A SURVEY OF METACERCARIAE IN CYPRINOID FISH IN NAKHON RATCHASIMA, NORTHEAST THAILAND

Suwannee Nithiuthai[1], Jamsai Suwansaksri[2], Viroj Wiwanitkit[3] and Ploenpit Chaengphukeaw[4]

[1]Division of Parasitology, Department of Pathology, Faculty of Veterinary Science, Chulalongkorn University, Bangkok; [2]Department of Laboratory Medicine, Faculty of Medicine, Chulalongkorn University Bangkok; [3]Department of Clinical Chemistry, Faculty of Allied Health Science, Chulalongkorn University, Bangkok; [4]Firmer Thailand Co, Bangkok, Thailand

Abstract. Metacercariae were recovered from freshwater fish taken from a stream in Lum Cha Muak, Nakhon Ratchasima Province, northeast Thailand during the year 2000. Seventy-nine cyprinoid fish comprising 3 species (52 *Puntius leiacanthus*, 22 *Cyclocheilichthys armatus*, and 5 *Hampla dispar*) were collected. The prevalence of infection with metaceracriae was 51.9%. Only two genera of metacercariae were found: *Haplochinae* spp and *Heterophyidae* spp. *Haplochinae* metacercariae were found in all 3 species of fish, giving rates of infection of 95.5%, 20% and 1.9% for *Puntius leiacanthus*, *Cyclocheilichthys armatus* and *Hampla dispar* respectively. *Heterophyidae* metacercariae were found only in *Puntius leiacanthus*, whose infection rate was 30.77%. There were fish intected at the rate of 3.8% with unclassified metacercariae. Interestingly, no fish infected with *Opisthorchis viverrini* metacercariae were found, which is at odds with previous reports from Thailand in which a higher infection rate was given. This is the first report of fish infected with *Haplorchinae* spp in Thailand.

INTRODUCTION

It is known that fresh water fish, especially *Cyprinoidae* spp, are important intermediate hosts of flukes that parasitize animals and humans. In Southeast Asia, especially Thailand and Lao PDR, eating raw fish is a tradition. Fluke diseases caused by fish-borne trematodes are therefore common in this region.

Several species of metacercariae of medically important flukes have been reported (Harinsuta and Vajrasthira, 1960; Wykoff *et al*, 1965; Vichasri *et al*, 1982). In the northeastern region of Thailand, fluke diseases remain as a common public health problem. However, studies of the prevalence of metacercariae in fresh water fish are few. We carried out a survey of metacercariae in fresh water fish in an area of endemic fluke infection in the northeastern region of Thailand.

MATERIALS AND METHODS

Study site

The study site was the Lum Cha Muak stream, Nakhon Ratchasima Province, northeast Thailand; the study was conducted during May 2000. The site is about 300 km from Bangkok, the capital of Thailand. The study area is known as an endemic area for fluke infection.

Correspondence: Jamsai Suwansaksri, Department of Clinical Chemistry, Faculty of Allied Health Science, Chulalongkorn University, Bangkok 10330, Thailand.

Identification of the metacercariae

Fish were collected from the Lum Cha Muak stream, a natural freshwater course. A total of 79 cyprinoid fish of 3 species (52 *Puntius leiacanthus* (Fig 1), 22 *Cyclocheilichthys armatus* (Fig 2) and 5 *Hampla dispar* (Fig 3) were collected. After collection, the fish were refrigerated and sent to the Veterinary Parasitology Laboratory for analysis. All were minced and examined for metacercariae by the compression technique, modified from the method previously described by Chanawong *et al* (1990): in brief, the minced flesh was compressed by a Petri dish in order to find the metacercariae. Metacercariae were identified by stereoscopic microscopy using the method described by Schell (1970).

RESULTS

The three species of cryprinoid fish; *Puntius leiacanthus*, *Cyclocheilichthys armatus* and *Hampla dispar,* which are often eaten by man, were selected for metacercarial study. From 79, metacercariae were found in 41 fish: a prevalence of infection of 51.9%.

Only two genera of metacercariae were recovered: *Haplochinae* (Figs 4 and 5) and *Heterophyidae*. *Haplochinae* metaceracriae were detected in all 3 species of fishes, giving rates of infection of 95.5%, 20%, and 1.9% for *Puntius leiacanthus*, *Cyclocheilichthys armatus* and *Hampla dispar* respectively. *Heterophyidae* metacercariae were found only in *Puntius leiacanthus*: an infection rate of 30.77%. There were fish infected with unclassified metacercariae at a rate of 3.8%.

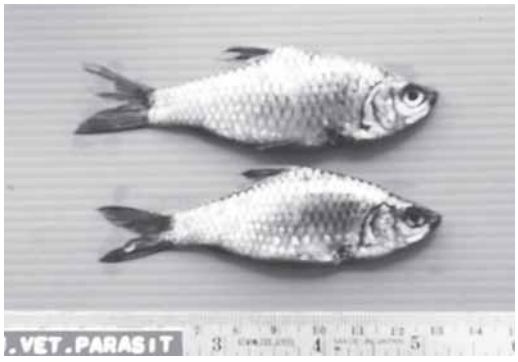

Fig 1- *Puntius leiacanthus.*

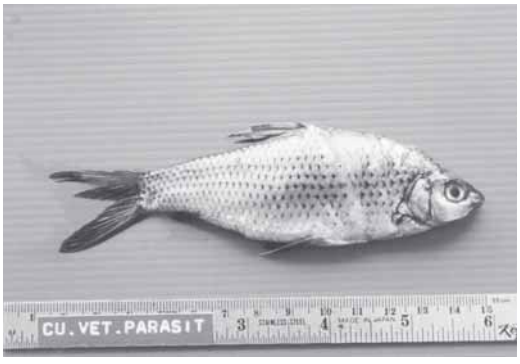

Fig 2- *Cyclocheilichthys armatus.*

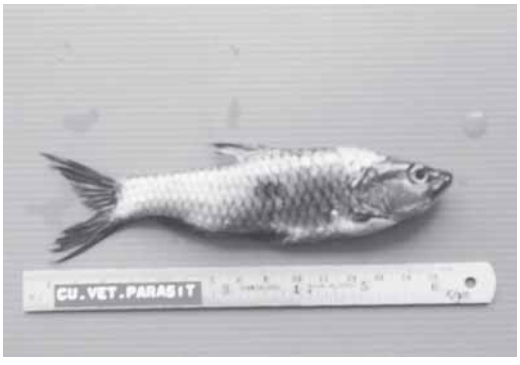

Fig 3- *Hampla dispar.*

Interestingly, no fish infected with *Opisthorchis viverrini* metacercariae was found (Table 1).

DISCUSSION

No metacercariae of *Opisthorchis viverrini* were found in spite of the fact that the study site is in an area with a high prevalence of opisthorchiasis. However, several other types of metacercariae of minute flukes were found (Table 1). These results are similar to those reported by Srisawangwong *et al* (1997), which showed a low prevalence of *Opisthorchis viverrini* metacercariae in fresh water fish. Our results also matched those from a study conducted by Waikagul (1998), in which no *Opisthorchis viverrini* metacercariae were found in two fresh water fish: *Puntius* spp and *Cyclocheilichthys* spp.

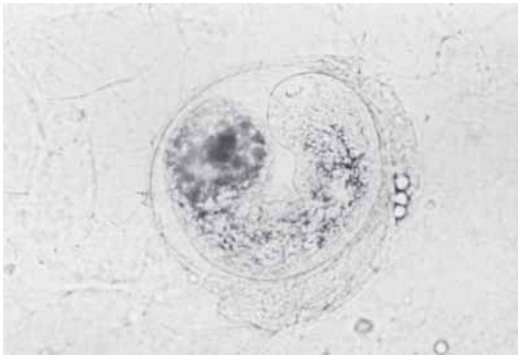

Fig 4- *Haplochinae* spp.

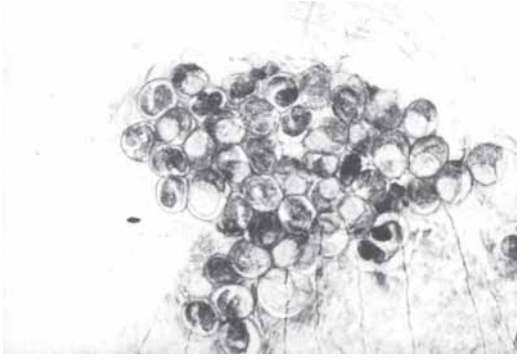

Fig 5- *Haplochinae* spp.

Although cyprinoid fish are known to be the second intermediate host of *Opisthorchis viverrini* (Harinsuta and Vajrasthira, 1960; Wykoff *et al*, 1965; Vichasri *et al*, 1982), a decrease in the prevalence of *Opisthorchis viverrini* metacercariae infection in these fish has been shown (Komalamisra and Setasubun, 1989; Srisawangwong *et al*, 1997; Waikagul, 1998). Many factors can affect the prevalence of metacercariae infection in fish, including the setting, season, type, and number of parasites and fish. Generally, the highest metacercarial infection rates in fish is found during the late rainy season in October (Vichasri *et al*, 1982). The low prevalence in our study, in May, might therefore be lower than the actual peak prevalence in the late rainy season.

Regarding the rate of metacercariae infection in fresh water fish, recent studies reported the prevalence

Table 1
Prevalence of metacercariae in the collected fish.

Type of fish	Number	Number of fish harboring metacercariae (relative percentage to the total number of fish of each type)			
		Haplorchinae	*Heterophyidae*	Unidentified	Total
Cyclocheilichthys armatus	22	21 (95.5 %)	-	-	21 (95.5 %)
Hampla dispar	5	1 (20 %))	-	-	1 (20 %)
Puntius leiacanthus	52	1 (1.9 %)	16 (30.77 %)	2 (3.8 %)	19 (36.5 %)

of 1% to 30% (Waikagul, 1998; Wongsawad *et al*, 2000). Our results, showed a higher infection rate than those in previous reports in Thailand. This is the first report of fish infected with *Haplorchinae* spp in Thailand (Figs 1 and 2) although infected fish with *Haplorchinae* metacercariae were reported in Lao PDR (Ditrich *et al*, 1990; Scholz *et al*, 1991).

Although the metacercariae of *Haplorchinae* spp are medically less significant than metacercariae of other parasites, an increased prevalence of *Haplorchinae* spp may imply the success of the control program for human opisthorchiasis launched by the Department of Communicable Disease Control of the Ministry of Public Health, Thailand. Due to the effectiveness of praziquantel treatment (Pungpak *et al*, 1998), the rate of passage of *Opisthorchis viverrini* eggs into the environment has decreased, resulting in the interruption of the life cycle of *Opisthorchis viverrini*. However, praziquantel has no effect on the life cycle of *Haplorchinae* spp because the true hosts of this parasite are birds and rodents (Waikagul, 1998): this explains sustained rate of metacercariae of this parasite in cyprinoid fish.

Although the *Opisthorchis viverrini* metacercariae in cyprinoid fish were not found in this study, metacercariae of other minute intestinal flukes were detected. It can be expected that the prevalence of these flukes will increase and as a consequence, the increase of some human pathogenic parasites in the future.

REFERENCES

Chanawong A, Waikagul J, Thammapalerd N. Detection of shared antigens of human liver flukes *Opisthorchis viverrini* and its snail host, *Bithynia* spp. *Trop Med Parasitol* 1990;41:419-21.

Ditrich O, Scholz T, Giboda M. Occurrence of some medically important flukes (Trematoda: Opisthorchidae and Heterophyidae) in Nam Ngum water reservoir, Laos. *Southeast Asian J Trop Med Public Health* 1990;21:482-8.

Harinasuta C, Vajrasthira S. Opisthorchiasis in Thailand. *Am J Trop Med Hyg* 1960;54:100-5.

Komalamisra C, Setasuban S. Heterophyid fluke and *Opisthochis viverrini* metacercariae in cyprinoid fish from an endemic focus in northeast Thailand. *J Trop Med Parasitol* 1989;12:22-8.

Pungpak S, Radomyos P, Radomyos B, Schelp FP, Jongsuksantigul P, Bunnag D. Treatment of *Opisthorchis viverrini* and intestinal fluke infections with praziquantel. *Southeast Asian J Trop Med Public Health* 1998;29:246-9.

Schell SC. How to know the Trematode. Iowa: WMC Brown, 1970.

Scholz T, Ditrich O, Giboda M. Differential diagnosis of opisthochiid and heterophyid metacercariae (trematoda) infecting flesh of cyprinid fish from Nam Ngum Dam lake in Laos. *Southeast Asian J Trop Med Public Health* 1991;22(suppl):171-3.

Srisawangwong T, Sithithaworn P, Tesana S. Metacercariae isolated from cyprinoid fishes in Khon Kaen District by digestion technic. *Southeast Asian J Trop Med Public Health* 1997;28(suppl 1):224-6.

Vichasri S, Viyanant V, Upatham ES. *Opisthorchis viverrini*: intensity and rates of infection in cyprinoid fish from an endemic focus in northeast Thailand. *Southeast Asian J Trop Med Public Health* 1982;13:138-41.

Waikagul J. *Opisthorchis viverrini* metacercariae in Thai freshwater fish. *Southeast Asian J Trop Med Public Health* 1998;29:324-6.

Wongsawad C, Rojanapaibul A, Mard-arhin N. Metacercaria from fresh water fishes of Mae Sa stream, Chiang Mai, Thailand. *Southeast Asian J Trop Med Public Health* 2000;31(suppl 1):54-7.

Wykoff DE, Chittayasothorn K, Winn MM. Clinical manifestation of *Opisthorchis viverrini* infection in Thailand. *Am J Trop Med Hyg* 1966;15:914-8.