

Water hyacinth

Eichhornia crassipes

DECLARED



Originally introduced to Australia as an aquatic ornamental plant, water hyacinth has become a major pest of rivers and dams. Not only does it destroy native habitats, but it also seriously depletes water bodies of oxygen, increases water loss and provides a breeding ground for mosquitoes.

An integrated control program that includes prevention and control (by physical, biological and chemical means) is the most effective management strategy. Ideally, dead plants are removed to avoid putrefaction of the water body.

Description

Water hyacinth is a floating water weed with dark green rounded leaves up to 5 cm across and a fibrous root system. The leaf stalks are swollen into spongy, bulbous structures.

Flowers are light purple with a darker blue/purple and yellow centre. They are borne in dense spikes projecting above the plant.

The problem

Rampant growth of water hyacinth can destroy native wetlands and waterways, killing native fish and other wildlife.

Water hyacinth can form dense mats that spread out across water surfaces eventually choking the entire water body. Propagation can be so rapid that an infestation may double in size every week under ideal conditions.

Water hyacinth can spread rapidly through the waterways of a catchment. It is particularly important that infestations be prevented in the Murray-Darling system where an infestation could spread through three southern states.

Heavy infestations can affect water bodies in a number of ways:

Safety and health risk

Children and livestock may be in danger of drowning if they become entangled in the roots and stolons of a heavy infestation. Moreover, the mats that the plants form create a haven for mosquitoes that are vectors of Ross River Fever and Encephalitis.

Interference with irrigation and stock watering

Stock may have difficulty gaining access to water to drink if the surface is completely covered by plants. Under flood conditions, rafts of plant material build up at fences and bridges, collecting other floating debris. The combined weight may cause such structures to collapse.

Water flow to irrigation equipment can be reduced due to the restrictive action of the roots, thus increasing pumping times and costs.

Loss of water

High rates of transpiration through the leaves during summer can cause up to four times the loss of water from normal water surface evaporation.

Degradation of water quality

Heavy infestations reduce the infiltration of sunlight necessary for photosynthesis in the plant life of creek and river beds. Heavy plant cover also prevents the exchange of air, which normally occurs on an open water surface.

As plant material decomposes, it uses oxygen causing water pollution and stagnation. This affects the water quality and may result in the death of aquatic animals.

Destruction of wildlife habitats

A large infestation of water hyacinth is a physical barrier for aquatic and semi-aquatic animals, restricting their territorial movements and breeding activities.

Recreation and aesthetics

Large infestations of water hyacinth stop the passage of boats by clogging the inlets of boat engine water cooling systems. The mats of weed also degrade the quality of swimming and make fishing impossible. The natural beauty of an open water body can be spoilt and further degraded as native aquatic plants, birds and animals are displaced.

Life cycle

Water hyacinth grows from seed or through vegetative reproduction. Seeds are produced in capsules at the base of each flower. Daughter plants, produced by vegetative reproduction, remain attached to the parent plant until broken off by wind or other physical damage.

Flowering can begin as early as October and continue through the summer months. Each of the flowers on a stalk remain open for one to two days before beginning to wither. When all the flowers on a plant have withered, the stalk gradually bends into the water. Seeds are released from capsules at the base of each dead flower after about 18 days.

In warm climates, vegetative reproduction is rapid and enables the formation of large, dense rafts of plants within a short time.

Habitat and distribution

Originally from Brazil, water hyacinth was introduced to the Brisbane metropolitan area as an ornamental pond specimen in the early 1900s. Valued for its floral presentation, it was released into ponds and lagoons in public parks throughout Queensland.

Flooding then spread the plant into creeks, rivers and dams where, having no natural predators, it flourished and quickly became a nuisance.

Infestations now occur mostly in coastal Queensland and New South Wales where the plant prefers fresh, static or slow flowing water with high organic content.

Declaration details

Water hyacinth is a declared plant under Queensland legislation. Declaration requires landholders to control declared pests on the land and waters under their control. A Local Government may serve a notice upon a landholder requiring control of declared pests.

Prevention

Floodwater can deposit water hyacinth in dams, lagoons and in calm water areas of rivers and creeks. Attempts to physically remove plants should be made before they flower and set seed.

New plants may spring up long after older plants have been removed, as Water hyacinth seeds are extremely long-lived.

Control

The best form of weed control is prevention. Always treat weed infestations when small, do not allow weeds to establish. Weed control is not cheap but it is cheaper now than next year, or the year after. Proper planning ensures you get value for each dollar spent.

Look at your weed problem carefully. Can you realistically eradicate it? Or should you contain the weed to stop new infestations developing while you reduce existing ones? What are you required to do by legislation? How does weed control fit into your property management plan? What can you do to restore areas and prevent re-establishment?

The best approach is usually to combine different methods. Control may include; chemical, mechanical, fire and biological methods; combined with land management changes. The control methods you choose should suit the specific weed and your particular situation.

Mechanical control

Physical removal is most effective for small infestations and any such attempt should be made before flowering and seed set in October.

Plant may survive for a short time on moist river or creek banks. After removing the plant, follow up with drying and burning to destroy reproductive organs. This will prevent introduction following rainfall and subsequent flooding.

Biological control

Four insect species have been introduced from South America and released by CSIRO since 1975. The two weevil species are *Neochetina eicchomiae* and *Neochetina bruchi* and the two moth species are *Niphograptus albiguttalis* (previously known as *Sameodes albiguttalis*) and *Xubida infusella*.

The weevil *N. eicchomiae* has been the most successful so far, and has played a key role in removing large infestations in tropical areas of the state. The adult is black, 5 mm long and feeds on the leaves making small scars. Eggs are laid in the bulbous leaf stalks and the larvae tunnel through the plant tissues. The damaged tissues are then attacked by bacteria and fungi. The plant becomes waterlogged and under heavy attack and will die.

The life cycle of the weevil takes three months and the insect is inactive over winter. The other weevil, *N. bruchii*, is active through the winter and so complements *N. eicchomiae*. This weevil was first released in south-east Queensland in 1990 and in north Queensland in 1991. Field testing of this weevil is still ongoing and it appears that *N. bruchii* is effective. It appears that introducing both of them is the best possible option, because their life cycles complement each other. However, both weevils are much less effective in sub-tropical and cooler areas.

Biological control is most effective on large areas of water hyacinth. However, it may take up to 10 years to achieve satisfactory control by this means.

The moth *N. albiguttalis* is well established in north and south-east Queensland and in northern NSW. The larvae of the moth tunnels into the petioles and buds. It is very damaging on young plants and luxuriant growth, but impact is often temporary and patchy.

The other moth, *A. infusella*, also has larvae that tunnel in petioles and buds and was first released in Ingham in 1981. New stocks were released by CSIRO in Queensland from 1996 to 1999 however, the success of this release is currently unknown.

Integrated control

Integrated control is a sensible strategy that includes the combination of mechanical, biological and chemical methods. The different methods complement each other.

First make certain that the weevils are established on the infestation, then carry out a spray program using a selective herbicide. Spraying sections of the infestation at a time will concentrate the insects on the remaining weed, they will destroy the remainder. Mechanical removal of dead plants will avoid water quality degradation by masses of rotting weed.

Herbicide control

Before using any herbicide always read the label carefully. All herbicides must be applied strictly in accordance with the directions on the label. When treating water that is used for irrigation purposes, the withholding period should be followed in accordance with the label recommendations.

Spraying an entire heavy infestation can cause water hyacinth to sink and result in pollution from the rotting weed. Large masses of the rotting weed will use all the oxygen in the water leading to fish and wildlife kills. This problem can be avoided by spraying strips of the weed or by mechanically removing much of the weed before spraying. For this reason it is vital to destroy scattered plants when they appear rather than delaying treatment until the entire water body has been choked. Heavy infestations on shallow water bodies should be physically removed to avoid putrefaction of the water.

Diquat (Regione) is the only product registered for use in water storage areas used for human consumption. Note that 14 days must elapse after treatment before water can be consumed.

Further information

Further information is available from the vegetation management/weed control/environmental staff at your local government.

TABLE 1 - HERBICIDE REGISTERED FOR THE CONTROL OF WATER HYACINTH

Situation	Chemical	Rate
Aquatic areas, streams, drains, dams, industrial areas	2,4-D acid (AF 300)	1:200 with water
Industrial areas, pastures, non crop areas	2,4-D amine	500 g/L 4.4-6.6 L/ha in 2200 – 3300 L water
Aquatic areas, channels, dams, bore drains, waterways	Amitrole	280 mL/100L
Aquatic areas, streams, drains, dams, industrial areas, potable water	Diquat	1:250 in water
Industrial areas, domestic, commercial areas, pastures, non-crop areas	Glyphosate	1 – 1.3L/100L water

Comments:

1. High volume spraying using power spray or knapsack; apply 200 L spray to 1 000m sq plants. Compatible with biocontrol agents.
2. Sprinkler sprayer apply 20 L solution to 1000m² of plants. Compatible with biocontrol agents.
3. Helicopter with raindrop D8 nozzles angled backwards at 45. Apply 200 L solution per ha. Compatible with biocontrol agents.
4. High volume spraying using power spray or knapsack; apply 200 L spray to 1000m² plants. Add 400 mL non-ionic wetting agent per 200 L water.
5. Spray to good coverage immediately prior to flowering.
6. High volume spraying using power spray or knapsack; apply 200 L spray to 1000m² plants. Add 375 mL non-ionic wetting agent per 250 L water.

<p>Find more <i>NRM Facts</i> at <www.nrm.qld.gov.au>; on the NR&M Free Faxback Line, phone 1800 240 691 and PrimeNotes CD-ROM, phone 1800 816 541.</p>	<p>The control methods suggested above should be used in accordance with restrictions (for example, federal and state legislation, local government laws, product manufacturer's guidelines) directly or indirectly relating to each control method. These restrictions may prevent the use of one or more of the methods referred to, depending on individual circumstances. While every care is taken to ensure the accuracy of the information in this fact sheet, the Department of Natural Resources and Mines does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.</p>
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