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☐ **Brief Communication** ☐

Infection status of *Paragonimus westermani* metacercariae in crayfish (*Cambaroides similis*) collected from Bogildo (Islet), Wando-gun, Chollanam-do, Korea

Myeong-Heon SHIN[1)]* and Duk-Young MIN[2)]

Department of Parasitology[1)], College of Medicine, Ewha Womans University, Seoul 158-056 and Department of Parasitology[2)], College of Medicine, Hanyang University, Seoul 133-791, Korea

Abstract: During the period from October 1996 to November 1998, the infection status of *Paragonimus westermani* metacercariae in freshwater crayfish (*Cambaroides similis*) collected from Bogildo (islet), Wando-gun, Chollanam-do, which is known for an endemic area of *P. westermani* in Korea, were examined. The average infection rate of *Paragonimus* metacercariae in crayfish was 88.6%, and mean number of metacercariae per infected crayfish was 30.2. This metacercarial density was the highest in the group of weight in 7.1-9.0 g. These results suggest that the natural life cycle of *P. westermani* is still well-preserved in Bogildo.

Key words: *Paragonimus westermani*, infection status, metacercariae, intermediate host, freshwater crayfish (*Cambaroides similis*), Bogildo, Korea

INTRODUCTION

Human paragonimiasis caused by *Paragonimus westermani* is locally distributed in the mountainous districts of southern part of Korea. This distribution of *P. westermani* mainly coincided with that of second intermediate host, freshwater crayfish, which is the most important source of human infections in Korea. A number of surveys to determine the infection status of crayfishes with *Paragonimus* metacercariae was done in endemic areas of human paragonimiasis in Korea (Ahn et al., 1966; Chun, 1970; Rim et al., 1975; Lee et al., 1979). Recently, the population density and infection rate of the crayfish with *Paragonimus* metacercariae in many endemic areas are drastically decreasing due to the destruction of environmental ecology and continuous control of human paragonimiasis (Hong et al., 1986).

Bogildo (Islet), Wando-gun, Chollanam-do has still been known for a highly endemic area of *P. westermani*, since the epidemiological surveys of paragonimiais and the second intermediate host were performed in this area (Ahn et al., 1979; Kim et al., 1985). Kim et al. (1985) reported that infection rate of *Paragonimus* metacercariae in crayfish was 65.4%, and the average number of metacercariae per infected crayfish was 10.0. However, no recent reports on the infection status of *P. westermani* metacercariae in crayfish from Bogildo have been available. This study was carried out to find out the changing pattern of the infection status of *P. westermani* metacercariae in crayfish collected from Bogildo.

The surveyed area, Bogildo, is a remote islet located in the southwestern part of Korea. From October 1996 to November 1998, the

* Corresponding author (e-mail: mhshin@mm.ewha.ac.kr)

Table 1. Infection status with *Paragonimus westermani* metacercariae in crayfish collected from Bogildo, Wando-gun, Chollanam-do

Month/year examined	No. of crayfish examined	No. of crayfish positive (%)	No. of metacercariae detected		
			Range	Total	Average
Oct/96	12	11 (91.7)	1-45	110	10.0
Oct/97	34	25 (73.5)	1-75	405	16.2
Apr/98	94	85 (90.4)	1-193	2,574	30.3
Nov/98	36	35 (97.2)	4-105	1,629	46.5
Total	176	156 (88.6)	1-193	4,718	30.2

Table 2. Infection density with *Paragonimus westermani* metacercariae by the weight of crayfish collected from Bogildo, Wando-gun, Chollanam-do

Weight (g) of crayfish	No. of crayfish examined	No. of crayfish positive (%)	No. of metacercariae detected		
			Range	Total	Average
3.1-5.0	54	47 (87.0)	1-98	1,218	25.9
5.1-7.0	92	80 (86.9)	1-110	1,956	24.5
7.1-9.0	16	16 (100.0)	7-193	1,041	65.1
over 9.1	14	13 (92.9)	1-102	503	38.7
Total	176	156 (88.6)	1-193	4,718	30.2

freshwater crayfish, *Cambaroides similis*, were collected once or twice yearly in a small stream near the Buwhang-ri in Bogildo. The collected crayfish were brought to the laboratory, and were individually weighed and crushed in a small bowel with tap water. The crushed tissues of crayfish were suspended in artificial digestive solution for 2 hr at 37°C and then filtered once through mesh screen. The filtered sediments were examined for *P. westermani* under a dissecting microscope.

Table 1 shows the infection rate and intensity of *P. westermani* metacercariae in 176 crayfishes examined. A total of 156 (88.6%) out of 176 crayfishes was found to harbor 1 to 193 metacercariae (average 30.2). Although average number of metacercariae per crayfish varied from 10.0 in October 1996 to 46.5 in October 1998, the overall infection rate and density during the examined period were higher in this study than those of Kim et al. (1985). This infection status in this study was also similar to that of Kanghwa-gun, Kyonggi-do in the 1970s (Rim et al., 1975; Lee et al., 1979), which had been known for one of the highly endemic areas in Korea. In the present study, the relationship between the weight of crayfish and intensity of metacercarial infection was also observed. The average numbers of metacercariae per crayfish were 25.9 in the group of weight in 3.1-5.0 g, 24.5 in 5.1-7.0 g, 65.1 in 7.1-9.0 g, and 38.7 in the group of over 9.1 g (Table 2). Such a correlation was also observed in crayfish collected in Kangwha-gun, Kyonggi-do (Lee et al., 1979). Especially, the infection rate in the group of weight in 7.1-9.0 g was 100%. From these results, it is strongly suggested that the natural life cycle of *P. westermani* is still well-preserved in Bogildo area.

It is particularly interesting that *Paragonimus* cercariae were not found in snails from Bogildo as compared with extremely high infection status of metacercariae in crayfish. Considering very low prevalence of active paragonimiasis in the residents of this area, some other mammals such as cats, dogs and wild rats may also be involved in the natural life cycle of *P. westermani* (Chung, 1983). Therefore, further research is needed to

determine natural life cycle of *Paragonimus* connected with wild animals in the ecosystems of Bogildo. In conclusion, the present results show that *P. westermani* is still highly prevalent in crayfish from Bogildo, Wando-gun, Chollanam-do, Korea.

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