

AIS

Aquatic Invasive Species

EURASIAN WATERMILFOIL



Photo: Alison Fox, University of Florida, www.forestryimages.com

COMMON NAME: Eurasian Watermilfoil

Eurasian watermilfoil may also be referred to as spike or spiked watermilfoil.

SCIENTIFIC NAME: *Myriophyllum spicatum*

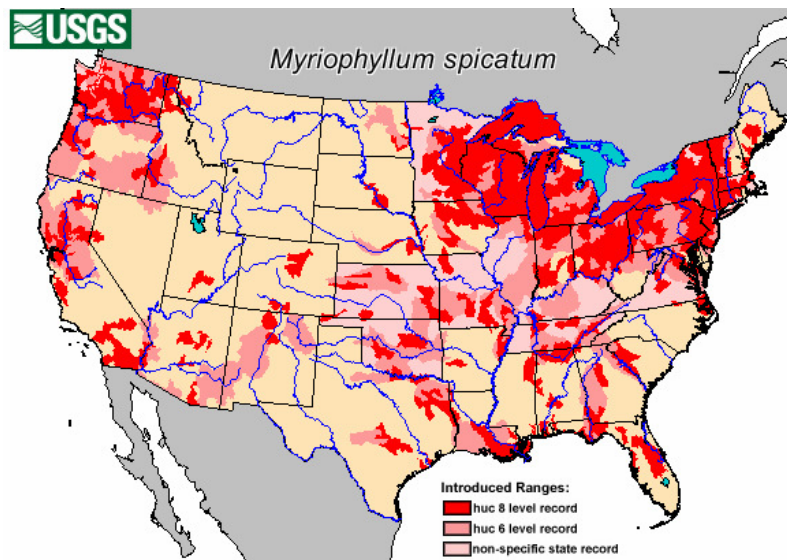
Eurasian watermilfoil is in the watermilfoil family, Haloragaceae. There are about 14 different species of watermilfoils.

DISTRIBUTION:

Eurasian watermilfoil is native to Europe, Asia, and northern Africa. As of 2003, 45 states reported the presence of Eurasian watermilfoil.

Indiana: Of the approximately 616 lakes and reservoirs in the northern one-third of the state, Eurasian watermilfoil infested at least 175 of them as of the late 1990's. Throughout the state, approximately 126,000

acres of lakes and impoundments contain some level of Eurasian watermilfoil.



DESCRIPTION: Eurasian watermilfoil is a submersed perennial. It has a long underwater stem that branches profusely when it reaches the surface of the water. Leaves are whorled on the stem at each node, and there are generally four leaves per whorl. Leaves are finely divided and feather-like in appearance. There are usually 12 to 21 pairs of leaflets. Each leaflet is thin, fine and about ½ inch long. It produces small reddish flowers that emerge several inches above the water on a spike grown from the tip of the stem.

Eurasian watermilfoil is often confused with a common Indiana native plant, northern watermilfoil (*M. sibiricum*), and it is sometimes difficult to tell the difference. If you rely on the characteristic that a mature Eurasian watermilfoil leaf has 12 to 21 pairs of leaflets and northern watermilfoil has 5 to 10 pairs you will be correct in identification much of the time. The leaves of Eurasian watermilfoil are limp when held out of water whereas the leaves of northern watermilfoil stay rigid.

LIFE CYCLE BIOLOGY: Eurasian watermilfoil can grow in a wide variety of habitats and conditions. It occurs in ponds, lakes, reservoirs, and slow flowing rivers and streams. It will grow in shallow or deep water, fresh or brackish water, a wide temperature range, as well as a pH from 5.4 to 11. It tends to do well in waters that have had some sort of disturbance like intense plant management, overabundance of nutrients, or extensive motorboat use. It grows best in fine textured inorganic soils where it can get plenty of sunlight.

Eurasian watermilfoil is capable of spreading by seeds and by vegetative means. Each plant is capable of producing over 100 seeds but germination of these seeds rarely takes place. Dispersal through vegetative means is Eurasian watermilfoil's main reproductive strategy. The plant goes through autofragmentation during the growing season, where roots will develop at the nodes and the plant will break off at these nodes on its own. Fragments can also be produced by wind, waves, and human activity. These fragments will set root and to grow into a new plant.

New shoots begin to grow from the overwintering root crowns when water temperature reaches about 60° F in the spring. Growth is rapid and when the plant nears the water's surface it will branch out creating a canopy. The fast growth and topped out canopy generally occurs before native species peak in growth. Flowering generally occurs in July. Autofragmentation usually occurs after flowering. Plants die back to the roots in the fall. These roots store carbohydrates in order to initiate the rapid growth in the spring.

PATHWAYS/HISTORY: Eurasian watermilfoil was first introduced into the United States through the aquarium trade. The first documented identification of Eurasian watermilfoil in open water in the United States was in 1942 from a pond in Washington D.C. By 1950 the species was into the Midwest in Ohio and was also found in western states such as Arizona and California. Eurasian watermilfoil is now found throughout the continental United States with the exception of the northern Great Plains region and Maine.

DISPERSAL/SPREAD: Eurasian watermilfoil has spread through accidental and intentional introductions. Pond owners intentionally introduced the plant into their ponds to provide fish habitat. Since Eurasian watermilfoil is capable of reproducing by vegetative means it is likely that the spread into most new bodies of water has been by fragments. Aquatic equipment which was used at Eurasian watermilfoil infested waters may have fragments attached; these fragments can be transported to other waters and start a whole new infestation. This plant can stay alive for weeks out of water if kept moist.

RISKS/IMPACTS: Eurasian watermilfoil negatively affects the water bodies it invades in several ways. Due to its tendency to branch profusely and form a dense canopy over the water's surface, it will shade out the native vegetation. This can alter the species composition of the water which can result in a near monoculture of Eurasian watermilfoil. This plant is not a valuable food source for waterfowl unlike some of the native submersed aquatic plants. Plant biomass can become so dense that predator fish will lose their foraging space and will be less effective at controlling prey species resulting in an imbalanced fish community. Dense beds of Eurasian watermilfoil make recreational activities such as boating, fishing and swimming nearly impossible. Residential or industrial water intakes can become clogged with Eurasian watermilfoil. Dense plant beds can be nursery areas for mosquito larvae. A lake heavily infested with Eurasian watermilfoil will be aesthetically displeasing which results in reduced property values. In 1998, 160 permits were issued for herbicide treatments on public waters in Indiana. Approximately four of every five permits issued targeted Eurasian watermilfoil. A conservative estimate of the cost of controlling exotic plants that interfere with recreation and drinking water supplies in Indiana is in the neighborhood of \$1.2 million per year.

MANAGEMENT/PREVENTION: The best management is prevention. Preventing the introduction and spread of Eurasian watermilfoil is the easiest and cheapest way to control it. If it is too late to prevent the establishment of this invasive, there are a few techniques that can be used to control it.

Mechanical: Mechanical removal of this plant should only be considered if the Eurasian watermilfoil has become widespread and all available niches have become occupied by this plant. This is important because mechanical techniques usually result in fragmentation which can actually help the plant spread. Cut stems can also branch abundantly which can result in even denser plant beds if harvesting does not occur frequently through the growing season. Harvesters and hand cutting are the most common mechanical removal methods. All fragments must be collected and disposed of properly for this to be effective. To dispose of the remnants, composting, burning, burying, or trash disposal are all acceptable methods.

Habitat Alteration: The most common habitat alteration used for aquatic vegetation control is a winter lake drawdown. A drawdown can be effective to reduce nuisance vegetation if you allow several weeks of drying time and expose the Eurasian watermilfoil root crowns to sub-freezing temperatures. Careful consideration must be given to the effect on the fish community as a result of a drawdown. You should consult with a fisheries biologist before implementing this control method so as to not put the fishery at risk.

Biological: Biological control methods are highly sought since they are viewed as “environmentally friendly”. To be most effective, a biological control should be target specific and not cause harm to unintended species. The most common biological control used for aquatic plant control in Indiana is the grass carp or white amur. Unfortunately, grass carp do not prefer Eurasian watermilfoil and may only turn to it as food only after many of the native plants have been consumed. Plant pathogens have also been sought out as a biological control for Eurasian watermilfoil. Laboratory research has shown that the fungus *Mycocleptodiscus terrestris* reduces the plants biomass significantly. The U.S. Army Corps of Engineers is continuing research with this possible biological control. The most effective biological control method discovered so far for the control of Eurasian watermilfoil has been the North American weevil, *Euhrychiopsis lecontei*. This species seems to only attack milfoil and causes a high level of damage to the plant. The adults feed on the stems and leaves of the plant and the larvae bore into the stem causing extensive damage.

Chemical: Until recently, chemical control targeting milfoil usually resulted in extensive collateral damage to non-target native species. Fortunately, advances have been made with chemical types, application rates, and timing of application that can selectively control Eurasian watermilfoil. The active ingredient Fluridone has been used at low rates to selectively control Eurasian watermilfoil. Aquatic herbicides containing Triclopyr or 2,4-D have also proven effective for Eurasian watermilfoil control while impacting few other native submersed aquatic plants. To determine the most effective herbicide to control Eurasian watermilfoil in your particular body of water, you should contact an aquatic herbicide applicator. Only herbicides labeled for aquatic use may be used to treat aquatic plants. An Aquatic Vegetation Control Permit is required for weed control efforts on Indiana’s public waters.

To help stop the spread of aquatic invasive plants including Eurasian watermilfoil, here are some simple steps you can follow.

- ✓ Rinse any mud and/or debris from equipment and wading gear and drain any water from your boat before leaving the access area.
- ✓ Remove all plant fragments from the boat, propeller, and boat trailer. The transportation of plant material on boats, trailers, and in livewells is the main introduction route to new lakes and rivers.
- ✓ Allow all equipment to thoroughly dry for at least five days before transporting it into a new body of water
- ✓ Do not release aquarium or water garden plants into the wild, rather seal them in a plastic bag and dispose in the trash.

REFERENCES:

Colette C. Jacono and M.M. Richerson. 15 October 2008. *Myriophyllum spicatum*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL.

<http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=237>

Eurasian Watermilfoil. 5 Nov 2003. Invasive.org.

<http://www.invasive.org/eastern/biocontrol/6EurasianMilfoil.html>

Eurasian Watermilfoil. ND. Iowa Department of Natural Resources.
<http://www.iowadnr.com/fish/news/exotics/milfoil.html>

Eurasian Water Milfoil (*Myriophyllum spicatum*). 18 August 2008. Wisconsin
Department of Natural Resources.
<http://www.dnr.state.wi.us/invasives/fact/milfoil.htm>

Remaley, T. Eurasian Watermilfoil (*Myriophyllum spicatum*). Plant Conservation
Alliance, Alien Plant Working Group. <http://www.nps.gov/plants/alien/fact/mysp1.htm>

Seng, P. and G. White. 2003. Indiana Aquatic Nuisance Species (ANS) Management
Plan. Indiana Department of Natural Resources and D.J. Case and Associates.
101 pp. www.in.gov/dnr/files/inansmanagementplan.pdf.

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