Milfoil Solution®

from EnviroScience, Inc.

Introduction

The Lake Management Division at EnviroScience Inc. is the only team of scientists in North America experienced in the culture and release of the large numbers of milfoil weevils required to affect lake-wide reduction of Eurasian watermilfoil, *Myriophyllum spicatum*, (EWM). Milfoil Solution® utilizes the North American native milfoil weevil, *Euhrychiopsis lecontei*, as the active biological control agent. *E. lecontei* is a specialist herbivore, feeding and reproducing only on EWM, Northern watermilfoil, and their hybrids.[1] Biological control is considered a more natural and sustainable method of control than alternatives such as chemical or mechanical.[2]

Research on the ability of *E. lecontei* to control EWM began with Dr. Sallie Sheldon at Middlebury College, VT, in the 1990s[1] and continued at the U of MN. EnviroScience brought this methodology to application in 1998 and since then the augmentation process has been effectively used in ponds, lakes, and reservoirs in 13 states and one Canadian province.

Promoting Milfoil Weevil Success

Weevils overwinter in dry duff (dead plant matter) from 3 to 26 feet (1-8 meters) of shoreline.[3] Duff can be composed of grass, native plants, or forest understory growth. Weevils begin to move ashore starting in September and October. They return to the water when the ice begins to leave the lakeshore.

Ways to promote weevil wintering success:

- Create a vegetation buffer zone of non-mowed and non-raked shoreline year-round – this also reduces shoreline erosion and runoff of excess nutrients into the lake.
- At the end of the season leave washed up milfoil at the shoreline or move it to the edge of the vegetation until freezing so weevils can easily move to shore.

Milfoil Solution® Program

Effective, environmentally safe **Milfoil Solution®** programs are realized through multiple-year weevil augmentations. Research and experience demonstrates that a threshold weevil population density is required to cause declines in the milfoil. In addition, lake-wide control is gained through weevil stocking in several areas within a water body. Yearly baseline and follow-up surveys track the progress of the program and allow for necessary adjustments. Annual reports provide lake residents comprehensive updates on the program.

The regrowth of native aquatic vegetation is crucial to preventing EWM from regaining dominance. In addition, native plants promote the healthy ecology of aquatic systems because they offer necessary habitat and food for wildlife. Removal of EWM mats promotes increased water circulation with an associated decrease in water temperature and increase in dissolved oxygen in previously infested areas.

Milfoil Solution® offers long-term management, sustainability, and targeted control of Eurasian watermilfoil.

Expected Results

- EWM density reduction
- Non-nuisance level of milfoil
- Elimination of milfoil in plant beds
- Increase in native plant species

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Research Update

Milfoil Weevils and Pan fish Foraging

Previous research suggested some small sunfish may consume milfoil weevils under certain conditions. To further address this question, Wisconsin Energies, of Milwaukee, WI, contracted with EnviroScience fisheries biologists to study potential weevil predation by pan fish in five reservoirs on the Menominee River between 2008 and 2010.

Wisconsin Energies contracted with EnviroScience to study weevil predation by pan fish

Based on a long-term study of milfoil weevil populations in this system, it is known that all of the reservoirs contain high natural milfoil weevil densities.[5] This situation offered an excellent opportunity to examine fish foraging where weevil populations are consistently plentiful.

Electroshocking was used to collect the fish during the same week in July each year and stomach contents were identified. From one to eight of 25 different prey items were found within the stomach contents of each of 342 total fish (235 Bluegill, 59 Pumpkinseed, 39 Yellow Perch, and 9 Green sunfish). Milfoil weevils were present in 16 fish (15 bluegills and 1 pumpkinseed), which represent less than 5% of the total fish collected (Figure 1.).

Corey Jerome of Lake Superior State University, Michigan, researched the extent of bluegill and pumpkinseed predation on the milfoil weevil in two Michigan lakes.[6] His study revealed that, out of 344 pan fish stomachs dissected, 12 milfoil weevils were found. This showed that milfoil weevils were present in only 3% of the fish. In addition, there were no differences in weevil predation by pan fish between control and treated (stocked with weevils) sites.

Reservoir (# of fish sampled)	2008	2009	2010
Badwater Lake, MI (56; 50)	4% (2)	4% (2)	
Cowboy Lake, MI (57; 50)	18% (10)		
Big Quinessec, MI (50)		0% (0)	
Brule, MI (89)			2% (2)
Lower Paint, MI (40)			0% (0)

Table 1. Percent weevils containing milfoil weevils in the Menominee River system. (#) = total fish sampled each year.

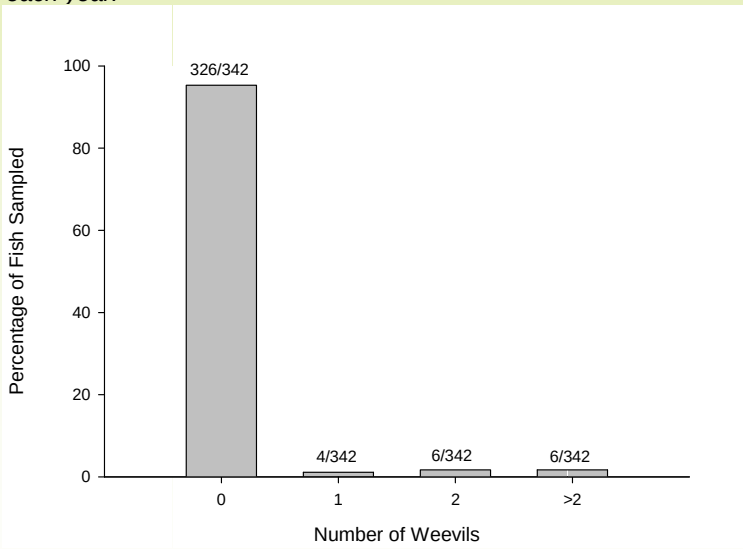

Figure 1. Percentage of total fish sampled from Table 1. containing 0, 1, 2, or >2 weevils.

References

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[4] Sutter, T. J., and R. M. Newman. 1997. Is predation by sunfish (*Lepomis* spp.) an important source of mortality for the Eurasian watermilfoil biocontrol agent *Euhrychiopsis lecontei* ? Journal of Freshwater Ecology 12: 225-234.

[5] Salerno, C. We Energies 2010 Progress Report of Milfoil Biological Control Research for the Menominee River. EnviroScience, October 2010.

[6] Jerome, C., J. Chiotti, A. Moerke. 2008. "Panfish Predation on the Milfoil Weevil *(Euhrychiopsis lecontei*) in Two Inland Lakes". Ohio Division of Wildlife, 69th Midwest Fish and Wildlife Conference, Columbus, OH.

Conclusion:

Milfoil weevils are an incidental and minimal component of pan fish diets

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