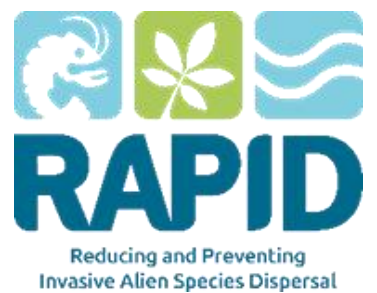




GOOD PRACTICE MANAGEMENT

Water Primrose (*Ludwigia grandiflora*)





GOOD PRACTICE MANAGEMENT GUIDE FOR Water Primrose (*Ludwigia grandiflora*)

Other names: Uruguay water primrose, *L. hexapetala* (same species)
Often incorrectly identified as *L. peploides*

For ID guides and more information:

<http://www.nonnativespecies.org/index.cfm?sectionid=47>

<https://www.cabi.org/isc/datasheet/109148>



Water Primrose (*Ludwigia grandiflora*)

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MANAGEMENT SUMMARY

Ecology and impact of Water Primrose



Water Primrose *Ludwigia grandiflora* is a perennial plant native to South and Central America. It can invade a variety of habitats, particularly ponds, lakes, wetlands, ditches and other watercourses. The plant has been introduced into the UK through the ornamental aquatic plant trade. It primarily spreads by clonal growth and vegetative fragments, though it can spread via seed. It forms dense carpets of growth that exclude native biodiversity, increases flood risk and siltation and degrades water courses for user of these sites.

Effective management: summary

Mechanical removal is the preferred option for management, where the site conditions allow. Post-control assessment is essential both immediately after the control operations to assess the need for further control and additionally at least annually. Further control such as hand removal or application of glyphosate may be required. Liquid glyphosate formulations are effective for reducing biomass of Water Primrose when used with an adjuvant. However, this method requires repeated applications over a number of years and often results in tiny fragments surviving in the soil.

The control of dispersal between freshwater systems is critical as *Ludwigia grandiflora* spreads vegetatively very rapidly. While most *Ludwigia* is found in garden ponds, a number of these ponds discharge to watercourses and are being targeted to work with pond owners to eradicate the plant (Renals, 2017).



MANAGEMENT METHODS



Biological

Biological control of *Ludwigia.grandiflora* by Water Primrose flea beetles has been tested in other countries, but no trials are underway in the UK. (McGregor, et al., 1996).

Chemical

Method: Water Primrose management has been performed using glyphosate-based herbicides, often in conjunction with adjuvants. Glyphosate @ 6 l/ha. Efficacy greatly increased with use of the adjuvant TopFilm @ 1 l/ha (Env Agency, 2010).

Potential equipment requirements (excluding PPE): Knapsack sprayer, preferably with a long-lance.

Most suitable situation for method: Particularly useful for terrestrial growth, thus avoiding deoxygenation problems. Good for sites that have poor access for mechanical/manual removal, or as a treatment following mechanical removal. Herbicide treatment is most effective in dry conditions.

Efficacy: Liquid glyphosate formulations have been effective on reducing biomass of Water Primrose when used with an adjuvant. However, this method requires repeated applications over a number of years and often results in tiny fragments surviving in the soil. Glyphosate is only effective on emergent or floating material (not underwater) so herbicide treatment may not be appropriate where water levels fluctuate. If possible, it may be useful to reduce the water level.

Constraints: Requires AqHeb01 approval and NPTC PA1 & PA6 qualifications. Potential non-target damage. For treatments in water, there is a risk of deoxygenation if large decomposing biomass is not removed. If the pond is heavily infested with weeds it may be best to treat the pond in sections and let each section decompose for about two weeks before treating another section. Aeration, particularly at night, for several days after treatment may help control the oxygen depletion.



If *Ludwigia* is submerged, this treatment cannot be used as there are no chemicals allowed in the UK for submerged vegetation. Treatment would require lowering water levels or waiting until there is a seasonal drop in water level.

When to manage Water Primrose with glyphosate

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec



Mechanical

Mechanical dredging

Method: Mechanical removal is the preferred option for management, where the site conditions allow. A containment net should be set around the treatment area. The containment net should be serviced regularly to remove weed fragments. A digger should be used to scrape off the top 10-20cm and remove as much plant material as possible. A new Regulatory Position Statement allows the burial of Water Primrose on-site or it can be trailed off the site and buried or composted.

Post-control assessment is essential immediately after the control operations to assess the need for further control and additionally at least annually. Further control, e.g. application of glyphosate may be required. Remediation measures, e.g. re-planting or transplantation of native species may be necessary.

Potential equipment requirements (excluding PPE): Digger/swing-shovel, dumper/tractor & trailer. Stop-nets and sweep nets.

Most suitable situation for method: Densely infested sites with good access.

Efficacy: Manual removal has proved effective in areas where Water Primrose has recently become established, but has had limited efficacy on larger sites, or where the plant is well-rooted or established amongst dense vegetation. Manual removal efficacy is improved if the roots are teased out with hand tools and other vegetation is cut back to allow good access.

Constraints: Requires good access and appropriate methods for waste management. Silts may contain heavy metals and other contaminants. Avoid damage to the habitats of sensitive species, such as water voles and nesting birds. The Regulatory Statement for treatment and disposal of invasive non-native plants is available at: <https://www.gov.uk/government/publications/treatment-and-disposal-of-invasive-non-native-plants-rps-178/treatment-and-disposal-of-invasive-non-native-plants-rps-178>

When to manage Water Primrose with mechanical dredging

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec



Manual

Hand pulling

Method: Small patches of *Ludwigia* can be carefully pulled up or dug using spades or forks. It can have thick, long rhizomes so digging may be more effective than hand pulling. Remove roots with hand tools and dispose of material by composting or burying away from water habitats.

Potential equipment requirements (excluding PPE): Boats, drysuits, wheelbarrows, forks, rakes. Vehicle & trailer if not disposing at site. Stop-nets and sweep nets.

Most suitable situation for method: Particularly relevant for smaller infestations, but can be very effective against any size of infestation, depending on the resources and time available. Useful at sites with sensitive areas where non-target damage is an issue. Suitable for volunteer groups.

Efficacy: Good, particularly for small accessible infestations. Hand weeding can be a very efficient follow up method after dredging. In a site in Germany, hand weeding was successfully tested in different sites and subsequently used for management of this species. Within 3 days, more than 99% of the biomass (25 tonnes) was harvested. After the first year, plant regrowth re-occurred only in one extremely muddy site, while in more than 99% of the water body, *L. grandiflora* was eradicated.

Constraints: Time-consuming, labour intensive, can be costly if non-volunteers are required, requires good access and shallow water. The Regulatory Statement for treatment and disposal of invasive non-native plants is available at: <https://www.gov.uk/government/publications/treatment-and-disposal-of-invasive-non-native-plants-rps-178/treatment-and-disposal-of-invasive-non-native-plants-rps-178>

When to manage Water Primrose with hand excavating

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec



Environmental

Controlled water level

Method: Maintain a constant water level, or minimise the level of fluctuation, to reduce the spread of localised infestations.

Most suitable situation for method: Suitable for sites that have the capacity to maintain a constant water level as a prelude to, or in conjunction with, other forms of plant management

Efficacy: Good, if able to be employed easily at the site in conjunction with other control techniques

Constraints: Only reduces spread and of limited applicability to most sites.

When to manage Water Primrose with controlled water level

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Ineffective or unavailable control

Burning

Burning will destroy all seeds and foliage but unless fire is of a very high intensity, rhizomes of established plants will survive and will grow well on bare ground left behind by burning. This method has potential for use in newly established areas, but is incredibly destructive to all life within burn site.



Preventing spread

There is evidence to suggest that Water Primrose has the ability to produce viable seed, which is able to survive for at least four years. There has been research carried out which suggest a number of best practice steps that could help to minimise or contain spread of *Ludwigia*.

Preventing the spread of *Ludwigia* between areas is key in any attempts to contain or eradicate the species. Check, clean, dry is the standard recommended biosecurity measure for treating equipment that will move to other sites. However, a study has shown that treating equipment with hot water (45°C for 15 minutes) is as or more effective, with 97% mortality 1 hour after treatment compared with drying which required around 3.2 days for 90% mortality. This compares to 17 days required for 90% mortality with no treatment (placed in unsealed plastic bags and stored in a climate controlled room at 14 ± 1 °C).

Legislation

Water primrose is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. It is covered by Article 15 (2) of the Wildlife (Northern Ireland) Order 1985 as well. As such, it is an offence to plant or otherwise cause this species to grow in the wild. This species is also banned from sale in England due to its significant negative impacts on biodiversity and the economy. This is covered under The Wildlife and Countryside Act 1981 (prohibition on Sale etc. of Invasive Non-native Plants) (England) Order 2014

Water primrose is also on the EU List of Invasive Alien Species of Union Concern. The EU Regulation (1143/2014) on invasive alien (non-native) species. Under the Under the EU Invasive Alien Species Regulation it is also an offence to import into the EU, keep, grow or cultivate, transport (to, from or within the EU; except to facilitate eradication), place on the market, use or exchange this species - unless there are specific exemption or permit

A link to other resources on legislation of INNS:

<http://www.nonnativespecies.org/index.cfm?sectionid=23>



Health and Safety

Use of glyphosate requires AqHerb01 approval and NPTC PA1 & PA6 qualifications.

[Application to use herbicides in or near water](#)

[City & Guilds Level 2 Principles of Safe Handling and Application of Pesticides \(PA1\)](#)

[City & Guilds Level 2 Award in the Safe Application of Pesticides using Pedestrian Hand Held Equipment](#)

[Health and Safety Executive Code of Practice for Plant Protection Products](#)

Useful resources and guidance on health and safety when planning a project working with invasive species is available on the GBNNSS website:

<http://www.nonnativespecies.org/index.cfm?pageid=266>



References

Anderson L.G., Dunn A.M., Rosewarne P.J. & Stebbing P.D. (2015) Invaders in hot water: a simple decontamination method to prevent the accidental spread of aquatic invasive non-native species. *Biological Invasions*, 17, 2287-2297.

Environment Agency (2010) Managing invasive non-native plants in or near fresh water

<http://www.nonnativespecies.org/downloadDocument.cfm?id=1010>

Hussner, A., Windhaus, M., & Starfinger, U. (2016) From weed biology to successful control: an example of successful management of *Ludwigia grandiflora* in Germany. *Weed Research*, 56(6), 434-441.

McGregor MA, et al. (1996) The potential for biological control of water primrose (*Ludwigia grandiflora*) by the water primrose flea beetle (*Lysathia ludoviciana*) in the Southeastern United States. *Journal of Aquatic Plant Management*, 34:74-76.

Regulatory Statement for treatment and disposal of invasive non-native plants (2016) <https://www.gov.uk/government/publications/treatment-and-disposal-of-invasive-non-native-plants-rps-178/treatment-and-disposal-of-invasive-non-native-plants-rps-178>

Renals, T. (2017) Water primrose control 2017 progress report.

Acknowledgements

Thanks to the Environment Agency for input and advice.



Where To Go For More Information

- ◆ <http://www.anglingtrust.net/>
- ◆ <http://www.invasive-species.org/>
- ◆ <http://www.europe-aliens.org/>
- ◆ <http://www.nonnativespecies.org/beplantwise>
- ◆ <http://www.nonnativespecies.org/home>

RAPID

RAPID is a three year EU funded LIFE project led by the Animal and Plant Health Agency (APHA), with Natural England and Bristol Zoological Society as key partners that piloting innovative approaches to Invasive Alien Species (IAS) management in freshwater aquatic, riparian and coastal environments across England. The project is supported by a number of further Technical Partners.

<http://www.nonnativespecies.org/rapid>