

PRODUCING SOFT CRAWFISH: IS IT FOR YOU?

by

Dr. Jurij Homziak

Marine Resources Specialist

Mississippi State University

Mississippi Cooperative Extension Service

The production of soft-shell crawfish is a new and potentially profitable industry for the Northern Gulf Coast. Like the more familiar soft-shelled crab, soft crawfish production provides an opportunity to produce a seasonal high value food product for consumer markets. Commercial production began in 1987 when the first crop was harvested in Louisiana and at least eight are in operation in Mississippi. For the 1989 season, the number of Louisiana producers may double and at least 30 additional producers are expected in Mississippi.

Crawfish must shed their skin or molt periodically to grow. As the crawfish grows it fills its hard shell with tissue. Once filled, a new soft skin forms beneath the hard shell in preparation for molting. When molting, the hard outer shell is discarded and the emerging soft crawfish can increase in size. The soft skin then hardens with calcium to form a new hard shell. It is during this brief time that the soft crawfish must be harvested. They may molt every fifteen to twenty-five days under favorable conditions and may shed their shells up to fifteen times in their life.

To produce soft-shell crawfish requires that an operator obtain a supply of pre-molt growing crawfish, hold them under conditions favorable to rapid growth and then harvest the crawfish after they have shed their shells. Only the red swamp crawfish, identified by the dark line running underneath the tail, is used in shedding operations. The best quality pre-molt crawfish are from commercial ponds, available during the crawfish season, normally from February to June. Some "off season" crawfish are available from about November to July.

The system to hold the animals for shedding is relatively simple. A building is needed for environmental control and for shelter for the crawfish. The building does not have to be elaborate and greenhouses or metal buildings are often used. The building must be supplied with electricity and running water, and have a waterproof floor with adequate drainage. A separate processing facility must be provided where the crawfish are handled, bagged and frozen.

Either well or surface water can be used. Surface water must be filtered and free of pollutants. City water must have the chlorine removed. Flow rates of 1 to 2 1/2 gallons per minute per tray are recommended, based on the water temperature and feed type used. It is very important that water quality tests be performed before construction of the facility. Poor water quality is the major cause of failure in soft crawfish operations.

Because crawfish molt at water temperatures of 70°F - 84°F, with best molt rates at 78°F - 82°F, production operations that have wells at this temperature or that can heat their water are most effective. Recirculating water systems that filter and recycle the water are more expensive than the flow through system described here but conserve heat, allowing for more consistent and earlier production. Where water is in short supply, recirculating systems are also recommended.

Prior to molting, the crawfish are held in light colored trays, generally constructed of 1/2" plywood covered with fiberglass epoxy and are approximately eight feet long by three feet wide. Trays should have 3/4" thick sides 6" high. Corners should be rounded and have covers to prevent the escape of crawfish. Plastic trays can also be used. The most efficient way to arrange the trays is in rows placed two wide and running the length of the building. An aisle about three feet wide separates the rows of trays. Most producers operate small systems of twenty to forty-eight trays. It is somewhat labor-intensive; a forty-eight tray system can easily employ two full time people over the production season.

One end and corner of each tray is slightly elevated (1/4") to allow rapid flushing and draining of each tray. The lowest corner in the tray floor is provided with a drain. Water level is controlled by a stand pipe covered by a screen to prevent the escape of crawfish and the loss of food. The standpipe should be removable so the trays can be drained and cleaned completely. Depending on temperature and loading density of the trays, water levels are maintained between three quarters and one inch high by the standpipe. A water pipe enters the top of each tray along one of the sides and water sprays into the tray from emitters to oxygenate the water. Oxygen should exceed 3 ppm at all times.

The production operation begins with collecting pre-molt crawfish trapped from farm ponds. The capture, transport and acclimation of pre-molt crawfish from ponds to the molting operation is a critical step. In general, the crawfish should be packed loosely, kept cool, damp and ventilated, and not subjected to temperature or oxygen shocks. Use only crawfish that have been in traps for a short time and preferably from stand up traps. Avoid crawfish exposed to low oxygen (less than 3 ppm) or high water temperatures (above 90°F). Because pre-molt crawfish are costly (pond side prices of \$.90 to \$1.00 per pound last year) and hauling times can be three hours or more, it is prudent to handle pre-molt animals carefully.

Once at the facility crawfish should be placed into unused culture trays for a period of acclimation. Following acclimation, crawfish are placed in the culture trays at a density of about a pound per square foot of tray bottom. The crawfish are fed daily with commercial feeds. Either a water stable floating catfish pellet (thirty two percent protein) or a commercially available crawfish feed is suitable. Use of raw fish or other organic materials as feed is not recommended because it may reduce the oxygen content of the water and may affect the flavor of crawfish. Feed is provided once or twice per day at a rate of one to two percent of the weight of crawfish in a tray. During the acclimation period it may be necessary to feed two to three times this amount for the first few days. Stop feeding when dissolved oxygen drops below 3 ppm. If wasted feed builds up, reduce the feeding rate.

Crawfish within one to three days of shedding (late pre-molt) become dark in color and cease feeding. Pre-molt crawfish are removed to separate molting trays to protect them from being cannibalized. About one molting tray is needed for every ten culture trays. Culture trays are generally inspected in the morning to identify pre-molt crawfish and to remove them to the molting trays. All dead crawfish are also removed. Because most (over ninety percent) crawfish molt during daylight hours, the molting trays are inspected at regular intervals three or four times during the standard work day. When removing soft crawfish, count the number of molts to make sure all soft crawfish are collected. Newly molted crawfish look limp and soft, and are dark and shiny in color. If a molted crawfish is

missed, it may harden and begin to eat the other soft crawfish in the molting tray.

All crawfish trays should be maintained near full density by replacing all dead and late pre-molt crawfish moved to the molting trays with new stock. Molting rates average around two percent per day over a six month production period. This estimate is based on observations made last year of over fifty operations averaging forty trays each in size. Normally fifteen to twenty-five days are required after feeding starts for significant numbers of crawfish to enter the pre-molt stage. However, once started, the percentage of crawfish molting can reach ten percent per day or higher, rapidly depleting the holding trays. Keeping all trays fully stocked is critical to keeping overall molt rates at optimum levels.

Soft crawfish harvested from the molting trays should be placed in a pan without water and they must not be stacked over three or four deep. Otherwise, the crawfish on the bottom may be damaged or deformed. Soft crawfish should be frozen as soon as possible after collection to the buyer's specifications. At optimum molting temperatures, crawfish can be hardened to paper shell condition in about three hours. If freezing must be delayed, the collected crawfish should be immersed in an ice water solution. The ice water bath prevents the hardening of the shell for up to twelve hours or more.

All crawfish must be frozen alive and in a butter soft condition. The crawfish are usually packed a pound or more per quart ziplock bag, depending on expected drip loss, with one to two additional ounces of water. The bags must be frozen flat with all air bubbles removed from the bag. It is important to remember that processing, packaging or freezing areas must be separate from the production area. Regulations also prohibit the use of private kitchens to process or hold the product.

The crawfish must be packed by size or by count, depending on the buyer's preference. In either case all crawfish in a package must be close to the same size. It is extremely important to follow the buyer's exact instructions on packing and freezing the crawfish. For example, buyers who prefer low size variability must be provided with a uniform size product. Failure to do so will result in loss of sales. Crawfish may lose one or both claws on occasion. It is

important to know that buyers will not accept soft crawfish that have lost both claws and will take only a limited number (one or two per bag) of one claw crawfish. Excessive numbers of one-claw and no-claw crawfish will erode profits rapidly. Remember, buyers will not accept paper shelled crawfish, crawfish packed dead, thawed and refrozen crawfish or crawfish without both claws. Small crawfish (less than about thirty-three per pound) are very difficult to sell.

Last season buyers offered prices ranging between \$7.50 and \$9.00 per pound for crawfish of any size. However, because a large number of producers are expected to enter the market for the next year it is not possible to accurately anticipate prices. All buyers place great emphasis on quality of the product. An inferior quality of very small product will not sell. As the emphasis on quality continues to grow, expect a shift in buyer preference for a product quick frozen in a commercial freezer and packaged in more attractive form. This will add to the cost of production.

Serious thought should be given to planning the logistics of a production operation. Supplies of pre-molt crawfish must be secured and timed to arrive at a rate that will keep the operation at full capacity. The operation must be designed to most efficiently use available water supplies. A recirculating system may be applicable for some situations while a simple flow-through design will suffice in others. As with any farming venture, it is extremely important to have an established market for the product before starting operations. A business plan with an estimate of expenses is essential to any successful venture.

This is a relatively new industry and techniques and methods will vary greatly. Because conditions will vary among sites and with the skill and experience of the individual operations, it is very difficult to predict mortality rates, feeding, shedding rates and other variables. All of these can profoundly affect the profitability of an operation. We strongly suggest that you contact your County Agent, the Delta Branch Experiment Station in Stoneville or our Biloxi office, 4646 W. Beach Blvd., Suite 1-E, Biloxi, MS 39531 directly to obtain more information on this venture.