



Science

FISH DISEASE AS A MONITOR OF LAKE WATER POLLUTION**Bharti Dwivedi^{*1}, Dr. Suchitra Banerjee²**^{*1} Govt. Subhash School for Excellence Bhopal, India²Institute for Excellence in Higher Education IEHE, Bhopal, IndiaDOI: <https://doi.org/10.5281/zenodo.439573>**Abstract**

One of the greatest problems that the world is facing today is of environmental pollution. Increasing with every passing year and causing grave and irreparable damage to the environment .potentially harmful substances e.g. pesticides, heavy metals and hydrocarbons are often released into the aquatic environment. When large quantities of pollutants are released in water there may be immediate impact as measured by large scale. Sudden mortalities of fishes and other aquatic organisms. Lower levels of discharge may results in accumulation of the pollutants in aquatic organism. The end results which may occur long after the pollutants have passed through the aquatic environment include reduced metabolism, damage of skin and gills. Current study shows that some of the diseases caused by virus, pseudomonas, flavobacterium resulted from generally adverse water quality i.e., higher than usual quantities of organic material, oxygen depletion, change in pH values and enhanced microbial populations some infections with Serratia and Yesinia may also well reflected contamination of water with domestic sewage e.g. leaking septic tank.

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The aim of this study is to determine the relationship between the contaminant water and its impact on fish health. The contamination of water is directly related to the degree of containment of our environment Rain water collect while passing through the air. Streams and rivers collect impurities from surface run off and through the discharge of sewage and industrial effluents; these are carries to lakes, rivers or reservoirs. All of the chemicals generated by man will eventual end up in our water supplies. These dangerous products from agriculture. Industry and other human activities enter Lakes Rivers and underground water and can contaminate our drinking water.

It is possible that adverse environmental conditions may decrease the ability of organisms to maintain and effective immunological response system, so that an increased susceptibility to different diseases might be expected to occur. This certainly occurs in aquatic organisms particularly fish where acute and/or chronic pollution of surface waters can cause a reduction in the level of unspecific immunity of disease. For example for long term exposure of sub lethal Zinc concentration, a significant decrease in the concentration of total proteins globulins and lysozymes in the blood plasma of carp occurs. A decrease in the number of leucocytes and significant changes in their different count are typical effects caused by a number of pollutant example heavy metals, pesticides, insecticide phenols etc. Decrease in number of lymphocytes which are active in the increase and transfer of globulins is followed by a decrease in antibody production and thus a decrease in resistance to disease. Any marked change in surface water quality is reflected directly and indirectly in the structure of fish population. Indirect effects can occur from damage to the food web which consists of lower organism in aquatic environment at low concentration.

2. Material and Method

Fishes were collect from weekly once in the experimental ponds of Bhopal. The collect Fishes were brought to the laboratory, external diseased characters were observed carefully by using magnify lens. Skin scarping and gill rashes observation were done to observe external signs. The gill lamellae were mandate immediately with glycerin and observed diseased condition. The skin was carefully observed for identification of ulcers and differentiation is done at the rate of superficial or deep ulceration.

Caudal, pelvic and Pectoral fins were observed for colour deformity and any other necroses. The stomach was observed any abnormal conditions were observed carefully by opening the fish by giving an incision through the vent. The internal organs like spleen, liver, intestine, gall bladder and gonads were careful observed for deformities or diseases. The weight of the fish was noted both diseases and normal healthy fish. After observation and identification of the disease, the diseased fish was fixed in 5% formalin and stored in laboratory for further study and water quality conditions observed regularly.

3. Observation

The following fish diseases have been shown to have a close connection with reduced water quality:

1) Bacterial diseases

The presence of specific bacterial agents is necessary to cause an infection. Many of these agents can survive naturally in the environment (e.g. *Aeromonas punctata*, *Aeromonas Salmonicida*) or in the digestive tract of healthy fish with increase in their virulence or weakening of the host fish. (Due to polluted aquatic environment) these agent can act causative factors in the outbreak of a bacterial disease organic pollution of water, followed by a decrease content of dissolved oxygen creates a favorable environment for growth of bacteria. A direct relationship between the organic pollution of surface water and outbreaks of furunculosis is well established. So that this disease

may it time serve as a positive indicator of water pollution or poor water quality. Vibriosis also occurred in fish. Skin ulcer dropsy, fin and tail rot of fishes increase in contaminated water.

2) Viral diseases

The presence of viral agents into lake and reservoirs causes viral haemorrhagic septicaemia in rainbow trout, spring viraemia in carp, infectious swimbladder inflammation ulcerative dermal necrosis, pox and other viral disease. Reduce water quality is an important stress factor in viral haemorrhagic septicaemia. A low dissolved oxygen content change in pH of water give conditions to grow virus. The action of virus and possibly the presence of carcinogens may well lead to neoplasia certainly numerous hot spots have been correlated with increased concentration of anthropogenic compound (Depledge)

3) Fish parasites

The degree of pathogenic activity exerted by ecto endoparasite living on the body surface or of internal body of fish can influence by water pollution (KHAN and THGCIN 1991) A association has been made between fish disease and parasite infestation and unknown components of sewage dumping (siddall et all 1994)

Reduction of water quality can be followed a gill infection with cryptobia branchialis decrease in pH value of water can control to an outbreak of ichthyobodosis. Low dissolved oxygen concentration associate with favored condition for chilodonellosis. Thermal pollution can lead to lethal outbreak of ichthyophiriosis. Low dissolved oxygen concentration associate with favored condition for chilodonellosis. Thermal pollution can lead to lethal outbreak of ichthyophiriosis. Domestic sewage discharge into surface waters can be source of high population of trichodinins. phenol and polychlorinated biphenyls can cause fish to become more sensitive to ichthyophthirius multifiliis and increased sensitivity of carp to this parasite has also been found in connection with subtle concentrations of cadmium.

Water is also an important factor affecting the growth and abundance of gyrodactylus population. Decrease in oxygen concentration 50% caused a three to four time increase in their reproduction rate. Carp fingerlings infected with tape worm bothrioccephalus gowkongensis were found to be more sensitive to DDT (Perevozchent and davydov 1974) and pasco and cram (1977) found a higher sensitivity of stickleback to cadmium when infected with the tapeworm schistocephalus solidus.

4. Result and Discussion

Present study show that water pollution heavy due to different types of pollutants bring change in hydro chemical properties of fresh water and cause damage to aquatic environment .change in value of physiochemical parameters i.e decrease in dissolved oxygen, change in pH value, increase in values of nitrates, presence of higher value of heavy metals, pesticides and hydrocarbons in aquatic environment has been associated with many disease of aquatic organisms like fish. Exposure to contaminated water has led to impairment of the mucus, the development of defective immune system, an increased incidence of parasitism, the induction of hyperplasia and mortalities.

5. Conclusion

Studies for these diseases suggest that abnormal incidence in specific areas is related industrial wastes and agriculture activates human activity that have released hazardous and toxic material in water and thereby led to the contamination of drinking water of lake & river. This knowledge will help us to identify sources of contamination can provide governing bodies with information useful in management of aquatic ecosystem, information on which to base regulations concerning usage and handling of chemical compounds essentially help to protect aquatic ecosystem from negative effect of anthropogenic.

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