

## SECTION VII FISH DISEASES

### 95. GENERAL

Diseases of fish are resulting from

- external physical and chemical agencies such as temperature, pH, dissolved gases or pollution
- infectious agents (bacteria, viruses, fungi) and parasites

Disease production depends on

- host susceptibility
- pathogen virulence
- environmental conditions

### 96. DISEASES CAUSED BY BACTERIA

#### Furunculosis

The furunculosis is characterized by clinical signs such as external bleedings on the skin and fin bases. On the body there are boil like "furuncles". Internally a flaccid inflamed intestine can be seen.

4 disease forms of furunculosis have been described:

- **acute form:** sudden increase in mortality with few or no external gross symptoms;
- **subacute form:** gradual increase in mortality with furuncles and haemorrhages (bleeding);
- **chronic form:** low steady mortality with intestinal inflammation and various lesions;
- **latent form:** no mortality, but the pathogen being systemically present;

Salmonids of all age groups are particularly susceptible. Most time outbreaks occur in summer and autumn at water temperatures above 16 °C. At low temperatures the disease may be latent without typical clinical signs. Mortality may go up to 30 % in older fish, and for fry up to 50 %.

### 97. DISEASES CAUSED BY VIRUSES

#### Viral Haemorrhagic Septicaemia = VHS and Infectious Pancreas Necrosis = IPN

Both diseases are characterized by clinical signs as dark color, exophthalmus, pale gills and bleedings in muscles, organs, and peritonium. The darm is empty of food and shows an intestinal inflammation.

In case of VHS critical water temperatures are mainly in spring.

#### VHS

Rainbow trout, young pike, and grayling are susceptible fish species. But brown trout and white fish are carries of the virus.

Mortality is most time in the range from 10 to 50 %, occasionally up to 80 %, dependent upon environmental conditions and fish health status.

VHS is a **notifiable disease!**

#### IPN

IPN virus usually causes mortality only in fry. All types of salmonides as well as pike fry are very susceptible.

Mortality goes up to 90 %.

Positive diagnosis of bacterial and virus diseases on the basis of gross symptoms is usually not accurate, because many of the fish pathogens produce similar symptoms. A positive identification is only possible on the basis of biochemical and serological tests.

Control of bacterial and virus diseases can usually be accomplished by a combination of preventive and chemotherapeutic procedures.

Preventive measures include sanitation, and the manipulation of environmental conditions.

Chemotherapy with sulfonamides, antibiotics, and nitrofurans has been ineffective in controlling virus diseases.

## **98. FUNGUS DISEASES**

### **Saprolegnia**

Saprolegnia is primarily a secondary parasite. That means an infection is usually a sign that something else is wrong, for example a damage of the mucus membranes. The susceptibility increases due to bad environmental conditions such as poor water quality, high stocking density. The fungus produce a fluffy mass on the skin, gills or eggs. But it also may invade the muscle tissue. Only in case of massive invasion mortalities may occur.

## **99. DISEASES CAUSED BY PROTOZOANS**

### **Whirling Disease**

The pathogen is an organism of the simples type formed of a single cell. It may cause heavy losses of fish. Deformity at the jaw or the spine, dark coloration of the posterior third of the body as well as uncontrolled swimming are typical clinical symptoms. The parasites picked up with nutrition penetrate the digestive wall and invade the gristle of the head and the spine. Here they damage the static and nervous system. When infected fishes die susceptible to infection as fry or young fingerlings up to an age of about 5 weeks. No therapy is possible.

### **White Spot Disease**

Fishes infected by Ichthyophthirius (Ich) show little white dots on their skin. Fishes rub or flash, and show breathing problems. The parasites may cause serious mortality in hatcheries with high stocking density. Ich gets under the fish skin and develops there into an adult parasite. It can be controlled when leaving the host for reproduction. Now the parasites must find a new host within three days otherwise they die.

## **100. DISEASES CAUSED BY CUSTACEANS**

### **Argulus**

Argulus can be seen with naked eye. But it's an almost transparent parasite. Argulus produce small often reddish inflamed wounds. The parasites can act as carrier for viral and bacterial pathogens. Acute mortality occur with young fishes in case of heavy invasions.

### **Ergasilus**

Small white points on gills are an indication for the existence of Ergasilus. In case of a severe invasion the parasites cause respiration problems. Mortality depends on fish species and degree of invasion. Due to an invasion fishes are more susceptible to other diseases.

## **101. DISEASES CAUSED BY WORMS**

### **Leeches**

Leeches occasionally parasitize fishes. The worms are up to 5 cm length and can easily be seen macroscopically on the skin. Many species will attach to the fins. Bites of leeches can lead to inflamed bite wounds. Like Argulus they are suspected to transfer viruses and bacteria from one fish to another.

## Tapeworms

Tapeworms or one of their larvae are parasites located in the intestine, liver, muscle tissue, or the body cavity.

The adult tapeworm of *Ligula Intestinalis* for example infests the intestine of water birds which have eaten infected fish. In the water the eggs are released. For the lifecycle of the parasite to continue, the eggs must be eaten by certain copepod crustaceans. Within the body of the crustacean (we call it the first intermediate host), the egg hatches and develops into a larva. The crustacean containing larvae in this stage may be eaten by the second intermediate host of the parasite. The second intermediate host may be a fish in which the parasite bores through the wall of the digestive tract. Development of the parasite continues now until the larva has grown up to the next stage. These larvae are found in the body cavity of many fishes.

Mortality is very rare, but fish infested with Tapeworms grow slower. Populations that are infested should be heavily fished, and their entrails should be disposed properly.

### Life cycles of different Tapeworms:

<i>Triaenophorus:</i>	first intermediate host:	copepod crustacean
	sec. intermediate host	char (liver) gwyniad (muscle)
	final host	pike (digestive tract)
<i>Dibothnocephalus:</i>	first intermediate host:	copepod crustacean
	sec. intermediate host	fish (burbot -- liver, muscle)
	final host	human, cat, dog (digestive tract)
<i>Ligula intestinalis:</i>	first intermediate host:	copepod Crustacean
	Sec. Intermediate host:	fish (body cavity)
	final host	bird (digestive tract)

## Triaenophorus

