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Minor Intestinal Flukes and Infections They Cause

THREE TREMATODES, in addition to *Fasciolopsis*, infect the human intestine: *Heterophyes heterophyes*, *Metagonimus yokogawai*, and *Gastrodiscoides hominis*. They are quite common in limited geographical areas. They are of only minor public health importance, and are included in this book for completeness.

Description of Pathogens and Diseases

Little is known of these infections or their epidemiology.

Identification

Heterophyiasis, metagonimiasis, and infection by *Gastrodiscoides hominis* are trematode infections of the small intestine. Infections are usually asymptomatic, but occasionally minor intestinal disturbances such as nausea, diarrhea, fever, and abdominal pain may occur.

Diagnosis is by identifying eggs in the feces. Treatment is by appropriate oral drug therapy.

Occurrence

Heterophyes heterophyes has a disjunct distribution, being found in southern Europe (Romania and Greece), the Middle East (Egypt and Israel), and East Asia (China, Japan, Philippines, South Korea, and Taiwan) (figure 30-1). *Metagonimus yokogawai* occurs in China, Japan, Korea, Taiwan and the eastern USSR (figure 30-1). *Gastrodiscoides hominis* is found in Bangladesh, India, Philippines, and Vietnam (figure 30-2).

Infectious agents

These are all hermaphroditic flattened trematodes. *Heterophyes heterophyes* and *Metagonimus yokogawai* (which are very similar in morphology and life history) are 1.5 by 0.5 millimeters (figure 30-3), and *Gastrodiscoides hominis* measures 6 by 4 millimeters (figure 30-4). The eggs of *H. heterophyes* and *M. yokogawai* measure 30 by 15 micrometers, and those of *G. hominis* 146 by 66 micrometers.

Reservoirs

These are all primarily parasites of animals. *H. heterophyes* and *M. yokogawai* infect dogs, cats, foxes, and other fish-eating mammals, and perhaps birds. *G. hominis* infects pigs, monkeys, and rats. All three parasites can probably be maintained in the absence of man.

Transmission

For all these parasites, eggs are passed in the feces and have to reach water for further development. Larvae develop in specific freshwater snails, and a process of asexual multiplication occurs so that some hundreds of the next free-living stage, the cercariae, are released from the snail into the water. These cercariae then form encysted metacercariae. *Heterophyes* and *Metagonimus* encyst under the scales, on the surface, or in the superficial muscle of fish. *Gastrodiscoides* encysts on water plants. The habitat of the snail and fish intermediate hosts of *Heterophyes* is brackish water. The habitat of the snail intermediate host of *Metagonimus* is freshwater, whereas the fish intermediate host lives in both fresh and brackish water. Animal or human infection takes place when raw fish or water plants are ingested. Thus the life cycles of

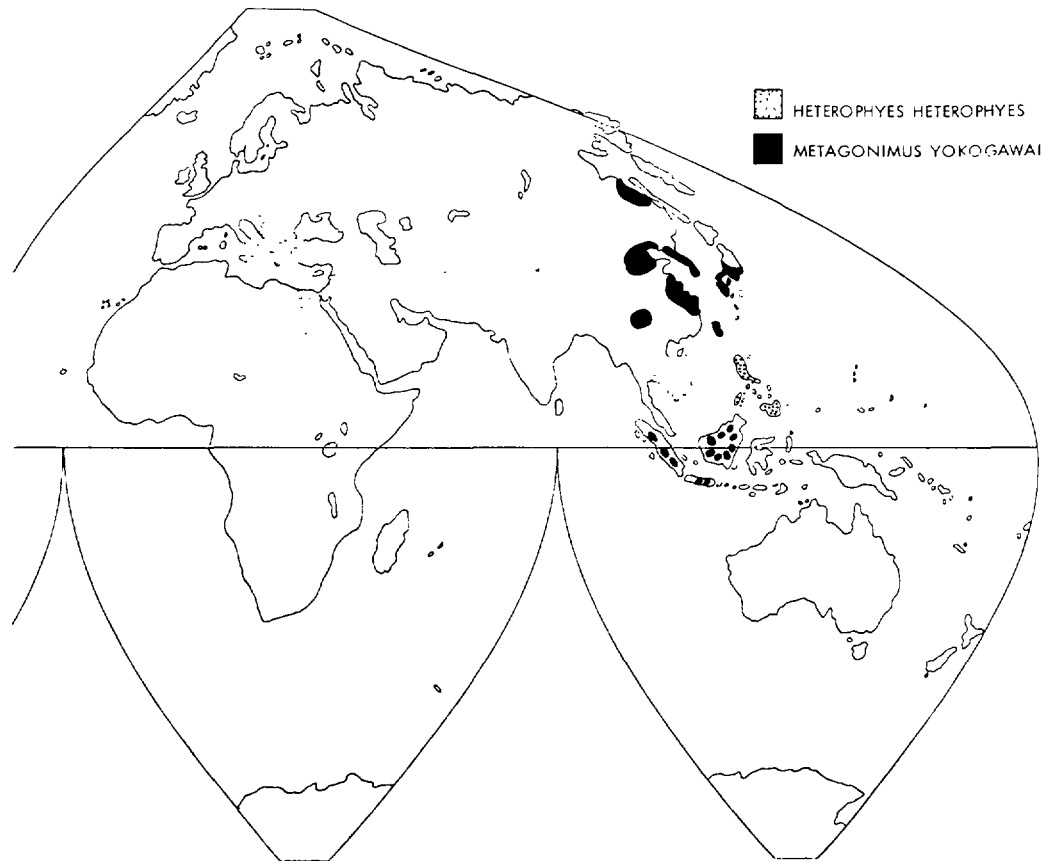


Figure 30-1. *Known geographic distributions of Heterophyes heterophyes and Metagonimus yokogawai. The infections may occur in areas as yet unrecorded*

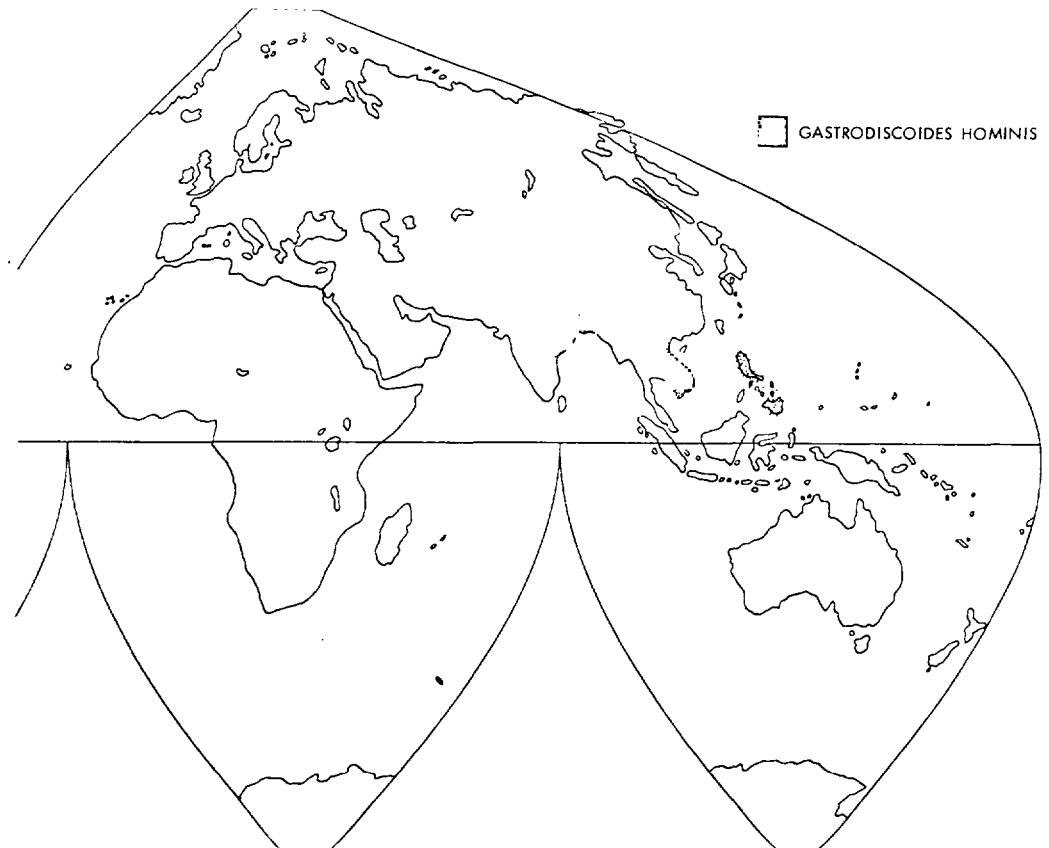


Figure 30-2. *Known geographical distribution of Gastrodiscoides hominis. The infection may occur in areas as yet unrecorded*



Figure 30-3. *Adult Heterophyes heterophyes (a) and Metagonimus yokogawai (b) under a light microscope. Scale bars = 0.1 millimeter. (Photos: Wellcome Museum of Medical Science)*



Figure 30-4. An adult *Gastrodiscoides hominis* under a light microscope. Scale bar = 1 millimeter. (Photo: Wellcome Museum of Medical Science)

Heterophyes and *Metagonimus* are similar to *Clonorchis* (chapter 24), whereas the life cycle of *Gastrodiscoides* resembles that of *Fasciolopsis* (chapter 28).

Prepatent and incubation periods

Metagonimus and *Heterophyes* flukes develop and begin to lay eggs 15–20 days after encysted metacercariae have been ingested.

Period of communicability

As long as mature flukes are present in the intestine, eggs will be passed. Mature flukes live for about 2 months.

Resistance

There is no evidence of immunity or resistance.

Epidemiology

Little is known of the epidemiology of *H.*

heterophyes and *M. yokogawai* and almost nothing of *G. hominis*. It may be broadly assumed that the epidemiology of the first two resembles that of *Clonorchis* or *Opisthorchis* (chapter 24), whereas that of *G. hominis* resembles *Fasciolopsis* (chapter 28).

In Egypt, heterophyiasis is associated with eating freshly salted mullet (Khalil 1933; Martin and Kuntz 1955). Heterophyiasis in the Philippines was reviewed by Africa and Garcia (1935). Metagonimiasis does not occur in areas where the summer water temperatures are below 18°C because the cercariae do not emerge from the snails in cool water. Seo and others (1969) surveyed 40,000 people in South Korea and found a prevalence of metagonimiasis of 0.4 percent. Infection rates were higher in males than females and higher in adults than in children. These age and sex differences are typical of heterophyiasis and metagonimiasis and are due to differences in diet. Metagonimiasis in the USSR was discussed by Zubov, Drozdov and Chernova (1970). The epidemiology of *G. hominis* infection is poorly understood, although there have been several reports from India (Ahluwalia 1960; Buckley 1939; Dutt and Srivastava 1972; Varma 1957).

Control Measures

Control of *H. heterophyes* and *M. yokogawai* is as recommended for *Clonorchis* (chapter 24). Control of *G. hominis* is as recommended for *Fasciolopsis* (chapter 28).

Occurrence and Survival in the Environment

Little is known. *H. heterophyes* cercariae survive for 20 minutes in freshwater and for 2 days in seawater. *M. yokogawai* cercariae survive for 8 hours in freshwater (Ito 1964).

M. yokogawai encysted metacercariae in fish survive for 15 minutes at 70–80°C, 2 hours in vinegar, 6 hours in soybean sauce, 3 days in rice wine, 7 days in beer, 10 days frozen, and 14 days in tap water (Ito 1964).

Inactivation by Sewage Treatment Processes

There is no specific information.

Inactivation by Night Soil and Sludge Treatment Processes

There is no specific information.

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