

## **General characteristics, diagnosis, prevention and treatment of fungal disease in fish.**

### **Introduction:**

Fungal infections (fungal infections are called mycoses) are among the most common diseases seen in temperate fish. Because fungal spores are found in all fish ponds and create problems in stressed fish. Poor water quality can also lead to an increase in fungal infections in an otherwise healthy fish population. Most fungal infections only attack the external tissues and only few fungal infections that will infect the internal organs of fish.

### **Possibility of fungal infections:**

1. Poor quality of water.
2. Poor hygiene.
3. Fish that are injured have other diseases.
4. Dead fish/large amounts of decomposing organic material in the pond.

### **1. Cotton Wool Fungus (Saprolegniasis):**

The most common presentation of water mold infection as relatively superficial, cotton like growth on the skin or gills. Such lesions usually begin as small, focal infections that can rapidly spread over the surface of the body. New lesions are white and over time will become red, brown, or green with tinged edges.

The area of skin and gill damage determines the severity of the disease. Saprolegniasis is mainly a secondary infection seen after damage to the fish integument. Water pollution and overcrowding like other predisposing factors were also include. *Saprolegnia* can act as a primary pathogen infecting fish that have not shown signs of previous damage. This disease attacks are temperature-dependant (temperature ranging from 32° to 95°F but seem to prefer 59° to 86°F) usually occurring at low temperatures.

### **Symptoms:**

1. Fish fungus appears as gray or white patches on the skin/gills.
2. They may become brown/green (later stage) as they trap sediment.
3. *Saprolegnia* normally establishes as small, focal infections that then spread rapidly over the body or gills.

### **Diagnosis:**

1. Observation of a cottony proliferative growth on the skin or gills alerts the clinician to a possible diagnosis of *Saprolegniasis*.
2. Direct smear from cottony fungal growth, presence of long, branched non-separate hyphae help in diagnosis of *Saprolegniasis*.
3. Isolation and identification of *saprolegnia* sp. using cultural method.

### **Treatment and control:**

1. Fish are removed from the water they appear to have a "slimy" matted mass growing out of the skin and scales.

2. Use the 100mg/ litter strong malachite green solution to clean the lesion and apply a waterproof cream.
3. Avoiding damage of skin during transportation of fish.
4. Right kind of food with sufficient amount must be provided to fish.
5. Overcrowding of fish must be prevented.
6. Preventing the introduction of new fish to the fish farm until known that fish are free from disease.
7. Disinfection of the equipments and utensils to prevent spread of infection.

### **2. *Ichthyosporidium*:**

Gustafson and Rucker (1956) reported that *Ichthyosporidium* is a fungus, but it manifests itself internally. It primarily attacks the kidneys and liver, but it spreads everywhere else.

Symptoms: The fish may become sluggish, lose balance and eventually show external cysts or sores.

#### **Treatment:**

1% Phenoxethol solution added to food or Chloromycetin added to the food has also been effective.

### **3. *Exophiala* sp.:**

*Exophiala salmonis* and *E. psychrophila*; these fungal organisms have hyphae that are septated, irregular in width and branched (Robert, 1989). Both fungal diseases infected the many species of fish.

#### **Symptoms:**

1. Fish become darker and lethargic, with erratic and abnormal swimming behavior.
2. Round yellow to white granulomas are present in visceral organs like liver, kidney and spleen with prominent enlargement of the posterior kidney.

### **4. Branchiomycosis (gill rot):**

It is a fungal disease involving gill tissues, affecting the most species of freshwater fish.

#### **Causative agent:**

**(*Branchiomyces sanguinis*)** it grows mainly in the blood vessels of gill arches, filaments and in the gill lamellae.

**(*Branchiomyces demigrans*)**: this fungal species is found in the parenchymal tissue of the gills.

The fungi grows at the temperature between 14 to 35°C.

**Diagnosis:**

1. Clinical sign.
2. Microscopical examination of wet preparation from infected gill.
3. Isolation and identification of the causative agent.

**Treatment and control:**

1. Strict sanitation and disinfection are essential for disease control.
2. Dead fishes should be collected and daily and burned or deeply buried .
3. Ponds with Branchiomycosis should be dried and treated with calcium oxide (quicklime) or 2 to 3 kg  $\text{CuSO}_4$  per hectare.
4. Diseased fish can be treated with malachite green at 0.1 mg/l for extended periods of time or 0.3 mg/l for 12 hrs.
5. Transportation of infected fish areas to non-infected areas must be prevented.
6. Regulating the feeding rate during warm weather.

**5. Aspergillomycosis:**

Infection caused by *Aspergillus spp.* has increased in the recent years in freshwater fish.

Histopathology of *Aspergillus spp.* Infected fishes are very few and scattered.

Present study is an effort to find out the pathogenicity of both the isolated species of *aspergillus* on some freshwater fishes and to find out histological alteration in various tissues due to infection.

Fishes showing external symptoms like white fungoid patches should be collected to identify in laboratory.

*Aspergillomycosis* has recently discovered as a pathogen of farmed fish.

**Symptoms:**

Showing cottony outgrowths without any lesion or wound.

**Diagnosis:**

1. Microscopical examinations of infected tissues to detect the fungi (spores).
2. Histopathological examination.
3. Isolation and identification of the causative agent using culture media.

**Treatment and control:**

1. All nets, brushes and utensils used around infected fish must also be disinfected at the same time.
2. Use the 0.1mg/ liter strong malachite green solution to clean the lesion.
3. Avoiding damage of skin during transportation of fish.

**6. Ichthyophonosis:**

**It is a fungal** disease of both fresh water and marine fish. Disease characterized by rough or granulomatus of the skin and white to grey white lesions in the internal organs and different body part.

**Causative agent:**

*Ichthyophonus hoferi*, obligatory parasite spherical or oval, yellowish –brown and has granulated cytoplasm. The fungus leaves as an anti-circular parasite in the tissues of various organs.

**Diagnosis:**

1. Microscopical examinations of infected tissues to detect the fungi (spores).
2. Histopathological examination.
3. Isolation and identification of the causative agent.

**Treatment and control:**

1. There are no therapeutic procedures for treatment of *Ichthyophonus* diseases.
2. Prevention of infection is the best method for control of disease.
3. Feeding of raw fish or infected food must be prevented.
4. Any infected fish or dead fish must be removed or destroyed.
5. All nets, brushes and utensils used around infected fish must also be disinfected at the same time.