



### INFECTIOUS PANCREATIC NECROSIS

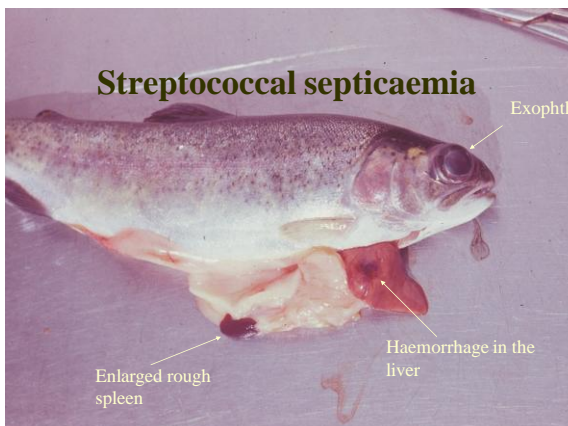
- double stranded RNA virus (Birna virus)
- strain VR299 - South Africa – 1985
- high mortalities in fry (acute)
- Transmission is mainly within the egg and genital fluids
- Isolated from more than 65 species of fish and shellfish
- Salmonids - darkening, exophthalmos, mucoid fecal pseudocasts and erratic and whirling swimming.
- Typical necrosis of acinar pancreatic cells
- All imports of salmonid ova are monitored by OVI

### IPN

- Virology – Included in S.A. testing protocol for imported salmonid ova. Virus isolation on BF-2, CHSE-214, PG and RTG-2 cell lines – The characteristic CPE and virus neutralization test confirm diagnosis.
- Asymptomatic carrier fish can result in the rapid spread of the disease via angling fish
- Many fish species can act as carriers.

### STREPTOCOCCAL SEPTICAEMIA OF TROUT

- Disease peculiar to South Africa
- First described from rainbow trout in 1975
- Has since emerged in many trout producing countries of the world
- Important septicaemic summer disease
- In South Africa primarily an environmental disease related to stress factors such as: chronic ammonia toxicity, particularly in alkaline waters, high dissolved gas pressures, low dissolved oxygen (related to high water temperatures), poor pond hygiene and high stocking densities.



### Symptoms and diagnosis

- Exophthalmos
- Darkening, lethargy
- Larger fish more severely affected
- Typical septicaemia with haemorrhage around the eyes, in the liver and on the peritoneum
- Histology – Focal haemorrhage and necrosis of liver, bacterial colonies sometimes visible
- Bacterial isolation from liver or kidney

## Treatment and control

- Stop or reduce feeding to maintenance level.
- Identify and correct sources of gas supersaturation.
- Improve pond hygiene through frequent scrubbing, reduce stocking levels, reduce handling of fish, aerate water if possible.
- antibiotics in the feed may be required.
- vaccination - considerable success has been achieved over several years using an autogenous injectable bacterin vaccine.

## Streptococcosis of tilapia

- An emerging disease of intensive tilapia culture in many countries
- Various streptococci involved but particularly *Streptococcus iniae*



## Pathology of *S. iniae*

- Pericarditis
- Epicarditis
- Myocarditis
- Endocarditis
- Meningitis
- Enlargement of spleen and kidney



## ENTERIC RED MOUTH

- *Yersinia ruckeri*
- N. America and Europe
- First recorded in RSA in 1985
- Common in environment, outbreaks coupled with stress
- Haemorrhages in mouth, tongue and base of fins
- Darkening and exophthalmos

## ERM

- Typical septicaemia with haemorrhages throughout the organs
- Flaccid intestines containing yellow fluid
- Bacterial isolation from liver or kidney
- Highly effective bacterin vaccine, currently not available in RSA

## Treatment and control

- susceptible to oxytetracycline, but tends to relapse after treatment unless stress factors are removed. Relapse outbreaks are less severe probably due to the development of a good immunity
- bacterin vaccine is highly effective and a locally produced, experimental, vaccine was in use by trout farmers for several years after 1985. Fingerlings were dipped in the vaccine bath before being released from the hatchery. Commercial vaccines are available internationally but none are currently imported into S.A

### MOTILE AEROMONAS SEPTICAEMIA (BACTERIAL HAEMORRHAGIC SEPTICAEMIA)

- *Aeromonas hydrophila* – facultative pathogen
- A motile gram negative aeromonad belonging to the Vibrionaceae.
- Favours water with low DO and high organic matter
- Part of normal water flora, on gills and skin, and in gut of healthy fish

### *Aeromonas hydrophila*

- Motile aeromonads are part of the normal water flora and occur on the skin and gills and in the gut of healthy fish. Disease can occur in all species of fish including salt-water fish.

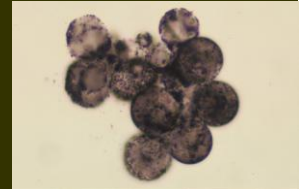


### *Aeromonas hydrophila* HAEMORRHAGIC SEPTICAEMIA

- Skin ulcerations, exophthalmos, darkening, haemorrhages on vent and in gills
- Peracute cases may show no symptoms
- Internal haemorrhages, spleen and kidney may be swollen, abdominal fluid and gut content blood tinged.
- Primary or concurrent with other disease
- All species of fish including salt water fish

### *A. hydrophila*

- A facultative pathogen that favours deterioration in water quality, especially **low oxygen and high levels of organic matter** and other pollutants.
- Many different serotypes occur

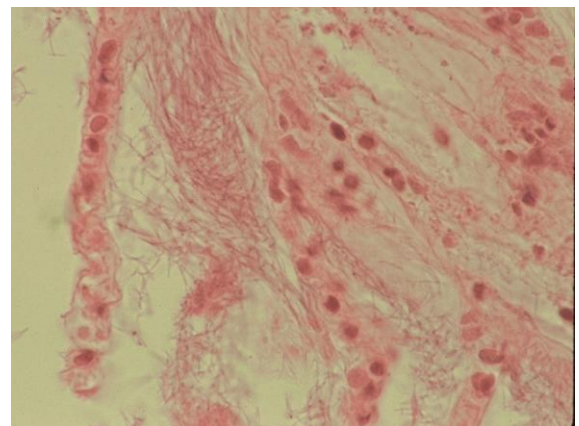
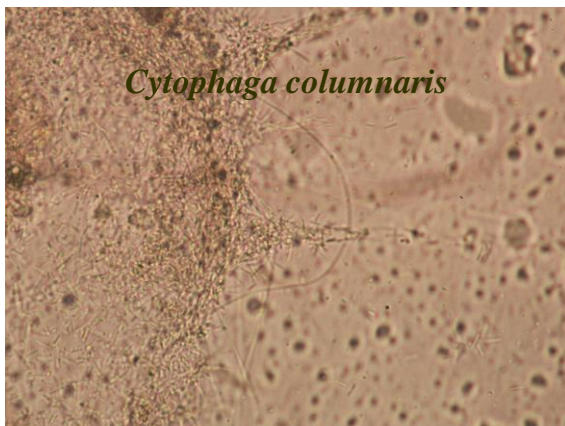
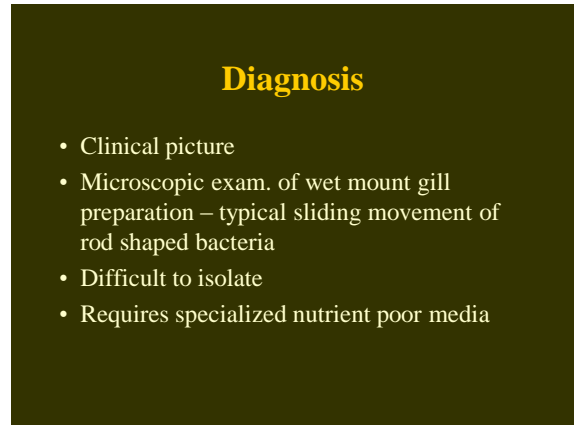


### Treatment and control

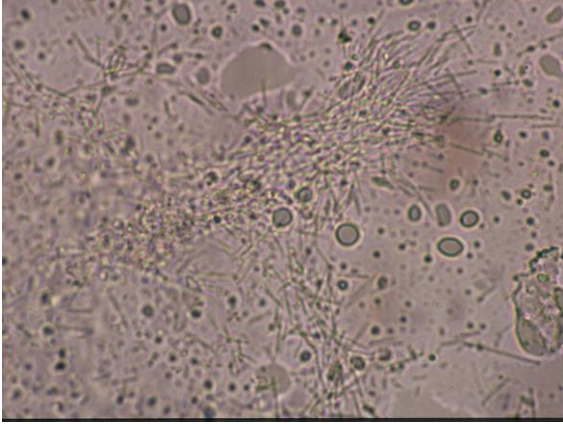
- Reducing stocking density and improve water quality conditions as far as is possible.
- The judicious use of antibiotics may be needed to bring an outbreak under control, particularly if environmental deterioration is temporary.

### ENVIRONMENTAL GILL DISEASE

- Caused by filamentous bacteria, belonging to the group Myxobacteria (Cytophagaceae), which are normal aquatic bacteria.
- *Flexibacter/Cytophaga/Flavobacterium columnaris*
- Common summer disease following gill damage – silt, parasites, gas emboli, over treatment with formalin, poor husbandry
- Irritation of gill – excessive mucus production – medium for bacterial growth – invade adjacent healthy tissue

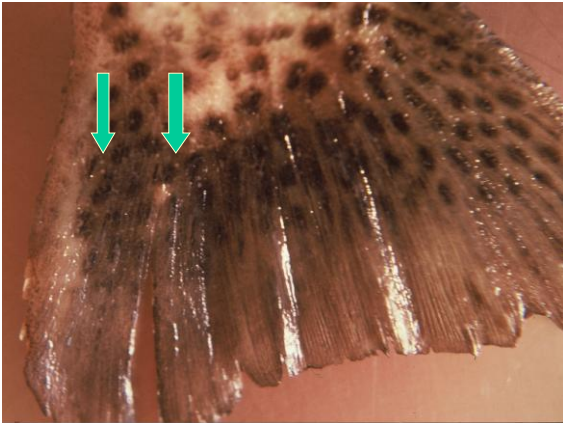




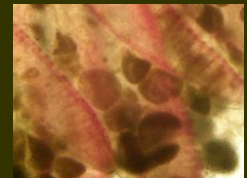
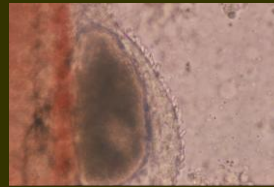


## WHITE SPOT INFECTION

- *Ichthyophthirius multifiliis*
- Holotrichous ciliate
- Worldwide distribution and almost no host specificity
- Endemic on most fish farms
- Potential of causing serious mortality in susceptible fish
- Exposure during cool months results in lasting immunity without symptoms



## Ichthyophthirius trophonts



## Trophont that has broken loose from tissue



## Life cycle

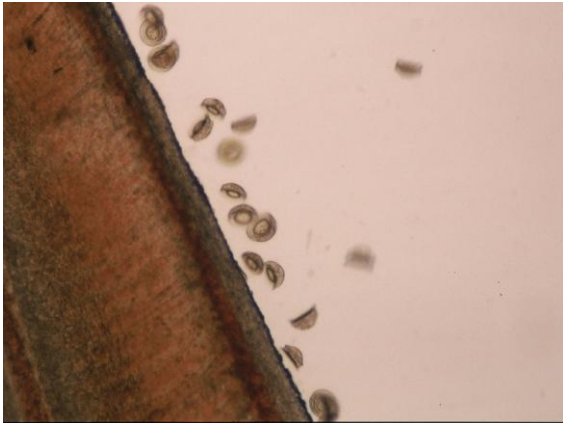
- Mature parasites leave fish
- Encyst on pond sides and bottom, multiply
- Swarmer or tomite released
- Burrow into skin and gill epithelium
- Release of mature parasite causes damage to skin and osmotic imbalance
- Frenzied, whirling swimming with frequent jumping followed by lethargy.

## Treatment and control

- Susceptible to a formalin bath treatment. Repeat treatments are necessary as only the parasitic stages of the fish are susceptible.
- Malachite green used in the past is no longer an acceptable treatment.
- Newer information indicates that controlled exposure of fish at temperatures optimal to the immune response of the fish can lead to lasting immunity within the population.
- In feed medication with Salinomycin has been effectively used to treat early outbreaks.
- Experimental work has been done to develop a vaccine from the closely related non parasitic ciliate, Tetrahymena.

## Trichodiniasis

- Small holotrichous ciliate
- Both marine and FW species
- Smaller species are usually pathogenic
- Associated with deteriorating water quality
- Severe cases show blotchy discolouration of skin, restlessness, near surface with open gill covers



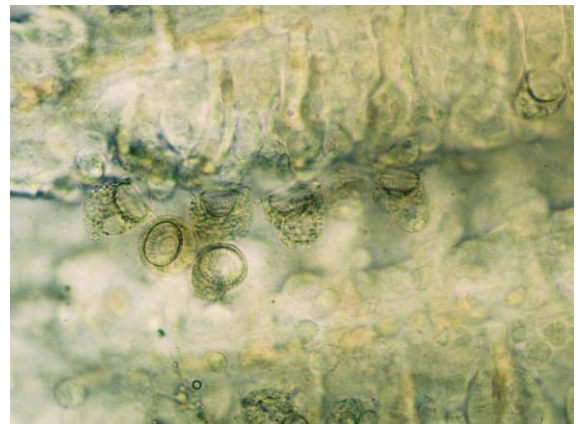
## Trichodina

- Often seen in caged fish in large dams or in ponds under conditions of poor husbandry.
- Occasionally a problem in newly hatched fry



## Treatment and control

- **Treatment** - Formalin bath. Glacial acetic acid dip has been used with some apparent success but is far more stressful than the formalin bath, but is more practical when treating caged fish.
- Improve water quality
- Re-infestation from wild fish in the water source remains a persistent problem.



## Diseases of farmed sharp tooth catfish

Bacterial septicaemias:

- *Edwardsiella tarda*
- *Vibrio anguillarum*
- *Aeromonas hydrophila*
- **Potentially serious impact of EUS on catfish farming**



Photo B vd Waal

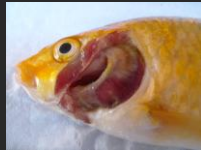
## Diseases of carp and koi



- Spring Viraemia of Carp (SVC) has never been diagnosed in RSA. Most RSA waters possibly too warm for disease to manifest
- KHV commonly diagnosed in RSA and infection confirmed by PCR



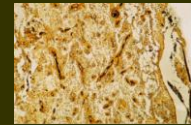
## KHV



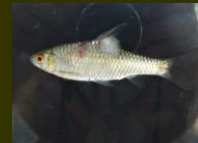
- Koi herpes virus (KHV) is a recently emerged viral disease of carp (*Cyprinus carpio*) in all of its varieties
- First officially identified in 1998.
- Examination of archive material indicates KHV presence as early as 1996
- Worldwide distribution. Commonly diagnosed in RSA
- Unregulated international trade of ornamental carp (Koi)



## EUS



- Oomycete
- Primary pathogen
- Little host specificity
- Affecting both fresh and estuarine warm water fish.
- Nile tilapia regarded as resistant



## EPIZOOTIC ULCERATIVE SYNDROME (EUS)

- *Aphanomyces invadans*
- Serious pathogenic oomycete
- First described from Japan and Australia.
- Spread through Southeast and South Asia and slowly westwards.
- Recorded in estuarine fish along the Atlantic Coast of the USA.
- Identified positively for the first time in the Chobe and Zambezi Rivers in April 2007 following an outbreak that started in October 2006.
- First recorded outbreak in South Africa in February 2011 in the Palmiet River in the Western Cape

