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HATCHERY, ON GROWING TECHNOLOGY AND ENVIRONMENTAL MONITORING OF OPEN OCEAN AQUACULTURE OF COBIA (*Rachycentron canadum*) IN THE CARIBBEAN.

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The offshore aquaculture industry is in its infancy in the Caribbean. Due to its extraordinary growth rate, one of the species identified as having the greatest potential for commercial aquaculture in the region is cobia (*Rachycentron canadum*). Advances in hatchery and on growing technology of cobia from egg to market are presented and discussed in this paper. New hatchery techniques include conditioned spawning of broodstock and intensive and semi-intensive larval rearing of cobia in tanks and ponds using probiotics. Emerging technology is being used to demonstrate the viability of raising hatchery-reared cobia in collaboration with the private sector (Snapperfarm, Inc. and AquaSense LLC) using SeaStation (Net Systems LLC) submerged cages in exposed sites in Puerto Rico (US) and the Bahamas. The University of Miami and the University of Puerto Rico conducted environmental monitoring in both operations. Sampling stations were set up at different distances and directions from the fish cages. Possible eutrophication of the local environment was evaluated monthly by measuring dissolved nitrogen and phosphorus, phytoplankton biomass, epiphyte growth potential, sinking flux of organic matter into sediment traps, organic content of the sediments, and benthic microalgal biomass. In all cases, no significant differences were found as a function of distance from the cages or relative to upstream-downstream direction. Environmental data from Puerto Rico and the Bahamas indicate that the current regime and resulting dilution of nutrients from the submerged cages do not lead to a significant change in the ecosystem near the cages.

Within stocking densities ranging from 5-15 kg/m^3, evidence to date indicates that cobia's growth, mortality and food conversion rates (FCR) are directly related to stocking densities. Growth and survival rates decrease dramatically at higher stocking densities. As a consequence, FCR increases and smaller fish (≤ 4 kg) command lower market demand and price. Under ideal conditions (i.e., at low stocking densities and adequate temperature range of 26-30^o C), cobia exhibit extraordinary growth (4-6 kg/12 months), yielding 1 kg of fish biomass when fed 1.8 kg of pellets containing 50% fish meal (FCR = 1.8). Taking into account that energy loss between trophic levels in nature results in an ecological efficiency of only around 10%, our data shows that using fishmeal to produce high-value fish for human consumption in aquaculture can be 3.7 times more efficient than this transformation in nature. The most important problem faced thus far was shark predation leading to major production loss both in Puerto Rico and the Bahamas. For this reason, combined with high capital and running costs, the economic viability of the open ocean aquaculture operations in the Caribbean has not been reached yet.