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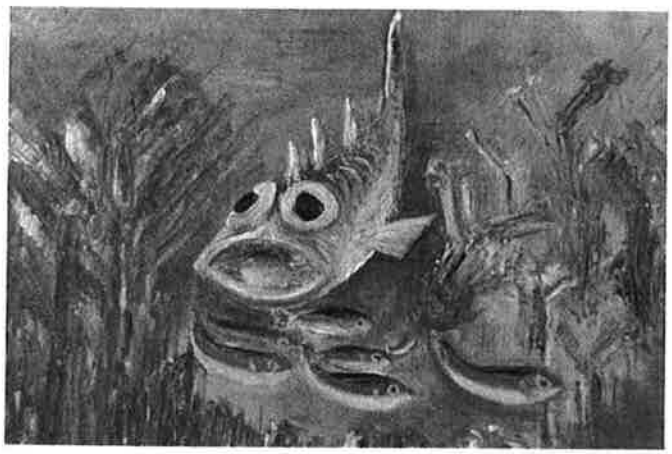
Workshop

Vaccination of early life cycle stages of fish



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Flavobacterium psychrophilum infections in rainbow trout: possible control methods

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High mortalities among rainbow trout (*Oncorhynchus mykiss*) fry are often the result of infections caused by *Flavobacterium psychrophilum*, and in Denmark this pathogen can be found in nearly all freshwater fish-farms. The infection is usually treated with antibiotics. At present, disease outbreaks can be controlled by the use of the antimicrobial agent florfenicol, whereas varying resistance patterns in *F. psychrophilum* to the licensed drugs oxolinic acid and trimethoprim/sulfadiazine are seen. The possibility of further changes in resistance patterns in *F. psychrophilum* to antibiotics demands the investigation of alternative treatment methods. Bacteriophage control of *F. psychrophilum* may constitute a realistic approach in the treatment of the infection. An experiment investigating the occurrence of bacteriophages and bacteria in rainbow trout during the initial stages of an infection showed that the phage and the bacterium were still found in some of the fish 10 days after infection, both in the group only injected with phages as well in the group injected with phages and bacteria. Other alternative treatment methods have been studied, among them increasing the water temperatures during the initial stages of a disease outbreak in fry.

A prophylactic measure like vaccination is also a possibility. An approved vaccine is not available yet, but several studies have been made with different *F.*

psychrophilum preparations in small scale trials. Currently good management and high hygienic measures on the trout farms are the fish farmers choice for avoiding disease outbreaks with *F. psychrophilum* or at least keep them low. Studies have shown that the establishment of bore-hole water recirculation systems for broodfish and fry as well as high hygienic measures including the disinfection of eyed eggs can minimise disease outbreaks.

The antiviral response of the salmonid alphavirus infected cell and viral counteractions

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Salmonid alphaviruses (SAV) are emerging viruses in salmonid aquaculture worldwide. Few studies have addressed the functional aspects of interferon (IFN)-α-induced antiviral responses in vivo or in vitro. In this study the IFN-alpha was cloned and expressed as recombinant protein and used for in vitro studies. SAV-3 infection in a permissive salmon macrophage cell line (TO cell) results in IFN-alpha and ISGs gene mRNA and protein upregulation. SAV-3 infection result in moderate macromolecular arrest in infected cells at early time post infection. Pretreatment (24h prior to infection) of TO cells with salmon IFN-alpha results in an induction of an antiviral state that inhibits the replication of SAV-3 and protects the cells against virus induced cytopathic effect (CPE), while post-infection treatment has minor effects. The