

Submitting Diseased Fish for Diagnostic Evaluation

General Comments

To make an accurate diagnosis requires cooperation between the producer and diagnostic laboratory personnel. Producers and diagnosticians must understand that an exchange of information is paramount in the development of a definitive diagnosis and institution of appropriate remedial measures. The producer must also keep in mind that he or she has the most to gain or lose in a disease outbreak and that decisions concerning management changes are ultimately theirs to make.

Signs of Disease

General Indicators of Disease

- Sudden massive mortality
- Constant or increasing mortality over time
- Individual fish separated from others on the bank, bottom, or surface
- Reduced feeding activity
- Fish congregating at inlets, aerators, or surface
- Change in water appearance (i.e. green to brown bloom)
- Equipment failure (aerators not running)
- Changes in smell (algae, H₂S, ammonia, or dead fish)
- Increased numbers of predators or scavengers



Specific Indicators of Disease

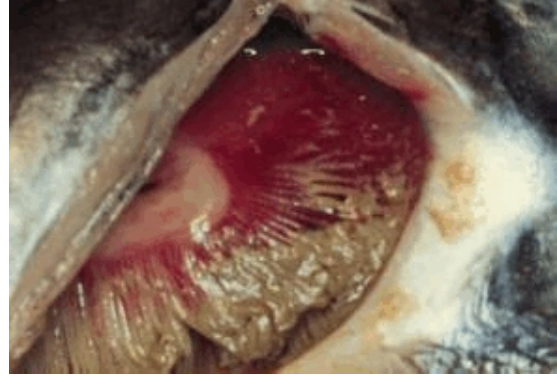
Behavioral signs

- Anorexia
- Lethargy
- Erratic swimming, porpoising, spiraling, or bobbing
- Flashing and rubbing
- Loss of equilibrium
- Gulping at water surface

Clinical Signs of Disease

Gill lesions

- Bleeding
- Color change: brown, mottled, white or pale
- Swelling
- Adherent debris
- Areas of tissue destruction or loss of gill filaments
- White spots



Columnaris disease on gills



“Hole in the head” lesion associated with chronic ESC

Skin lesions

- Abrasions, erosions, or ulcers
- Excessive mucus or dryness
- Hemorrhage
- Areas of discoloration
- Perforations
- White spots
- Woolly or cottony appearance

Swollen belly with free fluid

Bulging eyes

Physical deformities



Fluid filled abdomen and “popeye” of CCV

Sample Collection, Transport, and Submission

The purpose of submitting fish to a diagnostic laboratory is to identify the cause or causes of a mortality event. The type and condition of the sample submitted greatly influence the success or failure of a diagnostic investigation. It is essential that adequate samples are collected and preserved to promote the best chance of arriving at a rapid and accurate diagnosis so that treatments can be initiated in a timely manner. A minimum of three live fish, exhibiting behavioral and physical signs representative of the diseased population as a whole are the best sample for diagnostic evaluation. A diagnostician may also request to examine apparently healthy fish from the culture unit to help evaluate the significance of parasite burdens and other disease processes.

Appropriate samples may at times be difficult to obtain, but increase the probability of identifying the offending cause. Live fish obtained entirely from seines, caught by snagging or hook and line, or otherwise randomly caught from the general population make poor diagnostic samples, because the disease in question often does not afflict them. Exceptions include sampling for routine health checks, testing to prevent the introduction of pathogens into disease free stocks of fish, disease free certification for purchase or shipping, or when healthy fish are needed for comparative purposes in a diagnostic evaluation.

Freshly dead fish are often suitable for diagnostic purposes, although live fish are always preferable. Fresh carcasses have red gills, clear eyes, normal skin color, a glistening mucus coat, and usually no significant bloating or odor. Tissue decomposition occurs rapidly after death when a carcass is allowed to float in water, especially at warmer temperatures, greatly diminishing the precision of the necropsy examination. Post mortem decay results in the destruction of tissue structure, making microscopic examination difficult or impossible, parasites abandon the carcass or die soon after the death of the host fish, and bacterial contaminants colonize the carcass upon death and can quickly overgrow the causative bacterium, making isolation difficult.

Samples should not be frozen unless absolutely necessary to avoid spoilage before a sample can be delivered to a diagnostic laboratory. Freezing destroys parasite and tissue structure, often precluding parasitic and microscopic examination, but will permit chemical analysis. Viral and bacterial isolation may be possible, but is less reliable than when attempted from fresh samples.

Once collected, samples should be placed in sealed plastic bags or other waterproof containers and placed on ice. Water should not be added to the container. Clipping the spines from catfish will prevent puncture of plastic bags and prevent any subsequent influx of water. Samples prepared in this manner should be suitable for necropsy for 1-2 days. Fish collected alive can be placed in aerated water and transported if a diagnostic laboratory is nearby, although diseased fish may not survive for long following capture and transport.

Along with the submission of a proper fish sample, historical information regarding production practices and mortality patterns can be crucial to making a proper diagnosis and treatment recommendation. Information that should be provided with diseased fish is included below:

- Type and size of the culture unit
- Stocking density and fish sizes
- Feeding rate and feeding activity
- Observed clinical signs: behavioral and physical
- Date when losses began
- Total number of fish lost and approximate number dying per day
- Time of day when sick or dead fish are observed
- Recent water quality data
- Previous chemical treatments
- Bloom condition and recent changes
- Other pertinent information, such as any unusual bird activity, recent seining, etc.

A water sample from the affected culture unit should also be included with any fish sample submitted. Examination of the fish alone may not always provide sufficient information to determine a cause of death or disease. Water samples should be at least 8 ounces and placed in a clean glass jar. The jar should be flushed several times with pond water, filled to the top, and sealed tightly. If samples are to be shipped via overnight carrier, a well-insulated, sealed container should be used and samples packaged as above. The diagnostician should be notified prior to shipment to ensure receipt and for any other special shipping instructions.

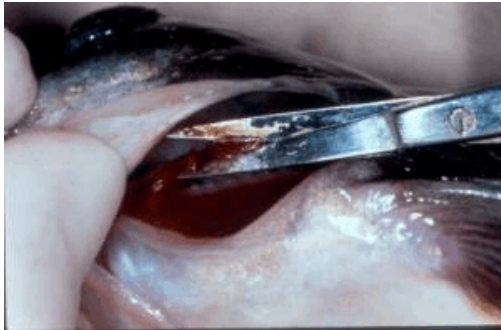
Mississippi State University operates two diagnostic laboratories for fish diseases:

Aquatic Diagnostic Laboratory
National Warmwater Aquaculture Center
Delta Research and Extension Center
127 Experiment Station Road
Stoneville, MS 38776

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Fish necropsy - bacterial culture



Gill clipping - parasite examination

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