



Aquatic plants of Lake Rototoa



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Made on the New Zealand Plant Conservation Network website: www.nzpcn.org.nz

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Selected from my own observations, and flora lists from the Auckland Botanical Society (Wilson 2014) , and Lake Ototoa Management plan (1985).

References

Wilson, David. 'Field Trip to Rototoa Scenic Reserve (Lake Ototoa), South Kaipara Peninsula, 17 May 2014'. Auckland Botanical Society Journal 69, no. 2 (2014): 107–14.

Department of Lands and Survey. 'Lake Ototoa Management Plan 1985.Pdf'. Auckland, N.Z., 1985.

Glossostigma elatinoides

FAMILY

Phrymaceae

AUTHORITY

Glossostigma elatinoides Benth. ex Hook.f.

FLORA CATEGORY

Vascular – Native

ENDEMIC TAXON

No

ENDEMIC GENUS

No

ENDEMIC FAMILY

No

STRUCTURAL CLASS

Herbs - Dicotyledons other than Composites

NVS CODE

GLOELA

CHROMOSOME NUMBER

$2n = 10$

CURRENT CONSERVATION STATUS

2012 | Not Threatened

PREVIOUS CONSERVATION STATUSES

2009 | Not Threatened

2004 | Not Threatened

LIFE CYCLE

Seeds dispersed by ballistic projection, wind and water (Thorsen et al., 2009)

ETYMOLOGY

glossostigma: Tongue-shaped stigma

elatinoides: Resembling *Elatine* - a superficially similar plant of wetlands and fresh water bodies

REFERENCES AND FURTHER READING

Duguid, F. 1969. Notes on *Glossostigma elatinoides*. *Wellington Botanical Society Bulletin*, 36: 15-18

Thorsen, M. J.; Dickinson, K. J. M.; Seddon, P. J. 2009. Seed dispersal systems in the New Zealand flora. *Perspectives in Plant Ecology, Evolution and Systematics* 11: 285-309

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/glossostigma-elatinoides/>



L. Otamangakau, January. Photographer: John Smith-Dodsworth



Cultivated, ex Clutha R. Photographer: John Barkla

Azolla pinnata

COMMON NAME

ferny azolla

SYNONYMS

Azolla pinnata subsp. *asiatica*

FAMILY

Salviniaceae

AUTHORITY

Azolla pinnata R.Br.

FLORA CATEGORY

Vascular – Exotic

STRUCTURAL CLASS

Ferns

NVS CODE

AZOPIN

BRIEF DESCRIPTION

A small aquatic free floating perennial fern which forms a conspicuous red (green in shaded areas) mat on the water surface. Plants are 1-3 cm long, triangular in outline, and regularly branched. Leaves green to red. Roots densely covered with branched, fine, hair-like rootlets.

DISTRIBUTION

Abundant in the northern half of the North Island to the Rotorua Lakes with scattered sites further south to Levin.

HABITAT

Still and slow flowing water bodies in warm areas.

FEATURES

Tiny free-floating aquatic fern, forming red-coloured mats (green in shaded areas). Plants 25 x 20 mm, triangular or 5-angled in outline, regularly branched. Leaves usually not overlapping, green turning red. Roots to 5 cm long; with fine, lateral rootlets.

SIMILAR TAXA

Azolla rubra – a native floating fern. *A. rubra* is more ovate and irregularly branched. Rootlets are and unbranched. In comparison *A. pinnata* has regular 2 pinnate branching and its roots have fine rootlets.

FLOWERING

N/A

FLOWER COLOURS

No flowers

FRUITING

N/A

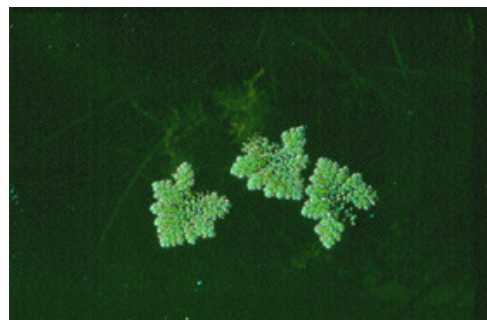
LIFE CYCLE

This perennial reproduces rapidly by fragmentation, forming dense mats across nutrient-rich still waters. Produces spores which may be spread by waterfowl.

Other dispersal mechanisms include downstream via waterflow and into new catchments via contaminated diggers, eel nets, boats and trailers, water fowl, occasionally by wind blown spores.

YEAR NATURALISED

1969



Azolla pinnata. Photographer: John Smith-Dodsworth



Lake Wiritoa. Jan 2009. Photographer: Colin Ogle

ORIGIN

Tropical Africa, Asia, Australia

REASON FOR INTRODUCTION

Possibly contaminant of ornamental pond plants, or a natural introduction from Australia being spread by migratory waterfowl.

CONTROL TECHNIQUES

Can be managed using floating booms that push floating plants to one end of a dam or small water body, then remove manually/mechanically. Only short-term control usually achieved.

TOLERANCES

Tolerates low to high nutrient water, high to moderate temperature. Intolerant of low temperatures and heavy shade. Does not dominate in moving water or expose surfaces.

ETYMOLOGY

azolla: From the Greek azo 'to dry' and ollo 'to kill', killed by dryness

pinnata: From the Latin pinna 'feather', in botany pinnatus 'pinnate' refers an arrangement of leaves, veins or branches in rows along a central axis, similar to the structure of a feather.

ATTRIBUTION

Factsheet prepared by Paul Champion and Deborah Hofstra (NIWA).

REFERENCES AND FURTHER READING

Champion et al (2012). Freshwater Pests of New Zealand. NIWA publication.

<http://www.niwa.co.nz/freshwater-and-estuaries/management-tools/identification-guides-and-fact-sheets/freshwater-pest-species>.

Johnson PN, Brooke PA (1989). Wetland plants in New Zealand. DSIR Field Guide, DSIR Publishing, Wellington. 319pp.

Coffey BT, Clayton JS (1988). New Zealand water plants: a guide to plants found in New Zealand freshwaters. Ruakura Agricultural Centre. 65pp.

Popay et al (2010). An illustrated guide to common weeds of New Zealand, third edition. NZ Plant Protection Society Inc, 416pp.

Johnson, A. T., Smith, H. A. (1972). Plant Names Simplified: Their pronunciation, derivation and meaning. Landsman Bookshop Ltd: Buckenhill, UK.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/azolla-pinnata/>

Limosella lineata

COMMON NAME

mudwort

SYNONYMS

Limosella lineata Glück var. *lineata*, *Limosella lineata* var. *spathulata* Glück

FAMILY

Plantaginaceae

AUTHORITY

Limosella lineata Glück

FLORA CATEGORY

Vascular – Native

ENDEMIC TAXON

No

ENDEMIC GENUS

No

ENDEMIC FAMILY

No

STRUCTURAL CLASS

Herbs - Dicotyledons other than Composites

NVS CODE

LIMLIN

CHROMOSOME NUMBER

2n = 60

CURRENT CONSERVATION STATUS

2012 | Not Threatened

PREVIOUS CONSERVATION STATUSES

2009 | Not Threatened

2004 | Not Threatened

FLOWER COLOURS

White

ETYMOLOGY

limosella: From the Latin 'limosus' mud, refers to the habit of growing in mud

lineata: Linear, striped with a parallel line (plumb line)

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/limosella-lineata/>



Falls Dam Central Otago. Photographer: John Barkla



Falls Dam Central Otago. Photographer: John Barkla

Lilaeopsis novae-zelandiae

SYNONYMS

Lilaeopsis lacustris A.W.Hill; *Lilaeopsis orbicularis* A.W.Hill

FAMILY

Apiaceae

AUTHORITY

Lilaeopsis novae-zelandiae (Gand.) A.W.Hill

FLORA CATEGORY

Vascular – Native

ENDEMIC TAXON

Yes

ENDEMIC GENUS

No

ENDEMIC FAMILY

No

STRUCTURAL CLASS

Herbs - Dicotyledons other than Composites

NVS CODE

LILNOV

CHROMOSOME NUMBER

2n = 44

CURRENT CONSERVATION STATUS

2012 | Not Threatened

PREVIOUS CONSERVATION STATUSES

2009 | Not Threatened

2004 | Not Threatened

ETYMOLOGY

lilaeopsis: Charming the eye

novae-zelandiae: Of New Zealand

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/lilaeopsis-novae-zelandiae/>



90 mile beach, September. Photographer: John Smith-Dodsworth



Falls Dam Central Otago. Photographer: John Barkla

Myriophyllum propinquum

COMMON NAME

common water milfoil

FAMILY

Haloragaceae

AUTHORITY

Myriophyllum propinquum A.Cunn.

FLORA CATEGORY

Vascular – Native

ENDEMIC TAXON

Yes

ENDEMIC GENUS

No

ENDEMIC FAMILY

No

STRUCTURAL CLASS

Herbs - Dicotyledons other than Composites

NVS CODE

MYRPRO

CHROMOSOME NUMBER

2n = 14

CURRENT CONSERVATION STATUS

2012 | Not Threatened

PREVIOUS CONSERVATION STATUSES

2009 | Not Threatened

2004 | Not Threatened

FEATURES

Weak aquatic or semiaquatic or terrestrial herb (50-)100-250(-400) mm tall; stems weak, slender, 1.0-1.5(-3.0) mm diameter, rooting at lower nodes; glabrous. Leaves distinctly dimorphic. Submerged leaves in whorls of 3-4(-5), ovate to orbicular in outline, (6-)10-20(-25) × 10-16(-25) mm, pectinate with 10-22 filiform pinnae 5-6(-20) mm long, with distinct petiole 1-2 mm long. Emergent leaves in whorls of (2-)3-4(-5), linear, (2-)5-7(-12) × 0.5-1.0(-1.5) mm, usually flattened but occasionally terete to filiform, spreading or slightly curved upwards, margin entire or sometimes weakly toothed. Rarely, all or most emergent leaves pinnatifid, 4-5 × 1.5-3.5 mm wide with pinnae to 1.5 mm long. Transitional leaves usually 1-2(-4) whorls only. Inflorescence an indeterminate spike with the unisexual flowers borne singly in axils of the emergent leaves. Each whorl contains flowers of 1 sex only, male in upper 1-8 whorls, female in lower 2-6 whorls, with usually 1-2 sterile whorls between. Occasionally all whorls (up to 20) contain female flowers only. All flowers subtended by 2 bracteoles. Bracteoles ovate, (0.4-)0.5-0.8 × (0.2-)0.4-0.5 mm wide, slightly lacinate towards tip or entire. Male flowers 4-merous, sessile or becoming shortly pedicellate. Sepals 4, ovate, 0.4-0.6 × 0.3-0.4 mm, weakly toothed near apex. Petals 4, hooded, very weakly keeled, 1.8-2.7(-3.0) × 1.4 mm, becoming reflexed and inrolled after anthesis. Stamens 8; filaments 1-2 mm long, elongating after anthesis; anthers yellow, linear-oblong, 1.7-2.4 × 0.4-0.5 mm, antisealous anthers c. 0.2 mm longer than antipetalous ones. Styles 0. Ovary vestigial. Female flowers 4-merous, sessile. Sepals, petals and stamens 0. Styles 4, clavate, 0.2-0.3 mm long, stigmas occupying most of length of style, white, fimbriate. Ovary 4-merous, oblong, 0.7-0.8 mm long (excluding styles), 0.7 mm wide; carpels cylindrical, smooth, with styles on outermost corners. Fruit pale yellow-brown, cylindrical, sessile, splitting at maturity into 4 mericarps. Mericarps 0.8-1.1 mm long, 0.4-0.5 mm diameter, smooth apart from scattering of very small asperities on outer face, crowned by persistent base of style.



Kopuatai swamp, February. Photographer: John Smith-Dodsworth



Wairarapa. Photographer: Jeremy Rolfe

FLOWER COLOURS

White, Yellow

PROPAGATION TECHNIQUE

Easily grown from fresh seed and rooted pieces. An excellent plant for pond, slow flowing stream or fish tank.

ETYMOLOGY

myriophyllum: Many leaves

propinquum: Very like the next species

ATTRIBUTION

Fact Sheet Prepared by P.J. de Lange (1 November 2009). Description based on Orchard (1979)

REFERENCES AND FURTHER READING

Orchard, A.E. 1979: *Myriophyllum* (Haloragaceae) in Australasia. 1. New Zealand: a revision of the genus and a synopsis of the family. *Brunonia* 2: 247-287.

CITATION

Please cite as: de Lange, P.J. (Year at time of access): *Myriophyllum propinquum* Fact Sheet (content continuously updated). New Zealand Plant Conservation Network.

<https://www.nzpcn.org.nz/flora/species/myriophyllum-propinquum/> (Date website was queried)

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/myriophyllum-propinquum/>

Myriophyllum triphyllum

COMMON NAME

Water milfoil

SYNONYMS

Myriophyllum elatinoides

FAMILY

Haloragaceae

AUTHORITY

Myriophyllum triphyllum Orchard

FLORA CATEGORY

Vascular – Native

ENDEMIC TAXON

Yes

ENDEMIC GENUS

No

ENDEMIC FAMILY

No

STRUCTURAL CLASS

Herbs - Dicotyledons other than Composites

NVS CODE

MYRELA

CHROMOSOME NUMBER

2n = 42

CURRENT CONSERVATION STATUS

2012 | Not Threatened

PREVIOUS CONSERVATION STATUSES

2009 | Not Threatened

2004 | Not Threatened

DISTRIBUTION

Endemic. New Zealand: North, South and Chatham Islands



Stevensons Island, Lake Wanaka.

Photographer: John Barkla



Ahuriri Valley, Canterbury. Photographer: John

Barkla

FEATURES

Weak aquatic herb; stems 50-100 cm long, rooting mainly at base, 1-2(-3) mm diameter; leaves dimorphic, verticillate. Submerged leaves in whorls of (2-)3(-4), ovate in outline, sessile (petiole 0.1-0.2 mm long), (6-)10-15 mm long, (5-)7-10(-15) mm wide, pectinate with 12-18 filiform pinnae 8 mm long. Leaves lacking hydathodes at base. Emergent leaves red-purple, in whorls of 3(-4), very rarely becoming alternate in upper part of inflorescence, narrowly ovate to obovate, (2.5-)5-6(-12) × (1.5-)2.0-2.5(-4.0) mm, entire (or those of lower whorls incised), obtuse, shorter than internodes at flowering. Transition from submerged to emergent leaves abrupt (1-2 whorls). Inflorescence all indeterminate spike, sometimes with 2-4 lateral inflorescences arising from axils of the upper whorl of submerged leaves. Flowers 4-merous, borne singly in axils of the emergent leaves, upper flowers male, lower ones female. Bracteoles cream, lanceolate, (1.0-)1.4-1.8(2.0) × (0.2-)0.3-0.4 mm, entire or minutely 3-4 toothed, acute. Male flowers. Sepals 4, cream, deltoid, 0.5-0.6 mm long, 0.4-0.5 mm wide, weakly 2-3-toothed. Petals 4, yellow to reddish, hooded, not or only very weakly keeled, 2.0-2.8 × 2.0 mm wide. Stamens 8; filaments 0.1 mm long, lengthening after anthesis; anthers linear-oblong, 1.8-2.4 × 0.4 mm wide, antisealous anthers c. 0.3 mm longer than antipetalous ones, non-apiculate. Styles 4, clavate, c. 0.2 mm long, vestigial. Ovary ± cubiform, 0.7 mm long, 0.6 mm wide, lobed opposite petals, non-functional. Petals and stamens of lowermost whorl of male flowers sometimes smaller than in upper whorls. Female flowers. Sepals 4, deltoid, 0.2 mm long, 0.2 mm wide, minutely serrate, vestigial. Petals 4, 0.5 mm long, vestigial. Stamens 0. Styles 4, clavate, 0.5 mm long, stigmas fimbriate, cream. Ovary ± cubiform, 1.0 mm long, 0.8 mm wide, 4-lobed opposite petals. Fruit reddish-purple, ± cubiform, 1.3-1.4(-1.5) × 1.4-1.5 mm wide, styles persistent and erect, fruit prominently 4-lobed opposite styles, splitting at maturity into 4 mericarps. Mericarps cylindrical, 1.4 mm long, 0.8 mm diam., smooth and rounded on dorsal surface, sometimes with a faint dorsal line, planar on faces where joined to other mericarps.

FLOWER COLOURS

Cream, White

PROPAGATION TECHNIQUE

Easily grown from fresh seed and rooted pieces. An excellent plant for pond, slow flowing stream or fish tank.

ETYMOLOGY

myriophyllum: Many leaves

triphyllum: Three-leaved

WHERE TO BUY

Not commercially available.

ATTRIBUTION

Fact Sheet Prepared by P.J. de Lange (1 November 2009). Description based on Orchard (1979)

REFERENCES AND FURTHER READING

Orchard, A.E. 1979: *Myriophyllum* (Haloragaceae) in Australasia. 1. New Zealand: a revision of the genus and a synopsis of the family. *Brunonia* 2: 247-287.

CITATION

Please cite as: de Lange, P.J. (Year at time of access): *Myriophyllum triphyllum* Fact Sheet (content continuously updated). New Zealand Plant Conservation Network.

<https://www.nzpcn.org.nz/flora/species/myriophyllum-triphyllum/> (Date website was queried)

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/myriophyllum-triphyllum/>

Myriophyllum votschii

FAMILY

Haloragaceae

AUTHORITY

Myriophyllum votschii Schindler

FLORA CATEGORY

Vascular – Native

ENDEMIC TAXON

Yes

ENDEMIC GENUS

No

ENDEMIC FAMILY

No

STRUCTURAL CLASS

Herbs - Dicotyledons other than Composites

NVS CODE

MYRVOT

CHROMOSOME NUMBER

2n = 14, c.21

CURRENT CONSERVATION STATUS

2012 | Not Threatened | Qualifiers: Sp

PREVIOUS CONSERVATION STATUSES

2009 | At Risk – Naturally Uncommon

2004 | Not Threatened

DISTRIBUTION

Endemic. North, South, Stewart and Chatham Islands

FEATURES

Dioecious perennial terrestrial herb, stems prostrate (rarely erect, forming tight cushions to 70 mm high), branching freely, rooting at nodes, forming clumps to 100 mm in diameter, glabrous. Leaves all opposite, entire, obovoid, 1.8-3.5 × (0.5-)0.7-1.1 mm, ± planar or slightly concave on upper surface, convex below, spreading or slightly upward-curving, glabrous.. Hydathodes absent. Rarely, in inundated plants, submerged leaves are formed, which are linear, 2.0 × 0.2 mm. Inflorescence a terminal spike with the unisexual flowers borne in the axils of opposite upper leaves indistinguishable from lower (sterile) leaves. Male and female flowers apparently borne on separate plants. Bracteoles linear, 0.5-0.7 × 0.1-0.2 mm. Hydathodes 0. Male flowers 4-merous, sessile, usually in axils of the uppermost pair of leaves only. Sepals 0. Petals 4, green at first, becoming white with a dark reddish spot at tip (rarely, completely dark red), hooded, non-unguiculate, 1.5-1.8 × 0.7-1.0 mm, reflexed at anthesis. Stamens 8; filaments 0.2-0.3 mm long, elongating to 0.8-11.0 mm at anthesis; anthers yellow, oblong, 1.2-1.3 × 0.4 mm, 4-celled, non apiculate or very weakly apiculate. Styles 0. Ovary vestigial. Female flowers 4-merous, sessile, in axils of upper 4-8 pairs of leaves. Sepals, petals and stamens 0. Styles 4, ± sessile, stigmas white, fimbriate, capitate. Ovary green, shortly cylindrical, 0.8 × 0.6-0.8 mm, longitudinally channelled between styles, rounded opposite styles, otherwise smooth. Fruit black, depressed-globular, 0.9-1.0 × 1.1-1.4 mm, suture between mericarps buff coloured; mericarps separating at maturity. Mericarps planar on inner faces, outer face convex, smooth or very weakly punctate, sometimes with a faint median longitudinal ridge.

FLOWER COLOURS

Green, White



Whatipu, December. Photographer: John Smith-Dodsworth



Myriophyllum votschii. Photographer: Lisa Forester

PROPAGATION TECHNIQUE

Easily grown from fresh seed and rooted pieces. must be kept moist. An interesting plant for a small pond or fish tank

ETYMOLOGY

myriophyllum: Many leaves

ATTRIBUTION

Fact Sheet Prepared by P.J. de Lange (1 November 2009). Description based on Orchard (1979)

REFERENCES AND FURTHER READING

Orchard, A.E. 1979: *Myriophyllum* (Haloragaceae) in Australasia. 1. New Zealand: a revision of the genus and a synopsis of the family. *Brunonia* 2: 247-287.

CITATION

Please cite as: de Lange, P.J. (Year at time of access): *Myriophyllum votschii* Fact Sheet (content continuously updated). New Zealand Plant Conservation Network.

<https://www.nzpcn.org.nz/flora/species/myriophyllum-votschii/> (Date website was queried)

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/myriophyllum-votschii/>

Ceratophyllum demersum

COMMON NAME

Hornwort, coontail

FAMILY

Ceratophyllaceae

AUTHORITY

Ceratophyllum demersum L.

FLORA CATEGORY

Vascular – Exotic

STRUCTURAL CLASS

Herbs - Dicotyledons other than Composites

BRIEF DESCRIPTION

Hornwort is a submerged freshwater perennial aquatic plant that may occur as stems attached to the sediment or as a floating mat or drifting fragments. Hornwort does not have roots but may be anchored to the sediment by the base of its stems, by means of special branches that bear finely divided foliage. It has whorled branched, narrow leaves, rough to the touch, that are densely crowded at the apex of much-branched stems. The flowers are tiny (2 mm long), in the leaf bases.

DISTRIBUTION

Widely naturalised and rapidly spreading in North Island, only known from near Motueka and Timaru in the South Island, sites have been targeted for eradication with no plants seen since 2008.

HABITAT

Moderate flowing to still water bodies, growing to >15 m deep in some clear water lakes.

FEATURES

Submerged, rootless aquatic perennial, which anchors in sediment by buried leaves and stems. Stems are generally around 1.5 m but can be as long as 6 m. They are brittle, and easily broken by wave action. Hornwort has a very delicate appearance. Leaves are whorled and 10-40mm long. The leaves fork once or more into linear segments which are toothed (the teeth look like tiny horns – hence the name hornwort, wort being old English for plant). Leaves are most dense at the tip of the stem, becoming sparser near the base. Flowers are minute and occur singly at the base of the leaves, green if female, or whitish if male. Fruits are black oval nuts 5 mm long, with one spine at the tip and two spines at the base. Hornwort has no roots, instead its lower leaves anchor it to sediment. It can survive as a free floating mat absorbing all the nutrients it needs from the surrounding water.

SIMILAR TAXA

Fanwort (*Cabomba caroliniana*), *Myriophyllum* spp. Differs from fanwort in that the leaves are arranged in pairs on fanwort, whereas hornwort has leaves arranged in whorls. *Myriophyllum* leaves are pinate or feathered while hornwort are forked.

FLOWERING

summer - autumn



Ceratophyllum demersum. Photographer: John Smith-Dodsworth



Ceratophyllum demersum. Photographer: John Smith-Dodsworth

FLOWER COLOURS

Red/Pink

FRUITING

No evidence that seed is set in NZ.

LIFE CYCLE

Perennial. Propagation by fragmentation of its brittle stems. Male and female flowers are produced but there is no evidence of seed production in New Zealand. Spread within catchments via water flow. New catchments invaded by contaminated boats and trailers (occasionally motor cooling water), eel nets, diggers, people liberating fish.

YEAR NATURALISED

1961

ORIGIN

Wide geographic range, naturally occurring in all continents, except Antarctica, not native in NZ.

REASON FOR INTRODUCTION

Ornamental aquarium plant

CONTROL TECHNIQUES

Notify Ministry for Primary Industries if found in the South island. Plants can be physically removed from the lake or waterway using SCUBA or snorkel divers for small scale infestations, or using mechanical diggers. Although the potential for contamination of other sites by mechanical equipment is a significant concern. There are a number of manipulations to the habitat that in theory can control hornwort (e.g., shading, bottom lining, water drawdown) but there are significant limits to their practical application, rendering them site (or waterbody) specific. Chemical control can be achieved using diquat or endothal. Grass carp (*Ctenopharyngodon idella*) are herbivorous fish that feed on submerged aquatic vegetation, and are currently the only biological control agent that can be used of hornwort in New Zealand.

TOLERANCES

Tolerant of low light conditions but sensitive to freezing and dehydration.

ETYMOLOGY

ceratophyllum: From the Greek keras 'horn' and phyllon 'leaf', the division of the leaves suggesting horns

ATTRIBUTION

Factsheet prepared by Paul Champion and Deborah Hofstra (NIWA).

REFERENCES AND FURTHER READING

Champion et al (2012). Freshwater Pests of New Zealand. NIWA publication.

<http://www.niwa.co.nz/freshwater-and-estuaries/management-tools/identification-guides-and-fact-sheets/freshwater-pest-species>.

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Popay et al (2010). An illustrated guide to common weeds of New Zealand, third edition. NZ Plant Protection Society Inc, 416pp.

WSDE (2001). An aquatic plant identification manual for Washington's freshwater plants. Washington State Department of Ecology, 195pp.

Aston, H (1977). Aquatic plants of Australia. Melbourne University Press, 367PP.; Hofstra D, P Champion, (2006). Management options assessment for *Ceratophyllum demersum*. NIWA client Report HAM2006-162.

Hofstra D, P Champion, (2006). Organism Consequence Assessment *Ceratophyllum demersum*. NIWA Client Report: HAM2006-058e.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/ceratophyllum-demersum/>

Chara australis

COMMON NAME

Stonewort

SYNONYMS

Chara corallina

FAMILY

Characeae

AUTHORITY

Chara australis R. Brown

FLORA CATEGORY

Non-vascular – Native

BRIEF DESCRIPTION

Small branched submerged plant with easily punctured stems and branches, often with bright orange structures at the base of upper branches

DISTRIBUTION

Indigenous. New Zealand: North, South Island. Also Australia.

HABITAT

Lakes and slow flowing waters.

FEATURES

Aquatic, submerged, macro-algae. Often a tall (0.3-0.5 m), stiff plant, which is easily crushed. Simple, not forked branchlets arise in whorls from central stems, which are anchored in the sediment by colourless rhizoids. Stem and branchlets are comprised of strings of large single cells that are easily punctured. Small accessory cells at junctions between branchlet cells are not obvious. Plant is dioecious, with large orange antheridia and pale oogonia on separate plants and with fruiting bodies dispersed over the upper stem portions. The plant is particularly conspicuous when orange, male fruiting bodies (antheridia) are abundant.

SIMILAR TAXA

Differs from *Chara* sp. aff. *muelleri* in being dioecious and having only one end cell on branchlet ends, while the former is monoecious and has a corona of 2-3 cells. Spines can usually be seen in abnormal freshwater forms of *Lamprothamnium* that otherwise resemble small plants of *C. australis*.

FRUITING

Produces large (>500µm long) black oospores that are round in transverse section. Oospore has 5-6 sinistral spiralling ridges.

PROPAGATION TECHNIQUE

Fragments or oospores.

ETYMOLOGY

chara: Origin unknown, possibly from the Greek *charis* 'grace' or 'beauty'

australis: Southern

REFERENCES AND FURTHER READING

Broady, P.A.; Flint, E.A.; Nelson, W.A.; Cassie Cooper, V.; de Winton, M.D.; Novis P.M. Chapter 23 Twenty –Three :Phyla Chlorophyta and Charophyta (Green Algae). In: New Zealand Inventory of Biodiversity (Volume 3), Gordon, D.P. (Ed), Canterbury University Press, 616pp.

Casanova, M.T.; de Winton, M.D.; Karol, K.G.; Clayton J.S. (2007). *Nitella hookeri* A. Braun (Characeae, Charophyceae) in New Zealand and Australia: implications for endemism, speciation and biogeography.

Charophytes (1): 2-18

de Winton, M.D.; Dugdale, A.M.; Clayton, J.S. (2007). An identification key for oospores of the extant charophytes of New Zealand. *New Zealand Journal of Botany*:463-476

Wood RD, Mason R 1977. Characeae of New Zealand. *New Zealand Journal of Botany* 15: 87–180.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/chara-australis/>

Chara fibrosa

COMMON NAME

Stonewort

FAMILY

Characeae

AUTHORITY

Chara fibrosa (Agardh ex Bruzelius) R.D. Wood

FLORA CATEGORY

Non-vascular – Native

BRIEF DESCRIPTION

Small branched spiny submerged plant looking like a miniature pine tree.

DISTRIBUTION

Indigenous. New Zealand: North, South Island. Widespread globally.

HABITAT

Oligotrophic lakes.

FEATURES

Aquatic, submerged, macro-algae. Spinose appearance, with outward-facing, spine-like cells on branchlet whorls and central stems. Branches are not forked. Stems are covered by a secondary cell layer (cortication), making them more resistant to physical damage. Accessory cells at junctions between branchlet cells are long and spine-like. Stems are anchored in the sediment by colourless rhizoids. Plant is monoecious, with antheridia and oogonia on the same plant often located together, and with fruiting bodies dispersed over the upper stem portions.

SIMILAR TAXA

Differs from *Lamprothamnium macropogon* by having spreading spine-like cells all over the stems, compared to downward pointing spines around the branchlet whorl only in the brackish water species.

FRUITING

Produces large (>500µm long) black oospores that are round in transverse section. Oospore has 7-9 sinistral spiralling ridges.

PROPAGATION TECHNIQUE

Fragments or oospores.

ETYMOLOGY

chara: Origin unknown, possibly from the Greek charis 'grace' or 'beauty'

fibrosa: Fibrous, from the Latin fibra; matted fibrous trunk

REFERENCES AND FURTHER READING

Broady, P.A.; Flint, E.A.; Nelson, W.A.; Cassie Cooper, V.; de Winton, M.D.; Novis P.M. Chapter 23 Twenty –Three :Phyla Chlorophyta and Charophyta (Green Algae). In: New Zealand Inventory of Biodiversity (Volume 3), Gordon, D.P. (Ed), Canterbury University Press, 616pp.

Casanova, M.T.; de Winton, M.D.; Karol, K.G.; Clayton J.S. (2007). *Nitella hookeri* A. Braun (Characeae, Charophyceae) in New Zealand and Australia: implications for endemism, speciation and biogeography. *Charophytes* (1): 2-18

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Wood RD, Mason R 1977. Characeae of New Zealand. *New Zealand Journal of Botany* 15: 87-180.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/chara-fibrosa/>

Chara globularis

COMMON NAME

Stonewort

FAMILY

Characeae

AUTHORITY

Chara globularis Thuillier

FLORA CATEGORY

Non-vascular – Native

BRIEF DESCRIPTION

Small branched submerged plant with a distinctive sulphur or musky smell.

DISTRIBUTION

Indigenous. New Zealand: North, South and Chatham Islands. Widespread globally.

HABITAT

Lakes and slow flowing waters, both fresh to slightly brackish conditions.

FEATURES

Aquatic, submerged, macro-algae. Often a tall plant (0.3-0.5 m) with slender shoots and a grey-green colour. Branches are not forked and branches and stems are mostly covered by a secondary cell layer (cortication), making them more resistant to physical damage. Small accessory cells at junctions between branchlet cells are either not obvious or longer around the fruiting bodies. Stems are anchored in the sediment by colourless rhizoids. Plant is monoecious, with antheridia and oogonia on the same plant, often located together. with fruiting bodies dispersed over the upper stem portions. The plant has a distinctive musky odour, and can be lime-encrusted in some water bodies.

SIMILAR TAXA

None, this is the only New Zealand charophyte with corticated branchlets and stems.

FRUITING

Produces elongate (>500µm long) black oospores that are round in transverse section. Oospore has 10-12 sinistral spiral ridges.

PROPAGATION TECHNIQUE

Fragments or oospores.

ETYMOLOGY

chara: Origin unknown, possibly from the Greek charis 'grace' or 'beauty'

REFERENCES AND FURTHER READING

Broady, P.A.; Flint, E.A.; Nelson, W.A.; Cassie Cooper, V.; de Winton, M.D.; Novis P.M. Chapter 23 Twenty –Three :Phyla Chlorophyta and Charophyta (Green Algae). In: New Zealand Inventory of Biodiversity (Volume 3), Gordon, D.P. (Ed), Canterbury University Press, 616pp.

Casanova, M.T.; de Winton, M.D.; Karol, K.G.; Clayton J.S. (2007). Nitella hookeri A. Braun (Characeae, Charophyceae) in New Zealand and Australia: implications for endemism, speciation and biogeography. Charophytes (1): 2-18

de Winton, M.D.; Dugdale, A.M.; Clayton, J.S. (2007). An identification key for oospores of the extant charophytes of New Zealand. New Zealand Journal of Botany:463-476

Wood RD, Mason R 1977. Characeae of New Zealand. New Zealand Journal of Botany 15: 87–180.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/chara-globularis/>

Nitella pseudoflabellata

COMMON NAME

Stonewort

FAMILY

Characeae

AUTHORITY

Nitella pseudoflabellata (A. Braun) R.D. Wood

FLORA CATEGORY

Non-vascular – Native

NVS CODE

NITPSE

BRIEF DESCRIPTION

Small branched submerged plant, with regular layered groups of branches, dividing more than once. Fruiting heads with slimy coating.

DISTRIBUTION

Indigenous. New Zealand: North, South Island. Widespread globally.

HABITAT

Lakes swamps and slow flowing waters.

FEATURES

Aquatic, submerged, macro-algae. Small (0.1-0.4 m) compact plant with regular, repeatedly forked branches. Forked branchlets arise in whorls from central stems, which are anchored in the sediment by colourless rhizoids. Stem and branchlets are comprised of strings of single cells that are easily punctured. Plant is monoecious, with antheridia and oogonia on the same plant, usually located together on terminal branchlets and rounded fertile heads covered by heavy mucus. Two cells beyond the last fork include a small, terminal conical end cell.

SIMILAR TAXA

Can be distinguished from the similar *Nitella hyalina*, as the latter has an additional tier of shortened branchlets at each whorl. *N. subtilissima* is very similar, but branchlets usually fork only once and only female, monoecious plants have been seen in New Zealand.

FRUITING

Oospores are dark brown, laterally compressed, between 330 and 450 µm in length and low spiral ridges, with a papillate/tuberculate surface.

PROPAGATION TECHNIQUE

Fragments or oospores.

Notes on taxonomy

Likely to represent a species complex in New Zealand, which requires further determination.

REFERENCES AND FURTHER READING

Broady, P.A.; Flint, E.A.; Nelson, W.A.; Cassie Cooper, V.; de Winton, M.D.; Novis P.M. Chapter 23 Twenty –Three :Phyla Chlorophyta and Charophyta (Green Algae). In: New Zealand Inventory of Biodiversity (Volume 3), Gordon, D.P. (Ed), Canterbury University Press, 616pp.

Casanova, M.T.; de Winton, M.D.; Karol, K.G.; Clayton J.S. (2007). *Nitella hookeri* A. Braun (Characeae, Charophyceae) in New Zealand and Australia: implications for endemism, speciation and biogeography. *Charophytes* (1): 2-18

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Wood RD, Mason R 1977. Characeae of New Zealand. *New Zealand Journal of Botany* 15: 87–180.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/nitella-pseudoflabellata/>

Nitella hyalina

COMMON NAME

Stonewort

FAMILY

Characeae

AUTHORITY

Nitella hyalina (DC.) Ag.

FLORA CATEGORY

Non-vascular – Native

BRIEF DESCRIPTION

Small usually low growing plant with pom-poms of many branched stems up the main stem.

DISTRIBUTION

Indigenous. New Zealand: North, South and Chatham Islands. Widespread globally.

HABITAT

Shallow zone of lakes, in swamps and slow flowing waters.

FEATURES

Aquatic, submerged, macro-algae. Small (0.1-0.4 m) compact plant, often with 'pom-poms' of forked branchlet whorls along the central stems, which are anchored in the sediment by colourless rhizoids. Each whorl comprises two tiers of branchlets, with shorter branches in the bottom tier. Two cells beyond the last fork include a terminal, small, conical end cell. Stem and branchlets are comprised of strings of single cells that are easily punctured. Plant is monoecious, with antheridia and oogonia on the same plant, usually located together on terminal branchlets and usually covered by heavy mucus present on rounded, terminal fertile branches.

SIMILAR TAXA

Can resemble *Nitella pseudoflabellata*, *N. subtilissima* and *N. stuartii*, but is distinguished by the lower tier of shorter branchlets at each whorl.

FRUITING

Monoecious plant Oospores are dun to chestnut brown, laterally compressed, between 330 and 450 µm in length, with low spiral ridges and a fibrous membrane surface.

PROPAGATION TECHNIQUE

Fragments or oospores.

ETYMOLOGY

hyalina: Without colour

REFERENCES AND FURTHER READING

Broady, P.A.; Flint, E.A.; Nelson, W.A.; Cassie Cooper, V.; de Winton, M.D.; Novis P.M. Chapter 23 Twenty –Three :Phyla Chlorophyta and Charophyta (Green Algae). In: New Zealand Inventory of Biodiversity (Volume 3), Gordon, D.P. (Ed), Canterbury University Press, 616pp.

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Wood RD, Mason R 1977. Characeae of New Zealand. *New Zealand Journal of Botany* 15: 87–180.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/nitella-hyalina/>

Nitella hookeri

COMMON NAME

Stonewort

FAMILY

Characeae

AUTHORITY

Nitella hookeri A. Braun

FLORA CATEGORY

Non-vascular – Native

NVS CODE

NITHOO

BRIEF DESCRIPTION

Small branched submerged plant with easily punctured stems and branches. Distinctive forked branches.

DISTRIBUTION

Indigenous. New Zealand: North, South Island. Also Kerguelen Island, Indian Ocean.

HABITAT

Lakes and slow flowing waters.

FEATURES

Aquatic, submerged, macro-algae. Usually a small plant to 0.3 m. Forked branchlets arise in whorls from central stems, which are anchored in the sediment by colourless rhizoids. Stem and branchlets are comprised of strings of single cells that are easily punctured. Plant is monoecious, with antheridia and oogonia on the same plant, usually located together on slightly contracted branchlets and without mucus present on slightly contracted fertile heads. Usually three cells comprise the branchlet beyond the last fork.

SIMILAR TAXA

Obviously forked sterile branchlets, in which the length to the fork and beyond the fork are similar, distinguish this species from *Nitella tricellularis* and *N. claytonii*, which have absent or inconspicuous forking. *N. masonae* has only occasional obvious forked sterile branchlets. Sterile branchlets in *N. hookeri* usually fork only once, compared to twice in the similar *N. sp. aff. cristata*.

FRUITING

Oospores are laterally compressed, longer than 450 µm and have prominent spiral ridges, with a smooth to rippled, or rough to reticulate membrane surface.

PROPAGATION TECHNIQUE

Fragments or oospores.

ETYMOLOGY

hookeri: Named after Sir Joseph Dalton Hooker (born 1817) - a world famous botanist who travelled on the Antarctic expedition of 1839 under the command of Sir James Ross and wrote "Handbook of New Zealand Flora" published in 1864-67 describing many specimens sent to Kew by collectors. He died in 1911 and has a memorial stone at Westminster Abbey London.

REFERENCES AND FURTHER READING

Broady, P.A.; Flint, E.A.; Nelson, W.A.; Cassie Cooper, V.; de Winton, M.D.; Novis P.M. Chapter 23 Twenty –Three :Phyla Chlorophyta and Charophyta (Green Algae). In: New Zealand Inventory of Biodiversity (Volume 3), Gordon, D.P. (Ed), Canterbury University Press, 616pp.

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Wood RD, Mason R 1977. Characeae of New Zealand. *New Zealand Journal of Botany* 15: 87–180.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/nitella-hookeri/>

Utricularia gibba

COMMON NAME

bladderwort

FAMILY

Lentibulariaceae

AUTHORITY

Utricularia gibba Lam.

FLORA CATEGORY

Vascular – Exotic

STRUCTURAL CLASS

Herbs - Dicotyledons other than Composites

NVS CODE

UTRGIB

BRIEF DESCRIPTION

Sprawling submerged plant often floating just under the waters surface, with finely divided thread-like leaves with tiny round bladders (often black). Usually many small yellow snapdragon-like flowers are held above the water surface in summer and autumn.

DISTRIBUTION

Abundant in Northland, Auckland and northern Waikato.

HABITAT

Most freshwater habitats, especially acidic and nutrient rich water.

FEATURES

Leaves are filamentous, up to 1 cm long, usually entire but occasionally branched. Bladders are up to 1.5 mm long and obliquely ovoid, situated on the leaves on short stalks. Small (c. 1 cm across) yellow flowers, with red stripes on the lower lip are commonly produced above the water surface either individually or in groups of up to 5 (8) on stems 3-20 cm long. Cleistogamous flowers are also produced on submerged stems. Capsules green, globose 2.5-3 mm across. Seed ovate, flattened with wing 0.75-1 mm x 0.7 mm.

SIMILAR TAXA

Utricularia australis (rare native species mostly in northern North Island) and *U. geminiscapa* (introduced species found in Westland). *Utricularia gibba* has entire or nearly entire leaves, whereas the other *Utricularia* species have leaves divided many times into filiform segments with larger bladders.

FLOWERING

December, January, February

FLOWER COLOURS

Red/Pink, Yellow

FRUITING

Summer - autumn

LIFE CYCLE

Perennial. Reproduces freely by seeds, turions, stem fragments. Forms dense mats. Dispersed by Water movement, dumped aquaria contents, contaminated machinery, eel nets, boats and trailers. Seed spread by water fowl.

YEAR NATURALISED

1980



Utricularia gibba. Photographer: John Smith-Dodsworth



Utricularia gibba. Photographer: John Smith-Dodsworth

ORIGIN

Widespread and almost cosmopolitan in tropical and warm temperate countries

REASON FOR INTRODUCTION

Originally known from northwest Auckland, possibly introduced via the aquarium trade. In late 1990's found in Northland and likely to have been introduced from Australia via water fowl. Has rapidly spread over the past decade.

CONTROL TECHNIQUES

Not usually controlled in New Zealand, but may be controlled manually, or mechanically.

TOLERANCES

Tolerant of clean or nutrient-rich, warm or cold, still or slow-moving water.

ETYMOLOGY

utricularia: A small bladder

gibba: From the Latin gibbus 'humped' or 'hunched', meaning gibbous, i.e. very convex or tumid

ATTRIBUTION

Factsheet prepared by Paul Champion and Deborah Hofstra (NIWA).

REFERENCES AND FURTHER READING

Champion et al (2012). Freshwater Pests of New Zealand. NIWA publication.

<http://www.niwa.co.nz/freshwater-and-estuaries/management-tools/identification-guides-and-fact-sheets/freshwater-pest-species>.

Salmon, B. (2001). Carnivorous plants of New Zealand. Ecosphere Publications, Auckland. 303 pp.

Webb, C.J.; Sykes, W.R.; Garnock-Jones, P.J. (1988). Flora of New Zealand Volume 4: Naturalised pteridophytes, gymnosperms, dicotyledons. Botany Division, DSIR, Christchurch. 1365 pp.

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/utricularia-gibba/>

Ottelia ovalifolia

COMMON NAME

Swamp lily

FAMILY

Hydrocharitaceae

AUTHORITY

Ottelia ovalifolia (R. Br.) L.C. Rich

FLORA CATEGORY

Vascular – Exotic

STRUCTURAL CLASS

Herbs - Monocots

NVS CODE

OTTOVA

BRIEF DESCRIPTION

Bottom rooted aquatic perennial plant with different submerged leaves (strap like) on juvenile plants and floating leaves on mature plants. Floating leaves are typically green with dark green veins. The distinct flowers have only three white petals with a dark red/purple base and orange stamens.

DISTRIBUTION

Locally common in the North Island but also in northern South Island.

HABITAT

It may occur in slow moving water and on the margins and shallow water of large lakes, but is more commonly found in fertile farm ponds and small lakes.

FEATURES

This bottom rooted plant has basal leaves; the submerged leaves are strap like, and those that float on the water surface have a long petiole. The floating leaves lie flat on the water surface and are oval to football shaped, 2 to 16 cm long, with 5 to 7 longitudinal nerves veins that are more prominent on the lower surface than on the upper. These veins are normally darker green than the remainder of the leaf. The flowers occur on stout peduncles and are of two kinds, those which remain unopened and submerged on short peduncles and those that are conspicuous and emergent. The latter flowers are large (c. 5cm across) and emergent on peduncles up to 38 cm long, each flower has 3 sepals with 3 alternate petals. The petals are white (to cream) with a dark red/purple base, rounded and creased lengthwise (a little like crepe paper). The anthers are yellow/orange and conspicuous. Flower stalks bend downwards into the water when fertilised. The fruit remains attached to the plant as the seed ripens. The fruit wall eventually disintegrates to release the seed, which is narrow/oval 2.5 to 3 mm long and has numerous fine appressed hairs.

SIMILAR TAXA

The strap like leaves of young plants may be mistaken for *Vallisneria australis* or *Sagittaria* spp., and the surface floating leaves for Cape pondweed (*Aponogeton distachyos*) or the native red pondweed (*Potamogeton cheesemanii*). Both *Vallisneria* and *Sagittaria* are stoloniferous. *Vallisneria* flowers are not 3-petalled. *Sagittaria* does have 3-petalled white flowers, but do not have floating leaves. Cape pondweed has narrower, longer leaves and neither this or red pondweed have dark green veins and a lighter coloured leaf, or 3-petalled white flowers.

FLOWERING

December - March

FLOWER COLOURS

Orange, White



Habitat of *Ottelia ovalifolia*. Photographer: Rohan Wells, NIWA



Submerged *Ottelia ovalifolia*. Photographer: Rohan Wells, NIWA

FRUITING

Summer-autumn

LIFE CYCLE

Perennial. Reproduces from seed, no tubers, rhizomes or runners. Water fowl feed on fruit and disperse seed and also seeds may be dispersed by water movement.

YEAR NATURALISED

1899

ORIGIN

Australia

REASON FOR INTRODUCTION

Unknown, possibly introduced from Australia by waterfowl or via contaminated drainage machinery.

CONTROL TECHNIQUES

Not controlled in New Zealand.

TOLERANCES

Tolerant of hot-cool temperatures

ATTRIBUTION

Factsheet prepared by Paul Champion and Deborah Hofstra (NIWA).

REFERENCES AND FURTHER READING

Johnson PN, Brooke PA (1989). Wetland plants in New Zealand. DSIR Field Guide, DSIR Publishing, Wellington. 319pp.

Aston, H (1977). Aquatic plants of Australia. Melbourne University Press, 367pp.

Coffey BT, Clayton JS (1988). New Zealand water plants: a guide to plants found in New Zealand freshwaters.

Ruakura Agricultural Centre. 65pp

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/ottelia-ovalifolia/>

Potamogeton cheesemanii

COMMON NAME

Red pondweed

SYNONYMS

None

FAMILY

Potamogetonaceae

AUTHORITY

Potamogeton cheesemanii A.Benn.

FLORA CATEGORY

Vascular – Native

ENDEMIC TAXON

No

ENDEMIC GENUS

No

ENDEMIC FAMILY

No

STRUCTURAL CLASS

Herbs - Monocots

NVS CODE

POTCHE

CHROMOSOME NUMBER

2n = 28

CURRENT CONSERVATION STATUS

2012 | Not Threatened

PREVIOUS CONSERVATION STATUSES

2009 | Not Threatened

2004 | Not Threatened

DISTRIBUTION

Indigenous. New Zealand: North, South, Stewart and Chatham Islands. Also Australia.

HABITAT

Coastal to montane - but mostly found in coastal and lowland areas. A common plant of ponds, lake margins and slowly flowing streams. Also colonising roadside ditches. rarely found in muddy hollows within forest.

FEATURES

Aquatic, submerged or floating, rhizomatous sparsely branched perennial herb. Rhizomes rooting at nodes and producing mostly simple leafy branches; these ultimately water surface. Stipules membranous, free, open. Leaves dimorphic. Submersed leaves usually rather distant, usually shortly petiolate; lamina c. 40–100 × 5–15 mm, narrowly elliptic, entire, subacute, delicate, ± translucent, longitudinal nerves c. 5–11, irregularly joined by cross veins. Floating leaves often long-petiolate; lamina 20–40 × 10–25 mm, broad oblong-oval, entire, usually quite obtuse, firm and opaque, longitudinal nerves 10–15, laterals emerging from petiole rather than from midrib. Inflorescence a densely flowered spike, 10–25 mm long. Peduncles in axils of floating leaves, stout, erect, usually projecting above surface of water at flower, submersed in fruit. Achene c.2.5 × 1.5 mm, green, green-brown or brown, moderately flattened with rather strongly 3-ridged keel and short straight beak.



Potamogeton cheesemanii. Photographer: Lisa Forester



Potamogeton cheesemanii. Photographer: John Barkla

SIMILAR TAXA

Distinguished from *Potamogeton suboblongus* by the strongly dimorphic foliage (i.e. clear distinction between submerged and emergent leaves), by the narrowly elliptic, ± translucent submerged leaves; floating leaves which are mostly broad-oval, with obtuse apices, and which have usually 6 or less (rarely an unequal higher number) nerves on either side of midrib; and by the green, green-brown or brown, flattened achenes which are 3-keeled when dry. In its submerged state *Potamogeton cheesemanii* could be confused with *P. ochreatus* from which it differs by non-fibrous stipules, and submerged and emergent elliptic to broadly oval leaves with well separated rather than closely set longitudinal nerves.

FLOWERING

November - March

FLOWER COLOURS

Cream, Red/Pink

FRUITING

December - March

PROPAGATION TECHNIQUE

Easily grown from rooted pieces and fresh seed, An attractive plant for a large pond or similar water body but inclined to become aggressive in fertile waters.

ETYMOLOGY

potamogeton: River dweller

cheesemanii: Named after Thomas Frederick Cheeseman (1846 - 15 October 1923) who was a New Zealand botanist and naturalist who, in 1906, produced *The Manual of the New Zealand Flora*.

ATTRIBUTION

Fact sheet prepared for NZPCN by P.J. de Lange (16 February 2012). Description adapted from Moore & Edgar (1970)

REFERENCES AND FURTHER READING

Moore, L.B.; Edgar, E. 1970: *Flora of New Zealand*. Vol. II. Government Printer, Wellington.

CITATION

Please cite as: de Lange, P.J. (Year at time of access): *Potamogeton cheesemanii* Fact Sheet (content continuously updated). New Zealand Plant Conservation Network.

<https://www.nzpcn.org.nz/flora/species/potamogeton-cheesemanii/> (Date website was queried)

MORE INFORMATION

<https://www.nzpcn.org.nz/flora/species/potamogeton-cheesemanii/>

Glossary

abaxial	Facing away from the stem of a plant (especially denoting the lower surface of a leaf).
acerose	Narrow with a sharp stiff point.
achene	A simple, dry, one-seeded (one-celled) fruit.
acicular	Needle-shaped.
acidic	Having a low pH, opposite of basic or alkaline.
acrosopic	Pointing towards, or on the side of, the apex.
acuminate	Gradually tapered to a point. Sharply pointed.
acute	Pointed or sharp, tapering to a point with straight sides.
adnate	Fusion of unlike parts, e.g. stamens fused to petals.
adventive	A plant that grows in the wild in New Zealand but which was introduced to the country by humans.
agglutinated	Stuck together.
allelopath	An organism that releases compounds that are toxic to other species.
allelopathy	The release by an organism of compounds that are toxic to other species.
alternate	Attached singly at each node but changing from one side of a stem to the other.
alveolate	Honeycombed with ridged partitions.
amplexicaul	Clasping or surrounding the stem.
anamorph	Asexual fruiting stage, usually of an ascomycete fungus.
anastomosing	Rejoining after branching, as in some leaf veins.
annual	A plant that completes its complete life cycle within the space of a year.
annual evergreen	Plants that lose their over-wintering leaves rapidly in the first half of the growing season. Annual evergreens never present a leafless appearance, but are closer in a functional sense to a deciduous plant than they are to multi-annual evergreens.
annulus	Line of thickened cells that governs the release of spores from a sporangium.
anterior	Towards the front.
anther	The pollen-bearing portion of the stamen.
antheridium	Male reproductive organ formed on the prothallus of a fern.
anthesis	Flowering period from when the bud opens
apex	Tip; the point furthest from the point of attachment.
apices	Plural of apex. Tip, the point furthest from the point of attachment.
apiculate	Bearing a short slender and flexible point.
apiculus	A small, slender point.
apomixis	A form of reproduction whereby seed is formed without the usual mode of sexual fusion.
appressed	Pressed against another organ or surface.
aquatic	Growing, or living in, or frequenting water. Applied to plants and animals and their habitats. Opposite of terrestrial (land living).
archegonium	Female reproductive organ of a fern formed on the prothallus.
arcuate	Curved into an arch.
aril	An often fleshy appendage on the outside of a seed.
artificial thinning	Selectively removing vegetation to create gaps to facilitate natural invasion of native plants, or to plant later successional plants.
ascending	Growing obliquely upward.
asexual	Vegetative reproduction, lacking sexual involvement by sperm or egg cells.
attenuate	Narrowing gradually.
auricle	A small, ear-shaped appendage.
auriculate	Bearing a small, ear-shaped appendage.
autogamous	Self-fertilising flowers.
autotrophic	Of or relating to organisms (as green plants) that can make complex organic nutritive compounds from simple inorganic sources by photosynthesis.
awn	A stiff or bristle like projection often from the tip or back of an organ.

axil	The upper angle between the leaf and the stem.
axis	The longitudinal supporting structure around which organs are borne, e.g., a stem bearing leaves.
barbellate	Barbed, having or covered with protective barbs or quills or spines or thorns or setae.
basal	At the base.
basisropic	Pointing towards the base.
beak	A prominent extension of an organ.
bifid	Deeply split into two lobes.
bifurcate	Divided into two.
biosecurity	Preventing, eradicating, controlling and managing risks posed by pests and diseases.
biotic	Pertaining to the living parts of the environment.
bipinnate	With each primary pinna divided to the midrib into a secondary pinna.
biserrate	Doubly serrate.
blade	The flattened part of a leaf.
blunt	Not pointed at the ends.
bog	A quagmire covered with specialised plants including sphagnum moss, grasses, sedges, rushes, sundews, umbrella ferns and other plants; has wet, spongy ground, a marsh-plant community on wet, very acid peat. Fed only by rainfall.
bottleneck	A genetic term; refers to the fact that in smaller populations there could be lower genetic variability.
brachyblasts	Short shoots.
bract	A reduced leaf or leaf-like structure at the base of a flower.
bracteate	Bearing bracts: leaves or leaf-like structure reduced at the base of a flower.
bracteolate	With small bracts.
bracteole	A small bract.
bracteoles	Bracts directly below the flower.
brevideciduous	Brief (1 month or less) loss of most leaves from the canopy just before flowering or during flushing of a new cohort of leaves.
bryophyte	Plant group including mosses, liverworts and hornworts.
bryophytes	Plant group including mosses, liverworts and hornworts.
bulbil	A bud produced vegetatively on the stem or frond that is capable of breaking off and growing into a new plant.
bullate	With rounded projections covering the surface as if blistered.
caespitose	Growing in dense tufts.
calli	Circular, warty, stalked thickenings commonly found on the lip (labellum) of the orchid (plural of callus).
callose	Hardened or thickened.
callus	Stalked thickening on the lip (labellum) of an orchid.
calyx	The group of sepals, or outer floral leaves, of a flower.
campanulate	Bell-shaped.
canaliculate	With longitudinal channels or grooves.
canopy	The uppermost cover formed by the branches and leaves of trees or the spread of bushes, shrubs and ground covers.
canopy closure	Stage where canopies of shrub and tree species meet.
canopy manipulation	Selectively removing vegetation to create gaps to facilitate natural invasion of native plants, or to plant later successional plants.
capillary	Hair-like.
capitula	Plural of capitulum: A dense head-like inflorescence of many flowers as occurs in most Asteraceae (daisies).
capitulum	A dense head-like inflorescence of many flowers as occurs in most Asteraceae (daisies).
capsule	A dry fruit formed from two or more fused carpels that splits open when ripe.
carbon sinks	Carbon locked away, or sequestered e.g. by trees.
carpel	One unit of the female part of a flower that consists of a basal seed-bearing ovary joined to a receptive stigma by a stalk-like style.

cauda	Tail-like appendage. (pl. caudae; adj. caudate).
caudex	The axis of a woody plant, esp. a palm or tree fern, comprising the stem and root.
cauline	Belonging to the stem, as in cauline leaves emerging from the stem.
cerise	Bright or deep red.
chartaceous	Having a papery texture.
chlorophyll	The green pigment of plants.
chlorotic	Lacking chlorophyll, therefore yellowish, suffering from chlorosis.
cilia	Short small hair-like structures on a cell or microorganism.
ciliate	With small hairs (cilia).
ciliolate	Diminutive of ciliate, i.e., having very small hairs.
cladode	Flattened stem with the function of a leaf.
cladodes	Usually flattened, photosynthetically active branches, these may be leaf-like (e.g., Phyllocladus) or branch-like (e.g., Carmichaelia).
clavate	Club-shaped, gradually widening towards apex.
cleft	Having indentations that extend about halfway to the center, as in certain leaves.
cleistogamous	Flowers that self-fertilise without opening.
coherent	Sticking together of like parts.
column	Stamen and stigmas fused to form a single organ.
columnar	Shaped like a column.
composite	Many small flowers tightly packed together e.g., daisy flowers.
compound	Composed of several similar parts (cf simple).
concave	Curved inward.
concolorous	Of the same colour.
conical	Cone-shaped.
connate	Fusion of like parts.
conspecific	Individuals of the same species.
cordate	Heart-shaped with the notch at the base.
coriaceous	Leather-like; thick, tough, and somewhat rigid.
corolla	The whorl of petals of a flower.
corymb	Modified raceme where stalks of lower flowers are elongated to same level as the upper flowers.
cosmopolitan	A species or other taxonomic group that is distributed widely throughout the world.
costa	The midrib.
crenate	With rounded teeth (bluntly toothed) along the margin.
crisped	Margin tightly wavy or crinkled, curled or wavy.
cristate	With a crest.
crown	The growing point of an upright rhizome or trunk. This usually produces a tuft or ring of fronds.
crura	The two small projections at the mouth of a utricle in Carex.
cucullate	Hood-shaped.
culm	The erect stem of a grass.
cuneate	Wedge-shaped.
cupular	Cup-shaped.
cuttings	Stems and/or leaves taken from plants for propagation.
cyathium	A cup-like structure that surrounds the inflorescence in Euphorbia.
cyme	Inflorescence at the terminus of a branch and where new flowering branches emerge laterally below the flower.
cytorace	Populations (or infraspecific taxa) that differ in chromosome number or chromosome morphology, e.g., <i>Nematoceras trilobum</i> agg. has two cytoraces, a diploid and a tetraploid (in which the chromosomes are doubled).
cytotype	Populations (or infraspecific taxa) that differ in chromosome number or chromosome morphology, e.g., <i>Nematoceras trilobum</i> agg. has two cytotypes, a diploid and a tetraploid (in which the chromosomes are doubled).
deciduous	Marked leaflessness in winter, and greater than 90% leaves lost by beginning of spring flush.

decrecent	Diminishing.
decumbent	With a prostrate or curved base and an erect or ascending tip.
decurrent	Attached by a broadened base.
decurved	Curved downward.
deflexed	Bent abruptly downward.
dehiscence	The time of opening at maturity to release the contents, e.g., a capsule releasing the seeds.
dehiscent	Splitting open at maturity to release contents (of a fruit).
deltoid	Shaped broadly like an equilateral triangle.
dentate	Toothed along the margin with the teeth pointing outward, not forward.
denticles	Minute teeth.
denticulate	Having a very finely toothed margin.
dichotomous	Divided into two equal branches.
digitiform	Finger-like.
dioecious	Having male and female flowers on separate plants of the same species.
diploid	With two complete sets of chromosomes in each cell.
disarticulating	Separating at a joint.
discoïd	Disc-shaped.
disjunct	A species or other taxonomic group that occupies areas that are widely separated and scattered and therefore have a discontinuous distribution.
distal	Toward the apex, away from the point of attachment (cf. proximal).
distichous	In two rows on opposite sides of the axis.
divaricating	Branching at a very wide angle with stiff intertwined stems.
domatia	Small structures on the lower surface of a leaf in some woody dicotyledons, located in the axils of the primary veins and usually consisting of depressions partly enclosed by leaf tissue or hairs.
dorsal	Of the back or outer surface relative to the axis. (cf. ventral).
drupe	A stone fruit, the seed enclosed in a bony covering (endocarp) which is surrounded by a + fleshy layer (mesocarp).
early successional species	Plants which are able to colonise an open area after disturbance but which are often temporary and are replaced by taller plants in time and shaded out.
echinate	Having sharply pointed spines or bristles.
ecological district	A characteristic landscape and biological community defined in the PNA (Protected Natural Area) programme.
ecological restoration	Attempt to reinstate original (pre-disturbance) state of a habitat, plant community or ecosystem.
ecosourced	Plants sourced from seed collected from similar naturally growing plants in the area of the planting site.
ecosourcing	Using native plants grown from locally grown seeds. Eco-sourced plants help to preserve the ecological distinctiveness of an area, and ecosourced plants fare better and are adapted to survive in the local conditions.
eglandular	Without glands.
elaiosome	Fleshy, oil-rich structure attached to seed that attracts ants which act as dispersers.
ellipsoid	Elliptic in long section and circular in cross-section.
elliptic	Broadest at the middle.
emarginate	With a notch at the apex.
emarginated	Having a shallow notch at the tip, as in some petals and leaves.
emergent	In an aquatic sense - wetland herbs that are rooted in the substrate below water level, but carry leaves and stems above the water level e.g. rushes and raupo. Found on the shallow margins of lakes, ponds and waterways. In a forest sense - tree that is appearing above the surrounding canopy.
emergent marginals	An aquatic plant having most of its structure above water. Other aquatic plants are submerged or floating.
endemic	Unique or confined to a place or region, found naturally nowhere else.

endophyte	An endosymbiont (usually a bacterium or fungus) that lives within a plant for at least part of its life without causing any apparent disease.
endophytes	Endosymbionts (usually bacteria or fungi) that live within plants for at least part of their lives without causing any apparent disease.
endosperm	The nutritive tissue of a seed, consisting of carbohydrates, proteins, and lipids.
enrichment planting	Returning to a revegetation site and creating gaps, or filling existing gaps, with different plants of plants, usually later successional plants which may not have survived being planted in the first phases of the project.
ensiform	Sword shaped.
entire	Smooth. Without teeth, notches or divisions.
entomophilous	Pollinated by insects.
epicalyx	Calyx-like structure outside, but close to, the true calyx.
epigeal	Growing on or close to the ground or emerging from the ground after germination (often used for cotyledons).
epiphyte	A plant that grows upon another plant but is not parasitic and does not draw nourishment from it.
epiphytic	Growing upon another plant but not parasitic and not drawing nourishment it.
erose	Irregularly toothed, as if gnawed.
estuarine	Pertaining to the meeting of freshwater and seawater wetlands.
ethnobotany	The study of people's classification, management and use of plants.
eusporangia	Sporangia that arise from groups of epidermal cells.
evanescent	Lasting a very short time or running a short distance.
ex situ	Away from the place of natural occurrence.
ex-situ	Maintenance of plants as live specimens or propagules in cultivation as insurance against the loss of wild populations and as source for material for translocation.
excurrent	Having the axis prolonged to form an undivided main stem or trunk (as in conifers).
extravaginal	Outside an enclosing sheath.
falcate	Hooked or curved like a sickle.
fastigiate	Branches erect and close to central axis.
fen	A type of wet land that accumulates peat deposits. Fens are less acidic than bogs, deriving most of their water from groundwater rich in calcium and magnesium.
ferruginous	Rust-like (a colour term).
fertile frond	Fronds that bear sporangia.
filamentous	Resembling a filament.
filiform	Thread like, resembling a filament.
filiramulate	Branching at a very wide angle with stiff intertwined stems.
fimbriae	Plural of fimbria: Fringe. A fimbria is composed of many fimbriae (individual hair-like structures).
fimbriate	With fringes.
flabellate	Fan shaped.
flaccid	Limp, not rigid, flabby.
flange	A projecting rim.
flexuose	With curves or bends.
floccose	Having tufts of soft woolly hairs.
floret	A small flower, usually one of a cluster - the head of a daisy for example.
foliaceous	Leaf-like.
foliolate	Having leaflets.
founder effect	When a small number of plants (and therefore their genes) from a larger population are selected some genetic information is lost.
frond	A leaf, the complete leaf of a fern including the stipe and lamina.
fulvous	Orange-yellow.
funneliform	Funnel-shaped.
fusiform	Broadest near the middle and tapering toward both ends.
galea	Helmet- or hood-shaped.

galeate	Shaped like a helmet or hood.
gametophyte	A plant that produces sperm and egg cells and in which sexual reproduction takes place - in ferns this is known as the prothallus.
gene pool	The mixture of all genes and gene variations of a group or population.
genetic diversity	The variety of genes in a plants or populations.
genetic variation	Differences displayed by individuals within a plant which may be favoured or eliminated by selection.
geniculate	Abruptly bent.
genus	A taxonomic rank of closely related forms that is further subdivided in to species (plural = genera). In a scientific name (e.g., <i>Sicyos australis</i>), the first word is the genus, the second the species.
gibbous	Swollen or enlarged on one side, as in a gibbous moon.
glabrescent	Lacking hair or a similar growth or tending to become hairless.
glabrous	Without or devoid of hairs, smooth.
gland	A structure that secretes a sticky or oily substance.
glandular	A structure that secretes a sticky or oily substance.
glaucous	Covered with a fine, waxy, removable powder that imparts a white or bluish cast to the surface.
gley	A soil prone to seasonal inundation.
globose	Globe-shaped.
glume	One of two bracts at the base of a grass spikelet.
groundwater	Groundwater is the water beneath the surface that can be collected with wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or springs. Groundwater is the water that is pumped by wells and flows out through springs.
gymnosperm	Plants in the class Gymnospermae that have seeds which are not enclosed in an ovary.
gynodioecious	A species population containing plants that produce bisexual (perfect) flowers, and plants that produce only female (pistillate) flowers.
gynoecium	The female reproductive organs of a flower; the pistil or pistils considered as a group. Means literally "womans house" i.e., the overall structure that contains the female sex organs.
hastate	Spear like. Shaped like an arrowhead, but with basal lobes pointing outward rather than downward.
haustorium	The absorbing organ of a parasite or hemiparasite.
hemi-parasite	Obtains water and nutrients from the roots of other plants but also manufactures food through photosynthesis.
hemi-parasitic	Obtaining water and nutrients from the roots of other plants then manufacturing food through photosynthesis.
herbarium	The place where collections of dried/pressed plants are kept.
hermaphrodite	Having both male and female sexual characteristics and organs.
heteroblastic	Exhibiting differences in leaf shapes or forms in juvenile and adult phases of the plant.
heteroblasty	The state of being heteroblastic (i.e., exhibiting differences in leaf shapes or forms in juvenile and adult phases of the plant).
hirsute	Hairy.
hyaline	Membranous, thin and translucent.
hybrid	An individual that is the offspring of a cross between two different varieties or species.
hybridise	Breeding with a member of a different plant or type.
hydrophyte	A plant species adapted to growing in or on water or in wet situations. Aquatic or semi-aquatic.
hymenium	The fertile, spore-bearing layer of a fruitbody.
hypanthium	A ring-like, cup-shaped, or tubular structure of a flower on which the sepals, petals, and stamens are borne.
imbricate	Overlapping.
imbricating	Overlapping.
imparipinnate	Odd-pinnate, a leaf shape; pinnate with a single leaflet at the apex.
in-situ	On site conservation relating to the maintenance of plants in the wild.
inbreeding	Genetic similarity in offspring of closely related individuals.

incoherent	Not sticking together.
incursion	Entrance of a pest into an area where it is not present.
indumentum	A covering of fine hairs (or sometimes scales).
indusia	Plural of indusium, a membrane covering a sorus of a fern.
indusium	A thin tissue that covers the sorus in many ferns. Plural: indusia.
inflorescence	The arrangement of flowers on the stem. A flower head.
infundibuliform	Funnel-like.
interkeel	The space between the keel and the leaf blade.
internode	The part of an axis between two nodes; the section of the stem between leaves.
internodes	Part of a stem between two nodes.
intramarginal	Within or near the margin.
involucral bracts	The scales surrounding the flower head or capitula.
involucre	A group of bracts surrounding a flower head.
involute	With margins rolled inward toward the upper side.
irritable	Responding to touch.
jugate	Paired.
juvenile	A plant of non-reproducing size.
keel	A prominent or obvious longitudinal ridge (as in a boat).
labellar	Pertaining to the labellum: a lip; in orchid flowers referring to the middle petal which usually differs in size, shape or ornamentation from the two lateral petals.
labellum	A lip; in orchid flowers referring to the highly modified middle petal which usually differs in size, shape or ornamentation from the two lateral petals.
lacinia	A jagged lobe.
lacinae	Jagged lobes.
lacinate	Cut into narrow, irregular lobes or segments.
lacustrine	Of or having to do with a lake, of, relating to, or formed in lakes, growing or living in lakes.
lamina	The expanded flattened portion or blade of a leaf, fern frond or petal.
lanceolate	Lance-shaped; of a leaf several times longer than wide with greatest width about one third from the base, tapering gradually to apex and more rapidly to base.
lateral	On or at the side.
lax	With parts open and spreading, not compact.
laxly	With parts open and spreading, not compact.
leaflet	One section of a compound leaf.
lemma	The lower of two bracts enclosing the flower in grasses.
lenticillate	Bark that is covered in fine lenticles (breathing pores).
ligulate	Strap-like, tongue-shaped.
ligule	The membrane between the leaf and the stem of a grass; the "petal" of a ray floret in a composite inflorescence.
linear	Long and narrow with more or less parallel sides.
littoral	Occurring at the border of land and sea (or lake). On or pertaining to the shore. The shallow sunlit waters near the shore to the depth at which rooted plants stop growing.
lobe	A recognisable, but not separated, rounded division or segment of a leaf or pinna. Used to describe ferns and leaves in <i>Cotula</i> and <i>Leptinella</i> .
lobed	Part of a leaf (or other organ), often rounded, formed by incisions to about halfway to the midrib.
lobule	A small lobe or sub-division of a lobe.
lustrous	Glossy, shiny.
lycophytes	Seedless vascular plants that belong to the phylum Lycophyta (characterised by microphylls - primitive leaves found in ancient plants).
lyrate	Pinnatifid or pinnatisect terminal lobe much larger than lower lobes.
maculate	Blotched or spotted.
mangrove	Coastal wetland dominated by Manawa or mangrove <i>Avicennia marina</i> var. <i>resiiifera</i> . Northern New Zealand only, salt marsh replaces it further south.

margin	The edge or border of a leaf.
marine	Pertaining to the sea and saltwater systems.
marsh	A tract of wet land principally inhabited by partially-submerged herbaceous vegetation. Has fewer woody plants than swamper habitats.
mealy	Dry, powdery, crumbly.
median	In the middle.
membranous	Very thin, like a membrane.
mid-lobe	The middle part into which a leaf is divided.
midrib	The central or principal vein of a leaf or pinna of a fern.
mire	Synonymous with any peat-accumulating wetland. Term covers bogs and peaty swamps, fens, carr, moor, muskeg and peatland. Term excludes marsh which is non-peat forming.
molecular techniques	Where proteins and genes are used to investigate plant relationships.
monitoring	Recording of quantitative data over time to document changes in condition or state of species or ecosystems.
monoecious	Having male and female flowers on the same plant of the same species.
montane	Land between 300 and 800 metres above sea level.
mucronate	Tipped with a short, sharp, point.
mucronulate	Having a very small mucro; diminutive of mucronate.
multi-annual evergreen	Overlapping annual cohorts of leaves always present.
multifid	Cleft into many lobes or segments.
multiseptate	With many septa.
muricate	Rough with short, hard points like the shell of Murex, a genus of tropical sea snails with elaborately pointed shells.
mycorrhiza	A symbiotic relationship between a fungus and a plant.
mycorrhizal associations	Symbiotic association between fungi and plant roots which assists plant health by allowing increased ability for uptake of nutrients and promote plant growth.
napiform	A long swollen but tapering root – like a parsnip, or carrot.
native	Naturally occurring in New Zealand (i.e., not introduced accidentally or deliberately by humans).
naturalised	Referring to plants that have escaped from cultivation (including gardens or forest plantations) and can now reproduce in the wild (without human assistance).
nectary	Organ that produces nectar.
nerve	Prominent vein or rib.
nerves	Strands of conducting and usually strengthening tissue in a leaves or similar structures.
net veins	Veins that repeatedly divide and re-unite.
net venation	Feather-like or hand-like venation on a leaf.
nival	Growing at high altitudes. From Latin: nivalis, snowy etc. from nix, nivis, snow.
node	The point at which leaves, branches or roots arise on a stem.
ob-	Prefix meaning inverted, in reverse direction.
obcordate	Heart shaped with the notch at the apex.
oblanceolate	Tapering and widest towards the apex or inversely lanceolate.
oblique	Slanting; of a leaf, larger on one side of the midrib than the other, in other words asymmetrical.
oblong	Rectangular.
obovate	Roughly elliptical or reverse egg shaped and widest near the apex (i.e., the terminal half broader than the basal half).
obtuse	Blunt or rounded at the apex, with the sides meeting at an angle greater than 90°.
operculate	With a small lid.
opposite	A pair of organs attached at nodes in pairs on either side of a stem or axis.
orbicular	Almost or approximately circular.
outbreeding depression	A reduction in vigor of offspring from distant parents. It can occur when a locally adapted population is moved and mixed with plants adapted to different conditions.

outer canopy deciduous	Marked reduction in leaf number in the outer canopy in exposed high light environments over winter.
oval	Planar, shaped like a flattened circle, symmetrical about both the long and the short axis; about twice as long as broad, tapering equally both to the tip and the base. Synonymous with elliptical.
ovary	Part of a flower containing the ovules and later the seeds.
ovate	Egg-shaped and widest at base.
ovoid	Oval; egg-shaped, with rounded base and apex.
pakihi	A term which in its strict sense refers to open clears within forest dominated by low scrub and rushes. However, more usually used to refer natural and induced wetlands and their associated shrublands. A vernacular most frequently used in the West Coast for impoverished soils and their associated peats, left after forest has been cleared.
palea	The small upper bract enclosing the flower of a grass.
palea	1. The upper of the two bracts that enclose each floret in a grass spikelet. 2. A small bract at the base of a disc floret in some plants of the composite family. 3. Scales on various parts of ferns (referred to as paleate or paleaceous). From the Latin word for 'chaff'.
paleae	Plural of palea, from the Latin word for 'chaff'. 1. The upper of the two bracts that enclose each floret in a grass spikelet. 2. A small bract at the base of a disc floret in some plants of the composite family. 3. Scales on various parts of ferns (referred to as paleate or paleaceous).
palmately	Radiating from a point, as fingers radiating from the palm of a hand.
palmatifid	Deeply divided into several lobes arising from more or less the same level.
palmatisect	Intermediate between palmate and palmatifid, i.e. the segments are not fully separated at the base; often more or less digitate.
palustrine	Pertaining to wet or marshy habitats. Term covers mires and marshes.
pandurate	Fiddle-shaped.
panicle	Highly branched (multiple raceme).
papilla	A short rounded projection.
papillae	A soft, fleshy projection, usually small and nipple-like.
papillate	With short rounded projections.
papillose	Warty, with short rounded projections or gland-dotted.
parallel venation	Veins are parallel along leaf.
parasite	An organism that derives all its nourishment from its host.
patent	Spreading or expanded, e.g., spreading petals.
peat	A mass of partially carbonised plant tissue formed by partial decomposition in water of various plants and especially of mosses of the genus Sphagnum, widely found in many parts of the world, varying in consistency from a turf to a slime used as a fertiliser, as stable litter, as a fuel, and for making charcoal. Partially carbonized vegetable matter saturated with water; can be used as a fuel when dried. A type of soil deriving from dead organic material situated in a wet area, where the reduced amount of [[oxygen available in the wet conditions results in the organic material not decomposing as much as it usually would do so in the presence of more oxygen. Used in growing media. Represents an important carbon sink –drainage of peat releases large amounts of carbon (CO ₂) to the atmosphere.
pedicel	The stalk of a single flower in an inflorescence or fruit (either in a cluster or existing singularly).
peduncle	The stalk of a solitary flower or the main stalk of an inflorescence or flower cluster.
pedunculate	Describing fruits, which are borne on a stalk (a peduncle).
pellucid	Transparent.
peltate	Shield-like, with the stalk attached well inside the margin.
pendent	Hanging down from its support.
pendulous	Hanging or drooping.
penicillate	With a tuft of hairs at the end, like a brush.
perennial	A plant lasting for three seasons or more.
perianth	A collective term for the calyx (sepals or tepals) and corolla (petals) of the flower, especially when these are indistinguishable.
petal	Part of flower inside the sepals; usually coloured.
petiolate	Having a petiole.

petiole	Leaf stalk.
phloem	The vascular tissue in land plants that is primarily responsible for the distribution of sugars and nutrients manufactured in a shoot.
photopoint	A monitoring technique where repeat photos are taken of the same scene from the same point over a period of time in order to quantify changes.
pilose	Bearing long, soft hairs.
pinna	A segment of a divided lamina that is classified as primary, secondary or tertiary according to the degree of dissection of the lamina.
pinnae	Divisions of a pinnate leaf.
pinnate	With leaflets arranged regularly in two rows on either side of a stalk as in a feather; the lamina on a fern is divided into separate pinnae.
pinnatifid	Pinnately lobed, cleft more than halfway to the midrib. Not cleft all the way to the rachis.
pinnatisect	Pinnately divided almost to midrib but segments still confluent.
pioneer	Plant species are hardy species that should be planted first to establish a good canopy cover that restricts weed growth and promotes natural regeneration. In natural ecosystems these are the first plants to arrive and grow on a site.
pistil	The female reproductive organ of a flower, consisting of an ovary, style, and stigma.
pistillate	A flower with one or more pistils, but no stamens.
plano-convex	Flat on one side, convex on the other.
plumose	Feathery.
podzol	Infertile, acidic soil, strongly leached to form a whitish-grey subsoil underlain by a layer enriched in iron, aluminium and organic matter; usually under forest in a wet temperate climate.
pole	A subcanopy size individual with a long thin trunk and foliage tuft of a potential canopy tree.
pollinia	Compact masses of orchid pollen.
population enhancement	Increasing a population for a specific biological purpose, e.g., when a species is already present in an area but extra individuals are added to address a sex imbalance.
porrect	Extending forward.
procumbent	Lying and flat along the ground but not rooting.
propagate	To reproduce a plant by sexual (i.e., from seed) or asexual (e.g., from cuttings) means.
prostrate	A general term for lying flat along the ground. This includes procumbent (that is lying and flat along the ground but not rooting) and decumbent (with a prostrate or curved base and an erect or ascending tip).
provenance	The place of origin (of a plant that is in cultivation).
proximal	Toward the base or point of attachment (cf. distal).
pseudobulb	Thickened surface stem; usually looking like a bulb.
pseudoterminal	Falsely terminal – as in a bud which appears to occupy a terminal position but does not.
puberulent	Minutely clad in short, soft hairs.
pubescence	Covering of soft, fine hairs.
pubescent	Covered in short, soft hairs.
pungent	Ending in a stiff sharp point.
pustule	Small blister-like elevation.
quadrate	Square, rectangular.
raceme	An unbranched, elongated inflorescence with pedicellate flowers maturing from the bottom upward i.e., flowers attached to the main stem by short stalks.
rachis	The axis of an inflorescence or of a compound leaf.
ray	An outer ring of strap-like florets in the head of Asteraceae (daisy) flowers.
re-introduction	Translocating wild or cultivated individuals to sites where the taxon has been known to occur in the past, but from which it has disappeared.
recurved	Curved backward.
reflexed	Bent back on itself.
reniform	Kidney shaped.
repand	With a slightly wavy margin.
replum	The outer structure of a pod in which the valves have dehisced (persists after the opening of the fruit).

restiad	Area dominated by rush-like plants (collectively known as restiads) of the family Restionaceae. Includes Chatham Island and North Island Sporodanthus and oioi (<i>Apodasmia similis</i>).
retorse	Pointing backward.
retuse	A shallow notch at the rounded or blunt apex of a leaf.
rhizoid	Any of various slender filaments that function as roots in mosses and ferns and fungi.
rhizomatous	With underground creeping stems.
rhizome	An underground stem (usually spreading horizontally or creeping) or short and erect.
rhombic	Diamond-shaped.
rhomboid	Diamond shaped, nearly rhombic.
riparian	Relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.
riparian margin	Refers to the edges of streams, rivers, lakes or other waterways.
riparian plants	Refers to plants found growing near the edges of streams, rivers or other waterways.
riparian zone	A strip of land next to streams, rivers, and lakes where there is a transition from terrestrial (land vegetation) to aquatic (water) vegetation. Also known as "berm".
riverine	Pertaining to rivers, streams and such like flowing water systems.
rootstock	A short, erect, underground stem.
rosette	A radiating cluster of leaves.
rostellum	In orchids, a modified stigma that prevents self-fertilisation.
rosulate	A dense radiating cluster of leaves.
rugose	Wrinkled.
rugulose	Having small wrinkles.
runcinate	Sharply pinnatifid or cleft, the segments directed downward.
runner	A trailing stem that roots at the nodes.
rupestral	Growing on rocks.
rushes	A group of distinctive wetland plants. They have solid stems (grasses have hollow stems), true rushes <i>Juncus</i> sp. have rounded leaves.
sagittate	Shaped like the head of an arrow; narrow and pointed but gradually enlarged at base into two straight lobes directed downwards; may refer only to the base of a leaf with such lobes; cf. hastate.
salt marsh	A coastal wetland, with specialized salt tolerant plants (halophytes).
sapling	A juvenile tree that has reached the stage of 1 or 2 main stems but is still in the shrub layer.
saprophyte	A plant lacking chlorophyll and living on dead organic matter.
saprophytic	Lacking chlorophyll and living on dead organic matter.
sarcotesta	The fleshy, often highly coloured outer layer of the seed coat in some species, e.g., titoki (<i>Alectryon excelsus</i>).
scabrid	Roughened or rough with delicate and irregular projections.
scale	Any thin, flat, membranous structure.
scape	A leafless flower stem.
schizocarp	A fruit which splits when dry, from the Greek <i>skhizein</i> 'split' and <i>karpos</i> 'fruit'.
schizocarps	Plural of schizocarp, a fruit which splits when dry, from the Greek <i>skhizein</i> 'split' and <i>karpos</i> 'fruit'.
scutiform	Shield-shaped.
sedges	A group of grass-like or rush-like herbaceous plants belonging to the family Cyperaceae. Many species are found in wetlands some are forest floor plants. Leaves are usually angular. Hence the saying "rushes are round and sedges have edges".
seedling	A newly germinated plant.
self sustaining	Able to sustain itself, or replace itself, independently of management i.e. regenerate naturally.
self thinning	Natural tree death in a crowded, even-aged forest or shrubland.
semi-deciduous	Partial leaflessness in winter, and greater than 50% leaves lost by the beginning of spring flush.
sepal	Outer part of flower; usually green.
serrate	Sharply toothed with teeth pointing forwards towards apex.
serrulate	Finely serrate, i.e., finely toothed with asymmetrical teeth pointing forward; like the cutting edge of a saw.

sessile	Attached by the base without a stalk or stem.
seta	The stalk of a fruiting moss capsule.
sheath	A portion of an organ that surrounds (at least partly) another organ (e.g., the tubular envelope enclosing the stem in grasses and sedges).
silicles	The flattened usually circular capsule – compared with the narrow, elongated fruit (silique) – containing the seed/seeds. A term used almost exclusively for plants within the cabbage family (Brassicaceae).
silique	A capsule, usually 2-celled, with 2 valves falling away from a frame (replum) bearing.
simple	Of one part; undivided (cf compound).
sinuate	With a wavy margin.
sinus	The space or recess between lobes; in hebes a gap between the margins of two leaves of an opposite pair that may be present in the bud before the pair of leaves separate.
sorus	A cluster of two or more sporangia on the margin or underside of the lamina of a fern, sometimes protected by an indusium.
spathulate	Spatula or spoon-shaped, a rounded blade tapering gradually to the base.
spheroidal	Almost spherical but elliptic in cross section.
spicate	Arranged in a spike.
spike	Flowers attached to main stem without stalks.
spikelet	Collection of individual grass florets borne at the end of the smallest branch of the inflorescence.
sporangia	Plural of sporangium. Structures in which spores are produced.
sporangium	Structure in which spores are produced.
spore	A single-celled reproductive unit similar in function to that of the seed in a flowering plant.
sporophyte	The spore producing plant in ferns that is usually the visible part.
stamen	The male reproductive organ of a flower where pollen is produced. Consists of an anther and its stalk.
stamens	The male, pollen bearing organ of a flower.
standing water	Where water lies above the soil surface for much of the year.
stellate	Irregularly branched or star shaped.
stigma	Female part of the flower that is receptive to pollen, usually found at or near the tip (apical end) of the style where deposited pollen enters the pistil.
stipe	The stalk of a frond.
stipitate	Borne on a stipe or stalk.
stipulate	A leaf with stipules.
stipule	A scale-like or leaf-like appendage at the base of a petiole, usually paired.
stolon	A stem which creeps along the ground, or even underground.
stoloniferous	Producing stolons.
stramineous	Chaffy, like straw or straw-colored.
stria	A fine line or groove.
striae	Fine lines or grooves.
striate	Fine longitudinal lines or minute ridges.
style	The elongated part of the flower between the ovary and the stigma.
sub-	A prefix meaning under, somewhat or almost.
subglabrous	Very slightly, but persistently, hairy.
suborbicular	Slightly rounded in outline.
substrate	The surface upon which an orchid grows.
subtended	Immediately beneath, occupying a position immediately beneath a structure, i.e., flower subtended by bract.
subulate	Slender and tapering to a point.
succession	Progressive replacement of one species or plant community type by another in an ecosystem.
successional	Referring to species, plant communities or habitats that tend to be progressively replaced by another.
succulent	Fleshy and juicy.

summer-green	Used in New Zealand to indicate herbs or sub-shrubs that die down to a root stock or rhizomatous network.
supplementary planting	Returning to a revegetation site and creating gaps, or filling existing gaps, with different plants of plants, usually later successional plants which may not have survived being planted in the first phases of the project.
surface water	Water present above the substrate or soil surface.
surveillance	Regular survey for pests inside operational and managed areas e.g. nurseries, standout areas on parks.
survey	Collection of observations on the spatial distribution or presence or absence of species using standardised procedures.
sustainable land management	The use of farming practices which are sustainable both financially and environmentally including management of nutrient runoff, waste disposal or stock effluent, reducing impacts of nutrients on waterways, preventing erosion and soil loss, and protecting native forest and wetland habitats from stock damage.
swamp	Low land that is seasonally flooded; has more woody plants than a marsh and better drainage than a bog. They are more fertile and less acidic than bogs because inflowing water brings silt, clay and organic matter. Typical swamp plants include raupo, purei and harakeke (flax). Zonation and succession often leads through manuka to kahikatea swamp forest as soil builds up and drainage improves.
symbiote	An organism that has an association with organisms of another species whereby the metabolic dependence of the two associates is mutual.
symbiotic	The relation between two different species of organisms that are interdependent; each gains benefits from the other (see also symbiosis).
sympatric	Occupying the same geographical region.
synangia	Structures made up of fused sporangia.
synonym	A botanical name that also applies to the same taxon.
systematics	The study of taxonomy, phylogenetics, and taxagenetics.
tabular	Shaped like a rectangular tablet.
taxa	Taxonomic groups. Used to refer to a group at any level e.g., genus, species or subspecies.
taxon	A taxonomic group. Used to refer to a group at any level e.g., genus, species or subspecies.
taxonomy	The process or science of classifying, naming, and describing organisms.
tepal	An individual member of the perianth.
terete	Cylindrical and tapering.
terminal	At the tip or apex.
ternatifid	Leaflets In threes,.
tetrad	A group of four.
tomentum	A hairy covering of short closely matted hairs.
translocation	The movement of living organisms from one area to another.
trifid	Divided into three.
trifoliate	Having three leaflets.
trigonus	Three-angled.
tripinnate	With each secondary pinna divided to the midrib into tertiary pinnae.
triquetrous	Triangular in cross section and acutely angled.
truncate	With the apex or base squared at the end as if cut off.
tuberculate	Bearing small swellings.
tubular	Tube-shaped.
turbinate	Top-shaped.
turgid	Distended through internal pressure.
type locality	The place or source where a holotype or type specimen was found for a species.
ultramafic	A type of dark, usually igneous, rock that is chemically dominated by magnesium and iron-rich minerals, the partially metamorphosed form of which is serpentinite.
umbel	Umbrella like; the flower stalks arise from one point at the stem.
undulate	Wavy edged.
undulose	Wavy edged.

unitubular	A tube partitioned once – literally one tube (compare – multitubular – many tubes).
utricle	A thin loose cover enveloping some fruits (eg., Carex, Uncinia).
valvate	Opening by valves.
vascular plant	A plant that possesses specialised conducting tissue (xylem and phloem). This includes flowering plants, conifers and ferns but excludes mosses, algae, lichens and liverworts.
velutinous	Thickly covered with delicate hairs; velvety.
ventral	Of the front or inner (adaxial) surface relative to the axis. (cf. dorsal).
vermiform	Worm-shaped.
vernucose	Glossy, literally as if varnished, e.g., Hebe vernucosa has leaves than appear as if varnished.
verrucose	Having small rounded warts.
verticillium	A fungus disease that will cause wilting and death.
villous	Covered with long, soft, fine hairs.
water table	The level at which water stays in a soil profile. The zone of saturation at the highest average depth during the wettest season.
wetland	A site that regularly has areas of open water for part or all of the year, or has a water table within 10 cm of the surface for at least 3 months of the year. Wetland ecosystems support a range of plant and animal species adapted to a aquatic or semi-aquatic environment.
whipcord	A shrub in which the leaves are reduced to scales that are close-set and pressed against the stem.
whorl	A ring of branches or leaves arising at the same level around the stem of a plant.
whorled	Aranged in a ring around the stem.