

# Streptococcosis in a Pet Fish, *Astronotus Ocellatus*: A Case Study

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**Abstract**—Fish Streptococcosis is a systemic infectious disease, caused by organisms of the genus *Streptococcus*. *Streptococcus* is a genus of bacteria containing some species that cause serious disease in a number of different hosts (1). A wide variety of freshwater and marine fish species has been reported to be susceptible to *Streptococcus* spp. (2). Streptococcal disease in fish was first reported in 1957, affecting cultured rainbow trout in Japan (3). Since then, many other species of fish have been found susceptible to infection, including salmon, mullet, golden shiner, pinfish, eel, sea trout, tilapia, sturgeon and striped bass (4). Streptococcosis has also been reported in a variety of ornamental fish, including rainbow sharks, red-tailed black sharks, rosy barbs, danios, some cichlids including venustus (*Nimbochromis venustus*) and *Pelvicachromis* sp. and several species of tetras (1). To best of our knowledge this case study is the first report on Streptococcosis in Yellow oscar as a freshwater aquarium fish.

**Keywords**—Streptococcosis, *Astronotus ocellatus*

## I. INTRODUCTION

**S**TREPTOCOCOSIS infection in fish can cause high mortality rates (>50 %) over a period of 3 to 7 days. Some outbreaks, however, are more chronic in nature and mortalities may extend over a period of several weeks, with only a fish dying each day (5).

The present report describes the occurrence of Streptococcosis in Yellow oscar. In November 2007, two numbers of Yellow oscars were delivered to microbiology laboratory of Artemia and Aquatic Animal Research Institute by an aquarist in Urmia, Iran. At the time the water temperature of aquarium was 26°C.

Clinical examination of the affected fish identified erratic swimming, loss of buoyancy control, unilateral and bilateral exophthalmia, corneal opacity, hemorrhages around the eye, the gill plate, base of fins, vent/anus, and other parts of the body; ascites and ulcerations (Fig. 1).

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Fig. 1 Exophthalmia, hemorrhages around the gill plate, base of fins, vent/anus, and other parts of the body of the Yellow oscar

The fish were sacrificed with a blow on the head. They were opened aseptically and the internal organs and ascetic fluid of fish were routinely sampled for bacteriological, pathological and biochemical analyses.

Kidney tissue, Liver, Heart and Spleen were cultured on Tryptone Soya Agar (TSA, Merck, Germany), Blood Agar (Merck, Germany) and Brain Heart Agar (BHA, Merck, Germany) and the plates were incubated aerobically and anaerobically at 25 °C for up to 72 hours. At all affected fish, pure cultures of a bacterium were isolated from kidney, liver, heart and spleen. Physiological and biochemical identification of bacterial isolate were performed as described previously (6). The isolated organisms consisted of facultative anaerobic Gram positive and non-motile cocci (Fig. 2), which showed negative reaction in catalase test. On the basis of Physiological and biochemical characteristics, the isolate was obviously identified as *Streptococcus iniae*.

The tissue samples including: eyes, stomach, ovary, spleen, liver, brain, kidney and heart were fixed in 10% buffered formaldehyde solution, and processed for light microscopy examination. Sections were stained with haematoxylin and eosin (H & E). Sections revealed the presence of congestion in choroid blood vessels of the eye, and some dilated vessels had septic thromboemboli with bacterial colony in the center and fibrin in the peripheral. There were purulent inflammation and focal micro abscesses in the muscular, mucosal and sub mucosal layers of the stomach. Histopathological examination of the formalin-fixed tissues confirmed the presence of local hemorrhages in the ovary. The melanomacrophages of the spleen had bacterial colony as a purple body, and some of the blood vessels of liver and brain had thrombosis with purple mass (bacterial colony, Fig. 3).

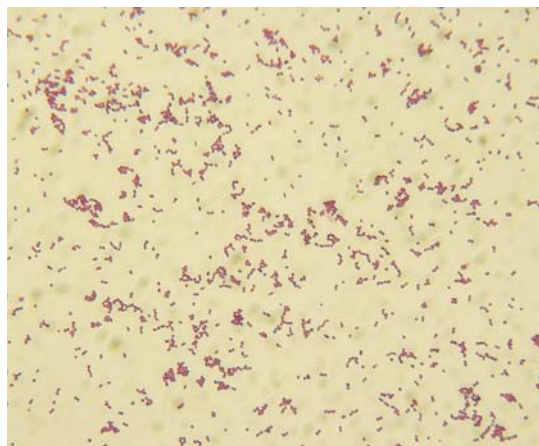


Fig. 2 Gram staining of *Streptococcus iniae* from Yellow oscar ( $\times 100$ )

Histopathological analysis demonstrates the presence of septicemic infection in Yellow oscar; this finding is in agreement with observation by Kusuda *et al.* (7) that Streptococcosis identified by hemorrhagic septicemia, exophthalmia, ascites and diffuse thrombosis in blood vessels.

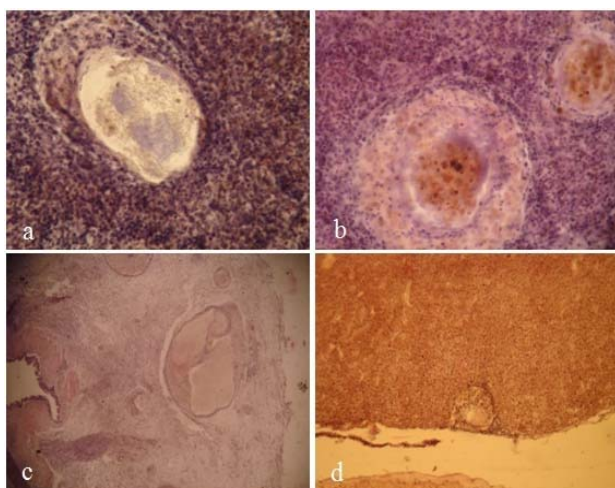


Fig. 3 Section of tissue samples of Yellow oscar: a) The section of spleen showing bacterial colony as a purple mass inside the blood vessel (H & E,  $\times 200$ ), b) The presence of bacterial colony in spleen melanomacrophages (H & E,  $\times 400$ ), c) Septic thrombosis in the stomach veins (H & E,  $\times 32$ ) and d) Septic thrombosis in the liver blood vessels (H & E,  $\times 32$ )

Biochemical analysis of ascetic fluid showed the presence of mononuclear cells, RBC and coccoid bacteria.

Antimicrobial sensitivity patterns of the isolated bacteria was determined by disc diffusion method according to guidelines suggested by Wanger (8) as susceptible, intermediate or resistant using discs impregnated by 10

antibiotics including ampicillin, cefazoline, enrofloxacin, lincospectin, nalidixic acid, tetracycline, erythromycin, gentamycin, streptomycin and colistin on plates of Muller Hinton agar. Among 10 antimicrobials *streptococcus iniae* was sensitive to ampicillin and enrofloxacin (Table I).

This is the first record of isolation of *Streptococcus iniae* from Yellow oscar in Iran. Yellow Oscar is a carnivorous fish and isolation of this bacterium may provide evidence that the aquarist may have been using some infected fish meal to feed their fish.

TABLE I  
ANTIMICROBIAL SUSCEPTIBILITY PATTERNS OF *STREPTOCOCCUS INIAE*  
ISOLATES OF YELLOW OSCAR

Antimicrobial agent	Pattern	Antimicrobial agent	Pattern
Ampicillin	S	Tetracycline	I
Cefazoline	R	Erythromycin	R
Enrofloxacin	S	Gentamycin	R
Lincospectin	R	Streptomycin	R
Nalidixic acid	I	Colistin	R

S= Sensitive, I= Intermediate and R= Resistance.

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