

Eurasian watermilfoil (*Myriophyllum spicatum* L.)

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Fig. 2. Inflorescences show above the water surface and have pollen- and seed- producing flowers.

Fig. 1. Eurasian watermilfoil grows up to 15 feet from the floor to a dense canopy.

Introduction

Problems Caused

Eurasian watermilfoil (*Myriophyllum spicatum* L.) is a nonnative aquatic plant from Europe and Asia that is green throughout the entire year. Growing completely underwater, with only the inflorescences above the water's surface, it can often be difficult to notice in early stages. Once mature, its dense canopy can interfere with boating, swimming, fishing, or other aquatic activities. Ecologically, it suppresses native plants and changes the equilibrium between predators, like bass, and their prey. Eurasian watermilfoil nuisance growths cost lake users millions of dollars a year to manage, and even more in other economic losses.

Regulations

Despite being recognized as a widespread nuisance-forming weed, including in the Rivers and Harbors Act, it is not on the federal noxious weed list. *Myriophyllum spicatum* is on the noxious weed lists of Florida, Minnesota, North Carolina, South Carolina and Washington. It is on the Florida Prohibited Plants list, Florida Department of Environmental Protection, and is included on the lists of government agencies and/or pest plant councils in 21 states.

Description

Vegetative Growth

Eurasian watermilfoil grows complete under water, but can form a canopy of leaves and branches very close to the surface. (Fig. 1) It is a submersed evergreen perennial plant, with green shoots present throughout the year. Eurasian watermilfoil grows in water depths from 1 to 15 feet, from which it can grow to near the surface; but occasionally can grow in even deeper water if water clarity is particularly high. Eurasian watermilfoil forms a dense root crown, from which numerous shoots grow towards the surface. The root crown and associated new shoots are the primary means by which Eurasian watermilfoil overwinters. As it grows to the surface, it branches repeatedly to form a very dense canopy with a profusion of leaves. The leaves are pinnately compound, with 14 to 24 pairs of thin tubular leaflets. These leaves typically occur in groups of four whorled at each node of the stem, though some variation can occur.

Flowering

The plant forms a short inflorescence, or flowering spike, above the surface of the water, composed of pollen-forming flowers on top and seed-producing flowers below. (Fig. 2) The flowers are wind pollinated. Stems and apical tips of Eurasian watermilfoil tend to be reddish, but variation in this color also occurs. Since Eurasian watermilfoil looks like some of the native *Myriophyllum* species, confusion in the identification of this nuisance invader frequently occurs.

Dispersal

While seeds are produced, they generally do not appear to be an important source of new colonies. Seeds do resist desiccation; so one possible mechanism of reproduction by seed is after drawdown. Reproduction is almost entirely by vegetative means, either through spread by stolons or fragments. The plants produce fragments seasonally that act as dispersal units, and can survive for long periods of time before establishment.

Habitat

Eurasian watermilfoil grows in a diverse range of aquatic habitats, including rivers, reservoirs, and natural lakes, fresh-water and brackish estuaries. In freshwater, it tolerates environments ranging from soft water, low alkalinity systems to hard water lakes, and trophic states from oligotrophic to eutrophic. Its growth can vary across its range from being winter dormant in northern lakes to dormant in both winter and mid-summer (from heat stress) in the south.

Distribution

US

Eurasian watermilfoil was first found in the United States in the 1940's, with almost simultaneous introductions to California, Arizona, Ohio, and the Chesapeake Bay. By the 1960's, it was found in a number of northeastern, midwestern, southwestern, and southeastern states. By the 1980's, numerous sites occurred throughout the United States with the apparent exception of the northern plains states. Currently, it is one of the most widespread invasive aquatic plants, occurring in at least 45 states and in three Canadian provinces. Once established in a new state, it continues to spread to new lakes.

Mid-South

Eurasian watermilfoil is found scattered throughout the region, but in particular has been a long-time problem in Tennessee Valley Authority waters, tributaries of Mobile Bay, freshwater and brackish estuaries of the Gulf, and backwaters of the Mississippi River.

Control Methods

Biological

Grass carp does not prefer Eurasian watermilfoil, so they are a poor control option at best. Native insects and a native pathogenic fungus have both shown some promise, but are still under development.

Chemical

Herbicides are the most commonly used control technique for Eurasian watermilfoil. Currently, approved systemic aquatic herbicides are 2,4-D, fluridone, and triclopyr. The contact herbicides diquat and endothall are also used on small infestations or along shorelines as a "spot" treatment. The most widespread herbicide recommendation for Eurasian watermilfoil control is to use granular 2,4-D at the rate of 100-200 pounds per acre. Numerous other options are available.

Mechanical

Mechanical control is also widely used for managing Eurasian watermilfoil. Of these, hand harvesting or hand implements are used on small segments of shoreline. Harvesters are commonly used to relieve the nuisance growth in larger areas offshore, with the plant material removed from the lake. While users get immediate relief from plant growth, this technique will not result in long-term control. Other techniques in use include rotovating and diver-operated suction harvesting.

Physical

Physical control techniques include shading or dredging. Of the physical techniques, the most affordable and effective is drawdown, particularly winter drawdown, in which the lakes is drained during the winter period to desiccate and freeze the plant.

References

Aquatic Ecosystem Restoration Foundation (AERF) 2004. Best Management Practices Handbook for Aquatic Plant Management in Support of Fish and Wildlife Habitat. Aquatic Ecosystem Restoration Foundation, Flint, MI. http://www.aquatics.org/aquatic_bmp.pdf.

Madsen, J. D. 2005. Eurasian Watermilfoil Invasions and Management Across the United States. *Currents: The Journal of Marine Education*. 21 (2): 21-26.

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