Case Of the Month – November 2026

Clinical Description:

Five adult guppies (*Poecilia reticulata*) presented with multiple, widespread, white, depigmented cutaneous foci. These guppies originated from a population of guppies experiencing >70% mortality over a two-week period. The fish had been treated with hypertonic saline and formalin baths, but the population showed no overall improvement in condition. Microscopic examination of wet-mounted skin scraping revealed numerous motile, ovoid, ~40-50 µm long ciliates exhibiting a 'spiraling football'-like swimming pattern.

Figure 1: Video Link: https://youtu.be/ntrdAcjxxCs

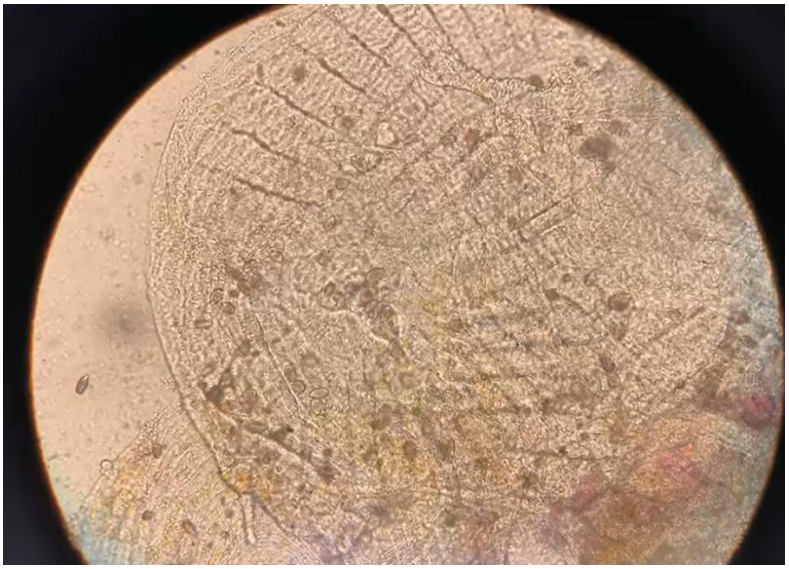


Figure 2

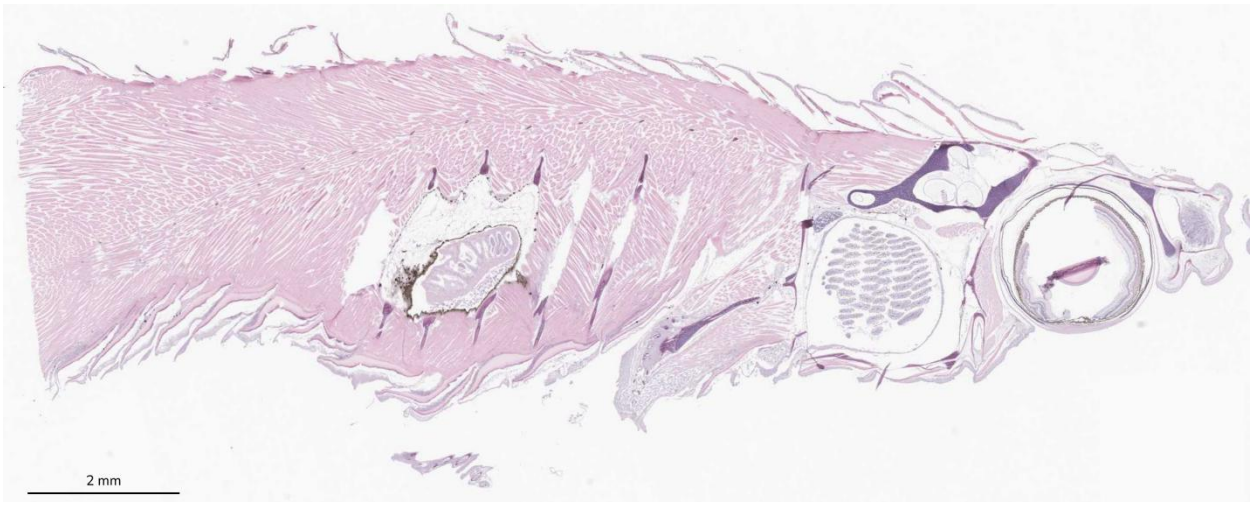


Figure 3

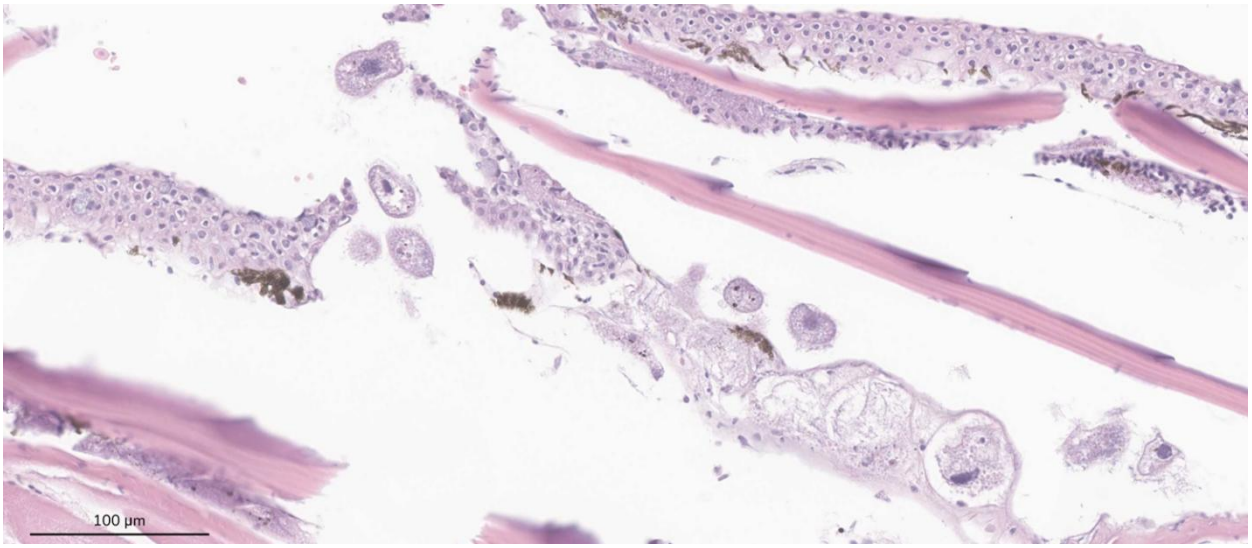


Figure 4

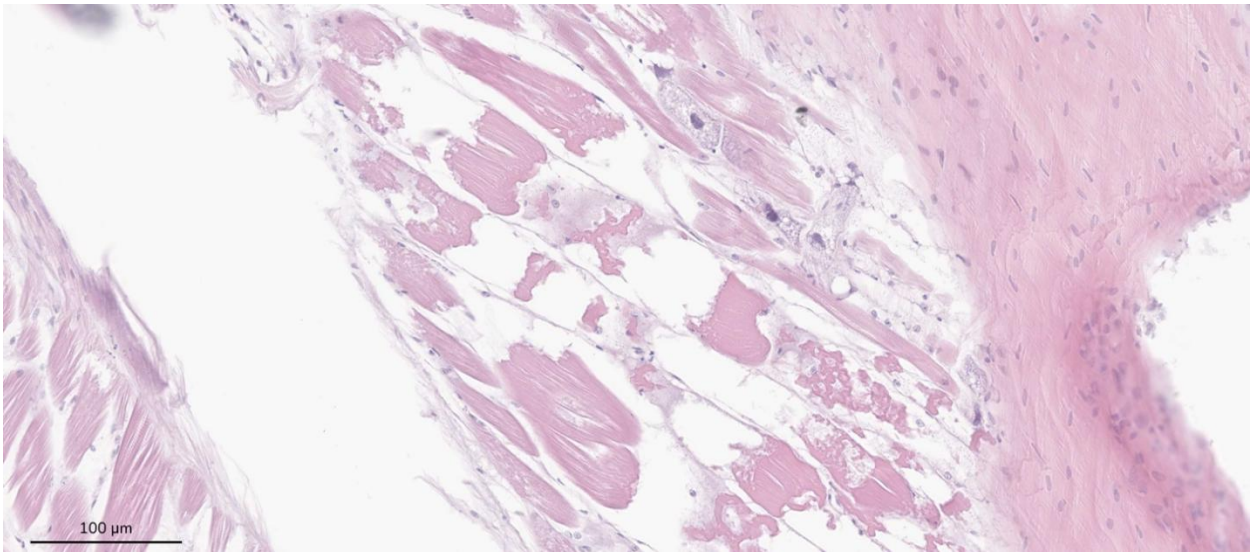


Figure 5

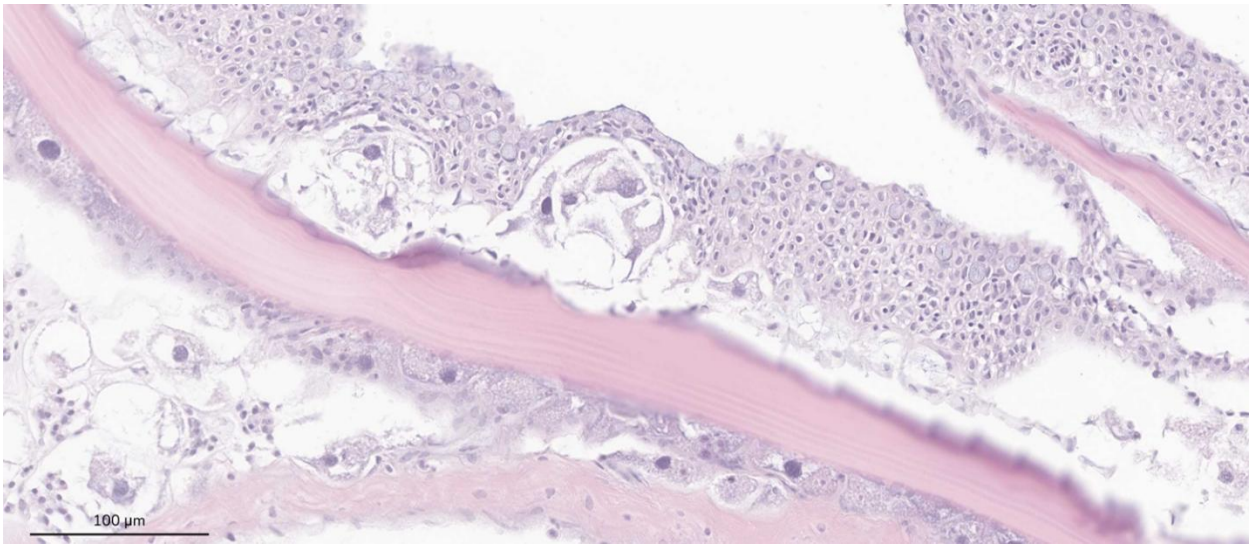
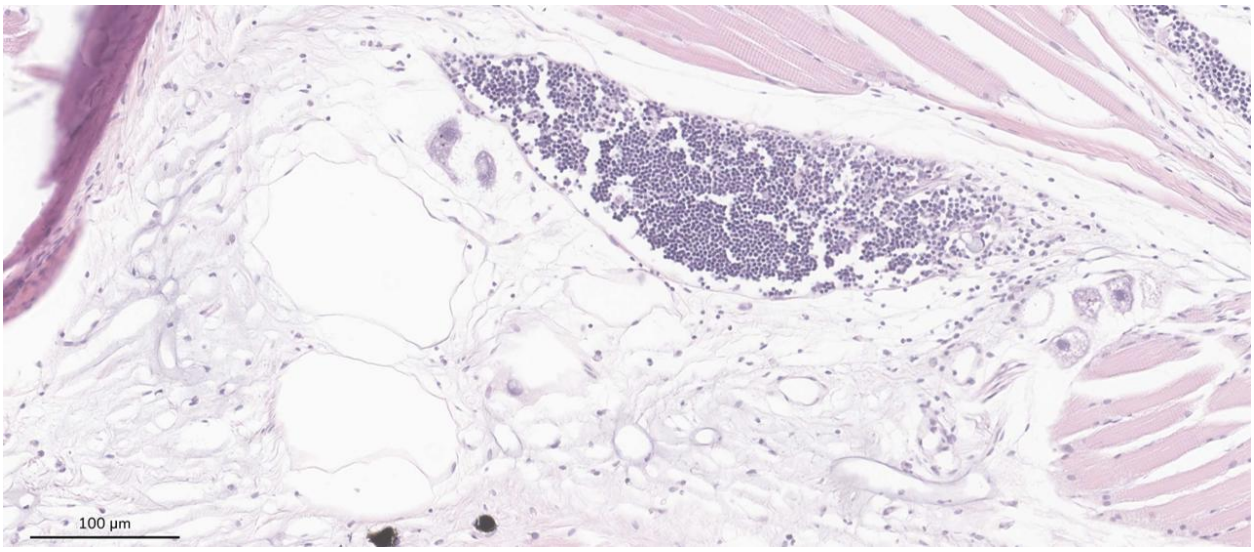


Figure 6



Which of the following is the etiologic agent?

A. *Ichthyophthirius multifiliis*
B. *Ichthyobodo necatrix*
C. *Trichodina* spp.
D. *Tetrahymena* spp.

Histopathologic Description:

Examined is a longitudinal section through the entire body of a whole guppy. Throughout the section are moderate to large numbers of 40-55 µm long, pyriform, ciliated trophozoites with granular cytoplasm and a round, basophilic, central macronucleus. The protozoa span the epidermis, dermis, and extend into the underlying skeletal muscle and the coelomic cavity. The trophozoites are surrounded by mild mixed inflammation (macrophages, lymphocytes, and plasma cells). Regions of the skin with increased trophozoite abundance demonstrate lifting of the scales, erosion, and ulceration. Additionally, sporadic myocytes within affected areas of skeletal muscle are degenerate or necrotic, with changes in these myocytes characterized by loss of cross striations, fragmentation or vacuolation of the sarcoplasm, and variations in staining affinity.

Morphologic Diagnosis:

Skin: Mild to moderate, multifocal, lymphoplasmacytic and histiocytic dermatitis, myositis, and coleomitis with numerous intralesional trophozoites (*Tetrahymena* spp.)

Comments:

The numerous 40-55 µm long, ovoid to pyriform, ciliated trophozoites observed on cytology and histopathology are consistent with tetrahymenosis, a disease of freshwater fish, particularly freshwater ornamental species, caused by infection with *Tetrahymena* spp. protozoa. The slow, 'spiraling football" swimming pattern observed on wet mount cytology is highly characteristic of *Tetrahymena* spp. This is a group of mostly saprozoic, holotrichous ciliphorans that can act as histophagous parasites of fish, amphibians, and invertebrates. The most economically important species is *Tetrahymena corlissi*, which is a major pathogen of freshwater tropical fish and the causative agent of "guppy killer disease". Other species have also been implicated in tetrahymenosis of cultured fish, including *Tetrahymena vorax* in goldfish (*Carassius auratus*) and *Tetrahymena pyriformis* in Amur minnow (*Phoxinus lagowskii*).

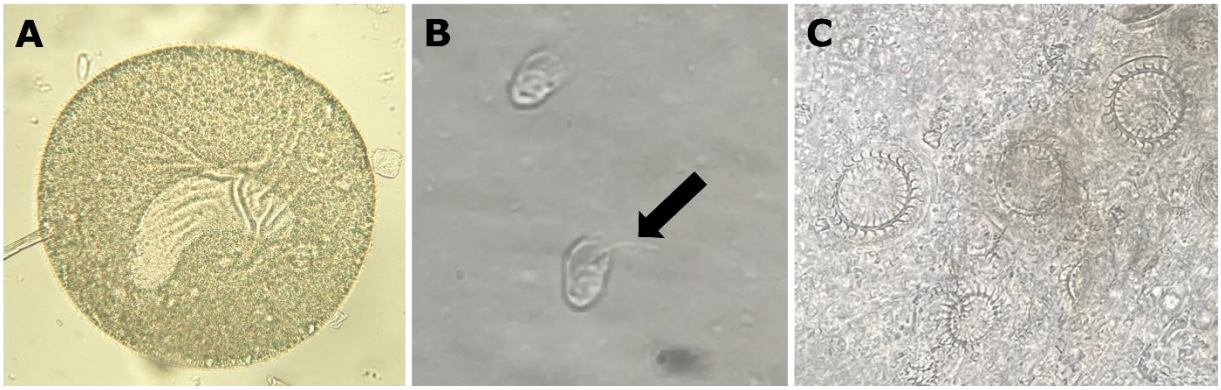
Guppies are highly susceptible to infection by *Tetrahymena* spp., with both natural and experimental infections leading to high morbidity and mortality within 1-3 weeks postinfection. *Tetrahymena* spp. infections begin at the skin, with the parasites invading the epidermis and dermis leading to regions of skin pallor and depigmentation due to dermal and epidermal necrosis. The parasites can also invade into the underlying skeletal muscle, leading to inflammation and muscle necrosis. In more severe infections, the parasites can penetrate into the coelomic cavity and disseminate throughout the coelomic viscera. In guppies, severe infections and mortality are often reported with little to no associated

inflammation whilst more resistant species, such as goldfish, typically generate a histiocytic inflammatory response to the infection.

Outbreaks of tetrahymenosis among cultured fish populations are often associated with poor water quality and high stocking densities. Organic matter and high ammonia levels facilitate parasite multiplication as well as induce stress on the fish which can increase host susceptibility and pathogen transmission. Additionally, high stocking densities further enhance horizontal disease transmission between tank mates. Effective treatment options for tetrahymenosis are limited and disease management is largely focused on improved sanitation and husbandry conditions. Management of *Tetrahymena* spp. involves rapid removal of dead fish, optimization of water quality parameters, and lowering of stocking densities. Formalin treatment prior to development of systemic infection can improve outbreak prognosis, however this can be challenging as guppies often die without development of obvious clinical signs. Experimental studies into treatments for *Tetrahymena* spp. have shown that niclosamide and albendazole can improve post-challenge survival in guppies.

Other important protozoal ectoparasite differentials for multifocal skin lesions in freshwater fish include *Ichthyophthirius multifiliis, Icthyobodo necatrix,* and *Trichodina* spp, which can be readily differentiated on wet mount examination of gill clip and skin scrape cytologies. *Ichthyophthirius multifiliis* is the causative agent of 'Ich' or 'white-spot disease' in freshwater fish. On wet mount cytology, *I. multifiliis* appear as round, to 1 mm diameter, motile, ciliated trophonts with a characteristic horseshoe-shaped macronucleus that move with an amoeboid-like motion (Figure 7A). *Icthyobodo necatrix* is a flagellated protozoa that can infect any freshwater fish species but is a particular problem in cultured salmon fry where invasion of the epithelium by the parasite leads to spongiosis and sloughing of the epidermis, eventually causing death of the host fish due to osmoregulatory failure. On wet mount cytology, *I. necatrix* appear as small, 10-15 µm long, oval to kidney-shaped, motile protozoa with two pairs of flagella of unequal length (Figure 7B). They exhibit a characteristic rapid, jerky, 'flickering flame'-like swimming pattern. *Trichodina* spp. can be found in small numbers on skin scrape cytology of apparently healthy fish with no associated pathology. In severe infestations, irritation caused by adhesion of these protozoa to the epithelium can cause epidermal hyperplasia and necrosis. On wet mount cytology, *Trichodina* spp. appear as circular, 50-100 µm diameter, motile, protozoa with a characteristic round skeletal ring with radially arranged denticles (Figure 7C).

Figure 7. Wet-mount cytology of **(A)** *Ichthyophthirius multifiliis,* **(B)** *Icthyobodo necatrix* (arrow = flagella)*,* **(C)** and *Trichodina* spp.



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Acknowledgements:

Wet mount cytology video and image of *Tetrahymena* spp. provided by Esteban Soto, DVM, University of California Davis, Weill School of Veterinary Medicine, California, USA.