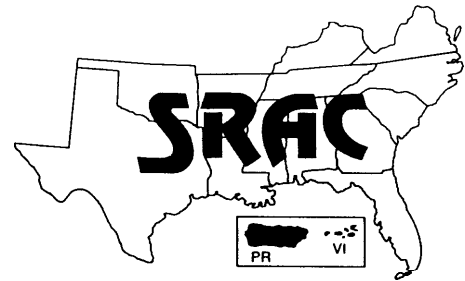


Southern Regional Aquaculture Center



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Capturing, Handling, Transporting, Injecting and Holding Brood Fish for Induced Spawning

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The physical injury and physiological stress of capturing, handling, transporting, injecting and holding brood fish can have a greater detrimental effect on spawning success than almost any other factor. Fish must be handled carefully and optimum water conditions must be maintained to minimize stress. The importance of proper handling and water quality cannot be overemphasized. Female brood fish ready for spawning are in a particularly delicate condition. When female fish are stressed or injured, they may undergo rapid physiological changes that can result in the break-down (resorption) of the eggs in the ovary. Fluctuations in temperature and low dissolved oxygen can hasten the resorption of eggs. Sub-optimum conditions, while not immediately lethal, may stress brood fish, resulting in delayed mortality or failure to spawn.

Capture of brood fish

Always check with your state conservation department to determine legal capture methods and obtain proper permits.

Haul seine

Haul seines are effective for fishing large areas to collect brood fish. While this collection method is probably the most versatile and popular, the area to be seined

must be free of bottom snags or obstacles. Mesh size is dependent on fish size, and seine depth determines the depth of water that can be fished. Bag seines with extra lead weight are usually more effective than straight seines for brood fish capture.

Brood fish raised in ponds are usually captured by haul seine. Partial draining of the pond can simplify capture. Water level should not be lowered during the heat of the day. The temperature of shallow water increases rapidly, stressing the fish. Dissolved oxygen should be checked frequently, before and during draining. If the dissolved oxygen drops below 4 mg/L while draining brood fish ponds, stop draining, refill and aerate. If additional brood fish are still in the pond after seining, the pond should be flushed with fresh water to counteract the effects of disturbing the bottom sediments on reduced dissolved oxygen and the release of hydrogen sulfide and other toxic chemicals.

Dip net

Dip nets can be an effective capture method when brood fish are concentrated on the spawning grounds or in tailwater areas. This method inflicts minimal damage to fish. Brood fish raised in tanks are usually captured with dip nets. A crowding net should be used in large tanks to simplify capture. Dip nets are also used when trans-

ferring fish from seines, trap nets, hauling tanks, etc. Knitted small-mesh dip nets are recommended for handling brood fish to minimize scale loss and injury.

Gill net

Both stationary and drift gill nets are effective for brood fish capture. They allow a large area of water to be fished to determine migratory routes and areas of brood fish concentration. However, these nets often cause physical damage and stress. Mortality may be appreciable, but losses can be reduced by checking the nets and removing fish every 15 to 30 minutes.

Trap net

Trap nets such as pound nets, fyke nets and hoop nets have also been used to capture brood fish during the spawning migration. However, entrapment gear is usually limited in its application because of site selection, manpower requirements, mobility, and equipment expense.

Electrofishing

When brood fish are concentrated on the spawning grounds or in tailwater areas below dams, electrofishing is an efficient method of capture. Fish collected in this manner usually will not struggle vigorously and, in most instances, are immobile for 1 to 3 minutes during the critical pickup and initial

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transportation period. Various types of electrofishing gear can be adapted to widely differing habitats. Electrofishing, however, is restricted in all states and a special collecting permit is required.

Angling

Mature fish may often be taken by hook and line in tailwater areas or where fish are concentrated and vulnerable to fishing pressure. For many fish species, this may be the only option for commercial fish farmers.

Handling brood fish

Handling of brood fish should be kept to an absolute minimum. Gentleness when handling fish is of utmost importance to prevent physical injury and physiological stress. Damage to the slime (mucus) layer, scales, and skin of the fish can result in infection. It also causes excessive uptake of water by freshwater fish or loss of water from marine species (osmotic stress). Knitted fine-mesh dip nets are recommended for handling fish to minimize injury and scale loss; do not use knotted dip nets. Minimize the number of times the fish are lifted from the water, and work as quickly as possible when transferring fish. Time spent with the fish out of the water during handling can mean the difference between a good spawn, no spawn, or death.

Transporting brood fish

Fish crowded in a transport tank can rapidly become stressed due to physical injury, deteriorating water quality, rapid changes in water temperature, and osmotic imbalance. Handling tanks in capture boats and transport trucks should be large enough to allow complete freedom of movement to the brood fish and have no sharp corners or edges that might injure the fish. Hauling tanks are usually aerated with oxygen (bottled or liquid) with air stones, electrical agitators (12-volt), or both. A high level of dissolved oxygen is crucial for rapid recovery of the brood fish from the oxygen debt incurred

during capture and handling. Oxygen bottled or liquid is recommended for reviving fish immediately following capture. For long hauls, water agitators should be used in addition to oxygen to drive off the carbon dioxide that accumulates in the water. The combination of aerators also provides a backup in case of system failure. Water in small containers can warm quickly, resulting in temperature shock. Warm water also reduces available oxygen and increases the metabolic rate of the fish, adding further physiological stress. Capture and transport brood fish during cool evening or early morning hours to minimize stress. Ice may be added to the water during hauling to prevent an increase in water temperature. Salt (0.3 -1.0 percent) may be used in the transport water to minimize osmotic stress and infection. Anesthetics have also been used successfully during transport of fish.

Injecting brood fish

Females that have eggs in a sufficiently advanced stage of development for successful hormone-induced spawning (See *Determining Sexual Maturity of Broodstock for Induced Spawning of Fish*) should be injected as soon as possible. Any delay in injecting the brood fish greatly diminishes the chance for a successful spawn. While injecting the fish, every effort must be made to minimize stress and injury. It is unnecessary to remove the fish from the water when giving injections. Brood fish are usually captured and gently restrained in a net for injections. Avoid squeezing or forcefully holding the fish. Fish may be anesthetized with MS-222 if necessary. The fish may struggle less if a cloth is placed over its head. Underwater injections while the fish is stationary or swimming slowly are sometimes used for large, delicate species of fish because it eliminates the stress of forcible restraint.

Holding brood fish at the hatchery

Environmental factors in the brood fish holding tank such as dissolved oxygen, water temperature and absence of disturbance to the fish following hormone injections are believed to play an important role for successful induced spawning. The handling stress and the physiological processes of final maturation of eggs and sperm increase the oxygen demand of the brood fish. High temperature accelerates egg maturation, resulting in an even greater oxygen demand by the fish. Elevated temperature will also increase the rate of development of disease organisms. However, if the temperature is too low, spawning will be delayed or in many cases completely inhibited.

Holding tanks should be large enough to allow complete freedom of movement to the brood fish. Round tanks or tanks with rounded corners are preferable because they minimize injury to the fish. Holding tanks should be covered to provide shading that will help quiet excitable species and prevent the fish from jumping to their death.

Conclusions

Brood fish must be handled carefully to minimize physical injury and stress. Speed and gentleness during fish capture and handling are of utmost importance. Crowding, dissolved oxygen depletion, rapid changes in temperature, and osmotic imbalance are well known causes of stress and must be avoided when transporting fish. Females that have eggs in a sufficiently advanced stage of development for successful hormone-induced spawning should be injected as soon as possible. Any delay greatly diminishes the chance for a successful spawn. Dissolved oxygen content of the water, proper temperature, and absence of disturbance to the fish following hormone injection(s) are believed to play an important role for successful induced spawning.