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## TECHNIQUES FOR IMPROVED HATCHERY PRODUCTION OF RED SNAPPER

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The rapid global development of mariculture in recent years has increased the demand for a reliable supply of larvae and juveniles for grow-out operations. Some subtropical marine species, such as the red snapper *Lutjanus campechanus*, are difficult to culture because they do not readily complete maturation or spawn freely in captivity. While hormone-induced strip spawning is currently the standard method of spawning red snapper, this method often results in poor fertilization and limited success in larval rearing. Research conducted at the Louisiana Universities Marine Consortium and the Louisiana State University Aquaculture Research Station evaluated the role of gamete quality in the production of red snapper. The specific objectives were to: 1) develop improved criteria for evaluating the reproductive condition of female broodstock; 2) determine the effect of sperm density on fertilization success, and 3) evaluate the short-term storage of eggs.

Female red snapper were captured in the wild and transported to the hatchery where they were prepared for spawning by injection with a 500 IU/kg priming dose and a 1000 IU/kg resolving dose of human chorionic gonadotropin. Oocytes collected by catheterization were used to assess the reproductive condition of females. Females exhibiting synchronous development with oocyte diameters ranging from 0.3 to 0.6 mm were monitored closely for maturation and ovulation.

The viability of red snapper sperm was determined by microscopic examination of the motility of sperm samples. Samples with high motility (> 80%) were selected for use in fertilization trials. Fresh sperm with densities ranging from  $1.0 \times 10^5$  to  $8.5 \times 10^8$  cells/ml were applied to eggs to determine the optimal sperm density and to provide a standard for comparison in fertilization trials. There was no significant effect of sperm density on fertilization rates within the range of 500 to 4.2 million spermatozoa per egg. Red snapper eggs stored at room temperature (25 C) were fertilized with fresh sperm at 10-min intervals after stripping from female broodstock. Eggs were incubated dry, in natural seawater (35‰), in 200 mOsmol/kg Hanks' balanced salt solution (HBSS), or dry with HBSS added with fresh sperm. Fertilization rates were highest when eggs were fertilized within 10 min after stripping (Figure 1). This study demonstrates that refinement of hatchery techniques could improve fertilization success and larval survival in red snapper.

Figure 1. Red snapper eggs were fertilized with fresh sperm at 10-min intervals after stripping. Fertilization rate was assessed at neurulation (12 h), and were significantly reduced within 10 min of collection ( $P = 0.03$ ).

