

# Invasive alien aquatic and riparian plant species

## Identification guide



**RIPAR IAS**

Reaching Integrated and Prompt Action  
in Response to Invasive Alien Species

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# INTRODUCTION

## The LIFE RIPARIAS project

Invasive Alien Species (IAS) are species that are accidentally or intentionally introduced outside their natural range, and which may cause many issues due to their rapid spread. In Europe, IAS are a growing threat to ecosystems and biodiversity. The presence of IAS can also have socio-economic implications and adversely affect human health.

Nevertheless, responses to address the issue of biological invasion have often been insufficient and actions have had varying and sometimes limited results. The diversity of actors involved in IAS management alongside the fragmented nature of available IAS data sources impede the implementation of concerted and coherent management actions. Moreover, the number of IAS and associated costs are constantly increasing. It has therefore become essential to take efficient and coordinated decisions in order to determine which species and sites should be considered as a priority for management actions.

To address these challenges, Belgian authorities and their partners have joined forces through the LIFE RIPARIAS project, which aims to optimise the management of IAS in aquatic and riparian environments. To do so, a scientific evidence-based workflow setting up priorities for action has been developed. This efficiently guides decision-makers and managers through the IAS management decision-making process.

The project targets riparian and aquatic plant species that are listed as IAS of EU concern under the EU Regulation No 1143/2014. Other species included in an alert list are also targeted for early detection and rapid eradication.

The LIFE RIPARIAS project is developing and testing its innovative approach in the Dyle, Senne and Marcq river basins in the Scheldt river basin district. This pilot area covers 263,103,000 ha across the three regions of Belgium (the Walloon Region, the Flemish Region and the Brussels-Capital Region). This project is co-funded by the European Union as part of the LIFE Programme.

# INTRODUCTION

## Species of Union concern

IAS listed as "species of Union concern" are species representing a major threat to biodiversity and ecosystems. Since 2015, a European Regulation on invasive alien species (No 1143/2014) compels Member States to take measures to address the issue of IAS. This Regulation was established with the aim to curb the phenomenon on a continental scale.

The regulation aims to prevent the introduction and establishment of listed species, while minimising and mitigating the adverse effects associated with their spread. The Union list entered into force in July 2016 and was updated in 2022 with a total of 88 species. Listed species are subject to restrictions which include restrictions on introducing, keeping, breeding, growing, transporting, selling, exchange and use.

## LIFE RIPARIAS alert list species

Alert lists can be defined as lists of alien species that are not yet present in a certain area, or with a very limited distribution, and that pose a threat to biodiversity.

Active surveillance and monitoring are recommended for a prompt response in the event of introductions and spread in the wild.

An alert list of freshwater aquatic and riparian plant and crayfish species was established for the LIFE RIPARIAS territory. This list was developed using information such as species availability on the Belgian market, the risk of establishment, spread and impact on biodiversity (assessment made via the Harmonia+ risk scoring system).

The alert list includes 9 plant species native to various regions of the world.

# HOW TO USE THIS GUIDE?

This identification guide has been designed to help field managers to recognise species targeted by the project, so that they can actively participate in the enhanced surveillance of IAS.

The guide is made of handy identification sheets. The sheets are divided into two groups: the first group concerns species of Union concern targeted by the LIFE RIPARIAS project\*; the second one involves LIFE RIPARIAS alert list species.

For each group, species are listed in alphabetical order by scientific name (latin name).

In order to facilitate the recognition of species in the field and to prevent identification errors, look-alike species (indigenous or exotic) are frequently presented for comparison. This look-alike species list is not exhaustive and only provides information on species found in the wild in Belgium.

Identification sheets have been designed using information based on morphological characteristics observed in Belgian populations. In their natural range, some species may present characteristics that are not observed in Belgium, such as the presence of flowers.

For identification, it is recommended to collect sufficient plant material during the growing season. Ideally, several organs (stems, leaves, flowers, etc.) should be observed before making a diagnosis, by comparing the collected specimen with the criteria illustrated in the sheets. In case of doubt, it is recommended to refine the identification with the help of more detailed works. In order to avoid the dispersion of IAS in aquatic environments, it is important to:

- **Check** the equipment and clothing to ensure the absence of mud, plant fragments and seeds.
- **Clean** the equipment, shoes and clothing with clean water.
- **Dry** the equipment and clothing for at least 48 hours.

\**Elodea nuttallii* is a species of EU concern that is not targeted by the project due to its low detectability and the low effectiveness of containment measures. The species is however included in this guide as it is widespread in Belgium.



## Species of Union concern



# Fanwort

*Cabomba caroliniana*

Species of Union concern



©alexis\_orion (1)



Invasive species native to America. **Not very common** in the wild in Belgium

Found in **fresh, stagnant** or **slow-moving** waters often **rich in nutrients**



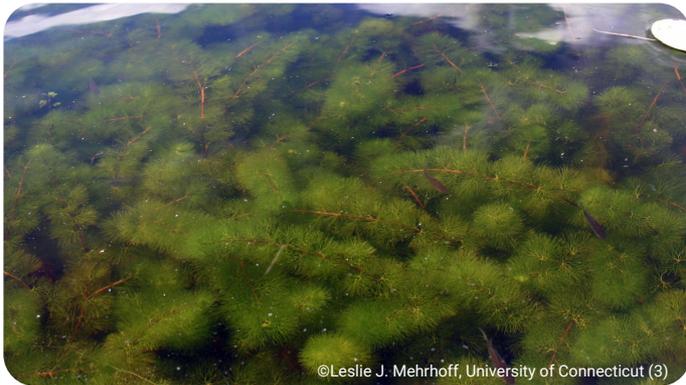
**Aquatic** or **semi-aquatic** plant, entirely **submerged**, except for the flowers. Stems can be up to 10 m long

Fan-shaped leaves (dichotomous branching) with a long petiole



©Kieft Ben (2)

Forms **dense mats**



©Leslie J. Mehrhoff, University of Connecticut (3)

If you spot that species, record your observation on

**Observations.be** **iNaturalist**

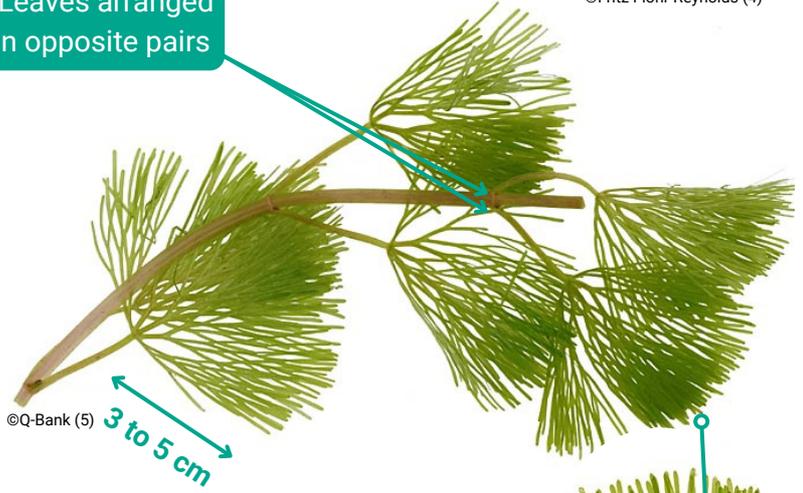
You will contribute to the protection of our ecosystems against invasive alien species

Small flowers (0,5 to 2 cm in diameter) of variable colours, but yellow in the center



©Fritz Flohr Reynolds (4)

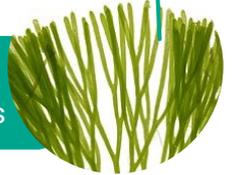
Leaves arranged in opposite pairs



©Q-Bank (5)

3 to 5 cm

Forked leaves with rounded tips



©Kieft Ben (6)

## Not to be confused with



©GB Non-native species (7)

### *Myriophyllum* spp. - Exotic

- Leaves arranged in whorls
- Pinnate leaves

### *Ranunculus* spp. - Native

- Alternate leaf arrangement
- Short petioles



©Kieft Ben (8)



©Kieft Ben (9)

### *Ceratophyllum* spp. - Native

- Leaves arranged in whorls
- "Fork-shaped" leaves
- Leaves slightly thorny, rough to the touch



# Nuttall's waterweed

*Elodea nuttallii*

Species of Union concern



©LIFE RIPARIAS



Invasive species native to North America. **Widespread** in the wild in Belgium

Found in **fresh, stagnant** or **slow-moving** waters



**Submerged** aquatic plant. Can measure a **few centimeters** to **several meters** long

Forms **dense mats** just below the surface of the water



©Christian Fischer (1)

Elongated, soft leaves bent like claws towards the stem with a sharp tip and wavy margins



©Christian Fischer (2)

Leaves in whorls of 3 (2 to 4)

Leaves measuring 10 to 25 mm

If you spot that species, record your observation on

 [Observations.be](https://observations.be)  [iNaturalist](https://www.inaturalist.org)

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## Not to be confused with

### *Egeria densa* - Exotic

- Soft elongated strap-shaped leaves, up to 4 cm long
- Leaves are in whorls of 4 to 5, very close to each other
- Large white flowers



©LIFE RIPARIAS



©LIFE RIPARIAS

### *Elodea canadensis* - Exotic

- Short rigid leaves (< 2 cm) with rounded tips and finely serrated margins
- Leaves occur in whorls of 3 (sometimes 2 to 4), fairly spaced along the stem

### *Lagarosiphon major* - Exotic

- Alternate and spiral leaf arrangement along the stem
- Leaves are curved towards the stem and numerous at its top
- Elongated leaves (up to 3 cm) with sharp tip



©LIFE RIPARIAS



©Robert Vidéki, Doronicum Kft., Bugwood.org (3)

### *Hydrilla verticillata* - Exotic

- Sharp leaves with marked serrated margins, up to 2 cm long
- Leaves occur in whorls of 5 (sometimes 4 to 8)



# Giant hogweed

## *Heracleum mantegazzianum*

Species of Union concern



©Etienne Branquart



Invasive species native to western Caucasus. **Widespread** in the wild in Belgium

Found **along waterways, roads** or in **gardens**



**Terrestrial** plant that can grow to heights of 3 to 4 m

Large toothed leaves which are deeply divided and dissected.  
Glossy appearance due to the absence of hair



©Leslie J Mehrhoff (1)

Forms **dense monospecific stands**



**Toxic sap** which can cause severe burns

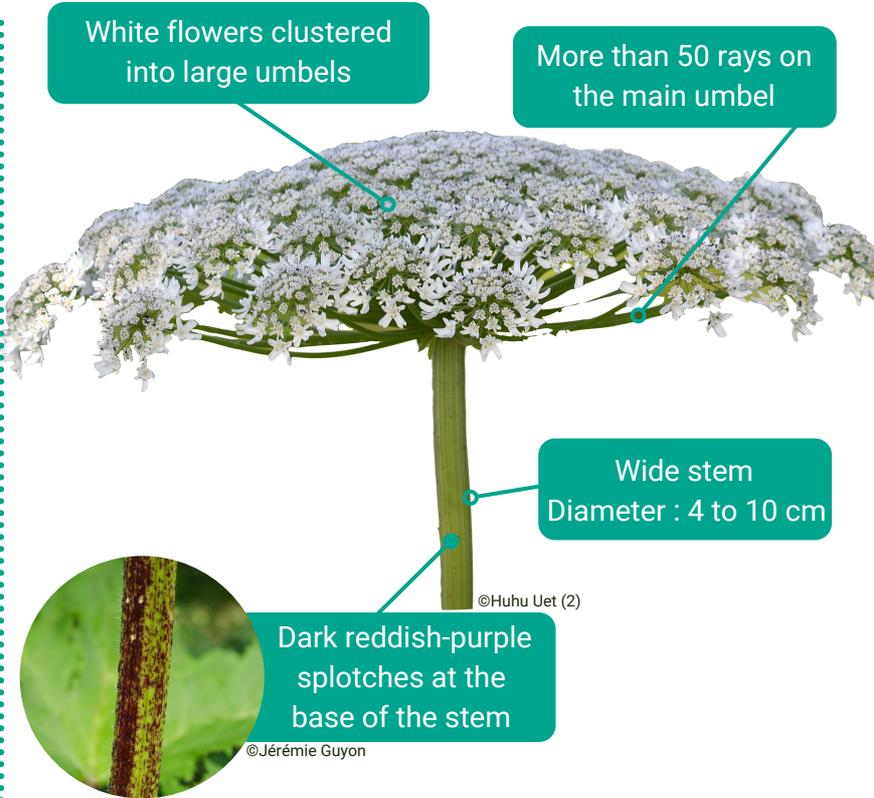


©Etienne Branquart

If you spot that species, record your observation on

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White flowers clustered into large umbels

More than 50 rays on the main umbel

Wide stem  
Diameter : 4 to 10 cm



Dark reddish-purple splotches at the base of the stem

©Jérémie Guyon

©Huhu Uet (2)

There are 2 other invasive alien species of giant hogweed that can be differentiated through genetic analysis

## Not to be confused with

### *Heracleum sphondylium* - Native



©Júlio Reis (3)

- Less than 30 rays on the main umbel
- Round and hairy leaves giving a matt appearance
- Smaller size (<2m)
- Ridged hollow stem with diffuse red spots

### *Angelica archangelica* - Native

- Round umbels
- Greenish-white flowers
- Finely toothed leaves
- Smaller size (<2m)



©Wouter Hagens (4)

# Floating pennywort

*Hydrocotyle ranunculoides*

Species of Union concern



©Etienne Branquart



Invasive species native to America. **Widespread** in the wild in Belgium

Found in **fresh, stagnant** or **slow-moving** waters



**Aquatic** plant, **floating** or **emerged**, rooted in banks and shallow mud

Round and shiny leaves with toothed lobes and a deep cut at the base



©Marie Patinet

Forms **dense mats** up to 40 cm above the water surface



©Etienne Branquart

If you spot that species, record your observation on

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Petiole measuring 5 to 40 cm, inserted at the base of the cut

©Kieft Ben (1)



up to 7 cm

Long, floating stem



Roots at the nodes

©Kieft Ben (2)

## Not to be confused with

### *Glechoma hederacea* - Native



©Marie Patinet

- Terrestrial plant
- Small, heart-shaped leaves with fine fuzzy hair
- Mint smell when leaves are crushed

### *Hydrocotyle vulgaris* - Native

- Rarely found in water
- Small, umbrella-shaped leaves (< 5 cm) with no cut at the base



©Saxifraga-Jasenka Topic (3)



©Stefan.lefnaer (4)

### *Ranunculus sceleratus* - Native

- Leaves clustered at the base of the plant
- Well-defined triangular lobes



# Himalayan balsam

*Impatiens glandulifera*

Species of Union concern



©Etienne Branquart



Invasive species native to the Himalayas. **Widespread** in the wild in Belgium

Found in **alluvial forests** and **open areas** along streams, sometimes **far from rivers in the alluvial plain**



**Terrestrial** plant that can grow to heights of 2,5 m

Toothed leaves measuring 5 to 20 cm long in whorls of 3 or opposite.  
Seed pods opening by explosion.

Flowering from June to October



©Jérémie Guyon

Forms **dense stands**



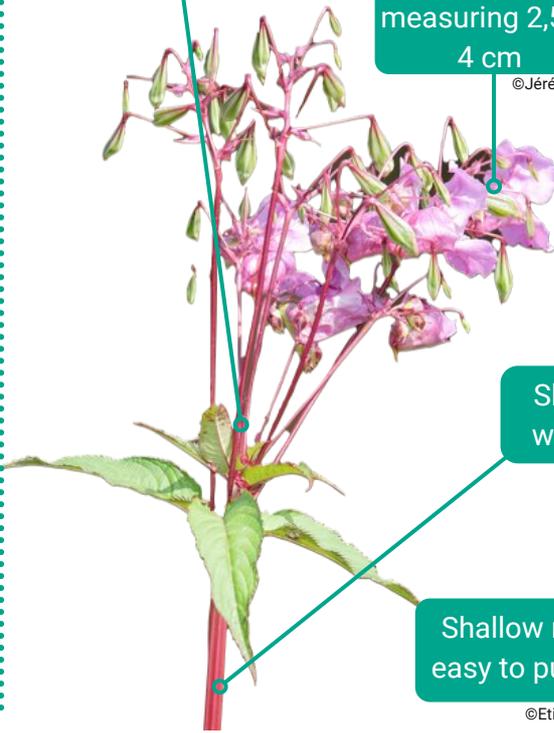
Reddish petioles with two glandular structures at their base

©MurielBendel (1)



Pink flowers measuring 2,5 to 4 cm

©Jérémie Guyon



Shiny hollow stems with a reddish color

Shallow roots easy to pull out



©Etienne Branquart

©James T M Towill (2)

## Not to be confused with

### *Impatiens balfourii* - Exotic

- Alternate leaf arrangement with 40 to 50 teeth on each side
- Bicoloured flowers with a white upper part



©Atman274 (3)

### *Senecio ovatus* - Native

- Alternate leaf arrangement
- Deep roots difficult to pull out
- Yellow flowers



©Patrice78500 (4)

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# Himalayan knotweed

*Koenigia polystachya*

Species of Union concern



©Frank Vincentz (1)



Invasive species native to the Himalayas. **Widespread** in the wild in Belgium

Found along **waterways, roadsides and railroads**, as well as in **vacant lots**



**Terrestrial plant** that grows to a height of 40 to 120 cm

Oblong to lanceolate leaves with marked tip, glabrous on the upper face and hairy on the lower face



©Rens Hendrickx (2)

**Rhizomatous plant forming dense colonies**



©Gilles San Martin (3)

If you spot that species, record your observation on

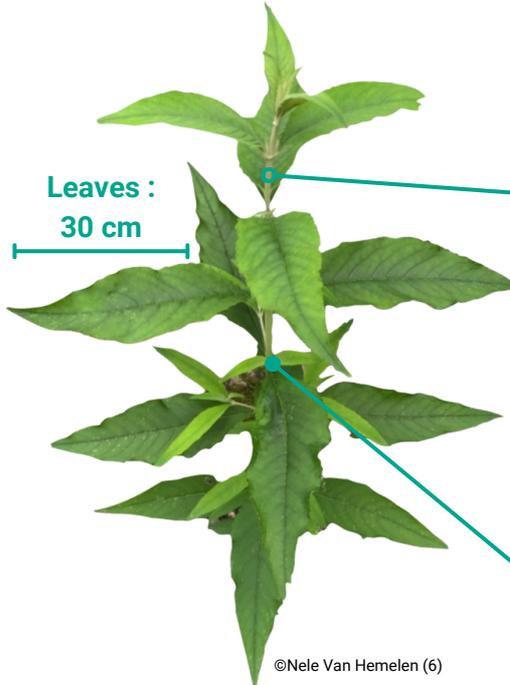
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Creamy-white or pinkish flowers in leafy panicles, with blue stamens



©Vinayaraj (4)



Leaves :  
30 cm

Brown stipules



©Paul en Marianne (5)

Reddish, hollow and erect stems

©Nele Van Hemelen (6)

## Not to be confused with

### *Bistorta officinalis* - Native

- Simple light green leaves, narrowed at the base
- Pink flowers, in oblong-cylindrical and compact terminal spike



©Agnieszka Kwiecień, Nova (7)

### *Rumex obtusifolius* - Native

- Very large oval leaves with petioles and slight wavy edges
- Green flowers in very close whorls, in clusters



©Saxifraga-Jasenska Topic (8)

### *Fallopia japonica* - Exotic

- Alternate leaf arrangement with ovate-triangular leaf blades, truncated at the base



©Michael Gasperl (9)

# Curly waterweed

*Lagarosiphon major*

Species of Union concern



©Saxifraga-Peter Meininger (1)



Invasive species native to South Africa. **Not very common** in the wild in Belgium

Found in **fresh, stagnant or slow-moving** waters



**Submerged** aquatic plant. Can measure **a few centimeters** to **several meters** long

Forms **dense mats** just below the surface of the water



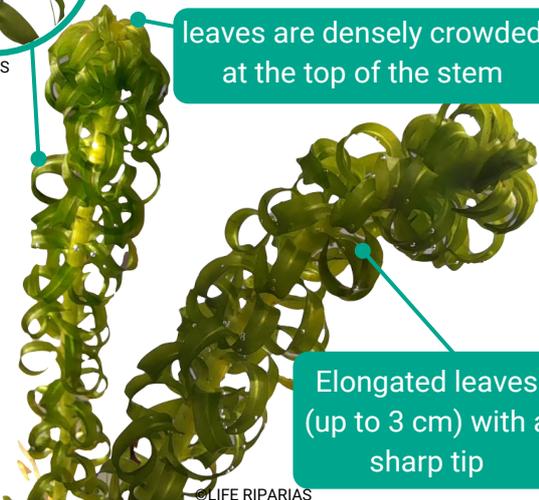
©Saxifraga-Peter Meininger (2)



©LIFE RIPARIAS

Alternate and spiral leaf arrangement, only visible at the base of the stem

leaves are densely crowded at the top of the stem



©LIFE RIPARIAS

Elongated leaves (up to 3 cm) with a sharp tip

If you spot that species, record your observation on

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## Not to be confused with

### *Egeria densa* - Exotic

- Soft elongated strap-shaped leaves, up to 4 cm long
- Leaves are in whorls of 4 to 5, very close to each other
- Large white flowers



©LIFE RIPARIAS

### *Elodea canadensis* - Exotic

- Short rigid leaves (< 2 cm) with rounded tips and finely serrated margins
- Leaves occur in whorls of 3 (sometimes 2 to 4), fairly spaced along the stem



©LIFE RIPARIAS

### *Elodea nuttallii* - Exotic

- Leaves occur in whorls of 3 (sometimes 2 to 4)
- Elongated leaves (up to 2.5 cm), soft and curved, with a sharp tip



©LIFE RIPARIAS

### *Hydrilla verticillata* - Exotic

- Sharp leaves with marked serrated margins, up to 2 cm long
- Leaves occur in whorls of 5 (sometimes 4 to 8)



©Robert Vidéki, Doronicum Kft., Bugwood.org (3)



# Water-primrose

*Ludwigia grandiflora*

Species of Union concern



©Marie Patinet



Invasive species native to South America. **Widespread** in the wild in **Northern Belgium**

Found in **fresh, stagnant or slow-moving waters and wet meadows**



**Aquatic and semi-aquatic plant**, with submerged or emerged stems. Stems emerge **up to 80 cm** above the water surface

Alternate leaf arrangement. Elliptic leaves with matt appearance (floating leaves) or lanceolate leaves (leaves of emerged stems)

©Etienne Branquart



©Marie Patinet

Forms **dense mats** on the surface of the water



Glabrous and elliptic floating leaves with petioles, growing in rosette-like shape



©Etienne Branquart

Marked white leaf veins

Slightly hairy leaves with a short petiole

Pubescent and rigid stems freely branching

Triangular stipules

©Marie Patinet



©Traumrune

## Not to be confused with



*Ludwigia peploides* - **Exotic**

- Smaller flowers
- Petals do not overlap
- Rounded stipules
- Glabrous erected leaves and stems

©Jardín Botánico Nacional, Viña del Mar, Chile (1)

*Veronica beccabunga* - **Native**

- Blue flowers
- Opposite leaf arrangement. Toothed leaves with very short petioles



© Arnaud Monty

If you spot that species, record your observation on

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# Floating primrose-willow

*Ludwigia peploides*

Species of Union concern



©Arnaud Monty



Invasive species native to South America. Widespread in the wild in Northern Belgium

Found in fresh, stagnant or slow-moving waters. Prefers sunny areas



Semi-aquatic or aquatic plant. Stems emerge up to 50 cm above the water surface

Alternate leaf arrangement. Rounded to lance-shaped leaves that range from 3 to 6 cm long



©Jérémie Guyon

Forms dense mats on the surface of the water



©M. Ravez

If you spot that species, record your observation on

[Observations.be](https://observations.be) [iNaturalist](https://www.inaturalist.org)

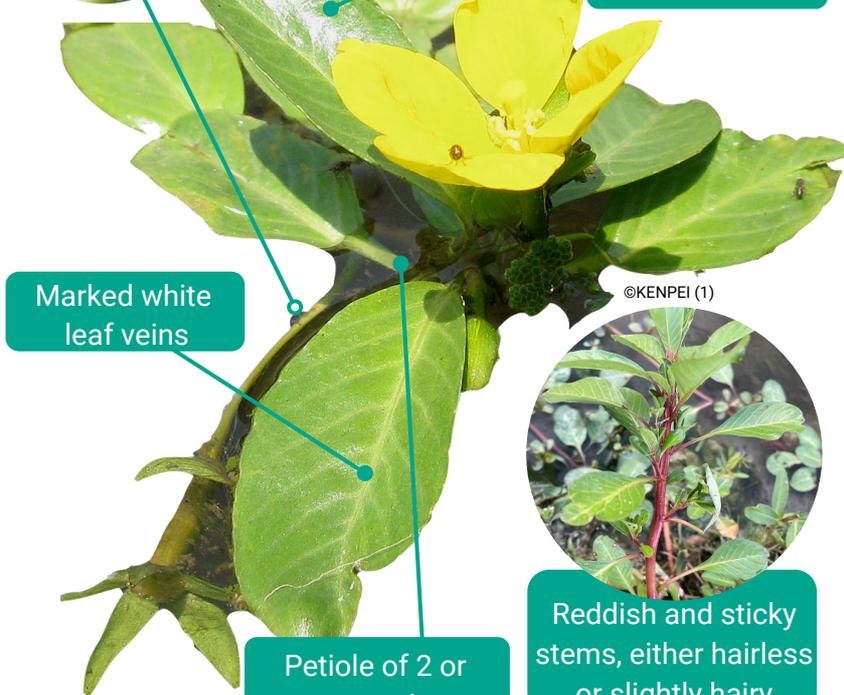
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Round stipules

©Arnaud Monty

Shiny and glabrous leaves, except on the lower leaf surface



Marked white leaf veins

©KENPEI (1)



Reddish and sticky stems, either hairless or slightly hairy

©morganalston (2)

Petiole of 2 or more cm long

## Not to be confused with



©Etienne Branquart

### *Ludwigia grandiflora* - Exotic

- Emerged leaves are lanceolate and hairy
- Overlapping petals
- Triangular stipules

### *Veronica beccabunga* - Native

- Blue flowers
- Opposite leaf arrangement. Toothed leaves with very short petioles



© Arnaud Monty



# American skunk cabbage

*Lysichiton americanus*

Species of Union concern



Invasive species native to North America. **Rare** in the wild in Belgium

Found in **peat bogs, marshes, near rivers and waterbodies**



**Semi-aquatic and aquatic** plant. From 30 to 100 cm high

Musty like odour when flowers and leaves are **crushed**. Flowering from April to May



©Jérémie Guyon

Forms **large and dense clumps** of vegetation



©David Knott

Bright yellow bract at the base of the inflorescence (spathe)

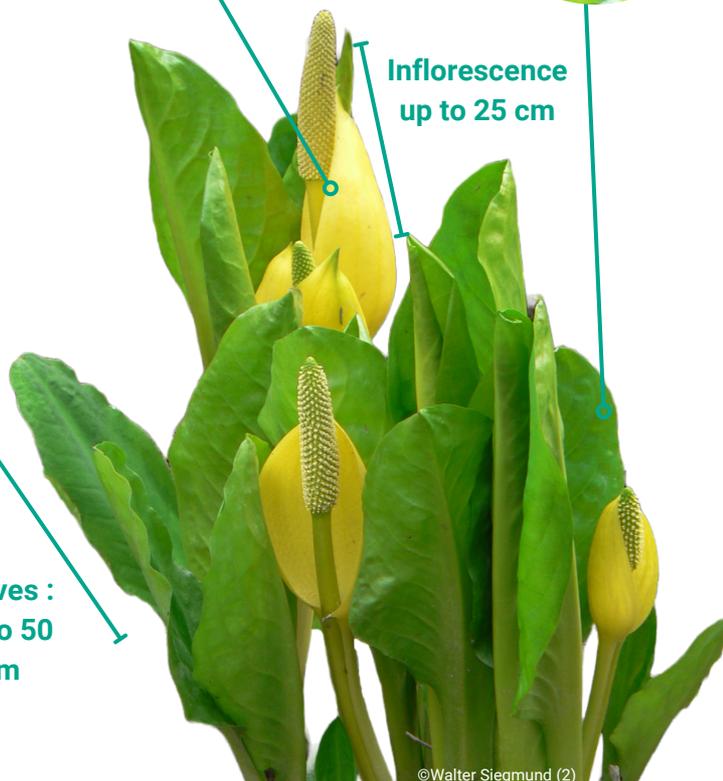
Shiny, thick, leathery leaves with dark spots

©Jérémie Guyon



Inflorescence up to 25 cm

Leaves : up to 50 cm



©Walter Siegmund (2)

## Not to be confused with

### *Lysichiton camtschatcensis* - Exotic

- Matt leaves, absence of dark spots
- White spathe
- Odourless plant
- In Belgium, presence of hybrids between *L. americanus* and *L. camtschatcensis*.



©Wendy Cutler (3)

### *Calla palustris* - Native

- Leaf blades are cordate at the base and acuminate at the top
- Bright red berries



©Anneli Salo (4)

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# Parrot's feather

## *Myriophyllum aquaticum*

Species of Union concern



©Dido Gosse



Invasive species native to Central and South America. **Widespread** in the wild in Belgium

Found in **stagnant or slow-moving freshwater**. Prefers **shallow waters and muddy substrates**



**Aquatic and semi-aquatic plant, entirely submerged** in spring and forming **emergent stems** in summer

Pectinate leaves occurring in whorls. Emergent leaves are blue-green in colour



©Jérémie Guyon

Forms **dense mats**



©Dido Gosse

If you spot that species, record your observation on

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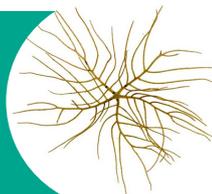
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Emergent part: 14-40 cm

©Q-Bank (1)

Submerged light-green leaves which appear feather-like. From 2,5 to 3,5 cm long



©Q-Bank (2)

Tiny white flowers occurring on the leaf axils on the emergent stem



©Darrel Brown (3)

Robust stem, green at the top and reddish at the base

## Not to be confused with



©Etienne Branquart

### *Myriophyllum rubricaulum* - Exotic

- Less robust plant
- Stem is entirely red
- Pink flowers

### *Hippuris vulgaris* - Native

- Entire leaves in whorls of 6 to 12
- Stem emerging up to 30 cm above the surface
- Looks like miniature Christmas trees



©Christian Fischer (4)



©Miguel Porto (5)

### *Myriophyllum* spp. - Native

- Entirely submerged plant
- Leaves divided into 3 to 14 leaflet pairs
- Internodes of the same length as leaves or of half of the leaf length



# Broadleaf watermilfoil

*Myriophyllum heterophyllum*

Species of Union concern



©Leslie J. Mehrhoff, University of Connecticut (1)



Invasive species native to Southeastern United States. Rare in the wild in Belgium

Found in **fresh, stagnant or slow-moving** water often rich in **nutrients**



**Aquatic and semi-aquatic** plant, entirely **submerged** in spring and forming **emergent stems** in summer and fall.

Leaves occurring in whorls. Submerged leaves are pinnate. Internodes about 1/4 of the leaf length



©Klaus van de Weyer (2)

Covers the whole water body



© Evan W. (9)

If you spot that species, record your observation on

**Observations.be** **iNaturalist**

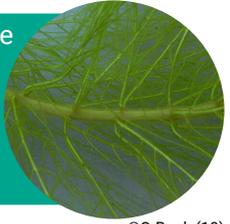
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Emergent part: 3-15 cm

©Stefan.lefnaer (3)

Submerged leaves are feather-like (2 to 5 cm). Whorls are irregular at the base of the stem



©Q-Bank (10)

Pink flowers occurring on the leaf axils on the emergent stem. Flowering from June to July



©Leslie J. Mehrhoff (4)

Emergent leaves are entire, toothed and of reduced size (0.5 to 3 cm)



©Stefan.lefnaer (5)

## Not to be confused with



©Miguel Porto (6)

### *Myriophyllum* spp. - Native

- Entirely submerged plant
- Leaves divided into 3 to 14 leaflet pairs
- Internodes of the same length as leaves or of half of the leaf length

### *Hippuris vulgaris* - Native

- Entire leaves in whorls of 6 to 12
- Stem emerging up to 30 cm above the surface
- Looks like miniature Christmas trees



©Christian Fischer (7)



©Stefan.lefnaer (8)

### *Ceratophyllum* spp. - Native

- Whorled leaves
- "Fork-shaped" leaves





## **LIFE RIPARIAS alert list species**



# Cape-pondweed

*Aponogeton distachyos*

LIFE RIPARIAS alert list species



©Cillas (1)



Invasive species native to South Africa. **Uncommon** in the wild in Belgium

Found in **fresh, stagnant** or **slow-moving** water often **rich in nutrients**



**Aquatic** plant with semi-persistent **floating leaves**, developing from a tuber. From 50 to 120 cm

Oval or narrow-lanceolate leaves with a colouration going from pale to dark green, with a pale distinctive central vein measuring from 5 to 30 cm



©H. Zell (2)

Can form **dense mats** on the surface of the water



©Dwergenpaartje (3)

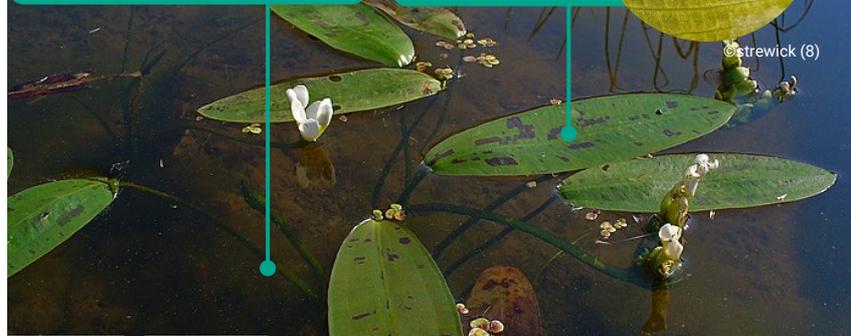
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The petioles and the peduncle are developed from a tuber buried in the mud

Veins arranged in marked perpendicular networks



©strewick (8)



©H. Zell (4)

Forked inflorescence bearing white and vanilla-scented flowers

Tough, elongated and floating leaves, often with purple spots and with a very long petiole

## Not to be confused with

### *Potamogeton* spp. - Native

- Green to brownish flower spikes
- Oval, round or cordate leaf base. From 2 to 10 cm long
- Parallel veins



©Vladimir Bryukhov (6)

### *Persicaria amphibia* - Native

- Pink flower spikes
- Oval or elongate leaves measuring from 5 to 15 cm



©Stefan Iefnaer (7)

# New Zealand pigmyweed

*Crassula helmsii*

LIFE RIPARIAS alert list species



© Jérémie Guyon



Invasive species native to Australia and New Zealand. **Widespread** in the wild in Belgium

Found on **the bottom** (up to 3 m deep) and on the **banks of ponds**



**Aquatic and semi-aquatic** plant, **submerged or partly emerged**. From 10 to 20 cm high

Linear fleshy leaves with acute tips, arranged in opposite pairs. Up to 2 cm long



©Q-Bank (1)

Creeping plant forming **dense mats**



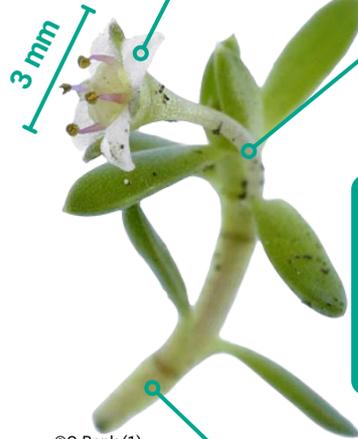
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Very small flowers, often absent, with 4 white petals



©Q-Bank (1)

Round and rigid stem

Emerged plants: fleshy leaves growing in opposite pairs, joined around the stem forming a collar

Submerged plants: long stem carrying thin leaves



©Q-Bank (1)

## Not to be confused with



©Richard Lansdown (2)

**Callitriche spp. - Native**

- Petiolate leaves, flexible and not fleshy
- Obtuse and indented leaf tips
- Tiny golden flowers

**Lythrum portula - Native**

- Round and opposite leaves which are not fleshy
- Tiny flowers placed at the base of the leaves



©Miguel Porto (3)



©Mike Pennington (4)

**Montia fontana - Native**

- Fleshy, opposite and oval leaves not joining at the base
- Small white flowers with 5 petals

# Greater pondweed

*Egeria densa*

LIFE RIPARIAS alert list species



©LIFE RIPARIAS



Invasive species native to South America. **Widespread** in the wild in Belgium

Found in **fresh, stagnant** or **slow-moving** waters



**Submerged aquatic** plant. Stems up to 2 m long (or more), producing roots at regular intervals

Forms **dense mats** just below the surface of the water



©Harum.koh



Leaves are in whorls of 4 to 5 (sometimes 3 to 8)

©LIFE RIPARIAS

Strap-shaped leaves with fine saw teeth on the margins, that fall down on each other once out of water



©LIFE RIPARIAS

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## Not to be confused with

### *Elodea nuttallii* - Exotic

- Leaves occur in whorls of 3 (sometimes 2 to 4)
- Elongated leaves (up to 2.5 cm), soft and curved, with a sharp tip



©LIFE RIPARIAS



©LIFE RIPARIAS

### *Elodea canadensis* - Exotic

- Short rigid leaves (< 2 cm) with rounded tips and finely serrated margins
- Leaves occur in whorls of 3 (sometimes 2 to 4), fairly spaced along the stem

### *Lagarosiphon major* - Exotic

- Alternate and spiral leaf arrangement along the stem
- Leaves are curved towards the stem and numerous at its top
- Elongated leaves (up to 3 cm) with sharp tip



©LIFE RIPARIAS



©Robert Vidéki, Doronicum Kft., Bugwood.org (1)

### *Hydrilla verticillata* - Exotic

- Sharp leaves with marked serrated margins, up to 2 cm long
- Leaves occur in whorls of 5 (sometimes 4 to 8)



# Monkeyflower

*Erythranthe guttata*

LIFE RIPARIAS alert list species



©newtpatrol (1)



Invasive species native to North America. **Widespread** in the wild in Belgium

Found in **wetlands** and along **waterways**



**Emerged plant** that can grow to heights of 80 cm

Ovate or suborbicular coarsely toothed leaves, strongly ribbed



©damontighe (5)

Can form **dense stands**



©newtpatrol (4)

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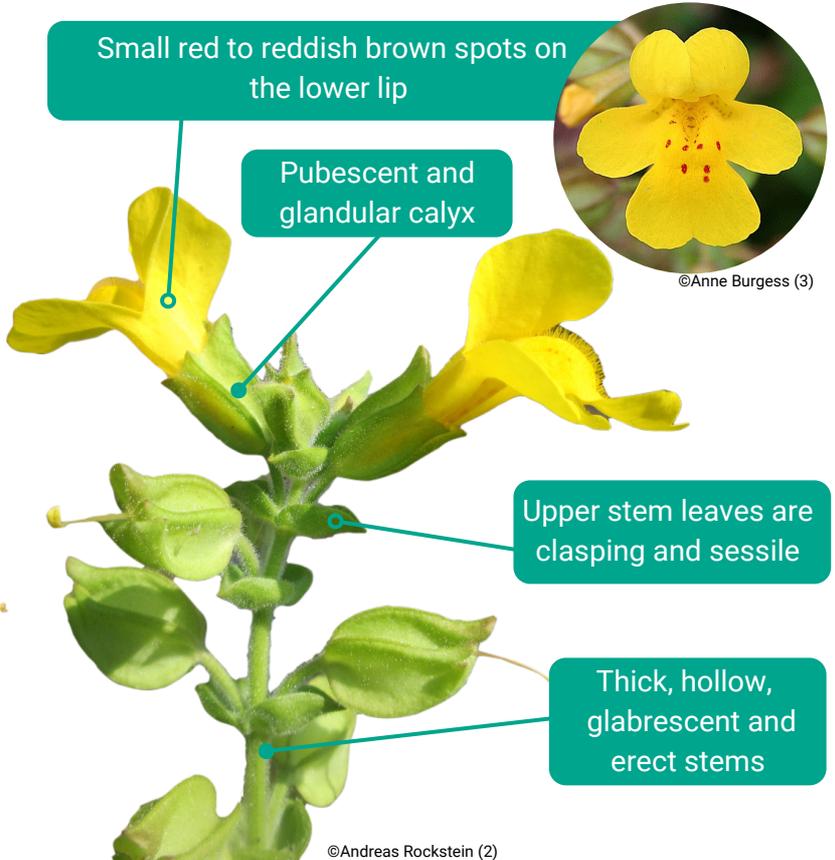
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Small red to reddish brown spots on the lower lip

Pubescent and glandular calyx

Upper stem leaves are clasping and sessile

Thick, hollow, glabrescent and erect stems



©Anne Burgess (3)

©Andreas Rockstein (2)

## Not to be confused with

### *Ludwigia* spp. - **Exotic**



©Marie Patinet

- Lanceolate emerged leaves with sharp tips
- Flower with 5 similar petals
- No flower on floating stems but flowering erect stems

### *Mimulus* spp. - **Exotic**

#### *Mimulus luteus*

Hairless flowers with one spot



©Dick Culbert (7)

#### *Mimulus moschatus*

Hairy plant. No spot on the flowers



©Kyle Brine (8)

# Chinese lizard tail

*Houttuynia cordata*

LIFE RIPARIAS alert list species



©Dinkum (1)



Invasive species native to Asia.  
Rare in the wild in Belgium

Found in **wetlands** and **cool forest environments**, in partially shaded sites



**Terrestrial or submerged semi-aquatic perennial plant.**  
Grows to heights of 30 to 40 cm

There is a cultivar with tricolour leaves which has, however, not been observed in the wild yet



©Deb Nystrom (2)

Fast growing rhizomatous species forming **dense stands**



©zmp (3)

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Heart-shaped leaves arranged alternately (length < 1.5 width) along the stem

Small yellow flowers crowded into a short spike



©Σ64 (4)

Leaves : 4 to 10 cm

Strong, peppery, lemon-like scent

4 white, petal-like bracts at the base. Can have double flowers

## Not to be confused with

### *Saururus cernuus* - Exotic



©Eric Hunt (5)

- Flowers aggregated in long spikes curved downwards
- Light green lower leaf surface
- Larger plant size

### Seedlings of *Fallopia* spp. - Exotic

- Alternate leaf arrangement with leaves not or slightly cordate at the base and straight edges
- Reddish stems with marked nodes



©Etienne Branquart

# Giant butterbur

*Petasites japonicus* var. *giganteus*

LIFE RIPARIAS alert list species



©Joi'ito (1)



Invasive species native to Asia.  
Rare in the wild in Belgium

Found along streams, riverbanks, wet meadows and shady forests



Dioecious terrestrial herbaceous plant. (Only male individuals in Europe).

Can reach more than 1 m high and 3 m wide



Very large kidney-shaped leaves up to 150 cm in diameter, irregularly toothed



©Krzysztof Ziarnek, Kenraiz (2)

Rhizomatous plant forming dense stands



©Jérémie Guyon



©Etienne Branquart

Flower clumps emerge before the leaves in February-April and quickly fade away afterwards



©urasimaru (4)



©Dominicus Johannes Bergsma (5)

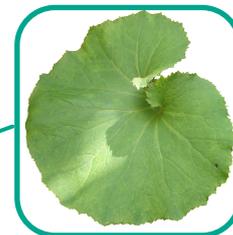
Inflorescences in spike made up of small fragrant cream-coloured flowers

Pale-green bracts

Rosettes appear in April-May and remain until the end of summer



©Christian Grenier (6)



## Not to be confused with

### *Petasites hybridus* - Native



©Zeynel Cebeci (6)



©caspermollering (7)

- Large toothed heart-shaped leaves
- Pink odourless flowers

### *Tussilago farfara* - Native

- Rounded, smaller and tougher leaves
- Leaves with black edges and white-felted underneath



©Robert Flogaus-Faust (7)

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# Pickerelweed

*Pontederia cordata*

LIFE RIPARIAS alert list species



©Cephas (1)



Invasive species native to America. **Rare** in the wild in Belgium

Found in **marshes** and shallow **stagnant waters**



**Aquatic perennial** plant. From 60 to 100 cm high

Lanceolate to heart-shaped leaves that can grow up to 12 cm wide and 25 cm long



©Frank Vincentz (2)

Rhizomatous plant forming **dense mats** along banks



©Dido Gosse

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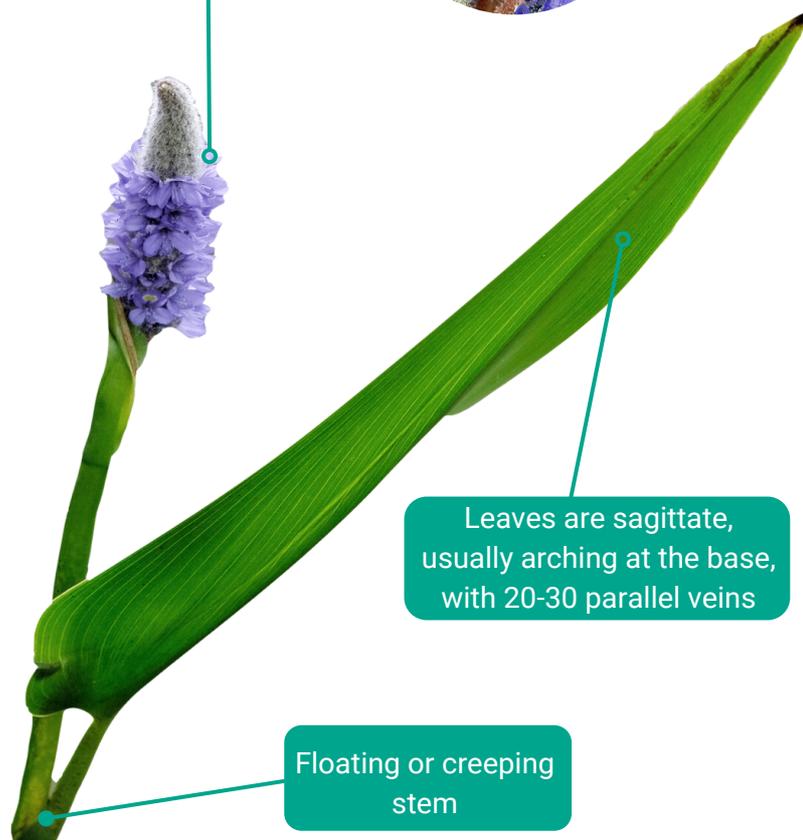
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Blue flowers (sometimes white) aggregated in dense spikes (June-September)



©Bob Peterson (3)



Leaves are sagittate, usually arching at the base, with 20-30 parallel veins

Floating or creeping stem

## Not to be confused with



©Algirdas at Lithuanian Wikipedia (4)

**Sagittaria spp. - Native**

- White flowers gathered in a bunch
- Arrow-shaped leaves which are acutely indented



# Lizard's tail

*Saururus cernuus*

LIFE RIPARIAS alert list species



©Dido Gosse



Invasive species native to North America. **Rare** in the wild in Belgium

Found in **marshes, streams** and **stagnant waters**



**Aquatic and semi-aquatic perennial plant, submerged or emerged.** Grows to heights of 50 to 60 cm



©Jo Packet

The plant can live on the bottom of water bodies in a vegetative form. Fragile appearance

Species with very long rhizomes (up to 5 m) forming **dense mats**



©Etienne Branquart

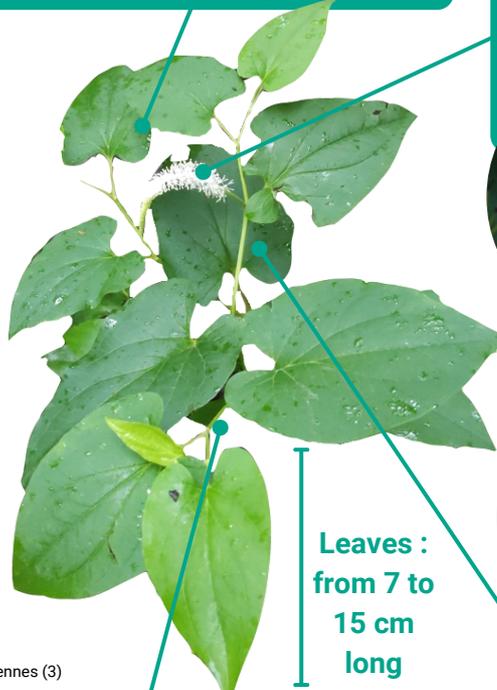
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Elongated, heart-shaped leaves (length > 1,5 x width). The upper leaf surface is dark green while the lower surface is light green

White flowers aggregated in spikes, curved downwards, 10-30 cm long



©ihennes (3)

Leaves : from 7 to 15 cm long



©Corey Lange (1)

©Ashley M Bradford (2)



Green to reddish stems that are zigzag branched

Young stem sometimes pubescent which becomes glabrous

## Not to be confused with

***Houttuynia cordata* - Exotic**



©Σ64 (4)

- Orange scent
- 4 white, petal-like bracts at the base

***Lysimachia clethroides* - Exotic**

- Lanceolate, alternately arranged leaves measuring 6 to 11 cm long
- Arching flower spikes. Star-shaped flowers with 5 petals measuring 1 cm wide



©Dominicus Johannes Bergsma (5)



# Manchurian wildrice

*Zizania latifolia*

LIFE RIPARIAS alert list species



©Forest and Kim Starr (1)



Invasive species native to China.

**Uncommon** in the wild in Belgium

Found in **shallow stagnant waters** (edge of water bodies, swamps...)



**Aquatic or semi-aquatic** emerged perennial plant. Can grow to heights of 4 m

Long, dull grey-green leaves with a stout midrib on the leaf underside



©Trevor James (2)

**Rhizomatous** plant forming dense long-lived stands. Does not produce flowers in Belgium



©Etienne Bracquart



©anna\_efimova (3)

Leaves up to 1 m long and 2 cm wide



©An Leysen

Smooth, shiny, hollow stem with flattened section



©Kevin Scheers

Black spots and large ligule at the base of the leaves

## Not to be confused with



©MM (4)

**Iris pseudacorus** - Native

- Stem slightly compressed
- Yellow flowers (between April and July)
- Dark-green basal leaves (10 to 20 mm) with a raised midrib

**Typha spp.** - Native Absence of midrib on the leaves.

Flowering between June and August

**Typha angustifolia**

Leaves are 1cm wide

**Typha latifolia**

Leaves are 1 to 2cm wide



©Mike Patterson (5)



©Amadej Trnkoczy (6)



©Kyle Brine (7)

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# GLOSSARY

## A

**Acuminate:** leaf that tapers into a long point

**Alien species:** species accidentally or intentionally introduced outside their natural range

**Alternate leaf arrangement:** leaf inserted at different levels on the stem, as opposed to opposite leaves

## B

**Bract:** leafy body in the vicinity of the flowers, unlike normal leaves and floral parts (sepals, petals)

## C

**Clasping:** said of a leaf without a petiole whose blade entirely or partially embraces the stem

**Cordate:** botanical term which means "heart-shaped".

**Corolla:** inner part of the perianth, often brightly colored, formed by petals

## D

**Denticulated:** which has small fine teeth on the margin

**Dichotomous:** which divides by bifurcation into branches of similar importance

## G

**Glabrous:** hairless

**Glabrescent:** which loses its hair over time

## H

**Heart-shaped:** leaf or other organ whose base is indented in the shape of a heart

## I

**Internode:** interval between two nodes of the stem

**In whorls:** arranged in whorls

## L

**Lanceolate:** in the shape of a spearhead; narrowed from the middle to the two ends

**Ligule:** membranous appendage appearing at the junction of the leaf blade and the leaf sheath, in the Poaceae

## N

**Native species:** species naturally present in a specific geographical area (Belgium in this case)

# GLOSSARY

## O

**Opposite:** said of 2 leaves inserted at the same level on the stem, one facing the other

## P

**Panicle:** inflorescence in the form of an assembled cluster

**Pectinate:** is said of a simple, pinnate leaf, cut symmetrically on each side of the central vein, whose indentations reach half the width of the leaf blade

**Peduncle:** axis of an inflorescence supporting the pedicels

**Petiole:** thinned part of the leaf connecting the blade to the stem

**Pinnate:** said of a leaf whose secondary veins or leaflets are arranged in two rows on either side of the main vein or rachis, like the barbs of a feather

**Pubescent:** which has a fluffy appearance, covered with hair

## R

**Rhizomatous:** provided with a rhizome, that is to say an underground stem carrying adventitious roots and aerial stems

**Rosette:** group of spreading leaves generally at ground level

## S

**Sepal:** part of the calyx of a flower, usually green

**Sessility:** attached directly to the stem

**Spathe:** large bract enveloping an inflorescence

**Spatulated:** spatula-shaped, wide at the top, narrow and elongated at the base

**Stipule:** appendage most often foliaceous or membranous, at the junction of the petiole and the stem

**Suborbicular:** which is almost round, which describes a quasi-circumference

## U

**Umbel:** inflorescence in which the flower pedicels are all inserted at the same point of the stem, and the flowers are all arranged on the same surface (spherical or flat)

## W

**Whorls:** leaves arranged in a circle, at the same level, around an axis

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Reaching Integrated and Prompt Action in Response to Invasive Alien Species

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