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Studies on Epizootiology and Pathogenicity of *Staphylococcus epidermidis* in Tilapia (*Oreochromis* spp.) Cultured in Taiwan

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Shih-Ling Huang, Wei-Cheng Chen, Mei-Chuan Shei, I-Chiu Liao and Shiu-Nan Chen (1999) Studies on epizootiology and pathogenicity of *Staphylococcus epidermidis* in Tilapia (*Oreochromis* spp.) cultured in Taiwan. *Zoological Studies* **38**(2): 178-188. This paper describes the epizootiology of a disease of tilapia with clinical signs that include white nodules and microscopic granulomatous formations. Diseased fish showed splenomegaly with diffusion of numerous white nodules. The most severe lesions were presented in the spleen and anterior kidney. Morphological, biological, and biochemical characteristics of microorganisms isolated from the diseased tilapia were examined and classified by Baird-Parker's biochemical subgrouping scheme. Strain LK0728 identified as *Staphylococcus epidermidis*, was used in a challenge test. Histopathological changes were similar to those seen in naturally infected fish. This is the 1st report on the isolation of staphylococci pathogenic to tilapia and on the confirms the etiological agent causing mass mortality in tilapia from 1992 to 1996 in Taiwan.

Key words: Granuloma, *Staphylococcus epidermidis*, Pathogenicity, Electron-dense particles.

Since 1992, mass mortalities of unknown etiology have occurred in pond-cultured tilapia in Taiwan, and have resulted in significant economic losses. Diseased tilapia were first observed in freshwater ponds in eastern and southern Taiwan, and have since spread all over the island area, in freshwater, brackish water, and seawater ponds. Although most of the moribund fish were normal in appearance, the internal organs such as spleen or anterior kidney contained numerous nodules. Several introduced bacterial pathogens have introduced severe disease in tilapia, including Gram-positive bacteria, *Streptococcus* sp. (Miyazaki et al. 1984); Gram-negative bacteria, i.e., *Aeromonas hydrophila* (Amin et al. 1985, Leung et al. 1994), *Pseudomonas fluorescens* (Miyazaki et al. 1984), *Edwardsiella tarda* (Plumb and Sanchez 1983, Kaigge et al. 1986), and *Vibrio vulnificus* (Sakata and Hattori 1988); and a Rickettsia-like microorganism (RLO) (Chern and Chao 1994). To identify pathogens, isolation and histopathology are routinely used to examine diseased fish. In the present studies, during 1992 to 1996, in more than 60% of cases, *Staphylococcus epidermidis* was the dominant pathogenic species isolated from the tilapia. It is therefore considered necessary to investigate the pathogenicity of this bacteria.

S. epidermidis was first reported as a fish pathogen by Kusuda and Sugiyama in 1981. A severe epizootic caused by this organism occurred in farmed yellowtail (*Seriola quinquiradiata*) and red sea bream (*Chrysophrus major*) in Japan from July 1976 to Sept. 1977 (Kusuda and Sugiyama 1981, Sugiyama and Kusuda 1981). Typical signs of the disease consisted of exophthalmia, congestion, and ulcerations on the tail.

In the present study, we attempt to describe the isolation and characterization of the bacteria from moribund tilapia. A challenge test was also performed as a confirmation of pathogenicity against experimental fish. This is the 1st report on the isolation and confirmation of *Staphylococci* pathogenic to tilapia.

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