International Journal of Zoology Studies
ISSN: 2455-7269; Impact Factor: RJIF 5.14
Received: 04-08-2019; Accepted: 06-09-2019
www.zoologyjournals.com
Volume 4; Issue 6; November 2019; Page No. 31-33

Studies on the pathogenicity of selected major Carpsat Bansagar colony pond, Rewa (M.P.)

Sheela Saket[1], Dr. Umesh Pandey[2]
[1] Research Scholar Zoology, Govt. Science College, Rewa, Madhya Pradesh, India
[2] Professor of Zoology, Govt. Science College, Rewa, Madhya Pradesh, India

Abstract
This study examined the pathogenicity of selected major carps at Bansagar colony pond, Rewa (M.P.). For treatment, the diseased fish were exposed to 4g salt per litre of water for 2 min accompanied by way of dip treatment with 5ppm $KMnO_4$ for 10 min, thrice every week for a duration of 6 weeks. The treatment resulted in recuperation from the sickness after 6 weeks from the establishing of treatment. Soon after recovery, the pond administration practices such as removal of pond bottom soil, application of lime and replenishment with freshwater had been followed in the contaminated ponds. Our study concluded that rapid decrease in pond water temperature from 22 to 8°C that stays low for months collectively coupled with increased water pH (8) and decrease dissolved oxygen (4ppm) causes saprolegniasis to the fingerlings of major carps.

Keywords: bansagar colony pond, saprolegnia, pathogenic fungi, major carps

1. Introduction
The major carps (*Catlacatla, Labeo rohita* and *Chirrinusmrigal*), minor carps (*Labeo bata, Labeo gonius*) and amazing carps (*Ctenopharygodon idella, Hypothalmicthis molitrix* and *Cyprinus carpio*) are the foremost fish species cultured in earthen ponds in the region (Vinod *et al.*, 2004) [1]. In many parts of the north jap hill region, the cultured fishes frequently suffer from fungal disease, in particular in the course of the months from late November to early February when water temperature falls under 10°C (Naskar *et al.*, 2005) [2]. The disorder motives mass mortalities and important monetary losses to the bad fish farming community.
Some of the ordinary signs and symptoms of ailment are pores and skin lesions associated with a 'dry' mucus-depleted skin, erratic swimming conduct and sunken eyes (Majhi *et al.*, 2005) [3].Indeed, each and every freshwater fish is exposed to at least one species of fungus in the course of its lifetime (Neish, 1997 and Noga, 1996) [4-5], starting from the embryonic stage via adulthood (Bruno and Wood, 1994) [6].
Several authors have pronounced occurrence of fungal ailments in many commercially important fish species such as Channel catfish cultured in earthen ponds in the southern U.S. (Bly *et al.*, 1992) [7]; young and person Salmonids cultured in northern coastal waters of Japan (Hatai and Hoshiai, 1992) [8]; Pike cultured in Scotland (Willoughby, 1989) [9]; Bass reared in cages in U.S. (Noga, 1996) [5], mass-scale culture of Tilapia during wintry weather months in Egypt (Zaki*et al.*, 2008) [10], Roach, Carp, Lamprey, Sturgeon, Barramundi, Mullet, Kissing gourami, Guppy, Swordfish and Platyfish (Bruno and Wood, 1994) [6]. Recently, we found a very similar diseased condition in our fish at Bansagar colony pond,Rewa at some stage in the iciness months, inflicting extreme mortality of major carps (*Catlacatla, Labeo rohita* and *Chirrinusmrigal*) fingerlings. In the existing study, we examined the key pathogen related with the ailment and recorded the developmental phases of contamination (from the first signal of contamination to the death), Bansagar Colony pond.

2. Materials and Methods
Bansagar pond is located close to Bansagar colony Saman region of Rewa-Shahdol road ½ km away from Samannaka. This pond is manmade pond and no longer earlier used for fish forming however after 1975 it converted into fish subculture pond due to neighborhood interest. The complete place of pond is about 2.3 hectare. It has a massive use for specific sort of fish farming distinguished fishes are properly farmed with a lot of different local fishes with additionally duck rearing and rooster uses. Rewa has a humid subtropical climate, with cold, misty winters a hot summer time and humid monsoon season. Summers begin in late march and go on till mid June, the average temperature being round 30˚C. The monsoon starts in late June and ends in late September. Winters two in Rewa are cold and misty with little rain. The total annual rainfall is about 1128 mm (44 inches).
The common water depths of the ponds had been 1.5 m. The major most important carp fingerlings (*Catlacatla, Labeo rohita* and *Chirrinusmrigal*) of 4-5 months ancient (mean physique weight 5.2 g and suggest physique size 6.8cm) produced in our hatchery facility have been stocked in nursery ponds at the rate of 8 nossq mt^{-1}. The fishes have been frequently fed with supplemental feeds (rice polish and mustard oil cake) at 5% physique weight. The water fantastic parameters (pH and dissolved oxygen) and air and water temperature were recorded weekly and analyzed the use of widespread methods (APHA, 2005) [11].

Microbiological assay
Ten every stay infected and control fish were randomly collected, maintained in aseptic conditions, from every ponds after 2, 6, 10 and 20 weeks from the commencing of infection. The fishes had been sacrificed and body weight recorded. The cotton-wool regarded on the body floor of

fishes have been eliminated by using sterile inoculating loop and incubated in Bansagar Colony Pond (pH 5.6) and stored at 22-30°C for 5-10 days. The plates were determined day-to-day at 10:00 hrs for growth. For identification of fungus, the cultures had been subjected to lactophenol cotton blue (LCB) stain (Bansagar Colony pond) following the protocol of Chakraborti (2003) [12], Thomas *et al.* (1991) [13], Pelczar*et al.* (2008) [14]. Briefly, a drop of LCB stain was positioned on the centre of slide. By using sterilized mounting needle, a small element of tradition was once mixed gently with the LCB stain. A cowl slip was once placed gently to keep away from formation of air bubble and used to be examined below a light microscope at magnifications between 10-100X and the picture have been captured the usage of a digital camera.

Disease treatments

The fishes at the preliminary stage of contamination had been caught alive and grouped into two (n=20). The fishes in each crew have been subjected to remedies (A: dip therapy with 4 g salt per litre of water for 2 min.; B: dip therapy with 4g salt l-1 of water for 2 min followed by way of 5ppm $KMnO_4$ for 10 min). The redress have been given thrice each week at 10:00 hrs in a plastic bathtub (capacity: 50 l), up to 6 weeks from the beginning. The observations were recorded each and every day for recuperation and/or improvement in condition, growth attainment and mortality prompted in every treatment.

Statistical analysis

Measured parameters for fish mortality at some stage in therapy period between 0-20 weeks, boom attainment and improvement in disorder circumstance following redress had been compared by means of one-way analysis of variance (ANOVA) accompanied through the Tukey's more than one contrast test. Data are introduced as suggest and differences between businesses have been regarded statistically widespread at $P<0.05$.

3. Results and Discussion

The microscopic observations of cultures recommend that the pathogen belongs to genus Saprolegnia and most likely were secondary product of asexual zoospore. In general, the secondary zoospores are extra motile for a longer period of time than main zoospores (Shah, 2010) [15] and are the principal dispersion phases of Saprolegnia (Pickering and Willoughby, 1982) [16]. Additionally, secondary zoospores are additionally regarded the infectious spore of Saprolegnia (Bruno and Wood, 1994 [6]; Hatai and Hoshiai, 1992) [8] that causes fish mortality.

Saprolegnia is ubiquitous in freshwater ecosystems and is the essential genus of water molds accountable for good sized fungal infections of freshwater fish and eggs (Pelczar*et al*., 2008) [14]. The infection of fish with Saprolegnia is generally termed "saprolegniasis" (Roberts, 1989) [17]. In the existing study, we recorded extreme mortality of fingerlings by using saprolegniasis in the course of the winter months i.e. early November 2014 to late January 2015. We determined that from the onset of contamination fishes died inside 12-15 days. The first signal of contamination were seen red or grey patches of filamentous mycelium. The development of patches used to be possibly due to rubbing of physique floor to a challenging substratum following attachment of filamentous mycellium that reasons itching. Subsequently, throughout acute infection that takes 7-8 days from opening of infection, look of cotton-like shape that radiate out in a circular, crescent-shaped or whorled sample and from then the fish died within 3-4 days. Several authors have mentioned that Saprolegnia invades epidermal tissues, generally starting on the head or fins and spreads over the whole floor of the physique Zaki,*et al.* 2008 [10]; Neish, 1997[4]; Willoughby and Roberts, 1992 [18]. Contrary, in the present investigation we discovered that the purple patches first regarded in the mid section of the physique floor and then regularly unfold to different parts.

The physiological country of the fish and the environmental prerequisites typically determines if a fungal infection will be successfully installed (Neish, 1997) [4]. In the existing investigation, a unexpected reduce in water temperature (from 20°C to 9°C) prompted saprolegniasis in cultured fish. Bruno and Wood, (1994) [6] pronounced that unexpected adjustments in temperature can make fish susceptible to saprolegniasis, due to the increased physiological stress. This may also be especially true in the present case due to the truth that the Indian primary carp species develop better in a temperature vary of 26-33°C (Das *et al.*, 2004) [19] and their physiology such as feeding, swimming, oxygen consumption and thermal rules prices are influenced substantially in lowtemperature condition. Generally, Saprolegnia has a pretty extensive range of temperature tolerance from 3 to 33°C (Aly and El Ashram, 2000 [20]; Willoughby and Roberts, 1992) [18]. However, they assault fishes that have been burdened or have vulnerable immune system (Bruno and Wood, 1994 [6]; Pickering, 1994) [21]. Neish (1997) [4] suggested that immunosupression pushed by using environmental parameters grant a mechanism that motives the transformation of typically nonpathogenic organisms, inclusive of Saprolegnia, to turn out to be pathogenic. Generally, fungal infections are hard to treat, mainly all through acute condition. Nevertheless, there are few chemical substances accepted for use in aquaculture (Fitzpatrick *et al.*, 1995; Meyer, 1991) [22-23] for cure of such diseases. Malachite inexperienced is considered the most superb chemical for controlling Saprolegnia (Willoughby and Roberts, 1992) [18].

However, because of issues about its attainable teratogenic (Fitzpatrick *et al.*, 1995) [22] and/or mutagenic properties, malachite inexperienced is banned in most of the creating nations (Marking *et al.*, 1994) [24]. Formalin, a answer of 37% formaldehyde, is advantageous in treating Saprolegnia (Mitchell and Collins, 1997) [25], and is the only fungicide registered for use in aquaculture (Marking *et al.*, 1994) [24]. However, there are issues about its have an effect on both the environment and personnel who deal with it (Fitzpatrick *et al.*, 1995) [22]. On the different hand, hydrogen peroxide seems to be a promising chemical for the cure of Saprolegnia (Fitzpatrick *et al.*, 1995 [22]; Marking *et al.*, 1994) [24] with minimal have an impact on on the surroundings (Mitchell and Collins, 1997) [25]. But it is important to think about the species, lifestyles stage and water temperature while treating Saprolegnia with hydrogen peroxide (Rach *et al.*, 1997) [26]. Contrary, in the current investigation, we formulated a easy remedy protocol that resulted in good sized enchancment and/or restoration from sickness condition. Our results suggests that fishes at the commencing of contamination dealt with in two steps i.e. dip remedy with 4g salt per litre of water for 2 min observed

by means of with 5ppm $KMnO_4$ for 10 min resulted in quicker recuperation (Table 1).

Table 1: Changes in body weight, mortality and recovery from disease condition recorded between 0-6 weeks of treatments

Treatments	Numbers of fish treated (n)	Initial weight (g)	Final weight (g)	Mortality (n ;%)	Disease recovery (n; %)
Control	20	6.2±2.9*	7.2±1.8*	1(4)*	NA
A	20	5.8±3.1*	6.3±2.6**	14(48)**	5(25)**
B	20	6.4±3.3*	7.3±1.3*	7(25)***	12(52)**

NA-Not applicable, Means without a common asterisks along the column significantly differ (P<0.05).

4. Conclusion

In conclusion, the outcomes of this find out about point out that a mixture remedy of salt (NaCl) and potassium permanganate ($KMnO_4$) might be an nice technique to deal with the fishes contaminated with Saprolegnia in mid hill altitude conditions and may be relevant in other species with minor modifications. Further, prospects of our low cost approach may also be handy to the bad fish farmers who have confined get admission to the aquatic fungicide and/or other commercially accessible branded chemical substances to be used for the treatment purposes.

5. Aknowledgement

The authors are greatly indebted to Principal & Dr. S.N. Shukla, Prof. of Zoology, Govt. Science P.G. College, Rewa (M.P.) who permitted to carry out this work at the centre.

6. References

1. Vinod K, BK Mahapatra SK, Majhi, BK Mandal. Potentials of terrestrial weeds for the production of grass carp, Ctenopharyngodon idella (Val.,) in Meghalaya, North Eastern India. SAARC J. Agri. 2004; 2:211-219.
2. Naskar S, Majhi SK, Khan MH, Bordoloi RK. Integrated livestock waste management through pig cum fish farming in mid hill micro situation of Meghalaya: A case study. Indian J. Hill Farming. 2005; 18:161-164.
3. Majhi SK, Mahapatra BK, Vinod K, Mandal BK. Stress management in fish ponds. *Fishing Chimes*. 2005; 25:51-53.
4. Neish GA. Observations on saprolegniasis of adult sockeye salmon, Oncorhynchus nerka (Walbaum). J. Fish Biol. 1997; 10:513-522.
5. Noga EJ. Fish disease diagnosis and treatment. Mosby-Year Book, Inc. St. Louis, MO, 1996.
6. Bruno DW, BP Wood. Saprolegnia and other Oomycetes. In Fish Diseases and Disorders, P.T.K. Woo and D.W. Bruno Eds. CABI Publishing, Wallingford, Oxon, United Kingdom, 1994.
7. Bly JE, Lawson LA, Dale DJ, Szalai AJ, *et al*. Clem: Winter saprolegniosis in channel catfish. *Dis. Aqua. Org.* 1992; 13:155-165.
8. Hatai K, G Hoshiai. Mass mortality in cultured Coho salmon Onchorhynchuskisutch due to Saprolegniaparasiticacoker. J. Wild. Diseases. 1992; 28:532-536.
9. Willoughby LG. Continued defense of salmonid fish against Saprolegnia fungus, after its establishment. J. Fish. Diseases. 1989; 12:63-67.
10. Zaki MS, Fawzi OM, Jackey JE. Pathological and biochemical studies in Tilapia nilotica infected with Saprolegniaparasitica and treated with potassium permanganate. J. Agric. Environ. Sci. 2008; 3:677-680.
11. APHA. Standard methods for examination of water and wastewater. 21st Edn. APHA, AWWA, WPCF, *Washi*ngton DC, USA, 2005.
12. Chakraborti A. A textbook of preventive veterinary medicine. 3rd Eds. Kalyani publisher, New Delhi, India, 2003.
13. Thomas PA, Kuriakose T, Kirupashankar P, Maharajan VS. Use of lactophenol cotton blue mounts of corneal scrapings as an aid to the diagnosis of mycotic keratitis. Diagn. Microbiol. Infect. Dis. 1991; 14:219-224.
14. Pelczar MJ, ECS Chan, NR. Krieg. Microbiology. 5th Eds. Tata McGraw Hill Publishing Company Ltd., New Delhi, India, 2008.
15. Shah SL. Impairment in the haematological parameters of tench (Tincatinca) infected by Saprolegnia spp. Turk. J. Vet. Anim. Sci. 2010; 34:313- 318.
16. Pickering AD, LG Willoughby. Microbial diseases of Fish. Ed.: R.J. Roberts. Academic Press, London, England, 1982, 271-297.
17. Roberts RJ. Fish Pathology, 2nd Edn. Bailliere Tindall Publishers, London, England, 1989, 467.
18. Willoughby LG, RJ Roberts. Towards strategic use of fungicides against Saprolegniaparasitica in salmonid fish hatcheries. J. Fish Diseases. 1992; 15:1-13.
19. Das T, AK Pal, SK Chakraborty, SM Manush N, *et al.* Thermal tolerance and oxygen consumption of Indian major carps acclimated to four temperatures. J. Therm. Biol. 2004; 29:157-163.
20. Aly S, A El Ashram. Some factors contributing to the development of saprolegniosis in Nile tilapia (*Oreochromis niloticu*s). Alex. J. Vet. Sci. 2000; 16:165-174.
21. Pickering AD. Factors which predispose salmonid fish to saprolegniasis. G.J. Mueller Eds. U.S. Department of Energy, Bonneville Power Administration, Portland, Oregon, 1994.
22. Fitzpatrick MS, CB Schreck, RL Chitwood. Evaluation of three candidate fungicides for treatment of adult spring chinook salmon. Prog. Fish Cul.1995; 57:153-155.
23. Meyer FP. Aquaculture disease and health management. J. Anim. Sci., 1991; 69:4201-4208.
24. Marking LL, JJ Rach, TM Schreier. Evaluation of antifungal agents for fish culture. Prog.Fish Cul. 2008; 1994; 56:225-231.
25. Mitchell AJ, CB Collin. Review of the therapeutic uses of hydrogen peroxide in fish production. Aquacul. Mag. 1997; 23:74-79.
26. Rach JJ, TM Schreier, GE. Howe, SD Redman. Effect of species, life stage, and water temperature on the toxicity of hydrogen peroxide to fish. *Pro*g. Fish Cul., 1997; 59:41-46.