

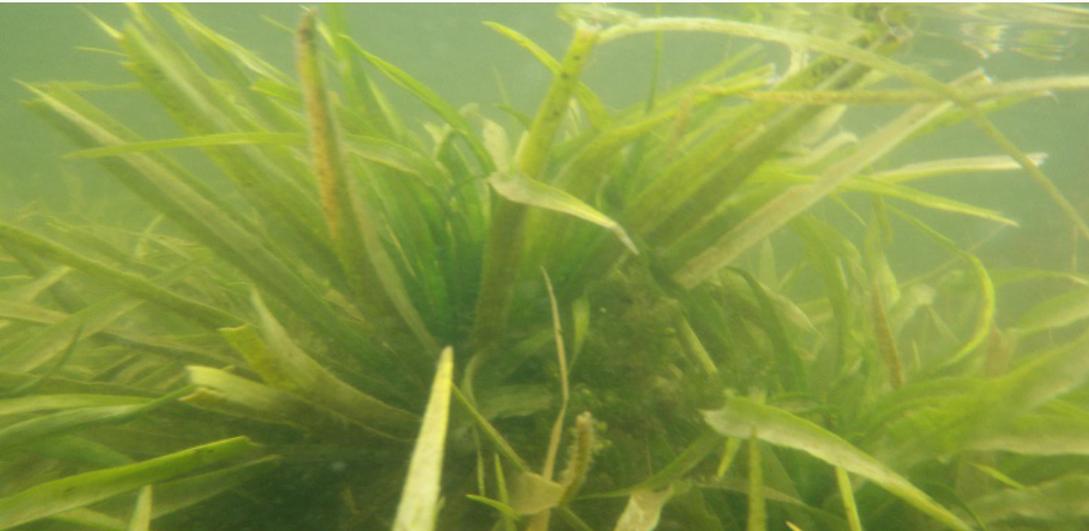


Water Soldier

Stratiotes Aloides L.

ALBERTA REGULATION:
FISHERIES ACT

Last Updated: February 2018



Underwater



wikipedia.org | Flower

Overview:

Water soldier is a freshwater, perennial aquatic plant native to Europe and central Asia. In Canada, it has been imported for ornamental use in water gardens and has since been found in five locations in South-central Ontario; there is high concern in both Canada and the U.S. that it may enter the Great Lakes and St. Lawrence drainage system.² Ontario has the only known populations in North America.³

Water soldier is a dioecious plant (separate male and female plants); therefore, it can reproduce by seed, but also vegetatively by stolons and offsets of an adult plant. To date, only female plants have been detected in North America and no evidence of seed production has occurred.² In its native habitat, populations with both genders are uncommon; therefore, vegetative reproduction is the primary

method by which populations are maintained and grow.²

Plant roots and stolons sink to overwinter or will decay through the growing season. The roots regrow the following spring as plants rise to the surface again.² Roots can be submersed and free-floating or attached to the bottom. Flowers occur on shoots which emerge above the water surface.²

Water soldier continuously forms new plantlets, very similar to the household spider-plant. Stolons of mature plants can produce up to 12 offsets (plantlets); offsets detach in the season in which they are produced. Turions (small bulbs) form on the stolons of parent plants (up to four) and remain attached until the following spring when they break off. These vegetative propagules are water dispersed.²

New leaves and stolons are produced throughout the growing season. This growth pattern facilitates rapid colonization of new habitats.

In its native range, significant differences in morphology and growth patterns have been observed. Two main forms are known to occur in Finland and Poland: one which floats near the surface with stiff leaves emerging from the water; and the other remaining near or at the bottom of the water with submersed, flaccid leaves. In other native ranges, similar forms of emergent and submersed plants were observed, with the latter form producing less biomass.²

Submersed, native aquatic plants which form rosettes could be initially mistaken for water soldier, but none have the serrated leaf edges.²



Water Soldier *(continued)*

Impacts:

Populations in Ontario have been observed in patches of a few plants or populations of hundreds of water soldier.² Dense mats of *S. aloides* can crowd out native vegetation and compete for nutrients. Inhibition of phytoplankton growth via competition for essential nutrients and allelopathic exudates has been associated with *S. aloides*, which could affect the ecological balance of waterways by depriving zooplankton of food sources.² Water soldier also interferes with recreational activities. The sharp leaves can cut the skin of swimmers or anyone who handles this plant.³

As of January 1, 2016, the possession, sale, or transport of this species in Alberta is illegal under the Fisheries Act.

Habitat:

Shallow (< 5 m), still to moderately flowing water of ponds, lakes and rivers, including ditches. Bottoms can be mud or vegetated. Rosettes overwinter under ice, but the plants themselves cannot survive freezing.

Identification:

Stems are short 10-18 mm long and 25-37 mm wide with stolons branching from the base. Stolons bear terminal rosettes, which become offsets, or bud-like turions measuring about 5 cm long.²

Leaves are similar in appearance to an aloe plant and can be emergent or submergent. Light green to red-purple² submerged leaves are thin, brittle and

droop due to a weak spine, but can grow up to 60 cm long and up to 1-2 cm wide.¹ Dark green emergent leaves are thick, rigid, and sword-shaped; they are usually less than 40 cm long and 1-4 cm wide.¹ Plants are arranged in a rosette. Water soldier leaves are distinguished from similar looking plants by strongly serrated leaf edges.¹

Leaf axils bear 2-14 narrowly triangular scales, 2-5.5 mm long and 0.15-.7 mm wide, which secrete a mucilage.²

Flowers are solitary to several, borne within a spathe consisting of two overlapping bracts (26-44 mm long) in July to August. Flowers have 3 sepals and 3 white petals with a yellow base. Pistillate flowers are borne on a stout pedicel up to 20 cm long. Staminate flowers are borne on a flattened peduncle up to 30 cm long.²

Fruits are a berry-like capsules with a leathery, brownish-green to green covering. Seeds are cylindrical, approximately 5.8-10.6 mm long and 2-3.1 mm wide with a slight beak at each end. Seeds are brown with translucent, gluey hairs when fresh, and can appear woody and ribbed, or shiny, when dry.²

Prevention:

Learn to recognize water soldier and do not purchase or grow it. Boats can dislodge plants and offsets, which spread to new areas.³ Early detection provides the best chance of eradication.

Since water soldier is often found on trailered boats, all aquatic equipment

should be inspected after each use.³ Never empty any contents of an aquarium into natural water bodies. Upon leaving a water body check all equipment, clothing, and pets for plant material and leave it at the site. Any material discovered after leaving the site should be disposed of in garbage.

Control:

Mechanical – In Ontario, manual removal was found to be ineffective due to a difficulty in detecting all water soldier plants in dense infestations and reduced visibility in turbid water conditions, potentially missing select plants. The strategy in Ontario is to focus on prevention and early detection until effective removal techniques can be developed. Benthic barriers and mechanical harvesting have yet to be evaluated.²

Chemical – Diquat is registered for control of *S. aloides* in Canada. However, pesticide use in water bodies requires special certification and permits. Always check product labels to ensure the herbicide is registered for use on the target plant in Canada by the Pesticide Management Regulatory Agency.

Biological – None researched to date.



Water Soldier *(continued)*



In Water



wikipedia.org | Illustration

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