3.2.1 Ichthyobodiasis

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A. Name of Disease and Etiological Agent

Ichthyobodiasis is caused by *Ichthyobodo* (*Costia*) spp. This is a protozoan flagellate belonging to the Class *Zoomastigophorea*, Order *Kinetoplastida*, Family *Bodonidae*. There are two species of *Ichthyobodo* commonly reported for fish: *I. pyriformis* and *I. necator*. A synonym for *Ichthyobodo*, is *Costia*. *Ichthyobodo* is sometimes spelled *Ictyobodo*, *Icthyobodo*, or *Ichtyobodo*.

B. Known Geographical Range and Host Species of the Disease

1. **Geographical Range**
   This parasite occurs throughout the world.

2. **Host Species**
   This parasite has been reported from many fish species. It is reported that all species of freshwater fishes are susceptible to attack. It has been a problem in virtually all cultured fish ranging from tropical fish to salmonids.

C. Epizootiology

Ichthyobodo is an obligate parasite that must have a fish host or it will die in a short time. It is attached to the host but adverse conditions may cause the parasite to encyst, either on the fish or free in the water. Electron microscopy has shown attachment to the host to be by a small disc with microtubules that extend into host cells. Young fish are reported to be more susceptible to *Ichthyobodo* than older fishes.

Temperature plays an important part in the infectivity of the parasite. Temperatures of 25° to 30°C are prohibitive for the infection.

Ichthyobodo is transmitted from fish to fish in the water, and the infective stage may come from host fish or cysts. The disease can be dispersed geographically by water or infected fish.

Ichthyobodo is a small parasite 5 to 20 μm in length (Figure 1). Reproduction takes place by simple transverse division, but the parasite is able to encyst after leaving the fish.

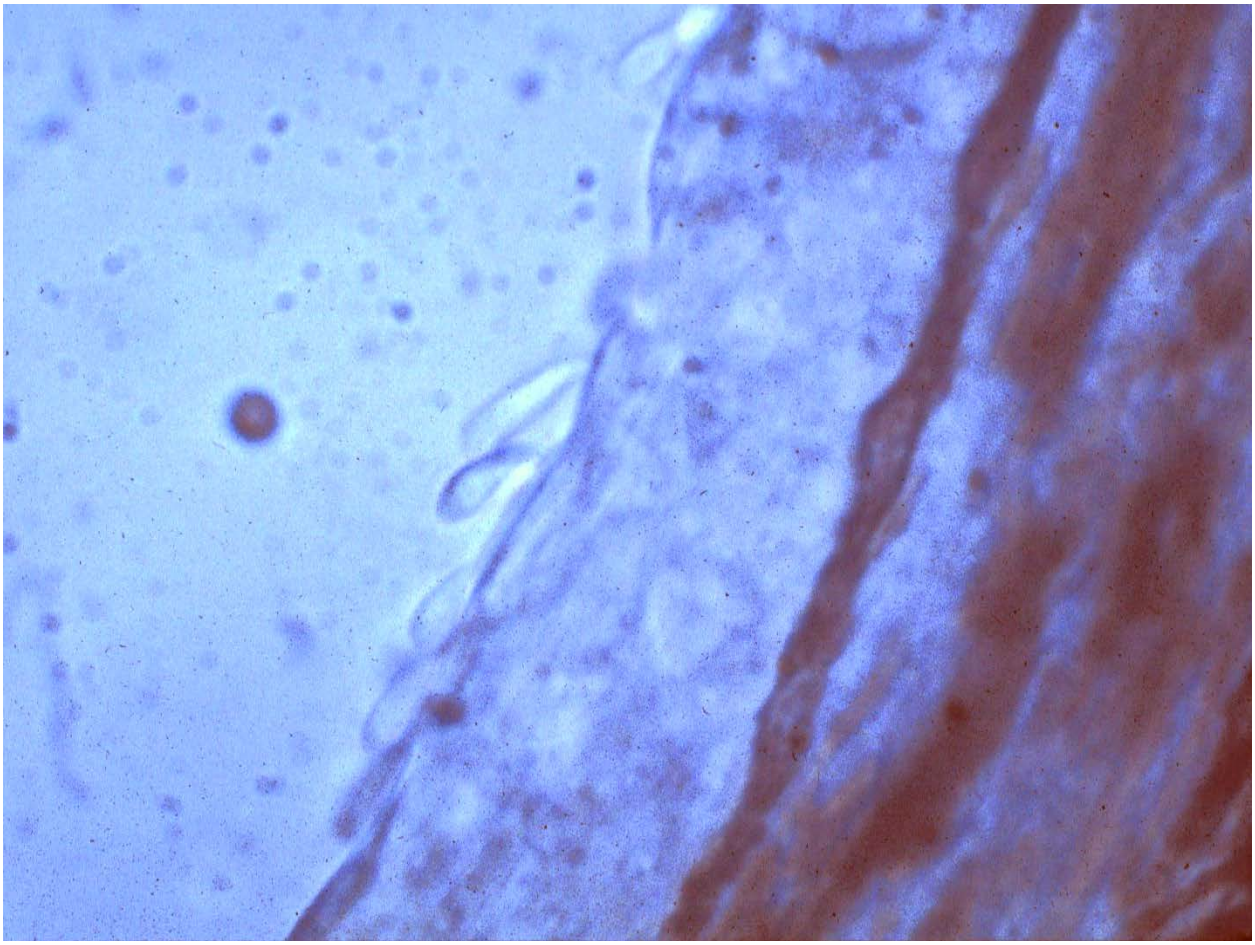

Figure 1. *Ichthyobodo* on the epithelium of a catfish gill (picture by Fred Meyer).

D. Disease Signs

1. **Behavioral Changes Associated with the Disease**
   Infected fish will commonly flash or scrape against objects. Infected fish may also stop eating and may gasp at the water surface.

2. **External Gross Signs**
   A characteristic sign of ichthyobodiasis is excess mucus production, which has been referred to as blue slime. Sometimes complete removal of epithelium may be seen and the pigment may be missing from the skin (Figure 2).

3. **Internal Gross Signs**
   Infected fish that have been off feed for a period of time may show signs of starvation.

4. **Histopathological Changes Associated with the Disease**
   Since *Ichthyobodo* spp. are found on the skin and gills of fish, these organs are affected. Histological sections will usually show a proliferation of mucous cells but inflammation at the sites of infection is not always seen (Figure 3).

Figure 2. Blue slime signs in a trout (picture by Fred Meyer).

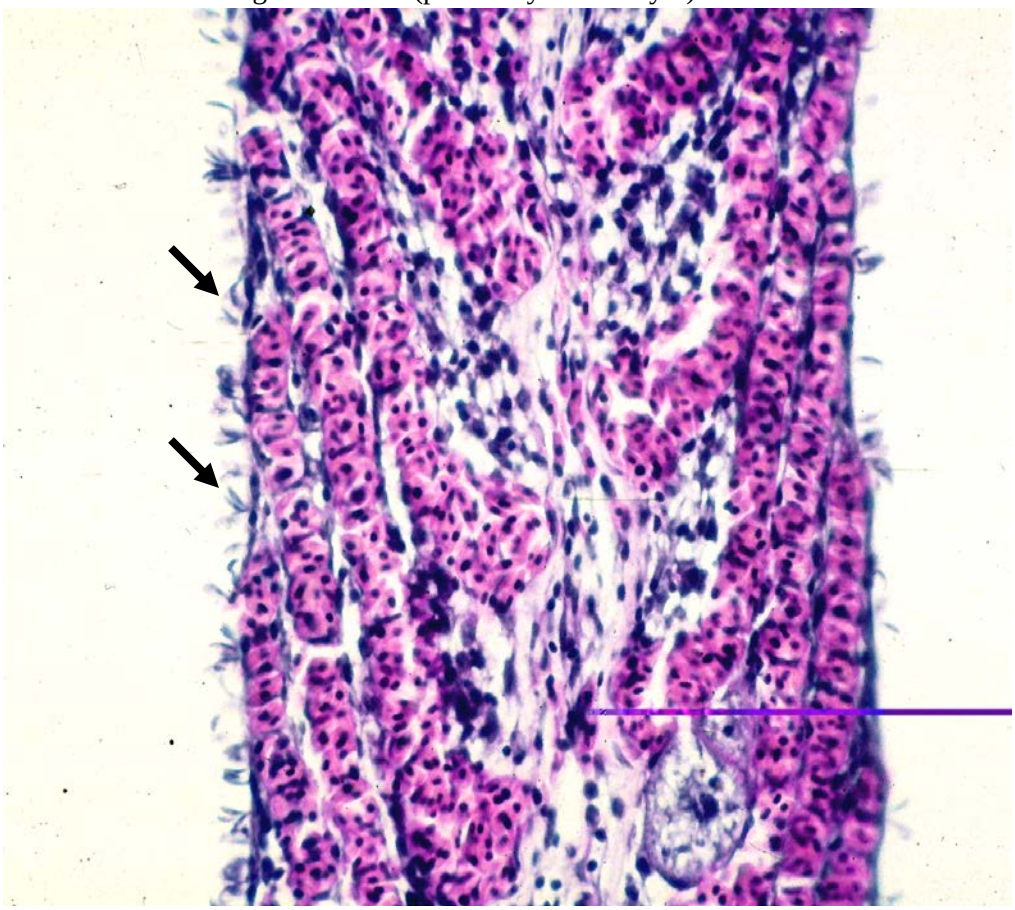

Figure 3. Numerous *Ichthyobodo* on the surface of a catfish gill. Histology with H&E stain (picture by Andy Goodwin).

E. Disease Diagnostic Procedures

1. Presumptive Diagnosis

a. Isolation/Detection of Pathogen
Diagnosis of *Ichthyobodo* is dependent upon disease signs and observation of the parasite in wet mount preparations. The disease signs will often, but not always, show a lesion with increased mucus production and discoloration, which is generally loss of pigment. Skin scrapings from the margin of the lesion will show the small oval, free swimming, almost kidney-shaped forms and the pear-shaped attached forms. Typically, one long and one short flagellum is present, however, when the parasite is ready to divide, two long and two short flagella may be seen. The attached forms may be seen with the free flagellum waving, which gives the parasite a flickering motion. This has been compared to the light of a candle flickering. Because of the characteristic movement, *Ichthyobodo* is easily diagnosed from live specimens.

b. Clinical Signs
Clinical signs associated with the disease include excess mucus production (blue slime) and discoloration, which is usually loss of pigment. Gills may become swollen. Behavioral changes may include loss of appetite, lethargy, and flashing or rubbing against objects apparently in an attempt to rid themselves of the irritation caused by the parasite. Complete removal of the epithelium may be seen.

c. Histopathological Examination
Histopathological examination will show the small, pear-shaped parasites attached to the skin and gills.

2. Confirmatory Diagnosis

Histological sections will confirm the presence of the parasite, but are not necessary for diagnosis. Observation of the parasite in wet mounts will confirm the disease.

F. Procedures for Detecting Subclinical Infections

Low levels of infection may be detected from apparently healthy fish using skin and gill scrapings (wet mount technique as described above).

G. Procedures for Determining Prior Exposure to the Etiological Agent

None available.

H. Procedures for Transportation and Storage of Samples to Ensure Maximum Viability and Survival of the Etiological Agent

Ichthyobodo is an obligate parasite and is difficult or near impossible to culture under experimental conditions. Thus, survival of the parasite depends on how fish hosts are treated. If live fish hosts cannot be transported then freshly killed hosts should be stored and shipped on ice.

References

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