Diphyllobotherium latum

Scolex

Mature proglottids

Diphyllobotherium latum (Linnaeus, 1758) Luhe, 1910 was prevalent in the Baltic Sea area at an early.

Today *D.latum* is indigenous throughout many parts of Russsia, in the Baltic Sea countries, Central and Southeastern Europe, Africa, Japan, New South Wales, Australia, Canada, Alaska, and in lakes of southern Chile and Argentina.

Morphology, Biology and Life Cycle.

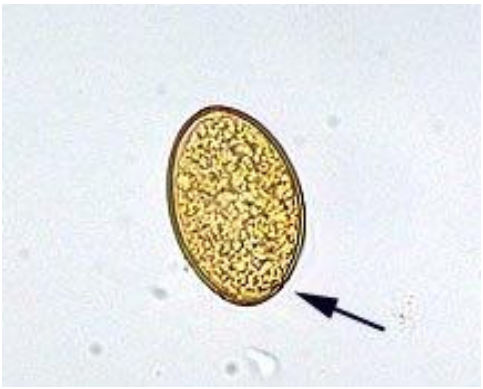
The fully developed strobila of *D.latum* is ivory colorded, up to 10 meters or more in length, and has up to 4000 proglottids. The elliptical or spatulate scolex measures about 2.5 mm in length by 1 mm in breadth, and is provided with a median ventral and a median dorsal grooved sucker. The adjacent portion of the neck is unusually delicate. Proglottid formation in *D.latum* occurs at the distal end of the neck as in other strobilate tapeworms, but accessory proglottids are produced at all levels of the worm.

The eggs within the fully developed uterus are continuously discharged through the uterine pore. Terminal proglottids gradually become non-productive and disintegrate. The egg of *D.latum* is unembryonated at the time it is evacuated in the host's feces, it is broadly ovoidal, has an operculum at one end and a small inconspicuous thickening of the shell at the opposite end. Size of the eggs varies considerably the range being from about 60 by 40 to 70 by 50 microns.

Embryonation of eggs which reach cool fresh water (15 to 25° C.) requires 11 to 15 days. Then the embryo escape through the opened operculum and by means of its ciliated covering swims about in the water. In order to proceed with development it must be eaten within 12 hours by an appropriate species of water “flea” (*Cyclops* in Europe, *Diaptomus* in North America).

Once ingested by this copepod, the embryo burrows into the hemocele and transforms into the procercoid larva. If the infected copepod is then eaten by a fresh-water fish, transforms into a plerocercoid larva.

Consumption of infected fish flesh by man completes the epidemiologic cycle. In approximately 3 to 5 weeks the worm develops to maturity and egg production is initiated.



Egg

Pathogenecity and Symptomatology

D.latum may produce no symptoms, but in approximately 50% of the infections there are digestive disturbances, including diarrhea, heartburn, a sense of fullness in the epigastrium, hunger pains, or loss of appetite, anorexia, nausea and vomiting.

In certain instances, there is an anemia, that so-called “bothriocephalus anemia” and severe symptoms associated with jejunal attachment, with this investigators believed to be responsible for an impairment of the interaction of the extrinstic and intrinsic factors of castle. (i.e., failure to assimilate vitamin B12).

In the average case the only change in the blood picture is a moderate eosinophilia and slight leukocytosis.

Diagnosis and Treatment

Diagnosis depends on finding the characteristic eggs in the stool or the occasionally vomited proglottids. A single worm at the height of reproductivity may produce up to 15.000 eggs per gram of formed stool.

Treatment is similar to that recommended for *Taenia saginata* infection, *Viz*., with praziquantel or niclosamide.

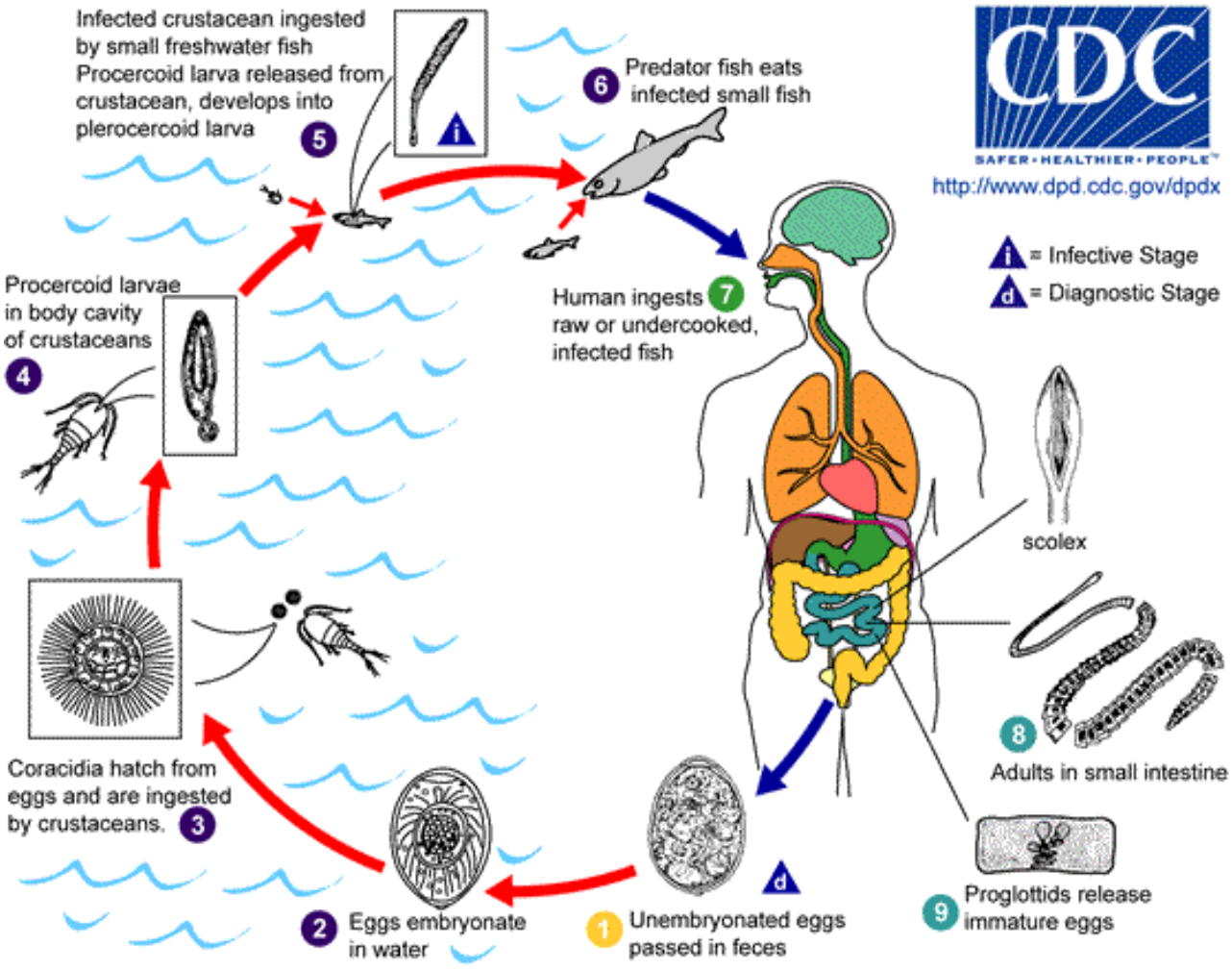
Epidemiology

Sveral epidemiologic conditions must exist before the life cycle of *Diphyllobotherium latum* can be completed: (1) Eggs must be discharged into cool fresh water, where they embryonate and hatch; (2) the emerging ciliated embryos must be eaten by certain species of water “flea” (*Diaptomus* or *Cyclops*), in which the embryos transforms into procercoid larvae; (3) the infected water “flea” must then be eaten by plankton-feeding fishes, in the flesh of which the procercoids transform into the plerocercoid larval stage, and (4) the infected fish must be eaten raw by the definitive host (human), in the intestine of which the larvae develop into adult worms.

Although dogs, and some areas probably bears, are reservoirs of *D.latum*, man is primarily responsible for establishing and maintaining the cycle in which he is involved.

Control

Control of fish tapeworm infection in endemic areas requires (1) sanitary disposal of human excreta so that viable eggs of *D.latum* do not reach bodies of fresh water in which the intermediate hosts breed, and (2) thorough cooking of all fish obtained from the area. Freezing at temperature of -10° C. for 48 hours also will kill the plerocercoid larval stage.



Life Cycle of *Diphyllobotherium latum*