

## Decrease of *Metagonimus yokogawai* Endemicity along the Tamjin River Basin

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**Abstract:** The Tamjin River which flows from Jangheung-gun via Gangjin-gun to the South Sea was reported to be a highly endemic area of *Metagonimus yokogawai* infection in 1977 and 1985. However, there were no recent studies demonstrating how much change occurred in the endemicity, in terms of prevalence and worm burden, of metagonimiasis in this river basin. Thus, a small-scale epidemiological survey was carried out on some residents along the Tamjin River basin in order to determine the current status of *M. yokogawai* infection. A total of 48 fecal samples were collected and examined by the Kato-Katz thick smear and formalin-ether sedimentation techniques. The egg positive rate of all helminths was 50.0%, and that of *M. yokogawai* was 37.5%, followed by *C. sinensis* 22.9% and *G. seoi* 4.2%. To obtain the adult flukes of *M. yokogawai*, 6 egg positive cases were treated with praziquantel 10 mg/kg in a single dose and purged with magnesium sulfate. A total of 5,225 adult flukes (average 871 specimens per person) of *M. yokogawai* were collected from their diarrheic stools. Compared with the data reported in 1977 and 1985, the individual worm burdens appeared to have decreased remarkably, although the prevalence did not decrease at all. It is suggested that the endemicity of *M. yokogawai* infection along the Tamjin River has been reduced. To confirm this suggestion, the status of infection in snail and fish intermediate hosts should be investigated.

**Key words:** *Metagonimus yokogawai*, human infection, prevalence, endemicity, Tamjin River

The intestinal fluke, *Metagonimus yokogawai* (Katsurada, 1912), has been one of the important heterophyid flukes causing fish-borne helminthic zoonoses in the Republic of Korea [1,2]. The infection is caused by eating raw sweetfish, *Plecoglossus altivelis*, and prevalent along riverside areas in accordance with the distribution of the snail and fish intermediate hosts [3,4]. This fluke infection can cause severe gastrointestinal troubles and chronic diarrhea particularly in heavily infected cases [1,5].

The prevalence studies on *M. yokogawai* infection were actively carried out in riverside areas for several decades. According to Chai et al. [6], *M. yokogawai* has been prevalent along almost all large and small streams in eastern and southern coastal areas in the Republic of Korea, and the egg positive rate among the residents ranged from 10% to 70% by different areas [1,3,7]. In particular, the eastern parts of Gyeongbuk province, Gangjin-gun (Tamjin River), Boseong-gun (Boseong River), Hadong-gun (Seomjin River), and Samcheok-gun (Osip Stream) were the most important endemic areas [4,8-10]. The Tamjin River

which runs from Jangheung-gun via Gangjin-gun, Jeollanam-do (Fig. 1) is one of the most well known endemic areas of metagonimiasis [3,11]. The egg positive rate of residents in 2 small riverside villages was reported to be 26.4% in 1977 [3] and 40.3% in 1985 [11]. The metacercarial infection rate in sweetfish ranged from 92.3% [12] to 100% [3]. Thus, monitoring the epidemiological status of metagonimiasis along the Tamjin River basin is strongly needed. The present study was, therefore, carried out to investigate the current status of *M. yokogawai* infection among riverside people along the Tamjin River basin, and to compare how much change has occurred in the endemicity, i.e., prevalence and worm burden, compared with the data reported in 1977 [3] and 1985 [11].

A total of 48 fecal specimens were collected from residents, including all age groups and both sexes, residing in Gundongmyon, Gangjin-gun, Jeollanam-do, in July 2007. The fecal examination for helminth eggs was performed using the Kato-Katz thick smear and formalin-ether sedimentation techniques. After the examination, 6 cases positive for *M. yokogawai* eggs were treated with 10 mg/kg single dose of praziquantel, followed by purgation with 30 g of magnesium sulfate. The whole diarrheic

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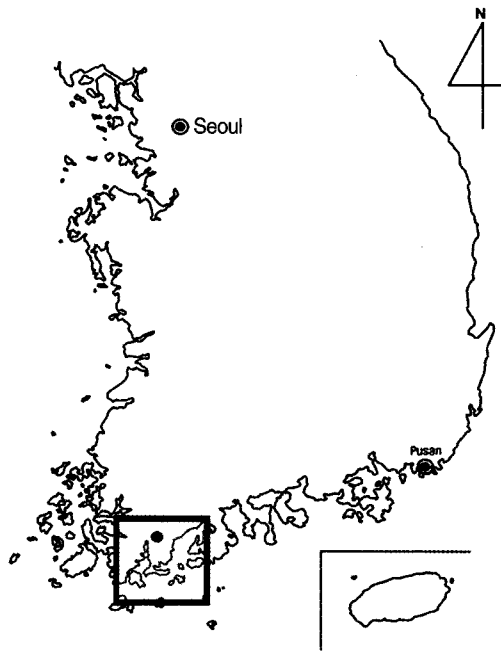


Fig. 1. Map showing the surveyed area of the Tamjin River basin, i.e., Gundong-myon, Gangjin-gun, Jeollanam-do.

stools were collected and washed several times with tap water, and the sediment was fixed with 50% ethyl alcohol and transported to our laboratory. The adult flukes of *M. yokogawai* were collected under a stereomicroscope and the number was counted in each person.

Several kinds of helminth eggs were detected in the fecal examination, but no protozoan cysts were detected. The number of helminth egg positive cases was 24 out of 48 villagers examined (50.0%). The egg positive rate was the highest for *M. yokogawai* (37.5%), followed by *Clonorchis sinensis* (22.9%), and *Gymnophalloides seoi* (4.2%). A few residents had mixed-infections with *M. yokogawai* and *C. sinensis* (data not shown). From the diarrheic stools collected after praziquantel treatment and purgation, a total of 5,225 specimens of *M. yokogawai* (average 871 per person) were recovered from the 6 treated and purged cases (Table 1).

A previous survey performed in the same village of Gundong-myon in 1977 showed that the overall helminth egg positive rate was 88.2% out of 288 people examined, and *M. yokogawai* egg positive rate was 26.4% [3]. In another survey conducted in the same village in 1985, the helminth egg positive rate was 55.2% among 221 residents examined, and *M. yokogawai* showed the highest egg positive rate, 40.3% [11]. In the present study, the egg positive rate of *M. yokogawai* appeared to be 37.5%, a value not significantly different from that in 1985 [11], and

Table 1. The number of worms collected from the egg positive cases of *M. yokogawai* in comparison with the data reported in 1985

1985 <sup>a</sup>			2007 (present study)		
Case No.	Age & sex	No. worms recovered	Case No.	Age & sex	No. worms recovered
1	61 M	2,886	1	52 F	245
2	45 F	4,594	2	49 F	720
3	40 F	7,038	3	62 F	889
4	48 F	7,047	4	70 M	1,063
5	55 F	10,630	5	47 M	1,089
6	59 M	12,685	6	60 F	1,219
7	34 F	12,820	-	-	-
8	57 F	16,517	-	-	-
9	63 M	20,286	-	-	-
10	50 M	25,858	-	-	-
11	30 M	26,019	-	-	-
12	43 M	33,825	-	-	-
13	55 M	52,030	-	-	-
14	33 M	63,587	-	-	-
Total		295,822	Total		5,225
Mean/person		21,130	Mean/person		871

<sup>a</sup>Seo et al. [11].

substantially higher than the figure in 1977 [3]. Therefore, it is difficult to acknowledge that the prevalence of metagonimiasis along the Tamjin River has decreased during the past 30 yr.

However, the individual worm burdens of *M. yokogawai* among the surveyed villagers were remarkably lower than expected. In 1985, the total number of worms recovered from 14 cases was 295,822, and the average number per case was 21,130 [11]. However, in the present study, the number of specimens recovered from 6 cases was 5,225 in total and averaged 871 per case, a 1/25 of the figure in 1985. In this respect, it is suggested that the intensity of infection in terms of worm burdens per person is currently much lower than that of the previous periods of time in this area.

Taken together, it is suggested that the endemicity of *M. yokogawai* infection in the Tamjin River basin has decreased, although the prevalence remained to be fairly high. The unchanged prevalence in this river basin may have been due to continued chance of infections with metacercariae of *M. yokogawai* by consuming raw sweetfish. It is predicted that the metacercarial density in sweetfish would be lower than before; however, it should be verified through further epidemiological studies.

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