

STREPTOCOCCUS AGALACTIAE ISOLATION PATTERNS FROM CAGE CULTURED TILAPIA

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Abstract

Attempts were made to isolate *Streptococcus agalactiae* from cage cultured tilapia kept in different water bodies. These include the small-sized but fast flowing irrigation canal, small-sized slow flowing ex-mining ponds, moderate-sized and moderate flowing rivers and huge-size slow flowing reservoirs. A total of 1164 tilapias were collected from irrigation canals, 982 from ex-mining ponds, 1967 from rivers and 1390 from reservoirs between October 2006 and March 2008. The brains, kidneys and eyes were collected for bacterial isolation, particularly *Streptococcus agalactiae*. *S. agalactiae* was successfully isolated from less than 5% tilapia kept in irrigation canals and ex-mining ponds, mainly in October 2006, July and September 2007. No disease outbreak was reported. Successful isolations in the range between 8 and 55% were made from tilapia kept in rivers, particularly in October to December 2006 and between June and August 2007. Death rates range between 5 and 45%, observed in May to October 2007. Isolations were made from 5 to 78% tilapia kept in reservoirs, particularly between October and November 2006, April and August 2007 and January and March 2008 with mortality between 5 and 60% fish. Isolations were frequently made from tilapia of the size between 150 and 250 grams when the water temperature was higher than 31°C.

INTRODUCTION

Red tilapia (*Oreochromis niloticus hybrid*) was first introduced into Malaysia in the mid 1980's. It was initially considered to be hardy and resistant to diseases. However, mortality of tilapia in Malaysia was first observed in 1997, affecting fish weighing between 300 and 400 grams kept in floating net cages of Sungai Pahang (Siti-Zahrah, personal communication). The affected fishes showed corneal opacity, exophthalmia, erratic swimming and occasional sunken body or inflammation along the base of pectorals and ventral region with mortality rate reaching 60-70%. This problem was subsequently observed in cages of Kenyir, Pedu and Pergau Lakes in Malaysia (Siti-Zahrah *et al.*, 2004, Siti-Zahrah *et al.*, 2005). High mortality was reported between April and July, and laboratory tests revealed the presence of Gram positive bacteria known as *Streptococcus agalactiae* (Siti-Zahrah *et al.*, 2004, Amal *et al.*, 2008). This study describes the isolation pattern of *Streptococcus agalactiae* from tilapia kept in different water bodies.

MATERIALS AND METHODS

Four types of water bodies were selected. They were the small-sized fast flowing irrigation canals, small-sized slow flowing ex-mining ponds, moderate-sized moderate flowing rivers and huge-sized slow flowing reservoirs or lakes. Approximately 30 tilapias ranging between 100 and 300 grams body weights were collected from more or less three collection points of each water body at monthly intervals for a period of 18 months (Amal *et al.*, 2008). The selected tilapias were killed before swabs from brains, kidneys and eyes were collected and immediately streaked onto blood agar. The agar plates were then incubated at 30°C for 24 hours. Colonies suspected of *S. agalactiae* were further tested and confirmed using the API 20 STREP Detection Kit. The monthly death rates were recorded.

RESULTS AND DISCUSSION

A total of 1164 tilapias were collected from irrigation canals, 982 from ex-mining ponds, 1,967 from rivers and 1,390 from reservoirs between October 2006 and March 2008. *S. agalactiae* was successfully isolated from less than 5% tilapia kept in irrigation canals and ex-mining ponds. Isolations were made only in October 2006 and July to September 2007 (Fig. 1). Disease outbreak was not reported in tilapia kept in irrigation canals and ex-mining ponds during the study period. Successful isolations of *S. agalactiae* in the rate between 8 and 55% were made from tilapia kept in rivers. Isolations were successful in October to December 2006 and between May and August 2007 (Fig. 2). Disease outbreaks that killed between 5 and 45% tilapia were observed in May to October 2007, the months when the high rates of isolation of *S. agalactiae* were recorded (Fig. 2). Isolations of *S. agalactiae* were made from 5 to 78% tilapia kept in reservoirs, particularly between October and November 2006, April and August 2007 and January and March 2008 (Fig. 3). Disease outbreaks that killed tilapia between 10 and 30% were reported in reservoirs between September and November 2006, and between April and July 2007 that killed tilapia between 5 and 60% (Fig. 3). Isolations were frequently made from tilapia of the size between 150 and 250 grams when the water temperature was higher than 31°C.

The results of this study are in agreement with our earlier study (Siti-Zahrah *et al.*, 2004) that revealed disease outbreaks closely related to the successful isolation of *S. agalactiae* from tilapia and the rate of isolation is closely related to the high water temperature of more than 31°C (Amal *et al.*, 2008). In this study, diseases outbreaks were not only observed during the periods when the isolation rates of *S. agalactiae* were high, but also more isolations and outbreaks were observed in

reservoirs that is a huge water body with slow flow rate. Menesguen and Gohin (2006) showed that accumulation of heat in water bodies depends on many factors including the recirculation of water. Lakes, which are huge water bodies with slow recirculation of water and rivers, which are moderately large water bodies with moderate flowing, tend to retain heat resulting in high water temperature compared to the fast flowing irrigation canals (Amal et al., 2008). Therefore, lakes and large rivers tend to have higher water temperature, leading to higher isolation rate of *S. agalactiae* incidence of disease outbreaks.

Fig. 1. Isolation pattern of *Streptococcus agalactiae* from tilapia kept in irrigation canals

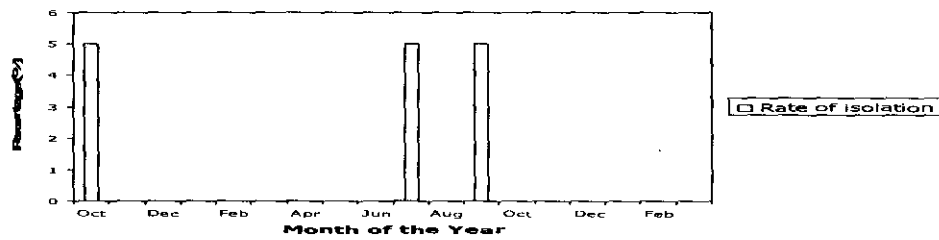
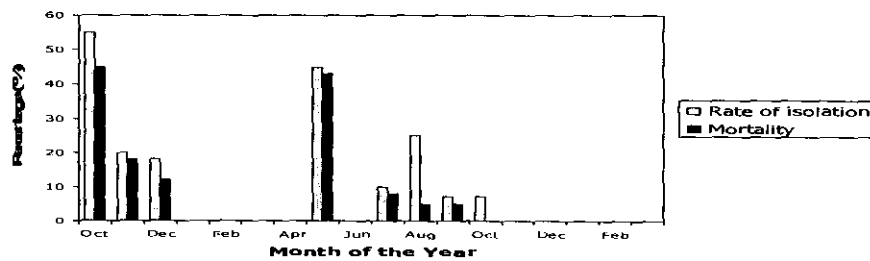
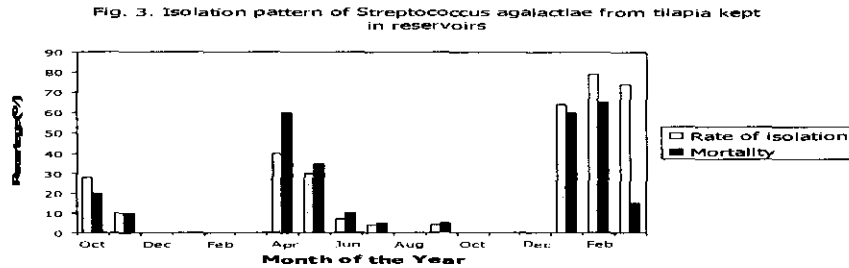


Fig. 2. Isolation pattern of *Streptococcus agalactiae* from tilapia kept in rivers





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