

BIOLOGICAL MILFOIL CONTROL

by Anita Deming, Cornell Extension Agent and BRASS Board Member

In the summer of 2000, we attempted an experimental *Acentria ephemerella* (milfoil moth) addition to Lincoln Pond in Elizabethtown, as part of a study to see if aquatic plant-eating insects can control the growth of *Myriophyllum spicatum* (Eurasian watermilfoil, or milfoil for short). Both APA and DEC permits were obtained prior to the release.

Lincoln Pond is a 600-acre lake with moderate, but increasing, amounts of milfoil. Lakeshore owners first discovered milfoil growing in Lincoln Pond in 1980. By now, 140 acres are now completely tangled in this aquatic weed. It is spreading at about 7 acres per year or a 15% increase. There are 450 acres of Lincoln Pond that would be suitable habitat for milfoil (i.e. less than 15 feet deep and soft bottom). There are still over 23 other native aquatic plants that are helping to slow the spread of milfoil. This is important as they will continue to provide competition and will reoccupy the areas as the milfoil recedes.

Lincoln Pond is a good site for a moth augmentation (release) study because there is no history of aquatic plant management in this lake. Some of the most widely used techniques of aquatic plant control, such as mechanical harvesting and herbicide use, may be detrimental to herbivore survival and make it harder to sort out which control method is reducing the milfoil populations. Previous observations of milfoil herbivores and lakes suggest a correlation between large, deep lakes and large moth populations. It seems that small lake size correlated well with high numbers of the aquatic weevil.

Although Lincoln Pond falls into the small lake group, few weevils appeared in our 1999 surveys of the Lake. In 1999, we found a few weevils (0.12 per stem) and very few moths (average 0.02 per stem). In early 2000, we found 0.08 weevils per stem and a few more moths (average 0.07 per stem).

On June 16, 2000, we added 20,000 tiny (second instar) *Acentria* moth larvae into two experimental plots in the south end of Lincoln Pond. One month later our first herbivore survey after the augmentation yielded unexpected results. We found no moth larvae in our herbivore survey, and we found more weevils than we had in any of our past surveys of Lincoln Pond. The weevil count, at the moth release site was recorded at 0.34 per stem, and continued to rise in later surveys. In this first survey, we found moderate to high levels of weevil damage and some less frequent indications of moth damage on the milfoil.

Our August survey showed a few moths, a large population of weevils (average of 0.84 per stem), and severe weevil damage on most stems. By September the weevils were hibernating and there were no moths to be found. However, we could see some new late season re-growth of the milfoil.

The moth augmentation was not a success, but did yield new insights into the process. The unexpectedly large population of weevils at the release site in Lincoln Pond was an important factor in our overall experiment. We plan to study the influence of weevils on moth populations more closely in the future. Our Study Group met to review the original plans and to offer suggestions for a follow-up project. All agreed that Lincoln Pond was a reasonable body of water to attempt an Acentria release and that the project would add to the body of knowledge on biological control of milfoil. Even though the first augmentation was not a success, they agreed that trying another release would be reasonable. They recommended releasing older caterpillars, higher up in the milfoil bed, and earlier in the season. The theory is that larger caterpillars (3rd and 4th instar) would be hardier and could take the trip better. They could also walk from the retreat to the new milfoil easier. If they are released in plastic mesh bags near the top of the milfoil growth, then they would not have to walk so far to find food. They would be more likely to make it without being eaten by fish or without wearing out. The Study Group recommended stringing the mesh bags together for easier retrieval so we would not be leaving any litter in the lake. Finally the earlier release time would allow the moths to take hold before the larger weevils took over the food supply.

We will release half of the caterpillars in one of the original release areas and half in a different milfoil bed to the north. This way we can compare no release, the 2000 release, the 2001 release and releases in both years to see which strategies work the best.

It is not uncommon for projects that work well in the laboratory to have trouble when applied to the real world. We are hoping to continue in our efforts to find an inexpensive and environmentally sound method to control milfoil. Release of the second set of caterpillars should be this June. Thanks to a Lake Champlain Basin Program grant we will be able to follow the progress of the moths more closely this time and hopefully learn how to adapt the success in the laboratory to success in the lake. Check out the web site at <http://www.cce.cornell.edu/clinton/ag/environment.html>.
