



## **Publications, Videos and Computer Software**

Funding level:           Approximately \$80,000 per year  
Project start date:       Renewed each year  
Project duration:        Annual  
Participants:            Varies annually

This is an ongoing project now in its 16th year. Objectives of the project are to prepare, peer review, edit, reproduce, and distribute educational publications and videos for southern aquaculture industries. To date, this project has produced 192 fact sheets and species profiles, 5 project summaries, 19 research publications and 20 videos with contributions from 192 authors from throughout the region. All fact sheets completed by this project to date are available on the Internet at <http://www.msstate.edu/dept/srac> and <http://srac.tamu.edu>.

## **Development of Baitfish, Goldfish and Ornamental Fish Hatchery Methods**

Funding level:           \$59,957  
Project start date:       1 March 2011  
Project duration:        1 year  
Participants:            University of Arkansas at Pine Bluff (Lead Institution), Louisiana State University, University of Florida

Concerns over the potential spread of fish diseases and aquatic nuisance species through the harvesting and distribution of wild baitfish have increased the demand for farm-raised bait and ornamental fish. Research on optimal hatchery methods for commercially important species is needed to meet production goals and reduce costs, while techniques for promising new bait and ornamental species must be developed. Bait and ornamental fish farmers have requested species-specific research on hatchery methods related to egg collection and handling for fathead minnows, goldfish, and ballyhoo. Objectives of this project include developing hatchery methods to de-stick adhered goldfish and ballyhoo eggs; and maximize egg collection of fathead minnows.

## **Reproduction and Larval Rearing of Freshwater Ornamental and Marine Bait Fish**

Funding level: \$500,000  
Project start date: 1 January 2011  
Project duration: 3 years  
Participants: University of Florida (Lead Institution), Louisiana State University, Mississippi State University

Freshwater ornamental fish and marine baitfish production are important and underserved sectors of domestic aquaculture. Key bottlenecks usually involve control of captive maturation, spawning, and rearing of early life stages. This project will develop new hatchery technologies for improved production of freshwater ornamental species and marine baitfish with high commercial potential. Specific objectives are to develop improved technologies for spawning and larval rearing of pinfish, goggle eye, and Bala shark, evaluate spawning substrate preference for captive ballyhoo, develop improved technologies for egg hatching and larval rearing of *Fundulus grandis* and *Fundulus seminolis*, and to publish and disseminate project results. This project will provide essential knowledge for successful commercial production of freshwater ornamental and marine baitfish species in the southern region, with immediate positive economic impacts for the United States.

## **Potential Marketing Structures for the Catfish Industry**

Funding level: \$250,000  
Project start date: 1 January 2011  
Project duration: 2 years  
Participants: University of Arkansas at Pine Bluff (Lead Institution), Auburn University, Kentucky State University, University of California at Davis, University of Missouri

Southern aquaculture industries have declined as a result of competition from low-priced imports, substantial increases in the price of feed, and a weak economy. Other segments of U.S. agriculture have integrated horizontally using various organizational forms and structures, including market exchanges, marketing cooperatives, marketing orders, market agreements, marketing commissions, market councils, marketing boards, bargaining associations, and others. Horizontally integrated structures provide for control over large volumes of supply, allowing greater influence over the price received by farmers and responsiveness to changing market conditions. This project will identify market structures that have resulted in higher farm-level prices for similar commodities and examine the consequences of adopting these alternative market structures and organizations for the U.S. farm-raised catfish industry.

## **Evaluation of Impacts of Potential “Cap and Trade” Carbon Emission Policies on Catfish, Baitfish, and Crawfish Farming**

Funding level: \$120,000  
Project start date: 1 January 2011  
Project duration: 2 years  
Participants: Auburn University (Lead Institution), University of Arkansas at Pine Bluff, Louisiana State University

Reducing carbon emissions for the purpose of curbing global warming and climate change is a national environmental goal, and aquaculture likely will be involved in future carbon cap-and-trade regulations. This project will estimate net carbon balance in ponds and determine practices that may increase net carbon capture. Based on estimations of net carbon balance under different management scenarios, economic effects will be analyzed for possible policy options. Carbon emission issues will be explained to producers through fact sheets for catfish, crawfish, and baitfish and a special session on the topic will be organized at a major United States aquaculture meeting.

## **Development and Evaluation of Cool-Water Crawfish Baits**

Funding level: \$125,000  
Project start date: 1 January 2011  
Project duration: 3 years  
Participants: Louisiana State University (Lead Institution), Texas A&M University, Auburn University

Crawfish aquaculture is unique among other aquaculture industries because harvesting is a passive process based on trapping using baits. Traps are typically baited with either manufactured formulated baits or fresh-frozen fish. Formulated baits are used during the warm season but become less effective in cool water. But, using fish for cool-water crawfish bait has become expensive and sources are unreliable. This project will develop biologically and economically effective cold-water formulated crawfish baits. Specific objectives are to identify attractants, bait formulations, or processes that increase the efficacy of formulated crawfish bait in cool waters and compare the efficacy of experimental formulated baits or processes with fish baits for increasing crawfish catch and profits in cool-water conditions.

## **Identifying Determinants for Development of Live-Market Grading Standards for Crawfish**

Funding level: \$50,000  
Project start date: 1 January 2011  
Project duration: 1 year  
Participants: Louisiana State University (Lead Institution), University of Arkansas at Pine Bluff

Large variation in sizes and appearance of product during the harvest season are marketing problems for live crawfish. Lack of industry-adopted grading standards hampers market expansion and leads to constant tension among sellers and buyers of crawfish. Objectives of this project include surveying major components of the crawfish supply chain to determine the value of grade standards for crawfish; determining size distribution of crawfish at harvest and using that data to identify grading methods that will segregate crawfish into various size categories; and presenting the findings and recommendations from the project to the crawfish aquaculture industry via workshops, educational programs and newsletters.

## **Effects of Mosquito Abatement Pesticides on Various Life Stages of Commercially Important Shellfish Aquaculture Species in the South**

Funding level: \$40,000  
Project start date: 1 March 2011  
Project duration: 1 year  
Participants: College of Charleston Graduate Program in Marine Biology (Lead Institution), Sanibel-Captiva Conversation Foundation Marine Laboratory.

Shellfish aquaculture occurs in coastal areas where land-use conflicts are common. One potential conflict involves mosquito abatement programs, which are increasingly used in the tidewater areas due to increased coastal development and corresponding human population growth. Objectives of this project are to review the various mosquito abatement pesticides utilized in the southern region near the major shellfish hatchery and nursery facilities; select pesticides of most concern based on application data and available toxicity data for further bioassay testing; and use standard toxicity-testing protocols to assess potential impacts of the selected pesticides on larval and post-set clams and oysters.

## **Improving Reproductive Efficiency of Cultured Finfish**

Funding level: \$496,782  
Project start date: 1 February 2009  
Project duration: 3 years  
Participants: USDA-ARS Catfish Genetics Research Unit (Lead Institution), Texas A&M at Corpus Christi, Texas A&M University, Auburn University, University of Florida, University of Tennessee, University of Arkansas at Pine Bluff, USDA-ARS National Aquaculture Research Center

Reproduction of captive finfish is often less than desired, requiring creative management or compensatory protocols to overcome the failure to reproduce spontaneously and at full potential. The overall goal of this project is to improve reproductive efficiency of ictalurid catfish, white bass, Atlantic croaker, redbtail black shark, and mono sebae—all commercially important in the Southern Region. This project focuses on improving broodfish management protocols for increased reproductive efficiency and improving spawning protocols to increase reproductive efficiency. Procedures and technology developed will be incorporated into management protocols to then be transferred to the aquaculture industry for broad commercial application.

## **Economic Forecasting and Policy Analysis Models for Catfish and Trout**

Funding level: \$150,000  
Project start date: 1 August 2007  
Project duration: 2 years  
Participants: University of Arkansas at Pine Bluff (Lead Institution), Louisiana State University, Mississippi State University, North Carolina State University, University of Florida, Auburn University

Many food-producing sectors of domestic agriculture rely upon economic models to forecast industry trends and estimate the effects of proposed policy initiatives and global macro-economic factors. Seven scientists at five universities are developing comprehensive economic modeling and policy analysis systems for catfish and trout. Demand and supply models will provide an indication of changes in catfish and trout prices and quantities demanded, effects on production and marketing channels, who will bear the costs, and to what extent demand would need to change to compensate for detrimental price shocks. International trade models will estimate the effect of the import supply of catfish and trout on the domestic price. The effects of tariffs, direct or countercyclical payments, feed assistance, crop disaster, export assistance, and loan programs will be identified, summarized, and made available to industry through trade associations.

## **Using National Retail Databases to Determine Market Trends for Southern Aquaculture Products**

Funding level: \$250,000  
Project start date: 1 June 2009  
Project duration: 2 years  
Participants: Mississippi State University (Lead Institution), University of Arkansas at Pine Bluff, Texas Tech University, Auburn University, University of Florida

Understanding market trends for aquaculture products is required to develop effective sales strategies and advertising and promotional programs. Market power in the U.S. lies primarily with large retailers such as WalMart. This project is evaluates how national retail databases from supermarkets can be used to evaluate pricing strategies, product substitution, and changing consumer preferences in key regions for aquaculture products. Analyses are restricted to fresh and frozen farm-raised catfish, shellfish, and crustaceans, but the tools developed should have wide applicability to other species.

## **Improving Reproductive Efficiency to Produce Channel x Blue Hybrid Catfish Fry**

Funding level: \$460,000  
Project start date: 1 March 2004  
Project duration: 4 years  
Participants: Auburn University (Lead Institution), Louisiana State University, Mississippi State University, University of Memphis, USDA-ARS Catfish Genetics Research Unit

The hybrid catfish produced by mating female channel catfish and male blue catfish grows faster, is easier to harvest, has a higher meat yield, and is more disease-resistant than channel catfish. Widespread use of the hybrid could improve farm efficiency and profitability. However, the fish is not widely used in catfish farming because of difficulties in making hybrid eggs and fry. Current technology relies on administering hormones to induce ovulation and laborious hand-spawning. Nine researchers at five institutions are collaborating to improve the hatching rate of hybrid catfish embryos and to improve numbers of hybrid fry produced. Specific objectives include 1) developing broodstock selection and management protocols; 2) developing spawning techniques to optimize gamete collection and storage; 3) developing techniques to assess and improve gamete quality; and 4) developing standardized fertilization and hatchery protocols to optimize hatching rate of hybrid embryos.

## **Development and Evaluation of Pond Inventory Methods**

Funding level: \$295, 241  
Project start date: 1 May 2007  
Project duration: 2 years  
Participants: University of Arkansas at Pine Bluff (Lead Institution), Louisiana State University, Mississippi State University, University of Florida, University of Mississippi

Tracking inventory in aquaculture ponds is difficult because of the inability to see, count and weigh aquatic organisms throughout the growing season. While record-keeping and inventory management programs have previously been developed for some species, multiple production challenges inherent to open-pond culture contribute to the need for improved methods of physically assessing pond inventories. The goal of this project is to determine the most accurate and reliable methodologies for estimating density and size distribution of ornamental fish, crawfish, and catfish under commercial conditions.

## **Feed Formulation and Feeding Strategies for Bait and Ornamental Fish**

Funding level: \$335, 063  
Project start date: 1 June 2005  
Project duration: 3 years  
Participants: University of Arkansas at Pine Bluff (Lead Institution), Texas A&M University, University of Florida, University of Georgia

Commercial production of baitfish and tropical ornamental fish, which primarily occurs in freshwater in the southeastern portion of the United States, is an economically valuable component of U.S. aquaculture. Many of the concerns of baitfish and ornamental fish producers are distinct from those who produce aquatic species for human consumption because fish must withstand repeated grading and handling during production, distribution, and sale. Diet and feeding strategy are crucial for attaining production goals in the bait and ornamental fish industries, and may increase baitfish production by increasing immunity and resistance to disease and handling stress. Five scientists at five institutions are collaborating on studies to assess the effects of diet composition and feeding strategies on growth, health, and body composition of freshwater baitfish and ornamental fish.

## **Innovative Technologies for Commercial-Scale Aquaculture**

Funding level: \$935,726  
Project start date: 1 August 2004  
Project duration: 4 years  
Participants: Auburn University (Lead Institution), Clemson University, Louisiana State University, Mississippi State University, University of Arkansas at Pine Bluff, USDA-ARS Catfish Genetics Research Unit, USDA-ARS National Aquaculture Research Center

Aquaculture in the Southern Region is under increasing pressure to maintain profitability. The price of aquaculture products received by farmers is low because of weak demand related to the sluggish economy and competition from low-priced, imported aquaculture products. Moreover, gradually rising production costs are compounding the historically lower than average prices paid to farmers. Solutions to the problem are complex and multi-faceted, but improved production efficiency can decrease costs of production and thereby improve the potential for profitability. Some improvement in efficiency may be attained by improving management and culture techniques used in conventional earthen ponds. Eleven investigators from seven institutions will collaborate to evaluate new technologies and methodologies to enhance efficiency and profitability of pond aquaculture. The research will be focused on three major themes: (1) improving existing culture techniques and developing new technology for production systems; (2) improving aerators and harvesting equipment; (3) assessing energy, material, and economic efficiency of systems.