

Parasitic Crustaceans in Fishes from Some Philippine Lakes

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Abstract

Parasitic crustaceans are among the most harmful parasites of fishes. Certain species cause disease outbreaks and mortalities in aquaculture, facilities, and sometimes in natural systems, resulting in serious economic losses. Edible fishes from some Philippine lakes also show infestation by parasitic crustaceans. The branchiuran, *Argulus indicus* Weber, and the copepod, *Lernaea cyprinacea* Linnaeus, were recovered from the skin and base of the dorsal fin, respectively, of the mudfish *Channa striata* from Laguna de Bay. *L. cyprinacea* was also found on the white goby *Glossogobius giurus* in Naujan Lake. In La Mesa Reservoir, the gills of wild populations of tilapias *Oreochromis niloticus* and *Tilapia zillii*, white goby, and silvery theraponid *Therapon plumbeus* were infected with the copepod, *Ergasilus philippinensis* Velasquez. An isopod, *Alitropus typus* Edwards, was recovered from the buccal and gill cavities of several fishes from Lake Taal, namely; the mud gudgeon *Ophiocara aporos*, cardinal fish *Apogon thermalis*, silvery theraponid, and cage cultured *Oreochromis niloticus*. Previous reports and above finding indicate wide host specificity of the parasites. Of these four parasites, only *Ergasilus philippinensis* has not been reported to cause mass mortality in cultured fishes. Measures should be undertaken to prevent their introduction to other water bodies in which they do not yet occur.

Introduction

Parasitic crustaceans are among the most harmful pests of fishes. Certain species cause mass infestation and mortality in fish culture sometimes in nature, resulting in considerable economic losses. Fish culture now includes raising fish not only in man-made ponds and tanks, but also in cages and pens built or suspended in large bodies of water such as reservoirs, lakes, and even in marine coastal areas. The practice of introducing fish into large water bodies facilitates transfer of parasites from the introduced fish to the wild populations, and vice versa.

Parasites introduced into the water body with fish introductions may become established in the natural populations of the water body. Measures recommended to eradicate the parasites in ponds or tanks are often inapplicable or impractical in large water bodies. To protect large water bodies against dangerous parasites, entry of the parasites into the habitat must be prevented.

In culture systems, high population density is among the most important factors facilitating disease outbreaks. When environmental conditions become favorable for the mass reproduction of the parasite, the disease may spread very quickly from one individual to another. This is particularly true of parasites with direct life cycles such as ectoparasitic protozoans, helminths and crustaceans (Bauer 1958). Parasites naturally occurring in the lake can infect fish in cages and pens resulting to mass mortality and substantial economic losses.

Knowledge of the parasites occurring in fishes both in aquaculture and in natural systems is therefore important for effective management of our fishery resources. This paper presents the parasitic crustaceans that have been found in some of our local lake fishes.

Copepoda

Lernaea cyprinacea L.

This parasite was recovered from the base of the dorsal fin of the mudfish *Ophicephalus striatus* (= *Channa striata*) from Laguna de Bay with prevalence of 4%, and average intensity of 1.0 (Lopez 1990). Other hosts reported for this parasite in Laguna de Bay were *Anabas testudineus*, *Glossogobius giurus*, *G. biocellatus*, *Therapon plumbeus* and *Chanos chanos* (Vallejo 1985; Velasquez 1986; Regidor and Arthur 1986). Mass infestations of milkfish fingerlings resulting in great economic loss were reported in fish pens in Laguna de Bay and fish ponds in Himlayang Filipino, a memorial park in Metro Manila. *G. giurus* from Naujan Lake were also found infected with this ectoparasite with prevalence of 8.6% and average intensity of 1.3 (Lopez and Palisoc 1992).

Lernaea spp.

They are commonly known as anchor worms and are among the most harmful parasites of cultured fresh water fishes. They have been the subject of extensive studies in temperate and tropical countries (Kabata 1985). Of the five species of *Lernaea* recorded from Southeast Asia, the greatest economic harm has been due to *L. cyprinacea*; all control measures developed against *Lernaea* have been directed primarily against it. This parasite has a wide host specificity and can probably infest all freshwater fishes and even frog tadpoles and salamanders (Hoffman 1967).

The life cycle of *L. cyprinacea* was worked out in detail by Grabda (1963 cited in Kabata 1985). Female *Lernaea* attach to host by deeply burrowing into the tissues with the highly modified anchor-shaped anterior end. The parasite is extremely difficult to control because only the free-living larvae are susceptible to treatment. Most control measures involve application of chemicals (Kabata 1985).

Lernaea lophiara Harding, 1950

The only record of this parasite in the Philippines comes from *Anabas testudineus* and *Glossogobius giurus* collected from Laguna de Bay (Vallejo 1985). Adult female differs from *L. cyprinacea*, in the structure of the holdfast branches, both being simple; in *L. cyprinacea*, the dorsal pair branch, while the ventral pair are simple. In Thailand, this parasite has been identified on *A. testudineus*, *Aristichthys nobilis*, *G. giurus*, *Lebistes reticulatus*, *Ophiocephalus striatus*, *Oxyeleotris marmorata* and *Oreochromis mossambicus* (unpublished record cited in Kabata 1985). Its life history and biology are unknown.

***Ergasilus philippinensis* Velasquez, 1951**

This parasite was first found in the gills of *Glossogobius giurus* from Laguna de Bay (Velasquez 1951). Many years later, Mamaril (1986) found a single specimen in a plankton sample from La Mesa Reservoir. Subsequently, Lopez (1992) recovered the parasite from the gills of *G. giurus*, *Therapon plumbeus*, *Tilapia zillii*, and *Oreochromis niloticus* from the reservoir with 100% prevalence in *T. plumbeus*.

The genus *Ergasilus* comprises more than 80 species, widespread in marine and freshwater habitats in many parts of the world (Kabata 1985). They are sexually dimorphic, the females being parasitic and the males free-living. Though small-sized, *Ergasilus* spp. can become very harmful to the host, damaging the gills as a result of their attachment and feeding activities. In heavy infections, large areas of the gills may become eroded and respiration severely impaired (Kabata 1970).

Ergasilus has not been reported to cause serious damage in aquaculture in South-East Asia. If necessary, control measures against *E. sieboldi*, a serious pest in temperate aquaculture, can be tested and adapted. In tanks and ponds, standard prophylactic measures such as provision of pathogen-free water and food, and disinfection of pond, equipment and fish have been recommended (Kabata 1985).

Branchiura

***Argulus indicus* Weber, 1892**

About 150 species of Branchiura have been reported on fish. As many as 100 species belong to the genus *Argulus*, commonly known as fish lice. The genus is distributed worldwide in both marine and freshwater habitats (Kabata 1985). *Argulus indicus* and *Argulus* sp. have been recorded in the Philippines.

A. indicus was found on the skin of *Ophicephalus striatus* from Laguna de Bay, and on *Oreochromis mossambicus* from brackishwater fish ponds in Malabon, Rizal (Lopez 1988). The author reported a prevalence of infestation of 6.4%, and average intensity of 2.0 for *O. striatus*; for *O. mossambicus*, prevalence was 9.0%, and average intensity, 1.7. *Carassius* sp. and *O. striatus* were also reported as hosts of *A. indicus* in the Philippines (Velasquez 1988).

***Argulus* sp.**

Parasites belonging to genus *Argulus* have been found on *Cyprinus carpio*, *Tilapia* sp., mullets and eels in the Philippines (Velasquez 1988) and mortalities have been reported in infected Japanese ornamental carps (Po *et al.* 1982 cited in Velasquez 1988).

Mortalities of fish due to *Argulus* have been reported in many parts of the world including the Philippines. Outbreaks also occur in natural habitats (Kabata 1985). Injuries inflicted by the parasite are caused by its attachment and feeding. Mechanical action of the buccal apparatus or lytic secretions of the buccal glands (Kabata 1970) may ulcerate the area of feeding. Secondary infections, particularly by fungi, may be promoted.

Chemical treatment has been found effective in pond systems. The control of water intake and treatment of fish before they are introduced into the ponds are standard prophylactic measures.

Isopoda

Alitropus typus Edwards, 1840

This parasite was reported to cause mass infestation and mortality of *Chanos chanos* in Iloilo fish ponds of the University of the Philippines in the Visayas (Velasquez 1986). Examination of some edible fishes from Lake Taal resulted in the recovery of the parasite from the buccal and gill cavities of the mud gudgeon *Ophiocara aporos*, translucent cardinal fish *Apogon thermalis*, *Therapon plumbeus*, as well as cage-cultured Nile tilapia. Mass infestations by the parasite of cage-cultured Nile tilapia have resulted in mass mortality of fingerlings and juveniles (del Mundo *et al.* 1996). *A. typus* has also been reported in Indonesia with *Chanos chanos* as its most important host. Other hosts include *Gerres*, eel, slip mouth, mullet, tilapia, gobies and tarpon (Kabata 1985). *A. typus* is a facultative parasite that lives in waters of low salinity and can survive in fresh water (Kabata 1985).

The harmful effect of parasitic isopods on their hosts includes destruction of host tissue resulting from the pressure of the parasite's body. When found in the gill cavity, the isopod can impair respiration by causing atrophy of the gills. In the mouth cavity, the isopod prevents normal feeding. In young fish, the attached isopod can weigh down the fish and prevent normal behavior such as swimming and food gathering (Kabata 1985).

No specific control or treatment measures against isopods have been developed. If necessary, measures against other crustacean parasites could be tested. Observations under laboratory conditions indicate that Malathion can be effective in killing the parasite at concentrations that will not kill the tilapia fingerlings (Macatula, unpubl.).

Present records on the crustacean parasites occurring in fishes from lakes indicate their wide host specificity and the harm that they cause on commercially important fish species. Since chemical treatment and other control measures effective against infections in ponds and tanks cannot be recommended in lakes, preventive measures are of paramount importance.

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