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Zizania latifolia

Species description

Manchurian wildrice (*Zizania latifolia*) is an aquatic and semi-aquatic perennial plant native to China. The species was introduced to Europe, including Belgium, as an ornamental plant for garden ponds, and to serve as a cover for wildfowl. The first records of Manchurian wildrice's presence in the environment in Belgium date from 2009. Escape from cultivation is probably at the origin of its current presence in the wild. Today, while emerging and uncommon in Belgium, the plant might become a problematic aquatic invasive species in the near future. The species is, therefore, a species of the LIFE RIPARIAS alert list. Manchurian wildrice can easily be confused with other plant species including native macrophytes such as *Typha* spp. Its distribution on the Belgian territory is probably underestimated due to a lack of recorded observations, monitoring efforts, and possible confusion with look-alike species.

Fig 1. *Zizania latifolia*. Photo: Marie Patinet

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Photo: anna_efimova

Zizania latifolia

Manchurian wildrice grows well (reaching heights of up to 4m) in shallow stagnant waters such as ponds, ditches, wetlands, and the edges of water systems. As an emerging invasive species in Belgium, the plant has the potential to cause diverse environmental, social and economic impacts. Already highly invasive in some parts of its introduced range (northern Europe and New-Zealand), this invader has the ability to form dense monocultures with subsequent detrimental impacts on the ecosystem and biodiversity. The species can strongly compete with and exclude native plant communities. Social and economic effects include the loss of pastures due to the formation of swampy areas, obstruction of drainage systems, and management-related costs.

Biological characteristics, reproduction and spread

While Manchurian wildrice appears to flower in summer in some parts of Europe (e.g. Lithuania), flowering has not yet been observed in Belgium. Growth is limited in winter and new shoots emerge from underground rhizomes. Manchurian wildrice forms strong and deep root systems with far-reaching rhizomes. The species seems to tolerate frost, drought and heavy water pollution but is sensitive to shade, and requires intense light to grow well.

Reproduction of Manchurian wildrice in Belgium appears to be exclusively vegetative via rhizomes and tillers. Rhizome fragments can form a new plant, and therefore a new population, away from the initial invaded area. The species is also known to reproduce sexually through seed production in its native range, although seed-set has not yet been recorded in Belgium. Spread mainly occurs through fragments of rhizome being transported with watercourses or via human activities with fragments being attached to boats, waders or other water equipment. The species' exceptional capacity for regeneration and dispersal highlight the critical importance of implementing effective management measures.

Fig 2. Manchurian wildrice on the edges of a pond. Photo : Etienne Branquart

References

Arnold, E.H. (1937) Manchurian rice grass (*Zizania latifolia*). Its occurrence and distribution in the Northern Wairoa district. New Zealand *Journal of Agriculture*, 55(3), 129.

Champion, P.D. and Hofstra, D.E. (2010) Manchurian wild rice (*Zizania latifolia*) biomass allocation and implications for control. In: *17Th Australasian Weeds Conference*. New Zealand, pp. 318-320.

Groom, Q. (2011). *Manual of the Alien Plants of Belgium* - Zizania latifolia. https://alienplantsbelgium.myspecies.info/content/zizania-latifolia [Accessed: 10th November 2022].

Invasive Species Specialist Group. (2022). *Global invasive species database* – Zizania latifolia. http://www.iucngisd.org/gisd/species.php?sc=866 [Accessed: 10th November 2022].

Hollings, M. and Hollings, O. (2000) Zizania latifolia – *fit and flourishing over-abundantly in a West Sussex pond.* BSBI News.

Liatukas, Z. and Vaclovas, S. (2009) *Zizania latifolia*—a new alien-plant in Lithuania. *Botanical Lithuanica*, 15, 17–24.

A few management options have been used to control and eradicate the species, but their effectiveness has been limited. There is, however, a lack of available literature on specific management measures for this invasive species. Local eradication of Manchurian wildrice is considered hardly achievable, even for small infestations, as any rhizome fragment will regrow. The eradication feasibility of populations must, therefore, be assessed on a case by case basis, considering site specificities, and be thoroughly discussed within the management team.

Due to the species' ability to reproduce vegetatively by fragmentation, precautionary measures must be implemented before initiating management actions to prevent fragment spread within the managed area or to other water systems. Managed areas are, therefore, isolated by physical barriers.

The harvested plant material must be safely disposed of away from the water and is either buried (6m deep) or destroyed (e.g. dried and incinerated). Plant material must not be composted, even on dry land, as it is highly likely that the plant will regrow. Material that has been in contact with the plant (e.g. tools, clothing) should be checked, cleaned and dried before being taken to another site.

Managed and downstream areas must remain under enhanced surveillance for a period of10 years after the implementation of the last treatment. Regular checks and monitoring activities should be carried out during this period. Eradication can be considered as achieved after 10 years without any signs of regrowth.

Northland Regional Council. (2022) *Manchurian wild rice, Poaceae* - Zizania latifolia. https://www.nrc.govt.nz/environment/weed-and-pest-control/pest-control-hub/?pwsystem=true&pwid=65 [Accessed: 10th November 2022].

Zhao, Y. (2018) Seed characteristic variations and genetic structure of wild *Zizania latifolia* along a latitudinal gradient in China: implications for neo-domestication as a grain crop. *AoB PLANTS*, 10(6), 1-14.

Fig 3. Manchurian wildrice on the edges of a pond. Photo : Etienne Branquart

Manual and mechanical removal

- v Control of small and early-detected populations can be achieved
- v Manual removal is highly selective and will have minimal impact on ecosystems and other organisms
- x Local eradication is unlikely, even for small populations
- x The method is only suitable for small and early-detected infestations
- x There is a risk to spread fragments to uninvaded areas

Method description

The principle is to remove the whole plant from the ecosystem. Plants are dug out in a way that all plant material is removed from the soil, including roots and rhizomes. This management strategy, which can be carried out manually or with machinery, can be conducted all year round. Operators must ensure that all parts of the plant are removed as new plants will develop from fragments of rhizome. Tearing out the plant with bare hand is extremely complicated and will be ineffective, and probably increase the risk of propagation in water systems, as the plant is really well-rooted with tough rhizomes. Adequate material and tools must therefore be used for manual and mechanical removal of Manchurian wildrice. This management method is repeated during multiple years to progressively remove regrowth from remaining rhizomes and new shoots from potential fragments. Manual or mechanical removal is maintained until no further regrowth is observed, which usually takes a few years.

Material

Management: Sharp spades or mechanical diggers, waders

Transport and stocking: Buckets, trucks and containers

Precautionary measures: Hand net, floating booms, containment nets

Fig 4. Manchurian wildrice's roots and tough rhizomes. Photo : Etienne Branquart

References

Champion, P.D. and Hofstra, D.E. (2010) Manchurian wild rice (*Zizania latifolia*) biomass allocation and implications for control. In: *17Th Australasian Weeds Conference. New Zealand*, pp. 318-320.

Northland Regional Council. (2022) *Manchurian wild rice, Poaceae* - Zizania latifolia. https://www.nrc.govt.nz/environment/weed-and-pest-control/pest-control-hub/?pwsystem=true&pwid=65 [Accessed: 10th November 2022].

The impact of management actions on ecosystem services

While the adverse effects of IAS are well-known and provide strong incentives for implementing management actions, the impacts of these management actions on ecosystems and the services they provide are less considered. The matrices are the result of expert assessments of the evolution of relevant ecosystem services (ES) from a highly invaded situation towards a managed situation. ES evolution is considered over 2 given periods of time: 1 year and 5 years after the initiation of management.

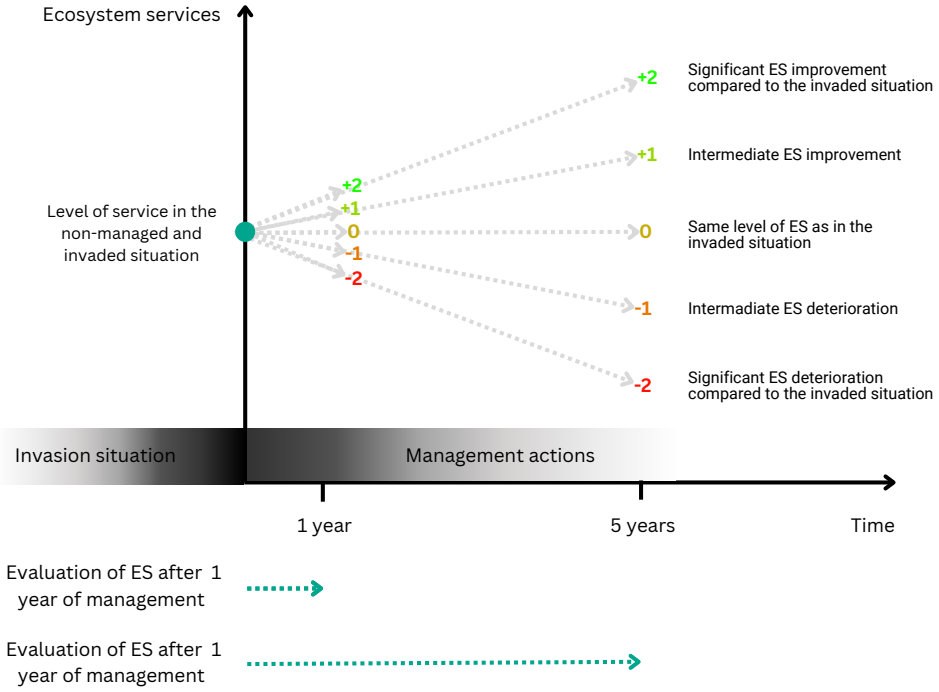

Fig 5. Representation of the survey process

Each matrix displays the average impact scores of management methods on ecosystem services. These scores have been associated to colours to facilitate the visualization of the impacts of every method on every relevant ecosystem service. Green indicates a significant improvement in the ecosystem services (ES) due to management, orange represents no or minimal effect, and red signifies a negative impact of the method on the ES.

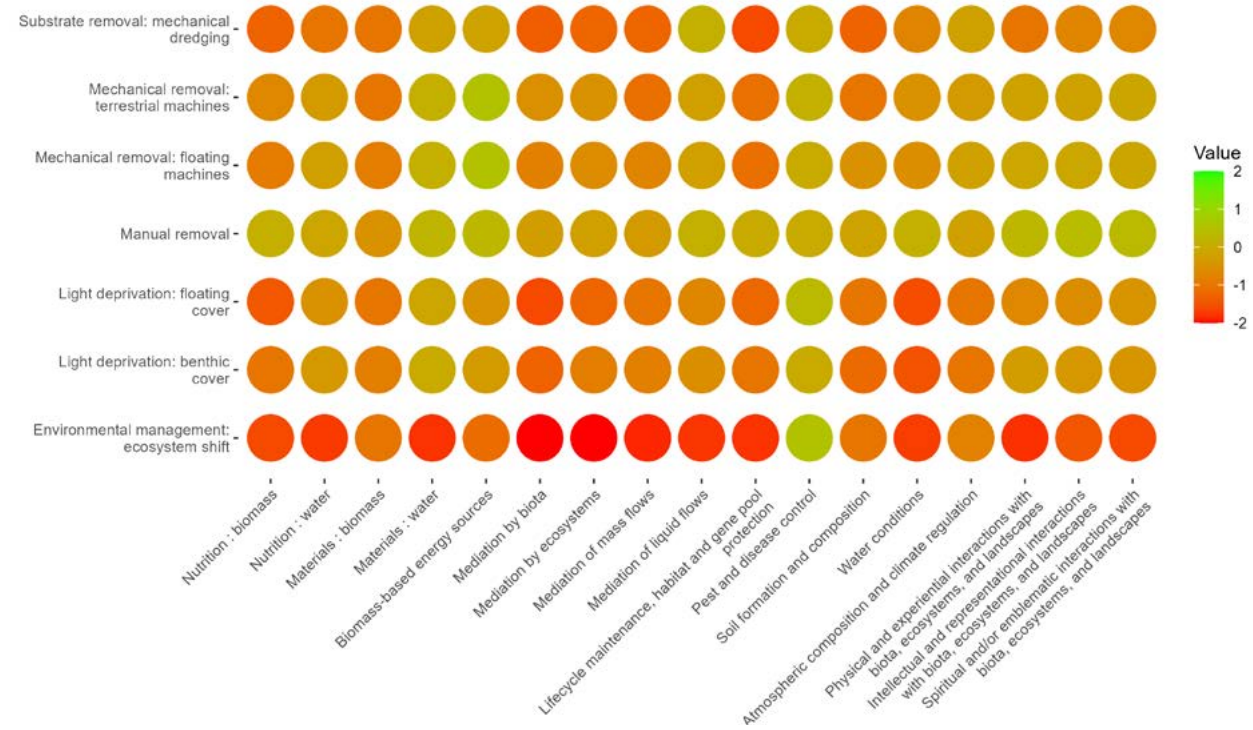

Fig 6. Matrix displaying the impact of management methods for aquatic plant species on ecosystem services after 1 year

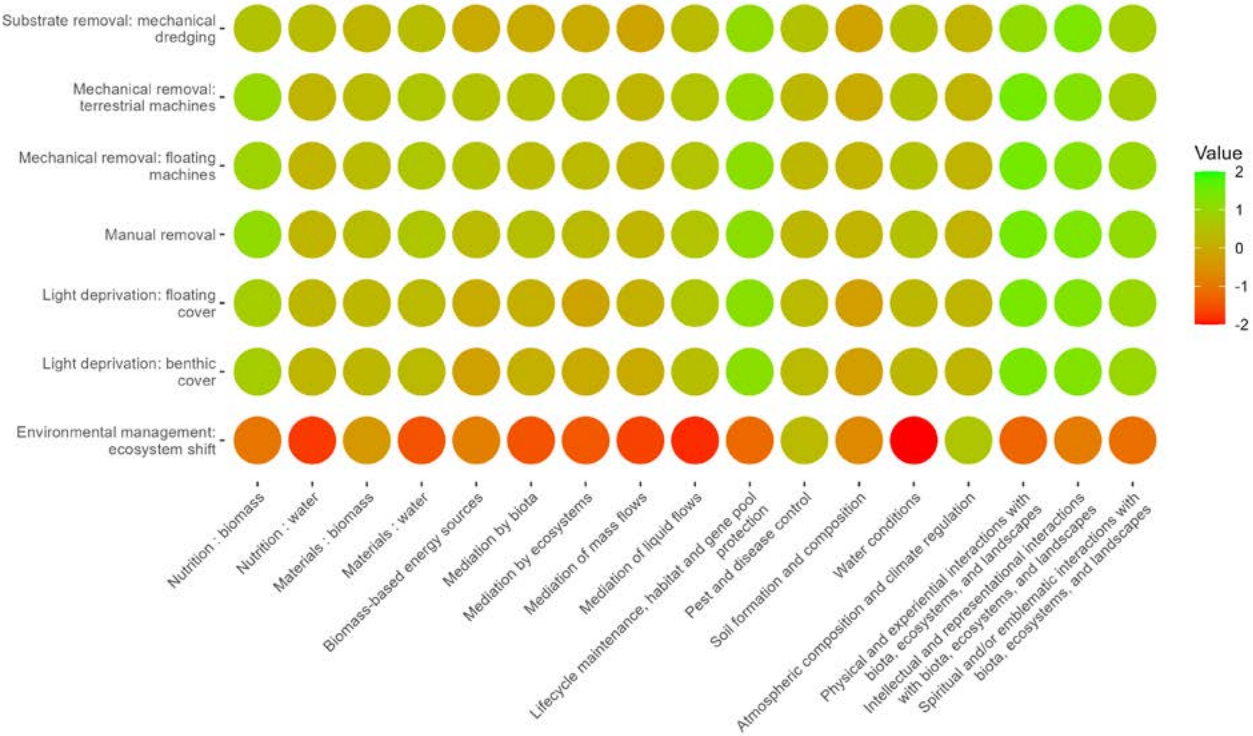

Fig 7. Matrix displaying the impact of management methods for aquatic plant species on ecosystem services after 5 years

LIFE RIPARIAS

Reaching Integrated and Prompt Action in Response to Invasive Alien Species

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