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Effect of butachlor on haematological profile of exotic carp, *cyprinus carpio* var *communis* (Linn) of Manasbal lake of Kashmir valley

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Abstract

Haematological studies of *Cyprinus carpio* of Manasbal lake of Kashmir valley in the present study includes the erythrocyte count, haemoglobin concentration and haematocrit value or packed cell volume of blood and subsequently absolute values of M.C.V, M.C.H and M.C.H.C were also calculated by the respective formulae. The major effects of butachlor on blood parameters are concerned with total R.B.C count, their size and differential count of W.B.C .The significance of the present study is concerned with pesticide pollution of Manasbal lake and the effect of butachlor on the haematological profile of the exotic carp, *Cyprinus carpio*.

Keywords: Effect, haematological, var *communis*, Manasbal lake, Kashmir valley

1. Introduction

Kashmir is a beautiful valley of lakes, rivers, torrential streams and lush green meadows, surrounded by mountains in the northern state of J&K in India. Kashmir lakes are rich in biota particularly in the ichthyofauna. The main lakes of the valley are Wular lake, Manasbal lake, Dhal lake, Nigeen and Anchar lake .Each lake has its own speciality and peculiarity. In the last one and a half decade tremendous change has occurred in the ecology of these lakes particularly by pesticide pollution. Kashmir's main fruit of commercial importance is apple, heavy pesticide sprays are made many times a year in the orchids and paddy field of the valley to improve the production and increase the yield. A heavy quantity of these pesticides finally finds way in the water bodies of the valley, particularly in the lakes, and the Manasbal lake is no exception to it. The main ichthyofauna of the Manasbal lake is composed of Schizothorax and *Cyprinus carpio* species.

Cyprinus carpio as an exotic fish species was introduced in Manasbal lake in 1956. Pesticide pollution has proved to be very hazardous for the general fauna and in particular for the ichthyofauna of valley lakes. In the neighbouring villages of Mansbal, the commonly used pesticides in paddy and orchid fields contain a chemical known as Butachlor. Heavy inflow of butachlor is very common in Manasbal lake which brings general morphological and physiological changes in aquatic biota in general and in *Cyprinus carpio* in particular. Effect of heavy pesticide pollution on haematological parameters of different fishes has been studied by many workers .In the present study the effect of butachlor on the haematological profile of *Cyprinus carpio* has been discussed.

2. Materials and Methods

Live specimens of the fish *Cyprinus carpio* were collected from the local fishermen of Mansbal locality. After acclimatization in the laboratory conditions for 10 days, the fish of same size and body weights (25-30g) were taken for experimentation. For each control and experiment 10 fishes were selected. Three glass aquaria were used in which the fishes were exposed to the sublethal concentrations of butachlor for 10, 20 and 30 days. Preliminary bioassays showed that 12 ppm of butachlor was the sublethal concentration for this fish in chlorine free water.

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Fig 1: Collection of blood sample from *Cyprinus carpio* exposed to Butacholar.



Fig 2: Blood collecting apparatus used during the experimentation.

Blood was collected from each control and experimental fish after 10, 20 and 30 days from the caudal region. The erythrocyte count/mm³ was determined by Naubar double haemocytometer. Haemoglobin concentration in g/100mL was determined by Sahli's Haemometer. Haematocrit value or packed cell volume (%) was determined with microhematocrit pipette.

Table 1: Changes in blood parameters of *Cyprinus carpio* from control and sublethal concentration of butachlor after different days.

Parameters	After 10 days		After 20 days		After 30 days	
	control	butachlor	control	butachlor	control	butachlor
Length of RBC (HM)	10.75	10.54	10.82	10.70	10.48	10.86
Breadth of RBC (HM)	8.74	8.62	8.56	8.56	8.60	8.75
Length of RBC nucleus (HM)	4.51	8.62	4.48	4.56	4.48	4.58
Breadth of RBC nucleus (HM)	4.14	4.15	4.18	4.17	4.02	4.10
TEC X10/mm	2.79	2.51	2.72	2.36	2.58	2.42
Hb (g%)	14.38	12.72	13.78	12.78	13.94	13.36
PCV (%)	29.95	25.52	30.24	24.64	28.50	26.30
MCV(μm ³)	107.35	101.67	111.18	104.41	110.46	108.68
MCH (PG)	51.54	50.68	50.66	54.15	54.03	55.21
MCHC (%)	48.01	49.84	45.57	51.87	48.91	50.80

Absolute values of M.C.V., M.C.H., and M.C.H.C. were calculated by following formulae:

$$\text{M.C.V} = \frac{\text{Haematocrit value}/100\text{mL blood}}{\text{RBC count (million/mm}^3)}$$

$$\text{M.C.H} = \frac{\text{Haemoglobin in g}/100\text{mL blood} \times 10}{\text{RBC count (million/mm}^3)}$$

$$\text{M.C.H.C} = \frac{\text{Haemoglobin in g}/100\text{mL blood} \times 10}{\text{Haematocrit value}/100\text{mL blood}}$$

The size of RBC, their nuclei and their surfaces were measured on air-dried methyl alcohol fixed blood films. The surface area was measured by the formula:

$$\text{Surface area} = \frac{\text{GD} \times \text{LD}}{2 \times 2}$$

Where GD = Greater diameter of RBC/their nuclei

LD = Lesser diameter of RBC/their nuclei

The WBCs were counted on morphological basis through L.M. and on the basis of morphological differences.

3. Results and Discussion

Changes in blood parameters of *Cyprinus carpio* from control and sublethal concentrations of butachlor after different days are given in table 1. It is clear that butachlor has an effective influence on the blood parameters. TEC, Hb content and PCV (%) showed a decrease during all the three periods. The length breadth ratio of the erythrocyte and their nuclei is almost near to the control values in all the cases of exposure showing no changes in shape. In some cases the hypochromasia and eccentrically placed nucleus were observed. Significant alteration in absolute values such as MCH, MCHC and MCV were also noticed. The TLC increased in number after butachlor treatment. Significant increase in LL count and insignificant increase in monocytes and neutrophils were observed.

Table 2: Differential counts of WBCs

LL	26.62	33.50	29.30	35.56	26.10	32.10
SL	56.60	42.01	57.00	43.00	58.90	46.30
M	5.25	8.02	6.56	7.60	6.00	6.60
N	1.50	3.00	1.50	4.00	1.75	2.30
E	1.63	1.30	4.00	4.50	5.00	5.02
B	5.80	5.58	2.05	4.05	2.00	3.05

P.C.V = Packed cell volume, LL. = Large lymphocyte, S.L.=Small lymphocyte, M = Monocyte, N = Neutrophil, E = Eosinophil, B = Basophil.

Histological studies are important from the pollution load, stress and disease point of view. Effect of butachlor on blood parameters has been proved to be a burning issue. The increase in RBC count and Hb concentration suggests enhanced erythropoiesis. PCV % is directly correlated with total erythrocyte count (TEC) in fishes. Significant alteration in absolute values such as MCH, MCHC and MCV were also observed (Goel et al. 1985) [1].

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