

Hydrilla: An Invasive Aquatic Plant

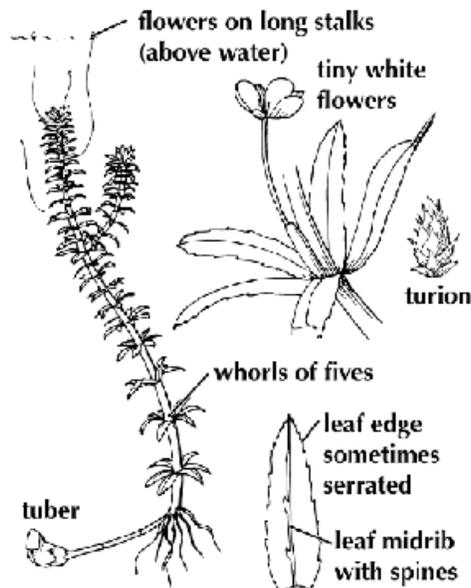
Hydrilla verticillata



Description

- Hydrilla is an invasive non-native submerged plant with long slender stems that branch out profusely when they reach the water surface. Hydrilla can grow an inch a day and 50% of the standing crop occurs in the top 0.5 m of the water column.
- The leaves are 5/8-inch long, strap shaped with pointed tips and a distinct midrib. The green leaves are arranged in whorls of 4-8 and are attached directly to the stem. The leaf margins have distinct saw-toothed edges that are visible to the naked eye and rough to the touch. The underside of the midvein may have one or more spines.
- Roots are whitish and 1/2 long, and yellowish potato-like tubers form at the root tips.
- The female flowers are single, white, with 6 petals, and float on the surface. The male flowers are greenish and develop close to the leaf axils near the tip of the stem. These male flowers break loose and float to the surface where they drift into the female flowers and fertilize them.

Hydrilla



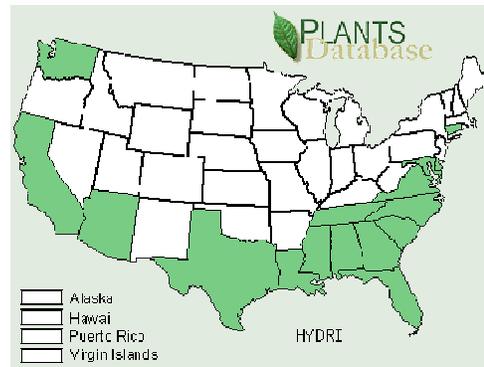
Habitat

Because of its unique biological and physical characteristics and an aggressive growth habit, *H. verticillata* has established itself in a wide range of aquatic habitats.

- Its low light requirements (1% of full sunlight or less) also allow *H. verticillata* to colonize deeper waters than other aquatic plants. *H. verticillata* most commonly occurs in waters around 3 meters deep, but has been found growing at depths of 15 meters.
- Water quality is rarely limiting. It is able to grow under a wide range of water chemistry conditions and is found in oligotrophic (low nutrient) and eutrophic (nutrient rich) lakes. *H. verticillata* can grow in water up to about 7% the salinity of seawater and tolerates a wide range of pH values, but prefers a pH of 7. *H. verticillata* is normally associated with low amounts of sulfate, chloride, nitrate and iron and is frequently found growing in deep sediments.
- *H. verticillata* is rarely found in swiftly flowing waters.
- Hydrilla is found mainly in the southern states, however Connecticut, Maine and Massachusetts each have an infestation.

Distribution Map

Hydrilla verticillata



As of 2001, MA now has one infestation of Hydrilla on Cape Cod.

Reproduction

Hydrilla reproduces by both vegetative and sexual methods.

- Vegetatively, *H. verticillata* reproduces by stem fragmentation and by the production of turions (axillary and subterranean). In general most Hydrilla plant fragments (more than 50%) can resprout and grow into new plants.
- Subterranean turions are considered the more important of the two methods of turion reproduction. One single subterranean turion has been shown to produce over 6000 new turions per m², per year, while 2,803 axillary turions can be produced per m². Subterranean turions can remain viable for several days out of water, and for over four years in undisturbed sediments. They can also survive ingestion by waterfowl and repeated herbicide applications.

Impacts and Threats Posed by Hydrilla

Hydrilla grows and reproduces rapidly, displaces native species, hampers recreational uses, slows water flow and reduces real estate values.

- Once established Hydrilla, can replace native vegetation and affect fish populations.
- *H. verticillata* can have long term impacts on native systems by reducing seed production of native species, resulting in a decline in the native species portion of the seed bank. Hydrilla can also displace native plants. Hydrilla produces dense large mats of vegetation on the water surface, thus intercepting sunlight to the exclusion of other submerged plants.
- Sediment levels increase with increasing Hydrilla abundance.
- Hydrilla slows the movement of water thus water supply, drainage, irrigation and recreational uses may be hampered. Hydrilla greatly impedes boaters, fisherman, water skiers and swimmers, and these limitations on water use can negatively impact real estate values.

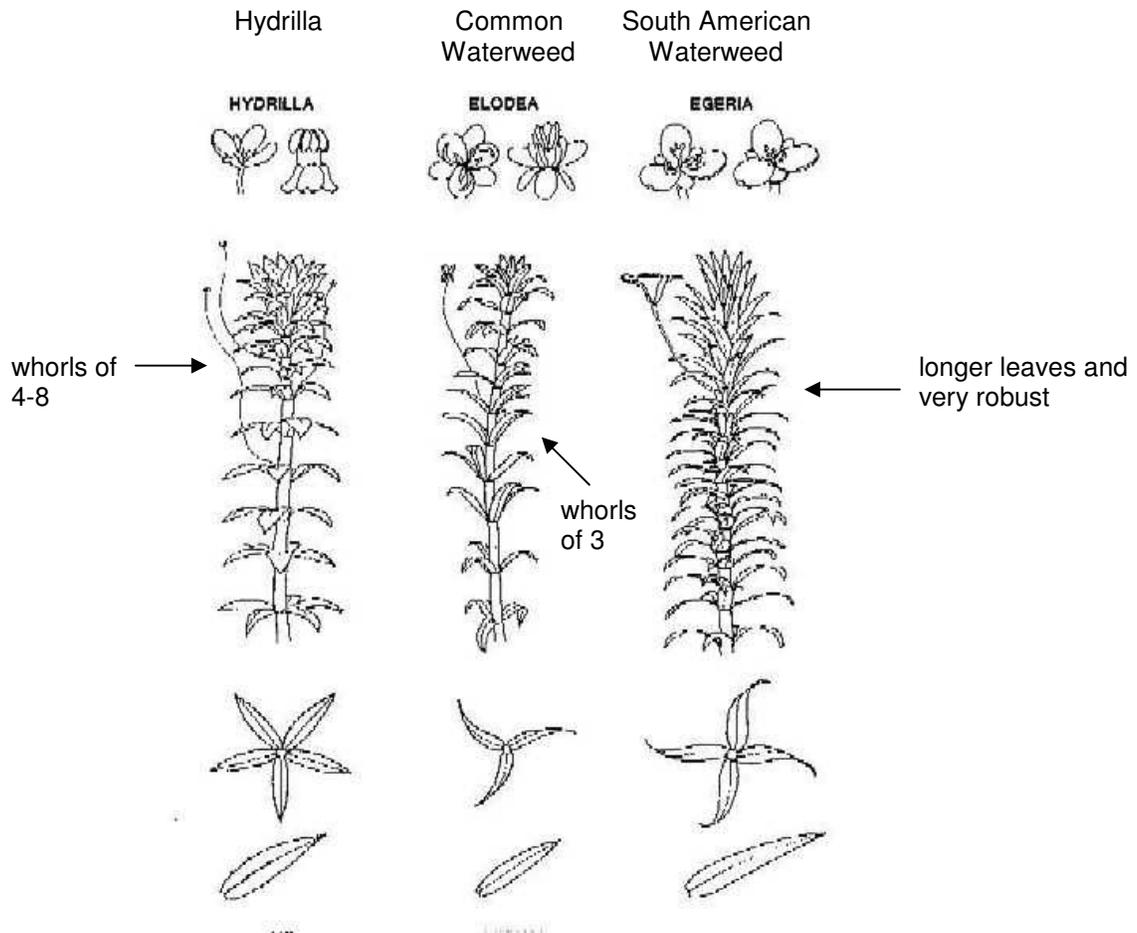
Management Methods

Management methods currently include mechanical removal, drawdowns, herbicides and the use of biological controls. California and Florida have spent millions of dollars on control efforts.

- The high cost of harvesting Hydrilla (\$1000 per acre) and its low nutrient value, greatly restrict Hydrilla's value as a forage plant. In addition, harvesting causes fragmentation and the fragments are capable of producing new plants.
- Drawdowns can be an effective mode of Hydrilla control if the drawdown is performed while subterranean turions are developing in the fall and prior to regrowth in the spring. Even in drained lakes and ponds, subterranean turions may remain dormant and viable in organic substances.
- Several herbicides have been used to control Hydrilla, including Diquat, Endothall, Fluridone, copper sulfate (Komeen and others) and bensulfuron methyl. Herbicides can only be applied by a licensed herbicide applicator.
- There are currently no known important native insect pests of *H. verticillata*. Unless and until biological controls become biologically and economically feasible, the potential for large-scale restoration of wildlands infested with *H. verticillata* is probably very low.
 - Several pathogens have been identified from Asia, but their effectiveness has yet to be tested.
 - Over 40 species of insects have been found that feed on Hydrilla, including a species of weevil. Several are currently being evaluated as potential Hydrilla biocontrols in the U.S.

Other Information

- *H. verticillata* is a federal noxious weed and is on the Massachusetts Prohibited Plant List (as of January 1, 2006). It is considered a pest species throughout its introduced range.
- There is only one species of Hydrilla in the world.
- Hydrilla probably entered Tampa and Miami Florida as an aquarium plant in the 1950's and is still sold by aquarium dealers today.
- Informational websites:
<http://www.ecy.wa.gov/programs/wq/plants/weeds/index.html> (WA State web site)
<http://aquat1.ifas.ufl.edu/welcome.html> (Florida Center for Invasive and Aquatic Plants)
www.ProtectYourWaters.net (National Aquatic Nuisance Species Web Site)
<http://plants.ifas.ufl.edu/seagrant/hydver2.html> (Sea Grant web site)
- Hydrilla is often confused with the native Common Waterweed (*Elodea*) and the non-native South American Waterweed (*Egeria densa*). Hydrilla can be distinguished by the sharply serrated leaf margins and the 4-8 leaves per whorl as opposed to 3-5 leaves per whorl on *Elodea* and *E. densa*.



References:

- 1) Sections of this paper were taken directly from an in depth paper by: Michael S. Batcher, Consulting Ecologist and Environmental Planner, 1907 Buskirk-West Hoosick Rd, Buskirk, NY 12028, email:mbatcher@nethaven.com
- 2) www.mass.gov/dcr/waterSupply/lakepond/geir.htm (Generic Environmental Impact Report)
- 3) Photographs were obtained from the following web sites:
<http://dnr.metrokc.gov/wlr/waterres/smlakes/weed.htm> (first line drawing)
<http://aquat1.ifas.ufl.edu/welcome.html> (cover photograph and second line drawing)
- 4) The distribution map was taken from:
http://plants.usda.gov/cgi_bin/topics.cgi (USDA Plant Data Base)

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Or visit the Lakes and Ponds web site at: www.mass.gov/lakesandponds

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