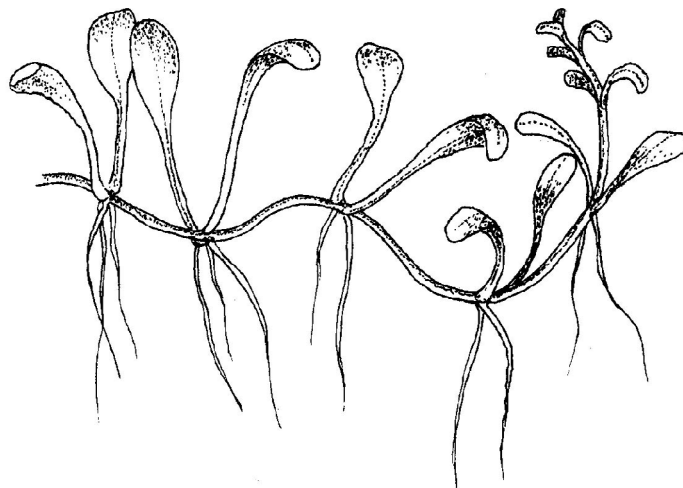


Plant Identification Guide

Low-risk aquarium and pond plants

Planting these in your pond or aquarium is environmentally-friendly.



Glossostigma elatinoides, image © Sonia Frimmel.

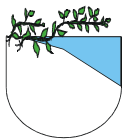
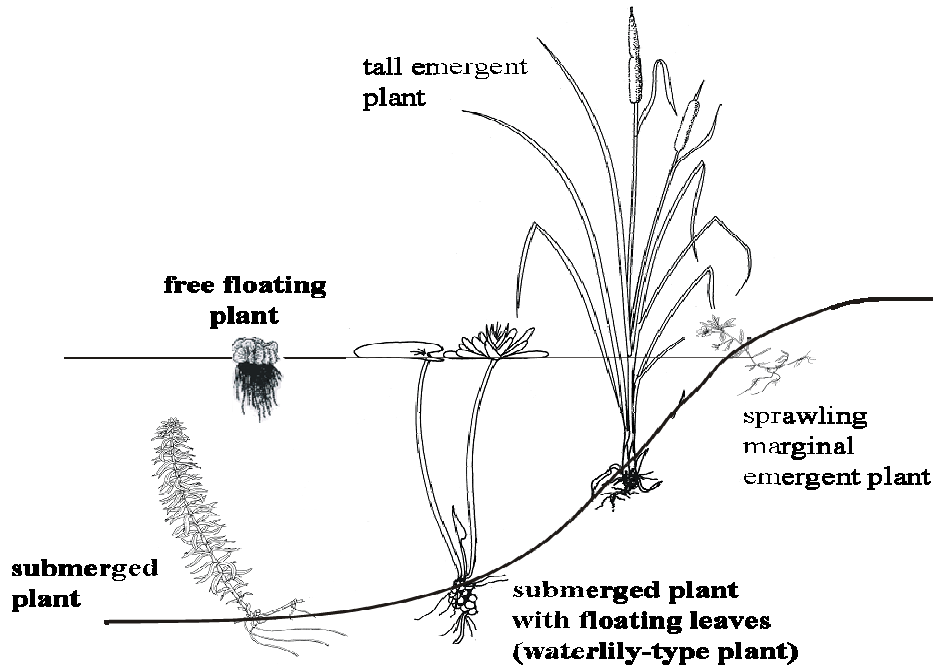
One of the biggest threats to New Zealand's waterbodies is the establishment and proliferation of weeds. The majority of New Zealand's current aquatic weeds started out as aquarium and pond plants. To reduce the occurrence of new weeds becoming established in waterbodies this guide has been prepared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

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.

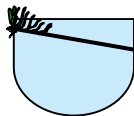


Key to plant life-forms



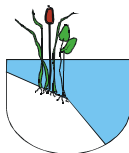
Sprawling marginal plants. Grow across the ground and out over water.

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



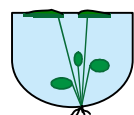
Tall emergent plants. Can grow in water depths up to 2 m deep depending on the species. Usually tall reed-like plants but sometimes with broad leaves. Ideal for deeper ponds.

Pond plants



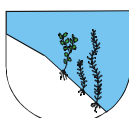
Free floating plants. These plants grow on the water surface and are not anchored to banks or bottom substrates.

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 **Acorus gramineus**
Family Acoraceae
Common names Japanese rush
Origin Asia
Natural habitat Marshes, swamps and open ponds.
Temperature range 5 - 25° C
pH Range 6.0 - 8.0
Water hardness soft - hard
Height 15 - 30 cm
Width Individual plant 10 - 15 cm
Lighting medium - high
Speed of growth slow



Image © Tropica

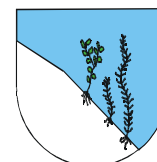
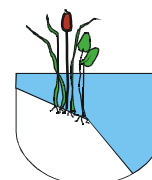


Image © Pauls Plants

Description

Perennial.

The most distinctive feature of Japanese rush is its creeping rhizome (underground stem) from which leaves emerge in two opposing rows. The leaves are glossy and robust with green, yellow or variegated varieties. Leaves radiate out from the roots in fan shaped clumps and are pointed at the ends (sword-like). Produces numerous tiny flowers if grown above water.



Genus / species **Alternanthera reineckii**
Family Amaranthaceae
Common names Red hygrophylla, beetroot plant
Origin South America
Natural habitat Rivers, lakes and swamps.
Temperature range 17 - 28°C
pH Range 5 - 8
Water hardness soft - hard
Height 25 - 50 cm
Width Leafy stems 10 - 15 cm
Lighting medium - high
Speed of growth medium



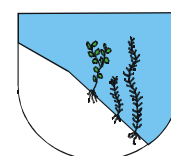
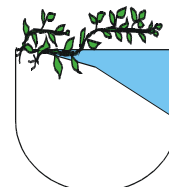
Image © Tropica, Alternanthera reineckii 'roseafolia'.

Photo pending.

Description

Perennial.

Sprawling stem plant with erect and creeping stems. The most distinctive feature is the deep red leaves which are arranged in opposite pairs. Leaves are spear shaped and delicate requiring high light to maintain their colour. Flowers occur on emergent plants in dense clusters in the leaf / stem axis, and are typically white, pink or purple. This plant comes in several varieties including 'roseafolia' and 'lilacina'.



Genus / species **Anubias**
Family Araceae
Common names
Origin West Africa
Natural habitat Marshes, stream and river banks, often shaded

All species of the genus **Anubias** are considered suitable for aquarium and pond use in New Zealand as they are not weedy. Anubias species have alternate leaves arising from a creeping rhizome (underground stem). Leaves are stalked, oval although ranging from broadly oval to narrowly oval with lobes at the base of leaves. Flower is a spathe. There are lots of cultivated varieties and hybrids available in the aquarium and pond trade with an example following.

Genus / species **Anubias barteri var. nana**
Family Araceae
Common names
Origin West Africa
Natural habitat Marshes, stream and river banks, often shaded.
Temperature range 20 - 30° C
pH Range 5.5 - 9.0
Water hardness soft - hard
Height 5 - 15 cm
Width Individual plant 8+ cm
Lighting medium
Speed of growth slow



Image © Tropica



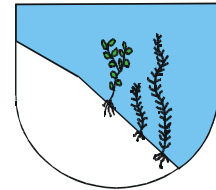
Image © Pauls Plants

Description

Perennial.

The most distinctive feature of Anubias nana is the dark green egg-shaped leaves (round at the base and narrow at the tip) which are tough and waxy in appearance. Leaves are borne on short stalks that arise from a creeping stem.

ALL SPECIES OF THIS GENUS RECOMMENDED.



Genus / species **Apodasmia similis (Leptocarpus similis)**
Family Restionaceae
Common names Oioi, jointed wire rush
Origin New Zealand
Natural habitat Coastal marshes and lakes, occasionally inland lakes.
Temperature range 0 - 25° C
pH Range 7.0 - 9.0
Water hardness medium - hard
Height 50 - 150 cm
Width Individual plant 20+ cm
Lighting high
Speed of growth medium

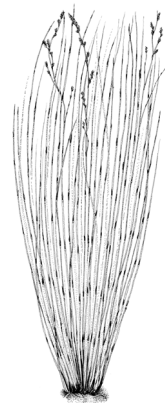


Image © Sonia Frimmel

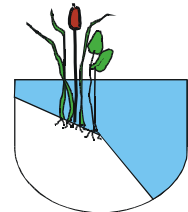


Image © John Clayton, NIWA

Description

Perennial.

Oioi is an endemic (only found in New Zealand) rush. Stems have distinctive dark bands (which are the leaves reduced to sheaths) giving the plant a slight zigzag appearance. Stems can vary from a dull bluish-green to a deep orange and even purplish. Flowers are clustered in an inflorescence at the tip of the stem, female flowers are chestnut brown and males are grey.



Genus / species **Aponogeton crispus**
Family Aponogetonaceae
Common names Sri Lankan sword, wavy edged sword
Origin South-east Asia
Natural habitat In still or running waters, mostly riverine.
Temperature range 15 - 32° C
pH Range 5.5 - 8.0
Water hardness soft
Height 25 - 50+ cm
Width Individual plant 15 - 30 cm
Lighting medium - high
Speed of growth fast



Image © Tropica

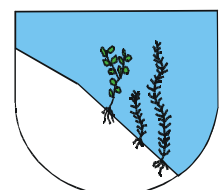


Image © Pauls Plants

Description

Perennial.

This aquarium plant can be identified by its long (up to 40 cm), and wavy-edged leaves that appear 'crinkled'. Leaves are light to dark green in colour, transparent and grow radiating out from a tuber. Flowers emerge above the water surface as a long spike.



Genus / species **Aponogeton rigidifolius**
Family Aponogetonaceae
Common names
Origin South-east Asia
Natural habitat In still or running waters, mostly riverine.
Temperature range 22 - 28° C
pH Range 6.0 - 9.0
Water hardness soft - very hard
Height 30 - 60+ cm
Width Individual plant 25 - 35+ cm
Lighting high
Speed of growth slow



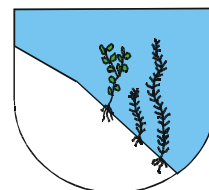
Image © Tropica

Photo pending.

Description

Perennial.

Aponogeton rigidifolius has dark-green to olive-brown fluted leaves which are quite rigid and brittle to touch. Unlike most other Aponogeton species, leaves do not radiate from a tuber but from a rhizome (underground stem) from which up to 10 new plants may arise. Flowers emerge above the water surface as a long spike.



Genus / species **Bacopa monnieri**
Family Scrophulariaceae
Common names Baby's tears, dwarf bacopa
Origin All tropical and subtropical parts of the world.
Natural habitat Streams, wetlands and lakes.
Temperature range 15 - 30° C
pH Range 6.0 - 9.0
Water hardness soft - hard
Height 25 - 50+ cm
Width Leafy stem 3+ cm
Lighting medium - high
Speed of growth slow



Image © Tropica

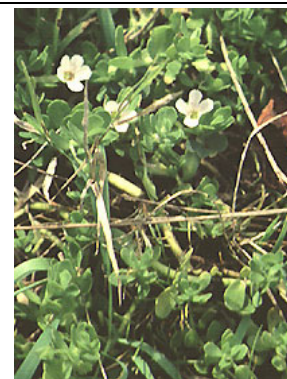
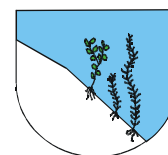
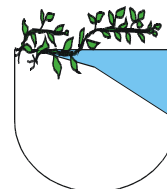


Image © V. Ramey, University of Florida, Centre for Aquatic and Invasive Plants.

Description

Perennial.

This plant has small waxy tear-shaped leaves which grow opposite each other and are green in colour. It has both erect and prostrate stems, growing more upright when submerged. The flowers are small with five petals that can range in colour from purple to white.



Genus / species **Barclaya longifolia**
Family Nymphaeaceae
Common names Orchid lily
Origin South-east Asia
Natural habitat Tropical pools and streams.
Temperature range 23 - 32° C
pH Range 5.0 - 8.0
Water hardness soft
Height 30 - 80+ cm
Width 20 - 50 cm
Lighting medium - high
Speed of growth medium



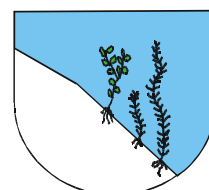
Image © Tropica

Photo pending.

Description

Perennial.

This is a submerged water lily with oblong arrow-shaped leaves that are often corrugated (wavy shaped) at the edges. Leaf colour can vary with the upper leaf surface usually a glossy green or brown while the underside is deep red or pink. Leaves arise from short stalks and can reach 30cm in length and are 3 - 4cm wide. Flowers may form above or below the water surface.



Genus / species	Baumea articulata
Family	Cyperaceae
Common names	Jointed twig rush, native jointed rush
Origin	New Zealand
Natural habitat	Lakes, rivers and swamps.
Temperature range	10 - 25° C
pH Range	6.0 - 8.0
Water hardness	medium - hard
Height	100 - 180 cm
Width	Individual stem up to 2 cm
Lighting	high
Speed of growth	medium



Image © Sonia Frimmel

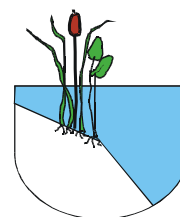


Image © NIWA

Description

Perennial.

A native sedge with round stems and leaves that are hollow and segmented. Stems are light to dark green throughout the year arising from a creeping rhizome (underground stem). Flower spikelets are reddish brown and usually form in clusters of 1-5. This is the deepest growing of the native Baumea sedges extending into water around 1 m deep.



Genus / species	Bolbitis heudelotii
Family	Lomariopsidaceae
Common names	African water fern
Origin	West Africa
Natural habitat	Seasonally submerged, growing on rocks and logs in full sun or shade.
Temperature range	20 - 28° C
pH Range	5.0 - 7.0
Water hardness	soft - medium
Height	15 - 40 cm
Width	Leafy stem 15 - 25+ cm
Lighting	low - high
Speed of growth	slow



Image © Tropica

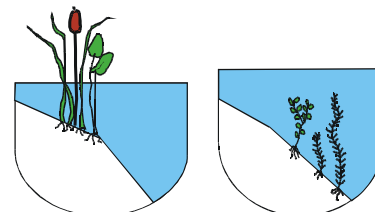


Image © Pauls Plants

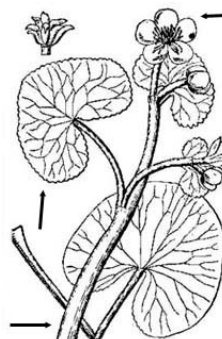
Description

Perennial.

A water fern with slender translucent green leaves that can grow up to 30 cm in length. Leaves can have variable shapes depending on emergent or submersed form and light levels. Leaves are spaced regularly along a creeping rhizome which is covered in a dense mat of brown scales. Daughter plantlets will develop on leaf tips under conditions of high humidity. New plants will also develop from spores or stem fragments.



Genus / species	Caltha palustris
Family	Ranunculaceae
Common names	marsh marigold
Origin	North America, Asia, Europe
Natural habitat	Bogs, fens and margins of streams.
Temperature range	10 - 25° C
pH Range	7.0 - 9.0
Water hardness	medium - hard
Height	20 - 60 cm
Width	Leaves up to 20+ cm
Lighting	high
Speed of growth	medium



Line drawing: Britton, N.L.; Brown, A. 1913. An Illustrated Flora of the Northern United States and Canada, 2nd Edition.

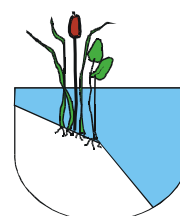


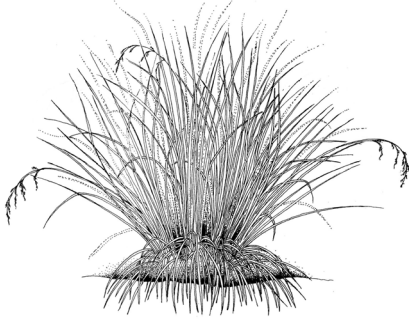

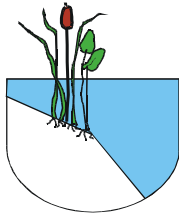
Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database



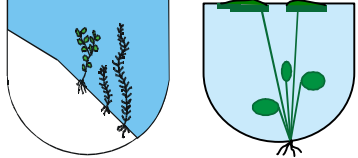
Description

Perennial.

This emergent pond plant has rounded to heart-shaped dark green leaves that are between 7 – 17 cm in width. It has large hollow stems that grow upright from the base. In early spring, yellow flowers are produced on long stalks that stand above the foliage and generally occur in clusters of 1-7 flowers on each stem.



Genus / species	Carex secta	 <p>Image © Sonia Frimmel</p>  <p>Image © Paula Reeves, NIWA</p>	
Family	Cyperaceae		
Common names	purei, tussock sedge		
Origin	New Zealand		
Natural habitat	Swamps, fens, margins of streams and lakes.		
Temperature range	10 - 25° C		
pH Range	7.0 - 9.0		
Water hardness	medium - hard		
Height	50 - 100 cm		
Width	Plant base 20+ cm		
Lighting	high		
Speed of growth	medium		
Description			
<p>Perennial.</p> <p>Leaves on this native sedge are long (up to 1 m), green and triangular in cross-section. Like most sedges it has sharp edges. Flowers are inconspicuous and arranged in an inflorescence that droops downwards. Plants can eventually (over tens of years) form 'trunks' up to several metres tall from old roots and leaves.</p>			

Genus / species	Ceratopteris thalictroides	 <p>www.tropica.com Image © Tropica</p>  <p>Image © A. Murray, University of Florida, Centre for Aquatic and Invasive Plants.</p>	
Family	Pteridaceae		
Common names	Indian fern, water sprite		
Origin	Pan-tropical		
Natural habitat	Margins of lakes, rivers, ponds and swamps.		
Temperature range	20 - 28° C		
pH Range	5.0 - 9.0		
Water hardness	soft - hard		
Height	15 - 30+ cm		
Width	Leafy stem 10 - 20+ cm		
Lighting	high		
Speed of growth	fast		
Description			
<p>Perennial.</p> <p>Ceratopteris thalictroides has finely branched fronds (leaves) that range in colour from emerald green to greenish-yellow. Leaves arise from the base of the plant and can be either submerged, emergent or float on the water-surface. Lower leaves are usually sterile (lack sporangia) but may have plantlets along the leaf margin, whereas emergent leaves are fertile with leaf margins curled under partially covering sporangia. Stems are compact with few scales.</p>			

Genus / species	Cryptocoryne	<p>All species of the genus Cryptocoryne are considered suitable for aquarium and pond use in New Zealand as they are not weedy. Commonly known as 'crypts', they have leaves arranged in a rosette with flowers in the form of a spathe. Over a dozen species are commonly available with some specific examples of submerged plants suitable for aquariums illustrated below.</p>
Family	Araceae	
Common names	Crypts	
Origin	South eastern Asia, from India to Papua New Guinea.	
Natural habitat	Rivers and swamps, adapted to fluctuating water levels.	

Genus / species **Cryptocoryne affinis**
Family Araceae
Common names sword crypto
Origin Malaysia
Natural habitat Rivers and swamps, adapted to fluctuating water levels.
Temperature range 20 - 28° C
pH Range 5.0 - 7.0
Water hardness medium - hard
Height 15 - 30 cm
Width Individual plant 10 - 15+ cm
Lighting low - medium
Speed of growth medium



Image © Paul Parsons, FNZAS



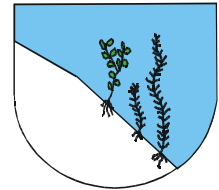
Image © Pauls Plants

Description

Perennial.

Leaves are long (15 - 30cm), sword-shaped, dark green on the surface and purple to violet beneath when fully developed. Leaves have short stalks growing from rootstocks which create long runners. Flowers are in the form of a spathe, which is tubular and twisted.

ALL SPECIES OF THIS GENUS RECOMMENDED.



Genus / species **Cryptocoryne crispatula var. balansae**
Family Araceae
Common names crypto
Origin India to China, Thailand
Natural habitat Rivers and swamps, adapted to fluctuating water levels.
Temperature range 20 - 28° C
pH Range 5.0 - 7.0
Water hardness medium - hard
Height 20 - 60 cm
Width Individual plant 15 - 20+ cm
Lighting high
Speed of growth medium



Image © Tropica

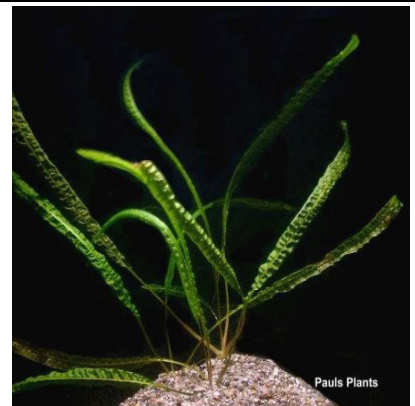


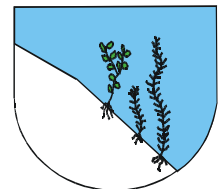
Image © Pauls Plants

Description

Perennial.

A distinguishing feature of this crypto is the very long (up to 50cm), bright green, corrugated leaves. Flowers form on a long tube that broadens and then continues to fold around a purple spathe with red points inside.

ALL SPECIES OF THIS GENUS RECOMMENDED.



Genus / species **Cryptocoryne pontederiifolia**
Family Araceae
Common names crypto
Origin Sumatra
Natural habitat Rivers and swamps, adapted to fluctuating water levels.
Temperature range 20 - 28° C
pH Range 5.0 - 8.0
Water hardness soft - hard
Height 10 - 35 cm
Width Individual plant 8 - 15 cm
Lighting low - high
Speed of growth medium



Image © Tropica



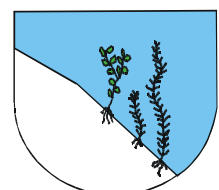
Image © Pauls Plants

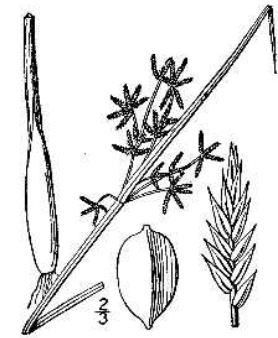

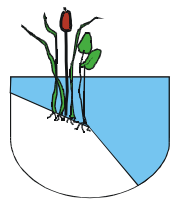
Description

Perennial.

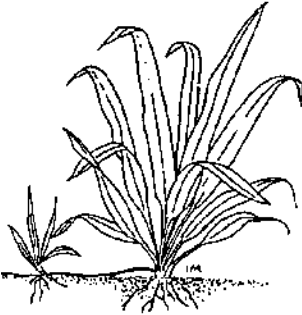

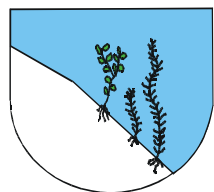
Broad oval-shaped leaves with long stems. Leaves are green on the surface and often pale-pink below. Flowers are in the form of a spathe which is reddish-pink on the outside and yellow inside. New plants develop along a thin rhizome (underground stem).

ALL SPECIES OF THIS GENUS RECOMMENDED.



Genus / species	Cyperus haspan	 <p>USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. <i>Illustrated flora of the northern states and Canada</i>. Vol. 1: 303.</p>	 <p>Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database</p>
Family	Cyperaceae		
Common names	sharp edge sedge, sheathed cyperus, dwarf papyrus		
Origin	North America		
Natural habitat	Wetlands, swamps, pinelands and coastal plains.		
Temperature range	20 - 30° C		
pH Range	5.0 - 7.5		
Water hardness	medium - hard		
Height	50 - 100 cm		
Width	Individual plant 20+ cm		
Lighting	high		
Speed of growth	medium		
Description	<p>Perennial.</p> <p>This sedge has no true leaves instead it has green to purplish leaf-like sheaths which grow from the base of the plant. Flowers are produced in small clusters (spikelets) at the top of triangular stems. Plantlets may develop on the seed heads of some forms of this plant. Stems are characteristically soft and weak unlike the firm stems of most Cyperus species in New Zealand.</p>		

Genus / species	Echinodorus	<p>All species of the genus Echinodorus are considered suitable for aquarium and pond use in New Zealand as they are not weedy. They are commonly known as 'sword plants' due to the sword-like shape of their leaves. A very popular genus in the aquarium trade with numerous species and hybrids traded. Specific examples of submerged plants suitable for aquariums are illustrated below.</p>
Family	Alismataceae	
Common names	Sword plants	
Origin	Americas	
Natural habitat	Both submerged and emergent in lakes, rivers, swamps and wet ground.	

Genus / species	Echinodorus amazonicus	 <p>Image © Ian Mills, FNZAS</p>	 <p>Image © Pauls Plants</p>
Family	Alismataceae		
Common names	Amazon sword		
Origin	Brazil		
Natural habitat	Lakes, rivers, swamps and wet ground.		
Temperature range	22 - 28° C		
pH Range	6.5 - 7.2		
Water hardness	soft - medium		
Height	20 - 30 cm		
Width	Individual plant 20 - 30+ cm		
Lighting	medium - high		
Speed of growth	medium		
Description	<p>Perennial.</p> <p>Leaves are bright green and sword-shaped arising from the base of the plant on short stems. Flowers consist of 3 green sepals and 3 white petals on a long stem that emerges above the water surface.</p> <p>ALL SPECIES OF THIS GENUS RECOMMENDED.</p>		

Genus / species **Echinodorus tenellus**
Family Alismataceae
Common names Amazon sword, mini chain sword
Origin Brazil
Natural habitat Lakes, rivers, swamps and wet ground.
Temperature range 22 - 28° C
pH Range 6.5 - 7.2
Water hardness soft - medium
Height 20 - 30 cm
Width Individual plant 5 – 10+ cm
Lighting medium - high
Speed of growth medium

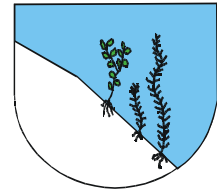


Image © Tropica

Photo pending.

Description

Perennial at temperatures indicated above.
 Leaves are arranged in basal rosettes that develop along root runners. Leaves are green, linear to lanceolate and no longer than 10 cm. Flowers occur in clusters of 3 – 6 flowers. Petals are white and flowers are ~ 1 cm across.
 ALL SPECIES OF THIS GENUS RECOMMENDED.



Genus / species **Echinodorus uruguayensis**
Family Alismataceae
Common names Amazon sword
Origin South America
Natural habitat Lakes, rivers, swamps and wet ground.
Temperature range 15 - 26° C
pH Range 5.0 - 7.0
Water hardness soft - medium
Height 20 - 55+ cm
Width Individual plant 10 - 30+ cm
Lighting medium - high
Speed of growth medium



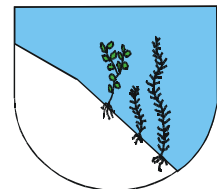
Image © Tropica



Image © Paul's Plants

Description

Perennial.
 Leaves are long, narrow, transparent and dark green however leaf length and width can vary greatly. Leaves are arranged in a basal rosette from which rhizomes (underground stems) emerge to spread plant vegetatively. White flowers, each with 3 petals, are produced above the water surface. Fruit are spiny.
 ALL SPECIES OF THIS GENUS RECOMMENDED.



Genus / species **Elatine gratioloides**
Family Elatinaceae
Common names elatine
Origin New Zealand
Natural habitat Swamps, margins of streams and lakes.
Temperature range 0 - 26° C
pH Range 6.5 - 7.2
Water hardness soft - medium
Height 5 - 30 cm
Width Leafy stem up to 1 cm
Lighting medium - high
Speed of growth medium

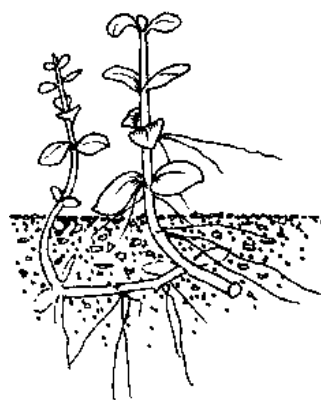


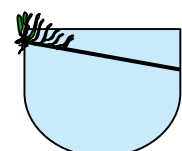
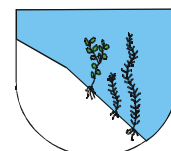
Image © Ian Mills, FNZAS



Image © Paul Champion, NIWA

Description

Perennial.
 This native herb is often found growing in prostate mats but can form erect stems when grown underwater. It has a fleshy stem, often pinkish, with bright green leaves arranged in alternate pairs along the stem. It produces inconspicuous flowers in the axil between the stem and leaves.



Genus / species **Eleocharis acicularis**
Family Cyperaceae
Common names hair grass, dwarf hair grass
Origin Cosmopolitan (not NZ)
Natural habitat Shallow edges of all water bodies, usually in sandy soils.
Temperature range 15 - 25° C
pH Range 5.0 - 8.0
Water hardness soft - medium
Height 10 - 15 cm
Width Individual plant 5+ cm
Lighting medium - high
Speed of growth medium



Image © Tropica

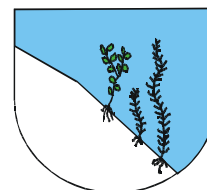


Image © Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database

Description

Perennial.

Hair grass as the name suggests has very fine hair-like stems. Leaves are reduced to small bracts at the base of the stems. The tiny inconspicuous flowers are clustered together in a spike at the end of the stems. Each flower is covered by a small bract (glume) which are arranged spirally on the spike. Plants spread either by seed or slender rhizomes (underground stems).



Genus / species **Elodea canadensis**
Family Hydrocharitaceae
Common names Canadian pondweed, elodea
Origin North America
Natural habitat Lakes, rivers and streams
Temperature range 0 - 25° C
pH Range 6.0 - 7.5
Water hardness medium
Height 50 - 300 cm
Width Leafy stem up to 2 cm
Lighting medium - high
Speed of growth high

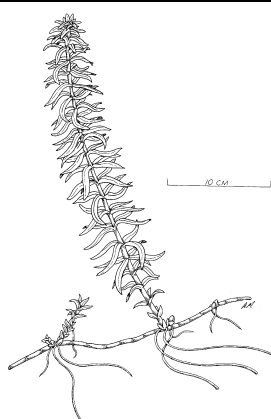


Image © NIWA

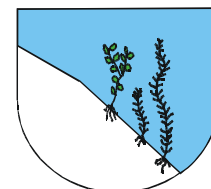


Image © NIWA

Description

Perennial.

Leaves are green and are arranged around the stem in whorls of 3 (rarely 4 or 5) with a distinct gap between whorls. Leaf shape can vary but leaves are usually elongated, egg-shaped, pointed at the ends and can appear finely serrated. Flowers small and inconspicuous on thin white stalks.
This member of the oxygen weed family is the only one allowed for aquarium use in New Zealand.



Genus / species **Glossostigma elatinoides**
Family Scrophulariaceae
Common names glossostigma, mudwort
Origin New Zealand, Australia
Natural habitat Shallow margins of streams, rivers and lakes.
Temperature range 0 - 26° C
pH Range 6.8 - 7.2
Water hardness soft - medium
Height 2 - 3 cm
Width Leaves up to 6 mm
Lighting high
Speed of growth high

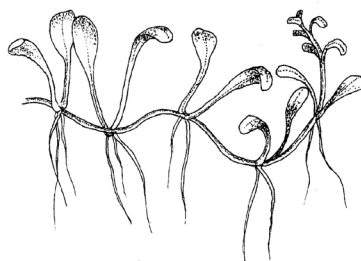


Image © Sonia Frimmel

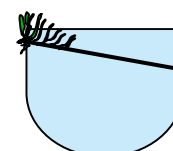
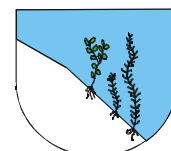


Image © Rohan Wells, NIWA

Description

Annual or perennial.

Leaves are pale green, spoon shaped and almost always found in opposite pairs along a prostrate stem. Flowers are tiny (4 mm across) with 5 petals white to pink in colour produced on emergent plants. While this is a very short plant it can form dense turfs. Dispersal by stem fragments or seeds.



Genus / species	Gratiola sexdentata
Family	Scrophulariaceae
Common names	gratiola
Origin	New Zealand
Natural habitat	Margins of lakes, rivers and ponds.
Temperature range	5 - 26° C
pH Range	6.8 - 7.2
Water hardness	soft - medium
Height	3 - 50 cm
Width	Leaves up to 3 mm
Lighting	high
Speed of growth	high



Image © Sonia Frimmel

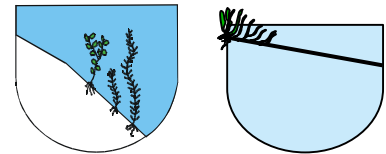


Image © Trevor James, AgResearch

Description

Annual or perennial.

The leaves of this attractive native herb are dark green, oval and often with black spots on the edges. They are arranged on the reddish-purple stem in opposite pairs. Flowers are up to 12 mm long with white petals and a yellow throat produced on emergent plants. On pond edges it grows prostrate but will ascend when grown submerged.



Genus / species	Heteranthera zosterifolia
Family	Pontederiaceae
Common names	stargrass
Origin	South America
Natural habitat	Still waters such as ponds, lakes, swamps and marshes.
Temperature range	18 - 30° C
pH Range	5.5 - 7.2
Water hardness	soft - medium
Height	30 - 50 cm
Width	10 - 15+ cm
Lighting	high
Speed of growth	high



Image © Tropica

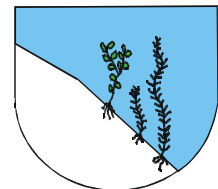


Image © Paul's Plants

Description

Annual or perennial.

The leaves of stargrass are bright green, ribbon-like with pointed ends. The leaves are arranged close together on the stems giving the plant a bushy appearance. Flowers have 6 blue to purple petals and are held above the water surface, often in pairs.



Genus / species	Hydrocotyle leucocephala
Family	Apiaceae
Common names	Brazilian pennywort, Cardamine
Origin	South America
Natural habitat	Swamps, fens, margins of streams and lakes.
Temperature range	18 - 25° C
pH Range	6.5 - 7.5
Water hardness	medium - hard
Height	10 - 20 cm
Width	5 - 15+ cm
Lighting	low - high
Speed of growth	high



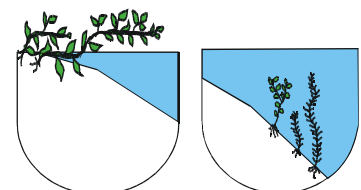
Image © Tropica

Photo pending.

Description

Perennial.

Leaves are attached to elongated stems and are round in outline with broad shallow lobes. They can either be floating, emergent or submersed depending on water depth. Flowers are white, small and inconspicuous and grouped together in an umbel. Dispersal by seed or stem fragments.



Genus / species *Hygrophila difformis*
Family Acanthaceae
Common names water wisteria
Origin South-east Asia
Natural habitat Seasonally submerged, growing on rocks and logs in full sun or shade.
Temperature range 19 - 26° C
pH Range 6.5 - 7.5
Water hardness soft - medium
Height 20 - 50 cm
Width 15 - 20+ cm
Lighting medium – high
Speed of growth high

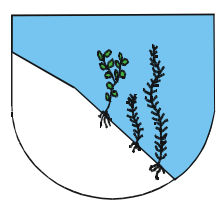


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Image © Tropica

Photo pending.

Description
 Perennial.
 As the name suggests leaves of this plant can have different forms. Submerged leaves are initially oval before becoming deeply incised and reach up to 12 cm in length. Leaves are usually bright green on the upper surface and white below. Stems are thin and quite fragile. Grows well from fragments.



Genus / species *Isoetes kirkii*
Family Isoetaceae
Common names quillwort
Origin New Zealand
Natural habitat Lake margins down to several metres in depth.
Temperature range 0 - 25° C
pH Range 5.5 - 7.2
Water hardness soft
Height 5 - 25 cm
Width Single plant 1 - 3 cm at base
Lighting high
Speed of growth high

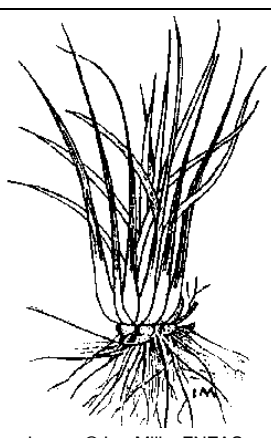


Image © Ian Mills, FNZAS

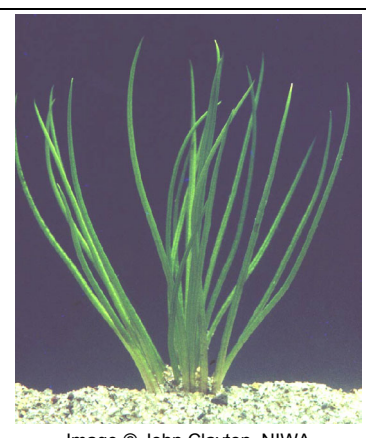
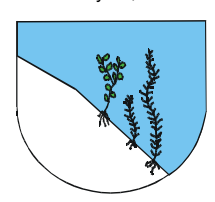


Image © John Clayton, NIWA

Description
 Perennial.
 This native fern-like species has stiff, fleshy leaves arranged in a rosette. They are white at the bases getting darker green and tapered toward the tip. Large dark brown spores can often be seen in the swollen leaf bases.



Genus / species *Isolepis cernua*
Family Cyperaceae
Common names slender clubrush
Origin New Zealand
Natural habitat Wet rock ledges, margins of streams and coastal lagoons.
Temperature range 10 - 25° C
pH Range 5.5 - 7.2
Water hardness medium - hard
Height 6 - 12 cm
Width Single plant 6+ cm
Lighting high
Speed of growth medium

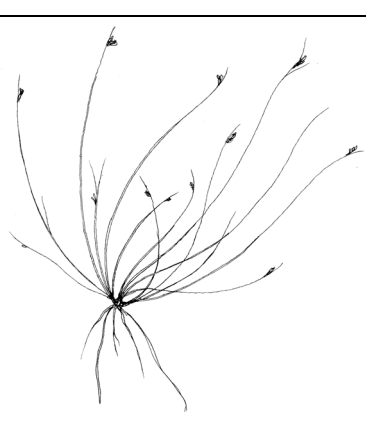
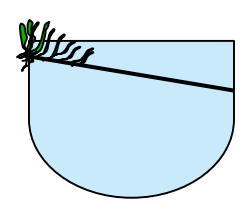


Image © Sonia Frimmel

Photo pending.

Description
 Perennial.
 This small native sedge forms dense tufts of very fine stems and leaves (0.5 mm in diameter). Leaves are bright green. Flowers occur as inconspicuous spikelets and are attached laterally near the tips of stems. Spikelets are reddish-brown or dark grey.



Genus / species *Lilaeopsis novae-zelandiae*
Family Apiaceae
Common names
Origin New Zealand
Natural habitat Mostly coastal occurring on the margins of brackish water bodies and salt marshes

Temperature range 0 - 25° C
pH Range 5.0 - 7.0
Water hardness soft
Height 2 - 10 cm
Width Leaf base up to 5 mm
Lighting high
Speed of growth high

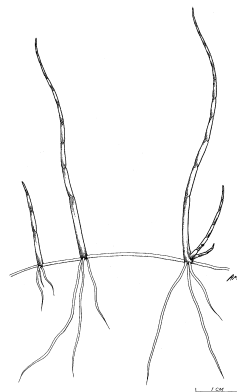


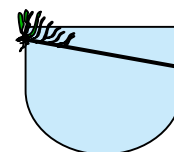
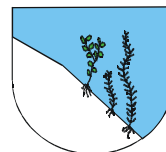
Image © NIWA

Photo pending.

Description

Perennial.

Leaves are linear and cylindrical with reddish-black septae (cross walls). Grows on margins of water bodies with short curved leaves, but submerged leaves are longer and more erect. Flowers in clusters (2 – 9) on a short stalk. Petals white to pink. (N.B. this is a true native of New Zealand, whereas the plant commonly sold in the trade under the same name is *Lilaeopsis brasiliensis*, which is also suitable).



Genus / species *Limnophila sessiliflora*
Family Scrophulariaceae
Common names ambulia
Origin Asia
Natural habitat Rivers, lakes and swamps.
Temperature range 20 - 28° C
pH Range 5.0 - 8.0
Water hardness soft - hard
Height 15 - 40 cm
Width Stem with leaves 4 - 7 cm
Lighting medium - high
Speed of growth high



Image © Tropica

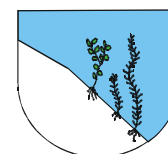
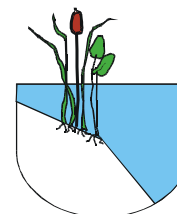


Image © Paul's Plants

Description

Annual or perennial.

Leaves are arranged in whorls of six to nine leaves and are divided many times. The submerged leaves have a more feathery appearance than the emergent leaves pictured (above right). The emergent part of the stem is finely hairy. Flowers are white with purple stripes and often blue on the outer side. Flowers occur above the water surface.



Genus / species *Lobelia cardinalis*
Family Lobeliaceae
Common names red lobelia, cardinal plant
Origin North America
Natural habitat Shallow water and damp ground.
Temperature range 18 - 26° C
pH Range 6.5 - 7.5
Water hardness soft
Height 20 - 30 cm
Width Stems with leaves 7 - 15+ cm
Lighting medium - high
Speed of growth slow



Image © Tropica

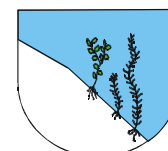
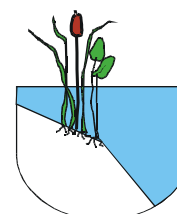


Image © V. Ramey, University of Florida, Centre for Aquatic and Invasive Plants.

Description

Perennial.

Leaves are bright green, lanceolate (narrowly oval) and occur alternately along the stem. Emergent leaves are usually between 2 – 6 cm in length, while the submerged leaves can be up to 10 cm long. Leaf stems are oval in cross section and like the main stem are pale green under water. When grown on the margin of a pond this species will produce bright red flowers.



Genus / species	Ludwigia mullertii / Ludwigia repens 'Rubin'
Family	Onagraceae
Common names	Red ludwigia
Origin	Central America
Natural habitat	Marshes and shallow water.
Temperature range	15 - 30° C
pH Range	5.0 - 8.0
Water hardness	soft - medium
Height	20 - 50 cm
Width	Stem with leaves 5 - 10 cm
Lighting	low - high
Speed of growth	fast



Image © Tropica

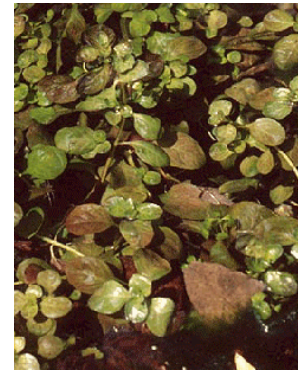
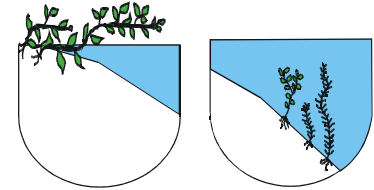


Image © A. Murray, University of Florida, Centre for Aquatic and Invasive Plants.

Description

Annual or perennial.

Leaves are oval-shaped and up to 5 cm long with short stems. The underside of leaves are reddish-brown, hence the name 'red ludwigia'. The reddish colouring of the leaves seems to increase with greater light intensity and iron content in the growing medium. Flowers occur in the leaf axils of the emergent portion of the plant and are very small with tiny yellow petals.



Genus / species	Mayaca fluviatilis
Family	Mayacaceae
Common names	bog moss, pine tree
Origin	Southeast USA
Natural habitat	Rivers, lakes and swamps.
Temperature range	18 - 25° C
pH Range	6.5 - 7.0
Water hardness	soft
Height	40 - 50 cm
Width	Stem with leaves up to 4 cm
Lighting	medium - high
Speed of growth	high



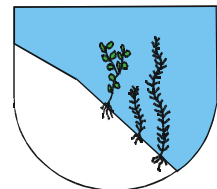
Image © University of Florida



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

Description

This plant is not a true moss but it has very soft moss-like leaves that are arranged spirally on a densely crowded stem. Leaves are bright green, less than 1cm long and can appear like short pieces of thread. Stems are whitish-green in colour, thin, erect and can grow to over 40 cm in height. Flowers are small and colour varies from white to pink.



Genus / species	Mazus radicans
Family	Scrophulariaceae
Common names	
Origin	New Zealand
Natural habitat	Margins of streams, dune hollows and damp forest margins.
Temperature range	10 - 25° C
pH Range	5.5 - 7.2
Water hardness	soft
Height	5 - 8 cm
Width	Leaves 2 - 5 cm
Lighting	medium - high
Speed of growth	high



Image © John Barkla, Department of Conservation

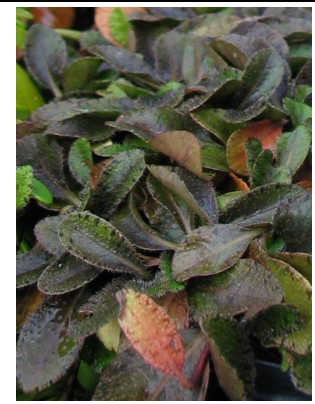
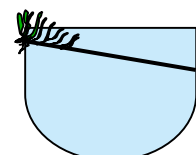


Image © John Barkla, Department of Conservation

Description

Perennial.

This small native herb has dark green leaves often with brown blotches making it appear bronze coloured. Leaves are 2 – 5 cm long and broadly oval in shape. The stems creep along the ground making it a good groundcover for the edges of ponds. The most striking feature of Mazus radicans is its unusually large flowers which are white with a deep purple throat and yellow markings.



Genus / species	Microsorium pteropus
Family	Polypodiaceae
Common names	Java fern
Origin	Tropical Asia
Natural habitat	Seasonally submerged, growing on rocks and logs in full sun or shade.
Temperature range	18 - 30° C
pH Range	5.0 - 8.0
Water hardness	soft - hard
Height	15 - 30 cm
Width	Plants 12 - 20 cm
Lighting	low - high
Speed of growth	slow



Image © Tropica

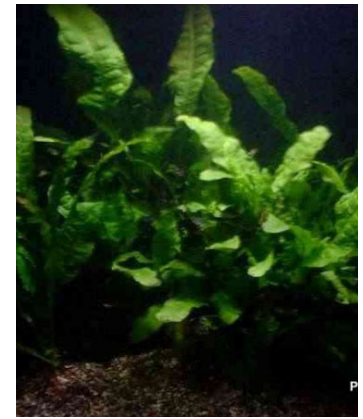
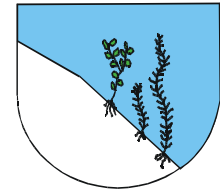


Image © Paul's Plants

Description

Perennial.

A hardy water fern with bright green leaves borne on short stalks. Leaves are long and spear shaped often appearing corrugated or concave in places and can grow up to 30cm long and 6cm wide. Sporangia (bundles containing spores) can be visible on the underside of leaves as black spots. Rhizomes are strong, green and scaly and enable this fern to spread rapidly.



Genus / species	Myriophyllum propinquum
Family	Haloragaceae
Common names	common water milfoil
Origin	New Zealand
Natural habitat	Swamps, rivers, streams and lakes.
Temperature range	0 - 25° C
pH Range	6.0 - 7.0
Water hardness	
Height	20 - 60 cm
Width	Stem with leaves up to 5 cm
Lighting	medium - high
Speed of growth	medium - high



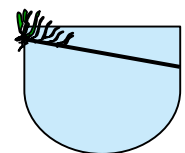
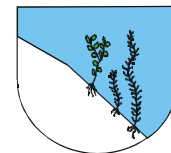
Image © Sonia Frimmel



Image © NIWA

Description

Native to New Zealand, water milfoil can form submerged and emergent leaf forms. Submerged leaves are pinnately divided in whorls of 3 - 4 and appear long and feathery. Stems can grow up to 3 m tall in deep water and arise from runners in the sediment. Small whitish pink flowers are borne on the lower leaf whorls of emergent stems during summer months. This species can also grow as a short herb in shallow water growing up to only 10 cm in height.



Genus / species	Myriophyllum robustum
Family	Haloragaceae
Common names	robust water milfoil
Origin	New Zealand
Natural habitat	Peaty swamps, rivers, streams and lakes.
Temperature range	
pH Range	5 - 23° C
Water hardness	4.5 - 7.0
Height	20 - 100 cm
Width	Leafy submerged stems 5 - 8 cm
Lighting	20+ cm
Speed of growth	high medium



Image © Sonia Frimmel

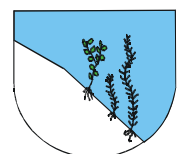
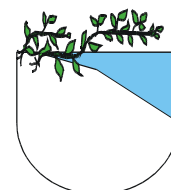


Image © Paula Reeves, NIWA

Description

Perennial.

As the name suggests this milfoil has 'robust' stems with submerged and emergent leaf forms. Emergent leaves are dark green, in whorls of 5 - 8 and pinnately divided. Submerged leaves are larger, feathery and often bronze in colour. Inconspicuous flowers in leaf axils of emergent stems. Acute emergent leaf tips distinguish this species from the noxious Myriophyllum aquaticum (parrots feather) with rounded leaf tips.



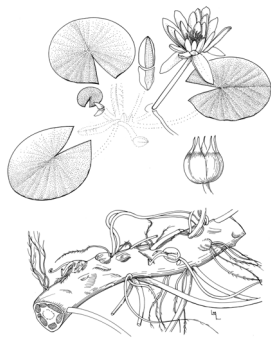

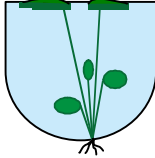
Genus / species	<i>Nymphaea hybrids</i>	 	
Family	Nymphaeaceae		
Common names	water lily		
Origin	Cosmopolitan		
Natural habitat	Still waters of all types of water bodies.		
Temperature range	5 - 30° C		
pH Range	5.0 - 8.0		
Water hardness	soft - hard		
Height	20 - 200 cm		
Width	Leaves 20 - 60 cm		
Lighting	medium - high		
Speed of growth	medium		
Description			
<p>Perennial.</p> <p>Leaves are green with smooth edges and are rounded or broadly oval with a deep notch at the base. Mature leaves are glossy, leathery and can grow up to 60cm wide. Stems can grow up to the surface from a depth of 2m and are attached to bottom sediments by thick white, fleshy roots. Flowers are distinctive and either float or grow stiffly emergent above the water surface. Flowers of unusual shape and colour are characteristic of hybrid varieties.</p>			

Image © University of Florida, Centre for Aquatic & Invasive Plants

Image © NIWA


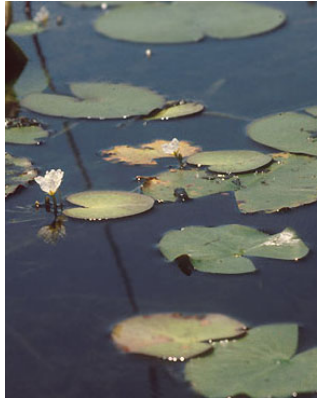
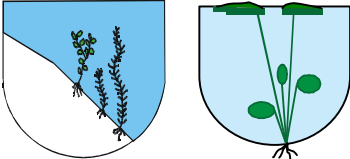
Genus / species	<i>Nymphoides aquatica</i>	 	
Family	Menyanthaceae		
Common names	Banana plant		
Origin	USA		
Natural habitat	Still waters of all types of water bodies.		
Temperature range	15 - 30° C		
pH Range	5.0 - 8.0		
Water hardness	soft - hard		
Height	20 - 60 cm		
Width	Leaves 20 - 40 cm		
Lighting	low - high		
Speed of growth	medium		
Description			
<p>Perennial.</p> <p>While its leaves resemble those of a small water lily, this plant gets its name from its cluster of thick banana-shaped roots. Leaves are green with a dull purple underside, slightly wrinkled at the edges, round in shape with a notch at the base (heart shaped). The banana shaped roots are located close to the leaves near the water surface and the plant is attached to the bottom sediments by a rhizome. Small flowers arise from below the leaf surface with five white petals.</p>			

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

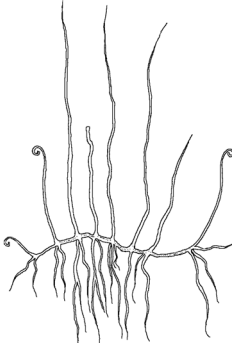

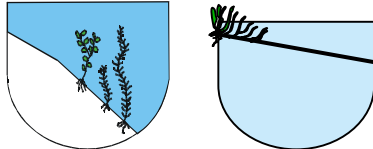
Genus / species	<i>Pilularia novae-zelandiae</i>	 	
Family	Marsiliaceae		
Common names	Pillwort		
Origin	New Zealand		
Natural habitat	Margins of lakes and mountain tarns to a depth of 4 m.		
Temperature range	0 - 26 ° C		
pH Range	5.0 - 8.0		
Water hardness			
Height	2 - 5 cm		
Width	Leaves <0.5 mm		
Lighting	medium - high		
Speed of growth	medium		
Description			
<p>Perennial.</p> <p>This small grass-like fern is only found in New Zealand and has green leaves that are slender and thread-like. Leaves (fronds) grow erect up to 5 cm high along a creeping slender rhizome. Leaves appear evenly distributed along the rhizome and can be identified by the tips of young leaves that are typically curled. Round, brown, hairy sporocarps (containing spores) are attached to the creeping stem on short stalks.</p>			

Image © Sonia Frimmel

Image © Paula Reeves, NIWA

Genus / species **Pontederia cordata**
Family Pontederiaceae
Common names Pickerel weed
Origin North and Central America
Natural habitat Shallow water of swamps, rivers, lakes and streams.
Temperature range 0 - 28° C
pH Range 5.0 - 8.0
Water hardness
Height 50 - 100 cm
Width Leaves 10 – 15 cm
Lighting medium - high
Speed of growth medium



Image © University of Florida, Centre for Aquatic & Invasive Plants

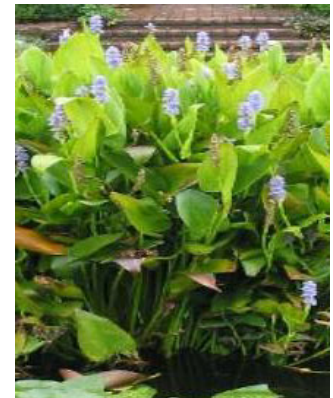
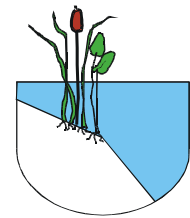


Image © Paul Champion, NIWA.

Description

Perennial.

This emergent plant has bright green erect leaves that vary in shape from heart-shaped to spear-shaped blades. Leaves have smooth edges, are borne on long petioles (stalks) and grow in clusters from a thick creeping rootstock. Plants can reach 1 m height and in summer they produce attractive violet-blue flower spikes similar to water hyacinth.



Genus / species **Ranunculus amphitrichus**
Family Ranunculaceae
Common names Waoriki
Origin New Zealand
Natural habitat Wet margins of streams, rivers and lakes, aquatic down to 4m in still water.
Temperature range 5 - 25° C
pH Range 5.0 - 8.0
Water hardness
Height 5 - 10 cm
Width Leaves up to 6 cm
Lighting high
Speed of growth medium - high

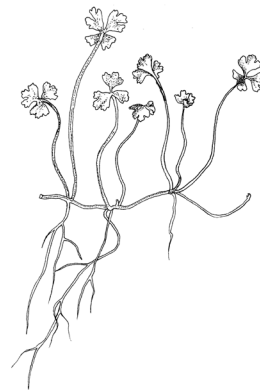


Image © Sonia Frimmel

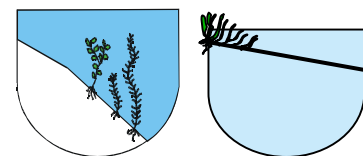


Image © John Clayton, NIWA

Description

Perennial.

This native herb has bright green leaves that can form mats up to 10 cm high. Leaf shape is distinct with each leaf blade dividing into 3 triangular lobes that are then divided further into segments. Each leaf blade measures 4 - 6 cm across and the lobes can vary in width. Leaves occur in clusters of two to seven leaves with roots produced at each node of a creeping stem that can grow up to 70 cm long. Flowers are small and have very small yellow petals.



Genus / species **Ranunculus limosella**
Family Ranunculaceae
Common names
Origin New Zealand
Natural habitat Margins of lakes, tarns and coastal lagoons.
Temperature range 0 - 28° C
pH Range 6.0 - 8.0
Water hardness soft - medium
Height 2 - 14 cm
Width Leave bases 2 – 3 mm
Lighting high
Speed of growth medium

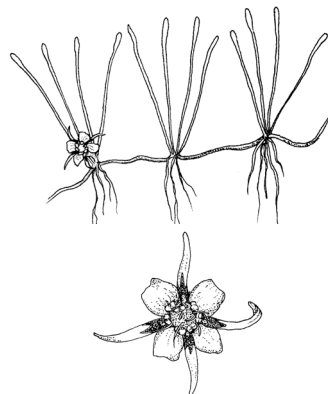
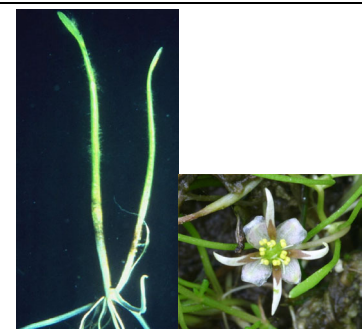


Image © Sonia Frimmel

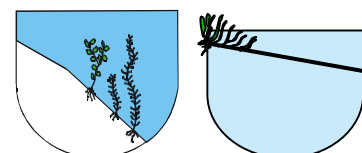


Images © Trevor James, AgResearch

Description

Perennial.

This small native herb has different leaf lengths depending on where its grown. Underwater leaves can grow up to 14 cm in length but may only be up to 2 cm long in exposed places. Leaves are round at the base and form oval spoon-shaped ends. Leaves can form singly or in tufts along a creeping stem. The flowers are 6 mm in diameter with 4 thin brownish pink petals and 4 pale pink sepals.



Genus / species **Riccia fluitans**
Family Ricciaceae
Common names Riccia, crystal wort
Origin West Africa
Natural habitat Seasonally submerged, growing on rocks and logs in full sun or shade.
Temperature range 20 - 28° C
pH Range 5.0 - 7.0
Water hardness soft - medium
Height 15 - 40 cm
Width Individual thallus 1 – 2 mm
Lighting low - high
Speed of growth slow

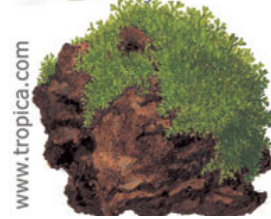


Image © Tropica

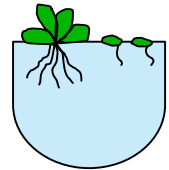
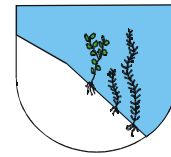


Image © Pauls Plants

Description

Perennial.

Traditionally this liverwort is a floating water plant but can grow well in or out of water. It has a leaf-like plant body (thallus) that is emerald green to bright green in colour. The thallus is ribbon-shaped and branched often growing in fibrous looking clumps. Short white rhizoids may be present when attached to the bottom or out of water but do not appear on floating plants.



Genus / species **Rotala indica**
Family Lythraceae
Common names Beanstalk
Origin Tropical Asia
Natural habitat Still shallow waters and water margins.
Temperature range 18 - 30° C
pH Range 6.5 - 7.5
Water hardness medium - hard
Height 40 - 60 cm
Width Leafy stem 3+ cm
Lighting medium - high
Speed of growth fast

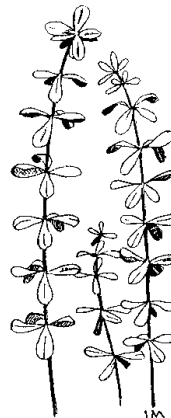


Image © Ian Mills, FNZAS

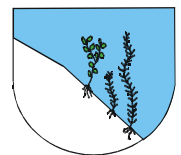
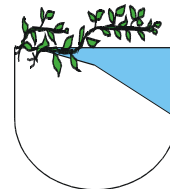


Image © Pauls Plants

Description

Perennial.

This species has very different submerged (top right photo) and emergent (lower right photo) leaves. Submerged leaves are narrow and lanceolate and grow opposite or in whorls. Colour varies from green to brownish red with high light levels promoting redder colour. Emergent leaves are egg-shaped, bright green and arranged in opposite pairs. Small bell-shaped purple flowers occur in the leaf axis of emergent stems.



Genus / species **Rotala macrandra**
Family Lythraceae
Common names Red rotala
Origin Tropical Asia
Natural habitat Still shallow waters and water margins.
Temperature range 22 - 28° C
pH Range 5.0 - 7.0
Water hardness soft - medium
Height 25 - 55 cm
Width Leafy stem 2 - 7 cm
Lighting high
Speed of growth fast



Image © Tropica

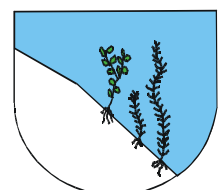


Image © Pauls Plants

Description

Perennial.

Rotala macrandra has very broad ovate leaves (2 – 3 cm long, 1-2 cm wide) which appear wavier when submerged. Leaves are unstalked, oppositely arranged with sharp tips and are so thin they can appear translucent. Stems are frequently branched giving the plant a 'bushy' appearance. Flowers occur in a flower spike, pinkish in colour and without petals.



Genus / species *Rotala wallichii*
Family Lythraceae
Common names Red pinetree
Origin South-east Asia
Natural habitat Seasonally submerged, growing on rocks and logs in full sun or shade.
Temperature range 18 - 28° C
pH Range 5.0 - 7.0
Water hardness soft - medium
Height 10 - 30 cm
Width Leafy stem 2 - 4 cm
Lighting medium - high
Speed of growth fast

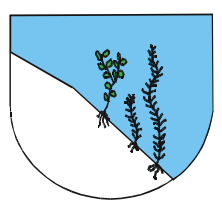


www.tropica.com

Image © Tropica

Photo pending.

Description
 Perennial.
 Submerged leaves are needle-like (long and thin) arranged in dense whorls (up to 12 leaves per whorl) around each stem. In good light conditions submerged leaves develop red tips towards the top of the stem. Emergent leaves are much more broad. Flowers occur in whorls on a flower spike. Petals are white or pale lilac.



Genus / species *Sagittaria subulata*
Family Alismataceae
Common names Dwarf sagittaria, mini val
Origin North America, Asia, Europe
Natural habitat All types of water bodies with conditions of high light levels.
Temperature range 16 - 28° C
pH Range 6.0 - 9.0
Water hardness soft - hard
Height 5 - 50 cm
Width Leaves up to 10 mm
Lighting low - high
Speed of growth fast



Image © Tropica

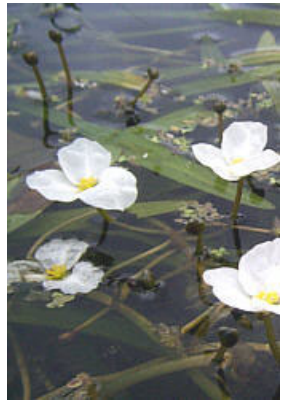
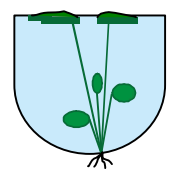
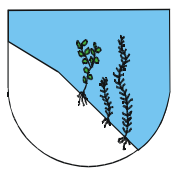


Image © Daniel Reed, www.2bntthewild.com

Description
 Perennial.
 A small grass-like herb with long slender green leaves. Leaves have smooth edges and grow in rosettes from the base growing to a height of 5 – 50 cm depending on water depth. If reaching the water surface leaves float but do not rise above the surface. Plants grow from a short rootstock that frequently produces side runners with new plants growing from them. Flowers float on the water surface and are white with 3 petals.



Genus / species *Samolus valerandi*
Family Primulaceae
Common names Green water rose, brook weed
Origin Cosmopolitan
Natural habitat Shallow, still waters or wet ground on the margins of swamps, lakes and rivers.
Temperature range 15 - 26° C
pH Range 6.0 - 9.0
Water hardness soft - hard
Height 6 - 12 cm
Width Plants 6 - 12 cm
Lighting high
Speed of growth slow

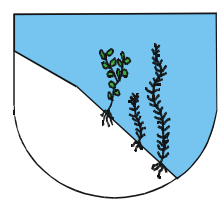


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Image © Tropica

Photo pending.

Description
 Perennial.
 Leaves on this plant are arranged in a rosette of 7 - 14 leaves. Leaves are light green, oval and tear shaped reaching up to 10 cm in length with a narrow base. Branching veins are visible on the leaves and are whitish in colour. Tiny white flowers with five petals can form on emergent plants while submerged plants do not flower but put out runners from which new plants grow.



Genus / species **Schoenoplectus tabernaemontani**
Family Cyperaceae
Common names lake clubrush, zebra sedge
Origin New Zealand, circum-Pacific
Natural habitat Margins of lakes, rivers and streams to a depth of 0.5 m.
Temperature range 10 - 28° C
pH Range 5.0 - 8.0
Water hardness
Height 100 - 200 cm
Width Leave base 10+ mm
Lighting high
Speed of growth medium



Image © NIWA

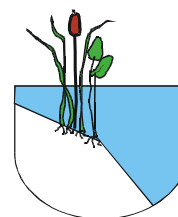


Image © NIWA

Description

Perennial.

This native sedge has tall dark green culms (reed-like leaves and stems) up to 1 cm in diameter with a sharp tip. The inflorescence occurs near the top of the stem and consists of several branches of brown spikelets. Vegetative reproduction occurs via a red creeping rhizome (underground stem).



Genus / species **Thalia dealbata**
Family Marantaceae
Common names Powdery alligator-flag
Origin America
Natural habitat Margins of lakes, swamps and rivers.
Temperature range 10 - 25° C
pH Range
Water hardness
Height 120 - 180 cm
Width Single plant 50 - 100+ cm
Lighting medium - high
Speed of growth medium



USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 1: 546.

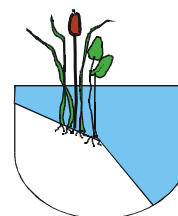


Image © Larry Allain USDA-NRCS PLANTS Database

Description

Perennial.

This tall emergent plant has broad oval leaf blades. The leaves are blue-green in colour with purple edges and are dusted with a fine white powder, hence the common name of powdery alligator-flag. Leaves occur alternately along the stem and have a smooth margin. Violet flowers occur in branched open clusters at the top of tall stems usually rising well above the leaves.



Genus / species **Vesicularia dubyana**
Family Hypnaceae
Common names Java moss
Origin South-east Asia
Natural habitat Emerged or submerged on stones, stumps or damp soil.
Temperature range 15 - 28° C
pH Range 5.0 - 9.0
Water hardness soft - hard
Height 5+ cm
Width Leaf thallus 1-2 mm
Lighting low - high
Speed of growth slow



Image © Tropica



Image © Pauls Plants

Description

Perennial.

This water moss grows in clumps or balls and can attach itself to most surfaces. 'Leaves' are small and lanceolate and bright green in colour growing in two rows along the stem. Stems are irregular and branching forming tufts that are held in place by rhizoids (root-like structures).

