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EFFECT OF AGRICULTURAL RUN-OFF ON CERTAIN HEMATOLOGICAL PARAMETERS OF A FRESH WATER TELEOST, CATLA CATLA

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Abstract:-The use of pesticides in agricultural practices has adversely effected the aquatic environment to a lethal extent, reflecting the effects on various biological parameters in fishes. The agricultural run-off during monsoon find its way from agricultural lands of the, Mauganj and Hanumana, Rewa (M.P.) which causes serious damage to fishes and reduces oxygen and releasing nutrients of the Gorama dam. The purpose of this study was to evaluate the effects of agricultural run-off on haematological alteration caused due to increased pollution influx especially during the monsoon period in Gorama dam.

Keywords: Agricultural run-off, haematolgical alteration, Catla catla.

INTRODUCTION

Agrochemicals are one of the most significant in the green revolution, but unplanned excessive use of these pesticides have contaminated the water resources and created biological problems to the aquatic biota. These pesticides also enter the food chain of aquatic ecosystem, effective the organism at different tropic levels. This has directly affected fish production. The pesticides which are major components of agricultural run-off enter the water body from various sources i.e. run-off from agricultural wastelands, industrial effluents, sewage, dust and rainfall. In water the residues and their degradation or transformation products are distributed dissolved from and those incorporated into sediments, benthic invertebrates, plankton, aquatic plants, aquatic vertebrates and suspended detritus. Pesticides can have aquatic system by co-distillation or volatilization, as residues in fish which are eaten by man, birds and animals or by degradation in sediments or out follow (Edward, 1973). Extensive studies have been made concerning the toxicity of pesticide in relation to mortality of fishes. Similar study was made by: Pandey, et al., 1979; Bakathavathsalam, 1991; Bhargava, et al., 1999; Tilak, et al., 2001; Most of the toxicological studied are restricted to mortality and growth rate of fishes. The present study has been taken to study the effect of agricultural run-off on haematological alteration like certain changes in RBC, WBC count and change in Hb% specially noticed during monsoon period reflecting the increased pollution in Gorama dam due to pesticides influxes.

MATERIAL AND METHODS

Fishes were caught from Gorama dam and were anesthetized with 100 mg/l tricaine methanesulfonate (MS-222) in laboratory. Then the caudal peduncle of Catla catla was cut off with a sharp razor blade and free flowing blood was collected for the hematological study. Hematological parameters were estimated by standard methods as described by Blaxhall and Daisley (1973). The RBC and WBC cells counts were made by Neubaur's haemocytometer. Hemoglobin % determined was performed by Sahli's haemometer.

RESULT AND DISCUSSION

In control fish the RBC count was 4.1 x 106/mm3. The total RBC count showed decrease with the increase in pesticide concentration in Gorama dam as the Catla catla caught in monsoon showed the least of RBC count 2.13 x 106/mm3, while the Catla catla caught in pre-monsoon showed 3.2 x 106/mm3 of RBC count, while the Catla catla caught in post-monsoon revealed the value of RBC count was 2.58 x 106/mm3. (Table-1)

Table-1

Hematological changes in Catla catla due to Agricultural run-off in Gorama dam During January – 20012 to Dec. 2013

Blood parameters	Control	Pre-monsoon	Monsoon	Post-monsoon
Total RBC Count (X x 106/mm3)	4.1	3.2	2.13	2.58
Total WBC Count (X x 104/mm3)	1.98	3.96	2.98	3.88
Hemoglobin (g./dl)	13.92	11.66	8.41	10.32

The WBC count of Catla catla caught in the monsoon was 2.98 x 104/mm3 when compared to the control group which estimated the WBC count of 1.98 x 104/mm3, while the experimental group caught in pre-monsoon represented the highest WBC count (3.96 x 104/mm3), While the experimental group caught in post monsoon revealed the value of WBC count was 3.88 x 104/mm3. The least WBC count was measured in caught in monsoon which reveals the malfunctioning of the haematopoietic system due to increased pesticides concentration in Gorama dam. The hemoglobin percentage in control group was 13.92 (g/dl) which decreased to 11.66 (g/dl) in pre-monsoon to least 8.41 (g/dl) in monsoon while in post-monsoon was observed 10.32 (g/dl). Respectively, these finding in Catla catla are in partial agreement with results of other researchers: Qayyum et al.,(1982) reported an increase in lymphocytes and a decrease in monocytes, neutrophils and basophils of Clarias batrachus on exposed to Dipterex. Bashmohideen & bala (1989) studied the effect of Malathion on Ach activity in the tissue of common carp Cyprinus carpio and reported that the decreased in the R.B.C. counts. Dutta et al., (1992) reported that the decreasing hemoglobin with increase in time exposure of malathion. Gupta et al.,(1995) examined the exposed fish exhibited higher values of prothrombin time (PT), white blood corpuscles (WBC) and packed cell volume (PCV) of Notopteres notopteres on exposed to chlordane and malathion. Fink and Salibin (2005) reported that WBC increase could be due to an induced proliferation as a result of the chemical toxicity of haematooietic cells that in turn may be a consequence of a depletion circulating differentiated cells. Gupta et al.,(2009) studied the effect of lindane on haematological indices of minor carp Labeo boga and reported the increase percentage of WBC count with the increase concentration of linden. Jaffar Ali and Jaya Rani (2009) determined that the total RBCs, WBCs, hemoglobin content, and haematocrit value significantly decreased of Oreochromis mossambicus on exposed to phosalone.

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