HAEMATOLOGY OF *ANABAS TESTUDINEUS* BLOCH

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ABSTRACT : Haematological investigation were carried out using 63 disease free adult Anabas testudineus. Quantification of erythrocytes, leucocytes, haemiglobin, haematocrit, serum protein and glucose was done differential counts of leucocytes was dominated by thrombocytes (43.90%), while red cell was dominated by erythrocytes (92.8%),MCV,MCH and MCHC were also calculated. The average haemoglobin content and blood glucose was 1.45m/100 ml and 81.17 mg/100 ml respectively.

INTRODUCTION

The outbreak of fish diseases are very common in intensive and super intensive fish farming systems. The blood of fish may be one of the indicators for diagnosis of fish diseases.Thus,haematlogicial investigations are very essential in monitoring of the fish health. The haematolgogy of the fishes has been studied by several investigators (BANERJEE ,1966),MUNSHI AND SINGH ,1968 ,SINGH 1976, (RAIZADA AND SINGH ,1980,USHA RANI,1981,RADHAKRISHNAN et al. 1984,KUMAR 1987
,MURAD AND MUSTAFA 1988).However little attention has been paid on the quantitative and qualitative structure of the blood of Anabas testudineus , which is a preferred food fish. The present investigation is an endeavour to explore the comprehensive blood picture of the disease free A. testudineus, so as to provide a standard base for disease diagnosis as well as other characteristics of their blood.

MATERIALS AND METHODS

Fishes were procured from the road side borrowpits located in the vicinity of Kausalyaganga, Puri District. They were treated with 250 ppm solution of KMnO4 before actimatization in the 300 liters capacity plastic pools for a week. Fish were fed with pelleted fish feed consisting of Rice bran, groundnut oil cake and fish meal. Blood was drawn from 63 specimens of 75-115 mm length, 9.0-21 g weight by severance of caudal peduncle and collected in small vials, containing 3.8% solution of sodium citrate as anticoagulant. Total erythrocytes, leucocytes counts and haematocrit values were estimated as per the methods described by WEDEMAYER and YASUTAKE (1977) .Absolute values (MCV,MCH and MCHC) were calculated from TEC ,haemoglobin content and haematocrit values. Thin smears were prepared and fixed with mathanol before staining with Giemsa .Haemoglobin content ,serum protein and glucose were analysed by Dr. Lange photometer using Dr. Lange Test Kits imported from Germany. (ANONYMOUS, 1986)

RESULTS AND DISCUSSION

Mean values with their range and standard deviation of various parameters of blood are given in table 1-3. Figure-1. The exythxocyteswere round and oval in shapwithy centrally placed nucleus (Fig.1). Among leucocytes, both granulocytes and non-granulocytes were recorded
. These cells were generally large and oval but their size and shape often varied.

The nucleusof the thrombocytes were ovoid shape and took dark stain with Giemsa. Chromatins were density packed in the nucleus of thrombocytes .

Fig. 1 :Blood Cells of *Anabas Testudineus,* E-Erythrocyte L-Lymphocyte

The total erythrocyte counts ranged from 4.01 to 4.71 X 106 mm-3 with a mean of 4.44 X 106 mm-3 which was comparable to the findings of BANERJEE 1966 (4.61 X 106 mm-3).However, these values were significantly higher than that of water breathing fishes L. rohita,C. catla and C. mrigla (1.55-2.14,1.78-2-25 and 1.57-2.03 million mm-3 respectively) reported by PANIGRAHI (1978).Average leucocyte count was 13,750 mm-3 .BANERJEE (1966) reported 12,200 mm-3 from the same species. Average hemoglobin content was found to be 13.45 g/100 ml (10.98-15.7 g/100 ml) which was slightly lesser than that reported by BANERJEE (1966).However, the hemoglobin concentration in the present study was in agreement with that of other airbreathing fishes,C. batrachus and H. fossilis (SINGH,1976) . Haematocrit value in present communication was found to be 41.53% (37.71-44.63%) , which was comparable with the findings of BANERJEE (1966) and also with other Indian airbreathing fishes C. batrachus and H. fossilis (SINGH,1976).

TABLE 1: Data showing values of different component of blood

Sl.No.	Parameters	Range	Mean	S.D.
1.	Length (mm)	75-115	94.78	± 11.4341
2.	Weight (g)	9.0-21.3	13.42	± 3.7417
	Total erythrocyte	4.01-4.71	4.44	±0.02184
	count X10^6mm^{-3}	9.00-17.50	13.17	±2.1242
5.	Total leulocyte	10.98-15.74	41.53	± 2.0686
count X 10^3mm^{-3}		37.71-44.63	41.53	± 2.0686
6.	Haemoglobin g/100 ml	86.47-100.02	92.21	± 3.3625
7.	Haematocrit value			
8.	Mean corpuscular value (cubic microgrames)	27.18-32.68	29.11	± 1.5690
9.	Mean corpuscular haemoglobin(Picograms)			
10.	Mean corpuscular Haemoglobin concentration (gl/100 mc of packed cells)	28.74-33.07	31.56	± 1.2188
11.	Blood glucose	72.90-89.24	81.17	± 4.4828
	Serum protein (g/100 ml)	2.79-4.1	3.42	± 0.3692

TALBE 2:Differential count of leucocyte of Ababastestudineus blood.

Sl.No.	Parameters	Percentage (mean)	S.D.
1.	Small lymphocytes	20.19	± 4.2579
2.	Large Lymphocytes	10.73	± 1.6279
3.	Neutrophils	18.30	± 1.8389
4.	Monocyte	2.25	± 0.6684
5.	Eosinophils	4.47	± 0.5763
6.	Basophils	0.91	± 0.6456
7.	Thrombocytes	43.98	± 4.2579

TABLE 3: Differential count of Red Cells of Anabas testudineus

Sl No	Parameters	Range	Mean	S.D
1.	Erythrocte	89-97	92.8	± 2.7129
2.	Erythorblast	3-7	5.0	± 1.7888
3.	Macrocyte	0-1	0.4	± 0.4898
4.	Microcyte	1-3	1.6	± 1.0198

The mean values of MCV, MCH and MCHC were 92.21 mm^{-3},29.11 picogram and 31.56% respectively. The glucose content ranges from 72.90 to 89.24 mg /100 ml with a mean of 81.17 mg/100 ml, was in as earlier reparted by TANDON and JOSHI (1975). Serum protein content ranged between 2.79-4.1 g/100 ml.

The values of differential red cell and leucocyte conutns presented in tables 2 & 3 revealed that the erythrocytes dominated in all blood smears. The percentage compositions of erythrocyte erythroblast, macrocyte and microcyte were 92.8 ,5.0,0.4 and 1.6 respectively.Among the leucocytes, thrombocytes were recorded to be highest (43.98%) , followed by small lymphocytes (20.19%),neutrohils (18.30%) large lymphocytes (10.73%) ,eosinophils (4.47%) , monocytes (2.25%) and basophils (0.91%).

Various parameters of the blood fluctuated under different environmental and diseased conditions. For example, the low count of TEC was due to anemia, hemodilution due to impaired osmoregulation, gill damage, while high value was due to stress polycythemia, dehydration and hemococentrations. In case of TLC , leucopenia was due to acute stress, while leucocytosis was due to bacterial infection.Low percentage of haematocrit was generally due to anemia, hemodilution due to gill damage while high might be due to hemoconcentration, dehydration stress and polycythemia. Low content of glucose might be due to inanition, while high content due to acute or chronic stress. High values of serum protein was due to hemoconcentration, impaired water balance , while low values due to infections, disease, kidney damage nutritional imbalance and inanition (WEDMEYER AND YASUTAKE, 1977). Therefore, it is suggested that various blood parameters described in the present study will form a good basis for health monitoring of A. testudineous under various environmental, pollution and diseased conditions.

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