



XVIIth World Congress of the International Commission of Agricultural and Biosystems Engineering (CIGR)

Hosted by the Canadian Society for Bioengineering (CSBE/SCGAB)
Québec City, Canada June 13-17, 2010



INSHORE RECIRCULATING SYSTEM FOR THE PRODUCTION OF MARINE FINFISH

ZI TIMOTHY J PFEIFFER¹, PAUL S. WILLS²

¹USDA Agricultural Research Service, Sustainable Marine Aquaculture Systems project in Fort Pierce, FL, United States, timothy.pfeiffer@ars.usda.gov

²Florida Atlantic University, Harbor Branch Oceanographic Institute, United States

CSBE101477 – Presented at Section II-B: Aquacultural Engineering Conference

ABSTRACT The Sustainable Marine Aquaculture System Facility was established by the USDA Agricultural Research Service in collaboration with Harbor Branch Oceanographic Institute / Florida Atlantic University to improve the efficiency and sustainability of recirculating aquaculture systems for the production of inland warmwater marine fish. The systems have been utilized for the research production of Florida pompano and red drum marine finfish. The water treatment and recirculating aquaculture systems used for juvenile and production studies of the project include: (1) the incoming saltwater and freshwater primary treatment system and 10 m³ storage capacity; (2) the 10 tank (1 m³ volume each) low-head fingerling production system design that utilizes a 0.7 m³ polygeyser and low-space moving bed bioreactor for solids removal and nitrification; (3) the 9-tank (1 m³ volume each) hybrid low-head fingerling production unit that utilizes air injection foam fractionation, paired tank moving bed torrus filters (0.11 m³ each), and microscreen rotary drum filtration (40 μ); (4) a 43 m³ low-head production system with four replicated systems each with 4 tanks (7.8 m³ each), a microscreen rotary drum filter (40 μ) for primary solids removal, static filters for additional solids and biofiltration, and a long-flow pathway moving bed biofilter and; (5) a 45 m³ system with four replicated systems of 4 tanks each (7.8 m³ each), microscreen rotary drum filtration (40 μ), two propeller-wash floating bead filters (0.7 m³ each), oxygen cone for oxygen supplementation, degassing towers, UV sterilization. Additional information regarding water usage, electrical consumption, filter nitrification rates, system water quality, stocking densities and production, and oxygenated feed monitoring and control will be presented.

Keywords: Recirculating aquaculture system, marine finfish, low head