



A Study on Fish Diseases in Freshwater Aquaculture at Siddipet (D) Telangana State, India

Sai Kumar B, Jagadeeshwara Chari T* and Ram Kumar D

Department of MSc Fisheries, Government Degree College, India

*Corresponding author: Jagadeeshwara Chari T, Department of MSc Fisheries, Government Degree College (A) Siddipet, Telangana, India, Email: drtjcou@gmail.com

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Abstract

Similar to other animals, fish can so suffer from various types of diseases. All fish carry pathogens and parasites. Usually this is at some cost to the fish, If the cost is sufficiently high, then the impact can be characterized as a disease. However, disease in fish is not understood well. What is known about fish disease after relates to aquaria fish and more recently to farmed fish. Fish can limit the impact of pathogen and parasites with behavioral or biochemical means and such fish have reproductive advantages. Interacting factors result in low grade infection becoming fatal diseases. In particular things that cause stress such as natural drought or pollution or predators can precipitate outbreak of disease. Fish are exposed from different environment pollutants including drugs and chemicals. The fish can also be infected or damaged by different pathogens micro-organisms or parasites The most common fish disease particularly in fresh water aquarium, include columnaris, gill disease, ick, dropsy, tail and fin-rot fungal infections, white spot disease etc.

Keywords: Disease; Columnaris; Dropsy; Pathogen; Gill Disease; Predators

Abbreviations: SAT: Spot Agglutination Test; IPN: Infectious Pancreatic Necrosis; SVCV: Spring Viremia of Carp Virus; EUS: Epizootic Ulcerative Syndrome.

Introduction

Introduction in to the environment each year, concerns remain reading our understanding of the linkages between exposure to toxic agents and potential disease. Chemical contaminants in aquatic environment is of significant concern because although it is understood that aquatic system serve as major conduits for distribution and deposition of many toxic agents, relatively few methods are available which provide sufficient sensitivity, accuracy and practicality necessary for assessment of

chemical toxicity [1]. As a consequence, new approaches are needed to improve the assessment of chemical toxicity. As a consequence, new approaches are needed improve the assessment of health risks associated with exposure to chemical contaminants in the aquatic environment. Similar to other animals, fish can so suffer from various types of diseases. All fish carry pathogens and parasites. Usually this is at some cost to the fish, If the cost is sufficiently high, then the impact can be characterized as a disease [2]. However, disease in fish is not understood well. What is known about fish disease after relates to aquaria fish and more recently to farmed fish. Fish can limit the impact of pathogen and parasites with behavioral or biochemical means and such fish have reproductive advantages. Interacting factors result in low grade infection becoming fatal diseases. In

particular things that cause stress such as natural drought or pollution or predators can precipitate outbreak of disease. Fish are exposed from different environment pollutants including drugs and chemicals. The fish can also be infected or damaged by different pathogens micro-organisms or parasites. The most common fish disease particularly in fresh water aquarium, include columnaris, gill disease, ick, dropsy, tail and fin-rot fungal infections, white spot disease etc. Among the common fish pathogenic bacteria *Streptococcus*, *agalactiae*, *Lactococcus garvieae*, *Aeromonas hydrophila* cause infectious disease. Therefore, fish may be used as model organism in the experimental pharmacology and toxicology. Disease in fish caused bacteria are most wide spread [3].

Materials and Methods

Microscope, Spot agglutination test kit (SAT), ELISA, strips, molecular probes. Fish disease diagnosis kits and instruments play a crucial role in identification of fish diseases which help for further health management in fishes [4].

Microscope

Microscope used to identify ecto parasites and endo parasites; first we had collected fluid samples and tissues from infected fish, after that prepared a slide for better visibility of specific structure, and like Giemsa stain for blood smears. The prepared slide is placed under microscope for identification of pathogens such as bacteria, fungi, and abnormal cell structures (Figure 1) [5].



Figure 1: Microscope.

Spot Agglutination Test Kit (SAT)

Spot Agglutination Test Kit are commonly used for rapid fish disease identification, antigen coating we have to coat the wells of a microtiter plate with specific antigens related

to the suspended pathogen. The sample gets clumped in the presence of specific pathogen in sample (Figure 2) [6].



Figure 2: Spot Agglutination Test Kit.

ELISA

We have to collect the samples from the fish, such as blood, mucus, or tissues, depending on the disease being investigated. The collected samples are tested with related antigens or antibodies. Apply the prepared fish sample to a microtiter plate. The sample is typically immobilized on the plate to act as the antigen, adds a blocking agent to prevent non-specific binding on the plate. Introduce a specific antibody or antigen that will react with the target pathogen. This can be a known antibody for detecting the presence of a pathogen or an antigen to detect the presence of specific antibodies in the fish sample. Apply a substrate that the enzyme will convert, resulting in a measurable color change. The intensity of the color is proportional to the amount of bound enzyme. Measure the color change using a spectrophotometer. This provides quantitative data about the presence and concentration of the target antibodies or antigens. Determine the presence or absence of specific antibodies or antigens in the fish sample based on the colorimetric readings (Figure 3) [7].



Figure 3: ELISA.

Diseases Identified During Our Examination (Table 1)

S. No	Disease Type	Disease Name	Causative Agent
1	Bacterial	Dropsy	Pseudomonas punctata
		Ulcer	Aeromonas , pseudomonas
		Fin & tailrot	Aeromonas,pseudomonas,flavobacterium
2	Viral	Infectious pancreatic necrosis (IPN)	Birnavirus
		Spring viremia of carp virus (SVCV)	Rhabdovirus , Spring viremia
3	Parasitic	Argulosis	Argulus , crustacean larvae
		Lemaecosis	Anchor worm, crustacean larvae
		Gill fluke (Dactylogyrus)	Dactylogyrus
4	Protozoan	Whirling	Myxobolus cerebralis
		Dermatomycosis	Saprolegnia, achyla
5	Fungal	Epizootic Ulcerative Syndrome (EUS)	Aphanomyces invades

Table 1: Diseases Identified During our Examination.

Dropsy

In fish, dropsy is a symptom rather than a specific disease. It's characterized by the swelling or bloating of the fish's body due to an accumulation of fluids. It's often associated with internal issues such as organ failure or infection. If you notice dropsy in a fish, it's crucial to address the underlying cause, which may involve isolating the affected fish, adjusting water conditions (Figure 4) [8].



Figure 4: Dropsy.

Ulcer

Ulcer disease in fish is a condition characterized by the presence of open sores or ulcers on the skin, often around the head, fins, or body. It can be caused by various factors, including bacterial infections, parasites, and environmental stressors. Common bacterial pathogens associated with fish ulcer disease include *Aeromonas* and *Pseudomonas* species (Figure 5) [9].



Figure 5: Ulcer.

Fin & Tail Rot

Fin and tail rot in fish is a condition characterized by the deterioration or rotting of the fins and tails. It is commonly caused by bacterial infections, with species like *Aeromonas* and *Pseudomonas* being frequent culprits. Poor water quality, stress, and injuries can contribute to the development of fin and tail rot (Figure 6) [10].



Figure 6: Fin and tail rot.

Infectious Pancreatic Necrosis (IPN)

Infectious Pancreatic Necrosis is a viral disease affecting fish, causing necrosis in the pancreas and other organs. It's caused by the IPN virus, part of the Birnaviridae family. Prevention involves strict biosecurity measures and vaccination in aquaculture (Figure 7) [11].



Figure 7: Infectious Pancreatic Necrosis.

Spring Viremia of Carp (SVC)

Spring viremia of carp is a viral disease that affects various species of carp, including common carp and koi. The causative agent is the spring viremia of carp virus (SVCV), which is a Rhabdovirus. This disease is characterized by high mortality rates, especially in young fish. Symptoms include lethargy, erratic swimming, hemorrhages, and inflammation of internal organs. SVC is often more severe during cooler water temperatures, such as in spring and fall (Figure 8) [12].



Figure 8: Spring viremia of carp.

Argulosis

Argulosis also known as the common fish louse/lice, is a species of fish lice in the family Argulidae. It is "the most common and widespread native argulid in the Palaearctic" and "one of the most widespread crustacean ectoparasites of freshwater fish in the world", considering its distribution

and range of hosts. It can cause the severe disease state argulosis in a wide variety of fish species. It is responsible for epizootic outbreaks that have led to the collapse of aquaculture operations (Figure 9) [13].

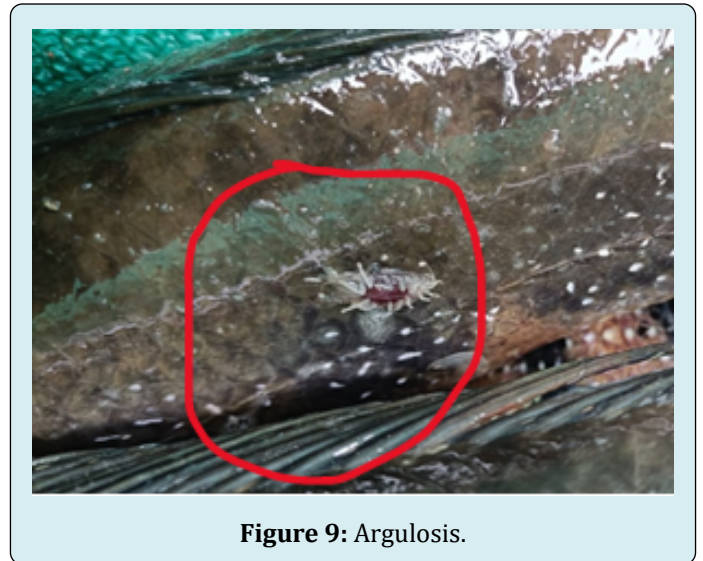


Figure 9: Argulosis.

Lemaecosis

"Anchor Worm" disease. It's a parasitic infection caused by a type of crustacean. Anchor worms attach themselves to fish, leading to irritation, tissue damage, and secondary infections. Treatment typically involves physical removal or chemical interventions in a separate quarantine tank (Figure 10) [14].

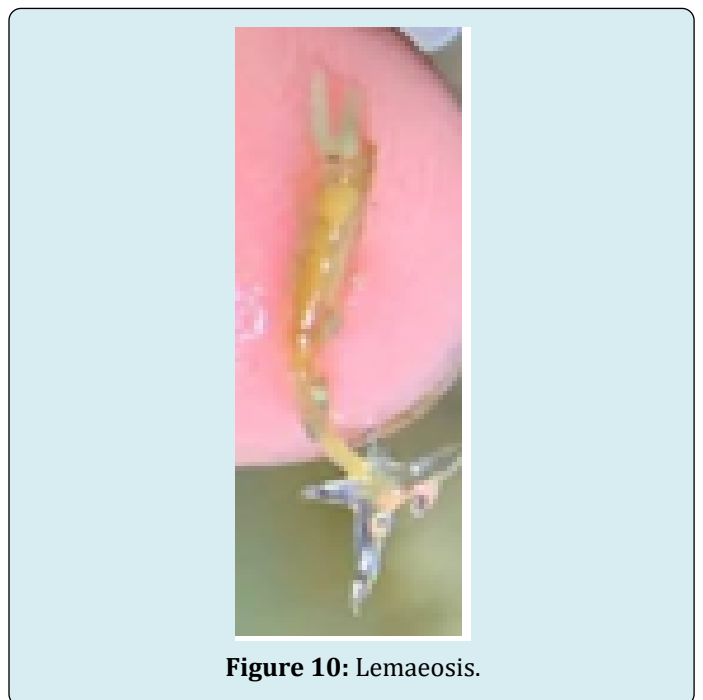


Figure 10: Lemaecosis.

Dactylogyrus

Dactylogyrus commonly known as gill flukes is a parasitic flatworm that can affect fish. These microscopic parasites attach themselves to the gills of fish, causing irritation and damage. Infected fish may exhibit signs like rapid gill movement, lethargy, and reduced feeding (Figure 11) [15].

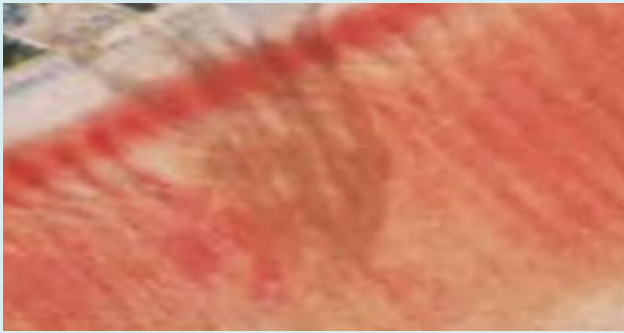


Figure 11: Dactylogyrus.

Whirling

Whirling disease is a parasitic infection in fish caused by the microscopic parasite *Myxobolus cerebralis*. This parasite primarily affects salmonids, such as trout and salmon. The infection can lead to skeletal deformities and damage to the nervous system, causing affected fish to swim in a whirling or corkscrew-like manner (Figure 12) [16].



Figure 12: Whirling.

Dermatomycosis

Dermatomycosis, also known as fungal infections, can affect fish and is caused by various types of fungi. These infections often occur when fish are stressed or have compromised immune systems. Symptoms include skin lesions, discoloration, and changes in behavior (Figure 13) [17].



Figure 13: Dermatomycosis.

Epizootic Ulcerative Syndrome (EUS)

Epizootic Ulcerative Syndrome (EUS) is a disease that affects fish and can result in skin lesions, ulcers, and tissue damage. It is caused by the water mold *Aphanomyces invadans*. EUS tends to occur in warm freshwater [18].

Result and Discussion

The Fish Samples are Collected From Different Ponds and Fish Farms from Siddipet District During Our Examination And This Study Period We Have Identified These Disease by performing some test like examination under microscope, dot ELISA test, spot agglutination test, and confirmed the disease by mode of infection and causative agent, Many of Aquaculture Farmers are Facing Problems with These Specific Diseases (Figure 14) [19-24].

TYPES OF DISEASE DISTRIBUTION

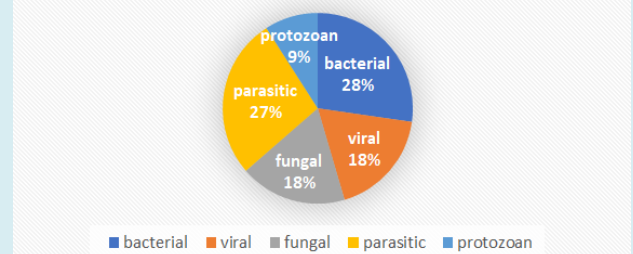


Figure 14: Types of disease distribution.

During this investigation we had find (03 diseases from bacterial infection), (02 diseases from fungal infection), (03 parasitic infection), (01 protozoan infection), (02 viral infection).

Conclusion

We here by conclude that the disease outbreaks are more in the Siddipet district area, Mostly We Have Identified There Is More Domination of Bacterial and Parasitic Disease Like, Epizootic Ulcerative Syndrome (EUS), Fin and Tail Rot, Argulosis, Lemaecosis, Branchiomycosis, Dactylogyrous. Better management practices can result in good production, maintaining water quality parameters and regular using of disinfectants during fish handling and stocking, Will run successful culture [24-28].

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