Netherlands Institute for Fisheries Research (RIVO)

P.O. Box 68
NL 1970 AB Ymuiden
The Netherlands
Phone: +31 255 564646
Fax: +31 255 564644

P.O. Box 77
NL 4400 AB Yerseke
The Netherlands
Phone: +31 113 672300
Fax: +31 113 573477

Internet:postmaster@rivo.wag-ur.nl

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Monitoring and treatment of diseases

Ronyai, A., Gielen, M., Philipsen, E. and Kamstra A. (2003)

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1. Introduction

Early recognition and efficient treatment of diseases are important factors for the success of any fish farming operation. Experience learns that during the culture of a new species like pike-perch (partly in new systems) new disease problems will be encountered.
The subtask on Moniotoring and diseases in this project has allowed each partner involved in rearing trials to dedicate special attention to this aspect and to report on disease cases and their treatment. Apart from action while encountering problems, fish health has been monitored in the pilots by regular sampling.
This report is a simple record of the experience gained by three partners, which raised pike-perch for prolonged periods.

2. Diseases at Haki

In 2002 pike-perch fries reared in tanks, or ponds were weaned to artificial diets in a recirculating system at the age of three weeks. The weaning was performed during one week; the life food was gradually decreased and the artificial diets were gradually increased. Two extruded diets were used simultaneously; Cyprico (carp diet with 45% of protein and 10% of fat) and Troco (trout diet with 56% of protein and 15% of fat) from Coppens Ltd. Fish received the mixed diets (both with 0.2 - 0.3 mm diameter) from belt feeders during 20 hours per day. In the dark hours of feeding artificial illumination was used.

The stocks were weaned successfully to the diets and died fish were observed only in few percent per day.

During this period the health-condition of the fish was monitored weekly. The monitoring procedure was begun by examination of the exterior of the fish. Usually ten fish per tank were examined. The colour of the skin, gills and fins, the presence of redness, light coloured areas of skin, small white spots etc., as well as the physical appearance of fish (emaciation, skin, fin and scale abnormalities etc) were recorded. Wet smears taken from skin and gill were examined using light microscope. Usually fish looked healthy, their appearance and physical condition was good.

In April - in the third week of feeding with diets - mass mortality among fish was observed. All investigated water quality parameters were at acceptable level and did not differed from that of the previous period. During microscopic examinations of wet smears the parasites, such as *Costia*, and *Trichodina* were found on the skin of fish, as well as bacteria *Flexibacter/Flavobacterium columnaris*. Fish were treated with formalin bath (20 ppm for one hour) and following treatment there were found neither any parasites nor bacteria.

Unfortunately the mortality did not stop and Veterinarian authorities were asked to examine the fish. Wet smears from skin and gill of 11 specimens were observed under microscope. Smears taken from kidney and spleen were fixed and stained using Giemsa method. Isolation of bacteria on blood agar was done. Some fish were taken for virological examination to isolate a virus from different organs.

Results of the parasitological, bacteriological and virological examinations were negative. Some fish were taken for histological examinations. Results of histological examination showed that fish tissue were healthy, except the liver of the fish, which cells were infiltrated with fat and a lot of fatty cells were observed. It was suggested, that feed should be considered to change.

Then the carp feed was excluded from feeding and only the trout feed was used. In the followed week the mortality rate gradually decreased and finally no died fish were found.

Since that time the monitoring of fish is continued. Fish do not show any pathological signs and looked healthy. There was no significant mortality and the fish attained a weight between 500 - 800 g.

3. Diseases at ULG

Diseases and mortalities in juveniles pike-perch (*Stizostedion lucioperca*)

The following table summarizes the most frequently observed pathologies during the intensive rearing of juveniles pike-perch in open (O.S.) and recirculating aquaculture (R.A.S.) systems. The impact on the survival and the treatments applied with success are also described. High mortalities following acute stress chain reactions, which were not related to pathologies, are also included in this synthesis.

Table 1: Summary of the main causalities of mortalities observed during the intensive rearing of juveniles pike-perch (*Stizostedion lucioperca*).

Pathologies	Mortality	Rearing system	Treatments
Parasites			
Trichodina sp.	+++	O.S.	Formalin-salt
Heteropolaria sp.	0	O.S.	Formalin-salt
Costia sp.	++	O.S.	Formalin-salt
Gyrodactylus	+++	O.S.	R.A.S.
Dactylogyrus	+++	O.S.	R.A.S.
Bacteriosis			
Aeromonas sobria	++	O.S. and R.A.S.	
Staphylococcus aureus	++	O.S. and R.A.S.	Antibiotics (food or bath)
Streptococcus	++	O.S. and R.A.S.	
Pseudomonas sp.	++	O.S. and R.A.S.	
Techno-pathologies			
Supersaturation (gas bubble disease)	++++	O.S.	Offgazing
Turbidity (130-480 FAU units)	++++	O.S.	R.A.S.
Ammoniac-ammonium	?	R.A.S.	-
Sudden mortalities			
Stress chain reactions	++++++	O.S. and R.A.S.	?

4. Diseases at Philipsen Aquacultuur

Sudden mortalities

There have been three occasions in which there has been a sudden appearance of strong mortality. At one time a batch of fish of app. 200 gram showed a mortality of 40 to 50% in a few days. The other occasions involved fish smaller than 5 gram, which showed a mortality up to 95% in 2-3 days. Fish turned grey within one day but showed no distinct aberrant behaviour beforehand.

Water quality, density or management could never be linked to these mortalities.

Some samples have been analysed by the Veterinairy Institute. The only remark that was made concerned the appearance of the liver of the pike-perch which was very fatty. Reasons for this could be a (too) high feeding level with diets, which contained too much fat and too little vitamin C and E. No signs of infection either with bacteria or virus could be detected.

A sudden and unexplained stress is postulated as main cause for the mortality.

Feed related problems

Sudden changes in the fat content of the feed have shown to be a problem for pike-perch. On one occasion significant mortality arose after a change from a feed with 12% fat to one with 15% fat.

Grading

Up to an individual weight of 100 grams pike-perch can be graded and transported without any problems. Large fish are more sensitive for handling and required sedation before handling.

Stress

In practice, pike-perch in the size-classes of 75 to 750 grams are relatively sensitive for disturbances like changes in the flow, shadows over the tanks etc.).

Bacterial infection

Some pike-perch were kept in a system together with Shubunkin. The Shubunkin at some stage had a problem with an infection with Flexibacter Columnaris, which was treated with 0.5% salt. The pike-perch never became infected and showed no adverse reaction after salt treatment.

5. Conclusions

- Sudden mass mortalities of juvenile pike-perch have been observed at all places where pike-perch were reared for prolonged periods. There is no explanation for the mortality; water quality or a viral or bacterial cause can be excluded. A 'stress chain reaction' is postulated as the cause of the problem. There is no indication for a method for prevention or treatment of this problem.

- Open (flow-through) systems show many problems with parasites like *Trichodina, Gyrodactylus* and *Dactylogyrus*. Supersaturation and turbidity are additional factors, which have caused problems in open systems.

- A number of bacterial infections have been shown to cause background mortality in pike-perch.

- In this project no indications for viral infections were detected.