

General Fish Parasitology

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Introduction to Fish Health

General References

- Textbooks:
 - Woo 1995*
 - Hoffman 1999*
 - Post 1987
 - Stoskopf 1993
 - Lasee 1995
- Lab/Necropsy
 - Luna 1968
 - Cable 1977
 - Humason 1979
 - Brown and Grazek 1980

Major Groups Fish Parasites

- Fungi-filamentous organisms
- Protozoa-one celled organisms
- Sporozoa-spore forming
- Monogenea-ectoparasitic worms
- Trematoda-tissue flukes
- Cestoda-tapeworms
- Nematoda-round worms
- Acanthocephala-spiny headed worms
- Crustacea-copepods, fish lice
- Hirudinea-leeches
- Glochidia-immature freshwater mussels
- Agnatha-lampreys

Terms

- Parasite-an animal which lives on (**ectoparasite**) or in (**endoparasite**) another animal (**the host**). The parasite depends on host for food and almost always causes some degree of injury, not always serious.
- Hosts: **Intermediate** (immature stages develop via asexual reproduction, often an invertebrate); **Final or Definitive** (adult stages are formed, sexual reproduction occurs)

General Characteristics of Parasites

- Tremendous reproductive capabilities
- Evolution of complex structures for attachment (suckers, hooks, clamps, etc.)
- Evolved mechanisms to avoid host immune response (form cysts, locate in “safe” organs...)
- Many exhibit complex life cycles with multiple stages and hosts

Effects of Parasites

- Tissue and organ damage from parasite attachment and feeding (may induce 2nd infections)
- Tissue alterations can occur (excess mucus, cell proliferation, cell swelling, etc.)
- Parasites may serve as vectors of viruses and bacteria

Signs of Parasitic Infections

- Fish at water surface piping or gulping for air (e.g., gill parasites)
- Fish flashing (internal or external parasites)
- Fish listless or lethargic
- Excess mucus
- Rest at bottom of raceway or pond (“Ich”)
- Off-feed

Signs, continued...

- Fin erosion and skin lesions
- Fish “shimmies” or appears to tremor
- Gills flared on small fish (gill parasites like *Gyrodactylus*)

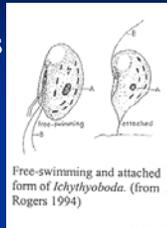
SECTION I: External Protozoa

- Most commonly encountered parasites in a hatchery
- Affected by:
 - host nutrition
 - crowding
 - cleanliness

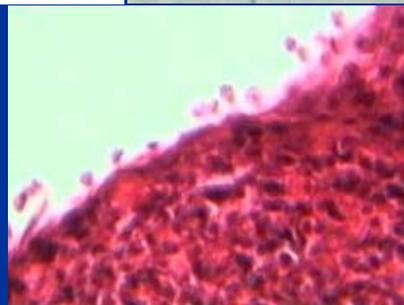


Flagellate-Ichthyoboda (Costia)

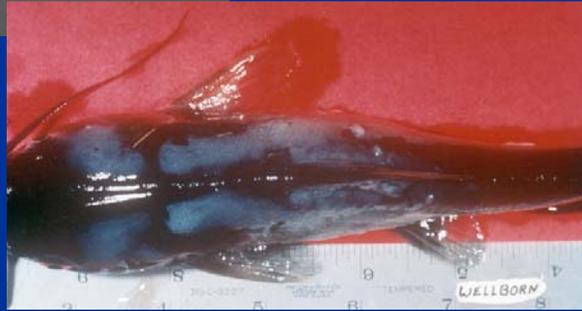
- Found on the skin & gills
- Crescent, oval shape
- Use a 40X objective when examining scrapings and look for a flickering motion
- May see a characteristic blue slime
- Treat with formalin



Free-swimming and attached form of *Ichthyoboda*. (from Rogers 1994)



Ichtyoboda – “blue slime”



No Picture

costia 01.mpeg

Ciliate-Chilodonella spp.

- Oval to heart-shaped with bands of cilia
- Can be found in large numbers on skin, fins and gills
- Easily observed with 10X objective



Diagram of *Chilodonella*. (from Lom 1995)



Picture

chilodonella 01.mpeg

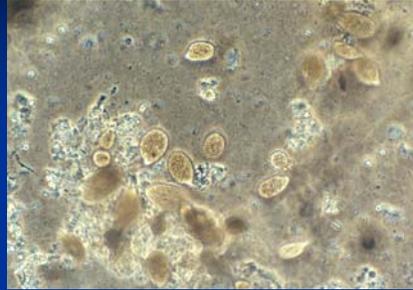


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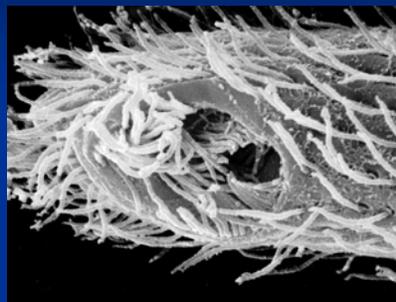
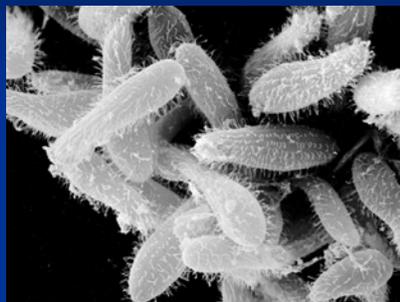
chilodonella 02.mpeg

Ciliate-Tetrahymena

- Small, pyriform, covered with bands cilia (many free-living spp.). In water moves like spiraling football
- Histophagous parasite that disintegrates host tissues and feeds
- Found skin, muscles and internal organs
- Cause high mortalities (very destructive, wear gloves!)



Ciliate-Tetrahymena-SEM



Ciliate-Ambiphyra (Scyphidia)

- Urn or barrel shaped with band of cilia around the oral surface
- Sessile or non-motile (attaches with flat disc)
- Found on gills, skin and fins of freshwater and marine fish
- At high no's they can impede respiration

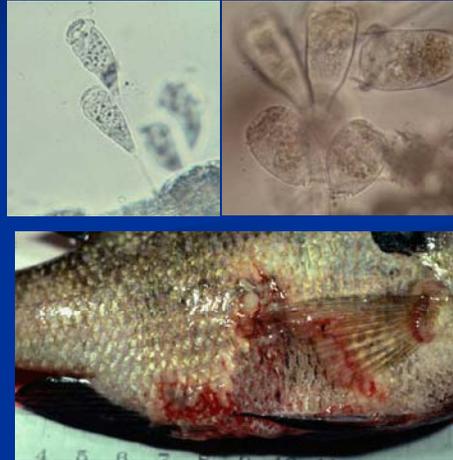


Ambiphyra - continued



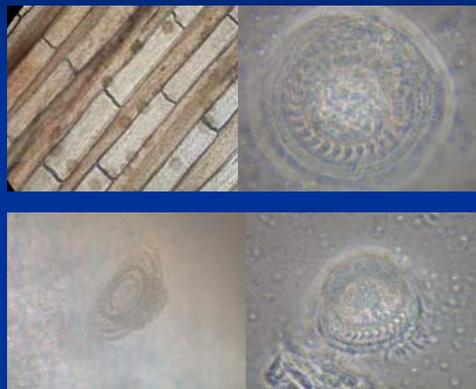
Ciliate-Epistylis (Heteropolaria)

- Resemble Ambiphyra, but stalk is non-contractile & branched
- Sessile, attach to body fin, or gills
- Grows in colonies made of zooids
- May predispose fish to 2nd bacteria (e.g. red-sore disease)

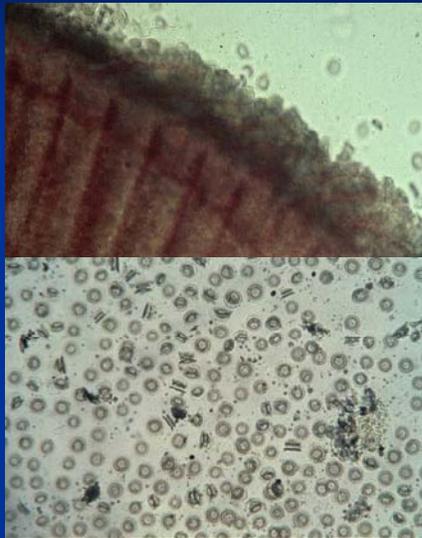


Ciliate-Trichodina

- Shaped like a flat disc or hemisphere with a spectacular protein-aceous skeleton
- Cilia surrounds adhesive disc
- Common ectoparasite of freshwater & marine fish
- May inflict heavy damage to hosts resulting in mortalities, especially in stressed fish (eg harsh winter conditions or overcrowding)



Ciliate-*Trichodina*



No Picture

trichodina 01 gill.mpeg

Ciliate (Suctorian)-*Capriniana* (syn. *Trichophrya*)

- Sedentary, attach by means of a non-contractile secreted stalk
- Lack cilia but may have few to many tentacles for capture and ingestion of prey
- Ectoparasitic on the gills
- Massive invasion of the gills may cause irritation and hamper oxygen exchange



Ciliate-*Ichthyophthirius multifiliis*

- Referred to as “Ich”
- It is the most pathogenic of protozoan parasites of fish, represents a major problem in aquaculture
- Cosmopolitan parasite, on any species of freshwater fish (*Cryptocaryon irritans* infects salt-water fish)
- Clinical signs are characteristic white spots that are visible with the naked eye in the skin and gills, ranging 0.5-1.5 mm in diameter
- Positively identified by its large horse-shaped macronucleus

Ich, continued



Ich, continued





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white spot 01.mpeg

“Ich” Life Cycle

From P.T.K. Woo 1995

