RISK ASSESSMENT SUMMARY SHEET

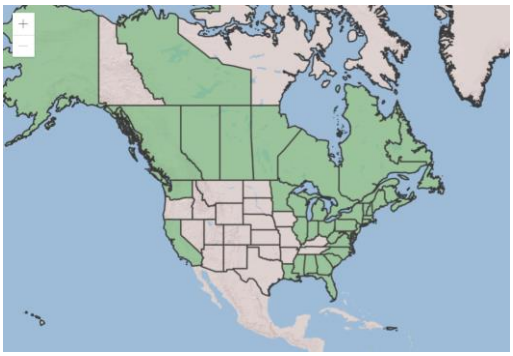
# Purple Pitcher-plant (*Sarracenia purpurea*)


- Carnivorous plant, up to 30cm long, with distinctive purple to red pitchers.
- Localised within GB, with c.16 extant sites in England.
- Deliberately planted, probably by carnivorous plant enthusiasts.
- Prefers high quality bog habitat, usually found in SSSIs, SACs and NNRs.
- Outcompetes native bog vegetation, may also impact on invertebrate communities and disrupt trophic interactions and nutrient cycling.

## History in GB

*S. purpurea* was cultivated at Kew before 1640 but not planted into the wild in GB until the 1960s (1890s in Ireland). Currently known to be established at 16 sites in England, with a further three sites possible but uncertain. Additional sites have existed, but either went extinct or have been eradicated. Not known to be established in Scotland or Wales.

## Native Distribution



Native to subarctic North America to north, central and eastern United states.

## GB Distribution


Source: APHA 2023

## Impacts

Environmental (moderate)

- Outcompetes native bog vegetation, particularly bog mosses and liverworts. Impacts on SSSIs, SACs and NNRs as it requires the high-quality bog habitat found in these to persist.
- May also impact on invertebrate communities which has the potential to significantly alter trophic interactions and nutrient cycling.

Economic (minor)

- Some management costs to control numbers and spread.

Social (minimal)

- None known.

## Introduction pathway

Deliberate planting/seeding (very likely) - carnivorous plant enthusiasts have deliberately planted *S. purpurea* into suitable habitats.

## Spread pathway

Natural (minimal) - limited due to the fragmented nature of its favoured habitat in the lowlands, combined with its limited dispersal ability. More likely to spread within upland habitats, although the number of 'plantings' in this area have been limited so far.

Human (major) - establishment of new sites will primarily be due to deliberate planting by carnivorous plant enthusiasts.

## Summary

| | Response | Confidence |
|---|---|---|
| Entry | VERY LIKELY | VERY HIGH |
| Establishment | VERY LIKELY | VERY HIGH |
| Spread | SLOW | MEDIUM |
| Impact | MODERATE | MEDIUM |
| Overall risk | MEDIUM | MEDIUM |

## GB NON-NATIVE ORGANISM RISK ASSESSMENT SCHEME

**Name of organism:** *Sarracenia purpurea* L. Purple Pitcherplant (Sarraceniaceae)
**Author:** Dr Kevin J. Walker, Botanical Society of the British Isles
**Risk Assessment Area:** Great Britain (England, Scotland, Wales and their islands)
**Version:** Draft 1 (May 2013); Peer Review (Sep 2013); NNRAP 1 (Oct 2013); Draft 2 (Sep 2014); signed off by Programme Board (Sep 2015), placed on GBNNSS website (Nov 2015), NNRAF (Dec 2022)
**Signed off by NNRAF:** December 2022
**Approved by GB Committee:** January 2024
**Placed on NNSS website**: January 2024, updated following stakeholder comments October 2024

**What is the principal reason for performing the Risk Assessment?**

The GB Committee for non-native species is considering whether to add this species to the list of species of special concern. It was selected for consideration by the Committee following a risk assessment that commenced in 2013 and because it is still at an early stage of invasion.

| SECTION A – Organism Information and Screening | | |
|---|---|---|
| **Stage 1. Organism Information** | **RESPONSE** | **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? | Yes | *Sarracenia purpurea* L. (Sarraceniaceae) is currently divided into two subspecies: subsp. *purpurea* and subsp. *venosa* (McPherson & Schnell, 2011). Some authors consider subsp. *venosa* var. *burkii* to be a separate species (*S. rosea*; Ellison *et al*., 2004) but this has not been widely accepted. |
| 2. If not a single taxonomic entity, can it be redefined? (if necessary use the response box to re-define the organism and carry on) | Not applicable | |
| 3. Does a relevant earlier risk assessment exist? (give details of any previous risk assessment) | No | |
| 4. If there is an earlier risk assessment is it still entirely valid, or only partly valid? | NA | |
| 5. Where is the organism native? | North America | *S. purpurea* is the hardiest and most widespread of the eight pitcherplants native to North America and the only species whose range extends into the boreal zone (McPherson & Schnell, 2011). In North America it *g*rows in ombrotrophic bogs, poor fens, and seepage mires throughout Canada east of the Rocky Mountains and along the Atlantic coast of the United States from Maine south to Florida and the extreme southeast of Mississippi (McPherson & Schnell, 2011). |

| | | |
|---|---|---|
| 6. What is the global distribution of the organism (excluding Great Britain)? | Ireland, Europe and New Zealand | *S. purpurea* has been reported from small numbers of sites in Austria, Belgium, Czech Republic, Denmark, France, Germany, Ireland, Sweden, Switzerland and New Zealand (subsp. *venosa* only: Heenan *et al*., 2004). |
| 7. What is the distribution of the organism in Great Britain? | 20 sites in England, 2 in Scotland | In GB *S. purpurea* was in cultivation at Kew before 1640 but was not planted into the wild until the 1960s (1890s in Ireland). Subsp. *purpurea* is currently quite localised with around 20 reported localities in England, and 2 in Scotland. Since 2000 it has been eradicated from 7 sites in England and one site in Scotland. At a further site in England (Edge Hill, Glos.) it has not been reported for many decades and the site is now considered unsuitable due to drainage for forestry.(Walker 2014). |
| 8. Is the organism known to be invasive (i.e. to threaten organisms, habitats or ecosystems) anywhere in the world? | Yes | In recent decades *S. purpurea* has become highly invasive on a few raised bogs and mires in North America (Schwaegerle, 1983) and in parts of Europe (Adlassnig *et al*., 2010; Feldmeyer, 1985; Foss & O'Connell, 1985; Parisod *et al*., 2005; Taggart *et al*., 1990). These include four raised bogs/valley mires in England (Lower Hyde Bog, Holmsley Bog, Wedholme Flow, Nor Moss) where it has shown fast population growth and an ability to outcompete native bog vegetation including rare and threatened bryophytes (Long, 2013; Sanderson, 2012). Anecdotal evidence also suggests that pitchers are having an adverse impact on the native invertebrate fauna at some sites (Long, 2013). |
| **Stage 2. Screening Questions** | | |
| 9. Has this risk assessment been requested by the GB Programme Board? (If uncertain check with the Non-native Species Secretariat) | Yes | |

## SECTION B – Detailed assessment

# PROBABILITY OF ENTRY

Important instructions:

- Entry is the introduction of an organism into GB. Not to be confused with spread, the movement of an organism within GB.
- For organisms which are already present in GB, 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 | CONFIDENCE | COMMENT |
|---|---|---|---|
| 1.1. How many active pathways are relevant to the potential entry of this organism?<br><br>(If there are no active pathways or potential future pathways respond N/A and move to the Establishment section) | very few | high | It is assumed that *S. purpurea* has always been deliberately planted (or more rarely seeded) into suitable habitats, often in places that have been carefully chosen by Carnivorous Plant (CP) enthusiasts, intent on establishing this (and other carnivorous) species in the wild (Kertland, 1968; Long, 2013). Subsequent spread is by waterborne dispersal of seeds across the bog or mire surface either via open water (e.g. pools, runnels, streams) or during periods of inundation during the winter months. In Ireland small numbers of plants have also been 'transplanted' to other sites (some to sites in England) where populations have been threatened from peat extraction (Taggart *et al*., 1990). |
| 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.<br><br>For each pathway answer questions 1.3 to 1.10 (copy and paste additional rows at the end of this section as necessary). | Deliberate planting/seeding | | |
| Pathway name: | Deliberate planting/seeding | | |

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| 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)?<br><br>(If intentional, only answer questions 1.4, 1.9, 1.10, 1.11) | intentional | very high | It is assumed that *S. purpurea* has always been deliberately planted (or more rarely seeded) into suitable habitats, often in places that have been carefully chosen by Carnivorous Plant (CP) enthusiasts intent on establishing this species in the wild (Kertland, 1968; Long, 2013). These populations provide a ready supply of material for horticulture or private collections. Ironically many Irish populations originate from 'transplants' from the original colony in Roscommon when it was threatened by peat extraction (Kertland, 1968; Taggart *et al*., 1990). |
| 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?<br><br>Subnote: In your comment discuss how likely the organism is to get onto the pathway in the first place. | very unlikely | very high | *S. purpurea* is probably only very rarely planted in small numbers. Because it is a slow-growing perennial species that only starts to reproduce after three years and reaches sexual maturity at ca 10 years (Parisod *et al*., 2005) populations can remain undetected. However, after about a decade numbers can increase markedly and high seed production (>1000 seeds per inflorescence) combined with high viability means that populations sizes can ultimately become very large where conditions are favourable. At most sites abundance seems to be controlled primarily by the dispersal of seed into suitable habitats with the largest populations occurring on sites where seed can be freely dispersed by water either along water bodies or during periods when the bog surface is inundated and seeds can be dispersed to suitable areas of habitat. |
| 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 | The locations of deliberate plantings are often chosen with great care to ensure that the conditions are suitable for establishment. Subsequent spread is usually restricted to suitable habitat in the immediate vicinity although in a few cases this has included up to 32 hectares of bog habitat (Kertland, 1968). As yet there is little evidence to suggest that *S. purpurea* can disperse naturally between sites, presumably because its favoured habitat, raised bogs, are highly fragmented and isolated in modern landscapes. However, there is potential for *S. purpurea* to colonise adjacent sites if their drainage systems are connected (e.g. valley mires draining into small bog systems, etc.). |

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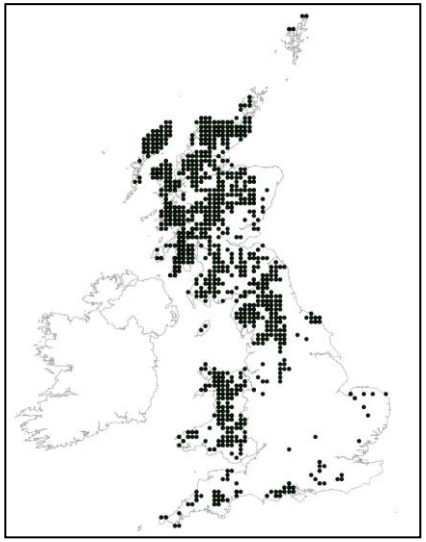
| 1.10. Estimate the overall likelihood of entry into GB based on this pathway? | very likely | very high | There has been an increasing tendency to 'plant-out' *S. purpurea* on bogs in recent decades. These are discussed openly on internet CP forums where the consensus is that such activities are being carried out by a minority of enthusiasts and should not be encouraged. However, given their popularity it seems likely that deliberate planting will continue to occur, especially in the face of control measures, and that further populations will be discovered in the future. |
| *End of pathway assessment, repeat as necessary.* | | | |
| 1.11. Estimate the overall likelihood of entry into GB based on all pathways (comment on the key issues that lead to this conclusion). | very likely | very high | There is really only one pathway – deliberate planting by CP enthusiasts either for personal, commercial or amateur scientific reasons. The species arrived via this pathway in England in the 1960s and Scotland in the 1980s. In England it has become thoroughly naturalised and invasive on a handful of raised bogs and valley mires where it has regenerated freely by seed. There has been an increasing trend to plant it out in recent decades and there is no reason to expect this trend to abate given the popularity of these species in cultivation. Attempts to eradicate it are only likely to increase the number of deliberate plantings in areas where they are likely to go undetected. |

# PROBABILITY OF ESTABLISHMENT

Important instructions:

- For organisms which are already well established in GB, only complete questions 1.15 and 1.21 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 GB? | very isolated | very high | The favoured habitats of *S. purpurea* in GB are raised bogs and associated bog pools, and more rarely blanket bog and valley, step and seepage mires. The majority of sites are lowland (<100 m) but it ascends to 290 m altitude on Rannoch Moor in Scotland and Stoke Flats in Derbyshire. Lowland raised bogs and mires are very localised and fragmented habitats in GB whereas blanket bog is extensive throughout the uplands of northern and northwest England and Scotland. However, most plantings have been on raised bogs and valley mires in the lowlands where they are likely to have the greatest impact due to the more highly threatened nature of the habitat.<br><br>A composite hectad map of the distribution of NVC community types in which *Sarracenia purpurea* has been recorded in Great Britain (list taken from Table 3 in Walker, 2014): M1, M2, M9, M15, M16, M18, M19, M21.<br>  |
| 1.21. How likely is it that biological properties of the organism would allow it to survive eradication campaigns in GB? | unlikely | medium | *S. purpurea* reproduces entirely by seed and so can be relatively easily controlled by removing whole plants and/or inflorescences before seeding. Removal by hand and/or treatment with broad spectrum herbicides such as Glyphosate has been effective in reducing numbers on a handful of sites in GB and Ireland. However, it produces prolific amount of seed (>1000 seeds per inflorescence) and these can |

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| | | | remain viable in the seedbank for up to five years (based on observations on a 'control' site in Dorset). Therefore the monitoring and removal of seedlings and juveniles is essential to any long-term eradication strategy. |

# PROBABILITY OF SPREAD

Important notes:

- 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 GB by natural means? (Please list and comment on the mechanisms for natural spread.) | minimal | medium | The natural spread of *S. purpurea* between sites is probably limited due to the fragmented nature of its favoured habitats in the lowlands combined with its limited dispersal ability. It is much more likely to spread on blanket bogs in the uplands where there are fewer barriers to its dispersal along watercourses and standing water bodies, although currently the number of 'plantings' in this habitat have been limited presumably because of their remoteness and inaccessibility. Natural spread will most likely be via waterborne dispersal although wading birds and waterfowl could potentially disperse seed over much larger distances. |
| 2.2. How important is the expected spread of this organism in GB by human assistance? (Please list and comment on the mechanisms for human-assisted spread.) | major | high | Establishment of new sites will primarily occur through deliberate planting by CP enthusiasts. |
| 2.3. Within GB, how difficult would it be to contain the organism? | easy | high | *S. purpurea* is relatively easy to control by hand-pulling and/or treatment with broad-spectrum systemic herbicides, such as Glyphosate (Round-up), although this may not be considered appropriate on sites with sensitive associated bog vegetation. If this is not practical then the removal of flowers before seeding should be effective in reducing regeneration. However, the monitoring and removal of seedlings and juvenile plants will need to be carried out as the seeds have been shown to survive in bogs for up to five years on one control site in Dorset. |
| 2.4. Based on the answers to questions on the potential for establishment and | | high | *S. purpurea* has been recorded in 20 localities in England, and 2 in Scotland. Since 2000 it has been eradicated from 7 sites in England and one site in |

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| spread in GB, define the area endangered by the organism. | | | Scotland. At a further site in England (Edge Hill, Glos.) it has not been reported for many decades and the site is now considered unsuitable due to drainage for forestry. Its present distribution can viewed on the BSBI website: http://www.bsbimaps.org.uk. Its future distribution is difficult to predict but could extend over much of GB as suitable habitat is scattered throughout lowlands and occurs extensively in the uplands over much of northern and northwestern GB. |
| 2.5. What proportion (%) of the area/habitat suitable for establishment (i.e. those parts of GB were the species could establish), if any, has already been colonised by the organism? | 0-10 | medium | *S. purpurea* has been recorded in 22 localities in GB and is currently extant in 16. Most populations are limited in extent. The proportion of suitable habitat colonised is therefore tiny and probably under 1%. |
| 2.6. What proportion (%) of the area/habitat suitable for establishment, if any, do you expect to have been invaded by the organism five years from now (including any current presence)? | 0-10 | high | At current rates of planting, colonisation and spread *S. purpurea* is unlikely to have increased by much within the next 5 years and would certainly still occupy less than 1% of suitable habitat. |
| 2.7. What other timeframe (in years) would be appropriate to estimate any significant further spread of the organism in Great Britain? (Please comment on why this timeframe is chosen.) | 40 | low | It is very hard to predict over what timescale *S. purpurea* could potentially spread significantly but the history of the plant on sites in Ireland, England and Europe suggests that significant populations can develop from the introduction of just a few plants within a 40-50 year time period. For example, *S. purpurea* colonised over 32 ha of bog in Ireland between 1906 and 1930 (Kertland, 1968); similarly at one site in Switzerland (Tenasses Bog) where it was introduced in 1900 over 25000 individuals now occur (Parisod *et al*., 2005). However, rates of spread vary markedly from site to site depending largely on hydrology, availability of suitable habitat and the ability of seed to be dispersed into these areas. In addition, spread has been prevented or restricted on many sites through control measures (e.g. removal of inflorescences, hand-pulling, etc.). |

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| 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? | 0-10 | low | It seems unlikely that *S. purpurea* will ever invade more than 10% of the available bog and mire habitat suitable for it in GB. However, this should not detract from the localised but significant impacts it is having on some of our most important raised bogs. |
| 2.9. Estimate the overall potential for future spread for this organism in Great Britain (using the comment box to indicate any key issues). | slowly | medium | Without adequate control measures *S. purpurea* will probably continue to spread slowly on a minority of sites where conditions are ideal for dispersal and there is much suitable habitat. Work in the New Forest has shown that it is a highly effective colonist in valley mires and that, in the absence of control, it has the potential to spread significantly and extensively within the confines of sites (Chatters, 2020). However, the potential for spread away from these sites would appear limited given how fragmented many of these habitats are today. On other sites where conditions are not ideal for dispersal (e.g. valley mires) populations will probably always remain small and there should be limited potential for spread even within the confines of the site. |

# 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 GB 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 GB**, including the cost of any current management? | minimal | medium | Although not exhaustive, literature searches have not revealed any evidence for control measures or eradication programmes being implemented in North America, Europe or New Zealand. |
| 2.11. How great is the economic cost of the organism **currently** in GB **excluding management** costs (include any past costs in your response)? | minimal | high | There are no known costs for GB other than activities to control numbers and spread. |
| 2.12. How great is the economic cost of the organism likely to be **in the future** in GB **excluding management** costs? | minimal | high | There are unlikely to be any future economic costs other than direct management to control numbers and spread. One exception might be the costs of restoring degraded bog habitat on sites where *S. purpurea* has become highly invasive although there is no published evidence to suggest the extent to which this might be needed. |
| 2.13. How great are the economic costs **associated with managing** this | minor | high | The cost of manual removal at most sites has been reduced as most of the work has been carried out by volunteer work parties, however this has usually been coordinated by a paid staff member with associated costs |

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| organism **currently** in GB (include any past costs in your response)? | | | (e.g. insurance, training, etc.). At some sites there has also been the cost of machinery to remove the material from the site. Costs were probably more significant at one site in the Lake District where the invaded habitats could only be reached by boat and consequently paid National Trust staff carried out the work as part of their existing jobs. Spot-spraying with Glyphosate has been carried out at one site in Dorset as part of forestry operations carried out by a contractor to Forestry Enterprise. |
| 2.14. How great are the economic costs **associated with managing** this organism likely to be **in the future** in GB? | minor | high | The effective eradication of *S. purpurea* will require annual investment in staff time to coordinate manual removal, removal of seedheads and the monitoring of seedlings and juveniles. |
| 2.15. How important is environmental harm caused by the organism within its existing geographic range **excluding GB**? | moderate | medium | Where abundant *S. purpurea* is clearly out-competing native bog vegetation, in particular bog mosses and liverworts, that usually dominate the habitats that *S. purpurea* invades (Sanderson, 2012). There is also anecdotal evidence that the pitchers may be impacting on the invertebrate assemblages present on the bogs (Long, 2013). |
| 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 GB (include any past impact in your response)? | moderate | low | Where abundant *S. purpurea* has the potential to cause localised declines in the diversity of associated bryophyte, vascular plant and invertebrate assemblages but further research is required to confirm the likely level of impact. For example localised displacement of bryophyte communities on moss cushions and hummocks has been observed at Holmsley Bog (Sanderson, 2012) and Wedholme Flow (walker, 2014), both of which are SACs with a range of threatened species and habitats. |
| 2.17. How important is the impact of the organism on biodiversity likely to be in the **future** in GB? | moderate | medium | As above. |
| 2.18. How important is alteration of ecosystem function (e.g. habitat change, nutrient cycling, trophic interactions) caused by the organism | minimal | medium | Probably not very significant at present. The capture of insect prey in areas where *S. purpurea* pitchers are abundant has the potential to significantly alter trophic interactions, and potentially alter nutrient cycling as a greater quantity of nitrogen, in particular, will be assimilated and therefore not |

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| **currently** in GB (include any past impact in your response)? | | | available to other organisms or returned to the peat. The exclusion of some species may also affect shading and drainage levels locally leading to pronounced habitat changes and shifts in the population dynamics of some associated species. |
| 2.19. How important is alteration of ecosystem function (e.g. habitat change, nutrient cycling, trophic interactions) caused by the organism likely to be in GB in the **future**? | minimal | low | Probably not very significant in the future either. |
| 2.20. How important is decline in conservation status (e.g. sites of nature conservation value, WFD classification) caused by the organism **currently** in GB? | moderate | high | The presence of *S. purpurea* has had a detrimental effect on the 'condition' of a number of SSSIs, SACS, and NNRs . *S. purpurea* is treated as a negative indicator and therefore its presence in large numbers can lead to the site being 'unfavourable' in conservation terms. This has recently occurred at Nor Moss in the Lake District which 'failed' its condition assessment due to the presence of *Sarracenia* combined with birch invasion. Management to remove both have therefore been undertaken to get the site back into 'favourable condition'. |
| 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 GB? | moderate | medium | In England *S. purpurea* has almost exclusively been planted on SSSIs as it requires 'high quality' bog habitat to persist. The impact on conservation therefore might increase if it becomes established on more protected sites in the future. |
| 2.22. How important is it that genetic traits of the organism could be carried to other species, modifying their genetic nature and making their economic, environmental or social effects more serious? | minimal | very high | There are no native members of the Sarraceniaceae in Britain and therefore no threats from hybridisation or introgression. |
| 2.23. How important is social, human health or other harm (not directly | minimal | very high | None known. |

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| included in economic and environmental categories) caused by the organism within its existing geographic range? | | | |
| 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)? | minimal | very high | In North America the aquatic inquiline community of pitchers includes larvae of various mosquitoes, but this is unlikely to be significant. |
| 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 | None known. |
| 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 GB? | moderate | medium | |
| 2.27. Indicate any parts of GB where economic, environmental and social impacts are particularly likely to occur (provide as much detail as possible). | New Forest<br>Dorset Heaths<br>Lake District<br>Solway<br>Derbyshire<br>Peak District<br>Rannoch Moor | very high | This species has become invasive in the New Forest, on the Dorset Heaths and in the Lake District (including coastal raised bogs on the Solway). It is potentially invasive in the Derbyshire Peak District as well as on Rannoch Moor in Scotland. Elsewhere populations have remained small and relatively stable. |

| RISK SUMMARIES | | | |
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| | **RESPONSE** | **CONFIDENCE** | **COMMENT** |
| **Summarise Entry** | very likely | very high | Already present |
| **Summarise Establishment** | very likely | very high | Already established |
| **Summarise Spread** | slowly | medium | Population growth rates are relatively low; poor dispersal and restricted to isolated habitats. Therefore unlikely to naturally colonise other sites. |
| **Summarise Impact** | moderate | medium | Occurs exclusively within threatened habitats (raised bogs, blanket bog, mires) with a sensitive associated flora and fauna. |
| **Conclusion of the risk assessment** | medium | medium | Of moderate risk but a species that should be relatively easy to control and at little cost. |

Additional questions are on the following page ...

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| **ADDITIONAL QUESTIONS - CLIMATE CHANGE** | | | |
| 3.1. What aspects of climate change, if any, are most likely to affect the risk assessment for this organism? | [see comment] | medium | Increased drying out of bogs, particularly in lowland England, will adversely affect this species thereby reducing, rather than increasing, the potential risks. |
| 3.2. What is the likely timeframe for such changes? | 50 | low | |
| 3.3. What aspects of the risk assessment are most likely to change as a result of climate change? | Reduced establishment | low | There will be less suitable habitat and therefore the likelihood of establishment will inevitably diminish although to what extent is very uncertain. |
| | | | |
| **ADDITIONAL QUESTIONS - RESEARCH** | | | |
| 4.1. If there is any research that would significantly strengthen confidence in the risk assessment, please summarise this here. | Impact on associated flora and fauna | high | There is little research into the impacts of invasion on the associated flora and fauna of any of the bog ecosystems currently invaded. Observational studies have looked at the captured prey items in pitchers at a range of sites (Chatters, 2015; Whatmore et al., 2022) but the actual impacts on invertebrate communities has not yet been quantified. The results of such research would significantly strengthen the case for control if it was found to be having significant impacts, particularly on threatened species confined raised and blanket bogs and mires. |

Please provide a reference list on the following page ...

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