



RESEARCH ARTICLE

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### Effect of Butachlor on Haematological Profile of *Channa punctatus* (Bloch) in Gandak River

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#### ABSTRACT

Haematological studies of *Channa punctatus* of Daha River in Siwan district in the present study includes the erythrocyte count, hemoglobin concentration and haematocrit value or packed cell volume of blood and subsequently absolute values of MCV, MCH and MCHC were also calculated by the respective formulae. The major effects of butachlor on blood parameters are concerned with total RBC count, their size and differential count of WBC. The significance of the present study is concerned with pesticide pollution of paddy field in local area and the effect of butachlor on the hematological profile of the exotic carp, *Channa punctatus*.

**Key words:** Effect, hematological, Paddy field, *Channa punctatus*

#### INTRODUCTION

Gopalganj is a district located in north Bihar with Daha River, its tributaries and floodplains in India. The local farmers used butachlor in paddy fields for control of weeds. In the last decade tremendous change has occurred in the ecology of these paddy fields with use of insecticides and chemicals to control weeds to improve the production and increase the yield. A heavy quantity of this chemical finally finds way in the Rivers (Sangeeta and Agrawal, 2003; Kumari, 2002). The main ichthyofauna of the paddy fields is composed of *Channa punctatus* and other small fishes.

*Channa punctatus* is an endemic fish species of local paddy fields. Pesticide pollution has proved to be very hazardous for the general fauna and in particular for the ichthyofauna of Daha River in Siwan district. Heavy inflow of butachlor is very common in Daha River which brings general morphological and physiological changes in aquatic biota in general and in *Channa punctatus* in particular. Effect of heavy pesticide pollution on hematological parameters of different fishes has been studied by many workers (Kumar et al, 2000). In the present study, the effect of butachlor on the hematological profile of *Channa punctatus* has been discussed.

#### MATERIALS AND METHODS

Live specimens of the fish *Channa punctatus* were collected from the local fishermen of Siwan district. The fishes of same size and body weights (20-25g) were taken for experimentation with prior 10 days acclimatization in the laboratory conditions. Then 10 fishes were selected for control and exposed conditions. 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.

Blood was collected from each control and experimental fish after 10, 20 and 30 days from the caudal region. The erythrocyte count/mm<sup>3</sup> was determined by Naubar double hemocytometer. Hemoglobin concentration in g/100mL was determined by Sahli's Hemometer. Haematocrit value or packed cell volume (%) was determined with microhematocrit pipette.

Absolute values of M.C.V., M.C.H., and M.C.H.C. were calculated by following formulae: MCV=Hematocrit value (100 ml blood)/RBC count (Million/mm<sup>3</sup>), MCH=Hemoglobin in gm (100 ml blood×10)/RBC count (Million/mm<sup>3</sup>) and MCHC=Hemoglobin in gm (100 ml blood×10)/ Haematocrit value (100 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: Surface Area=GD×LD/2×2, Where GD = Greater diameter of RBC/their nuclei, and, LD = Lesser diameter of RBC/their nuclei. The WBCs were counted on morphological basis through L.M. and on the basis of morphological differences.

## RESULTS AND DISCUSSION

It is clear that butachlor has an effective influence on the blood parameters as results are given (Table 1) in control and butachlor exposure after different days of investigation.

**Table 1:** Changes in *Channa punctatus* blood parameters in control medium.

Parameters	After 10 days Control (Exposure)	After 20 days Control (Exposure)	After 30 days Control (Exposure)
RBC length	11.68 (11.24)	11.80 (11.64)	11.38 (11.76)
RBC width	9.72 (9.60)	9.56 (9.50)	9.62 (9.67)
RBC nucleus length	4.62 (4.66)	4.52 (4.56)	4.50 (4.58)
RBC nucleus breadth	4.24 (4.26)	4.12 (4.09)	3.98 (4.08)
TEC×10/mm	2.86 (2.57)	2.78 (2.40)	2.56 (2.40)
Hb (%)	15.21 (13.56)	14.62 (13.64)	14.24 (13.86)
PCV (%)	30.62 (26.34)	31.42 (25.24)	29.96 (27.42)
MCV (µm <sup>3</sup> )	109.36 (102.28)	114.22 (107.41)	112.10 (109.98)
MCH (pg)	52.24 (51.10)	55.12 (55.04)	54.98 (55.12)
MCHC (%)	49.06 (50.36)	46.34 (50.32)	48.46 (50.34)

It is clear that butachlor 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 WBCs count.

Differential WBC	Control (10 days)	Exposure (10 days)	Control (20 days)	Exposure (20 days)	Control (30 days)	Exposure (30 days)
Large lymphocyte	27.50	32.46	30.12	36.22	27.32	33.42
Small lymphocyte	57.32	43.12	58.00	44.00	59.40	46.86
Monocyte	6.12	8.94	7.52	8.24	6.64	7.18
Neutrophyl	1.62	3.18	1.60	4.36	2.15	2.64
Eosinophil	1.72	1.46	4.24	4.74	5.26	5.32
Basophil	5.96	5.72	2.64	4.26	2.18	3.24

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).

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