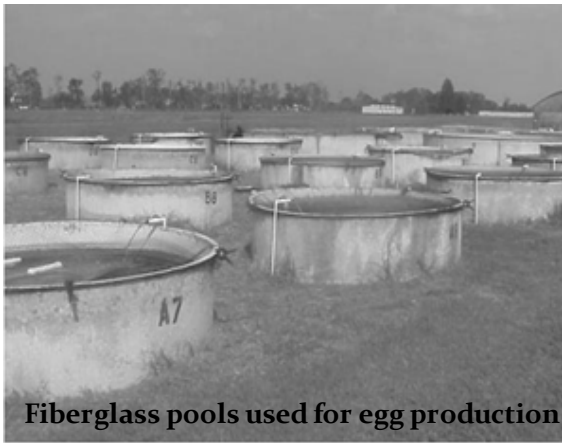
Cocahoe Pool Spawning

Utilization of above ground pools as static mesocosms at low salinities is practical for production of large numbers of cocahoe minnow eggs. Production of eggs is achievable outdoors throughout the summer, with peaks in late spring and early fall.

Pool Spawning: 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 would be necessary to regulate nitrogenous waste if pools were simply filled with water. This is due to the lower numbers of brood fish in pools, and the use of river silt as both filter and waste trap. It is also easier to observe fish in small pools than fish in ponds.



Fiberglass pools used for egg production

Photo by Chris Green

Our Study: For our experiment, we used 500 gallon pools. Two weeks prior to stocking, all pools were filled and fertilized daily with approximately 40 g of powdered feed (45% 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 airstones. 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.

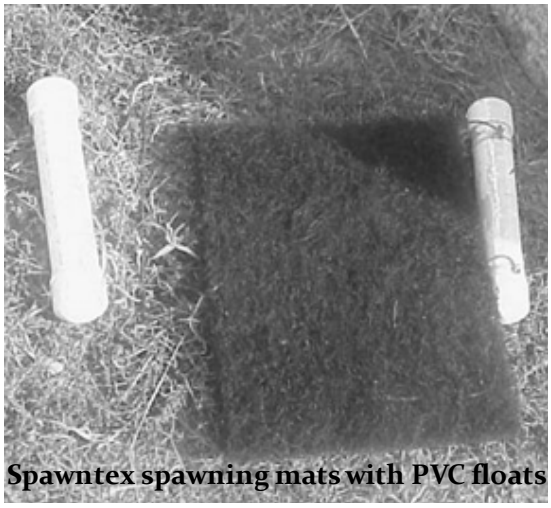
Stocking and Feeding: For experimental purposes, groups of pools were stocked with different numbers of females, but we found that a ratio of 60 females: 30 males resulted in the most eggs. Fish were fed a commercially available 45% protein, 12% fat, 2.4-mm diameter, extruded feed once daily at 3.5% of initial body weight per day. This percentage was constant throughout the study and adjusted for growth at 2 and 3 months after initial stocking. Currently studies indicate that a 40% protein, 9% fat ration could be cheaper and have similar results.

Shade cloth helps to lower water temperature during the hot summer months.

Photo by Craig Gothreaux

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 19.4 to 31.0 °C. 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, styrofoam panels were placed to shade approximately 70% of each pool to reduce water temperature.

Egg Collection: A Spawntex® spawning mat was placed in each pool for spawning substrate. These 1.5 inch thick 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. This substrate is too dense to allow fish to pass through, but each mat had sufficient void spaces to allow for eggs to be trapped and retained. 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 either be transferred into a hatching pool/pond for water incubation, or the eggs can be removed for air incubation.

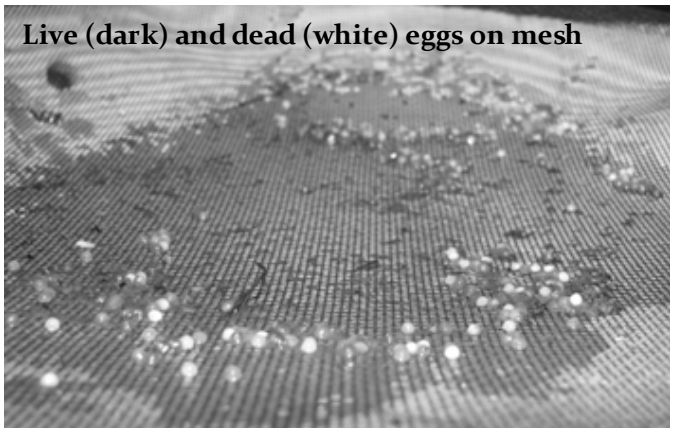


Spawntex spawning mats with PVC floats

Photo by 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 120 eggs. 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). After collection the eggs can either be placed in hatching jars, or be air incubated (see Air Incubation Fact Sheet).

Egg Production: Throughout the study period the 360 females stocked out produced a total of over 380,000 eggs. Egg production varied monthly due to natural semi-lunar (tidal) cycles, with peaks occurring between full and new moon phases. Although there is no relationship between number of eggs collected and temperature, the overall peak in egg production occurred between April and mid-May, when weekly water temperatures ranged from 74.8 to 82.7 oF (23.8 to 28.2 ^{o}C).



Live (dark) and dead (white) eggs on mesh

Photo by Craig Gothreaux

Materials	Purchase Location
Fish Feed	Burris Mill and Feed, Franklinton, LA
Rock Salt	Solar Salt, Cargill, Minneapolis, MN
Spawning mats	Spawntex®; Blocksom & Co., Michigan City, IN

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