

The dead fish! How to handle?



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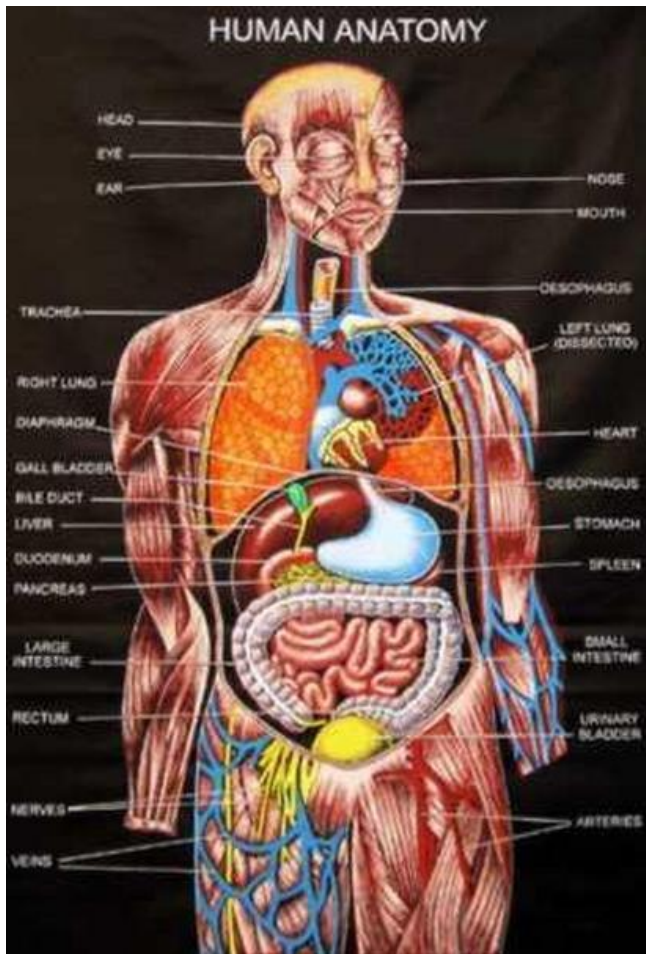
Danish National Veterinary Institute



Problems in a stable environment – what to do?

- Can you have problems in a microbiological stable system?
 - **Yes!**
- Should you in the name of diversity rely on your stability to deal with the problems?
 - **No!**

The RAS as an organism



- A RAS is more than an ecosystem
- You need to manage both the system
- And the single units especially fish tank

- Problems can relate to:

- Pathogens

- Specific
 - Opportunistic

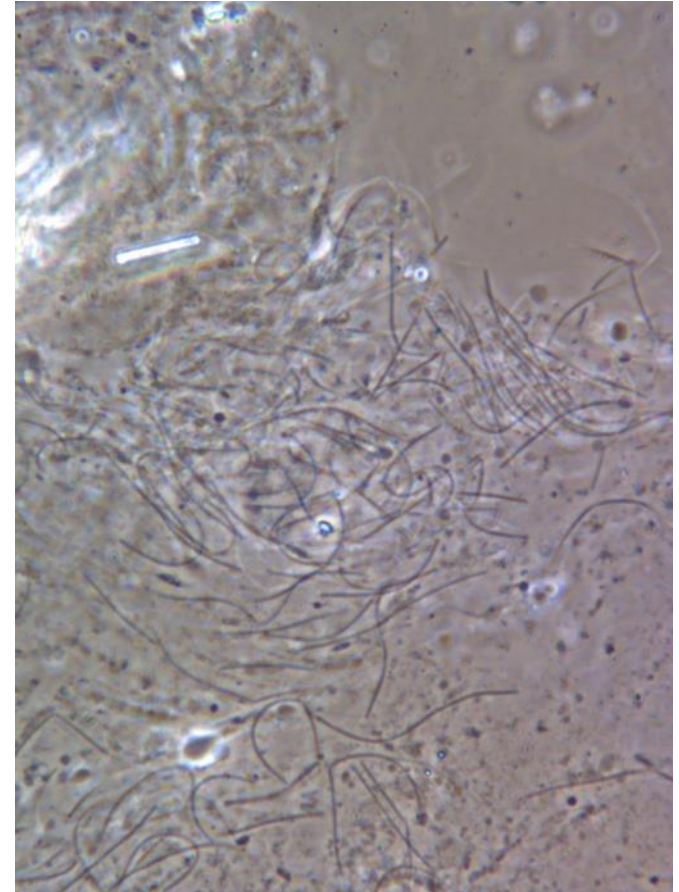
- General system management

- Biological
 - Physcal/chemical

- Accidents

Bacterial gill disease

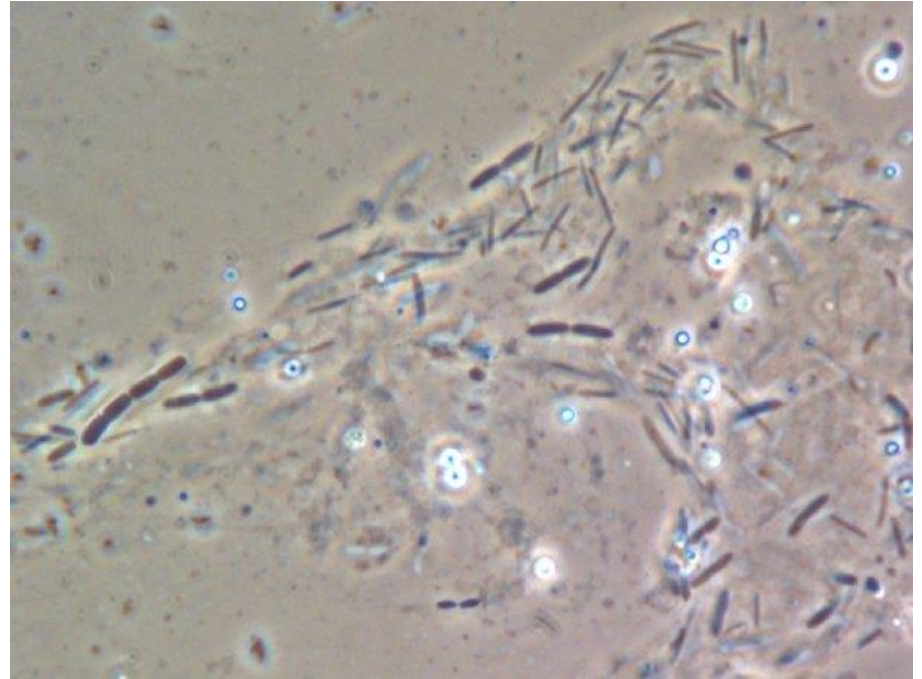
Acute



Clinical signs of intoxication, fish examination - gill infection. In the microscope uniform bacterial growth. This relate to single tank problems, mainly spilled feed. Stop feeding evaluate stressors, correct and treat the fish. Rarely spreads to other tanks unless they are also stressed.

Bacterial gill disease

Acute



Clinical signs like in previous slide. But often with debris in the gill mucus. Microscopic a variety of bacterial types + eventually protozoan, small arthropods and nematodes. Spillover of water from the water treatment, especially denitrification.

Thorough examine filter handling procedures, and system errors. Stop feeding, treat affected tanks, eventually all tanks as precaution. Often several days treatment at a level fish can tolerate

Treatment in RAS

- Peracetic acid
 - Potent, but need good treatment procedures to get adequate treatment concentrations in substantial time.
- Hydrogenperoxide
- Chloramin
- Formaldehyde
- Salt

Dose and Time

Treatment in RAS - Side effects

- **Fish: Acute or chronic**
 - Always start in the low dosage range, in a few tanks. Good idea to get idea of dosage level in your system before you get problems.
- **Filter: Ammonia, NO₂**
 - Rarely a problem unless treatment with high dosages directly into the filter, or very immature filters.
- **System: Change in equilibrium**
 - Normally a good thing if you can treat – change and let the system get back in balance again

The clusterfuck of pathogens

