



**ORIGINAL ARTICLE**

**Effect of Butachlor on Haematological Profile of *Heteropneustes fossilis* (Bloch) in Gandak River**

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**ABSTRACT**

*Haematological studies of *Heteropneustes fossilis* of Daha River in Siwan district includes the blood cells and other important parameters that affecting morphology and physiology of these cells of circulatory system. The study deals about pesticide affecting nearby paddy field in local area in relation to hematology of *Heteropneustes fossilis*.*

**Keywords:** *Effect, hematological, Paddy field, *Heteropneustes fossilis**

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**INTRODUCTION**

Siwan 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 recent years tremendous change has occurred in the ecology of these paddy fields with use of insecticides and chemicals to control weeds toward enhanced crop productivity. A heavy quantity of this chemical finally finds way in the Rivers (Sangeeta and RK Agrawal, 2003, Kumari I, 2002). The main ichthyofauna of the paddy field include *Heteropneustes fossilis* and other small fishes.

*Heteropneustes fossilis* is an endemic fish species of local paddy fields. Pesticide pollution is very hazardous to freshwater organisms especially for the ichthyofauna of Daha River in Siwan district. Heavy inflow of butachlor is general in Daha River which brings general morphological and physiological changes in aquatic biota and in *Heteropneustes fossilis* in particular. Effect of heavy pesticide pollution on hematological parameters of different fishes has been studied by many workers (Kumar et al, 2000). This study hematology of *Heteropneustes fossilis* have been studied with butachlor exposure.

**MATERIALS AND METHODS**

Live specimens of the fish *Heteropneustes fossilis* were taken by local fishermen of Siwan district. The fishes of same size and body weights (20-25g) were taken for experimentation with prior 10 days acclimatization. Than 10 fishes were selected for control and exposed conditions. Three glass aquaria were used where fishes were treated with butachlor toxicity 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.

The blood was 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:  $MCV = \text{Hematocrit value (100 ml blood)} / \text{RBC count (Million/mm}^3)$ ,  $MCH = \text{Hemoglobin in gm (100 ml blood} \times 10) / \text{RBC count (Million/mm}^3)$  and  $MCHC = \text{Hemoglobin in gm (100 ml blood} \times 10) / \text{Haematocrit value (100 ml blood)}$ .

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:  $\text{Surface Area} = GD \times LD / 2 \times 2$ , 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. due to morphological differences.

## RESULTS AND DISCUSSION

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

**Table 1:** Changes in blood attributes 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 $\times 10$ /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 ( $\mu\text{m}^3$ )	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 (%) exhibits fall during different periods. The length breadth ratio of the erythrocyte and their nuclei is almost near to the control values under 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. Here is increment 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 as it covers pollution load, stress and disease in target organisms. Effect of butachlor on hematology has been proved to be a burning issue. The increment 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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