

## DEVELOPING THE TECHNOLOGY FOR INTENSIVE REARING OF SPOTTED SEATROUT *CYNOSCION NEBULOSUS* FOR STOCK ENHANCEMENT

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The spotted seatrout *Cynoscion nebulosus* is the Gulf of Mexico's most popular sport fish; thus, the Gulf Coast Research Laboratory and the Mississippi Department of Marine Resources are testing the feasibility of using cultured spotted seatrout to supplement and assess the natural stocks in Mississippi. Typically, seatrout culture consists of spawning captive broodstock and extensive larval rearing in earthen ponds containing estuarine water and mixed wild zooplankton. We designed a recirculating system for intensive rearing of spotted seatrout larvae and juveniles. Because one of the goals of intensive systems is to maximize production per unit volume, we also are investigating optimization of prey type, quantity, and larval density.

Two-day post-hatch (PH) larvae are stocked at  $10\text{ L}^{-1}$  in 1000-1500 L tanks and fed enriched ss-rotifers, cultured copepod nauplii, enriched *Artemia* nauplii, and dry food. At day 25 PH, larvae are harvested, counted, measured and weighed, and stocked at up to  $3.5\text{ L}^{-1}$  into a nursery system and fed dry food. At about 40 days PH, the juveniles are transferred to grow out raceways where they remain until tagging and release. In 2005, mean survival from day 2 PH through day 25 PH was 25% and the larvae had a mean total length of  $16.64\pm 0.79\text{ mm}$  and a mean weight of  $0.04\pm 0.01\text{ g}$ . Cannibalism began at day 18 PH. Survival during the nursery phase averaged  $88.84\pm 5.8\%$  and the larvae averaged  $45.0\pm 1.9\text{ mm}$  and  $0.79\pm 0.1\text{ g}$ .

To investigate the effect of prey type and quantity, 51-hour PH larvae were stocked into 20 tanks of static, 25 ppt seawater at  $5\text{ L}^{-1}$ , maintained on a 14L:10D photoperiod for an additional 69 h (for a total of 120 h PH), and fed laboratory-cultured copepod nauplii and enriched ss-strain rotifers singly or in combination. Five tanks of larvae were fed laboratory-cultured copepod nauplii only at  $5\text{ mL}^{-1}$  daily, five tanks were fed enriched rotifers only once at  $1.5\text{ mL}^{-1}$ , five tanks of larvae were fed 3 nauplii  $\text{mL}^{-1}$  daily and 1 rotifer  $\text{mL}^{-1}$  once, and five tanks were not fed. Rotifer treatments were limited to one feeding due to mortalities during enrichment. Despite the small number of rotifers fed, residual rotifers remained in the systems and there were no significant differences in larval survival among the three feeding conditions. All survivals were significantly greater than in the unfed control. Notochord length and myotome height of larvae fed copepod nauplii were significantly greater than those of the larvae fed rotifers only and the unfed control. The notochord length and myotome height of the larvae fed rotifers only were significantly greater than those of the unfed larvae. The unfed larvae were the same size as at 51 h PH.

To investigate the effect of larval density, day 25 PH fish were stocked into 14 1,000 liter nursery tanks 0.8 (4 tanks), 1.0 (4 tanks), 1.5 (4 tanks), and 3.5 (2 tanks) fish/liter. At day 40 PH, survival averaged  $88.8\pm 5.8\%$ . Survival, total length, and weight were generally inversely proportional to density. Survival was not significantly different among the densities, but total length and weight were significantly different among densities.

This project demonstrated that seatrout can be reared intensively at reasonably high densities on modest levels of economical food such as enriched rotifers and *Artemia*.