A Catfish Revolution


In-pond Raceway System

By Jessica Nelson

American catfish farmers are in trouble. Currently, it costs more to produce a pound of harvested catfish than the market pays. PhD candidate Travis Brown hopes the work he is doing in Dallas County, Alabama will help to change that. With help and funding from the Alabama Cooperative Extension System, Alabama Agricultural Experiment Station, Alabama Catfish Producers, and Dean Wilson Farms, Travis is part of a project that aims to improve production efficiency in channel catfish aquaculture.

Skyrocketing feed and energy costs, along with competition from foreign imports, have made it almost impossible for these farmers to earn a living. In fact, more than 1,000 farms have already gone under.

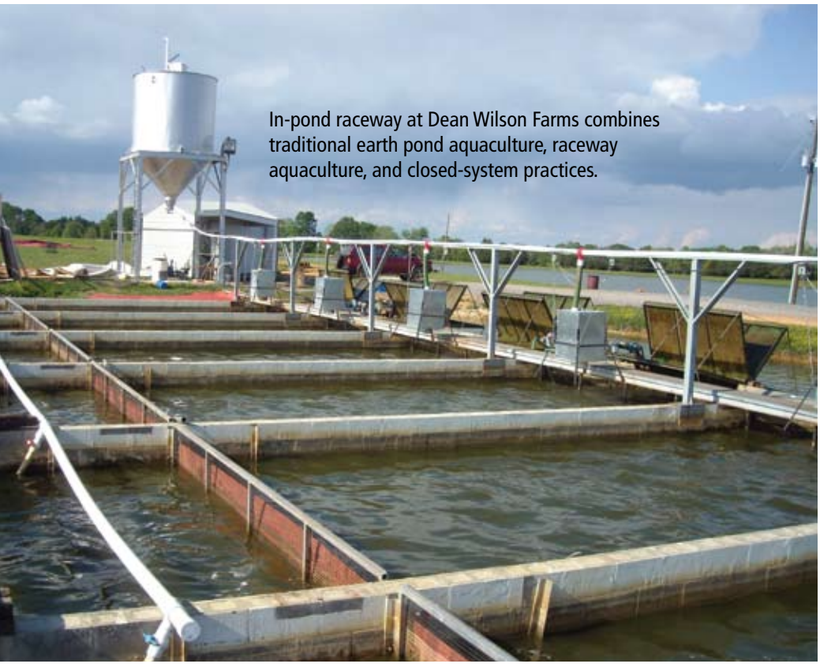
Brown says that commercial catfish aquaculture in the United States has remained largely unchanged since the industry first developed 34 years ago. Catfish are raised in traditional earthen ponds, and one of the strongest points of the new methods is that they can be built around these ponds already in existence.

The system Travis has helped to develop as part of his work for a PhD is called an in-pond raceway system, but that's really only the beginning. The technology has been around for at least 20 years, but only now are researchers putting it to use. The primary species — in this case, channel catfish and hybrid catfish — are confined to a line of chambers within the earthen pond, which resemble racehorse stables on a diagram. Fish in the smaller area are easier to monitor and treat for diseases, as well as easier to harvest. In addition to other benefits regarding the yield and production costs, the system also results in a more balanced ecosystem and sustainable effort.

In some ways the in-pond raceway is tougher. It integrates what are normally three separate disciplines in aquaculture: traditional earth pond aquaculture, raceway aquaculture, and closed-system practices. In other words, all the elements were already in use, but the innovation is putting them together in a new way.

Having the fish in a small area of the pond brings its own challenges, including water quality. If the water quality becomes compromised, farmers can lose more fish in a shorter amount of time. To address these issues, researchers have introduced a special paddle wheel to keep the water circulating throughout the whole pond on a circuit. This measure, along with additional aeration, prevents stratification, which can easily occur in the hot summer months.

Travis Brown and company are not the only outfit in the game. Researchers at Clemson and Mississippi State both have ongoing



In-pond raceway at Dean Wilson Farms combines traditional earth pond aquaculture, raceway aquaculture, and closed-system practices.

projects with the same objective and similar procedures. Brown's system borrows from the work done at both schools but also includes innovations that he and his colleagues have developed.

"We have several hurdles and several goals," Travis says. Toward the overall objective of improving production efficiency, some of the goals include reducing production costs, increasing yield, increasing survival rates, reducing labor costs, and improving the Feed Conversion Ratio (FCR), or the amount of food needed to produce one pound of harvested fish.

The results so far are more than promising. Last year the pond they set up yielded 11,500 pounds of catfish per acre, as opposed to the national average of 7,000 pounds per acre. They reduced the FCR from the average of 3/1 to 1.4/1. The survival rate was more than 91% — which is remarkable.

Because all income from the pond adds to its profitability, another major facet of this project is to bring in other revenue sources from the same harvest. To that end, they are doing several things. First, they have developed a way to catch solid waste. This endeavor improves water quality and provides another sellable product — fertilizer. The additional income helps to offset production costs and also contributes to a more sustainable business model. Only 35% of the feed that the fish consume is used; the rest is excreted as waste.

Another dual-purpose tactic is to co-culture other species in the rest of the pond. Tilapia, fathead minnows, and paddlefish are raised in the free area of the pond. There is a commercial market for tilapia and paddlefish, but these species also serve a valuable function in the ecosystem of the pond. Tilapia eat invasive algae species, and fathead minnows eat parasites that cause one of the most devastating catfish diseases. Including the other sources of revenue, their one pond grossed moe than $100,000 last year.

Skyrocketing feed and energy costs, along with competition from foreign imports, have made it almost impossible for these farmers to earn a living. In fact, over 1,000 farms have already gone under.

Travis started out with a marine species focus as he finished his undergraduate degree at UNC Wilmington. He worked in the commercial aquaculture industry for several years, was an instructor at a local community college, and also worked as a research associate. He came to Auburn for its highly ranked Master of Aquaculture Program and then took a position as a county extension agent, thinking his higher education was finished.

However, when this project came up, he didn't hesitate before "signing on for another stint," as he put it. The fact is, he says, farmers are in dire straits: "They really need help right now to be able to compete and survive." And helping farmers, for Travis, is really what it's all about. He grew up on a North Carolina tobacco farm and knew at an early age that he wanted his life's work to be helping farmers. He likes making technology work for farmers.

Brown will finish his PhD in a year, but the project will continue for another three to five years. He and his associates want to be sure the fantastic results they realized will continue to play out. Travis plans to see it through. In all probability he will stay on as an extension agent or possibly work in the field with production. Someone will need to help with design and maintenance of these systems, and he's in the best position to do so.

Brown and his team are still working out some kinks, and there is some initial investment in equipment and training that can make implementation seem daunting. The high-tech monitoring equipment required is not cheap, but it is vital. Even with the expenses, their first-year results are so remarkable that farmers could be excused for being skeptical. "I think if a farmer would go out and look at this and look at what we've done...it's much more believable on a farm than in a lab setting." After hearing Travis discuss the project, many farmers actually have traveled to see the experimental pond.

The best part, he says, is that farmers can convert to the new system slowly, one pond at a time. He also hopes impending improvements can reduce the startup costs by up to 30%. If they can do this, it will be even easier for farmers to begin to turn the entire industry around.

"It's not a save-all," says Brown, "but it will point us in the right direction. It's kind of like the Model-T Ford, but you have to start somewhere."

Travis Brown harvests tilapia.

Measuring fish inventory illustrates improved yield results.

A WISE INVESTMENT

"I was an aquaculturist long before I came to Auburn, but I knew there was more to learn. That's why I chose graduate school here. The Fisheries & Allied Aquacultures Department ranks top in the world. Since I've been here, I've had the pleasure to work on several research projects that I truly believe will make a difference in the field of aquaculture."

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