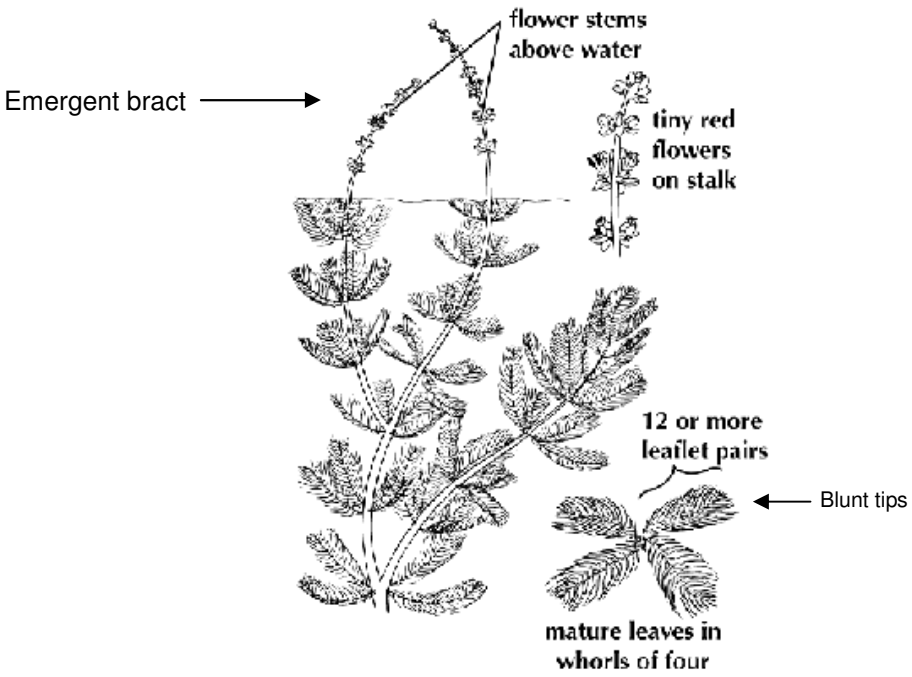
Eurasian Milfoil: An Invasive Aquatic Plant

Myriophyllum spicatum

Description

- Eurasian Milfoil is a submerged invasive aquatic plant that can form dense mats at the water's surface.
- The soft olive green feathered leaves are less than 2 inches long, and are arranged in whorls of four (occasionally 3-6) around the stem. On average, the whorls are 3/8" apart along the stem. Leaf tips appear blunt, as if trimmed by scissors.
- The stems are red/brown or white/pink in color and reach lengths of 20 feet.
- The reddish flowers form during July and August in whorls of four on an 8" emergent bract (protruding above the water surface).

Eurasian Milfoil



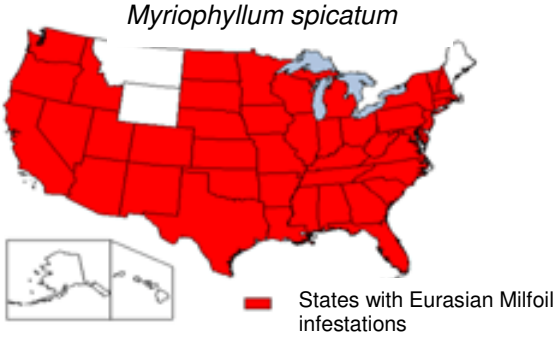
Habitat

Eurasian Milfoil is a very hardy species and has established itself in a wide range of aquatic habitats.

- Over-winters in the frozen lakes of northern climates and can also survive in shallow warm water bodies.
- Grows under a wide range of water chemistry conditions and is found in oligotrophic (low nutrient) and eutrophic (nutrient rich) lakes and can tolerate waters with up to 10 parts per thousand of salt, and a wide range of temperatures and pH.
- Prefers slow moving waters including lakes and ponds but occasionally exists in rivers.
- Occurs throughout the United States and worldwide.
- *M. spicatum* ends to prefer the alkaline waters of western Massachusetts, but is found statewide.

Distribution Map

Myriophyllum spicatum



Reproduction

Eurasian Milfoil reproduces by both vegetative methods and seed formation.

- Vegetatively, *M. spicatum* reproduces by stem fragmentation and in general, most Eurasian Milfoil plant fragments (more than 50%) can re-sprout and grow into new plants.
- *M. spicatum* also produces nuts that can remain viable in the soil for long periods of time.

Impacts and Threats Posed by Eurasian Milfoil

Eurasian Milfoil grows and reproduces rapidly, and often displaces native species, reduces biodiversity, hampers recreational uses, and reduces real estate and aesthetic values.

- Once established, Eurasian Milfoil can out-compete native vegetation and drive out the animals that depend on the native vegetation for survival.
- *M. spicatum* can produce dense large mats of vegetation on the water surface, thus intercepting sunlight to the exclusion of other submerged plants.
- Sediment levels often increase with increasing Eurasian Milfoil abundance.
- Eurasian Milfoil greatly impedes boaters, fisherman, water skiers and swimmers, and these limitations on water use can negatively impact real estate values.
- When dense mats of Eurasian Milfoil decay, the available oxygen in the water maybe significantly depleted. The resulting low oxygen conditions (anoxia) can lead to fish kills.

Management Methods

Management methods currently include mechanical removal, drawdowns, herbicides and the use of biological controls.

- Although harvesting can greatly reduce the Eurasian Milfoil biomass in a waterbody, harvesting causes fragmentation and the fragments are capable of producing new plants. Some fragments may drift down stream or attach to boats and wildlife and create new infestations elsewhere.
- Drawdowns can be an effective mode of Eurasian Milfoil control. Drawdowns may affect reptiles, amphibians, other organisms and downstream conditions.
- Several herbicides have been use to control Eurasian Milfoil. Most effective have been the contact herbicides copper sulfate, Fluridone, Endothal, Diquat, and 2,4-D. However, copper sulfate and endothal are non-selective herbicides, and copper sulfate is highly toxic to fish.
- Insect biological control is showing promising results in field trials. The native American Weevil *Euhrychiopsis lecontei* demonstrates species-specific behavior (preferring *M. spicatum* over all other available plants) and lives its entire life on Eurasian Milfoil. The weevils eat and burrow in the Eurasian Milfoil meristem, causing the plants to weaken, loose buoyancy, and eventually sink.

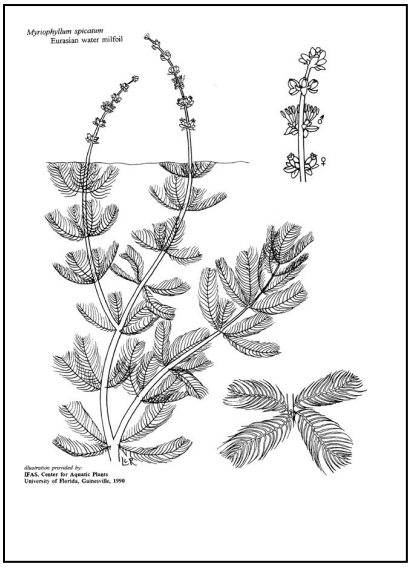
American Weevil
Actual adult size=3mm

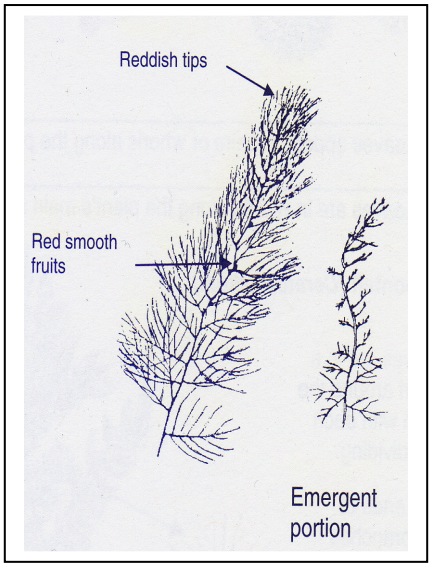
- Benthic barriers maybe used in small areas including swimming beaches, boating lanes and around docks. The barriers restrict light and upward growth but can have a negative impact on benthic organisms, and need to be properly anchored and maintained.

Other Information

- Eurasian Milfoil is on the Massachusetts Prohibited Plant List (January 1, 2006)
- There are over 40 species of Milfoil in the world, yet only a few species are invasive.
- Eurasian Milfoil was first discovered in Lake Minnetonka, Minnesota in 1987 and despite intensive management efforts, spread to over 100 waterbodies in three years.
- Eurasian Milfoil is still readily available at pet stores, aquarium dealers and over the Internet.
- Informational websites:
  http://aquat1.ifas.ufl.edu/welcome.html (Center for Aquatic Invasive Species, Florida)
  http://plants.ifas.ufl.edu/seagrant/myrspi2.html (Sea Grant Eurasian Milfoil information)
  http://www.fw.umn.edu/research/milfoil/milfoilbc.html (weevil information)
  www.ProtectYourWaters.net (Aquatic Nuisance Species national web site)
- Eurasian Milfoil is often confused with the native Low Water Milfoil (*Myriophyllum humile)*. Low Water Milfoil has less than 12 leaflets on each side of the midrib of the feathered leaf, and alternate leaves. The emergent bract is less rigid and lacks variable leaf types (see illustration below).

Eurasian Milfoil Compared to the Native Low Water Milfoil





Eurasian Milfoil Low Water Milfoil

References:

1) Literature sources:
www.mass.gov/dcr/waterSupply/lakepond/geir.htm (Generic Environmental Impact Report)
http://www.fw.umn.edu/research/milfoil/milfoilbc.html (University of Minnesota)
http://plants.ifas.ufl.edu/seagrant/myrspi2.html (Center for Aquatic and Invasive Species)
2) Photographs were obtained from the following web sites:
http://www.fw.umn.edu/research/milfoil/milfoilbc.html (cover photo, weevil photo)
http://plants.ifas.ufl.edu/myrspi2.jpg (line drawing of *M. spicatum*)
"A Guide to Aquatic Plants in Massachusetts" Wanda Kelly (line drawing of *M. humile*)
3) The distribution map was taken from:
http://plants.ifas.ufl.edu/seagrant/myrspi2.html (Center for Aquatic and Invasive Species)

For more information please contact:

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