

## **Intensification of First Year Largemouth Bass (*Micropterus salmoides*) Using Alternative Pond-Based Production Systems**

Largemouth bass (*Micropterus salmoides*; LMB) are one of the most popular sportfish in the United States. They are also one of the most popular table fares, especially in live Asian markets. The majority of LMB food fish producers in the Midwest purchase fingerlings from southern states, typically 10 – 13 cm total length (4 – 5 in), in early spring of their second year. These fish are then stocked into grow-out ponds until they reach market size 0.68 kg (1.50 lb). Sometimes it is necessary to purchase smaller feed-habituated LMB in year one, and they are held in nursery ponds and later split to lower densities for grow-out. Whether cultured to a fingerling size for stock enhancement or cultured to the food market size, cannibalism in low-density production ponds is a major problem for producers; especially during the early growth stage. The PIs are investigating intensified alternative production systems for LMB, which could allow for reduced cannibalism, lowered feed conversion ratios, improved opportunity for sheltering from piscivorous birds, and increased yields. Replicated systems will be evaluated for their applicability for largemouth bass producers in the Midwest. Information will be relayed to producers through field days, printed materials, presentations, among other avenues.

### **Project Title: Intensification of First Year Largemouth Bass (*Micropterus Salmoides*) Using Alternative Pond-Based Production Systems [Progress Report]**

**Total Funds Committed:** \$328,367

**Initial Project Schedule:** September 1, 2021-August 30, 2022 [Extended to August 31, 2025]

**Current Project Year:** September 1, 2023-August 31, 2024

**Participants:** James Garvey, Southern Illinois University-Carbondale; Robert Rode Purdue University; Paul Brown, Purdue University; Karolina Kwasek, University of New Hampshire

**Extension Liaison:** Paul Hitchens, Southern Illinois University-Carbondale

**Industry Liaison:** Stacey Sisk, Big House Fish Farm

**Relevance:** The benefit to the industry is to raise age-0 largemouth bass fry to fingerling size at maximum production. This project will provide us with data that we can use to compare production practices between traditional culture ponds, pond-side tank culture systems, and split-ponds for largemouth bass in research ponds at Purdue University and SIU-Carbondale. Largemouth bass farmers in the Midwest will have the opportunity to visit the research sites and the on-farm demonstration to learn about whether or not these production systems may be worth adopting on their farms. These systems could provide an opportunity for largemouth bass farmers to purchase smaller fingerlings from hatcheries. Additionally, farmers of other species can have the opportunity to learn about other potential production practices.

**Response:** Pond-side tanks and split ponds showed that age-0 largemouth bass raised in intensive culture produce more biomass than in whole ponds.

**Results:** Five distinct objectives are being pursued in this project:

1. To evaluate two alternative pond-based production systems (split ponds and pond-side tank culture) in the Midwest on largemouth bass, *Micropterus salmoides*, quantified production parameters.

Objective 1 has been completed at both SIU-Carbondale and Purdue University, with the experiments ending in September 2023. A rerun of Objective 1 has been started and is expected to finish in September 2024. Modifications were made to the treatment tanks and ponds to reduce predication on fish, and split pond design was improved. Age-0 largemouth bass have been collected and data are currently being analyzed for the initial 2023 experiment.

2. To investigate and compare changes in water quality and the aquatic food web in the pond-based production systems.

Objective 2 has been completed, although equipment failure during the experiment at SIU in 2023 prevented some water quality assessment. A second experiment in 2024 has been started and the water quality data has been collected throughout the study.

3. To investigate the effect of the two-alternative pond-based production methods (split ponds and pond-side tank culture) on LMB response to stress.

The water quality data from Objective 3 will be processed in late Fall 2024. Objective 3 data was unable to be collected from the initial 2023 experiment, samples will be taken at the conclusion of the ongoing experiment and processed early 2025.

4. To conduct an on-farm extension demonstration of the pond-side tank culture system.

The farm demonstration of Objective 4 will be conducted during spring through summer 2025.

5. To immediately disseminate results to industry via final termination report, NCRAC Extension fact sheet, on-farm and university-based workshops, videos, and other information technology transfer strategies.

Objective 5 will occur upon project completion.

**Outreach Overview:** Outreach work was conducted in early October 2023 where SIU-Carbondale presented preliminary results of split-pond and pond-side tank experiments to members of the aquaculture industry at Purdue University. Industry members toured the pond-side and full pond age-0 largemouth bass culture experiment at Purdue.

**Targeted Audience:** Farmers are the intended audience as we seek to learn more about the production feasibility of pond side tank culture and split-ponds using smaller feed habituated largemouth bass.

**Outcomes/Impacts:** The initial phase of the project completed in fall 2023 showed that split pond facilities increase the survival and yield of fingerling largemouth bass in intensive outdoor culture, generating 53% more total biomass than in traditional open ponds. Technical issues with side-pond culture and water quality monitoring have been addressed in a second experiment to be completed in Fall 2024.

**Partnerships**

Big House Fish Farm, Carbondale, IL

**Students Supported**

**Koaw Zaczek.** University of Illinois-Carbondale. Graduate Student.