Naturally *Tetrahymena* spp Protozoan Infection in Guppies (*Poecilia reticulata*)

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**INTRODUCTION**

Fresh water Guppy (*Poecilia reticulata*) fish is the most popular fresh water species reared and widely traded throughout the world. This beautiful color fish was originally from South America and easy to cultivate mainly in tropical water in country such as Thailand, Malaysia, Singapore including Indonesia. Incidence of the disease is a common problem encountered in places where fish breeding. Disease caused by metazoan and protozoan have been reported found in guppy fish farms which cause considerable economic losses. This paper reports diseased guppies which microscopically has been diagnosed parasitized by protozoa *Tetrahymena* spp.

**MATERIALS AND METHODS**

Diseased guppies were received at IPB Veterinary Pathology Laboratory. During their life in the aquarium these guppies were showed lethargic, vertical swimming and impaired equilibrium. Grossly the fishes showed skin ulcerative hemorrhage at dorsal or lateral abdominal body (Figure 1a). Tissue samples were fixed with 10% formaldehyde in 0.1 M phosphate buffer (pH 7.5), embedded in paraffin, cut to 5–6 µm-thick sections and stained with hematoxylin and eosin. Some sections were stained with Periodic acid Schiff. The sections were examined using a light microscope Olympus BX41 (Olympus, Tokyo, Japan) equipped with a digital eye piece camera.

**RESULTS AND DISCUSSION**

Histopathological observations of the skin tissue showed inflammatory cell infiltration with some of protozoan bodies found to invade the skin surface to penetrate into the muscle layer (Figure 1b). The protozoa infect the skin in large amount at the epidermis to the bottom layer of the stratum compactum up to dermis. Epidermis epithelia look degenerated and desquamated accompany with infiltration of mononuclear inflammatory cells and hemorrhage within the epidermis and dermis. Protozoa were also seen among the deeper muscle layers causing muscular necrosis and inflammation. The morphological examination of the protozoa showed that the protozoa had round to oval body shape, such as pears, and rarely looked as a cucumber seed shape with narrow anterior end. This protozoan sometimes showed the presence macronucleus and micronucleus. The measurement of body length obtained an average of 50.5 µm (35-73.7 µm) and a width of 32.4 µm (31-43 µm). The macronucleus was round and sometimes oval-shaped with an average size of 18.59 x 12.85 µm while the micronucleus measurement was not done because it is often not looked. The protozoa bodies were stained basophilic using Hematoxylin Eosin while stained magenta using Periodic acid Schiff staining. Morphological characteristics of protozoan on histopathology section leading to the protozoan *Tetrahymena* spp [1, 2, 3]. *Tetrahymena* spp. classified in subclass Hymenostomatia is a ciliated protozoan and known as the major causative agents of diseases that attack the guppy and famous as the 'guppy-killer parasite' [1, 4, 5] *Tetrahymena* spp invasion cause tissue damage and hemorrhage. The erythrocytes later were phagocytosed and digested by protozoa, as seen as erythrocytes accumulation in the protozoa cytoplasm as reported by [1, 2] There were no specific lesions in other internal organs except the increase in Melano-macrophage center accumulation in the organs of the liver, spleen, kidney and swim bladder. Increased focal accumulation of Melano-macrophage center within the tissue indicate that the fish are in a state of disease or stress [6]. *Tetrahymena* spp does not require a host.
to complete their life cycle [7]. Transmission of Tetrahymena spp infection in nature is horizontal and intermediate by water. Protozoan Tetrahymena spp. attached to the eroded surface of the skin. These protozoa consuming organic materials such as bacteria and destroyed cells [8]. The infections were thought originated from silk worms as food. Silk worms obtained from less hygienic environment that can pollute the aquarium water. The poor water quality, including ammonia and organic matter and low water temperatures increase the susceptibility of fish to infections. Organic matter content and high nutrient can be used by the parasite, thus increasing the population in the water. Stress on the fish also resulted in an increased susceptibility to infectious agents [5].

![Figure 1a](image1a.png) Gross lesion of diseased guppy. The fishes showed skin ulcerative hemorrhage at dorsal or lateral abdominal body (arrow)

![Figure 1b](image1b.png) Protozoa bodies found to invade the skin surface to penetrate into the muscle layer (arrows). The protozoa provoke inflammatory reaction, hemorrhage and tissue necrosis.

**CONCLUSION**

The presence of these protozoan provoked inflammation, hemorrhage, degeneration and necrosis of skin epidermis, muscle and internal organ include the swim bladder. The lesions cause clinical sign of lethargic, swimming disorders and incoordination of these guppies.

**REFERENCES**


