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DISEASES CAUSED BY BACTERIAL PATHOGENS IN INLAND WATER

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Contents

1. Inland water streptococcosis
 2. Furunculosis
 3. Bacterial gill disease
 4. Columnaris disease
 5. Bacterial Cold-Water Disease
 6. Red spot Disease
 7. Edwardsiellosis (*Edwardsiella ictaluri*)
 8. Motile *Aeromonas* Disease
- Glossary
Bibliography
Biography Sketches

Summary

Bacterial diseases cause huge damages in fish farms worldwide, and numerous bacterial pathogens from inland and saline waters have been identified and studied for their characterization, diagnosis, prevention and control. In this chapter, eight important fish diseases *viz.* 1) streptococcosis (inland water), 2) furunculosis, 3) bacterial gill disease, 4) columnaris disease, 5) bacterial cold-water disease, 6) red spot disease, 7) edwardsiellosis (*Edwardsiella ictaluri*), and 8) motile aeromonads from inland water were included covering the topics such as characteristics of disease agent, and pathogenesis, histopathological interest, diagnostic method, chemotherapy and disease control.

1. INLAND WATER STREPTOCOCCOSIS

Terutoyo Yoshida

1.1. Synopsis

Streptococcosis caused by the genera *Streptococcus* and *Lactococcus*, occurs in cultured and wild fish in freshwater, brackish water, and seawater environments due to the worldwide development of intensive fish farming practices. The genera *Streptococcus* and *Lactococcus* are facultative anaerobic, catalase-negative, and morphologically Gram-positive cocci. Historically, hemolysis on blood agar and Lancefield serological grouping have been used to identify and classify pathogenic *Streptococcus* spp. Fish pathogenic *Streptococcus* spp. and *Lactococcus* spp. are also classified into α , β , and γ (non-hemolysis) hemolysis types and Lancefield groups B, C, and non-typable.

Inland freshwater streptococcosis in cultured fish is caused by several bacterial pathogens, including *L. garvieae*, *L. piscium*, *S. iniae*, *Vagococcus salmoninarum*, and Lancefield serological group B *S. agalactiae* (GBS) and group C *S. dysgalactiae*. *L. garvieae*, *S. iniae*, and *S. agalactiae*, and *S. dysgalactiae* cause serious diseases in freshwater fish and in cultured and wild saltwater fish. In particular, a mass mortality of wild mullet occurred in Kuwait Bay due to β -hemolytic *S. agalactiae* infection (Evans *et al.*, 2002) (Figure 1.1). Although *S. agalactiae* causes diseases in marine fish, this section focuses on Lancefield serological group B *S. agalactiae* (GBS), *L. piscium*, and *V. salmoninarum* as causal agents of streptococcosis in freshwater fish. *L. garvieae*, *S. iniae*, and *S. dysgalactiae* also cause diseases in salmonids, sweetfish (*Plecoglossus altivelis*), or tilapia in freshwater environments. These pathogens will be described in the section on bacterial pathogens in saltwater streptococcosis.

1.2. Introduction

Inland water streptococcosis occurs in freshwater fish species, mainly tilapia and salmonids. *S. agalactiae* causes diseases in warm water species including tilapia. *S. agalactiae* infections occur in cultured and wild fish species in both marine and freshwater environments in many countries including Australia, Brazil, Kuwait, Israel, USA, and Thailand. Streptococcosis in salmonids under low water temperature conditions is caused by *V. salmoninarum* and *L. piscium* infections. This section also introduces these pathogens.