



# Arkansas AQUAFARMING

Cooperative Extension Program



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## Arkansas Aquaculture 2012 to be Held Jan. 12-13

*David Heikes, Extension Aquaculture Specialist, UAPB*

Make plans now to attend Arkansas Aquaculture 2012 to be held January 12-13, 2012. This year's meeting will once again be held at the Embassy Suites Hotel and Spa in Hot Springs, Arkansas. Book your room now by calling 501-624-9200, and don't forget to mention you are attending the Catfish Farmers of Arkansas Meeting to get the discounted rate. Also, you can pre-register for the meeting by calling Bo Collins at 870 672-1716.

The meeting agenda includes board meetings on January 12 and the main meeting on January 13, where you will hear the latest information on split-pond production systems, a commodities outlook update, bio-security measures related to *Aeromonas* outbreaks, government assistance programs and more. You will also enjoy great food and fellowship at the catfish luncheon and will have the opportunity to get involved and participate in the Catfish Farmers of Arkansas general membership meeting.

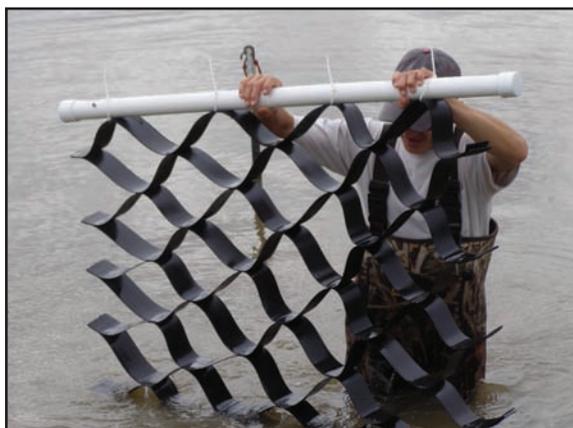
## Potential Fathead Minnow Spawning Substrate for Indoor Egg Incubation

*Nathan Stone, Extension Fisheries Specialist, UAPB, and Daryl Weldon, Research Specialist, UAPB*

Indoor hatching of fathead minnow eggs may be an option for producers seeking even-aged fry to grow large volumes of relatively uniform minnows, although the economics of this alternative method remain to be determined. Previous articles in *Arkansas Aquafarming* reported that over 1.5 million/acre of feeder size fathead minnows could be produced by stocking hatchery fry into small ponds for intensive culture (feed and aeration).

Fathead minnow eggs can be removed from spawning substrate with a 1.5 percent sodium sulfite solution and hatched in jars. However, leaving eggs attached to substrate for incubation in tanks (as is done for goldfish and most golden shiners) is another option, if a suitable compact substrate can be found. We have been testing a commercially-available plastic geoweb material (cellular confinement

*continued on page 2*



Section of geoweb material used as spawning substrate.



Close-up of eggs adhering to textured plastic within a geoweb cell. Often there will be more than one nest per cell.

## Upcoming Events

### Arkansas Bait and Ornamental Fish Growers Association February 9, 2012

**Lonoke Agriculture Center,  
Lonoke, AR**

Annual educational meeting sponsored by Arkansas Bait and Ornamental Fish Growers Association. Topics this year include: updates on new herbicide approvals and trials, National Aquatic Animal Health Plan, NPDES permits, the Lacey Act, frog fungus, financial programs, H2A visa requirements and more! For information contact Sathya Kumaran at (501) 676-3124.

### 2012 Midcontinent Warm Water Fish Culture Workshop Feb 6-8

**Overland Park, KS**

If you have any questions about meeting arrangements contact Dan Mosier II, dan.mosier@ksoutdoors.com . For program information and submission contact Randy Nelson at: randy.nelson@ksoutdoors.com. Both can be reached at (620) 362-4166.

### Eighth Catfish Culture Research Symposium Feb 17

**Savannah, GA**

The symposium is a forum for exchange of scientific and technical information among researchers, extension personnel, catfish farmers, and graduate students of aquaculture. For more information contact: Jimmy Avery javery@drec.msstate.edu

### Aquaculture 2012 February 29 - March 2 Las Vegas, Nevada

The U.S. Aquaculture Society (formerly U.S. Chapter of WAS) joins with National Aquaculture Association and the U.S. Aquaculture Suppliers Association to produce the annual Aquaculture America meetings. For information contact the Conference Manager at (760) 751-5505.

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system used for slope stabilization) as a spawning substrate. It consists of 3-inch-wide, textured high density plastic strips welded together to form a series of cells (EnviroGrid EGA 203T-29, textured, not perforated; available from vendors such as Geo Products and U.S. Fabrics). This material was selected based on fathead minnow biology; the textured surface helps retain eggs, and the narrow width and cellular form were chosen because fatheads appear to prefer to nest near the edges of substrates and also near each other, in colonies.

A single geoweb panel opens up to 8.4 feet deep, and 21.4 feet long, and costs around \$200, including delivery. Quantity orders may be discounted. For use in ponds, the panel would need to be cut in half to reduce the depth to around 4 feet. For ease in handling and to fit in hatching tanks, cutting the length into halves or thirds may be necessary. Given the expense,

this substrate would likely be reserved for indoor hatching only. A nice feature of the cellular material is that the 4 foot depth can be reduced for hatching in tanks; the cells collapse together and the depth can be reduced by half or so without damage to the majority of eggs. The material will need to be suspended from a float (e.g., PVC pipe), and a weight will be needed at the bottom to sink the material. For the latter, we have used a small diameter PVC pipe (e.g., 3/4 inch, filled with sand and capped) zip-tied to the bottom cells of the substrate.

We will be testing tank hatching of fathead minnow eggs on geoweb substrate this next season, and also will be placing some sections of the substrate in ponds of cooperating producers, to evaluate egg deposition and substrate durability. As a reminder, fathead minnow eggs will require daily treatments with a fungicide (e.g., formalin, hydrogen peroxide) during incubation, as the eggs readily fungus

## Managing Fish Businesses in Hard Times Workshop Held in Lonoke

*Carole Engle, Professor, Economics/Marketing, UAPB*

The UAPB Aquaculture/Fisheries Center held a workshop recently on "Managing Fish Businesses in Hard Times: Lessons from the Catfish Industry." Dr. Carole Engle presented a summary of the Catfish Trade Adjustment Assistance (TAA) program and its benefits to Arkansas catfish farmers. This national program provided a series of training workshops on catfish production and financial management for program participants. Those who completed the intensive training portion were then assigned to a consultant to assist them with completing long-term business plans. Dr. Engle has worked with more than 100 catfish farmers in Arkansas to complete their plans, under a contract between TAA and UAPB.

Comments from participants indicated that many learned more in-depth ways to analyze their financial posi-

tion, debt load and how to make decisions to address the most pressing financial aspects of their fish farm business. They also learned to calculate and interpret some key financial indicators that provide early warning signs of impending financial risk and possibly distress.

Many of the most serious financial problems for catfish farmers began with cash flow deficits. Increasing cash flow problems turned into longer-term debt problems as farmers were forced to re-structure their loans. A number of farms with debt-to-asset ratios above 50 percent that did not take steps to reduce their debt burden found ratios that increased to 200 percent to 300 percent in a single year and then on to more than 1,000 percent the second year.

*continued on page 3*

continued from page 2

The best approach to head off such a rapid escalation of debt problems is to monitor cash flow on a monthly basis. Monthly cash flow deficits must be dealt with in a timely manner, to avoid the types of rapid escalation that can lead to serious financial distress. A debt-to-asset ratio greater than 50 percent is one that merits attention. Taking active steps to pay down even 1 percent of the debt a year is beneficial. While a 1 percent decrease in the debt burden may not seem to be a major improvement, it might be that

it prevented the type of rapid escalation of debt loads that caused so much trouble on a number of farms.

Arkansas fish farmers who wish to receive assistance related to financial analysis and management similar to what Dr. Engle has provided to catfish farmers through the TAA program can call her at 870-575-8523 to schedule an appointment. A follow-up presentation will be made at the annual meeting of the Arkansas Bait and Ornamental Fish Grower association on February 9, at the Lonoke Agricultural Center.

## Croaking, Marine Baitfish and Arkansas

Todd Sink, Post-doctoral Research Associate, UAPB, and Rebecca Lochmann, Professor, Aquaculture and Fisheries, UAPB

Growing saltwater fish, in Arkansas? The answer is maybe. For the last three years, the University of Arkansas at Pine has partnered with The University of Tennessee and Texas A&M University on a project funded by the USDA's Southern Regional Aquaculture Center to develop croakers as an inland, low-salinity marine baitfish species. What's a croaker you may ask? The Atlantic croaker *Micropogonias undulatus* is a candidate for multiple-purpose aquaculture production as a baitfish and foodfish. Atlantic croakers are a popular live baitfish for several saltwater recreational angling species such as spotted seatrout and red drum.

The Atlantic croaker is a U.S. native that occurs throughout the Atlantic and Gulf of Mexico from New York to Mexico. Atlantic croakers have the ability to utilize a multitude of food resources including plankton, detritus, plant material, small fish, and invertebrates, and they adapt well to manufactured diets. Atlantic croakers are capable of rapid growth with a short life-span of 2-4 years. Croakers have an extended spawning season from October to March. Mature croakers spawn in the open ocean, but high salinity is not necessary as they sexually mature and demonstrate advanced gonad development in brackish water ponds (2 to 6 ppt salinity). Croakers mature at a young age and small size, which are ideal traits for a baitfish species. Total length of croakers at first maturity is approximately 7 inches with more than 85 percent mature by the end of their first year.

Croakers are partial spawners, with



Croakers.

eggs continuously matured and spawned throughout the spawning season. Fecundity for croakers ranges from 41,000 eggs per 7 inch female to 180,000 eggs for a 15 inch female.

Atlantic croaker production is still in its infancy and fundamental information on larval culture, nutrition, growout, economics and marketing is lacking. Significant strides have been made in reproducing Atlantic croaker on a large scale, and some progress has been made on the culture and feeding of juveniles to bait size. Significant challenges remain in incubating eggs at high densities and culturing larvae. Growout systems and practices are not yet well defined, but growout practices could be similar to those for red drum. Culture may be limited by the ability to spawn croakers out-of-season to stock into fertilized rearing ponds so expensive live-food production in the hatchery can be avoided. Many unknowns still exist for croaker production and the feasibility of their culture in Arkansas remains uncertain. However, research is currently underway to address several of these gaps in production information.

Research spearheaded by UAPB has focused on development of repro-

ductive and hatchery protocols and broodstock nutrition. Atlantic croaker broodstock measuring 8 inches or more can be obtained using various methods. Wild broodstock are easily pellet-trained using methods developed at UAPB. After pellet training, broodfish should be offered an 8 percent total lipid (6 percent menhaden fish oil), 45-50 percent protein diet at 4-6 percent of body weight per day. At UAPB, natural, ambient fall/winter water temperatures and photoperiod have been used to accomplish spawning. Atlantic croaker in captive trials spawn the best under fall conditions at 10 hours of daylight/14 hours of darkness and a water temperature of 66°F. Wild-captured Atlantic croaker will occasionally spawn passively when subjected to fall water temperature and photoperiod conditioning. These voluntary spawning events tend to yield high fertilization rates, good hatching success, and fry survival. However, natural spawns tend to contain fewer eggs and the number of times each female spawns is low, leading to an overall reduction in fry produced compared to croakers induced to spawn using hormones. Additionally, natural spawning is asynchronous among females, occurring over a month or more, which reduces hatchery efficiency.

Reproduction of croakers was neglected until recently when new commercially available hormone treatments became available. Researchers at UAPB used hormone implants containing salmon Gonadotropin-

continued on page 4

*continued from page 3*

Releasing Hormone analogue (sGnRH<sub>a</sub>) to induce captive Atlantic croaker broodstock to spawn. A single implant injected under the skin when water temperatures fall to 70°F is effective for inducing spawning in Atlantic croaker. Using this method, female broodfish averaging 0.75 pounds and 11.4 inches) produce an average of five spawns and 265,000 eggs per female. In addition to elevated fecundity, the sGnRH<sub>a</sub> implant produces highly-synchronized spawning events with a four to six day spawning period. sGnRH<sub>a</sub> implants are not without their drawbacks. These implants are expensive (\$10 per fish), may represent a biological overdose of GnRH<sub>a</sub> for fish of this size, and do not contain a dopamine blocker. This can result in poor milt production by males leading to reduced fertilization rates and over-hydration of eggs within females resulting in mortality.

Another spawning aid option investigated by UAPB is the lower-cost aqueous form of sGnRH<sub>a</sub> that contains a dopamine inhibitor. Atlantic croakers injected with aqueous sGnRH<sub>a</sub>/dopamine inhibitor at a rate of 0.23 cc/lb

body weight at a water temperature of 72°F and photoperiod of 10 hours of light have produced positive spawning results. These results include observation of males with free flowing milt by two days post-injection. Females injected with sGnRH<sub>a</sub>/dopamine inhibitor produce freely flowing eggs by two days post-injection and spawning begins around day three. Spawning continues from three to seven days post-injection with mean fertilization rates greater than 60 percent that decline over time. Mean hatch rate of fertilized eggs is often greater than 60 percent.

Several other research projects on spawning and rearing of Atlantic croaker are currently underway at UAPB. Recent developments include protocols to spawn Atlantic croaker out-of-season and refinement of lipid and protein amounts and sources in diets to improve fecundity of broodstock. Many hurdles must be overcome before commercial croaker production in Arkansas is realized, but it is not unrealistic to imagine that one day low-salinity marine baitfish production could be viable in Arkansas. For now, it remains a vision of a select few aquaculture researchers.



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