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Hydrilla Facts and the USACE Lower Connecticut River Hydrilla Research & Demonstration Project Information

What is Connecticut River (CT River) hydrilla and where is it growing?

Hydrilla verticillata, known commonly as 'hydrilla', was first identified in the Connecticut River near Glastonbury, Connecticut in 2016. Intensive vegetation surveys were conducted in 2019 – 2021 and the CT River hydrilla was found to occur from Agawam, Massachusetts south to near Long Island Sound. Many of the river's coves, tributaries, and boat basins were found to be heavily impacted. The Connecticut Agricultural Experiment Station (CAES) Office of Aquatic Invasive Plants confirmed through DNA testing that the strain of hydrilla in the Connecticut River is unique, and the plant's biology is therefore largely unknown.

There are currently three types of hydrilla found in the United States. The dioecious strain (male and female flowers found on separate plants), a monoecious strain (male and female flowers found on the same plant), and the Connecticut River strain (also botanically monoecious but does not behave like the classic monoecious strain). The southern dioecious strain is called *Hydrilla verticillata* subspecies *verticillata*, and the common name is southern hydrilla; the monoecious strain is called *Hydrilla verticillata* subspecies *peregrina*, and the common name is wandering hydrilla; and the Connecticut River hydrilla is called *Hydrilla verticillata* subspecies *lithuanica*, and the common name is northern hydrilla.

When did hydrilla arrive in the United States?

Hydrilla is not native to North America and the dioecious strain was first introduced to the U.S. in Florida waters in the 1950s. At that time, a dealer of tropical fish and aquarium plants in the Tampa Bay area dumped hydrilla in a canal, causing the first plants to become established. Monoecious hydrilla is believed to have been introduced in the 1980s in the Potomac River after being confused with native waterweed. The Connecticut River strain of hydrilla was first detected in Glastonbury in 2016. The exact time, location, and source of its introduction to the Connecticut River is unknown.

Hydrilla plant characteristics

Hydrilla forms thick stands, or mats, in freshwater lakes, ponds, and rivers. It typically grows in shallow freshwater with maximum depths up to approximately 40 feet deep, depending on water clarity. It only needs approximately 1 percent of available sunlight penetration to grow. When hydrilla reaches the surface, it continues to grow laterally, creating patches that interfere with navigation by entangling boat propellors and impeding paddlers.

CT River hydrilla grows very rapidly in the summer when propagules, called turions, form on the stems and plant base. The turions and stem fragments then break away, disperse, and fall to the bottom where they lay dormant until the following spring when they resume growth.

Why is hydrilla a concern?

The unique strain of hydrilla in the CT River has likely spread with great speed and efficiency. In 2023, the CT River strain of hydrilla had been confirmed by the Connecticut Agricultural Experiment Station to have moved into six lakes and ponds that are not connected to the CT River. Plant fragments are easily transported to other locations by boats and boat trailers where they can sprout roots to establish new populations. Fragments also float and are capable of dispersing via wind and water currents. Due to the importance of the Connecticut River as an environmental resource and driver of the local economy, stakeholders are seeking a hydrilla management program. This strain of hydrilla has caused concern that traditional methods used to control hydrilla may not be as effective, and the goal for stakeholders and aquatic resource managers, is to contain the plant within the CT River as much as possible, where management and control efforts can be more focused.

Hydrilla can disrupt, slow down, or divert water flow. It increases the water's pH, and it outcompetes and replaces native aquatic plants upon which aquatic and terrestrial organisms depend. Hydrilla also causes a complex set of negative impacts to the aquatic environment, especially in regard to dissolved oxygen. It can contribute to significant decreases in dissolved oxygen levels in the water when extensive and dense mats of hydrilla, that formed over the course of the summer, increase water temperatures by absorbing the sun's energy. Colder water retains a higher concentration of dissolved oxygen, and warmer water, conversely, does not effectively retain dissolved oxygen as well. As a result, warmer water in areas surrounding large hydrilla stands will not be as oxygenated, which can be harmful to aquatic wildlife. In addition, as extensive mats of hydrilla begin to die back and decompose during the fall months, bacteria begin to decompose the dead plant matter. Bacteria in the water require dissolved oxygen to carry out this process, which can use up the available dissolved oxygen in the water column when there is a large amount of plant matter decomposing. In the most extreme cases, this reduction in dissolved oxygen in the water could lead to fish kills. Dramatic swings in dissolved oxygen can also be caused by hydrilla during nighttime hours, when large stands of it consume and pull oxygen from the water, as part of its photosynthesis and respiration process, thereby, reducing dissolved oxygen concentrations in the waters in which it is growing.

Hydrilla has already had a negative effect on the Connecticut River's economy as marinas and boat basin operators have been removing the plant using machinery at considerable expense. A large (whole river) scale management plan will need to be developed and then implemented by local stakeholder groups, the State of Connecticut, and federal agencies, including the U.S. Army Corps of Engineers (USACE), and commercial lake management companies to effectively manage and contain the plant.

What is USACE doing to fight hydrilla?

USACE and its Engineer Research and Development Center's (ERDC) Aquatic Plant Control Research Program is leading a research and demonstration project in the CT River to verify the effectiveness of aquatic herbicides registered for use by the U.S. Environmental Protection Agency to reduce and control the spread of the CT River hydrilla safely and selectively. The project has been investigating hydrilla's growth patterns, site-specific water exchange dynamics, and evaluating herbicide efficacy under laboratory conditions. This information will be used to guide herbicide demonstrations in 2024.

An important tool that USACE uses as part of this research project is Rhodamine water tracer (RWT) dye. The dye is an inert substance that has no negative effects to wildlife or water quality. The dye is applied

to the water where it mimics the movement of aquatic herbicides. Initially, RWT is red to pink in color that dissipates and dilutes quickly. A series of sensors will be used to monitor and record the dissipation rates and concentration of the dye. This recorded data helps inform USACE researchers what the aquatic herbicide concentrations should be to effectively and safely treat hydrilla, with as little effect to native vegetation as possible.

Additional research is being conducted by USACE to understand the life cycle of hydrilla in the CT River. Plant samples are collected throughout the growing season, shipped to the ERDC research laboratory, and analyzed to document hydrilla's plant growth characteristics such as biomass accumulation and major reproduction events. ERDC researchers are also growing hydrilla in tanks, along with other Connecticut River native plants, and the plants in these tanks are exposed to different combinations of herbicides and herbicide concentrations to determine which combination will have the most effect on hydrilla with the least effect on nontarget species.

USACE Lower Connecticut River Hydrilla Research and demonstration project partners

USACE is working closely with two primary key stakeholders on this project: the Connecticut Agricultural Experiment Station (CAES) and the Lower Connecticut River Valley Council of Governments (RiverCOG). These governmental entities are aiding and contributing greatly to the USACE research and demonstration project. USACE is also working and communicating regularly with the Connecticut Department of Energy & Environmental Protection; Connecticut River Conservancy; river marina owners/operators; local towns; and the general public to keep them informed of any developments, plans, or results associated with the USACE Connecticut River hydrilla research and demonstration project.

Additional resources available:

The USACE New England District Lower Connecticut River Hydrilla Demonstration Project website contains additional information, resources, and fact sheets.
https://www.nae.usace.army.mil/Missions/Projects-Topics/Connecticut-River-Hydrilla/

Clean Drain Dry campaign, an effective and important national initiative to prevent the spread of all aquatic invasive species from water bodies.
https://www.fws.gov/story/clean-drain-dry

Mechanical removal methods not effective – plant spreads by fragments that break off the plant when disturbed using mechanical methods/harvesters or manual hand pulling.
https://plants.ifas.ufl.edu/plant-directory/hydrilla-verticillata/

The Connecticut Office of Aquatic Invasive Species website contains information on aquatic plants in Connecticut lakes, rivers, and ponds.
https://portal.ct.gov/CAES/OAIS/Office-of-Aquatic-Invasive-Species