

Weed Management Guide

Lagarosiphon – *Lagarosiphon major*



● Current ● Potential

Lagarosiphon (*Lagarosiphon major*)

The problem

Lagarosiphon is on the *Alert List for Environmental Weeds*, a list of 28 non-native plants that threaten biodiversity and cause other environmental damage. Although only in the early stages of establishment, these weeds have the potential to seriously degrade Australia's ecosystems.

Lagarosiphon is an aquatic plant that can dominate freshwater lakes, dams and slow-moving streams. It grows extremely quickly from the bottom of a water body to the surface and forms dense mats several metres thick at or just below the water surface. These mats stop light from penetrating into the water and displace native vegetation. Dense infestations can also deplete oxygen in the water.

Infestations of lagarosiphon choke waterways and reduce the potential for recreational use (eg fishing, boating) and commercial exploitation (eg by blocking water intakes for hydro-electricity). It is a major water weed in parts of Europe and New Zealand. In the past it has been found and eradicated from a few small dams in southern Australia.

The weed

Lagarosiphon reaches its maximum growth in clear water up to a depth of 6.5 m, but may only grow to 1 m in murky water. It has numerous thread-like roots which are 'adventitious' (branching from the stem) and, along



Infestations of lagarosiphon choke waterways and reduce the potential for recreational use (eg fishing, boating) and commercial exploitation.

Photo: Bill Chisolm

with rhizomes (horizontal stems in the sediment), anchor it to the bottom. Stems, which can reach the surface, are brittle and sparsely branched, 3–5 mm in diameter and curved towards the base (J-shaped). The leaves are 5–20 mm long and 2–3 mm wide, and occur in alternate spirals along the stem. They generally have tapered tips curving downwards towards the stem, except in low alkalinity water where they are straight.

The three-petalled female flowers are very small, clear-white on the surface, and grow on very thin white to almost translucent filament-like stalks. Neither the male flower, which floats freely to the surface, nor fruit or seeds have been recorded in Australia or outside of its native range.

Key points

- Lagarosiphon is a weed of still and slow-moving waterways in New Zealand and Europe; it is currently not known to be present in Australia.
- Quarantine control, public education and the cooperation of the aquarium and garden plant industries will help to prevent its spread into Australia.
- If it became established, eradication would be extremely difficult because it reproduces from plant fragments and no environmentally acceptable systemic herbicide is known.
- Any new outbreaks should be reported to local councils or state or territory weed management agencies. Do not attempt control on your own.

Lagarosiphon – *Lagarosiphon major*

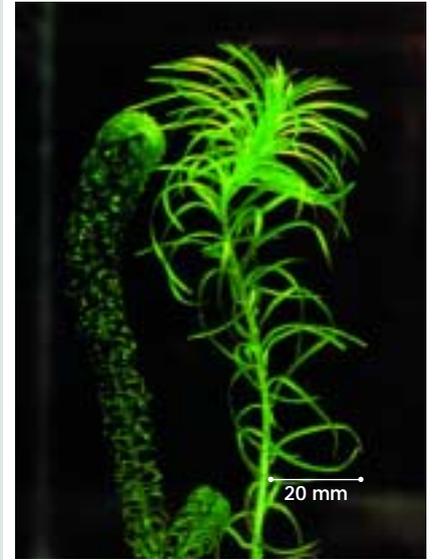


Growth calendar

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Growth												
Flowering												
Fruiting												
Germination	No viable seed yet produced in Australia											

■ Likely growth pattern in temperate Australia

Lagarosiphon is a perennial plant which can live for at least several years. It is well adapted to cooler climates and becomes dormant in the northern hemisphere during winter. In spring it breaks its dormancy and growth commences from rhizomes (horizontal stems from the plant base sunk into the sediment) and shoots. It grows fastest during the warmer months of summer when dense mats of stems can completely take over the water body. The female flowers appear from summer until early autumn. Growth decreases as light intensity and day length decrease, and is thought to be absent below 10°C.



Lagarosiphon generally have tapered tips curving downwards towards the stem, except in low alkalinity water where they are straight.
Photo: Ian Johnstone

How it spreads

There are currently no naturalised infestations of lagarosiphon in Australia. Small infestations near Melbourne in Victoria and Newcastle in New South Wales were eradicated in the late 1970s, and were believed to have originated from ornamental plants in aquariums or ponds. It has also been found in a Sydney aquarium and was intercepted entering Tasmania. The current distribution of lagarosiphon, as shown on the map on p.1, is of a cultivated specimen that was recorded in Queensland in 1990.

Lagarosiphon has not been known to produce seed in Australia and all spread is by vegetative reproduction. Colonies of lagarosiphon expand in water bodies as rhizomes take root and give rise to new growth. However, it can also spread large distances downstream when fragments break off naturally, especially during summer, or are dislodged by fast flowing water or other disturbance. Roots grow from the nodes (the joints between the segments on the stem) on these fragments, and new plants are formed. In New Zealand small fragments are frequently transported on boats and

trailers, and infestations are often first recorded at boat ramps.

Where it grows

Lagarosiphon grows best in clear, still or slow-moving fresh water with silty or sandy bottoms. It prefers the cooler waters of the temperate zone, with optimum temperatures of 20–23°C and a maximum temperature of around 25°C. It can live in high and low nutrient levels and grows best under conditions of high light intensity. It also tolerates relatively high pH (ie alkaline conditions). Growth of lagarosiphon is greatest in sheltered areas protected from wind, waves and currents.

A native of southern Africa, lagarosiphon is found in high mountain streams and ponds. It has spread throughout the world as an aquarium plant and is also known as an 'oxygen plant'. Note, however, that dense infestations can actually consume more oxygen than they produce, and reduce water quality and available oxygen.

It is a major weed on both the North and South Islands of New Zealand. It is also a naturalised weed in England, the Channel Islands, northern France and Italy.



Infestations of lagarosiphon can block water intakes such as hydroelectric systems, irrigation intakes and outboard motors.
Photo: Ian Johnstone



Why we need to be 'alert' to lagarosiphon

Lagarosiphon has significant impacts on New Zealand water bodies, including:

- completely dominating them and preventing recreational activities such as swimming, boating and fishing
- blocking water intakes such as hydro-electric systems and outboard motors, and potentially irrigation intakes as well
- preventing light from penetrating the water, and hence outcompeting and displacing native plants.

As a submerged aquatic weed, lagarosiphon is particularly difficult to control and spreads very readily. If it became naturalised in Australia, there is little doubt that it would cause similar detrimental impacts and be as hard to control as it is in New Zealand.

Lagarosiphon fragments are frequently transported on boats and trailers and infestations are often first recorded at boat ramps

Look-alike species

There are three similar water weeds which are already present in Australia, especially in the southeast. These species (*Elodea canadensis*, *Egeria densa* and *Hydrilla verticillata*) have similar characteristics to lagarosiphon. They are all submerged aquatic plants that reproduce vegetatively and inhabit still or slow-moving fresh water. Lagarosiphon can be distinguished from these species because its leaves grow in alternate spirals along the length of the stem; the leaves of all the other species grow in groups, or whorls, in a circle around the stem.



Control of lagarosiphon is ongoing because, unless all pieces are collected, it can grow back from any remaining fragments.

Photo: Bill Chisolm

The Alert List for Environmental Weeds

The Federal Government's *Alert List for Environmental Weeds* was declared in 2001. It consists of 28 weed species that currently have limited distributions but potentially could cause significant damage. The following weed species are therefore targeted for eradication:

Scientific name	Common name	Scientific name	Common name
<i>Acacia catechu</i> var. <i>sundra</i>	cutch tree	<i>Koeleruteria elegans</i> ssp. <i>formosana</i>	Chinese rain tree
<i>Acacia karroo</i>	Karoo thorn	<i>Lachenalia reflexa</i>	yellow soldier
<i>Asystasia gangetica</i> ssp. <i>micrantha</i>	Chinese violet	<i>Lagarosiphon major</i>	lagarosiphon
<i>Barleria prionitis</i>	barleria	<i>Nassella charruana</i>	lobed needle grass
<i>Bassia scoparia</i>	kochia	<i>Nassella hyalina</i>	cane needle grass
<i>Calluna vulgaris</i>	heather	<i>Pelargonium alchemilloides</i>	garden geranium
<i>Chromolaena odorata</i>	Siam weed	<i>Pereskia aculeata</i>	leaf cactus
<i>Cynoglossum creticum</i>	blue hound's tongue	<i>Piptochaetium montevidense</i>	Uruguayan rice grass
<i>Cyperus teneristolon</i>	cyperus	<i>Praxelis clematidea</i>	praxelis
<i>Cytisus multiflorus</i>	white Spanish broom	<i>Retama raetam</i>	white weeping broom
<i>Dittrichia viscosa</i>	false yellowhead	<i>Senecio glastifolius</i>	holly leaved senecio
<i>Equisetum</i> spp.	horsetail species	<i>Thunbergia laurifolia</i>	laurel clock vine
<i>Gymnocoronis spilanthoides</i>	Senegal tea plant	<i>Tipuana tipu</i>	rosewood
<i>Hieracium aurantiacum</i>	orange hawkweed	<i>Trianoptiles solitaria</i>	subterranean Cape sedge

Weed control contacts

State / Territory	Department	Phone	Email	Website
ACT	Environment ACT	(02) 6207 9777	EnvironmentACT@act.gov.au	www.environment.act.gov.au
NSW	NSW Agriculture	1800 680 244	weeds@agric.nsw.gov.au	www.agric.nsw.gov.au
NT	Dept of Natural Resources, Environment and the Arts	(08) 8999 4567	weedinfo.nreta@nt.gov.au	www.nt.gov.au
Qld	Dept of Natural Resources and Mines	(07) 3896 3111	enquiries@nrm.qld.gov.au	www.nrm.qld.gov.au
SA	Dept of Water, Land and Biodiversity Conservation	(08) 8303 9500	apc@saugov.sa.gov.au	www.dwlbc.sa.gov.au
Tas	Dept of Primary Industries, Water and Environment	1300 368 550	Weeds.Enquiries@dpiwe.tas.gov.au	www.dpiwe.tas.gov.au
Vic	Dept of Primary Industries/Dept of Sustainability and Environment	136 186	customer.service@dpi.vic.gov.au	www.dpi.vic.gov.au www.dse.vic.gov.au
WA	Dept of Agriculture	(08) 9368 3333	enquiries@agric.wa.gov.au	www.agric.wa.gov.au

The above contacts can offer advice on weed control in your state or territory. If using herbicides always read the label and follow instructions carefully. Particular care should be taken when using herbicides near waterways because rainfall running off the land into waterways can carry herbicides with it. Permits from state or territory Environment Protection Authorities may be required if herbicides are to be sprayed on riverbanks or in waterways.

What to do about it

Prevention is better than the cure

As with all weed management, prevention is better and more cost-effective than control. The annual cost of weeds to agriculture in Australia, in terms of decreased productivity and management costs, is estimated at \$4 billion. Environmental impacts are also significant and lead to a loss of biodiversity. To limit escalation of these impacts, it is vital to prevent further introduction of new weed species, such as lagarosiphon, into uninfested natural ecosystems.

It is illegal to grow lagarosiphon throughout Australia. The aquarium and garden plant industries have a major role to play in abiding by the relevant legislation. The sale or dumping of lagarosiphon should be reported to the authorities, and people who have unknowingly cultivated it should contact local councils or state or territory weed management agencies for information on how to properly dispose of it. Burial is the quickest means of disposal. Drying in the sun and/or burning are also suitable, providing there is no risk of accidental spread into a waterway.

Early detection and eradication are also important to prevent infestations of

lagarosiphon. Small infestations can be easily eradicated if they are detected early but an ongoing commitment is needed to ensure new infestations do not establish.

Quarantine to prevent further introductions

No importation of lagarosiphon into Australia is permitted because of the risk of further spread, and the potential introduction of new genetic diversity that could make future control more difficult.

Do not buy seeds via the internet or from mail order catalogues unless you check with quarantine first and can be sure that they are free of weeds like lagarosiphon. Call 1800 803 006 or see the Australian Quarantine and Inspection Service (AQIS) import conditions database <www.aqis.gov.au/icon>. Also, take care when travelling overseas that you do not choose souvenirs made from or containing seeds, or bring back seeds attached to hiking or camping equipment. Report any breaches of quarantine you see to AQIS.



Manual removal of lagarosiphon is not effective as it is impossible to mechanically collect all vegetation and infestations are able to regenerate from remaining fragments.

Photo: Ian Johnstone





Manipulation of water levels has been one control option for lagarosiphon in New Zealand.
Photo: Ian Johnstone

Raising community awareness

Many aquarium plants become naturalised after being dumped into drains and waterways. The Weeds of National Significance *Salvinia molesta* and *Cabomba caroliniana* are just two examples. Despite laws banning the sale, trade and importation of lagarosiphon, there are still concerns that it may be introduced into Australia and/or sold as an aquarium plant. It is vital that the general public is made more aware of the threats that lagarosiphon poses so that it is not allowed to spread into natural systems.

New infestations of lagarosiphon

There are no known infestations of lagarosiphon in Australia. Because it poses such a serious threat, any outbreaks should be reported immediately to your state or territory weed management agency or local council. Do not try to control lagarosiphon without their expert assistance. Control effort that is poorly performed or not followed up can actually help spread the weed and worsen the problem.

Lagarosiphon is extremely difficult to eradicate

The New Zealand experience has shown the difficulty of eradicating lagarosiphon. Only a few very small infestations have been eradicated and it has continued to spread into new areas. In most cases control is ongoing because, unless all the lagarosiphon is collected, it can grow back from any remaining fragments.

Two main control methods are used. At present the only herbicide that is considered to be environmentally acceptable in New Zealand does not kill the rhizomes, so regrowth is inevitable. This herbicide can be applied by helicopter, providing cost-effective control at recreational sites, albeit on an ongoing basis. An environmentally friendly systemic herbicide that targets the rhizomes is being sought.

Lagarosiphon has also been mechanically harvested from accessible areas, using a variety of methods such as hand cutting and suction dredging. However, it is virtually impossible to mechanically collect all vegetation, even from small areas, and infestations are able to regenerate from remaining fragments.

Other methods that have been used include covering the plant with black sheeting and lowering water levels to dry out the weed. Biological control is not currently an option.

Plant alternative species instead

In ornamental situations such as ponds and aquariums, use native species from known local provenance instead of lagarosiphon because they are unlikely to cause problems if they escape cultivation. However, in confined, nutrient-rich areas, these native species may also completely dominate the water in ponds, dams or wetlands. Check with your local council or weed management agency about alternatives to lagarosiphon.

Legislation

Landholders throughout all states and territories are required to control lagarosiphon if it is found on their property, and its importation and sale are illegal. Lagarosiphon is often confused with other water weeds, including *Elodea canadensis*, *Egeria densa* and *Hydrilla verticillata* (see p.3 for more details). These are also considered weeds in most states and territories.

Acknowledgments

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Maps: Data used in the compilation of actual and potential distribution maps provided by Australian herbaria via Australia's Virtual Herbarium and Sainty and Associates P/L, respectively.



If you find a plant that may be lagarosiphon

Quick reference guide

Identification

You will first need to confirm its identity. Contact your state or territory weed management agency for help in identifying the plant. You will need to take note of the characteristics of the plant in order to accurately describe it. Some important features of lagarosiphon are:

- leaves that grow in alternate spirals along the length of the stem
- leaf tips that are curved downwards towards the stem, although in low alkalinity water they may be straight

- small floating flowers on very thin white to translucent filament-like stalks.

Reporting occurrences

Once identified, occurrences of lagarosiphon should be reported to the relevant state or territory weed management agency or local council, who will offer advice and assistance on its control. Because lagarosiphon spreads so quickly and poses such a serious threat, its control should be undertaken with the appropriate expertise and adequate resources.

Follow-up work will be required

Once the initial infestation is controlled, follow-up monitoring and control will be required to ensure that reinfestation does not occur.



Lagarosiphon forms dense mats at, or just below, the water surface that stop light from penetrating into the water and displace native vegetation. Photo: Ian Johnstone

Collecting specimens

State or territory herbaria can also identify plants from good dried specimens. These organisations can provide advice on how to best collect and preserve specimens. As lagarosiphon plants contain large amounts of water, drying will require many changes of paper.

State/Territory	Postal Address	Phone	Web
Australian National Herbarium	GPO Box 1600 Canberra, ACT, 2601	(02) 6246 5108	www.anbg.gov.au/cpbr/herbarium/index.html
National Herbarium of New South Wales	Mrs Macquaries Rd Sydney, NSW, 2000	(02) 9231 8111	www.rbg Syd.nsw.gov.au
National Herbarium of Victoria	Private Bag 2000 Birdwood Avenue South Yarra, Vic, 3141	(03) 9252 2300	www.rbg.vic.gov.au/biodiversity/herbarium.html
Northern Territory Herbarium	PO Box 496 Palmerston, NT, 0831	(08) 8999 4516	http://www.nt.gov.au/ipe/pwcnt/
Queensland Herbarium	c/- Brisbane Botanic Gardens Mt Coot-tha Rd Toowong, Qld, 4066	(07) 3896 9326	www.env.qld.gov.au/environment/science/herbarium
South Australian Plant Biodiversity Centre	PO Box 2732 Kent Town, SA, 5071	(08) 8222 9311	www.flora.sa.gov.au/index.html
Tasmanian Herbarium	Private Bag 4 Hobart, Tas, 7000	(03) 6226 2635	www.tmag.tas.gov.au/Herbarium/Herbarium2.htm
Western Australian Herbarium	Locked Bag 104 Bentley DC, WA, 6983	(08) 9334 0500	http://science.calm.wa.gov.au/herbarium/

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