

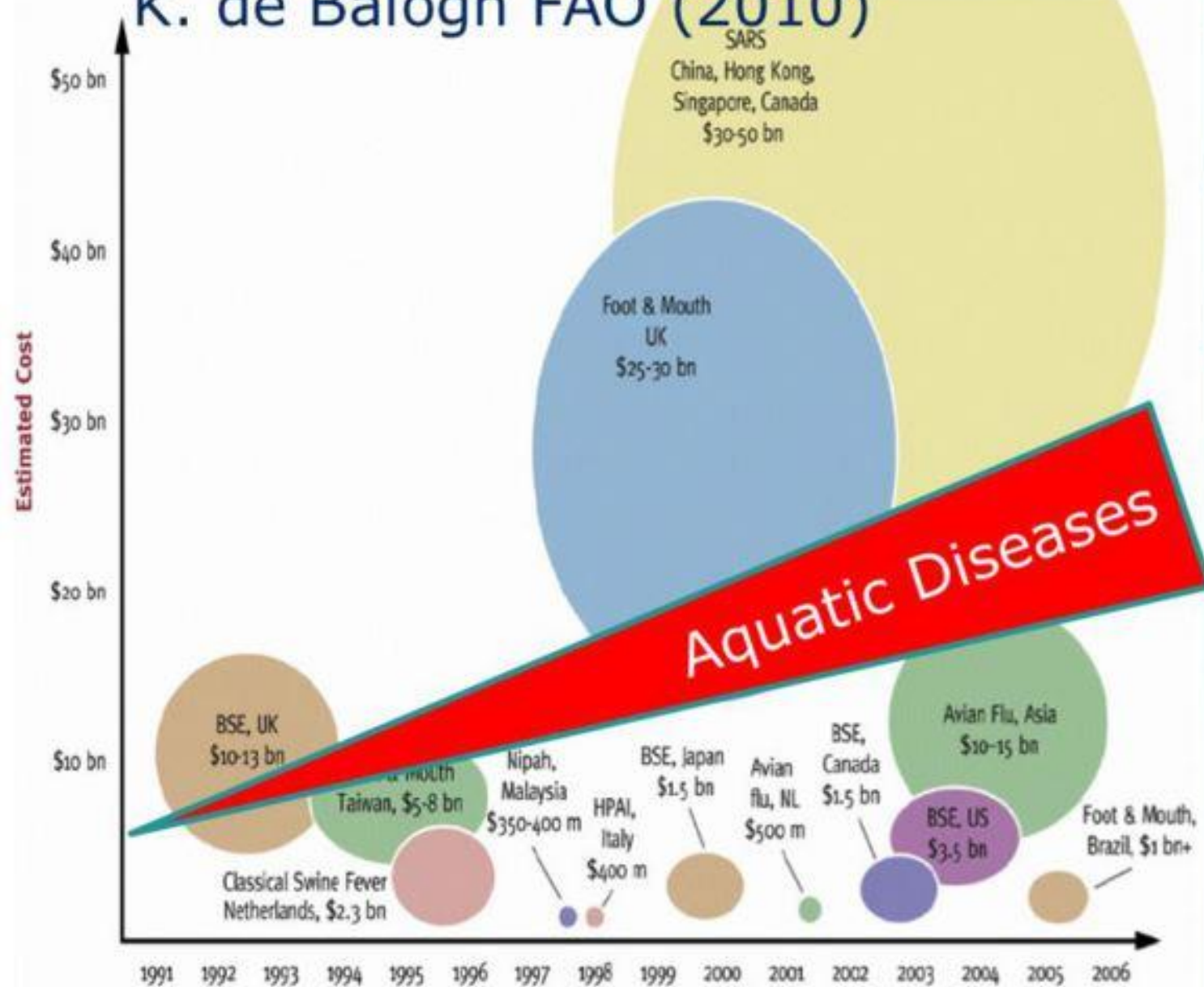
Common Diseases of Cultured Fish

Stephen Reichley, DVM, PhD, CertAqV
Director of Fish Health

• The Sustainable Superfood •



K. de Balogh FAO (2010)



Bacterial Diseases

Edwardsiella ictaluri

- Enteric Septicemia of Catfish (ESC)
 - “Hole-in-the-head”
- Gram-negative bacillus
- Major bacterial pathogen of catfish
 - Recently reported from other fish: tilapia, zebrafish, etc.



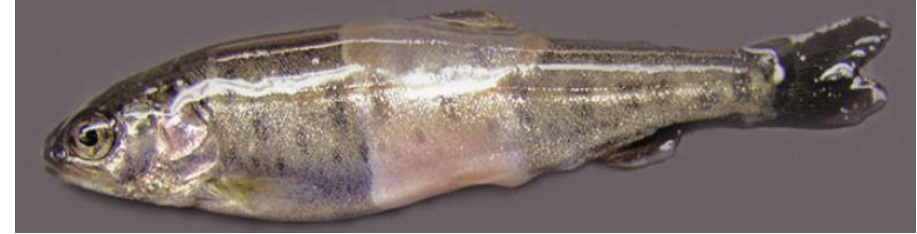
Edwardsiella piscicida

- Newly adopted taxa (2013)
 - Historic *E. tarda* actually represents 3 taxa: *E. tarda*, *E. piscicida* and *E. anguillarum*
- Chronic mortality
- Similar presentation to ESC
- More pathogenic in hybrid catfish than channel catfish

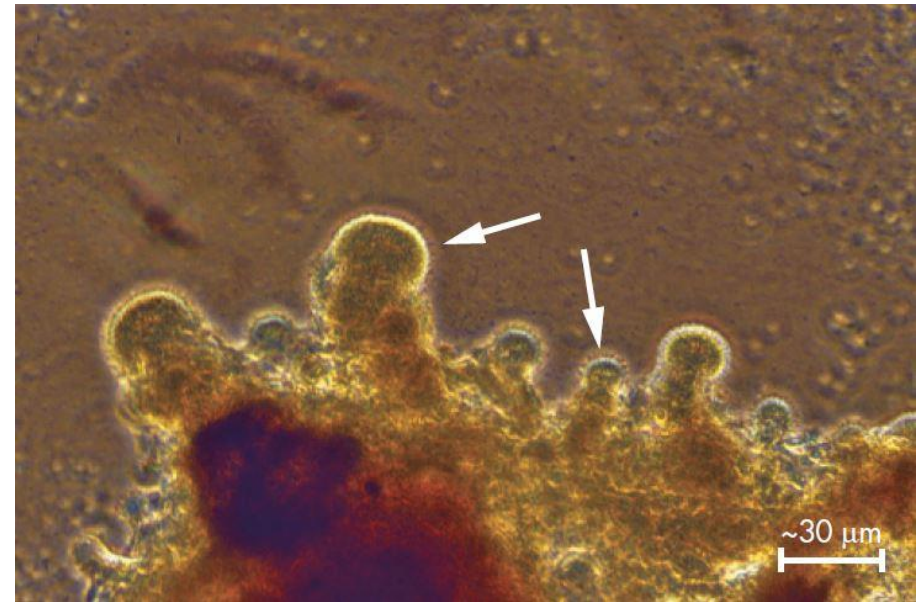


Flavobacterium columnare

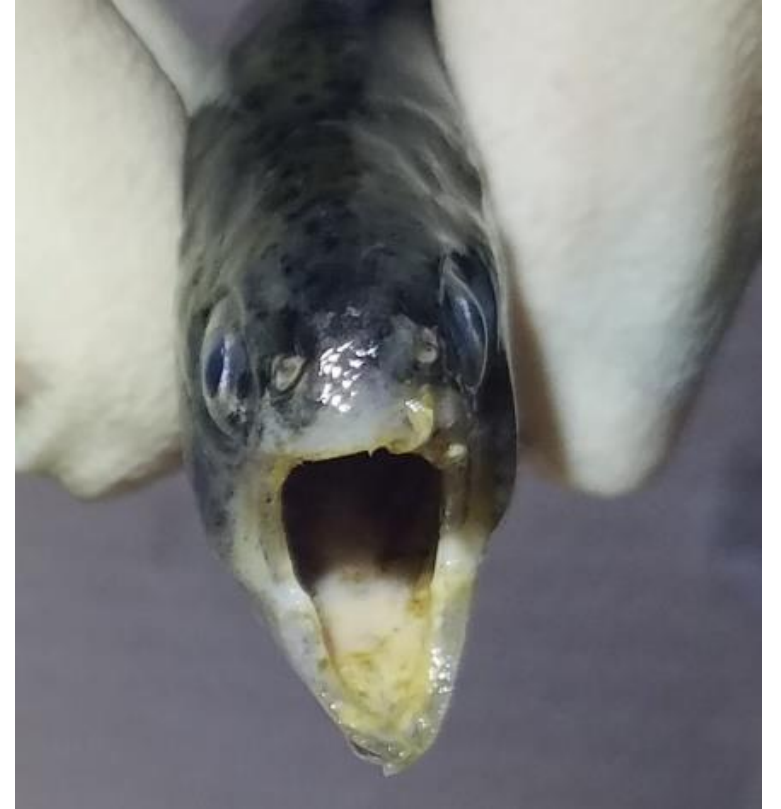
- Columnaris Disease
- Gram-negative bacillus
- Bacteria ubiquitous in the environment, wide host range
- Saddleback lesion, fin rot, cigar mouth
- Yellow lesions
- Different Genetic Groups – perhaps species?



A Colour Atlas of Salmonid Diseases. 2013



Fish Disease. Noga. 2010

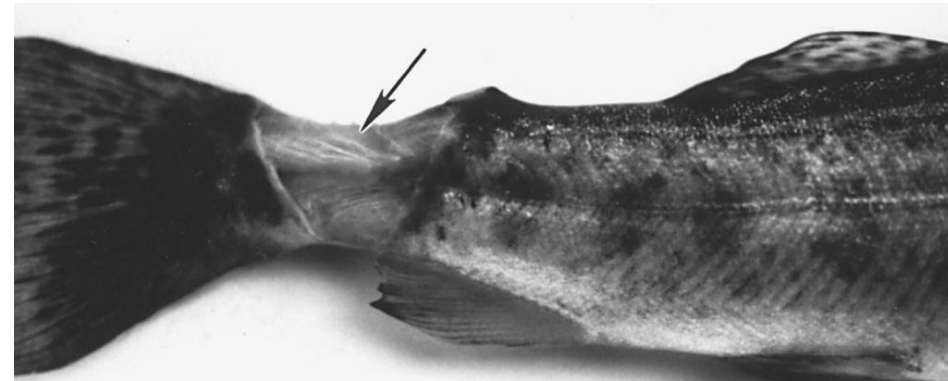


Flavobacterium psychrophilum

- Bacterial Coldwater Disease
- Gram-negative bacillus
- Principally an issue in salmonids, wide host range
- Necrotic and sloughing caudal peduncle
- Acute mortality in fry, no lesions



A Colour Atlas of Salmonid Diseases. 2013

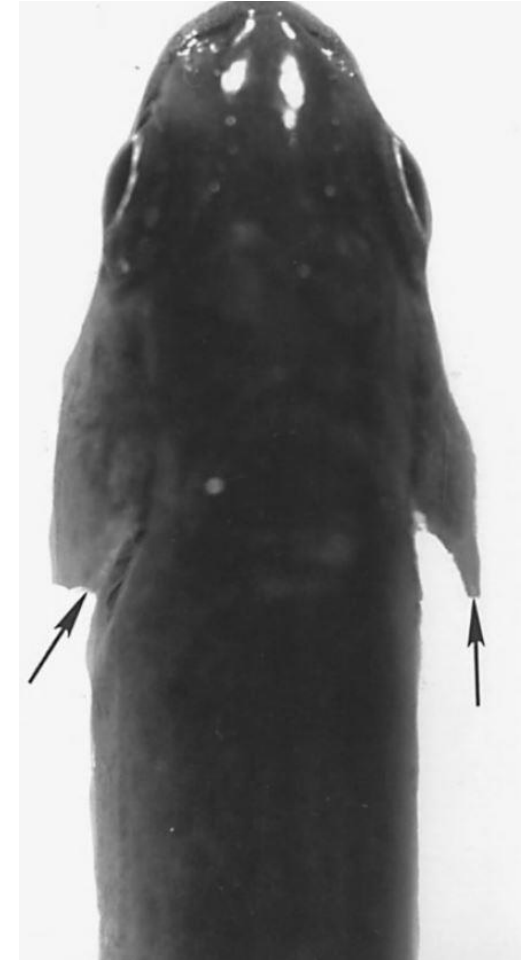


Health Maintenance and Principal Microbial Diseases of Cultured Fish. 2011.



Flavobacterium branchiophilum

- Bacterial Gill Disease
- Gram-negative bacillus
- Principally an issue in salmonids, but wide host range
- Pale, protruding gills, respiratory distress



Health
Maintenance and
Principal
Microbial
Diseases of
Cultured Fish.
2011.

Motile Aeromonas Septicemia

- *Aeromonas* spp.; primarily *hydrophila*, *sobria*, *veronii* and *caviae*
- Gram-negative bacillus
- Likely the most common bacterial disease in freshwater fish
- Very wide host range
- **Zoonotic concern**



Fish Disease. Noga. 2010



Courtesy of Dr. Lester Khoo

Aeromonas salmonicida

- Furunculosis
 - *Aeromonas salmonicida* subsp. *salmonicida*
- Gram-negative bacillus
- Primarily a disease of salmonids
- Outbreaks commonly occur after stressful events
- Acute, chronic, or latent



A Colour Atlas of Salmonid Diseases. 2013



Fish Pathology. Roberts. 2012

Renibacterium salmoninarum

- Bacterial Kidney Disease (BKD)
- Gram-positive bacillus
- Principally in cultured salmonids
- Significant cumulative losses
- Vertical transmission



A Colour Atlas of Salmonid Diseases. 2013

Yersinia ruckeri

- Enteric Redmouth (ERM)
- Gram-negative bacillus
- Principally cultured salmonids
 - Rainbow trout aquaculture
- Significant losses in all lifestages
- Immersion bacterin vaccine
 - First vaccine for fish licensed in the United States



A Colour Atlas of Salmonid Diseases. 2013



Francisella spp.

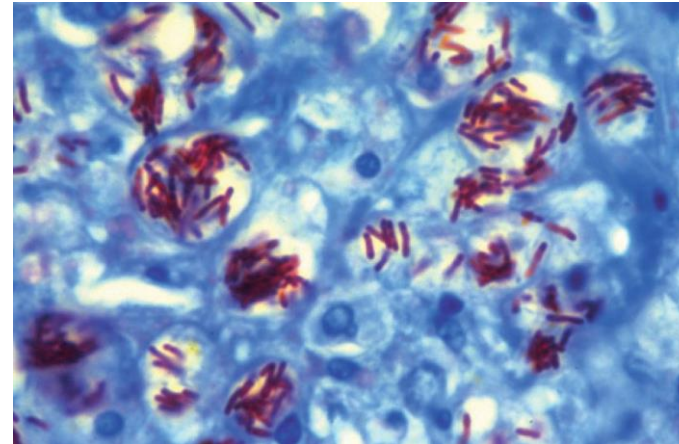
- *Francisella noatunensis*
 - Tropical: subsp. *orientalis*
 - Temperate: subsp. *noatunensis*
- Gram-negative coccobacillus
- Facultative intracellular
- Issue in tilapia



CTSA Publication #158

Mycobacterium spp.

- *Mycobacterium* spp.; primarily *marinum*, *fortuitum*, and *chelonae*
- Gram positive, acid-fast
- **Zoonotic pathogen**
- Wide host range
- Be mindful in home aquaria
- Depopulate/disinfect

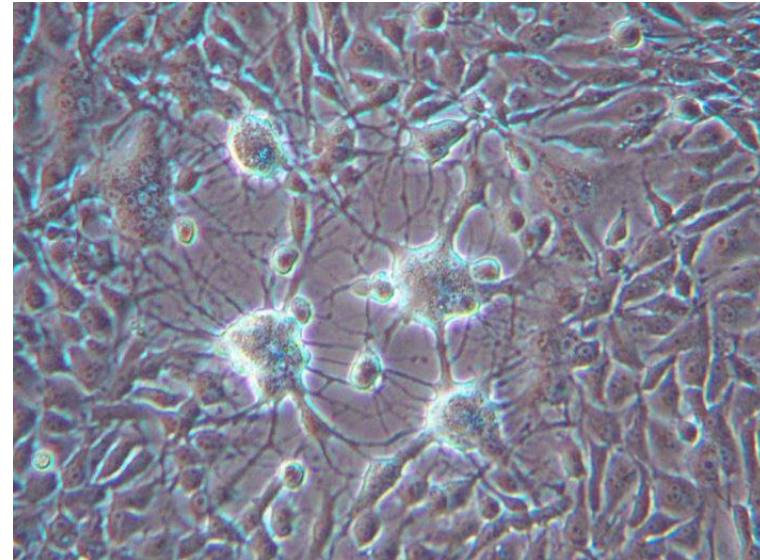


Fish Disease. Noga. 2010

Viral Diseases

Channel Catfish Virus

- Herpesvirus
- Primarily cultured catfish
- Can cause high mortality, especially in the hatchery
- Mostly an issue in young fish
- Vertical transmission



AFS-FHS
Blue Book

Infectious Hematopoietic Necrosis

- IHNV
 - Rhabdovirus
- Highly contagious
 - Primarily rainbow trout, Pacific salmon
- Horizontal and vertical transmission
- **OIE Reportable**



A Colour Atlas of Salmonid Diseases. 2013

Infectious Pancreatic Necrosis

- IPNV
 - Birnavirus
- Wide host and geographic range
- Subclinical to 100% mortality
- Carrier state important
- Vertical transmission?



A Colour Atlas of Salmonid Diseases. 2013

Infectious Salmon Anemia

- ISAV
 - Orthomyxovirus
- High cumulative mortality
 - Primarily smolts
- Decimated the salmon industry in Chile
- **OIE Reportable**
- **USDA APHIS eradication program**



A Colour Atlas of Salmonid Diseases. 2013

Viral Hemorrhagic Septicemia

- VHSV
 - Rhabdovirus
- Highly infectious, high acute mortality
- Wide host range
- Major impact on Midwest
- **OIE Reportable**



www.vetbook.org



A Colour Atlas of Salmonid Diseases. 2013

Spring Viremia of Carp

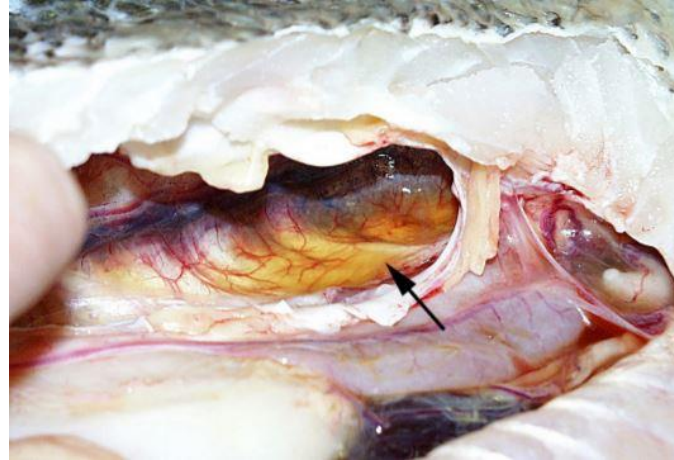
- SVCV
 - Rhabdovirus
- Variable mortality
- Horizontal transmission
- **OIE Reportable**
- **USDA APHIS eradication program**



Fish Disease. Noga. 2010

Largemouth Bass Virus

- LMBV
 - Ranavirus, Iridoviridae
- Variable mortality
- Present throughout the United States
- Associated with wild fish kills
- Predilection for the swimbladder



AFS-FHS Blue Book



US Fish & Wildlife, La Crosse Fish Health Center

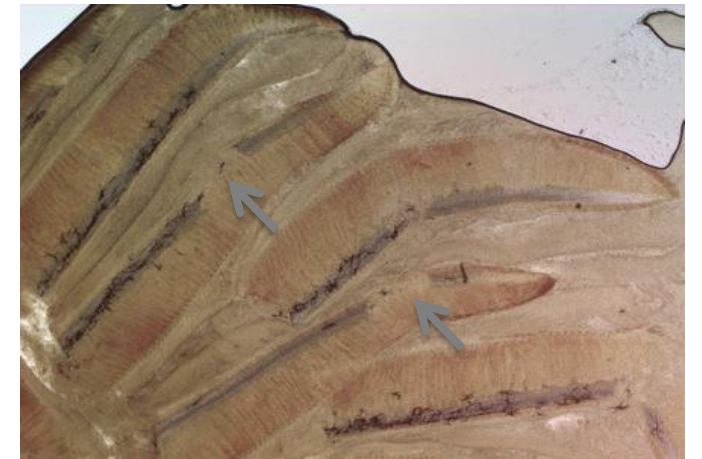
Parasitic Diseases

Proliferative Gill Disease

- *Henneguya ictaluri*
 - “hamburger gill”
- Myxozoan parasite
- One of the most prevalent parasitic diseases of catfish
- Can lead to tremendous mortality



Courtesy of Dr. Andy Goodwin



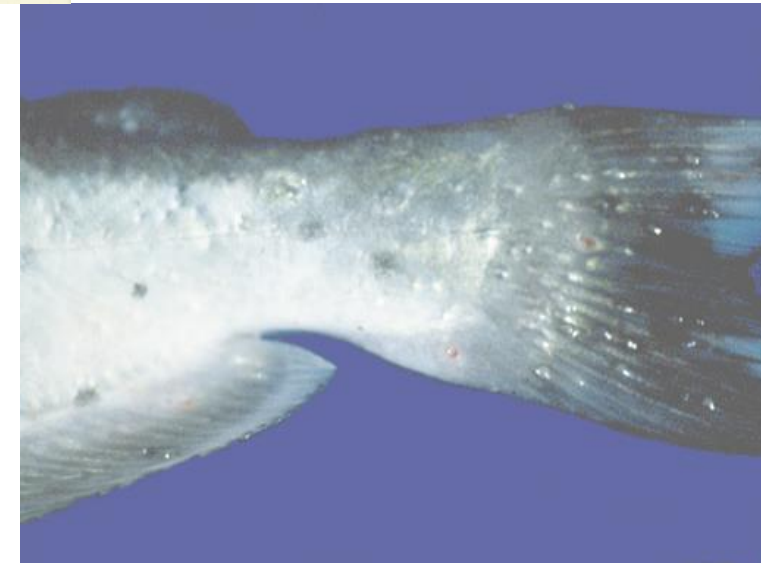
Courtesy of Dr. T. Rosser

Bolbophorus damnificus

- “Bumps”, “trematodes”
- Trematode parasite
 - American White Pelican, Ramshorn snail
- Mortality can be severe even in light infestation
- Significant economic losses



Courtesy of Dr. Lester Khoo



Myxobolus cerebralis

- “Whirling Disease”
- Myxozoan
- Salmonids
- Clinical disease in fish infected young
- Major concern to publicly stocked fish



AFS-FHS Blue Book

Ichthyophthirius multifiliis

- “Ich”, “white spot”
- Protozoan, direct lifecycle
- Wide host range and distribution
- Problematic in pet fish as well
- Treatment is only effective for part of the lifecycle
 - multiple treatments are necessary



Heterosporis sp.

- Microsporidian that infects muscle cells
- Important in yellow perch, walleye, and others
- Leads to white areas in fillet, “freezer burned”
- Some states require testing for this parasite prior to accepting shipments of fish



Great Lakes Fisheries Commission

Tetracapsuloides bryosalmonae

- “Proliferative Kidney Disease” (PKD)
- Myxozoan
- Salmonids
- Chronic mortality, variable severity
- Yellowstone River closure



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Grubs

- Trematodes
- *Clinostomum marginatum* – Yellow Grub
- *Posthodiplostomum minimum* – White Grub
- *Uvulifer ambloplitis* (and others) – Black Grub
- Adult parasite in various bird species
- Problematic in pond-reared fish

Grubs



Missouri Department of Conservation



Michigan DNR



Courtesy of Dr. Lester Khoo

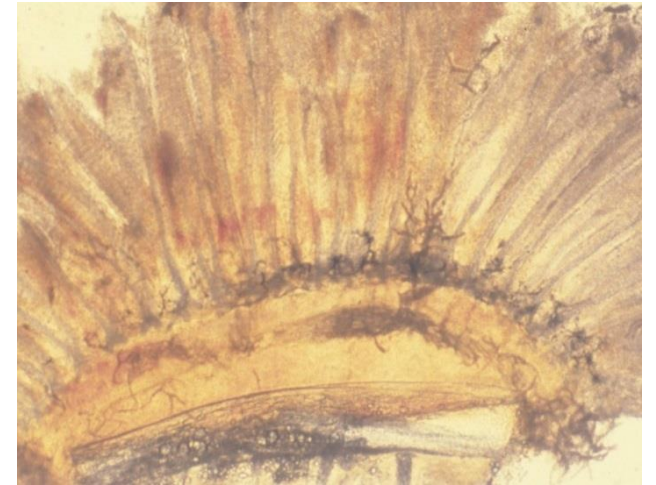
Fungal Diseases

Fungal/Oomycete Diseases

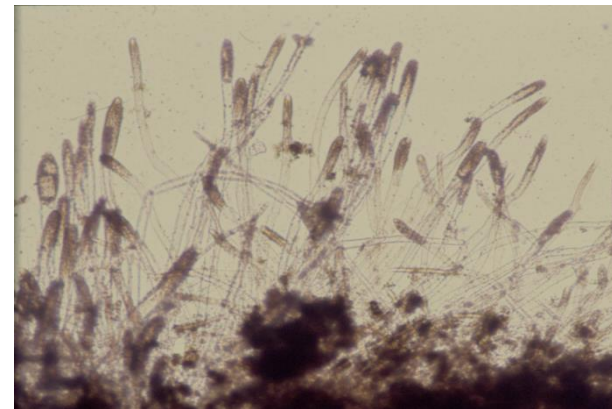
- *Branchiomyces* spp.
 - Blood vessels and tissues of gills
- *Saprolegnia* spp.
 - External
- Non-septate hyphae
- Wide host range



AFS-FHS Blue Book



Courtesy of
Dr. Lester Khoo



Summary

This was only a select list of pathogens

Infectious diseases greatly impact the culture of U.S. food fish

There is still much more to learn about these pathogens

Biosecurity as well as disease prevention, treatment, and control are important areas of focus in aquaculture

Non-infectious diseases and husbandry are vital

Questions?



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