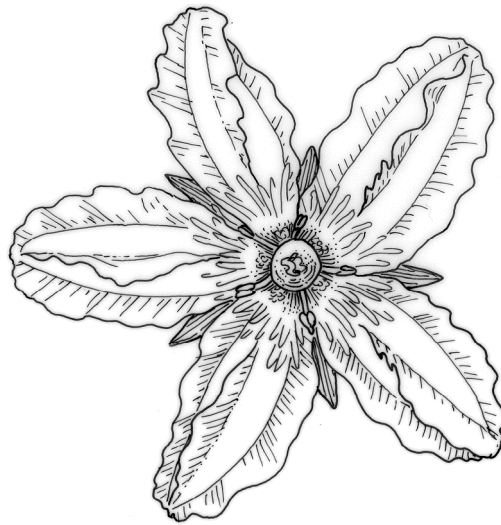


# Plant Identification Guide

## High-risk aquarium and pond plants

*Planting these in your pond or aquarium may ultimately lead to serious environmental damage.*



*Nymphoides cristata*, image © University of Florida, Centre for Aquatic and Invasive Plants

One of the biggest threats to New Zealand's waterbodies is the establishment and proliferation of weeds. The majority of New Zealand's current aquatic weeds started out as aquarium and pond plants. To reduce the occurrence of new weeds becoming established in waterbodies this guide has been prepared to discourage the use of aquarium and pond plants that pose a high risk to waterbodies.

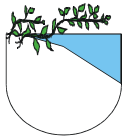
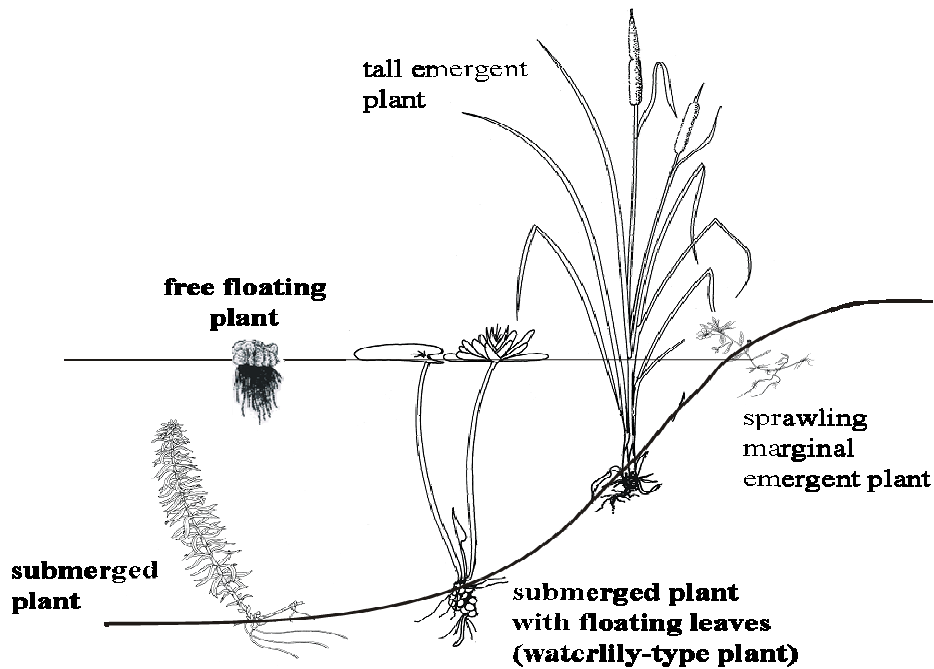
The plants contained in this guide are not yet known to be present in New Zealand. If you encounter one of these species please note the location and take a sample or photograph, if possible, then inform the Department of Conservation or a Regional Council Pest Plants Officer as soon as possible.

*Guide prepared by Dr John Clayton, Paula Reeves, Paul Champion and Tracey Edwards, National Centre of Aquatic Biodiversity and Biosecurity, NIWA with funding from the Department of Conservation.*

The guides will be updated on a regular basis and will be available on the NIWA website: [www.niwa.co.nz/ncabb/tools](http://www.niwa.co.nz/ncabb/tools).

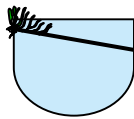


# Key to plant life-forms



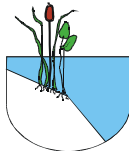
**Sprawling marginal plants.** Grow across the ground and out over water.

*Pond plants*



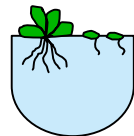
**Short turf-like plants.** Grow in shallow water on the edges of ponds and foreground of aquariums. Includes very small plants (up to 2-3 cm in height). Most species can grow both submerged (usually more erect) and emergent.

*Pond and aquarium plants*



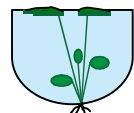
**Tall emergent plants.** Can grow in water depths up to 2 m deep depending on the species. Usually tall reed-like plants but sometimes with broad leaves. Ideal for deeper ponds.

*Pond plants*



**Free floating plants.** These plants grow on the water surface and are not anchored to banks or bottom substrates.

*Pond and aquarium plants*



**Floating-leaved plants.** Water lily-type plants. They are rooted to bottom sediments and may have leaves that float on the surface. Some species also have submerged leaves as well.

*Pond and aquarium plants*



**Submerged plants.** Plants that are rooted to bottom sediments and all parts of the plants grow underwater.

*Pond and aquarium plants*

**Genus / species** **Elodea nuttallii**  
**Family** Hydrocharitaceae  
**Common names** Western waterweed, Nuttall's pondweed  
**Origin** North America  
**Natural habitat** Lakes and slow-moving water in rivers, streams and drains.  
**Height** Up to 2+ m  
**Width** Stems 20 mm across  
**Threats** Spreads from seed and fragmentation of stems. Forms dense tangled mats that are problematic for recreation, hydro-power generation.



USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 1: 105.



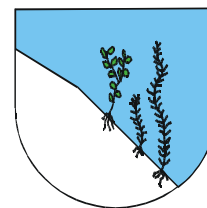
Image © B. Eugene Wofford, University of Tennessee Herbarium

**Description**

Perennial.

Leaves are pale green and usually in whorls of 3 to 5 (typically 4) with lower leaves occurring as pairs. Stems are slender and can vary widely in length with many branches. Flowers are small, usually < 2cm across with white petals.

Similar to *Elodea canadensis* which is already present in New Zealand, the main difference is that *Elodea nuttallii* typically has narrower leaves (< 1.5 mm) usually in whorls of 4, not 3.



**Genus / species** **Hydrocotyle ranunculoides**  
**Family** Apiaceae  
**Common names** Water pennywort, buttercup pennywort  
**Origin** North America  
**Natural habitat** Lakes, ponds, streams, rivers and drains with slow-moving waters.  
**Height** 10 – 20 cm  
**Width** Leaves 2 – 5+ cm wide  
**Threats** Reproduction is thought to be vegetative, with the plant capable of forming extensive mats from the smallest root fragment. In Australia, it can double its biomass in 3 days.

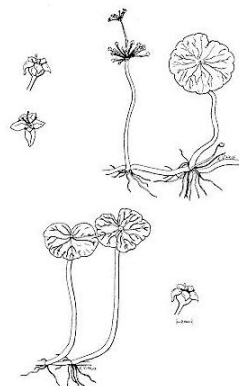


Image © University of Florida Centre for Aquatic and Invasive Plants.



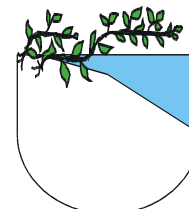
Image © V. Ramey, University of Florida, Centre for Aquatic and Invasive Plants.

**Description**

Perennial.

*Hydrocotyle ranunculoides* has emergent leaves rising on fleshy stalks from runners. The leaves range from being circular to kidney shaped and are deeply lobed, they can grow up to 180 mm in diameter. The flowers are inconspicuous at approx. 3 mm in diameter, growing in clusters of between 5-10 flowers.

Much larger and more prolific than any of the New Zealand native hydrocotyles.



**Genus / species** **Hydrocharis morsus-ranae**  
**Family** Hydrocharitaceae  
**Common names** European frog-bit , water poppy  
**Origin** Europe  
**Natural habitat** Warm lowland waters e.g. lakes, wetlands.  
**Height** Floating at water surface  
**Width** Leaves 3 cm wide  
**Threats** Self propagating by runners and turions (buds), hibernates in the mud and sprouts early spring, thrives in bright sunlit conditions. Also spreads by seed. Forms dense floating mats that could displace native plants and affect wildlife habitat.



Image © University of Florida Centre for Aquatic and Invasive Plants.

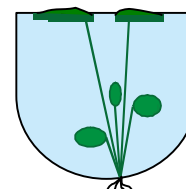


Image © Peter Wakely, English Nature

**Description**

Perennial.

Leaves float on water surface and are heart or kidney shaped. They are arranged in rosettes along runners. Flowers are comprised of white petals approx. 2.5 cm across and yellow centres. They form well-developed root systems, however, the roots generally do not anchor the plant to the bottom, instead become tangled amongst other vegetation to form dense floating mats.





<b>Genus / species</b>	<b>Ludwigia peruviana</b>		
<b>Family</b>	Onagraceae		
<b>Common names</b>	Water primrose, Peruvian primrose willow		
<b>Origin</b>	South America		
<b>Natural habitat</b>	Wet areas, bogs, swamps		
<b>Height</b>	3 m		
<b>Width</b>	Stem with side branches 1+ m		
<b>Threats</b>	Ludwigia peruviana can form tall dense stands potentially shading out many native species. It spreads by seed carried by birds or water.		

Image © University of Florida Centre for Aquatic and Invasive Plants.

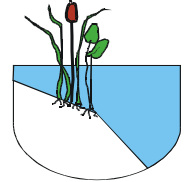
Image © Paul Champion, NIWA

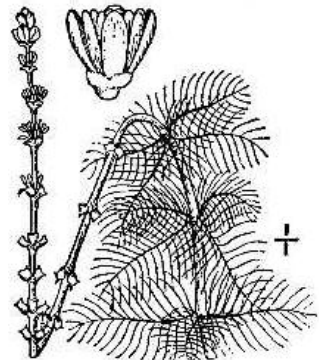
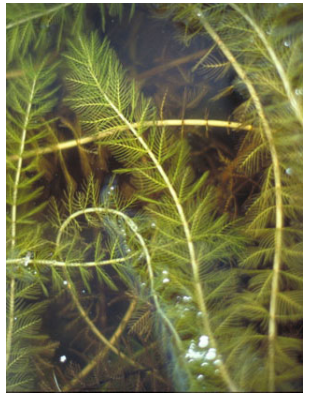
**Description**

Perennial.

The leaves are oval to lance-shaped, up to 10 cm long and 3 cm wide and arranged alternately on the stem. Leaves are covered on both sides by minute soft hairs. Stems are branched and sometimes have long hairs. It has large attractive yellow flowers with four or five petals.

It is much larger than the two introduced Ludwigia species that currently occur in New Zealand.



<b>Genus / species</b>	<b>Myriophyllum spicatum</b>		
<b>Family</b>	Haloragaceae		
<b>Common names</b>	Eurasian milfoil		
<b>Origin</b>	Europe, Asia & Africa		
<b>Natural habitat</b>	Lakes, ponds, streams, rivers and drains with slow-moving waters. Can grow to depths of 7.5 m		
<b>Height</b>	Up to 2+ m		
<b>Width</b>	Stem and leaves up to 60 mm across		
<b>Threats</b>	Dense infestations tht can replace native plants and negatively affect birds and fish. Interferes with recreational activities. Produces long-viable seed, but it spreads also from stem fragments which are brittle and easily dispersed.		

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 2: 614.

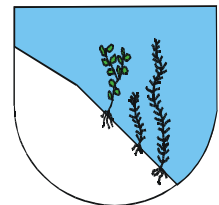
Image © Alison Fox, University of Florida, www.forestryimages.org

**Description**

Perennial.

Leaves are olive green and arranged in whorls of 3-6 leaves (usually 4). Leaves are feathery in appearance and only occur underwater. Reddish flowers are borne on leafless spikes that rise above the surface. Flowers are inconspicuous with 4 small petals.

Similar to native water milfoils but can be distinguished by its lack of emergent leaves and the often reddish colour of the plants.





<b>Genus / species</b>	<b>Najas guadalupensis</b>		
<b>Family</b>	Najadaceae		
<b>Common names</b>	Southern naiad, common water nymph		
<b>Origin</b>	Central and Southern America		
<b>Natural habitat</b>	Ponds, lakes and sluggish streams to depths of 5 m		
<b>Height</b>	Up to 2 m		
<b>Width</b>	Stem and leaves up to 60 mm across		
<b>Threats</b>	Forms dense weed beds in shallow water interfering with recreational activities. It produces a large amount of seed which may be spread by waterfowl.		

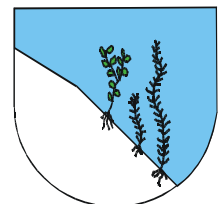
Image © University of Florida Centre for Aquatic and Invasive Plants.

Image © Aquatic Plant Information System CD distributed by the U.S. Army Corps of Engineers, U.S.A.E. Waterways Experiments Station, Vicksburg, MS.

**Description**

Annual.

Leaves are glossy, green, finely toothed and are oppositely arranged, but appear to be whorled near ends of the stems. The leaf base is much wider than the rest of the leaf blade, which helps to distinguish the water-nymphs from other submerged plants. Najas guadalupensis has inconspicuous flowers (2-3 mm) and fruits that are almost completely hidden by the leaf bases.



**Genus / species** *Najas marina*  
**Family** Najadaceae  
**Common names** Holly-leaved naiad  
**Origin** Cosmopolitan  
**Natural habitat** Still waters of lakes, swamps and fens. It typically grows at depths of between 0.5 and 1.5m often in slightly brackish water.  
**Height** Up to 0.5 m  
**Width** Stem and leaves up to 80 mm across  
**Threats** Forms dense weed beds in shallow water interfering with recreational activities. Because of tolerance to brackish water it could invade areas in New Zealand not presently impacted by invasive aquatic macrophytes.



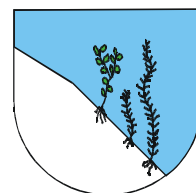
Image from Thomé, O.W. 1885. Flora von Deutschland Österreich und der Schweiz. Kurt Stueber's Online Library.



Image © Aquatic Plant Information System CD distributed by the U.S. Army Corps of Engineers, U.S.A.E. Waterways Experiments Station, Vicksburg, MS.

**Description**

Annual or short-lived perennial. Leaves are tough and narrow on forked, brittle stems. Both the leaves and the stems have spiky projections; particularly towards the tip of the stem. The flowers are inconspicuous, and the fruit, which lacks a stalk, is fleshy.



**Genus / species** *Nymphoides cristata*  
**Family** Nymphaeaceae  
**Common names** snowflake, crested floating heart  
**Origin** Asia  
**Natural habitat** Shallow bays of lakes, ponds and rivers.  
**Height** Up to 1 m  
**Width** Leaves up to 10 cm across  
**Threats** Spreads quickly forming impenetrable mats of floating leaves that through shading could displace native aquatic plants and interfere with recreational activities.

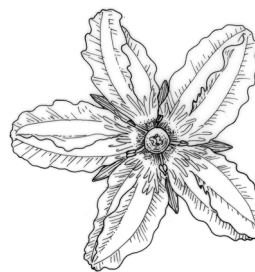


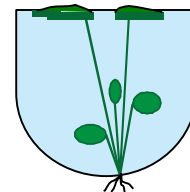
Image © University of Florida Centre for Aquatic and Invasive Plants.



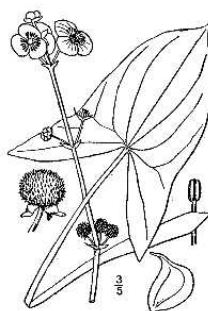
Image © A. Murray, University of Florida, Centre for Aquatic and Invasive Plants.

**Description**

Perennial. Leaves are yellow-green often with purplish brown blotches, heart shaped and float on the water surface. The underside of the leaves are reddish with the main vein evident. Small clusters of tapered tuberous roots are formed just below the surface. Flowers of 5 white petals with 'fringes' and a yellow centre occur individually or as clusters that sit above the water surface. The invasive species *Nymphoides peltata* and *N. geminata* are already present in New Zealand and can be distinguished from *N. cristata* by their bright yellow flowers.



**Genus / species** *Sagittaria latifolia*  
**Family** Alismataceae  
**Common names** duck potato, broadleaf arrowhead  
**Origin** USA  
**Natural habitat** Swamps, lake and stream margins in partial or full sun.  
**Height** 20 – 120 cm  
**Width** Individual plant 30 – 90 cm  
**Threats** Spreads by seed and tubers which can be spread by waterfowl. Forms dense stands that could displace native wetland plants.



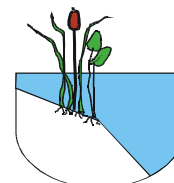
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. Illustrated flora of the northern states and Canada. Vol. 1: 100.



Image © V. Ramey, University of Florida, Centre for Aquatic and Invasive Plants.

**Description**

Perennial. Leaves are variable depending on water depth, emergent leaves look like arrowheads (as pictured above) and are 8-40 cm long while, while leaves in deeper water are similar shaped but more slender. Three-petaled white flowers appear in whorls of three atop stalks about 1 m tall. The common name of duck potato is in reference to the rounded tubers that form at the ends of underground plant runners (rhizomes). When dislodged from the mud, these tubers will float to the surface and are an important food source for waterfowl.



**Genus / species** **Sparganium erectum**  
**Family** Sparganiaceae  
**Common names** Branched bur-reed, simple stem bur-reed  
**Origin** Western and central North America, Europe, Asia  
**Natural habitat** Western and central North America, Europe, Asia  
**Height** 50 – 150 cm  
**Width** Individual plant 30 – 50 cm  
**Threats** Plants spread by vegetative methods including growth of the rhizome and dispersal of detached rhizomes. Can form dense stands that could displace native wetland plants.

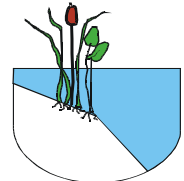


Image © University of Florida Centre for Aquatic and Invasive Plants.



Image © Peter Wakely, English Nature

**Description**  
 Perennial.  
 The narrow, smooth and keeled leaves are erect and triangular in cross-section. The spherical flowers are produced on a branching spike hence the name 'branched' bur-reed. Flowers at the tip of the spike are male whereas those further down are female. The female flowers take on a bur-like appearance before breaking up into distinct fruits. This plant looks similar to the native bur-reed (Sparganium subglobosum) and can be distinguished from the native species which rarely has any branching of the flower spike.



**Genus / species** **Stratiotes aloides**  
**Family** Hydrocharitaceae  
**Common names** Water soldier, water aloe, crab's claw  
**Origin** Europe  
**Natural habitat** Backwaters, ponds, drains and slow-moving streams and rivers.  
**Height** 50 cm  
**Width** Individual plant 20 – 30 cm  
**Threats** Forms dense mats with new plants forming along runners. Could displace native plants and interfere with recreational use of the shallow margins of some water bodies.

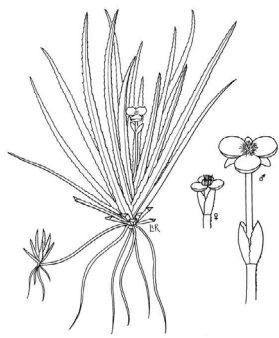
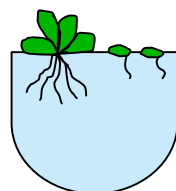


Image © University of Florida Centre for Aquatic and Invasive Plants.



Images © Biopix.dk [www.biopix.dk](http://www.biopix.dk)

**Description**  
 Perennial.  
 Leaves are arranged in rosettes and are up to 50 cm long and 2.5 cm wide with toothed edges. When floating on the surface of the water they look like the tops of pineapples. Flowers have 3 white petals and have a foul smell. In summer the plant floats on the water surface and in autumn sinks to the bed where it over-winters. In spring the buoyant new leaves cause the plant to float back to the surface.



**Genus / species** **Trapa natans**  
**Family** Trapaceae  
**Common names** Water chestnut  
**Origin** Asia  
**Natural habitat** Lakes, ponds and slow water.  
**Height** Up to 5 m  
**Width** Stem with leaves up to 50 cm across  
**Threats** It is likely to out-compete native plants, and cause a nuisance from mature nuts that drift to shore where the sharp spines can pierce bare feet and the hooves of stock.

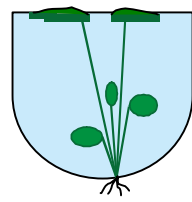


Image © University of Florida Centre for Aquatic and Invasive Plants.



Image © Leslie J. Mehrhoff, University of Connecticut, [www.forestryimages.org](http://www.forestryimages.org)

**Description**  
 Perennial. Water chestnut has broad, toothed, diamond-shaped upper leaves which form tight floating rosettes. The leaves connect to the stem by swollen stalks just below the leaf blades. The thin limp stems give rise to long, narrow or feather-shaped underwater leaves and are rooted in the sediment. It has small, solitary flowers with 4 white or light-purple petals on short, thick stalks that float among the upper leaves. The fruit is a hard, woody nut with usually four sharp spines.



**Genus / species****Typha domingensis**(previously *Typha angustifolia*)**Family**

Typhaceae

**Common names**

Southern cattail

**Origin**

North America

**Natural habitat**

Marshes, ponds, stream edges and moist ditches.

**Height**

250 cm

**Width**

Individual plants 20 – 50 cm

**Threats**

Can grow 2.5 m high and forms dense growths from thick underground rhizomes. Spreads vegetatively by rhizomes, and sexually by a large quantity of seeds produced in the spikes.



Image © University of Florida Centre for Aquatic and Invasive Plants.

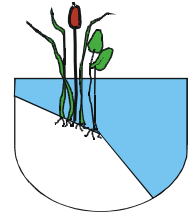


Image © Br. Alfred Brousseau, Saint Mary's College

**Description**

Perennial.

A perennial herbaceous plant. Long grass-like leaves usually <20 mm wide. The flower parts are not visible to the naked eye. Blooms first appear in mid spring and continue into early summer. Seed heads light brown, with female portion on lower half of the spike separated by a distinctive gap below the male portion on the upper spike. Female portion persists as a fuzzy cylinder approximately 20 cm in length (upper left picture). Similar to the native *Typha orientalis* (raupo), but with narrower leaves and distinctive bare gap in the mid-section of the seed head.

**Genus / species****Typha latifolia****Family**

Typhaceae

**Common names**

Common cattail, broadleaf cattail

**Origin**

North America

**Natural habitat**

Swamps, marshes, ponds, slow-moving streams and rivers.

**Height**

250 cm

**Width**

Individual plants 20 – 50 cm

**Threats**

Common cattail can reach 2.5 m and grows prolifically from thick underground rhizomes often dominating large areas, especially where water levels fluctuate. It spreads vegetatively by rhizomes, and sexually by a large quantity of seeds produced in the spikes.



Image © University of Florida Centre for Aquatic and Invasive Plants.



Image © Trevor James, AgResearch

**Description**

Perennial.

Long grass-like leaves usually <20 mm wide. The flower parts are not visible to the naked eye. Blooms first appear in mid spring and continue into early summer. Seed heads dark brown to black, with female portion on lower half of column persisting as a fuzzy cylinder approximately 20 cm in length (upper left picture). Similar to the native *Typha orientalis* (raupo), but with narrower leaves and much darker seed heads.

