

# Invasive Non-Native Plants

Invasive alien plants are becoming increasingly widespread in the UK. Species of particular concern are:

- New Zealand Pigmyweed (*Crassula Helmsii*)
- Parrot's Feather (*Myriophyllum aquaticum*)
- Floating Pennywort (*Hydrocotyle ranunculoides*)



Widespread in England and Wales. Spreading northwards, though much less common in Scotland. Very common in the south-east of England.



Source: NBN Gateway. Check website for current distribution.

New Zealand  
Pigmyweed

Mainly a lowland plant. Widespread in south of England, spreading northwards. Rare in Northern Ireland and Scotland.



Source: NBN Gateway. Check website for current distribution

Parrot's  
Feather

Common in the south-east of England, and spreading to other parts of the British Isles.



Source: NBN Gateway. Check website for current distribution

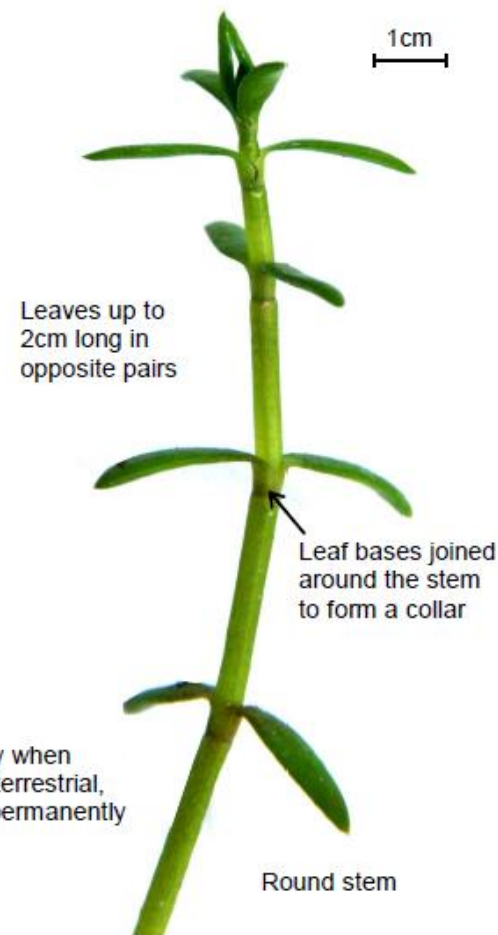
Floating  
Pennywort



# New Zealand Pigmyweed (*Crassula helmsii*)

## Key ID Features

Forms dense mats within the water body



Leaves fleshy when emergent or terrestrial, flatter when permanently submerged



# New Zealand Pigmyweed (*Crassula helmsii*)

## Identification of terrestrial, emergent and submerged forms

**Terrestrial:** Growing away from the water's edge or left stranded as water level falls, creeping stems and aerial, fleshy leaves.



**Emergent:** Densely packed leaves in water, intermediate between terrestrial and submerged form (occurs in water <0.6m deep).



**Submerged:** Elongated stems with leaves sparse and flat, able to form extensive mats on bed of the water body.





# New Zealand Pigmyweed

## *Similar Species*

A group of species known as water-starworts are most likely to be confused with New Zealand pigmyweed. Water-starworts are distinguished from New Zealand pigmyweed by their non-fleshy leaves, which are usually notched at the tip (hold up to light or use hand lens), and lack of collar at leaf base.

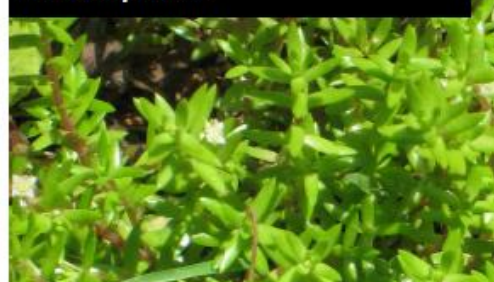
**Water-starworts**  
Native  
(*Callictriche* species)



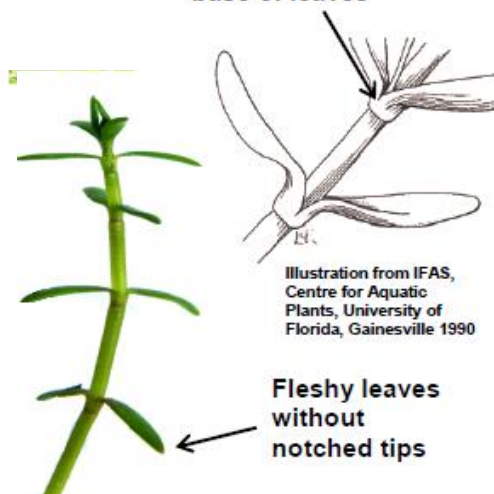
Water-starwort leaf with typically notched tip, a hand lens is usually required to see this properly



**New Zealand Pigmyweed**  
For comparison



New Zealand pigmyweed collar around stem at base of leaves



# Parrot's Feather (*Myriophyllum aquaticum*)

## Key ID Features

Changes form depending on the conditions, varying between submerged to emergent foliage. Both forms are similar in appearance. Emergent leaves are stiff, bright green and the most distinctive form. Submerged leaves are more fragile and, after death, decompose quickly.



Leaves bright to blue-grey green



Leaves form in whorls of 4-6



Forms inconspicuous flowers at base of leaves between May and August. Small (2mm) and white. Can be difficult to see.





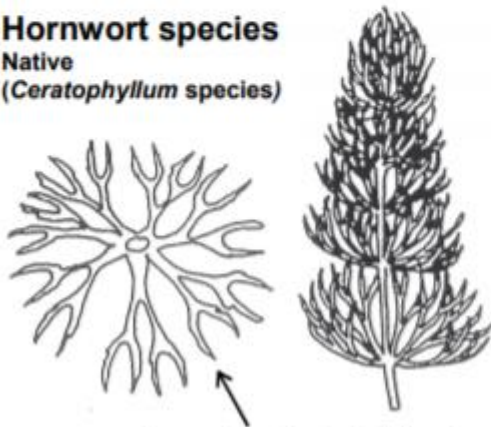
# Parrot's Feather

## *Similar Species*

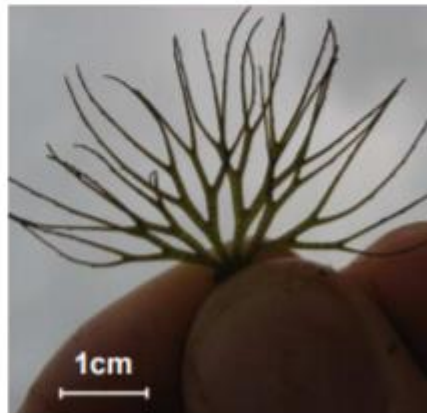
The emergent stems of parrot's feather distinguish it from native water-milfoil species (spiked water-milfoil *Myriophyllum spicatum*, alternate water-milfoil *Myriophyllum alterniflorum* and whorled water-milfoil *Myriophyllum verticillatum*) which are never emergent, although the native species can produce short emergent flower spikes. Parrot's feather is also rarely, if ever, found in fast flowing water, unlike some native water-milfoil species. Submerged parrot's feather is difficult to distinguish from these species and expert assistance may be required.

Other species that can be confused with parrot's feather:

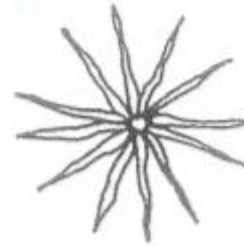
### Hornwort species Native (*Ceratophyllum* species)



Leaves have 'tuning fork' ends



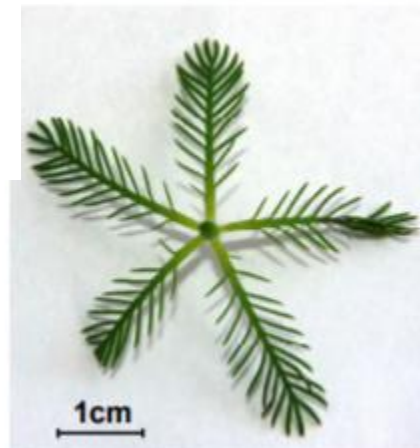
### Mares Tail Native (*Hippuris vulgaris*)



Leaves not divided



### Parrot's Feather (and other *Myriophyllum* species) For comparison





# Floating pennywort (*Hydrocotyle ranunculoides*)

## Key ID Features

Grows horizontally



Leaves can be floating or emergent

Shiny, kidney-shaped leaves with crinkled edge, frequently broader than long



# Floating pennywort

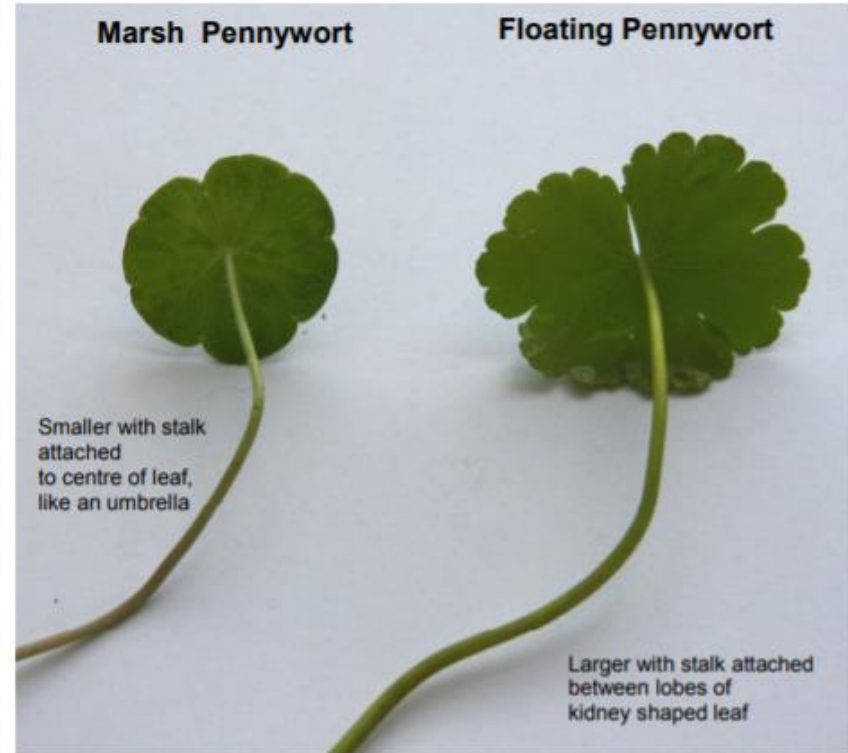
## *Similar Species*

**Marsh Pennywort**  
Native  
(*Hydrocotyle vulgaris*)



Grows on damp ground in bogs and fens. Always rooted in the ground, never free-floating

**Marsh Pennywort**

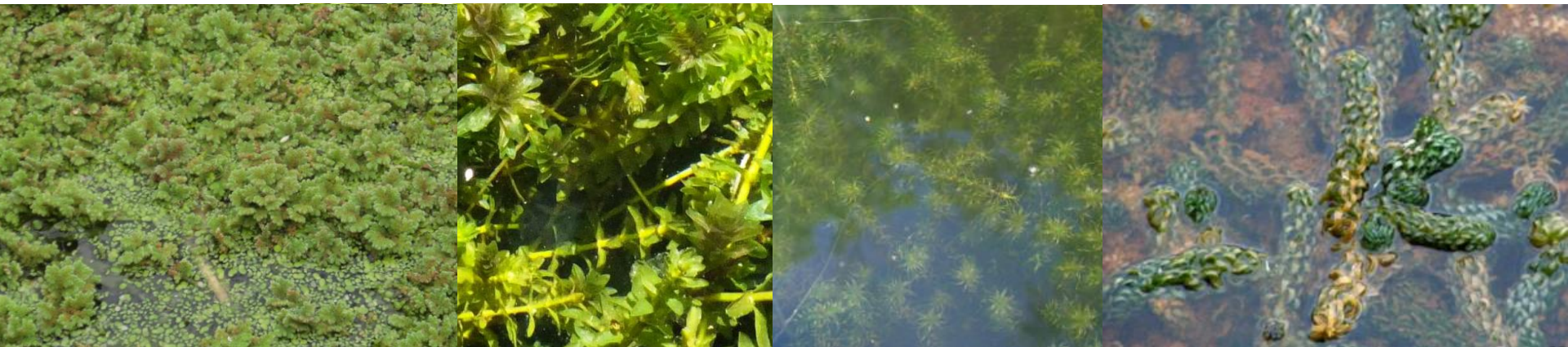


**Floating Pennywort**

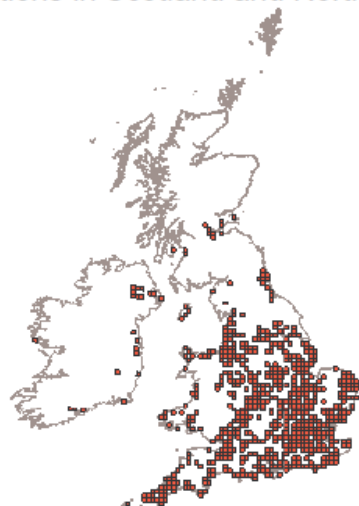


Other invasive non-native plants to avoid introducing into the wider countryside include:

- Water Fern (*Azolla filiculoides*)
- Canadian Pondweed (*Elodea canadensis*)
- Nuttall's Pondweed (*Elodea nuttallii*)
- Curly Waterweed (*Myriophyllum aquaticum*)



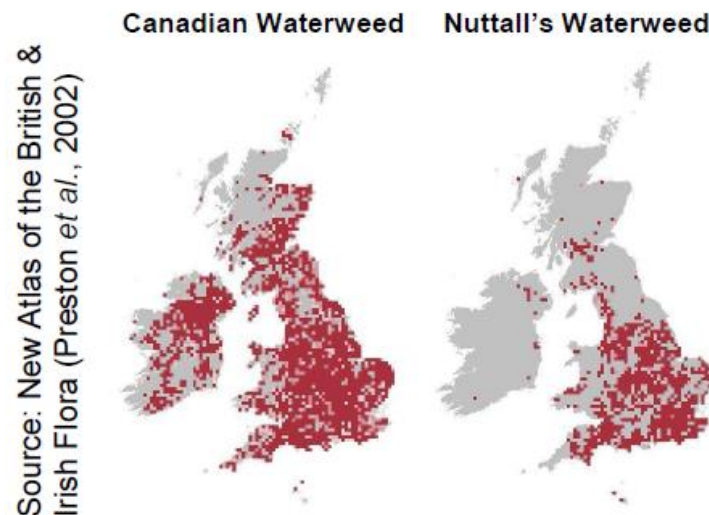
Sporadic distribution in southern and central England. Has spread north to Yorkshire and into Wales but relatively few locations in Scotland and Northern Ireland.



Source: NBN Gateway. Check website for current distribution

## Water Fern

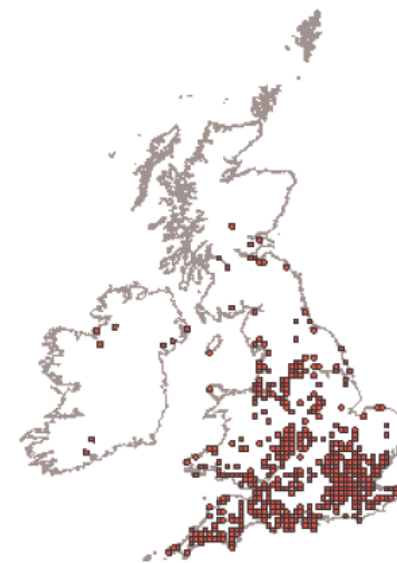
Canadian waterweed is widespread and common throughout the UK. Nuttall's waterweed occurs mainly in England.



Source: New Atlas of the British & Irish Flora (Preston *et al.*, 2002)

## Canadian & Nuttall's Pondweed

Widespread through lowland England.



Source: NBN Gateway. Check website for current distribution

## Curly Waterweed



# Water fern (*Azolla species*)

## Key ID Features

Usually green but often has a reddish tinge and can be completely red when exposed to stresses (such as cold temperatures, brackish waters or shading)



Forms dense mats but can also be present as a few fronds amongst emergent or other floating vegetation

# Water fern (*Azolla species*)

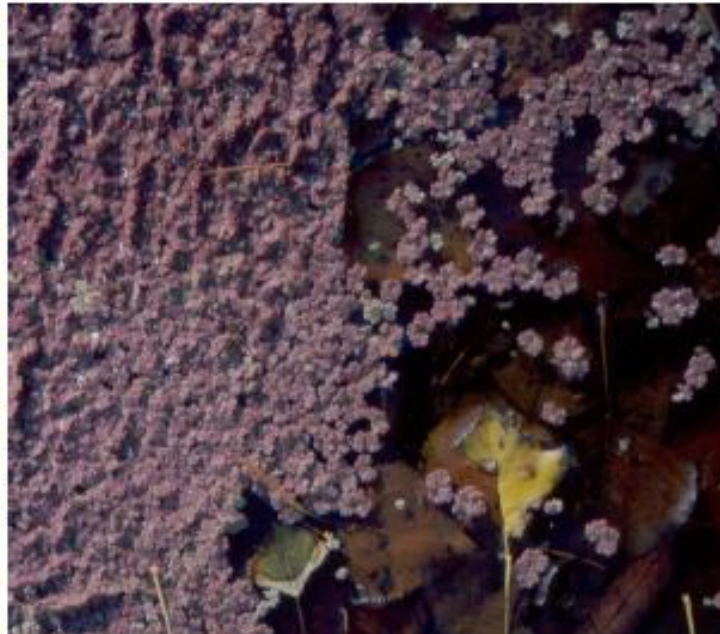
## Identification throughout the year

Plants can be present year round, but often die back in winter. Colour can vary considerably through the year. Green in spring/summer often turns red during cold weather in autumn/winter.

**Green form**



**Red form**





# Water fern

## *Similar species*

### Duckweeds

3 native and  
2 non-native species  
(*Lemna* species)



### Duckweed and water fern growing together



### Common Duckweed

Native  
(*Lemna minor*)

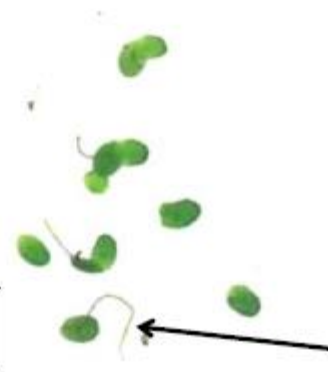
Light green colour

Smaller than water fern  
(only 1.5 - 4mm across)

Single round leaves, not  
branched

1cm

White to light green root  
attached to each leaf



### Water Fern

For comparison

Multiple dark  
brown roots

Leaves are much larger (up  
to 2.5cm) and branching

1cm



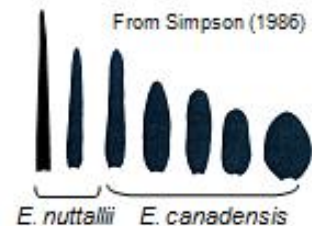
## Canadian Pondweed (*Elodea canadensis*)



### Key features

Leaves occur in *whorls* of (usually) 3 leaves.

The Leaves are up to 2 cm long, and widest in the *middle*. The leaf tips are broadly pointed or rounded at their tip. If you can measure this accurately – the width of the leaf is more than 0.8mm wide at a distance of 0.5mm from the leaf tip.



## Nuttall's Pondweed (*Elodea nuttallii*)



Leaves occur in *Whorls* of 3-4.

Leaves up to 3.5 cm long and widest at the base, tapering to a pointed end. The width of the leaf is less than 0.8mm wide at a distance of 0.5mm from the leaf tip.

Leaves are often (but not always), strongly curved.

## Curley Waterweed (*Lagarosiphon major*)



Lower leaves spiral down the stem (not whorled). Note that leaves near the shoot tips can be either spiral or whorled.

Leaves up to 3 cm long, and very strongly Curved.



# Killing invasive alien plants

- The best policy is to *regularly look out for these plants*, and if found remove them immediately before they begin to spread.
- Once they have colonised a pond, it can often be difficult and sometimes impossible , to remove them.
- If it is necessary to use herbicides to control alien plants , inform the authorities (Environment Agency) and use a registered operator.

# Killing invasive alien plants

## New Zealand Pygmyweed

One of the most problematic invasive plants to remove.  
The main options are:

- Repeat spraying with herbicide (glyphosate)
- Shading the plant by covering with black plastic.
- Physical removal.

**NB. New Zealand Pygmyweed can grow from a tiny piece so it is imperative that all footwear and equipment used is thoroughly cleaned!**



# Killing invasive alien plants

## Parrot's Feather & Floating Pennywort

### Parrot's Feather

- This can be removed by hand , or sprayed with herbicide.
- It is green in winter so can be treated when most native plants are dormant.

### Floating Pennywort

- Mechanical treatment is not effective for controlling this species because small fragments regrow.
- Spraying currently appears to be the only practical option for eradication.


# Removing other non-natives

Canadian & Nuttall's Pondweed and Curley Waterweed

- None of these species should be deliberately added to ponds but, there is a dilemma whether it is appropriate to remove them.
- All are now naturalised in Britain, and it will be impossible to keep them out of many ponds.
- They are all robust submerged species and can provide an underwater habitat in polluted ponds where native species do not thrive.



**Before management to remove these species, be clear what the benefits will be.**





GB non-native species secretariat

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Produced by Orla Bony, New Wales and Vicky White of RPS

## New Zealand Pigmyweed

**Species Description**

**Scientific name:** *Crassula helmsii*  
**AKA:** Tiliac aquatic, Australian Swamp-stonecrop, Britweg Zealand Newweed (Welsh), Tiliac reusne  
**Native to:** Australia and New Zealand  
**Habitat:** Aquatic up to 3m deep in still or slow flowing water bodies or terrestrial around pond or lake margins  
**Can be dangerous, invasive and harmful:** Highly invasive when growing at the edges of water bodies or in flood plains. Submergent stems can be up to 3m long and 1cm thick. It can form very dense clumps that do not produce viable seed in the UK.  
**Introduced in 1911** as an engineering plant to ponds and, since the 1970s, the garden industry. Forms dense mats and can invade drainage, causing flooding. Causes other aquatic plant species and reduces amenity use of the waterbody.  
**New Zealand Pigmyweed** is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland, as such, it is an offence to plant or otherwise cause this species to grow in the wild.  
For details of legislation go to [www.nonnativespecies.org/legislation](http://www.nonnativespecies.org/legislation)



**Key ID Features**

Plants are small, often absent when seen in slightly dry


Plants have 2 pairs of leaves

Leaves are 1-2cm long in opposite pairs

Leaves fleshy when emergent or dormant, but very prominently submerged

Round stem





[www.nonnativespecies.org](http://www.nonnativespecies.org)  
Produced by Orla Bony, New Wales and Vicky White of RPS

## Parrot's Feather

**Species Description**

**Scientific name:** *Myriophyllum aquaticum*  
**AKA:** Brazilian Watermillet and Myriodidal (Welsh), *Myriophyllum brasiliense*, *Myriophyllum proserpachoides*  
**Native to:** Central and South America  
**Habitat:** Still or slowly flowing water  
**Can be dangerous, invasive and harmful:** Parrot's Feather forms a distinctive water plant. It can be found in both fresh and salt water.  
**Aquatic perennial:** grows in emergent and submerged form. Both forms are similar in appearance. Most often found in nutrient rich waters. Grows in water gardens in UK since 1970s. Not recorded in the wild in 1980. Later spread to drainage ditches, ponds and watercourses. It is thought to be a native species, with most of the population, possibly by vegetative propagation, no seeds are produced in the UK.  
**Classified** as an invasive non-indigenous and discharge chemicals. Can harm some native fish, including native species.  
**Parrot's Feather** is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. As such, it is an offence to plant or otherwise cause this species to grow in the wild.  
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**Key ID Features**

Leaves bright to blue-green, green

Stem breaks easily, small, roots present around nodes

Leaves form in whorls of 4/6


Plants are 1-2m long in opposite pairs

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Produced by Orla Bony, New Wales and Vicky White of RPS

## Floating Pennywort

**Species Description**

**Scientific name:** *Hydrocotyle ranunculoides*  
**AKA:** Floating pennywort (Welsh), *Hydrocotyle nova zelandiae*  
**Native to:** North America  
**Habitat:** Emergent or floating on the surface of still or slowly moving freshwater  
**Can be dangerous, invasive and harmful:** This plant is native to North America and has been introduced to the UK since 1970s. It is found mostly in the south-east of England and occasionally in the north-west of England and Wales. Spreading rapidly.  
**First introduced in 1955** as a result of discarded plants from garden ponds. Can grow up to 10cm per day and may quickly dominate a waterbody. Forms a dense mat on the surface of the water, blocking out light, causing degradation of the pond and surrounding water flow and quality. May also cause native species to smother out light, causing degradation, destroying or covering in floating mats from blocking the surface and reducing water temperatures. Some and continue to be a health hazard as the water surface appears dead.  
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**Key ID Features**


Stems submerged leaves with pointed ends, frequently broader than long

Stems submerged leaves with pointed ends, frequently broader than long

Stems submerged leaves with pointed ends, frequently broader than long

Stems submerged leaves with pointed ends, frequently broader than long






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## Water Fern

**Species Description**

**Scientific name:** *Azolla filiculoides*  
**AKA:** Fairy Fern, Cyffwr (Welsh)  
**Native to:** North and Central America  
**Habitat:** Still and slow flowing water bodies (e.g. ponds, drainage channels, ditches, canals)  
**Can be dangerous, invasive and harmful:** Very small freshwater plant that forms dense mats. Uncharacteristic when it is not green and red when it is. It can be found in the UK since 1970s. It is found mostly in the south-east of England and occasionally in the north-west of England and Wales. Spreading rapidly.  
**First introduced in 1955** as a result of discarded plants from garden ponds. Can grow up to 10cm per day and may quickly dominate a waterbody. Forms a dense mat on the surface of the water, blocking out light, causing degradation of the pond and surrounding water flow and quality. May also cause native species to smother out light, causing degradation, destroying or covering in floating mats from blocking the surface and reducing water temperatures. Some and continue to be a health hazard as the water surface appears dead.  
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**Key ID Features**

Usually green but often has a reddish tinge and can be completely red when stressed or stressed and not very green, leaves are small and narrow

They are 1-2cm long and 1-2cm wide, they are small and narrow

They are 1-2cm long and 1-2cm wide, they are small and narrow

They are 1-2cm long and 1-2cm wide, they are small and narrow



# Invasive Plants or Infections

## CHECK

**Check** your equipment and clothing for live organisms - particularly in areas that are damp or hard to inspect.

## CLEAN

**Clean** and wash all equipment, footwear and clothing thoroughly.

If you do come across any organisms, leave them at the water body where you found them.

## DRY

**Dry** all equipment and clothing - some species can live for many days in moist conditions.

Make sure you don't transfer water elsewhere.



# Thank you for listening!