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IMPROVED METHODS FOR THE CULTURE OF RED SNAPPER

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The red snapper *Lutjanus campechanus* is an economically valuable sport and commercial fishery throughout the Gulf of Mexico and South Atlantic. Declines of these stocks combined with a high market value have stimulated interest in the culture of red snapper. Research conducted at Louisiana Universities Marine Consortium and the Louisiana State University Aquaculture Research Station evaluated hatchery techniques to improve spawning and fertilization success in red snapper. The specific objectives were to: 1) refine protocols for the collection and handling of broodstock to minimize stress; 2) optimize methods for the collection, storage and use of fresh and cryopreserved red snapper sperm; and 3) develop methods for strip-spawning to optimize egg quality and fertilization success.

Red snapper broodstock (N = 101; 1.0 to 3.8 kg) were collected during the 2000 and 2001 spawning seasons (May to August) off coastal Louisiana by hook and line sampling. After capture, inflated swim bladders were deflated with a 16 G sterile needle and fish were transported to the hatchery. The fish were injected with a 500 IU/kg priming dose of human chorionic gonadotripin (HCG) and placed in a recirculating culture system. Approximately 15 h later, the sex of the fish was determined by visual inspection and catheterization. Ripe males were identified by an extended urogenital papilla and the presence of flowing milt upon palpation of the abdomen. Male snapper were used for the collection of fresh sperm for refrigerated storage, cryopreservation, and fertilization experiments. Female snapper were given a 1000 IU/kg resolving dose of HCG and returned to the culture system. The females were monitored for oocyte maturation and were stripped after ovulation. In a series of 2 x 2 trials refrigerated and cryopreserved sperm were compared to evaluate fertilization and hatching success. Sperm samples with motility above 80% and densities ranging from 4.58×10^8 to 3.89×10^9 spermatozoa/ml were used in the fertilization trials. Fertilization was assessed as embryos developed through 8-cell, neurulation, and hatch (Figure 1). Variation in fertilization and hatch rates was low between treatment replicates, but varied significantly among sperm treatments. Fertilization and hatch rates for refrigerated and cryopreserved sperm ranged from 7 to 99% and were highly correlated ($r^2 = 0.92$). Refrigerated sperm yielded higher fertilization rates (52 ± 23%) than cryopreserved sperm (44 ± 22%), but each were effective for the fertilization of eggs and the production of red snapper larvae.