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Studies on the blood morphology of fresh water teleosts *Labeo rohita* (Ham) and *Clarias batrachus* (Linn).

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Abstract

In this course of study the blood morphology of both the fresh water teleosts *Labeo rohita* and *Clarias batrachus* was compared. In this investigation the heamoglobin percentage, Erythrocyte Count, Leucocyte Count, Thrombocyte percentage, PCV, MCV and MCHC were observed.

Erythrocyte count, lcucocyte count, haemoglobin percentage, PCV andMCV recorded a higher value for *Clarias batrachus* but values of MCH and MCHC were found lower than those of *Labeo rohita*. The thrombocyte count of *Labeo rohita* was higher than that of *Clarias batrachus* while neutrophils, eosinophils and monocytes counts were lower in the former. There was no change in the value of small and large lymphocyte of both the teleosts.

Keywords: Studies, Blood Morphology, *Labeo rohita, Clarias batrachus.*

Introduction

Our country is at a critical stage in industrial development and attention to environmental issues, now will pay timely dividends in national health. There is a need for all segments of our society to be cognizant of the hazards of continuing to pollute our environment; Scientists in particular as the informed segment of the society have an obligation to increase the public awareness and to alert the responsible authorities to act now. Due attention should however be devoted to the nature and causes of the problem, so that all segment of society may undertake appropriate measures.

The blood is an important liquid connective tissue flow in body and performs the role of distribution of oxygen to various tissues, taken out carbon dioxide and maintains the health status of an organism. Any changes in the blood components can cause adverse effects on the body. It is constituent of the animal body which plays a vital role in the body metabolism of living beings. It is a fluid containing cells and transports oxygen, water, food materials, carbon dioxide and other products of the metabolism and internal secretions. It is a tissues consisting of two fractions; one the cellular fraction consisting of erythrocytes, leucocytes and thrombocytes or platelets, and the other is the fluid plasma containing organic and inorganic substances. It provides a media by which the constancy of the internal environment is maintained. It is vehicle for quickly mobilizing defense against trauma and diseases. It is a fact that the blood is an index of the state of health of an organism.

As such the present study has under taken to examine the Study of Comparative Blood Morphology of *Labeo rohita* (Ham.) and *Clarias batrachus* (Linn).

Materials and Methods

Live specimens of *Labeo rohita* and *Clarias batrachus* were obtained from local fish catchers of Distt. (Etawah). Fishes were treated with 0.1% potassium permanganate solution to remove any fungal infection. They were acclimatized to the laboratory conditions for a period of 15 days. Only healthy specimens weighting (75.00 $\pm$5.00 g) were selected for this study. The blood sample were collected from the caudal vein or directly from the heart. EDTA was used as an anticoagulant. For R.B.C. and W.B.C. counts, a standard haemocytometer was used. Haemoglobin percentage wsa determined by cyanoment haemoglobin method (Dacie and Lewis 1974).

The volume of the packed cells was estimated by ultramicro method described by Natelson (1951) and the value of MCV, MCH and MCHC were calculated by the method of Dacie and Lewis (1974). Thrombocyte percentage was recorded by counting at least 100 leucocytes from each smear.

Results and Discussion

The present study shows the comparative haemotological values of the both fresh water teleosts *Labeo rohita* and *Clarias batrachus*. The higher number of erythrocyte count was found to be $4.50x10^6/mm^3$ in *Clarias batrachus* and lower number were found to be $2.65x10^6/mm^3$ in *Labeo rohita*. Bansal et al. (1979) and Verma et al. (1979) reported that, erythrocyte count in air breathing fishes comes higher than found in the exclusive water breathing, which falls true in the present study also since. *Clarias batrachus* gave a higher count than the *Labeo rohita*. Yadav et al. (1978) observed that varying erythrocyte count in fishes depends upon the extent of adaptability to aquatic conditions.

The number of W.B.C. differs in different fishes. The counts made on the blood of *Labeo rohita* was found to be $12.00x10^3/mm^3$ while the value for *Clarias batrachus* was found to be $35.00x10^3/mm^3$. Thus the total leucocyte count of *Labeo rohita* was comparatively much lower than that of *Clarias batrachus* verma et al. (1979) observed different value for the haemoglobin concentration in various fishes but has not accounted for the variations in these species. In *Labeo rohita* the haemoglobin percentage was 9.80 gm% and in *Clarias batrachus* 14.00 gm%. According to Krogh and Leitch (1919) and Johnson (1970) the difference in the haemoglobin content reflect the nature of their oxygen deficient habit.

Packed Cell Volume (PCV) showed a value of 27.50% in *Labeo rohita* and 47.50% in *Clarias batrachus*. This reported value of *Clarias batrachus* attains resemblance with Raizada and Singh (1982) but is lower than of Qayyum and Naseem (1967). Mean Corpuscular volume (MCV) in *Labeo rohita* and *Clarias batrachus* was 106.50 um^3 and 205.00 um^3. Respectively whereas mean Corpuscular Haemoglobin (MCH) of *Labeo rohita* was found to be 40.57 pg and in *Clarias batrachus* 31.11 pg.

Table 1: Comparative hematological values of *Labeo Rohita* (Ham) and *Clarias batrachus* (Linn).

Parameters	*Labeo rohita*		*Clarias batrachus*	
	Range	**Mean**	**Range**	**Mean**
R.B.C. ($X10^6/MM^3$)	2.60 – 2.70	2.65 ± 0.03	4.46 – 4.52	4.50± 0.05
W.B.C. ($X10^6/MM^3$)	11.00 – 12.50	12.00± 0.09	30.00 – 36.00	35.00± 0.06
HB. (GM%)	9.00 – 9.80	9.80 ± 0.14	13.50 – 14.50	14.00 ± 0.09
PCV (%)	26.00 – 28.50	27.50 ± 0.06	45.50 – 48.00	47.50 ± 0.67
MCV (UM^3)	105.00 – 108.50	106.50 ± 0.94	205.00 – 210.00	205.00 ± 0.57
MCH (PG)	35.00 – 46.50	40.57± 0.06	28.00 – 32.00	31.11± 0.26
MCHC (%)	36.50 – 39.00	38.57± 0.74	25.00 – 30.61	29.93± 0.36
Differential Leucocyte Counts (DLC)	**RANGE**	**MEAN**	**RANGE**	**MEAN**
Thrombocytes (%)	55.5 – 65.50	60.0± 0.89	35.0±42.50	40.5± 0.32
Small lymphocytes (%)	25.5 – 35.0	30.5 ±0.73	27.5 – 32.00	30.0 ± 0.34
Large lymphocytes (%)	0.0 – 3.0	1.5 ± 0.17	0.0 – 3.0	1.5 ± 0.23
Neutrophils (%)	3.0 – 4.0	3.5± 0.20	18.5 – 22.0	30.5 ± 0.73
Eosinophills (%)	1.5 – 4.5	2.0 ±0.16	4.5 – 6.0	5.0±0.24
Monocytes (%)	2.0 – 3.0	2.5 ± 0.15	2.0 – 3.5	3.0± 0.21

Values are Mean ± S.E.

Thus the *Clarias batrachus* having a higher haemoglobin content and R.B.C. count possessed a lower value of Mean Corpuscular Haemoglobin Concentration (MCHC) was found to be 38.57% in *Labeo rohita* and 29.93% in *Clarias batrachus*. According to Todd (1972) the high Mean Corpuscular Haemoglobin Concentration (MCHC) is advantage in limiting the number of blood cells for increased haemoglobin concentration.

The thrombocyte percentage also varies from species to species. The thrombocyte percentage was observed 60.00% in *Labeo rohita* and 40.5% in *Clarias batrachus*. Pickford et al. (1971) observed no change in thrombocytes cells after two hours of cold shock. According to Siddiqui et al. (1970) the thrombocyte count is higher in the exclusive water breathers. Little variation was observed in the percentage of small and large lymphocytes in both the test fishes. The small lymphocytes were nearly 30.00% and large lymphocyte were 1.5% in both the fishes. The differentiation of large and small lymphocytes was made on the basis of the size of cells. Neutrophils were 3.5% in *Labeo rohita* and in *Clarias batrachus* were 20.00%. The eosinophils were 2.0% and 5.0% *Labeo rohita* and *Clarias batrachus* respectively. Monocytes exhibited an average of 2.5% in *Labeo rohita* and 3.0% in *Clarias batrachus*.

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