



Fungal infection in freshwater fishes from Purna River, Jafrabad, Dist. Jalna (Maharashtra)

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Abstract

Fungal infections are a significant threat to freshwater fisheries, causing substantial economic losses and impacting fish health. This study aimed to investigate the prevalence and diversity of fungal infections in freshwater fishes from the Purna River, Jafrabad, Dist. Jalna. A total of 98 fish samples were collected and examined for fungal infections. The results showed a prevalence of 45.45% fungal infection, with *Aspergillus niger* being the most common. The study highlights the importance of monitoring fungal infections in freshwater ecosystems and provides insights into the fungal pathogens affecting fish populations in the Purna River.

Keywords: Fungal infection, fishes, Purna River, Jafrabad

Introduction

Freshwater fisheries play a crucial role in supporting the livelihoods of communities dependent on aquaculture. However, fungal infections are a major concern, causing disease outbreaks and economic losses. Diseases in freshwater fishes are a great threat to achieve optimum production and become a limiting factor to economic success of aquaculture. Fungi which are responsible for a number of diseases are present in fresh water. Fungal infections are mainly caused due to immune suppression. Fungi can attack fishes of all the ages and it can also prevent successful hatching when it invades fish eggs. The majority of fungal infections that affect freshwater fish primarily happen in the winter. High stock populations, inadequate habitat, and low water quality are examples of stressors. As a result fish become more susceptible to diseases (Khulbe and Bhargava, 1977; Hossain and Paul, 1993; Muniruzzaman and Chowdhury, 2008) [7, 12, 14].

Within the aquatic fungi, species of *Oomycetes* have special importance because of their impact on fish health (West, 2006). In addition, many workers (Sati, 1991; Chauhan and Qureshi, 1994; Qureshi *et al.*, 2002) [4, 15, 17, 18] have also reported that fungi belonging to *Saprolegnia*, *Pythium*, *Aphanomyces*, *Dictyuchus* and *Achlya* are some of the most virulent parasites. The Purna River, Jafrabad, Dist. Jalna, is an important freshwater ecosystem supporting a diverse range of fish species. Despite its importance, there is a lack of information on fungal infections in fishes from this river. Therefore present study has been aimed to isolate, identify the fungi which cause disease in fish and the seasonal variation and percentage of infection of fishes were analyzed.

Materials and Methods

Six economically important fish species samples were collected with the help of fisherman in sterile polythene bags in aerated water from Purna River, Jafrabad, Dist. Jalna during June 2023 to May 2024 and transported immediately to departmental laboratory for mycological study. The fishes were kept separate in glass aquarium with continuous air supply at ambient temperature. A total of 65 fish samples were examined for fungal infections. Isolation

of fungi from infected fishes were carried out by taking small pieces from muscles about 2mm in diameter from different portions of body and washed thoroughly with distilled water. These tissues were then inoculated over plates containing different culture media viz., Potato Dextrose Agar medium (Peeled potato-250gm, Dextrose-20gm, Agar-15gm, Distilled 1000ml), Richard's medium (Potassium nitrate 10gm, Potassium dihydrogen phosphate 5gm, Magnesium sulphate 2.50gm, Ferric chloride 0.02gm, Sucrose 50gm, Distilled water 1000ml) and Czapek-Dox Agar medium (Agar 15.0gm Sodium nitrate 2.0gm, Potassium dihydrogen phosphate 1.0gm, Magnesium sulphate 0.5gm, Ferrus sulphate 0.01gm, Sucrose 30.0gm, distilled water 1000ml). Streptomycin (50mg/l) was added in the medium to avoid bacterial contamination. These tissues were then inoculated over plates containing on Potato Dextrose Agar medium for 5-7 days of incubation at a temperature ranging between 26°C to 30°C in the incubator was provided to the different isolated fungi.

Identification of isolated fungi

Identification and characterization were made by observing the colony colour and texture. The prepared slides compared with the authentic manuals of fungi. (Coker 1923; Khulbe, 1995; Bilgrami *et al.*, 1991^[2, 5, 11]; Jamaludiin, 2004). The percentage of frequency of fungal species occurrence was calculated as follows:

Percentage of Frequency of Species =

$$\frac{\text{Average number of total colonies of species in one plate}}{\text{Average number of total colonies of all the species in one plate}} \times 100$$

Results and Discussion

In the present study, total 98 fishes were examined out of which 29 were found to be infected with fungal diseases. Mostly five species of fishes viz: *Labeo calbasu* (37.5%), *Catla catla* (20.0%), *Cirrhinus mrigala* (15.38%), *Channa punctatus* (45.45%), *Labeo rohita* (22.22%), *Channa gachua* (28.57%), were found infected are shown in Table 1. These fishes shows fungal infection with typical clinical symptoms such as de-coloration of body, de-scaling and exposure of epidermis, fungoid patches on body, lesions and ulcerations. *Aspergillus sp.* was the most prevent fungus

represented by three spp. Similar symptoms have been reported by (R.D.Khulbe and S.C Sati, 1981, Hatai, K. and G.Hoshaiai 1992 and K.Hatai *et al*, 1994) [6, 10, 13]. Amongst the various *Aspergillus fumigate*, *Aspergillus niger* and *Aspergillus nidulans* was the most dominant sp. It was followed by *Alternaria tenuis*, *Saprolegnia ferax*, *Allomyces anomalus*, *Rhizopus* sp, *Saprolegnia parasitica*, *Achlya proliferata* and *Neurospora* sp. and minimum frequency was observed by *Penicillium* sp. (T.A.Qureshi *et al*, 2002, R.J.Roberts *et al*, 1993 and K.Hatai *et al*, 1994) [10, 15, 16] Also reported pathogenicity of same on fishes.

Table 1: Incidence Percentage of fungal infected fish species during study period

Sr. No.	Fish Species	No. of fish observed	No. of Fish infected	Incidence %
01	<i>Labeo calbasu</i>	16	06	37.5
02	<i>Catla catla</i>	15	03	20.0
03	<i>Cirrhinus mrigala</i>	13	02	15.38
04	<i>Channa punctatus</i>	22	10	45.45
05	<i>Labeo rohita</i>	18	04	22.22
06	<i>Channa gachua</i>	14	04	28.57

During the study period three genera of fungus such as *Aspergillus* sp, *Achlya* Sp. and *Penicillium* Sp. were identified from dermal lesion, gill of the studied infected fish specimens where *Saprolegnia* and *Achlya* were associated with ulcer type disease of lesion and *Penicillium* S. was associated with gill rot disease. All types of pathogenic fungus were identified from, *L. rohita*, *C. catla*, *C.mrigala*. *Aspergillus* sp and *Penicillium* Sp were identified from *C.punctatus*. *Achlya* Sp. and *Branchiomyces* were isolated from *Cirrhinus mrigala*. *Aphanomyces* and *Branchiomyces* were isolated from *Labeo calbasu* and only *Saprolegnia* was isolated from *Channa gachua*.

In the present study, it was observed that the freshwater fishes of Purna river species suffer from three types of fungal diseases including *Aspergillus*, *Achlya* Sp and *Penicillium* Sp were found during the study period. Among them *C. punctatus* and *L. calbasu* were most infected species. It is almost similar with Alam *et al*.(2003) [1] who found that *C.mrigala* and *C.striatus* were most severely infected fishes.. Maximum infected fishes were observed during the month of October due to suitable temperature and minimum in June. Some species like *Alternaria tenuis*, *Rhizopus* sp. And *Verticillium* sp. were obtained in low counts in infected fishes. Some other fungi like *Mucor*, *Penicillium*, and *Saprolegniasis* showed a progressive increase in the month of August and September. Besides above mentioned fungal members some sterile hyphae without fruiting body were also observed. Jewel and Affan (2003) [9] found that *Aphanomyces* sp. and *Saprolegnia* sp. were common pathogens in *L. rohita*, *C.catla*, *P.gonionotus* and *C. punctatus*. Bruno and wood (1994) [3] stated that *Saprolegnia* sp.has great impact on aquaculture especially it can infect carp and *Tilapia* which strongly supported the present study. It was observed that *Branchiomyces* sp. recovered from affected gill of the infected fish species which caused the gill rot disease. The findings of this study are consistent with previous reports of fungal infections in freshwater fishes. The prevalence of fungal infection highlights the need for regular monitoring and management of fungal diseases in freshwater fisheries.

Conclusion

The study provides insights into the fungal pathogens affecting fish populations in the Purna River. From the survey and histopathological findings, *Channa punctatus* was the most severely affected species, followed by *Labeo calbasu*, *Channa gachua*, *Labeo rohita*. *Catla catla* and *Cirrhinus mrigala* was the least affected species. Regular monitoring of water quality, fish health and management of fungal diseases are essential to prevent economic losses and ensure the sustainability of freshwater fisheries of Purna River.

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