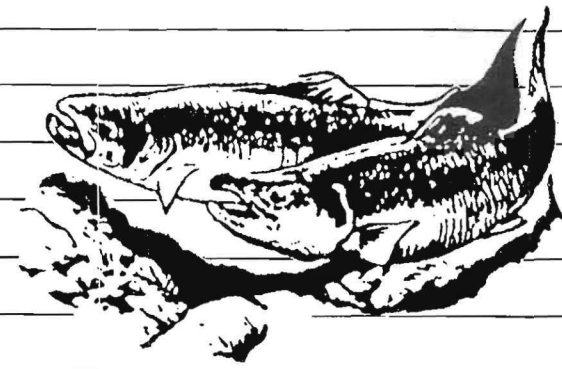
Research



Information bulletin

U.S. DEPARTMENT OF THE INTERIOR
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Commercial Fry Feed Improves Growth of Cultured Lamprey Larvae

Larval sea lampreys (*Petromyzon marinus*) are collected from the wild and held for toxicity tests before lampricide applications to streams, development of supplemental control methods, medical research, and other reasons. These animals must be healthy to ensure valid test results. In a 13-month study, supplemental feeding with BioKyowa A-250 fry feed (BioKyowa, Inc., Chesterfield, Missouri) improved the growth and survival of captive populations of sea lamprey larvae.

Yeast Is Still the Primary Feed for Lamprey Larvae

Historically, larval sea lampreys have been fed a slurry of bakers' yeast either once or twice a week. We conducted a study from 23 July 1992 to 1 September 1993 to determine the most suitable feeding schedule and the utility of supplemental feeding with a commercially available fry feed. We did not consider the fry feed to be a suitable replacement for the yeast because of its high cost (about $100 for 500 g).

Twenty groups of 50 sea lamprey larvae were anesthetized, measured, weighed, and placed in aquariums at a density of about 400 animals/m^2. The larvae were allowed to burrow into clean beach sand about 75 mm deep and were supplied with aerated Lake Huron water at ambient temperature (range, 1 to 21°C).

Larvae in 10 aquariums were fed twice a week; larvae in the remaining 10 aquariums were fed only once a week. All larvae were fed a slurry of bakers' yeast and water at a rate of 0.27 g of yeast per animal. Animals in five tanks on each feeding schedule were also given the fry feed at a rate of 0.03 g per animal. During feeding, the water to the aerated aquariums was shut off for about 16 h.

Any dead larvae on the surface of the substrate were removed daily, measured, and recorded. About every 2 months, the larvae were anesthetized and reweighed. To maintain the proper population density, dead and missing animals were replaced with larvae marked by latex injection. Marked larvae were not included in growth calculations. Corrections were made for all dead and missing larvae to more accurately calculate changes in mean weight in each aquarium.

Feeding Twice a Week Was More Effective

Over the course of the study, larval weight gains were consistently greater, weight losses were consistently less (a mean weight loss was recorded for all groups between 22 October and 15 December 1992), and total deaths was less for those fed twice a week (Table). Within a feeding schedule, mean weight gains were always greater and losses always less in those aquariums in which the diet was supplemented with the fry feed—many of these

differences were also statistically significant. Larvae given the fry feed received 10% more food during the study, but weight changes for these animals averaged 106.4% more positive (range, 12.0–393.5%) when fed twice a week and 56.7% more positive (range, 14.3–200.0%) when fed once a week than those given only yeast.

The sand substrate in the aquariums required changing about every 2 months for both feeding schedules. The aquariums that received the supplemental fry feed, however, needed more frequent cleaning by siphon because waste products built up more rapidly on the sand's surface.

Use of Fry Feed Is Worth the Extra Effort

Despite the higher cost and need for more frequent cleaning, supplemental use of the fry feed reduced mortality and provided healthier test animals. We recommend feeding larval lampreys with a slurry that consists of 454 g of bakers' yeast and 50 g of BioKyowa A-250 fry feed mixed in 8.5 L of the same water that is used in the holding aquariums. The slurry should be given twice a week at a rate of not less than 0.27 g of yeast and 0.03 g of fry feed per animal.

For further information contact:

William Swink or Richard Berryhill
National Fisheries Research Center—La Crosse
Hammond Bay Biological Station
11188 Ray Road
Millersburg, Michigan 49759
(517) 734-4768

Table. Mean annual mortality per aquarium of sea lamprey larvae (50 animals per aquarium).

	Feeding schedule	
Food type	Once a week	Twice a week
Yeast only	24.2	11.2
Yeast plus fry feed	16.2	9.8