

AQUAFACTS



Louisiana Red Drum Production

Technical Considerations: Collecting and Maintaining Wild Broodstock

Collection

Efforts to collect wild broodfish for hatchery production of red drum fingerlings are usually most successful during or just before the fall spawning period, although some success may be realized at other times. In the northern Gulf, collection of spawning-condition broodfish usually begins in September and continues through October. These large adults, often referred to as "bull reds," form schools in near-shore waters and bay-gulf passes.

By November, many adults have already spawned, but these fish are still a valuable resource. If properly collected and transported, these adults will be suitable for conditioning and subsequent maturation in environmentally controlled spawning tanks or even in outdoor ponds the following year.

Red drum research at the LSU Agricultural Center's Experiment Station facilities has required regular collection of brood red drum from the Gulf for a number of years. Virtually all of these collecting efforts have relied on sport fishing techniques. The sulfur rigs located about 6 miles off Grand Isle have been the most consistent source of bull reds during collection trips.

Local marinas are a good source of information about locations of schooling bull reds. Schooling locations are highly variable, so local reports should be checked frequently to maximize collecting success.

Occasionally, bull reds can be collected in surf areas, but these incidents are random and unpredictable.

Equipment

- Fishing rod and reel with 80-100 lb. test monofilament line

- Steel (preferably stainless) leaders roughly 16 in. long with snap swivels
- Large circle tuna hooks. Large hooks help avoid gut-hooking valuable broodfish.
- Enough weight to maintain bait in position in the current. Two medium-sized oval-shaped weights slipped over the line before the leader will usually give the fish the right amount of time to take the bait before setting the hook.
- Always count on losing at least 6 rigs per rod per day. Sharks, really big fish and underwater obstructions are common tackle busters in collection areas.
- A live-hauling tank with an oxygen bottle must be on board, or in a nearby boat, to bring the broodfish to shore.
- A 20-gauge (or larger) syringe is usually needed to deflate expanded gas bladders of fish brought up from depths of 30 feet or more.
- If broodfish are hitting the bait actively and holding space is minimal, they can be tied with a soft, heavy nylon rope between the jaw and the first gill arch and held close to the boat. Whenever possible, however, it is better to take the fish directly to holding tanks or ponds with adequate space to minimize transport stress.



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Bait

- Mullet and crabs are effective red drum bait.
- Although live bait is preferable, frozen baits also work well.
- Mullet heads hooked through the eyes are effective. Sections of mullet are generally tried after all the heads have been used. These softer portions of bait tend to attract hardhead catfish. Although squid can be an effective bait, it also may attract too many hardheads.
- Crabs can be hooked through the front of the shell with the hook tip pointing up. Occasionally, it is helpful to remove the claws from large crabs.

Technique

Cast the bait away from the boat, and leave the reel in the free-spooling position. Place the rod in a secure location and wait. Usually two or three rods can be fished per person if space permits. When a fish starts to run with the bait, grip the rod securely, put the reel into gear, quickly wind in the slack and set the hook with authority. Reel the fish in, letting the fish take line only when it is overpowering the drag setting of the reel.

Be sure to land the fish with a knotless landing net to reduce damage to the scales, skin and slime coating. A 3-foot by 4-foot plastic tarp with poles sewn into the long edges like a stretcher is helpful for holding the fish during landing and while removing the hook.

Day-to-day Maintenance

Technical information about the design of temperature- and photoperiod-controlled tank systems for spawning red drum (and other species) is readily available. Little, however, has been written about the day-to-day management required to maintain red drum in good health and to condition them for spawning. The following recommendations are based on the authors' personal experiences as well as conversations with commercial producers.

Feeding

Newly collected red drum broodstock are often reluctant to eat after being placed in tanks, but these fish are usually voracious feeders once they become accustomed to captivity. Although dietary preferences of individual fish may become apparent with time, captive red drum will eat a wide variety of foods. Squid, shrimp, croaker, crab, crawfish, beef liver and several other species of freshwater and marine fish have all proved to be acceptable. By-catch from shrimp trawls is an ideal, low-cost source of broodstock nutrition.

Oily species, such as menhaden, are not recommended because they tend to foul the water excessively after feeding. Catfishes are also not recommended



because of their spines. Larger crabs should be avoided because uneaten pieces of shell tend to clog drain lines and biological filter media.

Broodstock feed should be frozen before use to kill any parasites that may be present. It is important, however, to allow food to thaw completely before offering it to broodstock to avoid sudden temperature changes within their digestive tracts.

Most culturists recommend feeding broodstock at a rate of 3%-5% body weight per day, every day, to promote good reproductive performance and egg quality. Feeding fewer than seven days a week has been associated with reduced egg production and quality.

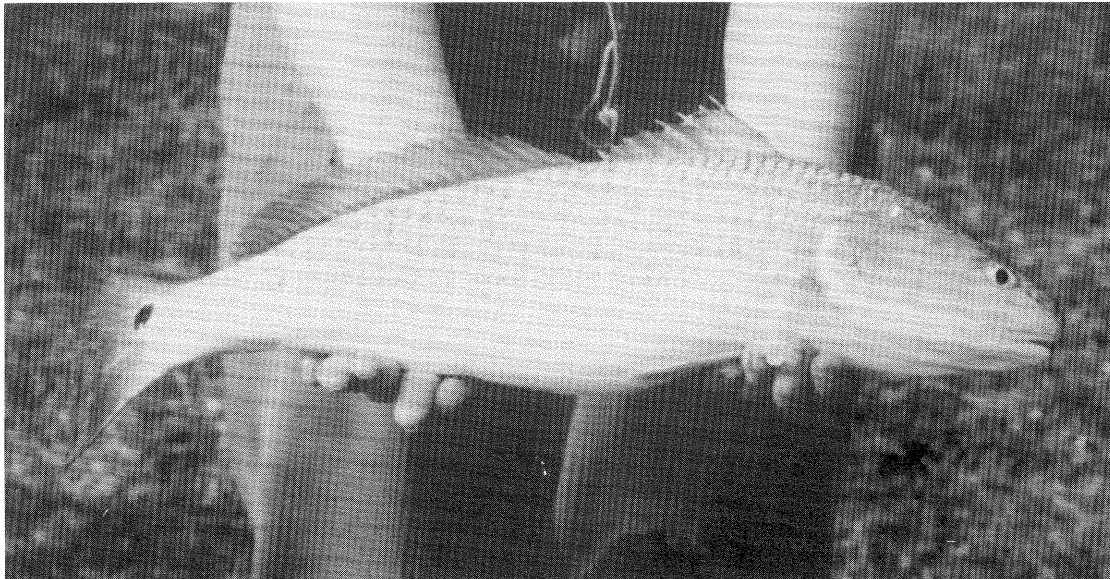
Fish should not be disturbed before feeding. Although some individuals will become remarkably tame, most red drum broodstock are especially sensitive to sudden changes in light level, loud noises and people touching or bumping the walls of the tank. If fish do become alarmed, wait for them to calm down before continuing to offer food. This helps maximize the consumption of feed and minimizes the impacts of uneaten feed on water quality. Red drum broodstock confined to tank systems can become extremely active when feeding (as well as during pre-spawning behavior or when frightened). Occasionally, fish may inadvertently leap out of the tank and sustain serious injuries. For this reason, many culturists cover tanks with lightweight plastic netting suspended above the water surface.

Moving Broodstock

Red drum broodstock generally weigh 20 pounds or more. Their strength and size make them especially difficult to handle gently; as a result, they are especially susceptible to handling stress. Injuries to scales and skin can be minimized by using knotless soft nylon nets and moving only one fish at a time.

Red drum broodstock must be handled gently but firmly to prevent fish from injuring themselves by falling or striking hard objects. When broodstock must be carried or examined, a wet plastic stretcher can effectively immobilize even large individuals, preventing unnecessary loss of scales and body slime. Large red drum can be severely bruised if they are lifted by the tail, and this type of mishandling often results in death. Covering a fish's eyes during handling usually minimizes physical resistance and helps calm the fish.

Round transport tanks are preferable to square or rectangular ones. Most injuries incurred during hauling are the result of repeated inadvertent impacts with transport tank walls. When broodstock are placed in a transport tank, they usually become calm. If they do not, MS-222, a common fish anesthetic, can be applied at 5-20 ppm to minimize transport injuries. Some culturists report better survival without anesthetics, as long as fish



Red drum collected as sub-adults can spawn many times in captivity if they are properly handled and maintained.

remain tranquil and can be handled gently. If transport times exceed 8 hours, water quality problems can be reduced by cooling the transport water to 18-20° C.

Medication

Newly acquired broodstock may become sick or die within several days or weeks after introduction into spawning tanks. Reasons for this include handling stress, secondary infections from loss of scales and slime, improper acclimation and/or proliferation of external protozoan parasites.

At this time, no drugs or medications have been approved by the FDA for use on red drum. Under certain circumstances, however, FDA will grant special permits, known as Investigational New Animal Drug permits (INADs), which allow the application of chemicals and drugs approved for other food fish to red drum or other “new” aquaculture species. The process associated with obtaining permission to treat aquaculture species under the INAD system is too complex to cover here, but aquaculture specialists with the Louisiana Cooperative Extension Service and experts at the LSU School of Veterinary Medicine can help with the process if an INAD becomes necessary. The one point to remember is that drugs administered under an INAD must be prescribed by a veterinarian. Your veterinarian should have an established relationship with your operation and an understanding of the conditions under which drugs will be administered, but it is not necessary for him or her to be present every time drugs are used.

External protozoan parasites common to red drum maintained in recirculating systems include *Amyloodinium ocellatum* and *Cryptocaryon irritans*.

These microscopic parasites can quickly kill broodstock if allowed to establish themselves in recirculating systems. A sure sign of protozoan problems is known as “flashing,” where fish jerk and rub against the sides and bottom of the tank erratically, as if trying to scratch an itch.

If proper regulatory requirements are met (INAD protocol), protozoan outbreaks can be controlled by applying copper sulfate at 0.75 ppm as CuSO_4 every two to three days for up to eight treatments. However, problems with egg maturation and production have been linked to chronic exposure to copper. An effective alternative is to include a diatomaceous earth filter in the recirculating system. These filters, which are widely available at swimming pool supply outlets, literally filter the infective stages of many protozoan parasites out of the water as it is forced through a layer of diatomaceous earth, mechanically removing the problem without the use of chemicals.

Water Management for Inland Broodstock Facilities

Unless a supply of natural saltwater is available, artificial sea salts must be used to maintain required salinity levels in closed marine systems. Saltwater from brine wells can provide part of the salinity needed, provided ionic levels and ratios are similar to seawater. Many brine wells in Louisiana are high in some elements, such as barium, and deficient in others. The effect of these deviations from natural seawater on survival of red drum larvae and juveniles is not well understood. It is reasonable in many cases, however, to blend a portion of the brine with artificial seawater to save money. The brine to be used should be analyzed by a reputable lab,

and experimentation may be required to establish just how much brine can be used. Since 26 to 28 ppt salinity is required for egg collection in broodstock tanks, a great deal of savings can be realized with this method.

Water exchanges are best performed on a regular basis. One way to maximize the effectiveness of these changes is to drain only water from solids collection areas such as biofilters and diatomaceous earth filters. Unless a serious problem exists, there is no reason to drain water directly from broodfish tanks.

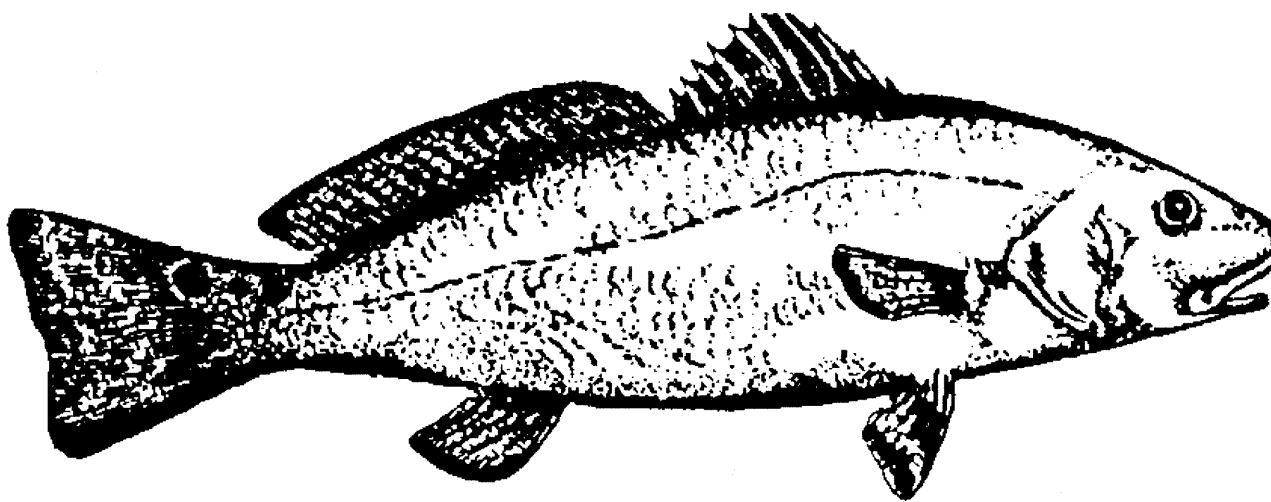
Mixing tank capacity for water replacements should be at least 15%-20% of the broodfish tank volume to ensure adequate exchange capacity if water quality problems develop. Exchange water made up from artificial sea salts should be aerated for at least 24 hours before use to allow time for dissolved gases to escape, elements to dissolve completely and pH to stabilize.

Artificial sea salts should not be allowed to dissolve in the biofilter or the broodfish tank. Some undissolved components of seawater can be toxic to fish.

Mixing tank salinity levels can generally be kept at 5%-15% less than the desired salinity in the broodfish tank. This is because some of the water in the broodfish tank and in the mixing tank will be lost to evaporation. As water evaporates, the salts are left behind and salinity increases.

Practical Considerations

Power outages are inevitable. Murphy's Law dictates they will occur when the aquaculturist is asleep or away from the facility. Oxygen cylinders equipped with electric solenoid valves and airstones provide an immediate, although short-term, approach to keep fish alive. For longer power outages, back-up generation capabilities are a must. In the event of a hurricane, power can be off for weeks. Alarms for low water level and air pressure are available from a number of sources. These safety features can reduce the anxiety associated with keeping valuable fish alive, but they are not foolproof. Successful culturists will be able to anticipate potential site-specific problems.



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