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Full Length Research Article

THE EFFECT OF VARIOUS POLLUTANTS ON FISHES AND AMPHIBIA FAUNA OF DAMOH DISTRICT

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ABSTRACT

All the 8 lakes and 3 rivers in Damoh District, were studied to analyse the effect of change in Physico-chemical parameters on the planktons, fish and amphibian population and distribution. Due to manhandling of these water bodies, the parameters changed, which led to population fluctuation of phytoplanktons and fish and amphibian.

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INTRODUCTION

Damoh is known as city of lakes it is embedded with 8 different lakes and 3 rivers. These wet lands are of utter importance as they are the good and useful sources to mankind in different ways. Some are used for irrigation, some for potable water supply, raw water supply, recreation, fisheries, washing etc.

With rapid urbanization, constant, changes in demographic structure specially during second half of last century, all these water bodies have been subjected to various environmental problems. The resulted in deterioration of water quality through inflow of sewage, solid waste dumping other anthropogenic activities thus affecting the biodiversity.

In this study all the 8 lakes and 3 rivers of Dahom were used for different purposes. The output of this study would some how lead to the better environmental management and help to save our water bodies.

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MATERIALS AND METHODS

The water samples were collected during June 08- Dec.08. The Method of collection, preservation and enumeration of Plankton, fish and amphibian were as per standard method (Ahamd and Datta Munshi, 1987; Allen, 1995). Eleven Physico-chemical parameters were analysed and planktons and fish population were grouped accordingly.

RESULTS AND DISCUSSION

The Physico-Chemical Parameters of the lakes and rivers (Tables 1 and 2) and the affected Plankton distribution (Table-3) are shown. In this investigation, Physico-chemical parameters highly affected the Plankton fish and amphibian distribution.

Most of the water bodies were either mesotrophic or in advance stage of eutrophic only Belatal and Danital Pond and Parewa Ponds was found eutrophic was a bog lake. It was found that *Microcystis aeruginosa* and *Catala catala* fish was a dominant flora and fauna in almost all the water bodies.

Table 1. Toxicity of heavy metal on fish

S. No	Test Organism	Metal/metal Conc	Exposure Duration	Effect on Organism
<i>COPPER</i>				
1.	<i>Heteropneustes</i> ⁸¹ <i>fossilis</i>	25 mg/l	-	increased hemoglobin concentration in blood at fish
2.	<i>clarias lazera</i> ²⁶	3.2mg/l	96 h	Haemolysis and anemia were observed.
3.	<i>Hypophthalmichthys</i> ⁵⁵ <i>molitrix</i>	01mg/l	2 h	glucose increased in the blood.
4.	<i>Heteropneustes</i> ⁸¹ <i>fossilis</i>	250 ug/l	24 h	Increase in the count of glucose in the blood.
5.	<i>Heteropneustes</i> ⁸¹ <i>fossilis</i>	25 ppm.		Lethargic response, frequent surfacing along with gulping of air.
6.	<i>Cyprinion watsont</i> ²⁷	0.3 mg/l 0.5 mg/l 12 mg/l	1 week	Little change in fish behavior, increased summing. Increased swimming activity and breathing movement Lethargy and loss of equilibrium
7.	<i>Lepidocephalichthys thermalis</i> ¹³		pH	Mortality Copper in tissues with increase in concentration and exposure time.
8.	<i>Catla catla</i> and <i>Labeo rohita</i> (Fingerlings)			Histopathological change in gill such as epithelial lifting was pronounced and enlarged chloride cell with more active mitochondria observed.
9.	<i>Danio dangila</i> ⁵⁷			R.B.C. lost their spindle shape become irregular Alteration of epithelial surface of gill.
10.	<i>Labeo rohita</i> ⁴⁷	1.5 mg/l	28 days	Tissue necrosis, prominent rupture and fusion of secondary lamellae in the gill.
11.	<i>Channa punctatus</i> ¹⁷	12ppm	19 days 30 days	Significant decrease in Growth . Lower RNA and protein content in muscles.
12.	<i>Channa punctatus</i> ²⁵	10mg/l 15mg/l 25mg/l	15 days	Significant depletion of glycongen, total protein and cholesterol level in muscle Histopathological changes in liver dependent on concentration of metal and exposure duration
13.	<i>Tilapia</i> ³⁸ <i>mossambica</i>	CADMUM		Expasure to higher concentration fish showed erratic movement. Loss of equilibrium and irregular movement of operculum
14.	<i>Cyprinus</i> ⁹⁴ <i>carpio</i>	01mg/l		Significant mortality of carp egg.
15.	<i>Cyprinus</i> ²⁴ <i>carpio</i>	.01mg/l		Delay in hatching time of the eggs.
16.	<i>Cyprinus</i> ⁹³ <i>carpio</i> (Finger lings)	1mg/l	4 weeks 7 Weeks	Red blood cell count decreased. Number of RBC cell recovered and increased frequency of abnormal cells observed.
			4 weeks 7 weeks	The number of W.B.C. increased. Phagocytic activity of W.B.C. reduced, due to which suppression of non specific immune mechanism observed.
<i>LEAD</i>				
17.	<i>Oncorhynchus</i> ⁷⁰ <i>my kiss</i>	(FC 50-1 mg/l)	96 h	Highest Pb accumulated in gill followed by kidney and liver. Branchial Na+K+ ATP ase activity in Juvenile trout was inhibited by approximately 40% after 48h.
18.	<i>Barbus</i> ⁸⁶ <i>conchonius</i>		30-60 days	Lead induced biochemical alteration such as hyperglycemic response and induced structure impairment such as branchial and renal lesion
19.	<i>Colisa</i> ⁸⁴ <i>fasciatus</i>	51mg/l	96 h	Reduction in spermatogenesis activity and hemorrhage in the testes.
<i>MERCURY</i>				
20.	<i>Catla catla</i> ²⁰			Mercury was more toxic in very hard water (96 h LC 50 : 062ppm) than hard water (06 h LC 50 : 0878pm)
<i>MIXTURE OF METAL</i>				
21.	<i>Chprinus</i> ⁶⁷ <i>carpio</i>	<i>Mercury and Cadmium</i>		Metal combination showed more toxic stress to embryos of comon carp than individual metal. Metal combination cause behavioral change in different life history stages of carp.
22.	<i>Channaa</i> ⁴¹ <i>punctatus</i>	<i>Cadmium, Lead, Copper, Mercury, Chromium and Arsenic,</i>		Decreases in protein and RNA content and dry weight and increase in free amino acid content and the activities of protease and ribonuclease in muscle, liver and kidney.
23.	<i>Heteropneustes</i> ³² <i>fossilis</i>	<i>Lead and Mercury</i>		Lead nitrate and mercuric nitrate effect on the activity of few lipids like phospholipids neutral lipid in the kidney and liver of fish.
24.	<i>Notopterus</i> ⁸⁰ <i>notopterus</i>	<i>Mercuric chloride and Cadmium chloride & their combination</i>		Heavy metal effect on the lipid and protein metabolism of hepatic and nephric tissue. The protein and lipid cholesterol contents of ovary and liver reduced General toxicity order of metal Hgcl ₂ > Hgcl ₂ + Cdcl ₂ > Cdcl ₂ > Control.
<i>MIXTURE OF METALS</i>				
25.	<i>Cyprinus</i> ¹¹ <i>Carpio</i>	<i>Cadmium and Mercury CdNo₂ 24ppm HgCl₂ .30ppm</i>		Significant decrease in erythrocyte count Leucocytes count thrombocyte and blood clotting the fish did not change due to exposure.

Table- 2. Toxicity of pesticides on fishes

S. No	Test Organism	Pesticide/ pesticide Conc.	Exposure Duration	Effect on Organism
1.	<i>Clans⁴⁴ batrachus</i>	Carbaryl and Phorate	24 h, 72 h 120h, 168h	Cholesterol level in serum decreased during exposure period
2.	<i>Cyprinus⁴¹ carpio</i>	Chiorphyrifos .014 ppm (1/5th of LC50)	7d, 14 d 21 d.	Highest inhibition of acetyl cholinesterase activity in brain was observed in 7 days of pesticide treatment and gradual recovery there after.
3.	<i>Channa²³ gachua</i>	Ekalux (Ec- 25) 525 ppm		Increase the activity of alkalin aminotransaminase (ALAT) and aspartate aminotransferase (AAAT) in liver, gill, kidney and muscles of fish.
4.	<i>Mystus⁸² Vittatus</i>	Dimecron and Thiodon		Rate of food in take absorption and metabolism decrease from the control value.
5.	<i>Cyprinus¹⁴ carpia</i>	Carbofuran 16 ppm		Decrease in total erythrocyte count, total leucocytes count and hemoglobin count.
6.	<i>Channa⁵⁶ punctatus</i>	Carbofuran (static water 4.5 ppm		Experiment showed the impairment in the hypothalma neurohypophyseal, gonadai complex in fish. Significant inhibition of gonadal development, degenerative change in ovary.
7.	<i>Nandus nandus⁴⁸</i>	Endosulfan carbonyl	.04ppm 1 month .05ppm	Significant histological alteration in gill.
8.	<i>Channa³⁰ punctatus</i>	Endosulfan and Diazinon		Depletion in the activity of arginine and tryptophane showing the interaction of pesticides with cellular proteins.
9.	<i>Heteropneustes⁶⁹ fessills</i>	Endosulfan .00075ppm .000.50ppm .000375ppm	15d, 30 d 45d, 60d	Increased concentration, of toxicant showed the decrease in liver dlycogen. Hepatic cells are damaged due to depletion of glycogen.
10.	<i>Labeo⁸⁷ rohita</i>	Chlorophynfos		Blochemical changes of total protein and glycogen observed.
11.	<i>Channa³¹ punctatus</i>	Endosulfan and Diazinon		Alteration of calcium content in the stomach after pesticides treatment.
12.	<i>Heteropneustes³ fassilis</i>	Dimecron	90 day	Significant decrease in Hb% , RBC number HCl% and O2 Carrying capacity of blood.
13.	<i>Clarias⁴⁴ batrachus</i>	Phorate 27ppm	168 h	Physiological and histological disorder in testis and ovary of insecticide exposed fish.
14.	<i>Gambusia⁷² affinis</i>	Dimecron .0068ppm	30 day	Histopathological changes such as hepatic lesion with necrosis pyconic nuclel vasculatation damaged blood vessel in alimentary canal, liver, kidney and gill.
15.	<i>Channa⁸² punctatus</i>	Rogon (dimithoate)		Abnormal behavior pattern in fish.

Species of *Belatal* was in abundance in almost all the ponds and species of *Bacillus* and *Pseudomonas* were abundant microbiological flora in the ponds. Rest of the Planktons enlisted were found in heavy quantity in the lakes.

REFERENCES

- Ahamd and Datta Munshi, J.S. 1987. Variation of copper toxicity on the fingerlings of fresh water Indian carps, *Catla catla* and *Laleo rohita*. Biol. Bull. Indian 9 (3). 185-189.
- Allen, P. 1995. Chronic accumulation of cadmium in the edible tissue of *Oreochromis aureus* Modification by mercury and lead. Arch. Environ cotam Toxicol 29. 8-14.
- Anand Kumar, A., Tripathy, A.P. and Tripath. N.K. 2001. Effect of dirnecron on the blood parameters of *Heferopneustes fossilis* J. Environ Bio. 22(4) , 297-298.
- Andersson, T. Forlin, L., Hardig, J. and Larsson, A. 1998. Physiological disturbances in fish living in coastal water polluted with bleach kraft pulp mill effluents, Can. J. Fish Aqaul, Sci, 45-1525-1536.
- Atsdr, 1999A. Toxicological profile for cadmium US Department of Health and Human Services, Public Health Service 205-93-0606.
- Atsdr, 1999b. Toxicological profile for Lead US Department of Health and Human Services Public Health Service 205-93-0606.
- Atsor, 1994. Toxicological profile for Zinc US Department of Health and Human Services, Public Health Service 205-88-0608.
- Avenant-Oldwage, A. and Marx, H.M. 2000. Bloaccumulation of chromium, copper and iron in the organs and tissue of *Clarias gariepinus* in Olifant River kruger National park water SA 26: 269-582.
- Barlas, N.A. 1999. A Pilot Study of heavy metal concentration in various environment and fishes in under Saharyia river basin, Tunkey, Environ, toxicol. 14. 367-373.
- Barlas, P.S. and Rani A.U. 2003. Cadmium Induced antioxidant defense mechanism in fresh water teleost *Oreochromis mossambicus* (tilapia) Ecotoxi ecology and Environment safety 56. (2) 216-221.
- Beena S. Viswaranjan, S. 1987. Effect of cadmium and mercury on the hematological parameters of fish *Cyprinus carpio*, Environ. Eco. 4. 726-732.
- Benoit, D.A. and Holcombe, G.W. 1978. Title Of Paper J Fish Bio 13, 701-708.
- Canli. M. and Furnss, R.W. 1993. Toxicity of heavy metals dissolved in sea water and influence of sex and size on metal accumulation and tissue distribution the Norway

- lobster, *Nephrops norvegicus*. *Mar. Environ , Res* 36, 217-236.
- Chandra, Smita, Ram, R.N. and Singh, J. 2001. Toxic effect of carbofuran on certain hematological parameter in yearlings of *Cyprinus carpio* *Aquacult.* 2(2) 137-140.
- Cogun, H.Y. and Kargin, F. 2004. Effect of pH on the motility and accumulation of copper in tissue of *Oreochromis niloticus* *Chemosphere* 55 2 277-282.
