TREMATODE INFESTATION	INTERMEDIATE HOST(S}	MODE OF ENTRY	SITE OF
Schistosoma hematobium		Penetration of skin by free-swimming cercariae.	Blood vessels of urinary bladder
Schistosoma mansoni	Snail		Inferior mesenteric veins
Schistosoma japonicum			Superior mesenteric veins
ParaQonimus westermani	Snail-crab	Ingestion of infested crabmeat	Lungs
Opisthorchis sinensis	Snail-fish	Ingestion of infested fish	Liver (bile ducts)
MetaQonimus yokegawai	Snail-fish	Ingestion of infested fish	Intestine
Heterophves heterophyes	Snail-fish	Ingestion of infested fish	Intestine
Fasciola hepatica*	Snail	Ingestion of encysts larvae on vegetation	Liver (bile ducts)
Fasciolopsis buski**	Snail	Ingestion of encysts larvae on vegetation	Intestine
Gastrodiscoides hominis**	Snail	Ingestion of encysts larvae on vegetation	Intestine

*Usual definitive host is sheep, but man is sometimes affected.

**Usual definitive host is swine, but man is sometimes affected.

1-Intestinal Flukes

The most common human intestinal trematode is ***Fasciolopsis buski*** (adult: 20 to 75 mm by 8 to 20 mm). It is found mainly in the central and southeast parts of Asia. *F. buski* is a common parasite in pigs. Others are ***Heterophyes heterophyes*** (adult: 1 to 2 mm in length), ***Metagonimus yokogawai*** (adult: 1 to 2.5 mm by 0.4 to 0.75 mm), and ***Echinostoma*** **species** (adult: 6.5 by 1 to 2 mm).

A-*Fasciolopsis buski*

Kingdom:	Animalia
Phylum:	Platyhelminthes
Class:	Rhabditophora
Order:	Plagiorchiida
Family:	Fasciolidae
Genus:	*Fasciolopsis* Looss, 1899
Species:	***F. buski***

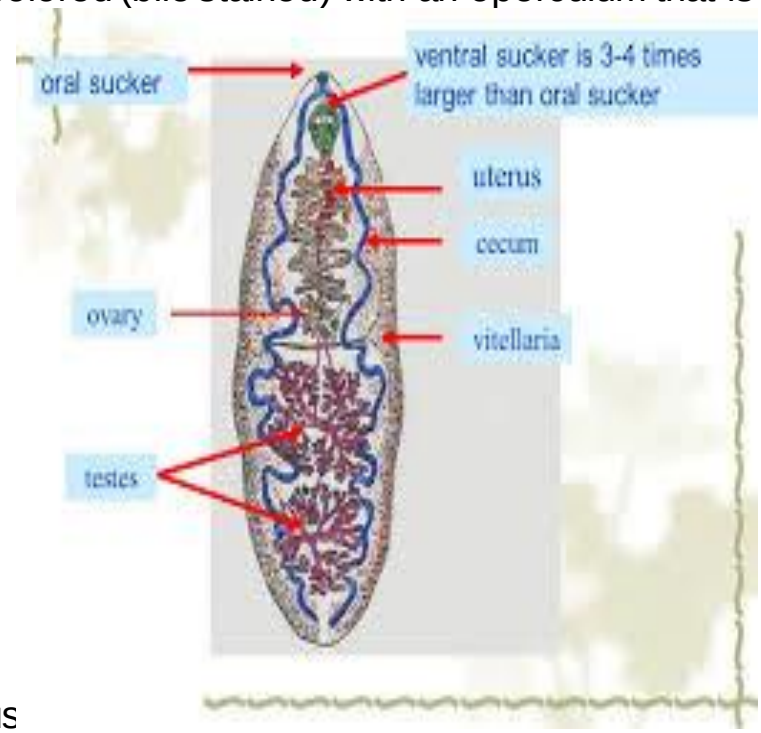
Human infection by *F. buski* occurs throughout central and south China, Taiwan, Laos, Vietnam, Cambodia, India, Korea, and Indonesia. The infection is usually acquired by ingestion of encysted metacercariae from fresh plants grown in ponds

s a relatively large intestinal fluke that is acquired in the Far East from ingestion of parasite cysts attached to aquatic plants, such as water chestnuts, contaminated by feces from infected mammals (pigs, humans).

Description

Fasciolopsis buski is the largest digenean infecting humans, reaching a size of 75-mm long and 20-mm wide. It is morphologically similar to *F. hepatica* with a few notable differences The most obvious of these are that, in *F. buski*, the caeca lack side branches, the ventral sucker is much larger than the oral sucker,. It differs further from all other members of the family Fasciolidae in that the definitive habitat is the small intestine of humans and pigs rather than the liver.**Ova** are all thin shelled,

ellipsoid, quinone colored (bile stained) with an operculum that is



often inconspicuous

Life cycles

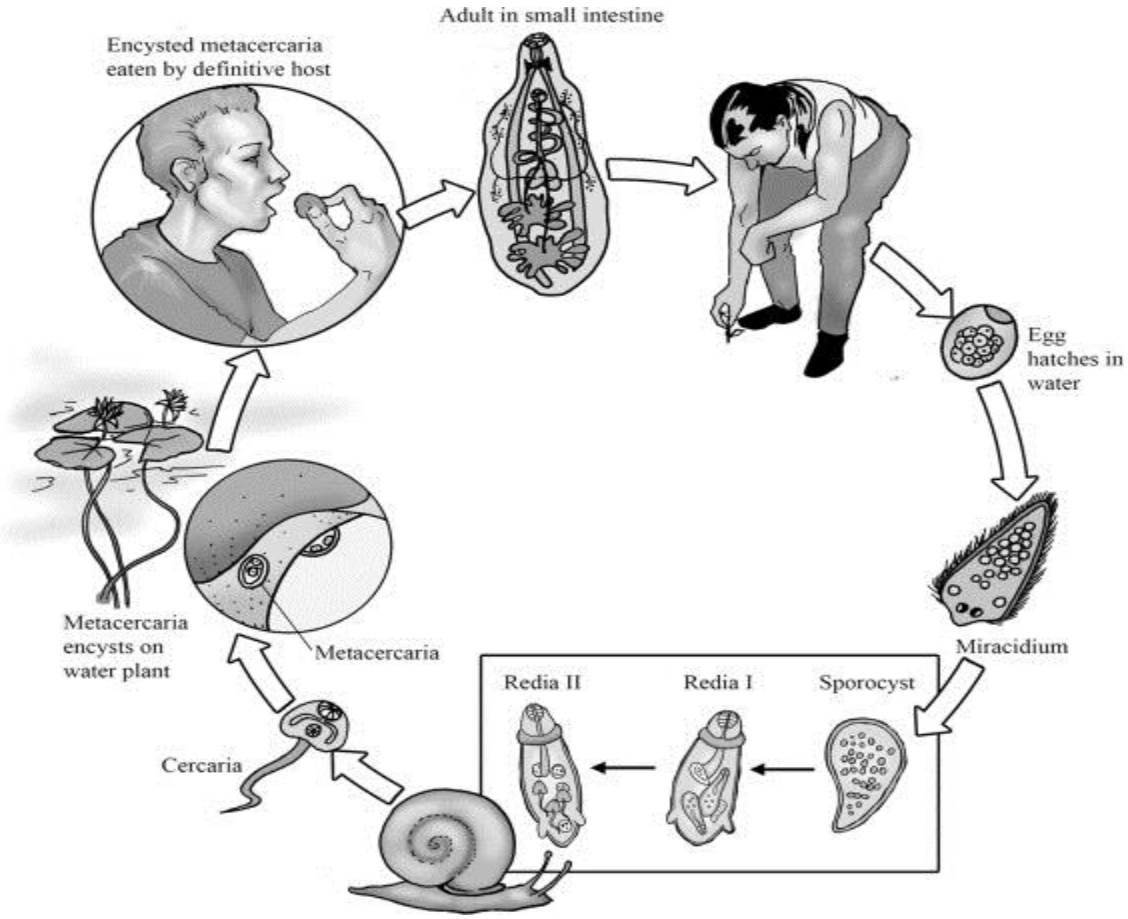
. -The adult worm, attached to the intestinal wall of humans, produces eggs that are passed in feces.

-The eggs reach water, and miracidia develop and penetrate the first intermediate host—snails. During the course of 6 to 7 weeks inside the host snails, they develop into sporocysts, rediae, and cercariae.

3-The cercariae leave the snails to encyst in the second intermediate host, which can be freshwater snails, fish, tadpoles, or vegetables.

4- Humans are infected by the ingestion of raw stems, leaves (especially bamboo shoots), watercress, or water chestnuts with encysted metacercariae. In the human duodenum,

5- the metacercariae attach to the walls and become adult worms in approximately 3 months.



Clinical Features

-Light infections with intestinal flukes are often asymptomatic.

- Persons with heavy infections may present with abdominal pain, chronic diarrhea, anorexia, nausea, and weight loss.

-Rarely, extraintestinal lesions may result from ectopic migration of larvae or from eggs gaining access to the circulation and being deposited in ectopic sites.

Diagnosis

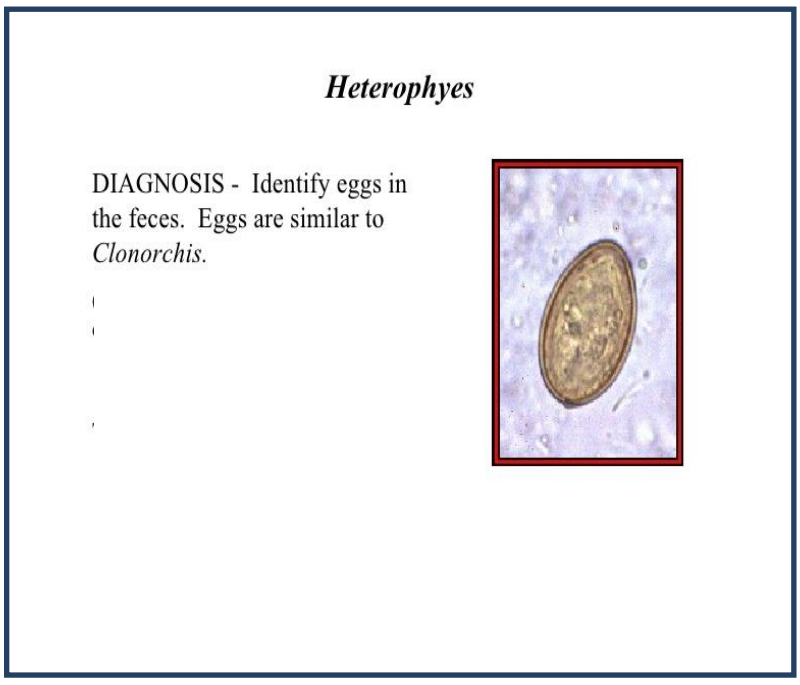
Diagnosis can be made by finding the characteristic parasite eggs in submitted stool samples. No diagnostic serologic tests are available.

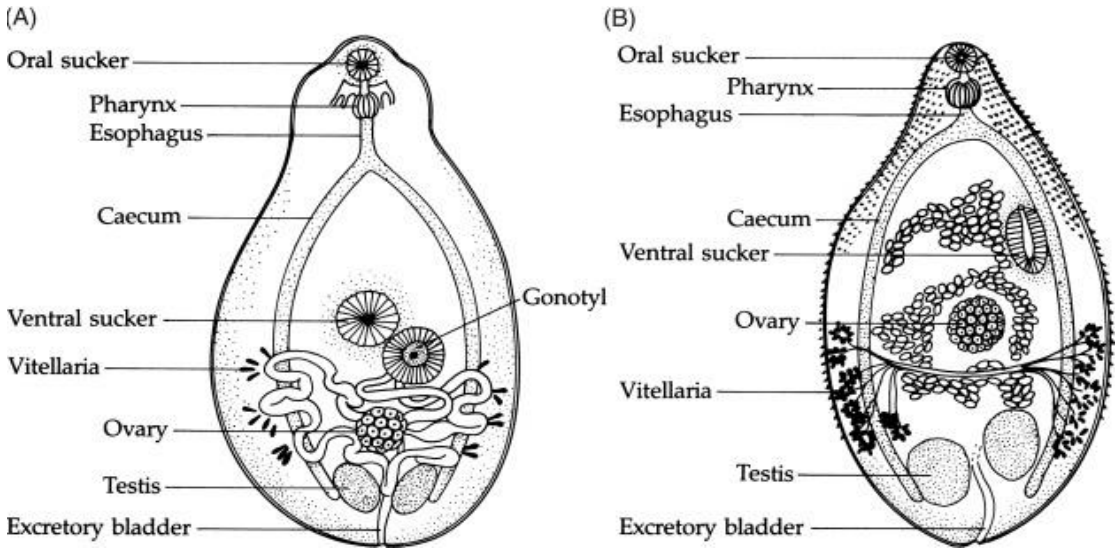
Treatment

The treatment of choice is praziquantel , Tetrachloroethylene, a drug not available for human use in the United States, is often used in developing countries because of its low cost.

B-Heterophyes heterophyes and *Metagonimus yokagawai*

Kingdom:	Animalia
Phylum:	Platyhelminthes
Class:	Rhabditophora
Order:	Plagiorchiida
Family:	Heterophyidae
Genus:	*Heterophyes*
Species:	***H. heterophyes***





Epidemiology

In addition to *H. heterophyes* and *M. yokagawai*, at least 14 other heterophyids have been reported in humans. There is an unusually high incidence of infection by *H. heterophyes* in Egypt, Poor sanitation practices by local fishermen, boatmen,. One of the principal food fishes in the region is the mullet, and parasitic infection results from eating fresh mullet, either incompletely cooked or poorly pickled. Human infection with *H. heterophyes* is also common in Japan, central and south China, Korea, Taiwan, Greece, Israel, and Hawaii. Infection with *M. yokagawai* occurs when the infected second intermediate host, such as a salmonoid fish, is consumed raw or improperly processed. A variety of fish-eating mammals, including cats and dogs, serve as reservoirs for these parasites

Description

Heterophyes heterophyes and *Metagonimus* yokagawai belong to the family Heterophyidae. Measuring 1.4-mm long and 0.5-mm wide, they are among the smallest digeneans infecting humans The tegument of these pyriform flukes contains scalelike spines. In *H. heterophyes*, the genital pore, situated posterolateral to the prominent ventral sucker, is surrounded by a genital sucker or **gonotyl**.

. The reproductive system is located in the posterior half of the body with the testes lying side by side; the ovary is medial, just anterior to the testes, with lateral, follicular vitelline glands restricted to the posterior third of

the body. The gravid uterus loops between the long intestinal caeca, terminating at the gonotyl.

The eggs of both species resemble those of *C. sinensis* except for their indistinct opercular shoulders and the absence of an abopercular knob.

Life cycle

-Eggs containing fully developed miracidia pass out of the human host in feces

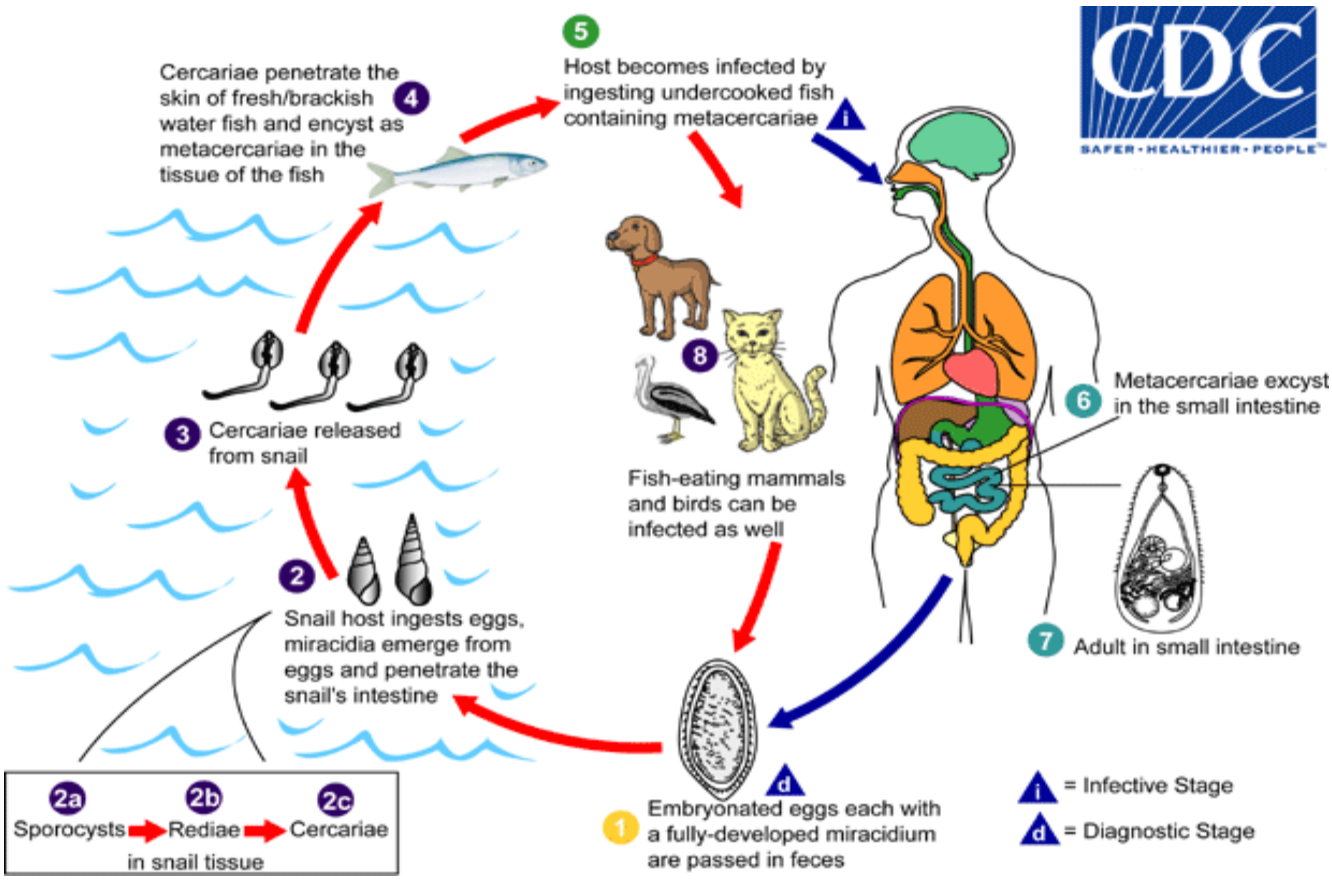
-and rates the intestine of the snail and transforms into a sporocyst when ingested by a suitable molluskan first intermediate host.

-The hatched miracidium penetgestive gland. Two generations of rediae follow the sporocyst with daughter rediae giving rise to cercariae that escape to the external environment,

-penetrate the musculature of any of a number of food fishes, and encyst as metacercariae.

-metacercariae. Human infection results from consumption of raw or improperly cooked fish.

-he metacercariae excyst in the duodenum, migrate to the jejunum, and attain sexual maturity in about a week.



The pathology, symptomatology,

-. Adult worms often produce little distress to the patient,

-severe infections may elicit inflammatory reactions at sites of contact as well as diarrhea and abdominal pain. Eosinophilia is also common but without anemia.

-The eggs are then carried to various parts of the body where they may cause granulomatous responses in such organs as the heart or brain.

-Heterophyid *myocarditis* sometimes precipitates fatal heart attacks, and neurological complications also have been reported.

Diagnosis

depends on positive identification of eggs from feces. Because of the great degree of similarity, care must be exercised to differentiate the eggs from those of other heterophyids and of opisthorchids.