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Fresh-water fish diseases in North Bengal region, specially Jalpaiguri district, West Bengal, India

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Abstract
On a recent times fish disease are creating alarming situation in fish production not only in India but worldwide also. Fish diseases are very much common in fresh and marine water. Fresh water fishes are very much essential source of protein, vitamins, minerals, macro and micro-nutrients for all mankind. The present study emphasis the several fish diseases in North Bengal region, Specially Jalpaiguri district, West Bengal, India. All fishes are carried pathogens further which may cause diseases. Fish disease is a main key which directly decreasing fish mortality rate in juvenile stage and create problem our fish diversity. Common fresh-water fish diseases are Tail -Fin rot, Dropsy, Exophthalmos, Mycobacteriosis, Pox infection, Folic-acid Deficiency etc. Because of water and arsenic pollution, a large amount of virus, bacteria and protozoa affect fish body. Now my present study highlights the definite causes of several fish diseases, their symptoms and control measure.

Keywords: fish disease, pathogens, parasite, treatment and control measure

Introduction
North Bengal, Specially Jalpaiguri district is rich in fish diversity. Almost human or other animals like fish can also suffer from several diseases. All fishes are carried pathogens and parasites. In recent times fish diseases play a main factor in fish production in Jalpaiguri district as well as North Bengal. Although marine water is far away from North Bengal region Jalpaiguri district is fully cover with fresh-water stream and river. Lish River, Gish River, Chel River, Neora River, Jaldhaka River, Karala River, Diana River, Bindu Barrage, Gajoldoba Barrage and some Tribal area village pond in Jalpaiguri district which helps in freshwater fish production. Still now every year fish diseases hampered the production rate. Basically, the disease is transmitting from affected one to a new fresh one fish body. The common fresh-water fish diseases are Dropsy, Hydrophilus etc. The present study is totally based on primary and secondary data resource. Such as several Research Paper, Review Paper and filled work study.

Methods and Materials
Study Area
The study is based on present freshwater fish disease in North Bengal region, specially Jalpaiguri district, so the study covered a majority portion of Jalpaiguri district. For this study, I choose major River such as Lish River, Gish River, Chel River, Neora River, Jaldhaka River, Karala River, Diana River and also covered different Tribal area village pond Under Nagrakata block, Kranti block, Rajganj block which also located in Jalpaiguri district.

Frequent diseases arising in fish
Primarily we know that fish diseases are of two types – infectious disease and non-infectious disease. Infectious diseases caused by several Bacteria, Virus, Fungi types of pathogen and Non-infectious diseases caused Vitamin deficiency symptoms. My study highlights the possible cause of fish disease and mark out their body symptoms.
In Jalpaiguri district region some notable infectious fish diseases are – 1.) Fungal, 2.) Viral, 3.) Protozoan, 4.) Bacterial, 5.) Helminth and non-infectious disease are – 1.) Vitamin – C deficiency, 2.) Vitamin – D deficiency, 3.) Folic Acid deficiency, 4.) Pantothenic Acid deficiency. Further I have been discussed in detail in this study.

Results and Discussion
Infectious diseases
The common infectious fresh-water fish diseases are described in below

Fungal diseases
There are two types of fungal disease observed in Jalpaiguri district freshwater fishes. They are described in below -

a. **Branchiomycosis:** Branchiomycosis is a fungal disease which is caused by *Branchiomyces sanguinis*. It grows mainly in the gill arches of blood vessels (Meyer, F.P) [6]. It also affects the gill filaments and gill lamellae. Fungi spores generally transmitted by water to gills. Diagnostic features are – at first fish become weak, do not swallow the air, gills become reddish, gills appeared striated, body tissue getting dried (Klinger R.E) [5].
b. **Saprolegniasis:** Saprolegniasis is another type of fungal disease which is very much common in Jalpaiguri district. It is caused by *Saprolegnia Parasitica* (Klinger R.E) [5]. It is a typical water molds which infected freshwater fish and fish eggs. Diagnostic features are – skin becomes white, pectoral and pelvic fins and eyes becomes greyish in nature (Idowu TA) [3]. Scales are uplifted totally.

Viral diseases
Basically, four types of viral diseases occurred in North Bengal region specially in Jalpaiguri district fresh-water fishes. Viral diseases are quite common in monsoon season. They are -

a. **Pox infection:** Pox is one of the most common viral disease which is caused by *Herpes* virus infection. It is specially affecting koi (*Cyprinus sp*) and singi

(*Heteropneustes sp*) fish. Diagnostic features are – mucus secretion starts from gills and skin of the infected fish; gill tissue fully deteriorate, and lastly breathing problem occur (Reno P.W.) [9].

b. **Lymphocystis:** It is a most common monsoon disease for fresh-water fishes. It is caused by *Lymphocystis* virus. Diagnostic features are – enlarge eyes, body and skin growth decreases, body turn into whitish colour.
c. **Necrosis:** Necrosis is caused by Betanodavirus. It can infect fishes winter season when the temperature of the river water is too low. Diagnostic features are – abnormality in larval stages, swelling of the swim bladder (Reno P.W) [9].
d. **Hemorrhagic Septicemia:** Hemorrhagic septicemia is a viral disease which is caused by Hemorrhagic septicemia virus. It is common in Jalpaiguri district majority rivers. Mostly affected the juvenile stage fishes. Diagnostic features are – gills, fins turned into pale, internal organ start rotting (Reno P.W) [9].

Protozoan diseases

In Jalpaiguri district most of the fresh-water river fishes observed three types of protozoan diseases. They are discussed in below -

a. **Coastiasis:** Coastiasis is a protozoan disease which is caused by *Costia necatrix*. Diagnostic features are – body skin purple-bluish, fins totally degenerate, respiratory distress, swollen mouth and large eyes (Bowser PR.) [2].
b. **Epistylis:** Another common protozoan disease is Epistylis, caused by *Heteropolaria colisarum*. It generally transmitted from one catfish to another catfish. It also known as catfish disease. Diagnostic features are – on a front view of lateral line grey spot observed, swim capability losses, gills have fungal growth (Reno P.W.) [9].
c. **Trichodiniasis:** Trichodiniasis is a protozoan disease, caused by *Trichodina truttae*. This disease is very much common in North Bengal. Body colour generally turn into pale and sometimes it may be bluish. Diagnostic features are – frazile fin ray, respiratory distress, enlarge eyes (Bowser PR.) [2].

Bacterial diseases

Generally in North Bengal region, especially in Jalpaiguri district freshwater fishes possesses six types of protozoan diseases. They are

a. **Dropsy:** Most common freshwater bacterial disease is known as Dropsy. Due to the inappropriate functions of kidney. Generally, some bacteria affect to the kidney and disbalance remove of excess water during hypotonic environment. Diagnostic features are – swollen gills and urinary tract, reddish dermal line, belly swollen and slightly oval (Austin B) [1].
b. **Hydrophilus:** Hydrophilus caused by *Aeromonas hydrophila*. It is also known as fish blood disease. Commonly occur in monsoon season. Diagnostic features are – formation of tumor in dermal lining, devoid abdomen (Austin B) [1]. Common examples – Catla, Mrigala, Catfish.
c. **Fin and Tail rot disease:** It is caused by *Pseudomonas sp*. bacteria (Reno P.W.) [9]. It is infected juvenile stage and adult stages fishes. Diagnostic features are – fin ray distorted; body bulb shaped.
d. **Exophthalmos:** It is caused by *Aeromonas punctata* type of bacteria. Diagnostic features are – vascularized eyeball and cornea. It is quite common in Catla and Rohu (Tripathi YR) [10].
e. **Cold water disease:** Cold water disease is very much common in north Bengal region which is caused *Flavobacterium psychrophilia*. Generally affected newborn fish or larval stages fishes. diagnostic features are – pelvic and caudal fin eroded, mouth shrinkage (Pridgeon. JW) [7].
f. **Mycobacteriosis:** Another fresh-water bacterial disease named Mycobacteriosis which is caused by *Mycobacteria chelonian*. It is also known as fish tuberculosis disease. The disease is observed on month April to mid-August month. Diagnostic features are – skin ulcers and shedding of the scales (Reno P.W.) [9].

Helminth diseases

Dactylogyrus is the parasite which responsible for helminth disease in freshwater fishes. It infects Koi and Singi fishes. Generally, body of the fishes turned into pale colour, drowsiness, breathing problem are primarily symptoms of that disease (R.L. Dhar) [8].

Non-infectious disease

Generally, in Jalpaiguri district area four types of non-infectious freshwater fish diseases are observed. They are discussed in below

Vitamin - C deficiency disease

Common fresh-water noninfectious disease is Vitamin – C deficiency disease (Kabata. Z) [4]. Some host fish species are *Channa punctatus*, *Mystus tengra*, *Batasio batasio*. Diagnostic features are –

Channa punctatus – fin erosion, distorted gill, dark patches club shapped gill lamellae.
Mystus tengra – operculum short, low growth.
Batasio batasio – fin distorted, body pale in colour, incapable of lay eggs.

Vitamin – D deficiency disease

It is another kind of deficiency of Vitamin – D (Tripathi YR) [10]. Some host fish species are *Barilius Barila*, *Puntius ticto*, *Catla catla*. Diagnostic features are –

Barilius Barila – reduced growth, bone distorted, shedding of scales.
Puntius ticto – dystrophy muscles, shedding of fins.
Catla catla – large eyes, shedding of scales.

Folic acid deficiency disease

Clarias batrachus, *Mystus tengra* are common host species where Folic acid deficiency occurred (Tripathi YR) [10]. Diagnostic features are -

Clarias batrachus – reduced growth, pale in body colour, inability of proper breathing.
Mystus tengra – low growth, body bluish, skeletal deformity, poor feeding in nature.

Pantothenic acid deficiency disease

It is another type of non-infectious disease which caused by deficiency of Pantothenic acid. Here some of the host species name are – *Channa punctatus*, *Puntius phutunio* (Tripathi YR) [10]. Diagnostic features are –

Channa punctatus – reduced growth, skin erosion, dark

patches, clubbed gills.
Puntius phutunio – feeding abnormality, bulb shape head, secretion of mucous.

Prevention and Therapy of Fish Diseases
Nature give every animal defensive support to prevent the disease and pathogen. Likewise, fish have also first line defensive barrier to prevent parasites, diseases and pathogens. So, in my present study highlight that what is the remedial steps needed to overcome the diseases like – viral, bacterial, protozoan and fungal. They are discussed in below –

Prevention and therapy of fungal diseases
If the Branchiomycosis disease is present uses formalin and copper sulphate have been used to stop mortality rate, pond should be dried and uses calcium oxide, copper sulphate at 3-4kg (Klinger, R.E) [5]. In case of Saprolegniasis disease used potassium permanganate, formalin and iodine solutions. Otherwise NaOH treated with 15-30gm/lit for 20- 25min (Klinger, R.E) [5].

Prevention and therapy of viral diseases
Here four types of viral diseases show in Jalpaiguri district river fishes. Generally, no such remedial measures are present for Pox infection, Lymphocystis and Necrosis diseases (Reno P.W) [9]. Best way to prevent the viral pathogen infection from spreading is to remove the fish and fish debris.

Prevention and therapy of Protozoan diseases
For Costiasis disease 2-3% common salt solution mixed into the water for 12-15min (Bowser, PR) [2]. In case of Trichodiniasis disease copper and calcium oxide is good compound which has direct impact of protozoan pathogens (Bowser, PR) [2].

Prevention and therapy of Bacterial diseases
In case of fin and tail rot diseases, 2-minute dip treatment in 600ppm copper sulphate solution. For dropsy disease, dip treatment in 7ppm sodium and potassium permanganate solution for 3 minutes (Bowser, PR) [2]. In case of cold-water disease and exophthalmos uses chlormycetin and euchromycetin 10-12 mg/litre for two minutes 3-5 days. For hydrophilus disease can treated by the ammonium chromide compounds (Bowser, PR) [2].

Prevention and therapy of Helminth diseases
Generally helminth disease is observed in Jalpaiguri district freshwater all river fishes. For Dactylogyrus the water treated with formaline. It kills all parasites, their eggs, and juvenile larvae also (R. L. Dhar) [8].

Conclusion
My present study totally based on Jalpaiguri district fresh-water river fish disease and the total study covered different river system and different tribal areas village ponds. In a recent times river are getting more polluted than past 5-7 years. Due to this pollution rivers getting mild toxic and pathogens grow rapidly. In fresh-water rivers fish disease cannot control but in tribal areas village pond diseases can control or treatment by a proper step. Government should monitor the river areas properly, always should be clean at the river ecosystem. In tribal areas village farmers must improve management skills and to prevent the disease problems.

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