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ORIGINAL ARTICLE

Study on Environmental Effect of Fish Diseases on Fish Yeild in North Bihar

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ABSTRACT

The present research work was carried out to investigate infestation capability of parasites in freshwater fishes, and also the impact of fish diseases on fish yield in north Bihar (India). This study included possibility of disease outbreak due to deterioration of environmental factors in water bodies of area. The infestation more occurred in young fishes than in adult fishes. The overall water qualities of water bodies fluctuated in study period. There physiochemical parameters have more or less significant combined effect on the deterioration of water quality as well as fish diseases. The gill filaments were damaged by parasites with rupturing blood capillaries, causing necrosis, coagulation and hemorrhage. The present study revealed the prevalence of different organisms in fishes, which are potential pathogen for them. Fishes were infested by parasites and other pathogens. During the study, it was observed that the parasites, bacteria and fungus were most important pathogen for outbreak of diseases. The disease outbreak among fishes was directly related to environmental factors. Low alkalinity reduces the buffer capacity of water and aquatic temperature reduces metabolic activities, which in turn increased chances of parasite infection and disease during the winter period.

Key words: *Environment, Impact, Fish, Disease, Production*

INTRODUCTION

The fishery industry has been suffering from outbreak of diseases in spite of large production potential. The normal growth of fishes is interrupted or inhibited in case of heavy infection, and these parasites, like those of other vertebrates feed either on the digested material or tissue of the host's tissue (Markov, 1946). Tripathi, *et al* (1978) estimated the losses due to mortality and growth retardation of fish in ponds located in north Bihar region as a result of epidemic infections. The death of fish caused by disease is of highest significance in fish culture; hence to achieve healthy it is must to maintain fish stock with their environment. There is also problems arises to reduce mortality and enhance growth and survival of fry and fingerlings (Shariff and Vijiarungam, 1986). The physiological and biological features of the host affect the composition of parasite (Dogiel, 1961). Fish pathogens cause significance loss to wild and cultured freshwater fishes.

The parasite presence in freshwater fishes as epidemic is a great threat to the major protein supply in India. In this region of study, the common fish diseases are ulcer type disease including epizootic ulcerative syndrome, tail and fin rot, bacterial gill rot, dropsy, fungal diseases and parasitic diseases (Chowdhury, 1993). Therefore, this study was aimed to evaluate several steps towards finding effective solutions to prevent spread of aquatic animal disease. Since the disease has tremendous impact on fish production, consumption, and aquaculture practices in the country, it is necessary to investigate the true causal pathogen and pathogenic influence of the disease.

MATERIALS AND METHODS

This study aimed with the survey on fish production include 60 nursery operators, 120 fish farmers and 120 fishermen from the study areas were interviewed for production statistics during the period of investigation. The survey was done through questionnaire and participatory rural appraisal methods in Gopalganj district of north Bihar in India. The research work was conducted during July 2014 to June 2015. The water quality was measured with the kits and disease was confirmed with either simple or microscopic observation and by the altered fish movement and behavior. The fishes after removal from the water have examined for body colour, deformities of

the vertebral column and of the mandibles, or perforation and /or shortening of the opercula. The excretory pore was finally examined for any swelling, and muscle carefully observed for any ulcer or inflammation with magnifying glass. The diseases were identified according to the methods of Amlacher (1961).

RESULTS AND OBSERVATIONS

Fish disease has got inverse impacts on fisheries resources. Economic losses due to fish diseases were investigated. At present fish parasites and other pathogen are causing heavy economic loss due to mortality and morbidity of carp brood stock. Infected market size fish may become unsuitable for human consumptions due to heavy infestation causing serious economic loss to the poor farmers. The impacts of diseases on fisheries resources are presented in Tables from 1 to 3.

Table 1: Depletion of fish production due to fish disease and water pollution at Yadopur

Mortality factor	Optimum fish production (Kg/hectare)		Loss due to disease &Water pollution (Kg /hectare)		Average Loss (%)
	Pond	Wetland	Pond	Wetland	
Bacteria	3260	320	704	155	24 %
Fungi	3260	320	340	90	12 %
Protozoa	3260	320	480	164	18 %
Monogenean	3260	320	400	137	15 %
Crustacea	3260	320	346	119	13 %
Malnutrition	3260	320	150	65	6 %
O2 deficiency	3260	320	180	71	7 %
Water pollution	3260	320	130	50	5 %

Table 2: Depletion of fish production due to fish disease and water pollution at Badheya

Mortality factor	Optimum fish production (Kg/hectare)		Loss due to disease &Water pollution (Kg /hectare)		Average loss
	Pond	Wetland	Pond	Wetland	
Bacteria	2140	230	550	208	32 %
Fungi	2140	230	160	124	12 %
Protozoa	2140	230	146	115	11 %
Monogenean	2140	230	150	63	9 %
Crustacea	2140	230	80	62	6 %
Malnutrition	2140	230	110	80	8 %
O2 deficiency	2140	230	176	132	13 %
Water pollution	2140	230	132	82	9 %

Table 3: Fish mortality due to disease and water pollution during study period

Disease agent/ Other factor	Mortality of fingerlings (%)	Mortality of Adult fishes (%)	Average mortality of fishes (%)	More affected fish
Bacteria	34	64	49	Adult fish
Fungi	25	35	30	Adult fish
Protozoan	65	45	55	Fingerlings
Monogenean	64	52	58	Fingerlings
Crustacea	35	45	40	Adult fish
Malnutrition	10	16	13	Adult fish
O2 deficiency	40	30	35	Fingerlings
Water pollution	33	25	29	Adult fish

During the period of July 2008 to June 2009 the average optimum fish production in pond is recorded 3705 Kg/ha and that of wetland is 380Kg/ha in Yadopur site. Average fish production loss due to different type of diseases like bacterial, fungal, protozoan, monogenean, crustacean,

Malnutrition, O_2 deficiency and water pollution is 58.10%, 32.60%, 46.0%, 44.0%, 37.70%, 15.30%, 19.40% and 24.90% respectively and overall loss 34.25% (Table 1).

In Badheya site, the average optimum fish production in pond is recorded 3952 Kg/ha and that of in wetland is 402Kg/ha during the period of July 2008 to June 2009. Average fish production loss due to diseases of bacteria, fungus, protozoa, monogenea, Crustacea, Malnutrition,O_2 deficiency and water pollution is 51.37%, 30.06%, 36.40%, 32.84%, 31.16%, 12.86%, 15.94% and 22.38% respectively and overall loss 29.12% (Table 2).

Average mortality of fingerlings was 36.5% and adult fish was 40.75%. Average fingerlings and adult was 38.62%.

DISCUSSION

The losses occurring due to diseases in aquaculture systems sometimes can be very frustrating especially to the rural poor and small scale fish farmers. Mohan (1999) reported ectoparasites, protozoan, monogenetic trematodes, fish lice, endoparasitic protozoans as some of the very important pathogens that have had significant impact on the yield in carp hatcheries and seed production centers in India. Perhaps parasite acts either as a pathogen or vector for diseases (Roberts *et al*., 1986). Hossain *et al*. (1994) reported that highest mortality of carp fingerlings were reported from nurseries infected with protozoan and monogenean parasites. Fish fry at the young stage become more susceptible to pathogen because of their immature immune system (Anderson, 1974), which support the present findings. Assistance of farmers from Government and non-government sectors on fish health management are very rare. There is a risk to livelihoods of fish farmers and fishermen from fish disease and fish health problems. Rural farmers were mostly resource poor with little or no knowledge of health management and had inadequate opportunities to improve management skills. Their ability to respond effectively to fish disease problem was also very limited. As a result, they suffered from financial losses due to fish disease. So prevalence of fish diseases had negative impacts in fish production. About 14% of the actual production could be loss due to fish disease (Faruk *et al.* 2004). Fish farmers have been utilizing pesticides to control *Argulus* infestations. Due to indiscriminate use of pesticides, the pond environment has been deteriorating affecting the productivity of pond adversely (Ahmed 2004). It was observed that the Indian farmers are using pesticides excessively as a quick treatment for the *Argulus* sp., which is posing a major threat for sustainable carp culture development in the country. The pesticide is not only killing the *Argulus* but also affecting the abundance of crustacean planktons and many other non-target species (Ahmed 2004). Prolong use of pesticides in the ponds may create environmental hazards which may lead to threat to the consumers. Disease reduces growth and survivability of fish, which reduces reproduction of fish and hence lowers the fish population. Ultimately this leads to loss of fish production.

When much mortality of fish occurs due to the presence of epizootic, every attempt must be made to collect and destroy the dead fish. When the wastewaters pollute the watercourse, the physic-chemical parameters deteriorate and fish diseases occur. A sample of the water should be taken and analyzed chemically when fish die without showing any definite macroscopic or microscopic symptoms of disease. There fixed material and cultures examined in Fish Pathology Laboratory. The decisions should be taken with control on water level fluctuation, aquatic vegetation, organic debris and water pollution in the regard of fish disease. There maintenance of water quality, prevention of algal bloom and control on Oxygen depletion are needful. Different size and age groups of fish stocking should be avoided. Fish health management should focus on the development of strategies for farm-oriented primary health management packages including mobile diagnostic centers. The farmers and the extension agents should be trained up on simple diagnostic procedure and effective therapy and awareness creation among the farmers. There should be legislation on the safe use of the chemotherapeutic agents in fish disease prevention and control. Enough facilities regarding fish disease research should be provided to the educational institutions. Stocking of healthy and disease free fingerlings should be maintained properly. Proper stocking density of healthy fish, their right feed in optimum doses and right feeding time should be maintained.

REFERENCES

1. Ahmed A.T.A. (2004): Development of environment friendly measures for the treatment of Argulosis in carp brood ponds. Bangladesh J. Fish (Special issue), 27: 3.
2. Anderson D.P. (1974): Fish Immunology. In: Diseases of fishes edited by Stanisias, F. Sneiszko, F. and Axelrod. H.R.F.H. Publication Inc. New Jersey 07753 USA.
3. Chowdhury M.B.R. (1993): Research Priorities for microbial fish disease and its control in Bangladesh. Proceedings of the workshop on Research Priorities in Bangladesh for fish health. Disease prevention and Pathology, May 17, edited by A. Tollervey. Pp 8-11.
4. Dogiel V.A. (1961): Ecology of the parasites of fresh water fish in parasitology of fishes. Oliver and Bayd, London. pp 1-47.
5. Hossain M.A., Banu A.N.H., Khan M.H. and Sultana N. (1994): Bacterial microflora isolated from carp and catfish fry and their sensitivity to some antibiotics. Bangladesh J. Microbios., 11(2): 95-101.
6. Mohan C.V. (1999): Social and Economic Impacts of aquatic animal health problems in Aquaculture in India. Paper presented at the Aquatic Animal Health Care in Rural Aquaculture, Dhaka, Bangladesh.