

Eustrongylides ignotus and *Centrocestus* sp. co-infection in farmed ornamental Mickey Mouse platy, *Xiphophorus maculatus*

P-C. Liao^{1**}, M-A. Tsai^{2**}, P-C. Wang¹,
Y-S. Ho³, T. Pulpipat¹ and S-C. Chen^{1,4,5*}

¹Department of Veterinary Medicine, College of Veterinary Medicine, National Pingtung University of Science and Technology, Pingtung, Taiwan; ²Department of Biology, National Museum of Marine Biology and Aquarium, Pingtung, Taiwan; ³Eastern Marine Biology Research Center, Fisheries Research Institute, Taitung, Taiwan; ⁴International Degree Program of Ornamental fish Science and Technology, International College, National Pingtung University of Science and Technology Taiwan; ⁵Southern District Fish Disease Center, College of Veterinary Medicine, National Pingtung University of Science and Technology, Pingtung, Taiwan

Abstract

A co-infection of *Eustrongylides ignotus* (Nematoda) and *Centrocestus* sp. (Trematoda) occurred in farmed populations of the Mickey Mouse platy, *Xiphophorus maculatus*, in Pingtung, Taiwan in 2014. The nematodes (*E. ignotus*) were present in the body cavity of fish. The diseased fish exhibited abdominal distension with convulsions, and buoyancy abnormalities involving swimming behaviour in the surface water during outbreaks. To our knowledge, this is the first report of an outbreak of *E. ignotus* and *Centrocestus* sp. co-infection in ornamental fish.

Introduction

The parasitic nematodes, *Eustrongylides* spp., causing eustrongylidosis have been associated with epizootics in piscivorous birds. Life cycles of *Eustrongylides* spp. involve a definitive host and two intermediate hosts. The first intermediate hosts are aquatic oligochaetes (Spalding et al., 1993). Many species of freshwater fish act as second intermediate hosts, and piscivorous birds, such as those belonging to the orders Anseriformes, Gaviiformes, Pelecaniformes, and Ciconiiformes, act as definitive (final) hosts (Measures, 1988; Spalding et al., 1993; Xiong et al., 2013). In some cases, humans might be

infected if raw or undercooked fish is consumed, resulting in gastritis and intestinal perforations (Deardorff and Overstreet, 1991).

In fishes, infections by *Eustrongylides* larvae have increased predation susceptibility (Coyner et al., 2001). *Eustrongylides*-infected fish exhibited erratic movement compared to non-infected ones. Western mosquito fish (*Gambusia affinis* Baird & Girard), Gulf killifish (*Fundulus grandis* Baird & Girard), Sheepshead minnow (*Cyprinodon variegatus* Lacepede), related cyprinodontiforms, and centrarchids were found to be