Cocahoe Pool Spawning

Utilization of above ground pools at low salinities is practical for production of a large number of cocahoe minnow eggs. Production of eggs is achievable outdoors throughout the summer, with peaks in spring and fall (April or early May and September and October). Using pools to spawn cocahoe minnows is practical for multiple reasons. Most predators, such as birds, can be excluded by using netting to cover the pool. Little water exchange is involved when using pools containing dirt, which helps to regulate nitrogenous waste. Pools typically contain lower numbers of broodfish, and river silt or other organic bottom cover can be used as both filter and waste trap. It is also easier to observe fish in small pools than fish in ponds.

Figure 1. Fiberglass pools used for egg production. Photo: Christopher Green

Research Study: For the experiment at the AgCenter Aquaculture Research Station, 500-gallon pools were used. Two weeks prior to stocking, all pools were filled and fertilized daily with approximately 1.5 ounces of powdered feed (45 percent protein). Approximately 25 pounds of salt was added to each pool, which resulted in 5 ppt salinity. A regenerative blower supplied continuous aeration to all pools via air stones. The pools were stocked at a 2:1 female: male ratio. A synthetic spawning substrate or mat (Spawntex®) was used for the females to deposit eggs. Eggs were harvested from the mats every 3-4 days from April to October. Water was added as needed to maintain depth in the pools.

Stocking and Feeding: For experimental purposes, groups of pools were stocked with different numbers of females, but we found that a ratio of 60 females: 30 males resulted in the most eggs. Fish were fed a commercially available 45 percent protein, 12 percent fat, 2.4 mm diameter, extruded feed once daily at 3.5 percent of initial body weight per day. This percentage was constant throughout the study and adjusted for growth at two and three months after initial stocking. Currently studies indicate that a 40 percent protein, 9 percent fat ration could be cheaper and have similar results.

Water Quality: Prior to stocking and weekly thereafter, dissolved oxygen (DO), pH, salinity, total ammonia nitrogen (TAN), total alkalinity, and total hardness were recorded for each pool. Salinity was maintained at 5-6 ppt using rock salt. Temperature ranged from 67 °F to 88 °F. Water quality parameters were maintained within acceptable ranges: DO remained above 5.5 mg/L, pH ranged from 8.2 to 9.2, salinity ranged from 4.7 to 9.5 ppt, TAN ranged from 0 to 1.4 mg/L, alkalinity ranged from 310 to 900 mg/L, and hardness ranged from 200 to 420 mg/L. In June, temperature was reduced by placing Styrofoam panels over each pool for shade.


Figure 2. Shade cloth helps lower water temperature during the hot summer months. Photo: Craig Gothreaux

Egg Collection: A Spawntex® spawning mat was placed in each pool for spawning substrate. These mats are constructed of coconut fibers with a latex binder on a polyester net backing. Spawning mats were cut into 18 x 24 inch sections, placed on a wire frame, and then suspended 6 inches below the water surface from two floats made of sealed PVC

tubing. Spawning began within 24 hours after mats were placed in pools. The mats were collected twice per week and replaced with clean mats. Depending on preference, egg-laden mats can be transferred into a hatching pool/pond for water incubation, or the eggs can be removed for air incubation.

Figure 3. Spawntex® mat with PVC floats. Photo: Craig Gothreaux

For the purpose of the experiment, we needed to remove eggs from the spawning mats in order to quantify the numbers produced from each pool. Eggs were removed by manually tapping and shaking mats against a rigid screen positioned over a water-filled, plastic container. Egg-laden water from the container was poured through nylon mesh (window screen) to collect the eggs. The eggs were separated from debris (algae, mat fibers, etc.) in order to quantify the numbers volumetrically. We found that 1 mL of eggs is roughly equal to about 100-120 eggs, as these eggs tended to decrease in size across the spawning season. Not all eggs produced are fertilized and/or viable, but the live eggs (brown pigment) can easily be distinguished from the dead eggs (white in color) as seen in Figure 4. After collection the eggs can be placed in hatching jars or be air incubated (see Air Incubation Fact Sheet).

Figure 4. Live and dead eggs. Photo: Paula Ouder

Egg Production: Throughout the study period, the 360 females stocked out produced more than 380,000 eggs. Egg production varied monthly due to natural semi lunar (tidal) cycles, with peaks occurring between full and new moon phases. The overall peak in egg production occurred between April and mid-May, when weekly water temperatures ranged from 75 °F to 83 °F (24 °C to 28 °C).

Contributors:

Chris Green

Craig Gothreaux

Julie Anderson

Jill Christoferson

LSU AgCenter Research & Extension

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