The significance of bluegill predation on walleye stocking

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INTRODUCTION

In 1986, the alewife (*Alosa pseudoharengus*) was introduced illegally to Otsego Lake (Foster, 1990), and since then the population has exploded. Being an efficient planktivore, subsequent trophic changes have contributed to problems, such as increases in chlorophyll *a*, phosphorus cycling, and the rate of oxygen depletion. These contribute to decreased water clarity (Warner, 2000) and jeopardize the cold water fishery. It has been suggested that reducing the alewife population might alleviate those symptoms of eutrophy through top-down and bottom-up mechanisms (Warner, 1999). In order to achieve this control, authorized stocking to reintroduce walleye (*Stizostedion vitreum*) took place in 2000 and 2001, the rationale being that this gamefish would utilize the forage base provided by the alewife. Additionally, their establishment may reduce the alewife population to the point where crustacean zooplankton rebound leading to greater algal grazing, increased water clarity and reduced rates of oxygen depletion (Cooke, et al., 1993). One concern with the stocking of the walleye deals with their survivability. The small size at which most of the walleye were stocked (~55mm) makes them very vulnerable in the open water, and many times they are eaten by perch, bass and pickerel within a short amount of time after they are stocked (McDonnel, in prep.). The purpose of this experiment was to determine the importance of walleye size at the time of stocking relative to survival rates based on feeding different sized walleye to large bluegills (*Lepomis macrochirus*). Large bluegills are being used in the experiment because being sunfish, they are not normally thought of as a carnivorous fish. Bluegills are opportunistic feeders, generally eating plants and small crustaceans. However, being opportunistic, they will feed on small fishes. Given the high population of bluegills and other sunfishes (Meehan, 2002a), if they did efficiently consume walleye, their impact may be substantial.

The hypothesis for the experiment is that the larger walleye will be less likely to be eaten, and will have a better chance for survival. Also, walleye that are not eaten immediately in the tank will learn to avoid predation.

Current studies are underway to evaluate the success of the stocking program (McDonnel, 2002), as well as any lake-wide trophic changes that may result from alewife reduction (Cornwell, in prep.).

METHODS AND MATERIALS

Two forty-gallon tanks were used, each set up with uniform pebble-sized gravel, so there would be no refuges available in which the walleye could hide. Ten bluegills were captured, all greater than 175 mm, using a 200-foot haul seine in Rat Cove and at

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Brookwood point. Five bluegills were weighed and measured to find the average size of the fish and five were placed in each tank. The fish were left to adapt to the tanks over night, and had no available food for at least 12 hours. The room was kept dark and quiet. After being weighed and measured, 20 pond fingerling walleye were set aside from the stocking and ten were put in each tank. The tanks were then monitored for the first five minutes to see if the walleye were eaten, and how fast, and then at intervals for the next 24 hours. The tanks were checked every hour for the first three hours, then after five, seven, and twenty-four hours to determine how long it takes for the walleye to be eaten. This same procedure, with the same bluegills, was used again for the second trial, which was conducted a few weeks after the first. The intent was that the second set of walleye would be larger than the first, allowing for a comparison of survivability based upon size; however, the average walleye sizes for the two trials was essentially the same at 0.99g, 55mm, and 0.92g, 55mm, respectively.

RESULTS AND DISCUSSION

In both trials, the bluegills in one tank ate at least eight of the ten walleye within the first twenty seconds, and all ten were consumed by the end of the first five minutes. Conversely, in the other tank, the walleye were eaten at a much slower rate; after twenty-four hours an average of four walleye remained uneaten. After observation of the tanks, it was found that bluegills eat walleye, however, larger walleye never became available, so there can be no comparison of consumption based upon size. Comparison between the two trials can still be made based upon the rate at which the bluegills ate the walleye. However, each of the tanks was fairly consistent from the first to the second trial.

CONCLUSION

These results are based solely on observations in a tank environment with no plants, and the findings may not reflect circumstances in the lake. Also, the availability of other food in the lake may influence the bluegill's food selection.

The economic efficiency of the walleye stocking is in question when it can be seen that virtually any fish with a big enough mouth will eat the walleye being stocked in the lake. Thus there is question as to whether or not it is worth saving money by getting smaller fish, just to have them eaten when they are stocked. It may prove cost effective to raise walleye to a larger size to increase the likelihood of their survival.

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