

Inland Saltwater Shrimp Production in Alabama: Reality and Potential

David Teichert-Coddington, Fisheries Extension Specialist-Aquaculture, Department of Fisheries and Allied Aquacultures, Auburn University, AL, 36849

About 20 million pounds of shrimp were landed in Alabama in 1998, and several more times this quantity were processed at Alabama coastal packing plants. But Alabama shrimp may no longer be limited to those captured in shrimp trawls. Saltwater shrimp have been produced in ponds in Greene County, West Alabama, about 200 miles from the Gulf of Mexico. The water supply for this production was pumped from brackish water aquifers about 1300 ft below ground. Aquifers like these are scattered throughout the west Alabama and contain 5 to 6 parts per thousand (ppt) salinity, about 1/6th of seawater. Fish farmers in the area have used the brackish water for years to produce channel catfish. The rolling prairie land in west central Alabama is peppered with picturesque commercial catfish ponds that generated \$60 million dollars in farm gate receipts in 1998. Saltwater shrimp were grown as a trial in these same ponds by two catfish farmers, Dickie Odom and Rafe Taylor, who saw another opportunity to use their brackish water.

The shrimp used in this Alabama farm trial were a pacific white shrimp (*Penaeus vannamei*) which are widely cultivated in the Western Hemisphere. These shrimp are related to, and look like the Gulf white shrimp, *Penaeus setiferus*. The Pacific white shrimp is a tropical animal, so their pond culture in Alabama would be restricted to between May and the middle of October. The Pacific whites tolerate a wide range of salinity in their natural habitats; their nursery grounds are estuaries that may fluctuate widely in salinity depending on rainfall and river discharge rates. In Central America, the Pacific whites are cultured on farms supplied with water that, in a single year, may vary from near zero salinity to concentrations that are greater than that in ocean water.

Upon hearing of saltwater shrimp culture early in 1999, the Greene County producers wondered about growing these crustaceans in their salty water. After accomplishing a successful, short-term study for shrimp survival and growth in their water, they purchased post larvae (baby shrimp) for stocking into small

catfish ponds. Shrimp grew to 31 grams (15 count shrimp) in 100 days. The growth was phenomenal, but yield was lower than expected because of poor survival (12 to 15%). No explanation could be given for the low survival, but environmental factors were probably not involved.

The production of saltwater shrimp inland from coastal waters is not original to Alabama. These shrimp are produced inland in Florida, and have been produced in Texas and other western states. The situation in Alabama is unique in that a progressive catfish aquaculture industry is already established and expanding. The principles of aquaculture are the same for shrimp and catfish, so the catfish producers may readily adapt shrimp culture to their fish farming plans. Of equal importance is that catfish culture is profitable and the farmers have no need to base their entire business plans on shrimp production. Those who have appropriate water can incorporate shrimp into their plans slowly as they develop confidence in growing the animal, and selling their product.

As with other forms of agriculture, inland shrimp farming is not without risk and problems. An appropriate salinity and quality of water is basic to shrimp culture. Salinity may approach zero periodically in estuarine waters, but shrimp growth and tolerance to handling is less than optimal under these conditions. In general, the higher the salinity, the less risk. Salinity is composed of all dissolved salts in water. The salts should include appropriate concentrations of chloride, calcium, and magnesium for shrimp physiology. The water chemistry should be analyzed, and studies for shrimp growth and survival may be accomplished in containers out of ponds before resources are invested in infrastructure for shrimp production.

Viral diseases have decimated coastal shrimp crops in the past and continue to plague producers to this day. Inland culture has the great advantage that it is removed from coastal waters and regions where these viruses reside, or where they may be readily contracted. Additionally, inland ponds may be dried and sanitized annually during the winter. Despite these advantages, the danger always exists that a lethal disease that causes mass mortality of shrimp may be introduced to ponds.

Most catfish ponds in Alabama are built into the rolling hills to be filled entirely or partially with watershed runoff. These ponds are built for harvesting by seine without draining ponds. Ponds are drained once every 8 to 10 years for repair and renovation. Therefore, pond bottoms have low slopes towards the drain and drainage pipes may be undersized for rapid drainage. Shrimp ponds are harvested by draining because shrimp are difficult to remove with seines. Structures are usually built on the backside of pond drainage systems to capture shrimp as they leave ponds with the discharge water. Hillside catfish ponds have the added disadvantage that heavy rainfall could rapidly dilute a brackish water pond with freshwater runoff. The upshot is that most catfish ponds are inappropriately constructed for shrimp culture. New ponds must be built specifically for shrimp, or catfish ponds will need to be renovated for shrimp. Once appropriate ponds are constructed, most catfish farmers already possess the infrastructure necessary for shrimp production such as aeration, water supply and dispersal, and feed storage and distribution.

The supply of baby shrimp (post-larvae) for stocking shrimp ponds is an important variable factor largely out of Alabama producer's control. Shrimp post-larvae must be purchased from out-of-state suppliers (hatcheries) because the reproduction of shrimp involves expertise and infrastructure that is not available to small producers. Because shrimp diseases often are introduced to production facilities with the post-larvae, the suppliers must be reputable and possess a traceable quality control program for producing disease-free animals. There are only a couple of hatcheries within the USA that supply US producers with post larvae. The hatcheries sometimes have difficulty accommodating producers, most of who want post-larvae for stocking at the same time in the late Spring. The post-larvae supply can be a serious bottleneck for shrimp production, because a disease or some other catastrophic event in the hatchery could prevent producers from stocking ponds.

Because of the restricted growing season in Alabama and the necessity to batch harvest shrimp in the fall, a large supply of shrimp may suddenly be placed on the market. This may produce a marketing problem for the producers and depress prices. Highest prices are paid for fresh shrimp, and as long as total shrimp production is low, the local marketing of fresh shrimp should not be difficult. However, the local markets will eventually become saturated as production increases, and will have to be processed and stored before

distribution. Processing adds another level of complexity for the producer, but Alabama already has the expertise in shrimp and fish processing to accommodate inland needs. The economic returns for inland shrimp production currently look good, but could change if shrimp are forced to directly compete in the market with Gulf shrimp. Inland shrimp producers should try to develop niche markets for their product where they will receive a premium price for freshness, large size, and uniqueness.

The potential for inland shrimp culture in Alabama is largely unknown. More production testing has to be done before shrimp culture can be confidently recommended. Also, information on the location and extent of saltwater aquifers needs to be collected. Meanwhile, I suspect that the catfish farming pioneers of inland shrimp production in Greene County are seriously considering the economic benefits of diversifying their catfish farms.