

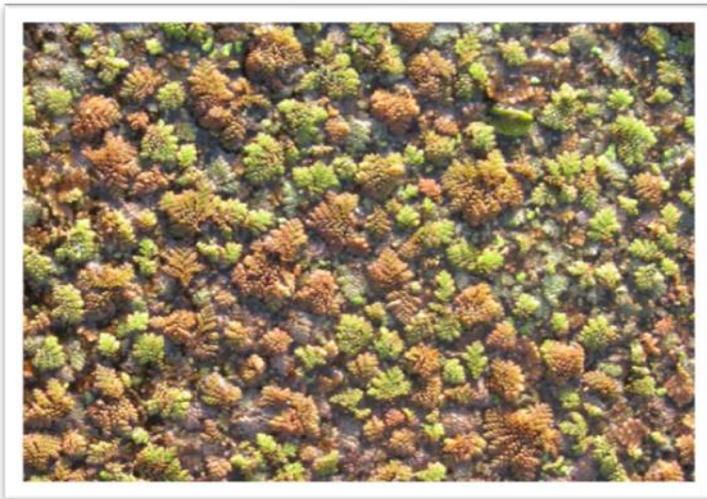
Azolla – native aquatic weeds

Azolla are free floating, native aquatic weeds that are quite common in freshwater enclosures in South East Queensland. It is a floating fern that branches freely, breaking into smaller sections as it grows. It is often present in slow flowing streams and creeks, irrigation channels, ponds and lakes, and is subject to seasonal fluctuations. Azolla range from green to red in colour and have a main stem approximately 20mm long with pinnate branches, longer towards the base giving it a triangular shape. Fossil records suggest that Azolla has been around for at least 80 million years in its present form.

Azolla grows and flourishes within nursery recycling and storage dams and can quickly cover the water surface completely. The plants have very small water repellent leaves, and float on the surface by means of numerous, small, closely overlapped scale like leaves, with their roots hanging in the water. Individual plants are 20-25mm long with roots hanging down about 40mm below the water surface, and in significant numbers can quickly form large dense floating mats out-competing other native plant species.

Azolla is capable of rapid vegetative reproduction throughout the year by elongation and fragmentation of the small fronds, and under favorable environmental conditions sexual reproduction can also occur through spore production. These spores can be easily dispersed on the feet and feathers of water birds quickly spreading the weed to new previously uncontaminated areas. High nutrient levels, temperatures between 18°C and 26°C, and pH values between 5 and 7 provide optimum conditions for the plant to thrive allowing the floating fern to double its leaf area every five to seven days. Azolla supports Nitrogen fixing bacterium, allowing the plant to utilise Nitrogen from either the water or the atmosphere for its own growth, however importantly Azolla does require Phosphorous from the water. The fern-like leaves of the Azolla are usually green when young or growing in shaded areas, but redden on maturity or in full sunlight.

Azolla is often transferred and spread to new areas by being flushed downstream during heavy storm flows, through careless discarding of aquarium and ornamental pond waste, or by bird life moving from dam to dam.



Azolla sp.

Azolla pinnata & *Azolla filiculoides*

(Red water fern, water fern, mosquito fern)

Azolla is not considered to have a harmful effect on farm or nursery irrigation water, however excess growth of the plant may cause blockages to pump intakes, clogging of filtration systems, and an increased demand or load on disinfection systems. Excessive growth can also have serious impacts on fish and other fauna. These infestations can reduce sunlight penetration into the water restricting the growth of other aquatic plant species, lessen the nutrients available to other organisms, and can also lead to reduced oxygen levels causing a loss of aquatic life.

Azolla can be a habitat and potential food source for many small organisms including fish, crustaceans and insects. Azolla also take up nutrients from the water to enable it to grow, and therefore restricts the nutrients available for the growth of other nuisance plants including the potentially toxic blue-green algae.

The need to control growths of Azolla should be carefully evaluated.

Management techniques will depend on a range of issues such as the severity of the infestation, the cost, labour availability, environmental conditions and the terrain. The best form of Azolla management is prevention, however if prevention is no longer possible, it is best to treat the weed infestation early before it forms into large dense mats. If the growth of Azolla is problematic and control is considered necessary, it is best achieved by manual or mechanical removal, scooping the floating weed from the surface of the dam and allowing the plant to dry. Care must be taken with physical removal as the plant reproduces by fragmentation and any plant fragments left behind can quickly re-establish. This is still arguably the best management option, removing the Azolla plants from the water, therefore removing the nutrients from the dam and breaking the continuous cycle of growth of the weed.

Some chemical control options are available to help manage Azolla, but the treated plants will settle to the bottom of the dam and decay, depleting the water body of oxygen potentially causing severe issues for the aquatic life in the dam, often causing major fish kills. If chemical management is applied, it is best to manage small areas at a time, by treating strips of the floating weed rather than the whole mass, or by using a floating boom (such as a length of irrigation pipe filled with air and capped at both ends) to move sections of the floating weed into smaller areas for management. It is recommended the chemically treated water should not be used for irrigation for ten to fourteen days; see chemical label directions for full details.

Excessive growth of Azolla is best managed by limiting the amount of excessive nutrients entering the water storage which make conditions favourable for the plant.

Azolla spp. is not a declared weed in Australia.

More information can be obtained by contacting the Farm Management System Officer in your area.

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