

Biosecurity Protection for Fish Operations

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Producers of trout and salmon have long followed rigorous biosecurity protocols designed to prevent the spread of fish diseases from one farm to another, between farmed fish and wild fish and from pond to pond within a farm. The bacterial and viral diseases of trout are easily spread and research has shown that the incidence of diseases is significantly higher on farms that employ workers that work at more than one production facility. Trout and salmon are subjected to rigorous health inspections before any fish transfer takes place. These inspections may involve individual lots of fish, but more commonly focus on certifying production facilities and their water supplies as free from specific fish diseases. State and federal law mandate the protocols for these inspections and frequently involve highly sensitive DNA techniques (PCR).

There are no such organized regulations governing the movement of the warmwater fish. Each state and foreign country may have its own import regulations but there is no system for routine inspection of warmwater fish farms. The difference in handling of coldwater and warmwater fish diseases developed because of a historic emphasis by the U.S. Fish and Wildlife Service on the management of trout and salmon. Since then, warmwater fish have remained out of the inspection spotlight because of a widespread perception by farmers and regulators that disease risks associated with the transport of warmwater fish are not significant. This widely held assumption might not be valid. A careful examination of the history of some warmwater fish diseases provides ample evidence of disease spread.

Enteric septicemia of catfish (ESC) is the most important disease in the catfish industry. The disease occurred on an Arkansas fish farm in 1969, but was not correctly diagnosed until 1978 when three cases were reported. By 1985, the disease was so widespread that diagnostic laboratories reported almost 4,000 cases. Another example is Koi Herpes Virus (KHV). This disease was exported to the U.S. along with shipments of koi. It spread slowly at first because water temperatures were not optimal. When spring came and koi ponds warmed, valuable collections of koi were wiped out all over the U.S. Clearly

there are warmwater fish diseases with the potential to be just as devastating as those that affect trout.

Preventing the Introduction of New Diseases

The greatest disease risk facing Arkansas fish producers is the introduction of new diseases into established farms. Possible mechanisms for disease introduction vary depending on the fish species involved, but those below probably present the biggest hazard.

- Bringing infected fish onto the farm from another fish farm or from the wild.
- Transfer of equipment (seines, aerators and trucks) between farms.
- Animal vectors, especially birds.
- Using contaminated water.

Farmers can avoid introducing new diseases by following procedures aimed at blocking these modes of disease transfer. A comprehensive biosecurity plan should include the following.

When introducing new fish: Wild fish, fish from other farms or fish returned to the farm by a distributor should all be considered potential sources of disease. New fish should be inspected for known diseases before they are brought onto the farm. While not practical with current catfish production practices, producers of other fish species should quarantine new fish in ponds or facilities separated from the rest of the farm by the greatest practical distance and as far away from existing broodfish stocks as possible. The duration of the quarantine should be at least several weeks and involve the full range of spring or fall temperature fluctuations (quarantining fish in the winter for a disease that only occurs in warm water is not useful). Minnows returned to producers from dealers should be kept separate from established fish stocks.

When moving equipment: Drying kills many fish pathogens. When practical, trucks, seines and other equipment that has been used for fish from another facility or from the wild should be rinsed

(warm soapy water is even better) and allowed to dry before reuse. This is especially critical for seines and trucks that have been used to harvest or transport sick fish. As a mechanism to transfer disease from farm to farm, a wet mucus-laden seine is almost as dangerous as the transfer of infected fish.

Animal vectors: The most important animal vectors for fish diseases are birds. Several species of fish-eating birds carry life stages of parasites (“grubs”) that infest fish. A bird control program that uses the most effective legal means to discourage birds from visiting farm ponds can reduce this risk (see your Extension agent or the animal control specialists from USDA-APHIS). The same parasites that travel in birds also have snails in their life cycles so chemical or biological control of snail populations is beneficial in species where grubs are a problem. There is also some evidence that birds may be able to transmit bacteria or viruses through their droppings. Birds may also drop fish that they have removed from one body of water into another.

Contaminated water: The safest water for fish production is water pumped straight from a well to the pond. However, concerns about declining water tables and pumping costs have raised interest in

reusing water and in the use of water pumped from rivers. Water recirculated within a farm from pond to pond is not likely to be the source of new pathogens but may enable existing pathogens to build up larger populations. River water may contain new pathogens not present on the farm and is the least desirable source of water for fish production. If river water must be used, it should be pumped through the finest filter practical and aged in fish-free ponds before use.

Preventing the Establishment and Spread of Disease

When populations of fish quit feeding, behave strangely or suffer significant mortality, samples should be submitted to one of the four UAPB Fish Disease Diagnostic Laboratories. This is especially critical if the disease appears different than those previously experienced on the farm. Until a diagnosis is determined, sick fish should be quarantined and any movement of fish, water or equipment from the pond should be prevented. If an exotic disease is diagnosed, the infected fish should be treated or eradicated to prevent the spread of the disease. Careful adherence to this policy has prevented the establishment in Arkansas of several potentially devastating exotic diseases.