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Achotines lab studies diets for larval, juvenile yellowfin tuna

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Work focuses on broodstock nutrition and resulting egg quality, larval and juvenile nutrition



The Achotines Laboratory is located on the Pacific coast of Panama. Photo by Liam Scholey. At the Inter-American Tropical Tuna Commission's Achotines Laboratory in southern Panama, research centers on tuna biology, particularly the early life history of yellowfin tuna (*Thunnus albacares*). From 2001 to 2003, four laboratory trials were conducted to examine the effects of probiotics (beneficial Gram-positive bacteria) on the survival of yellowfin tuna larvae during the first week of feeding.

The trials were carried out by Patrick Tracy, a graduate student at the University of Miami's Rosenstiel School of Marine and Atmospheric Science (RSMAS); Dr. Daniel Benetti, director of the RSMAS Aquaculture Program; and the authors.

Probiotic studies

Yellowfin larvae are routinely reared at the Achotines Laboratory on a first-feeding diet of cultured and enriched rotifers. However, rotifer cultures are characterized by an abundant and complex bacterial flora. It was anticipated that the occurrence of pathogenic, Gram-negative bacteria could be reduced when the rotifers and larvae were treated with probiotics to enhance rotifer production and promote better larval survival.



Yellowfin larva during the first week of feeding.



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The experimental trials lasted for seven or eight days of feeding. Yellowfin larvae were stocked in replicated tanks. Probiotic treatments involved the addition of probiotic bacteria at stocking, first feeding and daily intervals thereafter. In control tanks, untreated larvae were fed only enriched, but untreated, rotifers.

Mixed results

Results of the trials were mixed. Two experiments in 2001 and 2002 indicated that probiotics appeared to slightly improve survival of the larvae. A third trial in 2003 showed no difference in survival between probiotic treatment and controls.

Results from the fourth experiment in 2003 indicated the average survival of larvae treated with probiotics was four times that of the control fish. However, the results were highly variable and therefore not statistically significant. One additional trial is planned for 2005.

Weaning diet trials

Yellowfin are routinely reared up to six weeks after hatching for a variety of experimental purposes at the Achtines Laboratory. Rearing protocols in past studies have involved feeding a sequence of live planktonic foods, fish larvae, and minced fish to late larvae and early juveniles.

During 2004, early-juvenile yellowfin were reared on a diet of fish larvae and several types of artificial pellet feed. The majority of the juveniles survived 36 days after hatching, and a small group survived longer than 45 days. The longest-lived individual was 65 days old at death, at which time it was approximately 6 cm in standard length.

These fish were the first juvenile yellowfin reared partially on an artificial diet at the Achtines Laboratory. Further rearing trials of early-juvenile yellowfin using artificial diets are planned.

Other research

The authors are continuing research on yellowfin tuna at the Achtines Laboratory to study broodstock nutrition and resulting egg quality, larval and juvenile nutrition and the development of vision in tuna. The main emphasis of the research is ecological experimentation, but the basic biological information gained will also have practical applications for the mariculture of tunas and other pelagic species.

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