CHAPTER 11

FISH NOSOLOGY AND RESTRAINT

Fishes are susceptible to various diseases. The major symptoms of disease of fish are loss of appetite, abnormal swimming movements, increase in the rate of ventilation, clumping of fins, remaining in the surface water, inactive in the bottom, production of excessive mucous and changes in colouration (Varghese, 1988).

Generally fishes have a good resistance power. The occurrence and magnitude of infections are closely related to the sanitary conditions prevalent in the water as also the condition and general health of the fishes themselves. (Jhingran, 1991)

In the present investigation, the nosologies of the test fishes are classified into three major groups from the causative point of view. (A) Infection caused by bacteria, (B) Infection from fungi and (C) Infection caused by parasites.

Fishes are constantly monitored to detect any abnormal behaviour. A quarantine tank/hospital tank is always maintained to accommodate diseased fishes. Specific prophylactic and control measures formulated are administered to the diseased fishes.

Ornamental fish farmers in temperate region have already practiced several treatments that are listed in the present study. However, these treatments are not effective and hence in the present study the treatment are modified to attain optimum effectiveness.

11.1. **Zymosis types and traits** (Figure 31)

The nosology of common aquarium fish species so far reported by earlier workers along with those accounted in the present test fish species are depicted below in tabular form. *(Abbr. +, recorded; - , not recorded).*
Table – 45. Nosology of *Esomus danricus* (Hamilton-Buchanan, 1822) and *Puntius conchonius* (Hamilton-Buchanan, 1822)

<table>
<thead>
<tr>
<th>Name of the disease</th>
<th>Occurrence</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. BACTERIAL INFECTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Fin and tail rot</td>
<td>+</td>
<td><em>E. danricus, P. conchonius</em></td>
</tr>
<tr>
<td>2) Dropsy</td>
<td></td>
<td><em>E. danricus, P. conchonius</em></td>
</tr>
<tr>
<td>3) Exophthalmia</td>
<td>+</td>
<td><em>P. conchonius</em></td>
</tr>
<tr>
<td>4) Ulcer disease</td>
<td>+</td>
<td><em>E. danricus, P. conchonius</em></td>
</tr>
<tr>
<td>5) Cotton wool disease</td>
<td>-</td>
<td>_</td>
</tr>
<tr>
<td><strong>B. FUNGAL INFECTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Body Fungus</td>
<td>+</td>
<td><em>E. danricus, P. conchonius</em></td>
</tr>
<tr>
<td>2) Eye Fungus</td>
<td>_</td>
<td><em>E. danricus</em></td>
</tr>
<tr>
<td>3) Gill rot</td>
<td>+</td>
<td><em>E. danricus, P. conchonius</em></td>
</tr>
<tr>
<td><strong>C. PARASITIC INFECTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Ichthyophthiriasis</td>
<td>+</td>
<td><em>E. danricus, P. conchonius</em></td>
</tr>
<tr>
<td>2) Ichthyobodosis</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>3) Argulosis</td>
<td>+</td>
<td><em>E. danricus</em></td>
</tr>
<tr>
<td>4) Helminth</td>
<td>_</td>
<td>_</td>
</tr>
</tbody>
</table>
A. Bacterial infection

Fin and tail rot

The causative bacteria for this disease as reported by earlier worker are mainly *Aeromones spp, Pseudomonas spp and Vibrio spp.*

**Symptom:** The first sign of the disease is the appearance of a white line on the margin of the fin, spreading and imparting frayed appearance to the appendage which eventually putrefies and disintegrates.

**Stage of infection:** Infection is found in adult stage.

**Treatment:** Dip treatment in 1 – 2 mg malachite green/litre of water is found effective

**Period and duration:** 7 –10 days treatment is necessary depending on the intensity of infection.

**Remark:** The disease occurs in both *E.danricus* (Hamilton-Buchanan, 1822) and *P.conchonius* (Hamilton-Buchanan, 1822) mostly at their caudal fin.

Dropsy

**Symptoms:** Accumulation of fluid inside the body cavity and scale protrusions.

**Stage of infection:** Infection is mostly found in female adult fishes.

**Treatment:** Chloromycetin at a concentration of 125 mg in 5 litres water is effective.
**Period and duration:** 3 – 10 days treatment is necessary.

**Remark:** Both the test species are found affected.

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**Exophthalmia**

The disease is caused by *Aeromonas spp.*

**Symptom:** During initial stages cornea of the eye becomes vascularized and late becomes opaque, subsequently the eye ball gets petrified, leading to death.

**Treatment:** Dip treatment in 8 –10 mg/l tetracycline for 1 hr given for 2 –3 days in effective.

**Period and duration:** The period of the disease is 3 - 15 days.

**Remark:** Exophthalmia is observed only in *P.conchonius* (Hamilton-Buchanan, 1822).

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**Ulcer disease**

The causative bacterium for this disease reported by earlier workers is *Flexibactor spp.*

**Symptoms:** The symptom of this disease in the initial stage is occurrence of raised, white plagues, often with reddish peripheral zone finally leading to haemorrhagic ulcers.
Stage of infection: Infection is found in adult stage.

Treatment: Chloromycetin 125 mg dissolved in 300 ml water is spread over the hospital tank is found effective. If no improvement is noticed a second dose of 125 mg Chloromycetin is administered and found effective with 50% change of water. Bath treatment in 1 mg KmnO4/litre along with 250 mg Chloromycetin dissolved in 1 litre water is found effective.

Period and duration: Duration of the disease is 7 –12 days.

Remark: The disease is rare in occurrence for P.conchonius (Hamilton-Buchanan, 1822) but found mostly in the case of E.danricus (Hamilton-Buchanan, 1822).

B. Fungal infection

Body Fungus

The causative fungus for this disease as reported by earlier worker is saprolegnia spp.

Symptom: Tufts of minute white hair like outgrowths occur in the affected area of the body.

Stages of infection: Infection is found mainly in adult fish.
**Treatment:** In case of mild infection in fin rays, manual removal of the fungal hyphae with forcep and dipping the infected fish in 1 mg/ liter KmnO₄ for 5 mins is effective. Chloromycetin 125 mg dissolved in 300 ml water is spread over the hospital tank is effective. In case of heavy infection a second dose of 125 mg Chloromycetin dissolved in 300 ml of water is administrated and is found effective.

**Duration of treatment:** 2 days in case of mild infection, 7 – 12 days in case of heavy infection.

**Remark** The disease mostly occurs in the dorsal portion of the body, beneath the dorsal fin and also in the opercular region. In case of severe infection, it may pierce the opercular bone and expose the gills.

**Gill rot**

The disease is known to be caused by *Brachiomyces spp.* according to earlier workers.

**Symptoms:** Initially a red flecking appears on the gill filament which gradually becomes greyish-white and finally falls off altogether leaving the cartilaginous support exposed.

**Stages of infection:** Adult and sub adult stages are mostly affected.
**Treatment:** The diseased fishes are given dip treatment in copper sulphate solution at the rate of 1mg/gallon water twice daily for 30 to 40 seconds for about 3 days.

**Period and duration:** Duration of the disease is 7 – 14 days.

**Remarks:** The disease is found in the sub adult and adult stage of both the test specimens.

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**C. Parasitic infection**

**Ichthyopithiriasis (white spot)**

The causative agent is mainly a ciliate protozoan *Ichthyopithirias spp*.

**Symptoms:** The whole body and fins are covered with small pin head sized white spots. The spots are clearly visible with the naked eye and the infected fishes exhibits irrational movements.

**Stages of infection:** Adults are mainly infected.

**Treatment:** The diseased fishes are bathed once daily in formalin solution at the rate of 4ml/gallon water for 40 – 50 seconds for 2 – 3 days. Another alternative method is to keep the infected fishes in salt solution water at the rate of 10gms/litre water. This method is continued for 5 – 6 days.
**Period and duration:** The disease usually occurs during the summer months for duration of about 7 – 14 days.

**Remarks:** The disease occurs in both *Esomus danricus* (Hamilton-Buchanan, 1822) and *Puntius conchonius* (Hamilton-Buchanan, 1822) but in very negligible form. It is found to be infectious as one infected fish in the tank spreads the disease to all the other remaining fishes.

**Argulosis**

It is a common ectoparasite disease caused by *Argulus*, commonly called as fish lice.

**Symptoms:** This crustacean parasite attaches and penetrates the host fish skin and suck blood. A round perforated reddish inflammation appears on the body surface of the fish. The affected fish behaves abnormally and repeatedly rub themselves against rough surfaces.

**Stages of infection:** Adult fishes are mainly attacked by the parasite.

**Treatment:** The parasite is manually removed from the body of the fish and the aquarium water is totally changed. To remove smaller argulus the fishes are bathed in concentrated salt water. Another alternative method found effective is bath treatment of the fishes in KMnO$_4$ at the rate of 3mg/gallon water for 4 – 5 minutes.
**Period and duration:** Occurs mostly during summer. Duration of the infection is for about 7 – 10 days.

**Remarks:** This crustacean parasite infection is found in isolated cases in *Esomus danricus* (Hamilton-Buchanan, 1822).

### 11.2. Prophylactic and control measures

It is possible to control fish disease by prophylaxis (preventive treatment), therapy (curing treatment) and metaphylaxis (after cure). It is well-known that prevention is better than cure this also applies in the case of fish. With the observance of this principle most of the losses can be avoid from the very outset, particularly when disease are often, difficult to cure or cannot be cured at all once they break out.

Prevention measures and practices should be economical and should cover as far as possible all fish disease. The origin of many fish disease may be due to on one hand, deficiencies in the environment and the maintenance and on the other hand, to the general condition attained by fish and to inherited and acquired resistance.

The general prophylactic measures adopted in the present experiment for the prevention of disease of the two test fishes are purported as below:

1. **Avoid over-crowding:** This is not an actual cause of disease but contributes to the rapid spread of any infection.
(2) **Avoid over feeding:** Over feeding contributes to diseases sometimes because uneaten food on the bottom of the tank will rot and pollute the water.

(3) **Avoid supply of inadequate diet:** The supply of inadequate feed especially poor quality dried food is one of the factor of gross imbalance in protein – carbohydrate - fat ratio, which leads to a variety of infection.

(4) **Partial water change:** Approximately 10-12 % of the water in a tank should be changed weekly under ideal condition. This prevents the building up of excess nitrogenous condition and will help keep the entire tank in good condition.

(5) **Water quality maintenance:** Rapid change of the physicochemical properties of the aquarium water will have weakening effect on fish. The water quality like dissolve oxygen, water temperature, pH value and hardness are maintained in permissible limit for prevention of disease.

(6) **Precaution on new addition:** The unfortunate experience of introducing new fish, plants, small or accessories into the established aquaria have caused a sudden onslaught of disease. Therefore, precautionary measures are taken before introduction of a new addition.
(7) **Quarantine process:** The precautionary measure for preventing disease is the quarantine process. All new addition is kept in the quarantine aquarium for 2–4 weeks.

(8) **Avoid contamination:** The contamination takes place due to unsterilized net and unwashed hand. Therefore, proper sterilization method is followed after handling of diseased fish and tank.

(9) **Proper cleanliness and filtration:** The lack of cleanliness and filtration leads the aquaria unhealthy, which may help for disease. The outmost care is taken for cleanliness and filtration of the aquaria.
FIGURE 31: STRESS AND RESTRAINT IN REARING OF TEST FISHES

Tail rot (1), Dropsy (3), Exophthalmia (4), Ulcer in body (5), Larval mortality due to bacterial infestation (7) in *E. danricus* (Hamilton-Buchanan, 1822); Tail rot (2), Body Ulcer (6), Larval mortality due to bacterial infestation (8) in *P. conchonius* (Hamilton-Buchanan, 1822).