species as “introduced into British gardens in about 1894. It was first recorded in the wild in 1936 and appears to be increasing due to its continued use to screen eyesores and from the discarding of surplus garden material onto roadsides and rubbish tips. It is rarely naturalised away from habitation and some of the increases may be attributable to an increased tendency to record aliens; some records may be of plants rooted in gardens.”</p>

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The number of recorded wild occurrences in some areas (such as Greater London) is probably 'inflated' due to some recorders failing to discriminate between wild plants and those being cultivated. However, it is also probable that this species is under-recorded in

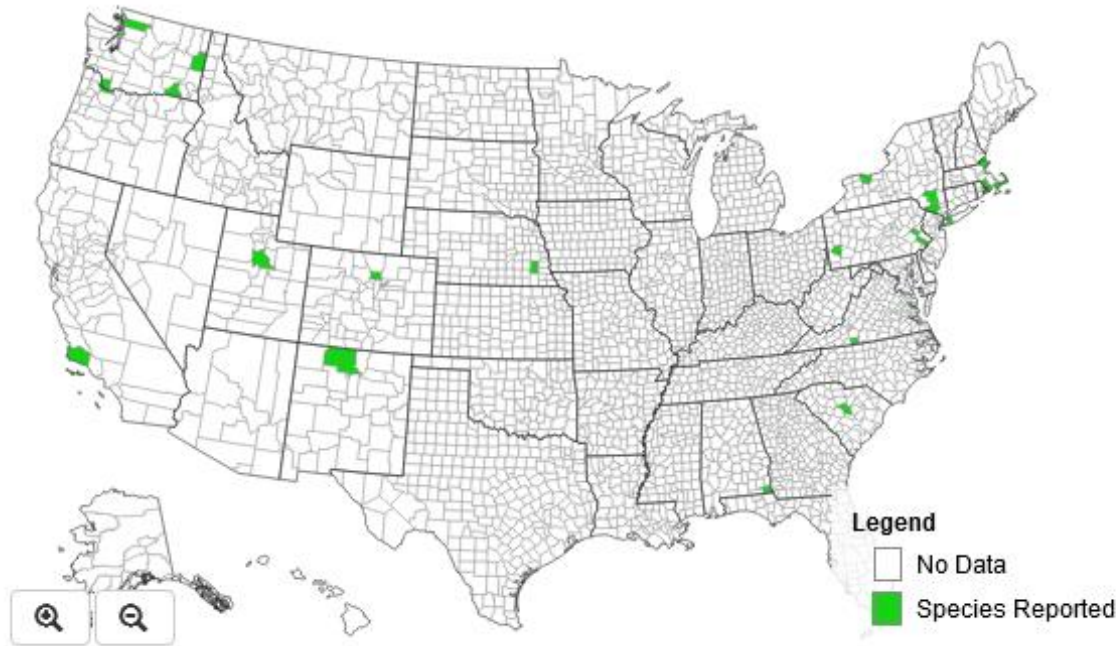
some urban areas; this is because this species usually escapes from gardens onto adjacent railway embankments. Due to lack of access on railways, the wild occurrence of this plant in these areas is being underestimated (pers. obs. Mark Spencer).

8. Is the organism known to be invasive (i.e. to threaten organisms, habitats or ecosystems) anywhere in the world?

Described as becoming invasive in parts of USA, and potentially invasive in Europe generally (See comment)
 Recorded as invasive in scattered counties of USA by the US Invasive Plant Atlas (2020):

Chinese fleecyvine (*Fallopia baldschuanica*)

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In King county, Washington state, species listed as a weed of concern (King County government website 2020).

In Ireland, species is listed as an invasive plant with medium impact (National Biodiversity Data Centre, Ireland 2020).

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<p>9. Describe any known socio-economic benefits of the organism in the risk assessment area.</p>	<p>Popular garden plant, grown for quickly covering (usually vertical) surfaces</p> <p>Known as 'mile-a-minute' by gardeners due to very fast growth. Sold by multiple GB plant nurseries (Royal Horticultural Society 2020)</p>
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SECTION B – Detailed assessment			
PROBABILITY OF ENTRY			
<p>Important instructions:</p> <ul style="list-style-type: none"> • Entry is the introduction of an organism into the risk assessment area. Not to be confused with spread, the movement of an organism within the risk assessment area. • For organisms which are already present in the risk assessment area, only complete the entry section for current active pathways of entry or if relevant potential future pathways. The entry section need not be completed for organisms which have entered in the past and have no current pathways of entry. 			
QUESTION	RESPONSE [chose one entry, delete all others]	CONFIDENCE [chose one entry, delete all others]	COMMENT
<p>1.1. How many active pathways are relevant to the potential entry of this organism?</p> <p>(If there are no active pathways or potential future pathways respond N/A and move to the Establishment section)</p>	very few	very high	Already in the RA area, but still popular and widely sold as an ornamental garden plant in nurseries and online. Royal Horticultural Society lists 30 nurseries that grow the species in England and Wales (Royal Horticultural Society 2020).
<p>1.2. List relevant pathways through which the organism could enter. Where possible give detail about the specific origins and end points of the pathways.</p> <p>For each pathway answer questions 1.3 to 1.10 (copy and paste additional rows at the end of this section as necessary).</p>	Horticulture/Ornamental plant trade (Saul et al. 2016)		Available for sale online, and likely imported for sale in GB from growers in continental Europe (e.g. Netherlands): (Floraccess 2020: https://www.floraccess.com/en/v/20717/hooegeveen-plants/fallopia-baldschuanica/)

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Pathway name:	Horticulture/Ornamental plant trade		
1.3. Is entry along this pathway intentional (e.g. the organism is imported for trade) or accidental (the organism is a contaminant of imported goods)? (If intentional, only answer questions 1.4, 1.9, 1.10, 1.11)	intentional	Very high	Sold as a garden plant; unlikely to enter unintentionally by other means- seeds are relatively large and without means of attachment. No evidence of seed being a contaminant of substrate.
1.4. How likely is it that large numbers of the organism will travel along this pathway from the point(s) of origin over the course of one year? Subnote: In your comment discuss how likely the organism is to get onto the pathway in the first place.	likely	high	Grown and imported as live plants ready for sale, likely in large numbers from wholesale growers in continental Europe. Quantity of plants sold that are imported versus grown in GB nurseries unknown. Compared to commercial growers and importers, live plants sold online and imported by individuals likely to be fewer in number; evidence of online sales from GB growers via ebay (e.g. eBay 2020: https://www.ebay.co.uk/itm/Fallopia-baldschuanica-Russian-Vine-Plant-in-9-cm-Pot-/153832494458) and Amazon. Seeds may also be available for sale online from non-GB as well as GB sources, but no evidence available to quantify numbers sold as live plants versus seed.
1.9. How likely is the organism to be able to transfer from the pathway to a suitable habitat or host?	very likely	very high	Plants directly planted in gardens, transfer through abandoned plantings, dumping of garden waste. Lateral movement and layering via stems (this is the main way it is encroaching on railway lands in Greater London. Pers. obs. Mark Spencer)
1.10. Estimate the overall likelihood of entry into the risk assessment area based on this pathway?	very likely	very high	Evidence of imports from wholesale growers: Hoogeveen nurseries (NL), through Floraccess (2020) (https://www.floraccess.com/en/v/20717/hoogeveen-

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			<p>plants/fallopia-baldschuanica/)</p> <p>While not currently available, seeds of species are listed by B and T World seeds (2020) (https://b-and-t-world-seeds.com/cartall.asp?species=Fallopia%20baldschuanica&sref=433746) and etsy (2020) (https://www.etsy.com/uk/listing/526822166/)</p>
<i>End of pathway assessment, repeat as necessary.</i>			
1.11. Estimate the overall likelihood of entry into the risk assessment area based on all pathways (comment on the key issues that lead to this conclusion).	very likely	very high	Even if import of plants by continental growers ceases, species could still be imported through online private sale.

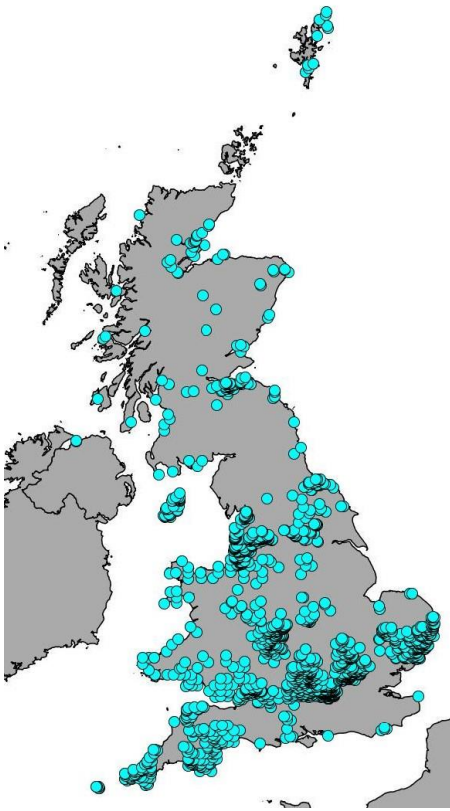
PROBABILITY OF ESTABLISHMENT			
Important instructions: <ul style="list-style-type: none"> For organisms which are already well established in the risk assessment area, only complete questions 1.15, 1.21 and 1.28 then move onto the spread section. If uncertain, check with the Non-native Species Secretariat. 			
QUESTION	RESPONSE	CONFIDENCE	COMMENT
1.15. How widespread are habitats or species necessary for the survival, development and multiplication of the organism in the risk assessment area?	moderately widespread	medium	<p>The Atlas of the British and Irish Flora states that: “This species was introduced into British gardens in about 1894. It was first recorded in the wild in 1936 and appears to be increasing due to its continued use to screen eyesores and from the discarding of surplus garden material onto roadsides and rubbish tips. It is rarely naturalised away from habitation and some of the increases may be attributable to an increased tendency to record aliens; some records may be of plants rooted in gardens.” Thus, while the species is widespread in the RA area, this may reflect planting and sampling effort more than an ability to establish in multiple habitats. It is not clear how often the species is well established or how large populations/infestations are, and what habitats specifically are invaded.</p> <p>In Greater London, the majority of wild records are from railway embankments and canal margins. These areas are often ecologically significant urban habitats. Pers. obs. Mark Spencer</p>
1.21. How likely is it that biological properties of the organism would allow it to survive eradication campaigns in the risk assessment area?	likely	high	<p>Asexual reproduction: Species is described by botanical and horticultural sources as spreading quickly by rhizomes (Missouri Botanical Garden 2020); being able to layer (Dave’s Garden 2020); growing vegetatively from discarded garden plant material (King County government website 2020). These vegetative reproductive abilities would make eradication more difficult.</p> <p>Sexual reproduction: While this species is known to be visited by pollinators and hybridise with female <i>F. japonica</i> var. <i>japonica</i> (<i>Fallopia x conollyana</i>- Bailey et al. 2009), the quantity of viable seed production and seed rain/seed bank formation by <i>F. baldschuanica</i> alone in the RA area is not known. However, work from Belgium indicates that pollinated fruit set for the species was 0-35%, but</p>

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			germination success on compost was zero (Tiebre et al. 2007), and earlier work suggests the species is highly self-incompatible (Bailey et al. 1994). Thus there may be little or no viable seed production and seedling recruitment in GB (Booy et al. 2015).
1.28. Estimate the overall likelihood of establishment (mention any key issues in the comment box).	very likely	very high	Note the caveat in 1.21, that while the species is established, this seems be mostly in areas close to human habitation (UK Biological Records Centre 2020).

PROBABILITY OF SPREAD			
Important notes: <ul style="list-style-type: none"> • Spread is defined as the expansion of the geographical distribution of a pest within an area. 			
QUESTION	RESPONSE	CONFIDENCE	COMMENT
2.1. How important is the expected spread of this organism in the risk assessment area by natural means? (Please list and comment on the mechanisms for natural spread.)	minimal	medium	<p>The Atlas of the British and Irish Flora states that species rarely naturalises far from human habitation, indicating very low powers of dispersal given how widely the species has been planted.</p> <p>Seed dispersal mechanism unknown, but a lack of fleshy fruit or appendages that aid attachment or movement in air suggests that dispersal by animals, birds, or unintentionally by humans on surfaces is unlikely. Seeds may be able to float, but plants are not associated with waterways making hydrochory unlikely to be important for further spread. However, elsewhere the species is described as being spread by rhizomes, seeds and stem fragments in Washington State (King County government website 2020) and by stem fragments/rhizomes in Ireland (National Biodiversity Data Centre, Ireland 2020).</p> <p>In Britain and Ireland, the species is thought not to produce seed (Booy et al. 2015).</p>
2.2. How important is the expected spread of this organism in the risk assessment area by human assistance? (Please list and comment on the mechanisms for human-assisted spread.)	major	medium	<p>Spread in GB and elsewhere can occur through dumping of garden waste, lateral spread from fences via layering and widespread planting, but again, spread far from human habitation appears to be rare, suggesting any dumping occurs at distances that are not far from original plantings.</p>
2.3. Within the risk assessment area, how difficult would it be to contain the organism?	very difficult	very high	<p>Given how widely and frequently planted the species is in gardens throughout GB, containment will probably only be possible if all garden dumping was prevented.</p>

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<p>2.4. Based on the answers to questions on the potential for establishment and spread in the risk assessment area, define the area endangered by the organism.</p>	<p>All areas close to human habitation within GB, and denser areas in the South/South-west of England and Shetland, where records are currently greatest in density (see comments)</p>	<p>medium</p>	<p>Difficult to quantify, given area it could establish in is largely linked to planting in gardens, but the National Biodiversity Network (2020) records show marked high densities in: Shetland, Sutherland, Cornwall, Devon, Bath, Glamorgan, Welsh Coast, East Anglia, NW England, W Yorkshire, W Midlands, Berkshire, Bedfordshire, Hertfordshire, Oxfordshire and Edinburgh; https://records.nbnatlas.org/occurrences/search?q=lsid:NBNSYS0000003761&fq=occurrence_status:present#tab_mapView</p> <p>Two of these counties are probably impacted by recorder bias – i.e. recording horticultural material as well as wild plants. Pers. obs. Mark Spencer</p> 
<p>2.5. What proportion (%) of the area/habitat suitable for establishment (i.e. those parts of the risk assessment area were the species could establish), if any, has already been colonised by the organism?</p>	<p>0-10</p>	<p>low</p>	<p>Again, confidence is low, and proportion depends on definition of habitat suitable for establishment. Given the inability to spread far from human habitation, the total area where the species could spread to and establish is still large (and so it is only in a very small proportion of area where it could theoretically establish after dispersal). The area already colonised may be greater if restricting to only areas near human habitation, but the proportion is still probably <10%.</p>
<p>2.6. What proportion (%) of the area/habitat suitable for</p>	<p>0-10</p>	<p>low</p>	<p>Given the species was first planted in 1894, and first recorded as established in 1930s (UK Biological Records Centre 2020), rapid spread and establishment in new</p>

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establishment, if any, do you expect to have been invaded by the organism five years from now (including any current presence)?			areas seems unlikely, and may be more a function of trends in human planting/dumping of garden waste.
2.7. What other timeframe (in years) would be appropriate to estimate any significant further spread of the organism in the risk assessment area? (Please comment on why this timeframe is chosen.)	80	low	Assuming that spread by seed is not important in future, spread beyond human habitation will probably be slow and dependent on dumping of garden waste; spread in areas of human habitation will depend on trends in urbanisation, horticultural fashion and land abandonment.
2.8. In this timeframe what proportion (%) of the endangered area/habitat (including any currently occupied areas/habitats) is likely to have been invaded by this organism?	10-33	low	Again, given likely reliance on garden waste dumping and further planting, further spread over an 80-year timescale may move toward upper end of 10-33 % scale. But, low confidence.
2.9. Estimate the overall potential for future spread for this organism in the risk assessment area (using the comment box to indicate any key issues).	slowly	high	Depending on human planting and dumping of garden waste; seed viability and production information lacking, but powers of natural dispersal and reproduction are presumably low given lack of significant establishment away from human habitation areas. Perhaps requires further monitoring of sexual reproduction and dispersal.

PROBABILITY OF IMPACT

Important instructions:

- When assessing potential future impacts, climate change should not be taken into account. This is done in later questions at the end of the assessment.
- Where one type of impact may affect another (e.g. disease may also cause economic impact) the assessor should try to separate the effects (e.g. in this case note the economic impact of disease in the response and comments of the disease question, but do not include them in the economic section).
- Note questions 2.10-2.14 relate to economic impact and 2.15-2.21 to environmental impact. Each set of questions starts with the impact elsewhere in the world, then considers impacts in the risk assessment area separating known impacts to date (i.e. past and current impacts) from potential future impacts. Key words are in bold for emphasis.

QUESTION	RESPONSE	CONFIDENCE	COMMENTS
2.10. How great is the economic loss caused by the organism within its existing geographic range excluding the risk assessment area , including the cost of any current management?	minor	medium	<p>In King County Washington state, “escaped populations of silver lace vine mostly occur in developed areas in and around Seattle, near where it has been planted or dumped as yard waste. Although the populations are few in number, they are large in size and would be difficult to control without harming other vegetation. Limiting further spread of this plant is the key to avoiding significant impacts” (King County government website 2020). Economic losses may be minor taking into account costs of removal but low number of populations, and indirect economic costs relating to property value in areas with infestations. Confidence low, due to lack of quantified evidence.</p> <p>Infestations of hedgerows in Ireland may result in economic costs for landowners through difficulties encountered in hedgerow maintenance (National Biodiversity Data Centre Ireland 2020), but no quantified evidence.</p> <p>Overall, economic costs are likely to be low, and restricted to removal costs.</p>
2.11. How great is the economic cost of the organism currently in the risk assessment area excluding management costs (include any past costs in your	minor	medium	<p>Minor but medium confidence: evidence suggests infestations are largely on abandoned land, in hedges, so potential economic costs described outside RA area are likely to apply to GB. Lacking quantified evidence in monetary terms. No evidence that species has the same level of economic costs through infrastructure/built-environment impacts that <i>F. japonica</i> has.</p>

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response)?			
2.12. How great is the economic cost of the organism likely to be in the future in the risk assessment area excluding management costs?	minor	low	No evidence that economic costs could increase in the future, though continued planting and escape/established populations may increase cumulative economic costs nationally.
2.13. How great are the economic costs associated with managing this organism currently in the risk assessment area (include any past costs in your response)?	minor	low	<p>Lacking quantified evidence of economic costs associated with management, so confidence is low, but EPPO (2012) in their RA for the species suggest that “the only management method which has shown some effectiveness is the manual removal of plants though this can only be effective if subterranean organs are removed. In urban and ruderal habitats, management of the species using this method may be more effective than natural habitats where the species has twisted around natural vegetation.”</p> <p>EPPO (2012) also estimate that “if plant material is on a discrete piece of land, control costs could be as little as 100- 500 Euros”, but costs will be higher where infestations are large and involve multiple land ownership and affected native vegetation. Overall, costs of management are likely to be minor, and there is no evidence that costs would differ markedly to managing vegetation in the built environment in general.</p>
2.14. How great are the economic costs associated with managing this organism likely to be in the future in the risk assessment area?	minor	low	Minor- economic costs of management are unlikely to change in the future, but confidence still low due to lack of quantified evidence.
2.15. How important is environmental harm caused by the organism within its existing geographic range excluding the risk assessment area ?	moderate	medium	<p>While the species has not established many populations in King County, Washington State, its impacts are described as follows (King County government website 2020):</p> <p>“Silver lace vine is found growing on fences, hillsides, trees and on other vegetation in a variety of habitats. It tolerates a wide range of soil conditions and is most abundant in full sun to part shade. Because it grows over other plants, it can suppress</p>

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			<p>their growth and weigh them down. It is highly branched and difficult to remove from other plants without injuring them. It grows over low-lying vegetation as well as climbing high into trees and growing over the tops of tall plants, even other invasive plants.” The species also contains oxalates, which can be toxic to animals consuming the plant in large enough quantities, including livestock.</p>
<p>2.16. How important is the impact of the organism on biodiversity (e.g. decline in native species, changes in native species communities, hybridisation) currently in the risk assessment area (include any past impact in your response)?</p>	moderate	medium	<p>No data quantifying impacts are available from the RA area, but as indicated in 2.15, the main biodiversity impacts are likely to be through reduction in local plant diversity in infested areas, and changes in vegetation/habitat structure which may have knock-on negative effects on faunal diversity. Evidence for wider non-plant impacts is lacking.</p> <p>In Greater London, this plant often forms extensive stands along railway embankments. It is frequently associated with <i>Parthenocissus</i> spp., <i>Buddleja davidii</i> and <i>Ailanthus altissima</i>. Under these conditions, these plants often form dense stands that outcompete other vegetation (including smaller trees). This plant is likely to be having negative impacts upon plant diversity in some urban areas. These impacts are likely to be significant as railway embankments are often important habitats for a wide range of ecologically significant native and non-native species. Due to lack of safe access, it is very hard to quantify the negative impact (pers. obs. Mark Spencer).</p>
<p>2.17. How important is the impact of the organism on biodiversity likely to be in the future in the risk assessment area?</p>	moderate	medium	<p>Given the slow/limited spread of the species in areas away from human habitation, and the types of habitats where infestations occur, the biodiversity impacts are unlikely to increase dramatically in future; more likely they will slowly accumulate with new escapes and infestations over time.</p>
<p>2.18. How important is alteration of ecosystem function (e.g. habitat change, nutrient cycling, trophic interactions), including losses to ecosystem services, caused by the organism currently in the risk assessment area (include any past impact in your</p>	minor	medium	<p>As a twining vine, the main impact on habitats would be through smothering of vegetation both vertically and horizontally, and therefore changes in vegetation structure may occur. While these changes will be acute at the local scale of an infestation, invasions tend to occur in highly anthropogenic and disturbed habitats. This would make the benchmark ecosystem function/vegetation structure uncertain.</p> <p>Infestations of hedges and hedge banks in GB may lead to local-scale degradation of these habitats.</p>

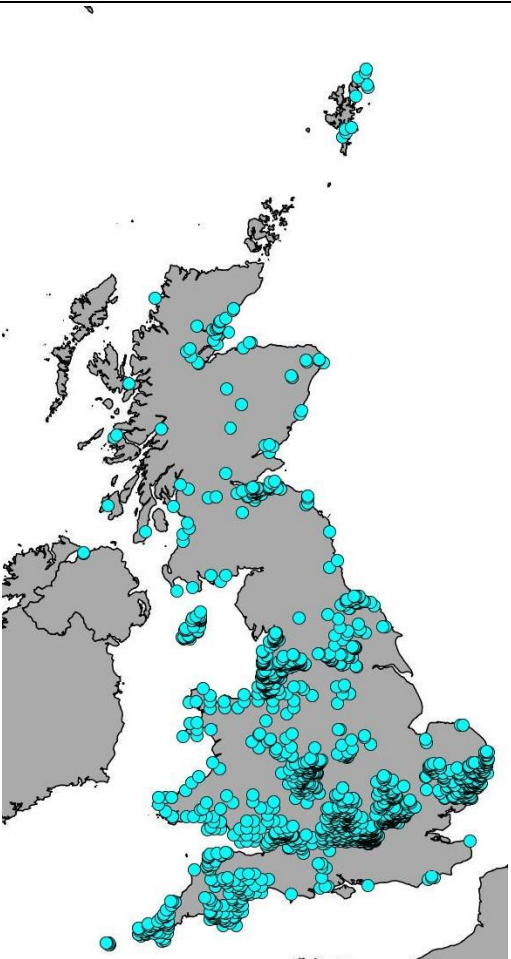
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response)?			While outside the RA area, on the island of Ireland, infestations are recorded in the following habitats: Grasslands and landscapes dominated by forbs, mosses or lichens; Heath, scrubland & tundra; Woodland, forest and other wooded land; Inland unvegetated or sparsely vegetated habitats; Regularly or recently cultivated agricultural, horticultural or domestic habitat; Constructed, industrial or other artificial habitats (National Biodiversity Data Centre, Ireland 2020).
2.19. How important is alteration of ecosystem function (e.g. habitat change, nutrient cycling, trophic interactions), including losses to ecosystem services, caused by the organism likely to be in the risk assessment area in the future ?	moderate	low	Importance of habitat change at a local scale could increase to moderate in future if the species is left unchecked, and escapes occur in less anthropogenic habitats. The reasonably long residence time of the species in GB and limited powers of dispersal suggest that the species would be slow/unlikely to reach new areas, but the fast and vigorous growth once established at a site could lead to rapid habitat change.
2.20. How important is decline in conservation status (e.g. sites of nature conservation value, WFD classification) caused by the organism currently in the risk assessment area?	minimal	medium	No quantified evidence of a decline in conservation value in urban areas invaded, though establishing impacts in such areas may be difficult due to access and uncertain baselines. Hence medium confidence.
2.21. How important is decline in conservation status (e.g. sites of nature conservation value, WFD classification) caused by the organism likely to be in the future in the risk assessment area?	minor	low	As with alteration of ecosystem function, in the unlikely event of dispersal and establishment in areas of high conservation value away from human habitation, the species could quickly reduce the conservation value through vigorous growth and smothering of vegetation. Areas of high conservation value nearer to human habitation would be at a higher risk.
2.22. How important is it that genetic traits of the organism could be carried to other species,	minimal	high	The species does hybridise with <i>Fallopia japonica</i> to form <i>Fallopia x conollyana</i> offspring (Bailey 2001; Bailey et al. 2009). The invasiveness of the hybrid is unclear, but is most frequently recorded in GB. If the hybrid was very invasive/impactful, it


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modifying their genetic nature and making their economic, environmental or social effects more serious?			seems reasonable to assume that invasions and impacts would have been already detected, given the attention paid to invasive <i>Fallopia</i> species in GB. The hybrid is an herbaceous perennial, forming woody rhizomes in older plants and appears not to compete well with other plants (Bailey 2001). It looks more shrub-like, without the twining or vigorous shoots of either parent species (personal observation). Unlikely to be competitive/ have significant impact (M A Spencer, pers. obs; W Dawson, pers. obs.). Evidence also suggests that hybrids are sterile (Bailey 2001; Engler et al. 2011).
2.23. How important is social, human health or other harm (not directly included in economic and environmental categories) caused by the organism within its existing geographic range?	minimal	high	No evidence for human health/social impacts in areas where species has been described. The only potential social impact may be through neighbour conflicts caused by neglect of plantings in gardens, but there is no documented evidence of this impact. While the species contain oxalates that may be toxic to animals if consumed in large quantities, consumption is not likely in areas where the species occurs. The plant also does not have characteristics which would attract consumption.
2.24. How important is the impact of the organism as food, a host, a symbiont or a vector for other damaging organisms (e.g. diseases)?	minor	medium	In GB, there is some evidence that the species' leaves are eaten by a species of chrysomelid beetle (<i>Gastrophysa polygoni</i>) and 2 fungal pathogens (powdery mildew: <i>Peronospora polygoni</i> , <i>Erysiphe polygoni</i>) (BioInfo website 2020). It is not known if these species cause wider economic/environmental damage that is of concern.
2.25. How important might other impacts not already covered by previous questions be resulting from introduction of the organism? (specify in the comment box)	NA	medium	Moderately confident that potential impacts have been described and discussed based on evidence, but rigorous quantification of species impacts is recommended.
2.26. How important are the expected impacts of the organism despite any natural control by other organisms, such as predators, parasites or pathogens that may already be present in the	minor	low	Little is known about the effect of interactions that the species is involved in within the RA area, though the species is widespread and frequent, making host-switching of native natural enemies to this species plausible. In GB, there is some evidence that the species' leaves are eaten by a species of chrysomelid beetle (<i>Gastrophysa polygoni</i>) and 2 fungal pathogens (powdery mildew: <i>Peronospora polygoni</i> , <i>Erysiphe polygoni</i>) (BioInfo website 2020).

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<p>risk assessment area?</p>			
<p>2.27. Indicate any parts of the risk assessment area where economic, environmental and social impacts are particularly likely to occur (provide as much detail as possible).</p>	<p>Open coastal habitats, hedges and hedge banks, particularly in the SW of England, Wales and Scotland (see map in comments)</p>	<p>medium</p>	<p>The species records in the National Biodiversity Network (2020) seem to indicate that the species is frequent in coastal areas of GB, Wales and SW England in particular. Personal observation: there are infestations on the Cornish coast in open habitats, along hedgerows, hedge banks along roads and drystone walls (image below is a hedge bank west of Newlyn, Cornwall, SW coast path). Given the difficulties in reaching coastal habitats, infestations in these areas are more likely to go unchecked, and may be logistically difficult to manage. Coastal areas are scenic and of economic (tourism) and cultural value, but any perceived economic and cultural impacts in these areas are unknown.</p> 

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<p>2.28. Estimate the overall impact of this organism in the risk assessment area (using the comment box to indicate any key issues).</p>	<p>moderate</p>	<p>medium</p>	<p>Impacts are largely going to be restricted to anthropogenic habitats close to human habitation given the limited powers of dispersal. However, the widespread planting of the species in GB combined with the vigorous smothering growth and potential to spread from human garden waste mean that overall impact could increase to moderate if the species invades habitats of high conservation value. It may also incrementally increase economic costs through infestation of hedgerows and costs associated with removal in urban environments.</p>

RISK SUMMARIES			
	RESPONSE	CONFIDENCE	COMMENT
Summarise Entry	very likely	very high	Species was introduced to GB in the late 1800s, and ornamental garden plant trade is still a pathway for entry.
Summarise Establishment	very likely	very high	While the species is established, this seems be mostly in areas close to human habitation (UK Biological Records Centre 2020).
Summarise Spread	slowly	high	Depending on human planting and dumping of garden waste; seed viability and production information lacking, but powers of natural dispersal and reproduction are presumably low given lack of significant establishment away from human habitation areas. Perhaps requires further monitoring of sexual reproduction and dispersal.
Summarise Impact	moderate	medium	Impacts are largely going to be restricted to anthropogenic habitats close to human habitation given the limited powers of dispersal. However, the widespread planting of the species in GB combined with the vigorous smothering growth and potential to spread from human garden waste mean that overall impact could increase to moderate if the species manages to establish in semi-natural habitats of high conservation value. It may also incrementally increase economic costs through infestation of hedgerows and costs associated with removal in urban environments.
Conclusion of the risk assessment	medium	medium	The species has been in GB for a relatively long period of time and is widely distributed through planting and nearby local escape and establishment. Impacts may be more acute at a local infestation scale, but the low dispersal power means that the ongoing invasion risk to GB is not high. However, its widespread distribution means the probability of accidental spread to areas of higher conservation value somewhere in the RA area are elevated. Unchecked spread and increase in abundance at infestation sites are likely to increase the strength of impacts on plant diversity and vegetation composition. Thus concluding risk is moderate. Monitoring of the species distribution to detect incursions in semi-natural habitats of high conservation value is recommended.

Additional questions are on the following page ...

ADDITIONAL QUESTIONS - CLIMATE CHANGE			
3.1. What aspects of climate change, if any, are most likely to affect the risk assessment for this organism?	Rising average temperatures	low	The species is a regulated invasive plant in Spain and is reported as invasive in scattered counties of the USA. As these regions have broadly warmer climates than GB, it is possible that plant performance and invasiveness could increase with climate change in the RA area. But confidence is low due to a lack of data on plant growth and reproduction in relation to temperature.
3.2. What is the likely timeframe for such changes?	50 years	low	Estimates for projected 2070 mean temperature increases in GB are 0.9 - 5.4 °C in summer, and 0.7 - 4.2 °C in winter, depending on the Representative Concentration Pathway (RCP) scenario (Met Office UK 2020).
3.3. What aspects of the risk assessment are most likely to change as a result of climate change?	Spread, Impact	low	Plant growth and growth rates may increase with increased temperatures, leading to increased smothering and suppression of native vegetation at infestation sites. Effects of temperature on reproduction unknown, though seed production is described in other parts of the naturalized range (North America).
ADDITIONAL QUESTIONS - RESEARCH			
4.1. If there is any research that would significantly strengthen confidence in the risk assessment please summarise this here.	a) More detailed surveys of habitats and areas where infestations occur are needed to fully assess ecological	high	Seed production and the scale/intensity/dimensions of ecological impacts need more study, as does an assessment of risks to areas of high conservation value that are anthropogenic habitats/close to propagule sources near human habitation. If a lack of seed production in GB is confirmed, the mechanisms that prevent it need to be understood- for example, does climate play a role, or are key pollinators missing from GB? Is seed production likely to increase

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	impacts. b) Studies of seed production and what limits this would increase confidence in assessment of spread risk currently and in the future.		with increasing temperatures under climate change?
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Please provide a reference list on the following page ...

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