

## 1.3.3 Streptococcal Disease

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### A. Name of Disease and Etiological Agent

Streptococcal disease is caused by *Streptococcus iniae* and *Streptococcus* spp.

Although nonhemolytic Lancefield Group B is most commonly reported, there are reports in the literature, particularly from Japan and South Africa, that other Lancefield groups of streptococci have caused fish mortality. Of these other Lancefield groups, group D (alpha or beta hemolytic streptococcus) is most often reported and *Streptococcus iniae* is of particular note in closed culture systems.

### B. Known Geographical Range and Host Species of the Disease

#### 1. Geographical Range

It is found in the United States, South and Central America, South Africa, Japan, and Republic of China

#### 2. Host Species

There is no specific host. The disease has been reported from fishes in brackish and marine waters and from several freshwater fishes, including aquarium fish species. Tilapia cultured in closed and intensive systems are particularly vulnerable.

### C. Epizootiology

The epizootiology of the Group B type is not understood at this time. It appears to spread from fish to fish (aquarium species) by cannibalism, and has been isolated primarily from the brain of affected

fish. Cases of Group D streptococcal infections have been associated with fecal contamination. Water salinity in brackish environments may exert some selectivity for specific streptococcal types.

The infection appears to be very communicable as long as infected fish are present. Fish stress and unfavorable environmental conditions enhances the probability and severity of infection.

#### D. Disease Signs

Disease signs are variable, but affected fish commonly have numerous raised, hemorrhagic, inflamed areas on the skin including the operculum, around the mouth, at the bases of fins, and in general along the dorsolateral portions of the body (Figures 1 and 2). The abdomen is distended and the peritoneal cavity often contains bloody fluid (Figure 3). Exophthalmia is present with hemorrhage in the eye (Figure 4). The liver is usually pale and the spleen dark red. Kidneys appear normal and are not the primary target organs. A hemorrhagic enteritis with bloody fluid present in the intestinal lumen is also seen. Infected fish are lethargic and often swim in a tail-chasing spiral (Figure 5). Histological findings vary depending on the organisms and host species involved. Infections in the head often produce a granulomatous encephalitis and meningitis.



**Figure 1.** Atlantic Menhaden with a streptococcal infection.



**Figure 2.** Severe skin hemorrhage in a tilapia with a streptococcal infection (picture by Andy Goodwin).



**Figure 3.** Hemorrhage from the vent of Atlantic Menhaden with a streptococcal infection.



**Figure 4.** Exophthalmia in a tilapia with a streptococcal infection.



**Figure 5.** Tilapia with bent tails characteristic of some streptococcal infections.

## E. Disease Diagnostic Procedures

Diagnosis is based on the observation of characteristic clinical signs and the isolation and identification of the causative organism. Primary isolation should be made from fish tissue on TSA or BA, or both, incubated at 25 to 35°C for 24 to 48 hours. The addition of whole blood increases isolation efficiency. The brain often is the best organ for bacterial isolation.

### 1. Presumptive Diagnosis

Organisms isolated in culture are gram-positive, nonmotile, cytochrome oxidase-negative, catalase-negative cocci in chains. The colonies are pinpoint to pinhead in size and convex. In liquid culture, the broth may appear viscous. On BA, colonies of Group B streptococci are nonhemolytic and CAMP-positive, whereas colonies of Group D streptococci show alpha or beta hemolysis and are CAMP-negative.

### 2. Confirmatory Diagnosis

Diagnosis is confirmed by the isolation of a catalase-negative, gram-positive cocci in chains which is typed by Lancefield grouping as Group B or Group D. Isolates from Asia may be serologically distinct from North American isolates (Kitao 1982).

## F. Procedures for Detecting Subclinical Infections

Isolation of *Streptococcus* sp. from locations such as brain tissue of an asymptomatic fish would indicate a subclinical infection.

## G. Procedures for Determining Prior Exposure to the Etiological Agent

No procedures have been reported.

## H. Procedures for Transportation and Storage of Samples to Ensure Maximum Viability and Survival of the Etiological Agent

See Section 1, 1.1.1 General Procedures for Bacteriology.

## References

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