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INCIDENCES OF MYCOFLORA INFECTIONS IN *CHANNA PUNCTATUS* AND *CHANNA STRIATUS* OF BHANDHAM LAKE OF, WARANGAL, TELANGANA, INDIA

Koteshwar Rao. Podeti[1] and Benarjee. G*[2]

Fisheries Research Laboratory, Department of Zoology Kakatiya University – 506 009.

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***Correspondence for Author**
Benarjee. G
Fisheries Research Laboratory, Department of Zoology Kakatiya University – 506 009.

ABSTRACT

Control and infected *Channa punctatus* and *Channa striatus* were collected from Bhandham Lake of Warangal for the present study during the July 2012 to June 2014. The control and infected fishes brought to the laboratory and examined infected fishes; they were identified from red spots on their body, eroded scales, damaged skin and sluggishness. The aim of the present study was investigate mycological infections in commercial fresh water fishes of *Channa punctatus* and *Channa striatus.* Isolation of fungi was obtained from infected fishes exhibited seven different fungal infections. The fungal infected tissue was cultured on suitable culture media and the microscopic observations showed the presence of fungal species like *Aspergillus fumigatus, Aspergillus niger, Aspergillus flavus, Rhizophuus stolonifer, Penicillium chrysogenum, Fusarium solani* and *Trichoderma harzianum.* All these fungi were isolated from *C. punctatus* and *C. striatus.*

KEYWORDS: *Channa punctatus, Channa striatus, Fungal infection, Red spots.*

INTRODUCTION

Air breathing fishes are of the most important groups of vertebrates which provide free economic services to human beings in different ways. In the world fish production India ranks third (2010). Bacterial, Fungal, Parasitic and Environmental infections in fishes causes the damages on various parts of the body (Refai *et, al.*, 2010). Specifically fungal infection in fishes is harmful to Fisheries and Aquaculture. In India, the Incidence of disease has been observed in major carps cultured in the country. (Gopalakrishnan V. 1964). Stressed and poorly fed fishes are more susceptible to fungal infection (Siddique *et, al.*, 2009). Fungus has

been reported to cause serious diseases in Estuarine and fresh water fishes in Australia Japan and through out of South Asia (Koeypudsa W. *et, al*., 2005). Fungal diseases are the second most serious cause of losses in Aquaculture (Mayer 1991). Fungal disease in Coho Salmon (Oncorhynchus kisutch) caused 50% annual mortality (Ramaiah 2006) and Das S.K, Kmumu 2012). The effect of these infections on sizes in fresh water ecosystem. In India fishermen is facing serious problems with fungal diseases. Therefore diseases cause high mortality, which results in economic losses. (Pachade G. R *et, al*., 2014). The study of fungal infections in fresh water fish is of great significance as it would be helpful in knowing the diversity and life cycle of fungus parasitic and saprophytic on the fresh water fish. The pathogenesis of *Aspergillus fumigatus* and *Aspergillus niger* have been reported in fresh water fishes by (Myiazaki T. and S. Egusa1972), (Olufemi B.E 1983), (Qureshi TA *et, al.*, 2001), (Raper KB *et, al*., 2010), (Roberts RJ 1989), (Chauhan*et, al*., 2014a). Therefore, the study was under taken on fungal infections in locally available fresh water edible fishes.An aquatic ecosystem (habitats and organisms) including the rivers and streams, ponds and lakes, oceans and bays and swamps and marshes and their associated animals. (Manikandan B. *et, al*., 2012). The aim of present study was to assess the presence of pathogenic fungi on *Channa punctatus* and *Channa striatus* reared in earthen lakes and research fish farms in Warangal district.

MATERIAL AND METHODS

Bhandham Lake was selected for the study of fungal infections on the fresh water Murrel fishes. Bhandham Lakeis located in Warangal, Telangana, (India). Control and infected fishes were collected from Bhandham (L- 79^0 30’ 00” Eand 17^0 58’ 0” N) Lake for the present study.

COLLECTION OF FISHES AND SAMPLING TECHNIQUES

The control and infected *C. punctatus* and *C. striatus* were collected randomly every week at regular interval from the study area with the help of fishermen. The infected fishes were identified from red spots on their body, excess mucus secretions, damaged and infected gills and their sluggishness. Infected fishes were studied during 2012 to 2014. For further clinical examinations like isolation and their morphotaxonomy fishes were brought to the laboratory and kept in medium aquaria (24x9x9) inches.

ISOLATION OF FUNGI

A small block of tissue was removed from the lesion and culture media for the isolation of fungus. Potato Dextrose Agar (PDA); Corn Meal Agar (CMA) were used as amedia in to the

Petri dishes. The tissue blocks were transferred in to the other set of petridishes. Petri dishes were placed inverted in incubator at(25^0C to 28^0C) for three daysuntil a circular fungal mat developed, which were used for sub culture of the fungus.Identification of fungi was carried out on the basis of keys of (Raper, 1965, Refai *et, al*., 1987, Willoughby 1994, Shrivastava 2009).

INCIDENCE OF FUNGAL DISEASES

Fungi from infected fishes were identified with help of charectrs and mesurements of fruiting bodies, color, shape, size and attachments of conidia with relevantliterature. Incidence of fungal disease of infected fishes was calculated by following formula:

Incidence (%) = (No. of fish Infected/ No. of fish Examined) x 100.

RESULTS AND DISCUSSION

During the present study period total (2460) fishes were examined, out of which 372 fishes were found to be infected by fungi and thus the incidence of infection observed was (15.2%) of the total fishes observed (Table 1).Fungal infection was studied in *C. Catla*three types of genera like *Aspergillus sp, Blastomycetes sp* and *Pencillium sp* were isolated from head, opericulum, eye, buccal cavity, obdomen, skin and gills of *C. Catla Aspergillus sp* was the most prevalent fungus infecting all the organs of *C. Catla* followed by *Blastomycetes sp* and *Pencillium sp*. (Zafar Iqbal and Saria Saleemi 2013). During study period out of *C. striatus* (174) and *C. punctatus* (198) fishes were infected (30.55%). Clinical signs of fungal infection were more severe in the month of October, November, December and January, where as in the month of March and April most fishes were not infected and were control.

Table 1:Fungal infected fish species and their incidence during the study period (2102-2014).

S.No	Name of the Fish	Total No. of Fishes observed	Total No. of Fishes Infected	Incidence (%)
1	***Channa punctatus***	1138	198	17.39
2	***Channa striatus***	1322	174	13.16
3	**Total**	2460	372	15.12

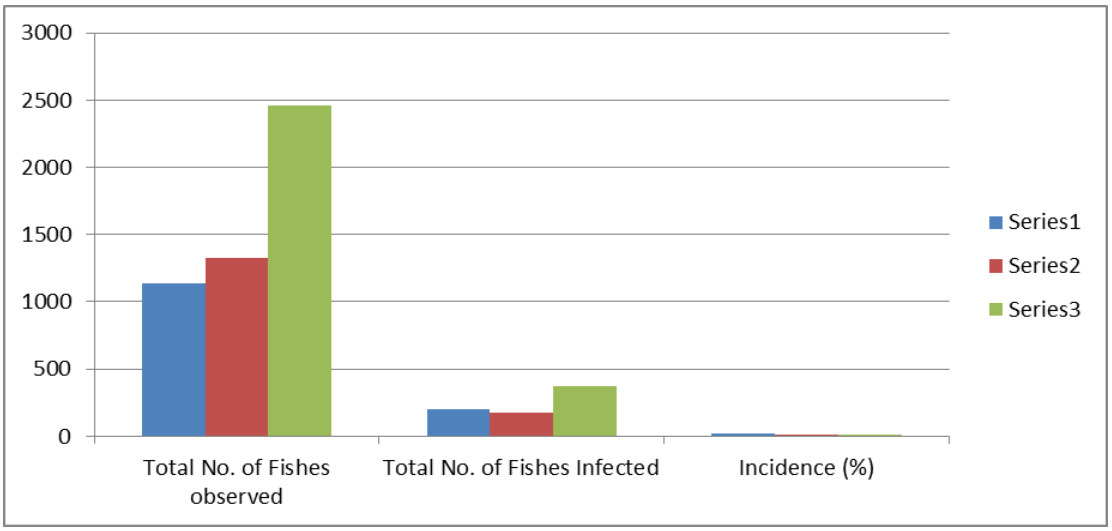

Fig 1 Fungal infected fish species and their incidence during the study period (2102-2014).

FUNGAL IN FECTIONS

The incidences of fungal infections in *C. punctatus* and *C. striatus* reported during present investigations are shown in the (Table-2& 3).

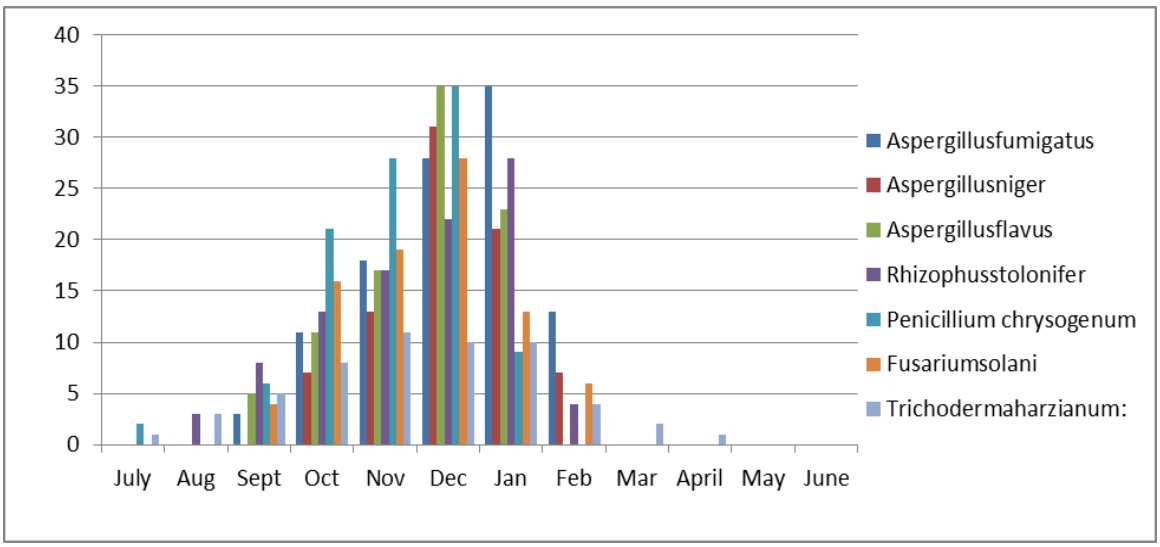

Fig 2 Average incidence of infection by fungal species (%) on *Channa punctatus* during the study period (2012- 2014).

Aspergillus fumigatus

The infection of *Aspergillus fumigates* in the fishes was very common during the present study of *A. fumigatus* was more during November to January in *C. punctatus* and in the *C. striatus A. fumigates* was more during September to January. However thesefungi were reported even up to February. It was not reported in *C. straitus and C. punctatus* during April to June.

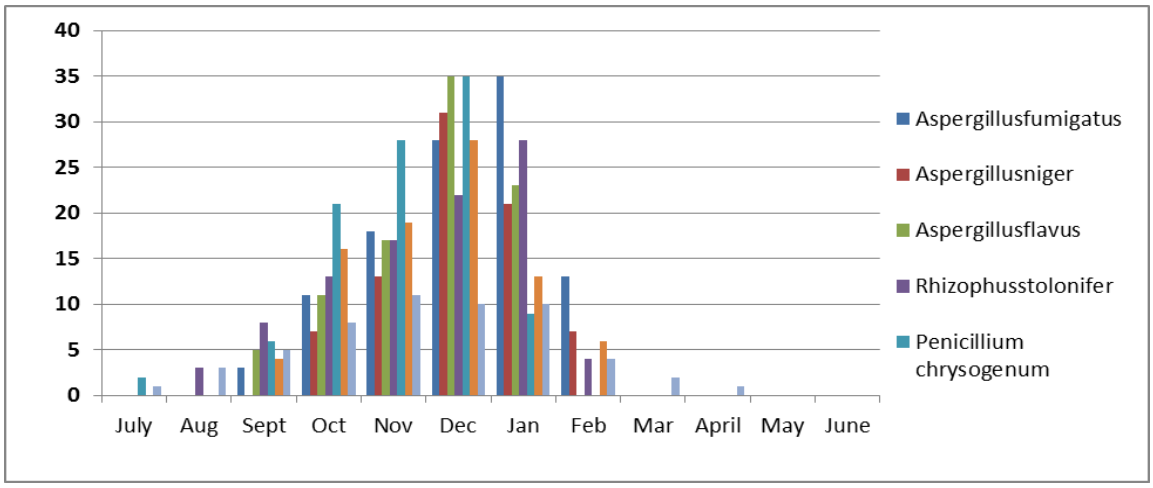

Fig 3 Average incidence of infection by fungal species (%) on *Channa striatus* during the study period (2012- 2014).

Aspergillus niger

Maximum average incidence i. e (19%) of *A. niger* was reported during the month of December in *C. punctatus.* And in the average incidence (31%) of *A. niger* was reported during the month of December in *C. straitus.* It is noticed that no incidence of *A. niger* was observed during the month of April to June.

Aspergillus flavus

The infection of *Aspergillus spp* in the fishes was very common during the present study infection of *A. flavus* categorically was more during the month of October to December in *C. punctatus.* And in the average incidence more during the month of October January in *C. straitus.* However, those fungi were reported even up to February. It was not reported in *C. straitus* and *C. punctatus* during April to June.

Table- 2.Average incidence of infection by fungal species (%) on *Channa punctatus* during the study period (2012- 2014).

		Fungal species (%) per month											
S. No	**Fungi isolated**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**
1	***Aspergillusfumigatus***	**2**	**0**	**7**	**18**	**22**	**29**	**8**	**0**	**0**	**0**	**0**	**0**
2	***Aspergillusniger***	**0**	**0**	**0**	**7**	**14**	**19**	**16**	**4**	**0**	**0**	**0**	**0**
3	***Aspergillusflavus***	**0**	**0**	**5**	**12**	**17**	**28**	**5**	**3**	**0**	**0**	**0**	**0**
4	***Rhizophusstolonifer***	**0**	**0**	**1**	**7**	**6**	**11**	**2**	**0**	**0**	**0**	**0**	**0**
5	***Penicillium chrysogenum***	**3**	**0**	**12**	**17**	**22**	**29**	**16**	**2**	**0**	**0**	**0**	**0**
6	***Fusariumsolani***	**0**	**2**	**7**	**11**	**7**	**9**	**2**	**0**	**0**	**0**	**0**	**0**
7	***Trichodermaharzianum:***	**1**	**2**	**6**	**8**	**11**	**12**	**10**	**3**	**2**	**1**	**1**	**1**

Table- 3. Average incidence of infection by fungal species (%) on *Channa striatus* during the study period (2012- 2014).

		Fungal species (%) per month											
S. No	**Fungi isolated**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**
1	***Aspergillusfumigatus***	**0**	**0**	**3**	**11**	**18**	**28**	**35**	**13**	**0**	**0**	**0**	**0**
2	***Aspergillusniger***	**0**	**0**	**0**	**7**	**13**	**31**	**21**	**7**	**0**	**0**	**0**	**0**
3	***Aspergillusflavus***	**0**	**0**	**5**	**11**	**17**	**35**	**23**	**0**	**0**	**0**	**0**	**0**
4	***Rhizophusstolonifer***	**0**	**3**	**8**	**13**	**17**	**22**	**28**	**4**	**0**	**0**	**0**	**0**
5	***Penicillium chrysogenum***	**2**	**0**	**6**	**21**	**28**	**35**	**9**	**0**	**0**	**0**	**0**	**0**
6	***Fusariumsolani***	**0**	**0**	**4**	**16**	**19**	**28**	**13**	**6**	**0**	**0**	**0**	**0**
7	***Trichodermaharzianum:***	**1**	**3**	**5**	**8**	**11**	**10**	**10**	**4**	**2**	**1**	**0**	**0**

Rhizophusstolonifer

Theinfection of *R. stolonifer* was reported from August to February in *C. punctatus* and *C. striatus*. The maximum average incidence (11%) was observed in the month of December in *C. punctatus.* And maximum average incidence (28%) was observed in the month of January in *C. striatus*. Whereas in *C. punctatus* and *C. striatus* no incidence of fungus was observed April to June.

Penicillium chrysogenum

The incidence of *C. punctatus* and *C. striatus* infection appears from the month of July in *C. punctatus* last up to month of February. And the infection was observed in the month of July to January in *C striatus*. Whereas in *C. punctatus* and *C. striatus* no infection was observed during the month of March to June.

Fusarium solani

The incidence of *Fusarium solani* infection was at the peak (11%) during the month of October in *C. punctatus.* And the *F. solani* infection highest (28%) during the month of December in *C. striatus*. The infection starts to appear from the month of July and it prevails only up to January in *C. punctatus*. And the infection starts to appear from the month of July to February in *C. striatus*. While no incidence was observed during March to June.

Trichodermaharzianum

From the study of fungal incidence it was observed that *T. harzinum* prevails throught the year except the month of May and June in the case of *C. punctatus* and *C. striatus* with the

maximum incidence (11%) during the month of November. It was more or less equally reported during the month of August, September, October, December and January in infected *C. punctatus* and *C. striatus.*

DISCSSION

The quality of water will provide Aeration, Breathing, Feeding, Growth, Excretion, and Maintenance of Sodium balance and also for Reproduction. The quality of the water is the first and most important limiting factor in existence of fish in any ecosystem. However pathogens of fish already stressed by disease, due to mechanical injure. The fungi can spread rapidly among fish population and the fungal spores dispersed with water currents (Hatai K. *et, al*., 1994). The first time reported on fungal infection in fish during the mid eighteenth century (Arderon 1748). The fungi have wide range of infection, depending on the management of farm and environment (Willoughby L. G. 1994). Several pathogenic fungi from different species of fish (Mastan S.A. 2008). This was supported by field level studies with pathology based investigations in Bangladesh. Where it has been reported that the major carps are the most significantly affected farmed fish and once on outbreak in carp lakes, EUS can damage the entire crop (Khan and Lilley, 2002). Fish feed stored under tropical conditions is contaminated with *Aspergillus flavus*, hence the toxins produced by the fungus may be deposited on feed pallets (Haller, R. D and R. J. Roberts 1980). If such contaminated feed is consumed by the fish, it may cause deleterious effects, which may lead to mass mortality (Olufemi, B. E 1985). There are some reports on fungal infections in commercial fishes(Firouzbakhsh *et, al*., 2005). *A. niger* from common carp, its eggs and environment. *A. niger* is caused to internal and external infection in fishes. *Fasarium sp, Pencillium sp, Saprolegnia sp* and *Mucor sp* were reported in the eggs of *Aspencer percicus* (Jalilpoor, J. S. A. *et, al*., 2006). According to (Rfai. M. K. *et, al*., 2010) reprted on the *Pencillum spp, Aspergillus spp* and *Rhizopus sp* are the normal Mycoflora present on fresh water fishes. Fungal load increases significantly during storage period of feed at high moisture levels in ground and tree nuts (Juben, F. I. *et, al*., 2012).

CONCLUSION

The incidences of fungal infections varied with fungal species and season of the year. On com paring the fungal incidences, the highest prevalence of infection was in winter from October to January and the lowest infection during the month of February to July. Retardation of the pathogenic potentiality of the water molds at higher temperature more than

30^0 C, which cannot infect and require a certain period for multiplication. In the present investigation *S. parasitica* and *A. niger* were found to be the most common water molds responsible for the fungal infections to fresh water fishes. *Saprolegenia* is found to be more virulent for fishes. The fungi specific species is causing parasitism, it was found from the present study *Aspergillus spp* is highly pathogenic to fresh water murrel fishes. All these fungi there may be certain toxins present in given species which cause pathogensity in fish leads to high mortality.

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