Hybrid Milfoil: Management Implications and Challenges

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Background

Millions of dollars are spent annually on programs to combat invasive aquatic plants in Michigan. A primary focus of many of these programs is the control of Eurasian milfoil (*Myriophyllum spicatum*), an aggressive-growing exotic plant introduced into the United States from Europe and Asia.

Eurasian milfoil is not the only type of milfoil found in Michigan. There are several native milfoil species, such as northern milfoil (*Myriophyllum sibiricum*). Some native species closely resemble Eurasian milfoil and are commonly mistaken for it. However, the native milfoils rarely form dense, impenetrable plant beds like Eurasian milfoil often does. In some lakes, hybridization between exotic Eurasian milfoil (*M. spicatum*) and native northern milfoil (*M. sibiricum*) is occurring. Genetic testing has found milfoil hybrids to be widely dispersed across the northern portion of the United States and hybrid milfoil appears to be widespread in Michigan. The documentation of the presence of hybrid milfoil is important because hybridity in plants is often linked to invasive traits. In fact, hybrid milfoil may be more invasive than Eurasian milfoil. There is concern in the scientific community that hybrids could have a competitive advantage over, and ultimately displace both northern milfoil and Eurasian milfoil.

In terms of physical appearance, hybrid milfoil is difficult to distinguish from Eurasian milfoil. For positive identification, genetic testing is required. Further, not all hybrid milfoils are the same. There is considerable genetic variability within hybrids.

Herbicide Treatments

Herbicide applications are the most commonly-used method to control Eurasian milfoil. However, in some lakes, herbicide treatments have become less effective. Dose rates that historically provided good control of milfoil are sometimes only partially effective, and plant die-back is incomplete and/or regrowth occurs more rapidly.

Recent research indicates that hybrid milfoils may exhibit increased tolerance to some herbicides. On average, hybrid milfoil is less susceptible to control with the commonly-used aquatic herbicide 2,4-D in comparison with Eurasian milfoil. The decreased sensitivity to 2,4-D appears to be common across different hybrid lineages. Lakes that have been treated historically with 2,4-D have a higher incidence of hybrid milfoil than non-treated lakes. This research suggests that use of certain herbicides may inadvertently allow tolerant hybrid milfoil to gain dominance.

With the aquatic herbicide fluridone (Sonar®), hybrid tolerance appears to be limited to fewer hybrid lineages. While hybrid resistance to fluridone has been observed in a small percentage of lakes, hybridity does not necessarily infer fluridone tolerance.

Management Implications

Management of hybrid milfoil presents new challenges. Fortunately, there are some new tools available to document the presence of hybrid milfoil and to evaluate the potential for herbicide resistance.

Eurasian milfoil (Myriophyllum spicatum)

Hybrid milfoil (Myriophyllum spicatum x Myriophyllum sibiricum)

Genetic Testing: As discussed in an article in the Summer 2014 issue of the Michigan Riparian, genetic testing is now commercially available and can be used to determine the presence and distribution of Eurasian versus northern versus hybrid milfoil in a given lake. This data can, in turn, be used to inform management decisions.

Herbicide Susceptibility Screening: Another approach that is being used is herbicide susceptibility screening in which milfoil samples are collected from various locations in a lake and exposed to typical herbicide dose rates to evaluate plant response. If plant response is diminished, it may indicate the presence of hybrid milfoil and the need for reevaluation of a treatment approach, before substantial resources are committed to a treatment protocol that may not be very effective.

As with most invasive species, early detection and rapid response is key to effective control. Annual monitoring of the type and abundance of aquatic plants is an essential first step in this endeavor. In areas of the lake where milfoil is found, plant samples can be collected for further analysis.

In general, the use of herbicides with different modes of action, rather than using the same type of herbicide year after year, may help stem the spread of hybrids that are showing resistance to a particular herbicide or class of herbicides.

Given the potential management implications, genetic testing and herbicide susceptibility screening may soon become standard practices for lake managers. Additional research is ongoing to better evaluate the distribution of hybrid milfoil, its biological characteristics, herbicide treatment impacts, and its susceptibility to control measures.

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