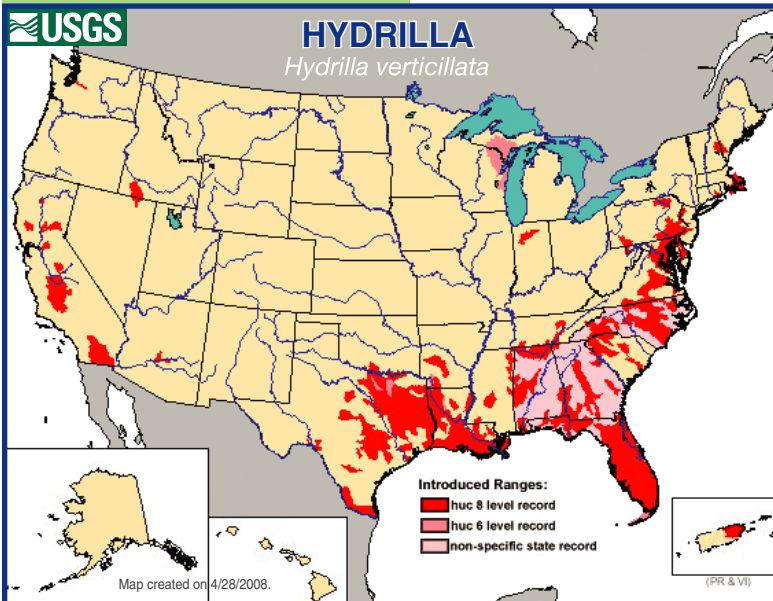




HYDRILLA

Hydrilla verticillata

Hydrilla verticillata is sometimes considered nature's "perfect weed". It grows and spreads at a very fast rate, covering the surface of water bodies it infests. In doing so, it can restrict boating, fishing, swimming, and other recreational uses.



NATIVE & INTRODUCED RANGES

Hydrilla is a federal noxious weed that continues to spread to new regions in the United States. It is unknown exactly where *Hydrilla* originated, but Asia, Africa, and Australia are all mentioned in the literature as native ranges. *Hydrilla* was introduced into the United States in the 1950s and became widespread in the southern states. In Pennsylvania, *Hydrilla* was first reported in the mid-1990s in Adams and Bradford counties. It is also established at several additional sites including the Schuylkill River in Philadelphia, Highland Lake in Bradford county, and Lake Nockamixon in Bucks county. Currently, Antarctica is the only continent without records of *Hydrilla*.

SPREAD

Hydrilla was imported to the United States as an aquarium plant. Subsequent releases, along with transport by recreational boaters, helped it spread across the United States. *Hydrilla* reproduces primarily vegetatively; even the smallest living plant fragment can float downstream and form a new plant.

This makes it easy for whorls of *Hydrilla* stuck on boat motors, trailers, livewells or bait pails to start new infestations. Currently, *Hydrilla* is found in approximately 690 bodies of water within 190 drainages and 21 states.



Photo courtesy of
 Alison Fox, University of Florida.

IMPACTS

Threat to Biodiversity

Nuisance weeds such as *Hydrilla* are characterized by their ability to form dense thick mats at the water surface. These mats prevent the penetration of sunlight into the water and effectively shade out other species growing beneath. Under ideal conditions *Hydrilla* can grow up to 2.5 cm a day! As the mats die and decay, bacteria deplete oxygen from the water. It was commonly thought that *Hydrilla*'s growth characteristics could outcompete native plants; however, a 2007 U.S.

Geological Survey study found *Hydrilla* to be beneficial to the Potomac River aquatic plant and waterfowl communities. Another study in the Chesapeake Bay found that *Hydrilla* benefited a number of bottom dwelling organisms.

Economic Costs

Hydrilla interferes with commercial and recreational activities. Thick mats can hinder irrigation by reducing the flow rates up to 90 percent. Hydroelectric power is also hindered by fragmented plant material clogging water intake pipes and filters. Propeller boats are clogged by thick floating mats of *Hydrilla*, requiring frequent cleanings to travel short distances. Its heavy growth can impair recreational uses such as swimming and water skiing. Using a mechanical harvester, removal of *Hydrilla* can cost up to \$1000 per acre.

HYDRILLA



Photo courtesy of U.S. Geological Survey.



Extension • Education • Research

Sea Grant is a partnership of The Pennsylvania State University, The Commonwealth of Pennsylvania, and NOAA.

Penn State is an affirmative action, equal opportunity university.

Lake Erie Office
814-217-9011
sng121@psu.edu

Delaware Estuary Office
215-806-0894
afaulds@psu.edu



Funded in part by PA DEP Coastal Zone Management

PREVENTION & CONTROL

Physical, chemical, and biological methods have been used to control *Hydrilla*. Mechanical aquatic weed harvesters open boating lanes and provide temporary relief, but the resulting plant fragments can spread vegetation faster. Contact herbicides can provide temporary control, while systemic herbicides, which are absorbed and spread throughout the plant, provide more long-term control but tend to act slowly. Herbivorous fish have been used for *Hydrilla* control where allowed by law.

To prevent the spread of *Hydrilla*, always remove all visible mud and plants before leaving a water body. Eliminate water from all equipment before transporting anywhere. Clean gear and equipment with either hot water (104°F or 40°C), or salt water and let dry thoroughly for five days before entering a new water body. *Hydrilla* is listed as a federal noxious weed in Pennsylvania, making it illegal to possess, distribute, or transport.

SPECIES DESCRIPTION

Hydrilla is a submerged, perennial aquatic plant. The stems are long and branching, forming intertwined mats at the surface of the water. The leaves have small sharp teeth on the edges and sometimes have spines on the midvein which makes the plant rough to touch. Plants are usually rooted to the lake bottom, growing upward from the substrate to the surface in water up to 12 feet (3.7 meters) deep. During the late growing season, small white tubers are formed on the plants roots. These tubers are used for food storage and allow the plant to overwinter. *Hydrilla* closely resembles Brazilian elodea (*Egeria densa*) and American water weed (*Elodea canadensis*). To tell the plants apart, look at the whorls around the stem; invasive Brazilian elodea typically has whorls of four to six leaves, the native American water weed leaves occur in whorls of three, and *Hydrilla* occurs in whorls of four to eight.



Photo courtesy of Michigan Sea Grant.



Photo courtesy of Elizabeth Czarapata, Wisconsin Department of Natural Resources.

HABITAT & BIOLOGY

Hydrilla is able to grow in a wide variety of still and flowing water settings such as freshwater lakes, ponds, rivers, impoundments and canals. It tolerates a wide range of pH, nutrient, and light levels. *Hydrilla* is somewhat winter-hardy; however, the optimum temperature for growth is 68-81°F (20-27°C).

References:

Langeland, K.A. 1996. *Hydrilla verticillata* (L.F.) Royle (*Hydrocharitaceae*), "The perfect aquatic weed." *Castanea* 61:293-304

The University of Georgia, USDA Forest Service, & USDA APHIS PPQ. 2003. *Invasive Plants of the Eastern United States: Hydrilla*. <<http://www.invasive.org/eastern/biocontrol/7Hydrilla.html>> (Accessed October 2007).

Posey, MH; Wigand, C; Stevenson, JC. 1993. *Effects of an introduced aquatic plant, Hydrilla verticillata, on benthic communities in the upper Chesapeake Bay*. *Estuarine, Coastal and Shelf Science* 37:539-555.

Rybicki, Nancy B., et al. 2007. *Long-term changes in Abundance and Diversity of Macrophyte and Waterfowl Populations in an Estuary with Exotic Macrophytes and Improving Water Quality*.

The American Society of Limnology and Oceanography 52(3): 1195-1207