



## REQUEST FOR PRE-PROPOSALS

*Please Copy and Distribute to All Interested Parties*

The USDA-NIFA Southern Regional Aquaculture Center solicits response from qualified multi-state teams interested in participating in the regional project:

### **Investigation of Visual Capabilities of Finfish Species to Inform Larviculture Lighting Protocols**

SRAC's Board of Directors has authorized up to \$300,000 for a 2-year project on *Larviculture Lighting Protocols*. This project will be developed using the "comprehensive method" where a team of multi-state scientists having demonstrated records of expertise in the subject complete a single pre-proposal that addresses all project objectives. One proposal will be selected for funding based on review by a committee of scientists not involved in any of the proposals that are submitted.

#### **Background**

Low survival and poor prey ingestion rates of larvae are a major obstacle in the expansion of finfish aquaculture. The transitional stage where larvae switch from endogenous reserves to exogenous feeding results in high mortality and is responsible for significant economic losses. Despite providing larvae with appropriate environmental conditions and an excess of prey items, feeding incidence can still be poor and feeding performance can vary drastically by species. Investigations into vision could greatly inform future larval feeding practices and help to explain poor feeding success during this transitional phase. Larval fish rely heavily on their vision to identify and capture prey items, but limited research has been conducted on the visual capabilities of fishes during their development. Retinal development is crucial for exogenous feeding and long-term survival. Additionally, research has indicated that retinal composition may evolve for improved prey capture at specific life stages and throughout maturation. Investigations into retinal development and prey visualization are of interest to commercial producers as they can help to better define lighting parameters needed for increased growth and survival. By manipulating conditions such as light intensity and wavelength, and tank color, larvae may be able to visualize feeds easier within the water column and capture these items more efficiently. Furthermore, retinal ontogeny can be used to refine timing and application of species specific larviculture protocols. The visual capabilities of fish are relatively unexplored, and methodologies developed within this project can be applied across numerous species and commodity groups within the southern region.

#### **Objectives**

1. Use microspectrophotometry to characterize ontogeny of vision in two ornamental and two food fish species of commercial importance to the southern region.

2. Evaluate the effects of factors such as light intensity, wavelength, tank color, and timing of lighting protocol transitions on larval survival, feeding incidence, and growth for species evaluated in Objective 1.

### **Experimental Approach**

The species of interest should include marine and freshwater fishes of importance in the SE region for ornamental and foodfish production. Ornamental families such as Characidae, Cyprinidae, Osphronemidae, etc. are of specific interest due to persistent bottlenecks in commercial larviculture. This project should characterize the ontogeny of visual capabilities of these species and use experimental data to inform lighting protocols for enhancing prey contrast. These protocols should then guide applied experiments evaluating effects of manipulation of culture parameters (light spectrum, intensity, etc.) on survival, growth, and feeding incidence of larvae.

### **How to Respond**

Pre-proposals must address all objectives. Preference will be given to pre-proposals that show a high degree of collaboration and coordination among participants. To meet the criterion for a regional project, the pre-proposal must include collaboration from scientists in two or more states or territories in the Southern Region (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, Texas, U.S. Virgin Islands, and Virginia).

The pre-proposal must include a one-page vita for each participant and a proposed budget for each participating institution or organization. Pre-proposals, vitae, and budgets that are not in the proper format will not be considered. (See “Guidelines for Writing a SRAC Pre-Proposal (Comprehensive)” file attached or contact Kristen Thompson with the SRAC office at 662-686-3269.)

Send an electronic copy of the pre-proposal in Word format to Jimmy Avery, SRAC Director as an email attachment (jimmy.avery@msstate.edu) by **July 20, 2024**. Proposals received after that date will not be considered.