

# Comparative Study Of Certain Haematological Parameters (Total Rbc, Wbc Count And Haemoglobin Estimation) Among Four Species Of Live Fishes

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**Abstract:** The blood parameters are indicator of physiological condition of fishes. The value of haematological parameters depend on sex, size, species, season, age and activity of the fishes. Changes in physico-chemical parameters may be reflected by haematological parameters of the fishes. In view of this, the purpose of the present study was to compare certain haematological parameters like Total RBC, Total WBC count and Haemoglobin estimations among four species of live fishes. In the present study, the RBC numbers are found higher in the active and predacious fishes i.e. *Heteropneustes fossilis* and *Clarias batrachus* and whereas in the relatively slow and inactive *Channa striatus* and *Channa punctatus* these values are comparatively low. The values of WBC and Hb concentration are also observed to be higher in *Heteropneustes fossilis* and *Clarias batrachus* and quite low value as recorded in the *Channa* species.

**Keywords:** *H. fossilis*, *C. batrachus*, *C. punctatus*, *C. striatus*, RBC, WBC, Hb content.

## I. INTRODUCTION

Fish is the source of cheapest protein available for mankind. Blood comprises 1.3% -7% of the total body weight of fish and it is one of the most active components that contribute to metabolic process by ensuring gas exchange between the organism and the environment. For this reason blood parameters are increasingly used as indicators of the physiological condition or sub-lethal stress response in fish to endogenous or exogenous changes. Studies have been done on blood parameters in different species of fishes. Several authors have done remarkable works on haematology of fishes inhabiting streams, rivers, lakes as well as oceans to get the normal values of various blood components which are used as reference values for different other experiments regarding fish haematology. Experiments on comparative haematology of fishes have been done by many authors to get information on intra and inter-specific variations. For this study, four live fish species are considered which are most common fishes of economic importance. The particular interest in studying the blood parameters of *Heteropneustes fossilis*, *Clarias*

*batrachus*, *Channa punctatus* and *Channa striatus* lies in the fact that these species were proposed as good model organisms because of their, economic and medicinal importance.

## II. MATERIALS AND METHODS

The sample fishes for this study were *Heteropneustes fossilis*, *Clarias batrachus*, *Channa punctatus* and *Channa striatus*. These fishes are commonly known as singhi, magur, goroi and shol respectively in Assam. Live individuals of each of the four species (irrespective of sex) were collected from nearby local market. The collected species were brought to the lab and kept in aquarium for acclimatization. During this period water of the aquarium was changed on each alternate day and fishes were fed with commercial fish food. After 15 days of acclimatization fishes were sacrificed and blood samples collected by tail ablation in small plastic tubes containing EDTA as anticoagulant. The blood samples were diluted with appropriate diluting fluid for RBC, WBC. The

results of total count were recorded using a Neubauer Haemocytometer and Hb content was calculated using Sahli's Haemoglobinometer.

### III. RESULT

The haematological values in the four species of fishes are shown in the Table 1. On the basis of the data obtained from 3 fishes of each species the ranges of values of haematological parameters were: RBC  $2.56 \times 10^6$  to  $3.01 \times 10^6/\text{mm}^3$ ; WBC  $11.20 \times 10^3$  to  $32.80 \times 10^3/\text{mm}^3$ ; Hb content 10.5 to 15.7g/dl. These values indicated that there are slight fluctuation of the values among these 4 species.

Parameters	<i>H. fossilis</i>	<i>C. batrachus</i>	<i>C. striatus</i>	<i>C. punctatus</i>
RBC X $10^6/\text{mm}^3$	$3.01 \pm 0.087$	$2.98 \pm 0.065$	$2.61 \pm 0.096$	$2.56 \pm 0.075$
WBC X $10^3/\text{mm}^3$	$32.80 \pm 0.163$	$29.70 \pm 0.255$	$11.65 \pm 0.153$	$11.20 \pm 0.127$
Hb g/dl	$15.70 \pm 0.708$	$13.60 \pm 0.901$	$10.5 \pm 0.929$	$11.00 \pm 0.8$

Table 1: Haematological values in four species of live fishes (Values are mean  $\pm$  STDEV of 3 observations)

### IV. DISCUSSION

Fishery sector play an important role in the economy of Assam. Any changes in the environment would affect the physiology of the fishes. Fish blood is being studied in toxicological research and environment monitoring as a possible indicator of physiological and pathological changes in fishery management. There is growing interest in the study of haematological parameters and these parameters are regarded as important for aquaculture purposes. It is therefore considered desirable to evaluate the haematological changes in the blood parameters fish species. Within this group, blood parameters are found to vary from species to species, probably as a physiological adaptation to their different modes of life and ecological niches. According to Larsson et. al. (1976) the lesser values are observed in slow moving sedentary and benthic species, whereas the active, predacious and pelagic species give comparatively higher erythrocyte and leucocyte counts, Hb content. Pandey et. al (1976) reported a great variation in RBC number and other blood components in different species of fish.

In the present study, the RBC, WBC count and Hb content are found to be higher in the active and predacious fishes i.e. *Heteropneustes fossilis* and *Clarias batrachus*, whereas in the relatively slow and inactive *Channa punctatus* and *Channa striatus* these values are comparatively low. It can

be considered from this investigation that the *Channa* species are slow, sluggish and less active than the cat fishes. Thus the haematological values obtained in the present study almost agrees with earlier workers.

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