

THREE YEARS OF MILFOIL MOTH STUDIES IN LINCOLN POND

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Lincoln Pond is a 600-acre, lake in Elizabethtown, NY with a spreading population of a noxious exotic plant, Eurasian watermilfoil (*Myriophyllum spicatum*). Milfoil is a nonnative plant that frustrates recreational use of water bodies and out-competes native aquatic plants by forming a canopy across the waters surface. Lincoln Pond shares the problem of an increasing milfoil population with a vast number of lakes across the United States.

Various insects eat milfoil (e.g., aquatic moths [*Acentria ephemerella*], milfoil weevils [*Euhrychiopsis lecontei*], milfoil midges [*Cricotopus myriophylli*] and certain caddisflies] potentially limiting its growth, and inhibiting canopy formation. One of these insects is the aquatic macrophyte moth (*Acentria ephemerella*). The concept that an insect already present in NY could control noxious milfoil is attractive since it would involve modest expense and it would be environmentally safe. *Acentria* is not native to NY, but rather to Europe from where Eurasian watermilfoil was brought to the United States. However, *Acentria* has become naturalized in NY since its arrival. The question is how do we ensure *Acentria* populations are high enough to control milfoil in the US as it does in Europe?

In experiments undertaken between 1999 and 2002 the moth was added into areas of Lincoln Pond. We released little ones in the early spring, larger ones in mid- summer, cocoons in summer, and finally some in an over-wintering state in late autumn. None of these introductions appear to have significantly changed moth total numbers in Lincoln Pond or to have produced a significant impact on Pond milfoil although there was a discernable, even dramatic, decrease in milfoil in one mid-lake plot following the late fall augmentation.

We are concerned that fish predation on moths is preventing their population from expanding in Lincoln Pond. Our Lincoln Pond studies and research from other locations focuses attention on sunfish as the variable most likely to be interfering with the moths potential as a milfoil control. In other lakes that have more predator fish to eat sunfish, *Acentria* populations have been observed to reach two per stem. In those circumstances milfoil acreage has actually decreased. This has been seen in Cayuga Lake and in Keuka Lake, and at a site near Willsboro in Lake Champlain. In these instances *Acentria* arrived naturally and expanded without conscious human management. Is there a way to speed up the process of bringing milfoil under control in our lakes?

Late fall, dormant state augmentations initially seemed to control an area of milfoil in Lincoln Pond. This release produced dramatic results in early spring.

Apparently the moth caterpillars were able to hide in the short milfoil plants and eat the growing parts, preventing elongation in this one test plot. Perhaps the plants were dense enough there to hide the caterpillars from predation for a time. In this one test plot milfoil produced half of the biomass and half of the total stem length in the summer following release. Additionally, there were several other native aquatic plants growing in the area indicating that a population of other plants exists in Lincoln Pond ready to repopulate areas now dominated by milfoil if milfoil competitiveness is reduced.

We are planning to continue work with *Acentria* in Lincoln Pond and in other NY lakes. In 2003 Lincoln Pond initiated a catch and release program for bass. Larger bass actually eat sunfish and help to control their populations. In addition, we had a sunfish derby in which Lincoln Pond youths competed for the most weight and largest numbers of sunfish for awards of \$50, \$20, and \$10 for first, second, or third places, respectively, in each category.

We hope to reduce the sunfish to predator fish ratio so that *Acentria* moths can survive and even flourish in Lincoln Pond. We are planning a release of 100,000 moths in 2004 anticipating a significant number may elude the surviving Pond sunfish.

Information on moth, weevil, caddisfly, and midge populations in Lincoln Pond is helpful in studying the potential for a natural milfoil control in small lakes throughout the Northeast. Lincoln Pond is an ideal site for this work, as this lake does not confound natural control results by employing artificial controls at the same time. For example, there is no aquatic plant harvesting, no use of chemicals and no dredging occurring on Lincoln Pond. The Lincoln Pond Landowners Association has been thoroughly supportive of these natural control efforts.

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