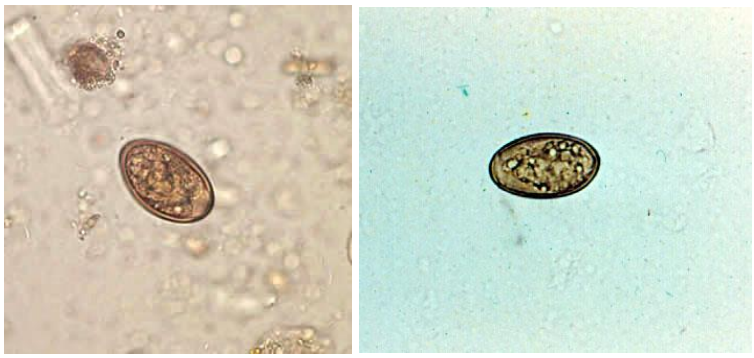
Dicrocoelium dendriticum, Dicrocoelium hospes, Eurytrema pancreaticum
(Pathogen – Less Common Liver Trematodes)

Organism:

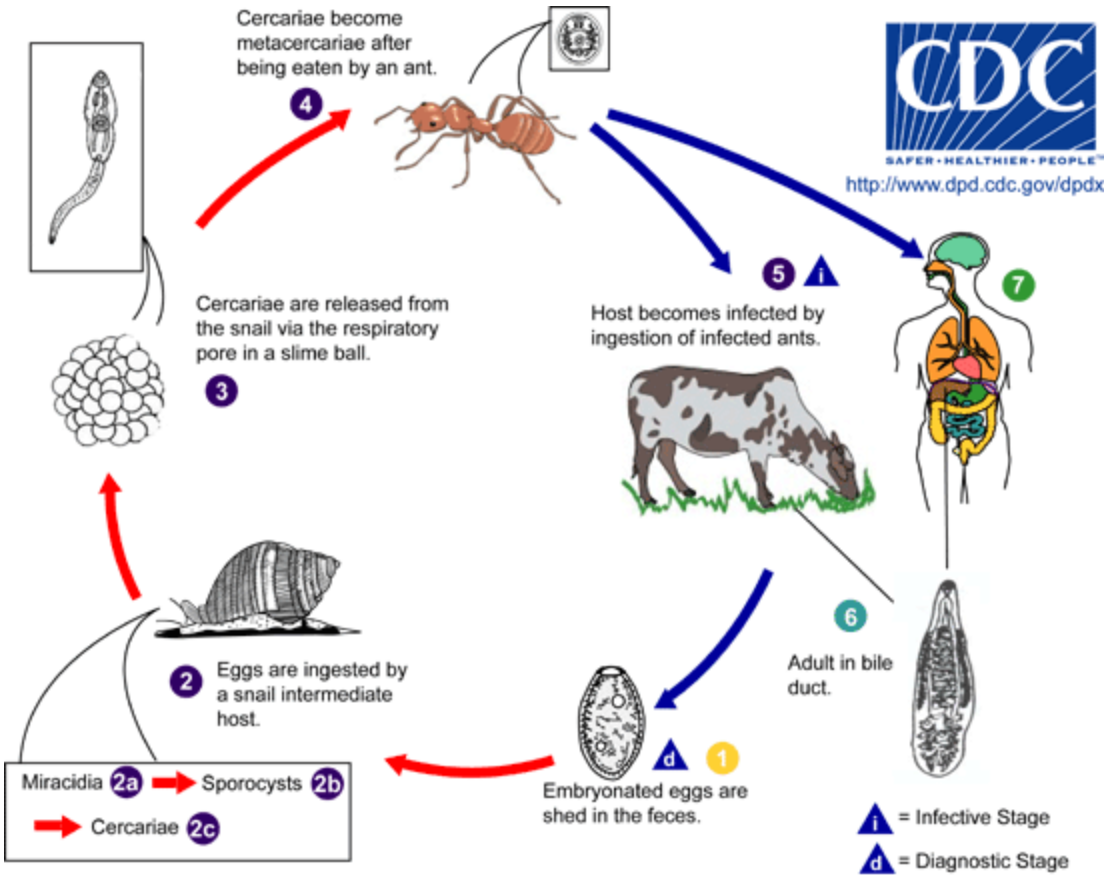
Dicrocoelium dendriticum (lancet fluke, lanceolate fluke) is commonly found in the biliary passages of sheep, deer, and other herbivores and omnivores in Europe, Poland, Turkey, northern Africa, northern Asia, Turkistan, parts of the Far East, and North and South America; as an example, in southern Poland, 80% of the sheep are reported to be infected. Although many human infections have been reported, most are probably spurious infections acquired from eating infected raw sheep liver. However, true human infections have been reported from Europe, Egypt, Iran, Nigeria, Ivory Coast, and China. Approximately 30 cases of human infection with *D. hospes* have been reported from Ghana, Sierra Leone, Nigeria, and Democratic Republic of Congo. Although *D. hospes* has been thought to be a polymorph of *D. dendriticum,* ultrastructural study results can now distinguish *D. hospes from* other species of *Dicrocoeliidae* studied.

Eurytrema pancreaticum is usually found in the pancreatic ducts of hogs in south China and of herbivores such as cattle, sheep, goats, monkeys and camels in the Orient and Brazil. True infection in humans has been reported in China and Japan.



Eggs (operculated)

Adult worms



Life Cycle:

The life cycle is similar to that of the other liver trematodes. However, in this case, the snail intermediate host is a land snail. The cercariae are released from the snail after rains follow a long period of dry weather. They are released from the snail's respiratory chamber as slime balls that are left behind on grass as the snail crawls along the ground or on plants. The ant (*Formica fusca*) is the required second intermediate host for *D. dendriticum* within the United States, while other ants serve this function in other areas. The second intermediate host for *E. pancreaticum* is either tree crickets or grasshoppers. Human infection is acquired through accidental ingestion of ants, primarily on fresh herbs or plants used for human consumption. Accidental ingestion of infected crickets or grasshoppers can also result in human infection. The metacercariae excyst and migrate to the biliary passage for *D. dendriticum* and the pancreatic ducts for *E. pancreaticum*, where they then become adult flukes.

The adult worms of *D. dendriticum* are lancet-shaped, flat, and transparent and measure 5 to 15 mm long by 1.5 to 2.5 mm wide. The eggs are thick-shelled, operculate, deep golden brown, and measure 38 to 45 µm by 22 to 30 µm; the eggs of the two flukes cannot be differentiated. The eggs are embryonated when passed and are resistant to drying. The adult worm of *E. pancreaticum* is 8 to 16 mm long by 5 to 9 mm wide and tends to be more ovate and broader than that of *D. dendriticum*.

Acquired:

Human infection is acquired through accidental ingestion of ants, primarily on fresh herbs or plants used for human consumption. Accidental ingestion of infected crickets or grasshoppers can also result in human infection.

Epidemiology:

Like *F. hepatica*, infection can occur in a wide range of herbivorous mammals when they ingest infected water plants or drink water contaminated with metacercariae. In some areas, the rate of infection in these animal hosts is quite high: in China, the rates are 50% for cattle, 45% for goats, and 33% for water buffalo; in Iraq, the rates are 71% for water buffalo and 27% for cattle; in northeastern Thailand, the rate is 60% for cattle. In various surveys, the occurrence of infections in cattle in Zambia was approximately 61%; in Tanzania the incidence in traditional, large-scale dairy and small-scale dairy cattle was 63.8%, 46.2% and 28.4%. Studies in Australia testing a commercially available ELISA for antibody detection was evaluated; results indicate this test will be very valuable in screening cattle and sheep for infections with *F. hepatica*, and probably *F. gigantica*.

Clinical Features:

Although the life cycle is similar to that caused by *F. hepatica*, the pathogenic effects are less severe and patients may report mild symptoms. Symptoms include chronic constipation and flatulent dyspepsia. In heavy infections, there may be jaundice with an enlarged liver. There may also be vomiting and diarrhea, as well as systemic toxemia. Eosinophilia tends to be absent in this infection.

Clinical Specimen:

Stool: Confirmation of the infection depends on finding the operculated eggs in a routine stool examination; multiple stool examination may be required to find the eggs.

Laboratory Diagnosis:

Stool: The routine sedimentation concentration is recommended. Since the eggs are operculated they cannot be recovered from the zinc sulfate flotation method. Eggs of *D. dendriticum* and *E. pancreaticum* can resemble those of many other small intestinal and liver trematodes such as *C. sinensis, O. viverrini, H. heterophyes*, and *M. yokogawai*. Differentiation may be difficult without a patient history. Multiple stool examinations may be needed to detect light infections.

Organism Description:

Egg: The eggs can be found in the stool; however, multiple stool examinations may be required to demonstrate the eggs. Eggs of *D. dendriticum* and *E. pancreaticum* can resemble those of many other small intestinal and liver trematodes such as *C. sinensis, O. viverrini, H. heterophyes*, and *M. yokogawai*. The eggs are thick-shelled, operculate, deep golden brown, and measure 38 to 45 µm by 22 to 30 µm; the eggs of the two flukes cannot be differentiated. The eggs are embryonated when passed and are resistant to drying. The adult worm of *E. pancreaticum* is 8 to 16 mm long by 5 to 9 mm wide and tends to be more ovate and broader than that of *D. dendriticum*.

Laboratory Report:

Liver fluke type eggs recovered (similar to *Clonorchis sinensis*)

Treatment:

Praziquantel is the drug of choice, and the same dosage is recommended as that used for infection with *Opisthorchis* infection. Triclabendazole, an imidazole derivative, may also be effective.

Garcia, L.S. 2007. Diagnostic Medical Parasitology, 5th ed., ASM Press, Washington, D.C.

Control:

Because infection in humans is usually accidental, few preventive measures are effective. Use of wild herbs and grasses as food can be avoided unless they are carefully washed. Crickets or grasshoppers could also be accidentally ingested if they were within plant material that had not been carefully washed.