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The background of the cover is a detailed illustration of six ornamental fish species swimming in an aquarium. The fish include a silver and orange striped fish, a blue and orange striped fish, a large orange fish, a blue and orange striped fish, a small blue and red fish, and a large brown spotted fish. The background is a deep blue-green color with green leafy plants.

# Common Diseases of Ornamental Fishes: Diagnosis, Treatment, and Preventive Management

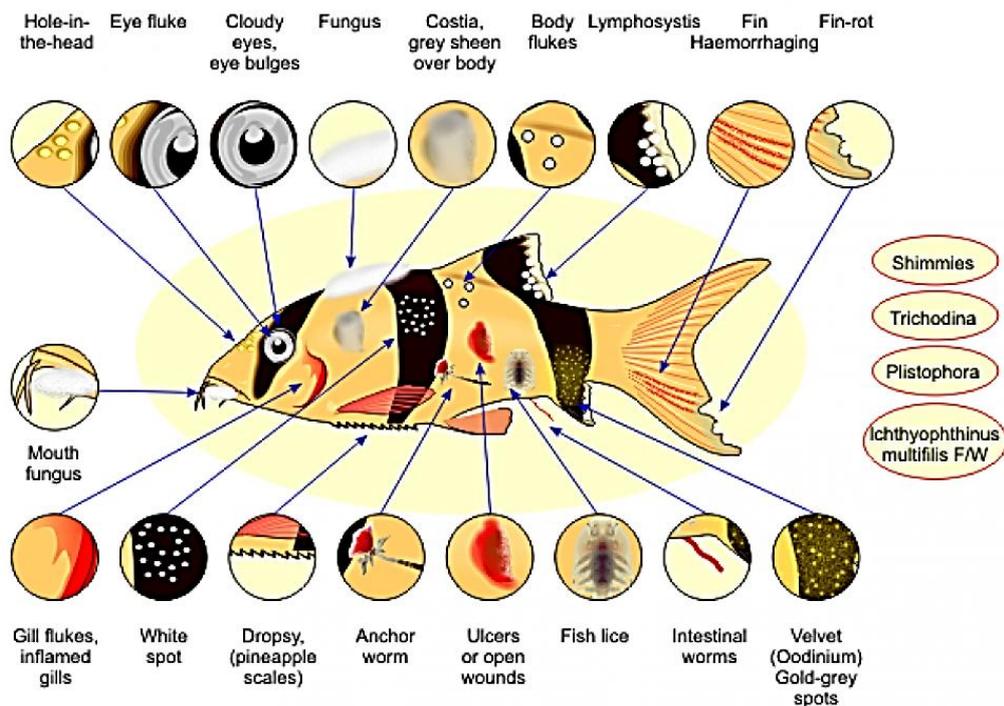
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# INTRODUCTION

Ornamental fisheries represent a dynamic, rapidly expanding sector of the global aquaculture industry, contributing significantly to livelihoods, international trade, recreational aquaculture, and biodiversity conservation. India, with its rich aquatic resources and growing expertise in ornamental fish culture, has emerged as an important player in this sector. However, the sustainability and profitability of ornamental fish farming are severely constrained by disease, which remains a critical challenge for breeders, traders, aquarium operators, and hobbyists.

Diseases in ornamental fishes are caused by a wide range of pathogenic organisms, including bacteria, fungi, viruses, parasites, and other opportunistic microbes. Among these, bacterial, fungal, and viral diseases are of major concern due to their high prevalence, rapid transmission in confined systems, and potential to cause heavy mortalities. Ornamental fish are commonly reared in closed or semi-closed environments, such as aquaria, tanks, hatcheries, and recirculating systems, where stressors and suboptimal conditions can quickly lead to disease outbreaks.



Several predisposing factors contribute to the occurrence and severity of diseases in ornamental fishes. Poor water quality, overcrowding, inadequate aeration, accumulation of organic waste, improper nutrition, rough handling, and stress during transport weaken fish's immune systems, making them highly susceptible to infections. In many cases, diseases are opportunistic, meaning pathogens that are normally present in the aquatic environment invade fish only when their resistance is compromised. Furthermore, the movement of infected ornamental fish through domestic and international trade can facilitate the spread of pathogens across regions, posing risks to native fish populations and natural ecosystems.

Disease outbreaks in ornamental fisheries result in significant economic losses due to mortality, reduced growth, poor coloration, deformities, and rejection of diseased fish in the market. Even non-lethal infections can drastically reduce the aesthetic appeal of ornamental fishes, which is a key determinant of their commercial value. In addition to direct financial losses, disease outbreaks increase production costs through treatment expenses and can lead to trade restrictions, quarantine measures, and loss of consumer confidence.

Effective disease management in ornamental fish culture requires a comprehensive and integrated approach. While bacterial and fungal diseases may respond to timely therapeutic interventions, viral diseases generally lack effective treatments, making prevention and biosecurity the cornerstone of control. Regular health monitoring, early diagnosis, maintenance of optimal water quality, quarantine of newly introduced fish, use of healthy and disease-free stocks, and adoption of good husbandry practices are essential components of a successful disease management strategy. Judicious use of chemotherapeutic agents and antibiotics is also critical to prevent the development of drug resistance and environmental contamination.

This manual has been prepared to provide consolidated, practical information on the major bacterial, fungal, and viral diseases affecting ornamental fishes. It aims to enhance awareness and understanding of disease causation, clinical signs, and management practices among students, farmers, extension personnel, and aquarium enthusiasts. By promoting scientific health management and preventive practices, this manual seeks to support sustainable development, improved productivity, and long-term viability of the ornamental fisheries sector.



# **Bacterial Diseases of Ornamental Fishes**

Ornamental fisheries constitute a rapidly growing sector of the aquaculture industry, providing livelihood opportunities, supporting international trade, and contributing significantly to biodiversity conservation and aesthetic value. However, disease outbreaks remain one of the most critical constraints affecting the sustainable development of this sector. Among various disease-causing agents, bacterial pathogens are particularly important due to their ability to spread rapidly in confined aquatic systems such as aquaria, tanks, and hatchery units.

Bacterial diseases in ornamental fishes often result in high morbidity and mortality, leading to substantial economic losses for breeders, traders, and hobbyists. Poor water quality, overcrowding, stress during transport, improper nutrition, and inadequate biosecurity practices predispose fish to bacterial infections. Early diagnosis and timely management are therefore essential to prevent large-scale losses.

This manual has been prepared to provide practical and scientific information on major bacterial diseases affecting ornamental fishes, their causative agents, symptoms, and recommended treatment measures. It is intended for students, fish farmers, aquarium managers, extension workers, and hobbyists as a ready reference guide.

## **Importance of Disease Management in Ornamental Fisheries**

Disease management plays a crucial role in maintaining fish health and ensuring the profitability of ornamental fish culture. Unlike food fish culture, ornamental fish farming demands high survival rates and superior aesthetic quality. Even minor disease symptoms such as fin erosion, discolouration, or ulcers can significantly reduce the market value of fish.

Bacterial diseases not only cause direct mortality but also weaken fish, making them more susceptible to secondary infections by fungi and parasites. In addition, the uncontrolled movement of infected ornamental fish can facilitate the spread of pathogens across regions and countries, posing a threat to native fish populations and natural ecosystems.

### **Effective disease management strategies include:**

- Maintenance of optimum water quality parameters



- Quarantine of newly introduced fish
- Regular health monitoring
- Stress reduction during handling and transport
- Judicious use of therapeutants and antibiotics
- Adoption of biosecurity and hygiene measures

## Major Bacterial Diseases of Ornamental Fishes

### 1. Red Pest (Hemorrhagic Septicemia)

**Causative Agent:** *Aeromonas hydrophila*

#### **Description:**

Red pest is one of the most common and destructive bacterial diseases observed in ornamental fish, particularly under poor water quality conditions. The disease is often associated with stress and unhygienic rearing environments.



#### **Symptoms:**

- Bloody streaks on the body, fins, and tail
- Reddening at the base of fins
- Ulcer formation on the skin
- Fin and tail rot in advanced stages
- Lethargy and reduced feeding activity

#### **Treatment:**

- Administer antibiotics such as chloramphenicol (chloromycetin) or tetracycline at a dose of 10–20 mg per litre of water
- A second dose may be given after two days if required



- Medicated feed may be prepared by mixing 1% antibiotic thoroughly with flake food
- Improvement of water quality is essential for successful treatment

## 2. Mouth Fungus (Columnaris Disease)

**Causative Agent:** *Chondrococcus columnaris* (also known as *Flavobacterium columnare*)

### Description:

Although commonly referred to as mouth fungus, this disease is bacterial in origin. It primarily affects the mouth region but can also spread to the gills and body surface.



### Symptoms:

- White or grey cotton-like patches around the mouth
- Greyish or white line forming around the lips
- Short tuft-like growths emerging from the mouth
- Difficulty in feeding
- Rapid progression under high temperature conditions

### Treatment:

- Use acriflavine (0.2% solution) at the rate of 1 ml per litre of water
- Add antibiotic capsules at 10 mg per litre of water
- Medicated feed containing 1% antibiotic may be provided
- Isolate infected fish to prevent spread



### 3. Tail Rot / Fin Rot

**Causative Agent:** Bacterial infection associated with poor water quality

#### **Description:**

Fin rot is a progressive disease that begins with the deterioration of fin margins and can extend to the body if left untreated. It is commonly observed in overcrowded and poorly maintained aquaria.



#### **Symptoms:**

- Disintegration of fins, often reduced to stumps
- Exposed fin rays
- Blood on the edges of fins
- Reddened areas at the base of fins
- Skin ulcers with grey or red margins
- Cloudy eyes in severe cases

#### **Treatment:**

- Penicillin at 10,000 units per litre of water is highly effective
- Repeat treatment after two days if necessary
- Alternatively, chloramphenicol or tetracycline may be used
- Improve water quality through partial water exchange



#### 4. Dropsy

**Causative Agent:** Bacterial infection is often linked to poor environmental conditions

##### **Description:**

Dropsy is a systemic condition characterised by fluid accumulation in the body cavity. It is usually a symptom of internal bacterial infection rather than a disease itself.



##### **Symptoms:**

- Swollen or bloated body
- Protruding scales giving a pinecone appearance
- Loss of appetite
- Lethargy and abnormal swimming behaviour

##### **Treatment:**

- Administer antibiotics through medicated feed (1% antibiotic mixed with flake food)
- Chloramphenicol or tetracycline may be used
- Isolate affected fish and improve water hygiene

#### 5. Fish Tuberculosis

**Causative Agent:** *Mycobacterium piscium*

##### **Description:**

Fish tuberculosis is a chronic bacterial disease that progresses slowly and is difficult to treat. It poses a serious risk to ornamental fish culture due to its persistence.



##### **Symptoms:**

- Hollow or sunken belly



- Pale body colouration
- Skin ulcers and frayed fins
- Loss of appetite and emaciation
- Yellowish or dark nodules on the body or eyes

**Treatment:**

- No effective treatment is currently available
- Infected fish should be destroyed to prevent the spread
- Strict quarantine and disinfection measures must be followed

**Preventive Measures and Best Management Practices**

Prevention is always better than cure in ornamental fish health management. The following measures are strongly recommended:

- Maintain optimal water quality parameters (temperature, pH, dissolved oxygen, and ammonia)
- Avoid overcrowding and sudden environmental changes
- Quarantine new fish for at least 2–3 weeks before introduction
- Provide balanced and high-quality feed
- Regularly clean tanks, filters, and equipment
- Observe fish daily for early signs of disease
- Use antibiotics responsibly to avoid resistance development



# Fungal Diseases of Ornamental Fishes

Ornamental fish culture is an important and rapidly expanding component of the fisheries sector, contributing to employment generation, export earnings, and recreational aquaculture. However, the success of ornamental fisheries is severely constrained by disease outbreaks, particularly fungal diseases. Fungal infections are common in both freshwater and marine ornamental fishes, particularly under stressful environmental conditions.

Fungal diseases are often opportunistic, invading fish that are already weakened by poor water quality, handling stress, injuries, or concurrent bacterial and parasitic infections. In ornamental fish systems, fungal pathogens can spread rapidly due to high stocking densities and closed water circulation systems. These diseases not only cause mortality but also reduce the aesthetic value of fish, making them unsuitable for trade.

This manual provides detailed information on the major fungal diseases affecting ornamental fishes, their causative agents, symptoms, treatment measures, and preventive strategies. It is designed as a practical guide for students, fish farmers, aquarium operators, extension personnel, and hobbyists.

## Significance of Fungal Diseases in Ornamental Fisheries

Fungal diseases pose serious challenges to the management of ornamental fish health due to their rapid progression and high transmission potential. Eggs, larvae, juveniles, and adult fish are all susceptible, with fungal infections being particularly devastating in hatcheries and breeding units.

The impacts of fungal diseases include:

- Heavy mortality of fish and eggs
- Reduced growth and vitality
- Secondary bacterial infections
- Economic losses due to rejection of diseased fish
- Increased cost of treatment and management



Environmental factors such as low dissolved oxygen, poor water circulation, accumulation of organic matter, extreme pH, and stress from overcrowding can predispose fish to fungal infections. Therefore, understanding the disease dynamics is essential for effective control.

## **Major Fungal Diseases of Ornamental Fishes**

### **1. Saprolegniasis (Cotton Wool Disease)**

**Causative Agent:** *Saprolegnia* species (water moulds)

#### **Description:**

Saprolegniasis is one of the most common fungal diseases affecting ornamental fish and fish eggs. The fungi are ubiquitous in aquatic environments and usually infect fish through damaged skin, fins, or eggs. Poor water quality and high organic load levels greatly increase disease incidence.



#### **Symptoms:**

- Tufts of dirty, cotton-like growth on skin, fins, or gills
- Lesions may spread to cover large body areas
- Infected fish eggs turn opaque white and fail to hatch
- Reduced activity and loss of appetite

#### **Predisposing Factors:**

- Low dissolved oxygen
- Poor water circulation
- High ammonia and organic matter
- Physical injuries and stress

#### **Treatment:**



- Penicillin at 10,000 units per litre of water
- Repeat treatment after two days if required
- Chloramphenicol (chloromycetin) at 10–20 mg per litre with a second dose after two days
- Phenoxethol solution at 1% concentration in distilled water
- Isolate infected fish and improve water quality

## 2. Ichthyosporidiosis

**Causative Agent:** *Ichthyosporidium* species

### **Description:**

Ichthyosporidiosis is a systemic fungal disease that primarily affects internal organs such as the liver and kidneys. The infection gradually spreads throughout the body, leading to chronic health deterioration and eventual mortality.



### **Symptoms:**

- Sluggish behaviour and reduced swimming activity
- Loss of balance and abnormal movement
- Hollow or sunken belly
- External cysts, nodules, and open sores
- Progressive emaciation

### **Treatment:**

- Phenoxethol added to feed as a 1% solution may be effective in the early stages
- Chloramphenicol may also be used as a supportive treatment



- Severely infected fish should be removed to prevent spread

### 3. Fungal Gill Rot (Branchiomycosis)

**Causative Agent:** *Branchiomyces* species

**Description:**

Branchiomycosis is a serious fungal disease affecting the gills of ornamental fish. It usually occurs under stressful environmental conditions such as low pH, low dissolved oxygen, and high algal blooms. The disease spreads rapidly and can cause sudden mass mortalities.



**Symptoms:**

- Lethargy and reduced activity
- Fish seen gasping or gulping air at the water surface
- Gills appear striped or marbled with pale and dark areas
- Extensive gill tissue damage
- Release of fungal hyphae and spores into water, infecting other fish

**Treatment:**

- Dip infected fish in a 3–5% common salt solution for 1 minute
- Alternatively, dip in 5 ppm potassium permanganate (KMnO<sub>4</sub>) for 1 minute
- Dry affected ponds completely
- Treat ponds with quicklime (calcium oxide)
- Apply copper sulphate at 2–3 kg per hectare

**Preventive Measures and Management Practices**



Prevention is the most effective strategy for controlling fungal diseases in ornamental fish. The following best management practices are recommended:

- Maintain optimum water quality parameters
- Ensure adequate aeration and water circulation
- Avoid overcrowding and excessive organic loading
- Handle fish carefully to prevent injuries
- Remove dead fish and eggs immediately
- Quarantine new fish before introduction
- Disinfect equipment and tanks regularly
- Monitor fish health on a daily basis



# **Viral Diseases of Ornamental Fishes**

The ornamental fish industry is an important component of modern aquaculture, contributing significantly to employment generation, export earnings, and recreational fisheries. Despite its rapid growth, the sector faces serious constraints due to disease outbreaks. Among the various pathogens affecting ornamental fish, viral diseases are particularly challenging due to their high infectivity, rapid spread, and the lack of effective therapeutic treatments.

Viral diseases often result in chronic infections, mass mortalities, and severe economic losses. Unlike bacterial and fungal diseases, viral infections generally do not respond to chemotherapeutic agents, making prevention, early detection, and strict biosecurity measures the primary means of control. Stressful conditions such as overcrowding, poor water quality, genetic weakness, and improper handling increase susceptibility to viral infections.

This manual has been developed to provide comprehensive information on major viral diseases affecting ornamental fishes, their causative agents, clinical signs, and recommended management practices. It is intended as a reference guide for students, ornamental fish farmers, aquarium managers, extension personnel, and hobbyists.

## **Importance of Viral Disease Management in Ornamental Fisheries**

Viral diseases represent a serious threat to the sustainability of ornamental fish culture due to their persistent nature and limited treatment options. Infected fish often become lifelong carriers, serving as reservoirs for disease transmission. Movement of infected ornamental fishes through trade can facilitate the spread of viral pathogens across regions and countries.

The major consequences of viral disease outbreaks include:

- High morbidity and mortality
- Chronic infections leading to poor growth and deformities
- Loss of aesthetic value and market rejection
- Trade restrictions and quarantine issues
- Threats to native fish populations through pathogen introduction



Effective viral disease management relies primarily on preventive strategies such as quarantine, health screening, genetic improvement, and maintenance of optimal environmental conditions.

## **Major Viral Diseases of Ornamental Fishes**

### **1. Lymphocystis Disease**

**Causative Agent:** Iridovirus

**Description:**

Lymphocystis disease is a chronic viral infection caused by an iridovirus that infects connective tissue cells of fish. The disease is more commonly observed in marine and brackish water ornamental fishes, but can also occur in freshwater species. Although mortality is usually low, the disease significantly reduces the ornamental value of affected fish.



**Symptoms:**

- Nodular white to grey swellings on fins, skin, or body surface
- Lesions resembling cauliflower-like growths
- Slow progression of the disease
- Normal feeding behaviour in early stages

**Treatment and Management:**

- No proven chemotherapeutic treatment is available
- Infected fish should be removed and destroyed to prevent the spread
- Maintain good water quality and reduce stress
- Avoid introducing infected fish into healthy stocks



## 2. Iridovirus Disease of Dwarf Gourami

**Causative Agent:** Iridovirus associated with genetic susceptibility

### **Description:**

This disease primarily affects dwarf gourami (*Trichogaster lalius*) and is strongly linked to poor genetic quality resulting from severe inbreeding. The disease has emerged as a major concern in the ornamental trade due to high mortality rates and a lack of effective treatment.

### **Symptoms:**

- Progressive loss of body colouration
- Loss of appetite and reduced feeding
- Muscle deterioration and wasting
- Necrosis of internal organs, particularly the kidney and spleen
- Sudden death in advanced stages

### **Treatment and Management:**

- No cure or effective treatment is available
- Diseased fish should be immediately removed and destroyed
- Avoid purchasing genetically weak or inbred stocks
- Source fish from certified and reputable breeders



### 3. Goldfish Herpesviral Hematopoietic Necrosis Disease (HVHN)

**Causative Agent:** Cyprinid Herpesvirus 2 (CyHV-2)

#### **Description:**

Goldfish herpesviral hematopoietic necrosis disease is caused by a herpes-like virus, Cyprinid Herpesvirus 2. The disease has been reported exclusively in goldfish (*Carassius auratus*) and poses a serious threat to the culture and trade of goldfish.



#### **Symptoms:**

- Lethargy and abnormal resting at the bottom of the tank
- Increased ventilation and rapid opercular movement
- Loss of equilibrium and erratic swimming
- Pale gills or localised pale patches on skin and gills
- High mortality in severe outbreaks

#### **Treatment and Management:**

- No direct chemotherapeutic treatment is available
- A live attenuated vaccine against CyHV-2 has been developed
- Strict quarantine of new goldfish stocks is essential
- Prompt removal and destruction of infected fish

#### **Preventive Measures and Biosecurity Practices**

Since viral diseases lack effective treatments, prevention remains the most reliable control strategy. The following measures are strongly recommended:

- Quarantine new fish for a minimum of 2–3 weeks
- Maintain optimal water quality parameters



- Avoid overcrowding and sudden environmental changes
- Use genetically healthy and disease-free broodstock
- Disinfect tanks, nets, and equipment regularly
- Restrict the movement of fish between systems without proper health checks
- Monitor fish daily for early signs of disease





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