

# OPISTHORCHIS VIVERRINI METACERCARIA IN THAI FRESHWATER FISH

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**Abstract.** Examination for metacercaria in freshwater fish, the common intermediate hosts of *Opisthorchis viverrini* was carried out during 1992-1996. The 4-year survey of fish from markets in 14 provinces revealed that metacercariae of *O. viverrini* were found in fish from Udon Thani, Sa Kaeo and Prachin Buri Provinces; fish from Aranyaprathet district had the highest positive rates (25-28%). Fish from 12 provinces were found to be positive with heterophyid metacercariae, namely: *Haplorchis pumilio*, *H. taichui*, *H. yokogawai*, *Stellantchasmus falcatus*, *Centrocestus formosanus* and *Haplorchoides cahirinus*. It was also observed that the prevalence of *O. viverrini* metacercaria in fish decreased markedly during the last 10 years.

## INTRODUCTION

*Opisthorchis viverrini* is one of the most common trematode parasitizing humans in Thailand and the neighboring countries. Human infections are acquired by eating raw freshwater fish parasitized with *Opisthorchis* metacercariae. Many species of freshwater fish, particularly those of the family Cyprinidae have been reported as second intermediate hosts of *O. viverrini*. Commonly reported fish intermediated hosts are *Cirrhinus julleine*, *Cyclocheilichthys apogon*, *C. armatus*, *C. repasson*, *C. saija*, *Hampala dispa*, *Puntius gonionotus*, *P. leiocanthus*, *P. orphoides*, *P. Partipentazona*, *Osteochilus* sp, and *Mystacoleucus atridorsalis*. The infection rate of *O. viverrini* metacercariae in fish was very high, particularly in the northeast, as reported in papers published before 1990 (Harinasuta and Vajrasthira, 1960; Komalamisra and Setasuban, 1989; Tesana *et al*, 1985, Vichasri *et al*, 1982). However, these have markedly declined in recent reports. (Srisawangwong *et al*, 1997). In the present study, the prevalence of *O. viverrini* metacercariae in cyprinoid fish examined during the period 1992-1996 is summarized.

## MATERIALS AND METHODS

Cyprinoid fish, the common second intermediate host of *O. viverrini* were purchased randomly from 20 markets in 14 provinces in the north, northeast and central Thailand during the period 1992-1996. The fish were digested in a solution of

0.25% pepsin A and 1.5% HCl for 2 hours at 37°C in a shaking water bath. The digested fish material was then washed with 0.85% NaCl and allowed to settle. The sediment was later examined under a stereomicroscope for the characteristic metacercariae. The identification of metacercariae was done by examination of fresh specimens using a light microscope.

## RESULTS AND DISCUSSION

Several species of fish were examined for *O. viverrini* metacercaria. These were *Cyclocheilichthys* spp, *Puntius* spp, *Hampala dispa*, *Cirrhinus julleine*, *Labioharbus spitopleura*, *Esomus metallicus*, *Osteochilus vittatus*, *Trichogaster* spp *Cyclocheilichthys* spp and *Puntius* spp were the most common hosts of *O. viverrini*, although metacercariae were also found in other fish but in lesser numbers.

The survey revealed that *O. viverrini* metacercariae were found in fish from Udon Thani, Sa Kaeo and Prachin Buri provinces (Table 1). Fish purchased from Nong Bua, Udon Thani province harbored only a small number of *O. viverrini* metacercariae, while those from Aranyaprathet and Watthana Nakhon, Sa Kaeo Province harbored considerably more. The percentage of fish from Aranyaprathet infected with *O. viverrini* metacercaria ranged from 25-80% with an average of 46.3%. Fish from other provinces were infected only with heterophyid metacercariae (Mahannop *et al*, 1994; Salarote, 1996; Sornprasit, 1996; Watthanakulpanich, 1995).

About 6 species of heterophyid metacercariae were found in freshwater fish in Thailand, namely: *Centrocestus formosanus*, *Haplorchis pumilio*, *H. taichui*, *H. yokogawai*, *Stellantchasmus falcatus* and *Haplorchoides cahirinus* (Komalamisra, 1983). The most abundant species was *H. cahirinus* which was found in nearly all species of fish examined and from many provinces (Table 1). Fish purchased from Phichit (Komalamisra, personal communication) and Chanthaburi Provinces were found to harbor only *H. cahirinus*. Fortunately, this species is not a human parasite; adult worms parasitize the intestines of catfish. The other 5 species of heterophyid metacercariae are human parasites, as well as parasites of other mammals and birds. Among them, the most common species are *H. taichui* and *H. pumilio*; *H. yokogawai* was found in lesser numbers in fish from all provinces except Phichit and Chanthaburi. *Centrocestus* metacercaria was reported from Chiang Mai, Khon Kaen, Saraburi and Nakhon Nayok Provinces. *S. falcatus* was found in *Puntius* fish from Nakhon Nayok and Chiang Mai.

The infection rate and density of *O. viverrini* metacercariae in fish had decreased markedly during the last ten years (Table 2). For instance, in *Cyclocheilichthys* spp from Khon Kaen Province, the reported rate of *O. viverrini* metacercaria in

1980 was 85.1-100% with an intensity of 9-88 metacercariae per fish (Vichasri *et al*, 1982). In 1987 however, the infection rate was 2.3-68.8% and averaged 3-28 metacercariae per fish; while in 1993 none of the fish were positive with *O. viverrini* metacercariae. The same pattern appeared also in *Puntius* fish from Khon Kaen, the positive rate being 82.4-100% in 1980 (Vichasri *et al*, 1982), 27.2-69.8% in 1987 (Komalamisra and Setasuban, 1989) and 0% in 1993 (present study). On the other hand, the prevalence of heterophyid metacercariae has persisted and possibly even increased. The former is probably due to successful control programs targetted against liver flukes, leading to a decreased in the number of infected persons. Humans, being the main definitive hosts are responsible for spreading the infection. Implementation of chemotherapy and proper latrine utilization resulted in fewer worm eggs being introduced into the environment, consequently disrupting the life cycle of the worm. The situation is quite different with heterophyid intestinal flukes since rodents and birds serve as reservoir hosts, thereby sustaining the life cycle in nature as evidenced by the presence of metacercariae in fish. It is expected that prevalence of these intestinal flukes will increase, the number of worm species infecting man will also increase, and new species or new records are expected in the near future.

Table 1

Distribution of *O. viverrini* and heterophyid metacercariae recovered from cyprinoid fish purchased from markets in various parts of Thailand during 1992-1996.

Region	Province	Metacercariae recovered	
		<i>O. viverrini</i>	Heterophyid
North	Chiang Rai	-	+
	Chiang Mai	-	+
	Sukhothai	-	+
	Kamphaeng Phet	-	+
	Phichit	-	+
	Nakhon Sawan	-	+
Northeast	Khon Kaen	-	+
	Kalasin	-	+
	Udon Thani	+, -	+
Central	Sa Kaeo	+	-
	Prachin Buri	+	-
	Nakhon Nayok	-	+
	Saraburi	-	+
	Chanthaburi	-	+

Table 2

Prevalence and density of *O. viverrini* metacercaria in fish from Khon Kaen Province (1980-1993).

Fish species	Year examined	Number examined	% Fish positive	Metacercaria/fish
<i>Cyclochilichthys</i> spp	1980 <sup>a</sup>	10-47	85.1-100	9-88
	1985 <sup>b</sup>	384-609	-	22-29
	1987 <sup>c</sup>	42-250	2.3-68.8	3-28
	1991 <sup>d</sup>	2-200	0-52.0	1-17
	1993 <sup>e</sup>	10-32	0	0
<i>Puntius</i> spp	1980 <sup>a</sup>	25-148	82.4-100	8-32
	1985 <sup>b</sup>	252	-	2-6
	1987 <sup>c</sup>	11-408	27.2-69.8	13-19
	1991 <sup>d</sup>	13-267	15.4-39.1	1-26
	1993 <sup>e</sup>	3-27	0	0

<sup>a</sup>Vichasri *et al*, 1982<sup>b</sup>Tesana *et al*, 1985<sup>c</sup>Komalamisra and Setasuban, 1989<sup>d</sup>IDRC final report, ( ) = range of the number of metacercariae per fish (Migasena *et al*, 1991)<sup>e</sup>Present study

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