

## EURASIAN WATERMILFOIL

*Myriophyllum spicatum* L.  
Plant symbol = MYSP2

Contributed by: USDA NRCS Bozeman State Office



Photo by Alison Fox, University of Florida, available from Bugwood.org

**Caution:** This plant is weedy and may be invasive.

**Alternate Names:** none

**Uses:** Weed beds provide habitat for freshwater crustaceans and cover for bass. Where removed by harvesting it has been used as fertilizer, animal feed, and as a soil conditioner with limited success.

**Status:** Eurasian watermilfoil is a non-native, invasive, aquatic nuisance species listed as noxious or otherwise restricted in 17 states. Please consult the PLANTS Web site and your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and management.

**Description:** *Myriophyllum spicatum* L., Eurasian watermilfoil is a submersed, aquatic perennial in the Haloragaceae family that roots to the bottom of water bodies. The roots are slender and fragile. Stems emerge from root crowns, are smooth and hairless, and grow up to 21 feet to the water surface, where

they branch profusely. Stems have layers of specialized, partially lignified cells that enable the stem to self-fragment without mechanical disturbance. Stem fragments are capable of forming new plants. Leaves are whorled in groups of four at the stem nodes, are 0.5 to 1.5 inches long, and have 14 to 24 pairs of threadlike divisions giving the leaf a feather-like appearance. Pollen and seed flowers are separate on eight-inch long spikes that form at the ends of the stem branches. They emerge from the water supported by the stem that is twice as wide as the lower portion of the stem. Seed-producing flowers lack sepals and petals but have a four-lobed pistil. Pollen-producing flowers have four pink petals that drop off early in development, and eight stamens. Flowers are whorled in groups of four. The fruits are globelike in shape, 2-3 mm long with four long narrow grooves and four seeds.

The easiest way to distinguish Eurasian watermilfoil from native milfoils is by lifting a stem out of the water. The leaves of the invasive will relax and fall against the stem whereas the leaves of the native will remain rigid and spread from the stem. Also natives have sparse stem branching near the water surface compared to the abundant branching of Eurasian watermilfoil. Natives lack the conspicuous change in stem width below the inflorescence compared to the almost doubled stem width of Eurasian watermilfoil. The specialized layers of stem cells that facilitate stem fragmentation are characteristic of the invasive species and not the native species. Eurasian watermilfoil dies back to propagating root crown buds in the fall, whereas the natives form prominent cylindrical or cup-shaped perennating shoots (turions) attached to, or detached from the parent plant.

**Adaptation:** Eurasian watermilfoil can be found on every continent except Antarctica. It is native to Europe, Asia, and northern Africa. It colonizes rivers, lakes, and other water bodies. It grows under a range of trophic conditions, but it is considered an indicator of eutrophic (low levels of dissolved oxygen, high levels of organic matter) conditions. Root anchoring may be impeded by sand, gravel, or flocculent substrate textures. Growth is limited by light, preventing colonization of deep waters or water with high suspended particles. Optimum water depth for growth ranges from three to 13 feet, and a maximum depth for growth is 39 feet). Cold temperatures have little influence on growth except

under reservoir drawdown conditions when plants are exposed to the air. Eurasian watermilfoil can use bicarbonate as a source of dissolved inorganic carbon, and high growth rates and dominance in hard, alkaline, high pH waters is common. It grows vigorously in salinities up to 10 parts per thousand and survives at 20 parts per thousand salinity, the concentration of brackish water. It can tolerate moving water, and water currents and wave action facilitate fragmentation.

A Wisconsin study developed models to predict the likelihood of finding Eurasian watermilfoil based on its presence or absence in Wisconsin lakes. Variables associated with dissolved inorganic carbon were the most important factors predicting occurrence. These variables included alkalinity, bedrock, and forest cover. Lakes with a one percent increase in forest cover in their drainage were five to 50 times less likely to become infested than other lakes. Variables affecting Eurasian watermilfoil growth were better predictors of presence than variables indicating human activities. The presence of a public boat launch was the best human activity predictor, followed by the relative abundance of walleye and smallmouth bass. Lakes with a public boat launch were 21 to 28 times more likely to become infested than lakes without a boat launch.

**Establishment:** Although Eurasian watermilfoil produces seeds, most establishment is from stem fragments and root crown buds. Propagating root crowns typically break dormancy in the spring when water temperature and light intensity increase.

**Management:** Prevention is the most important management option for Eurasian watermilfoil. Mapping, monitoring, early detection and eradication are critical to prevention. If a new infestation is found, save a specimen and report the infestation to your county extension agent. Inspection and sanitation of recreational equipment will prevent spread. Any aquatic plant debris on boats, trailers, live-wells, boat bilges, and fishing equipment should be disposed of away from lakes, ponds and rivers. Establishing washing stations with sanitation instructions at water-based recreational sites is recommended. Control with herbicides requires direct application to water. In most cases special permits and licenses are needed. Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method.

**Pests and Potential Problems:** See environmental concerns.

**Environmental Concerns:** The dense weed beds formed by Eurasian watermilfoil have adverse effects on native aquatic vegetation that are important food sources for waterfowl and some mammals, and habitat for fish. The dense beds create habitat for disease-carrying insects, including mosquitoes, and parasites that cause swimmer's itch. The richness, diversity, and distribution of invertebrate species on lake bottoms are reduced where infestations occur. The function of water ecosystems are altered, including biomass turnover and nutrient cycling. Reduced dissolved oxygen and changes in water temperature are associated with infestations. Eurasian watermilfoil is a nuisance species to humans when it reduces open areas along lake shores, washes up on beaches, and curtails recreational activities. Populations reduce water flow thus interfering with industrial, agricultural, and municipal water systems. Irrigation ditches, canals, farm ponds, and irrigation equipment can be clogged by the weed. Management of Eurasian watermilfoil is difficult and expensive.

**Cultivars, Improved, and Selected Materials (and area of origin):** None.

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