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HAEMATOLOGICAL STUDY OF *CLARIAS BATRACHUS* FROM AHMEDNAGAR

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ABSTRACT

Haematological study of Clarias batrachus fish from Ahmednagar. In present investigation , haemoglobin 10.8mg/dl, Total erythrocyte count, 2.49,10^6/mm^3, Total WBCs count 4.51 mm^3x10^3, Differential leucocyte count (out of 100 cells) includes Neutrophil 38.1%, Eosinophil-9.8%, Monocytes 6.9%, lymphocytes 45.1%, Blood indices MCV, MCH and MCHC count were observed. MCV values is 132.2 famolitre the MCH value 44.04 pg . MCHC value 33.28g/dl . packed cell volume 32.7, ESR 39 mm/hr value were observed.

Key word- *Clarias batrachus, Haematology, Haemoglobin, MCV, MCH.*

INTRODUCTION

Haematological parameters have been recognized as valuable tools for the monitoring of fish health (Bhaskar and Rao, 1984; Schuett et al, 1997) and in helping fishery biologist to interpret physiological responces to environmental stress, for comparing studies of different fish species living in constrasted habitats (Fasihuddin and kumara,1990; lvanc et al., 1997; Leonard and McCormick, 1999; Zhiteneva,1999). It is well known that blood parameters such as haemoglobin, haematocrit and RBC count are related to environmental factors such as water, temperature and salinity (Graham, 1997). In addition the relationship between haemoglobin and oxygen differs between loading and unloading sites and shows adaptations not only to environmental condition but also to metabolic requirements, both of which govern oxygen availability and transport to tissues (Weber and Wells, 1989). Although a number of reports known on the haematology of the different species of fish,

The aim of this work was to determine the relationship between haematological and biological parameters in the fresh water fish *Clarias batrachus*. The factors like temperature, salinity, oxygen tension , hydrogen concentration of the water affect the respiratory metabolism and consequently the blood constituents also. The collected data confirm a valuable diagnostic aid in fishes, as the deviation from normal values serves as a definite clue of the pathological state (Pradhan,1961).

Haematological observations can be used to distinguish different group of fishes. In this project an attempt has been made to studies some haematological aspects such as morphology, counting of different types of cells, haemoglobin percentage in freshwater fish *Clarias batrachus*.

MATERIAL AND METHODS

Collection

Healthy specimen of *Clarias batrachus* measuring 25-30cm in length and 300-800 gm weight were obtained from sarjepura fish market, near cotla stand, Ahmednagar Dist: Ahmednagar, Maharashtra, India. A total 10 fish were collected. The specimen were immediately transported to the laboratory and maintained further for the purpose of acclimatization and experimentation as describe below.

Maintenance

In the laboratory, fishes were kept in large plastic bowls containing 60 lit. of clean, dechlorinated tap water. The fishes were fed regularly with soyabean, shrimp and small fishes to avoid the possible effect of starvation on any of the haematological parameters of the fish. The fishes were allowed to acclimatize to the laboratory condition for 15 days prior to experimentation. Fish of both the sexes were used for experimentation without discrimination.

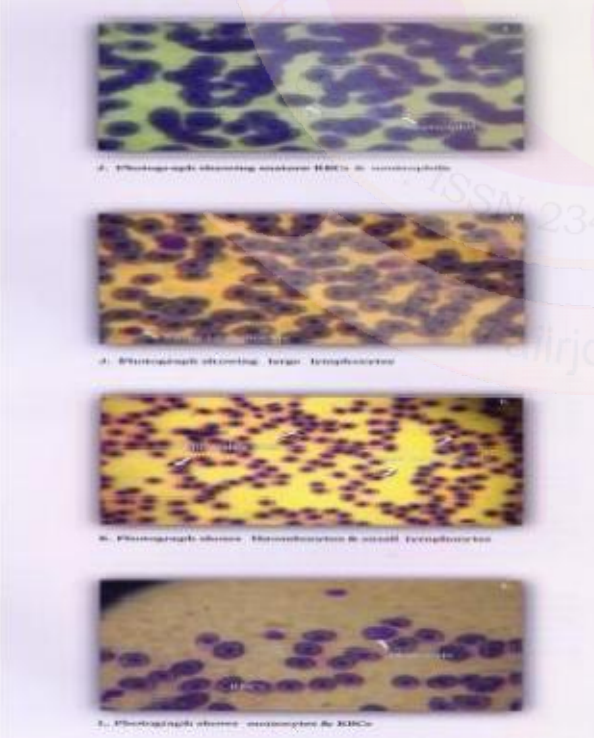
ESTIMATION OF HAEMATOLOGICAL PARAMETERS

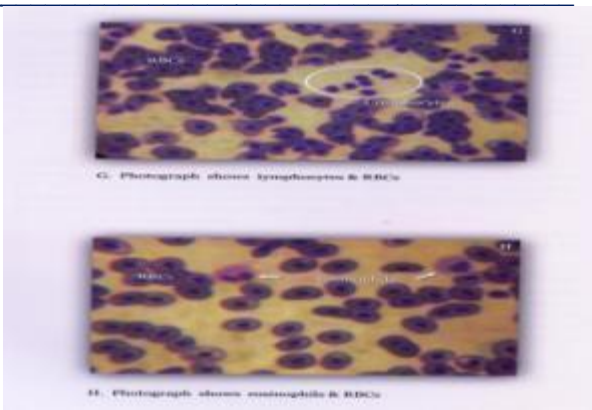
Only healthy fishes regardless of the sexes, were used for estimation of haematological parameters. Following haematological parameters were analyzed: total RBC (Red blood cell) count, total WBC (white blood cell) count, Differential leucocyte count (DLC), Hb (Haemoglobin), ESR

(Erythrocyte sedimentation rate), ,blood indices such as MCH (mean corpuscular haemoglobin) MCV (mean corpuscular volume) and MCHC (mean corpuscular haemoglobin concentration) and PCV (packed cell volume). The blood was collected by the method of steuke and Schoetteger (1967) by severing the caudal peduncle. EDTA solution was used as anticoagulant. However, blood for total RBC (Red blood cell), WBC (white blood cell), Hb (haemoglobin), ESR,PCV, MCH, MCHC, MCV, differential leucocyte count.

The RBC count using RBC diluting fluid is used for the RBC count.The WBC count used in WBC diluting fluid.The differential leucocyte count , RBC morphology and thrombocyte were performed by blood smear using the Leishmans stain/ field A and Field B . Haemoglobin was measured by sahlis haemometer by using N/10 HCl, packed cell volume value by wintrobe method (2000-3000 r.p.m. for 10 min). The blood indices such as mean corpuscles volume (MCV), mean corpuscles haemoglobin (MCH), mean corpuscles haemoglobin concentration(MCHC) were calculated from the result of RBC, Hb and PCV using the formulae given in practical haematology by Dacie and Lewis.

RESULT





HAEMATOLOGICAL STUDY OF *CLARIAS BATRACHUS* SHOWS FOLLOWING RESULTS

1. RBCs:

In *Clarias batrachus* fish, red blood cells are red coloured because of haemoglobin pigments. Each RBC is large oval cell with distinct cell membrane and centrally placed small oval nucleus surrounded by non granulated protoplasm. In present investigation the total number of red blood cell and average 2.49 x 10^6 /mm^3.

2. White blood cell :

White blood cell number is very scanty as compared to that of red blood cells in this fish *Clarias batrachus*. WBC are mainly distininguished into Monocytes, lymphocytes, neutrophils, basophils , eosinophills depending upon their staining properties, shapes and characteristics of their nuclei.

2.1) The monocytes are large cell with compact nucleus. In present investigations, monocytes average is 6.9% out of 100 cell.

2.2) The lymphocytes are of two types depending upon their size. Small lymphocytes and large lymphocytes was made on the basis of size of cell (liab et al, 1953). The average number of lymphocyte is 45.1%

2.3) Neutrophils : The nucleus of the neutrophils is some what lobed and horse shoe shaped. The lobes may be two or more in number. Cytoplasm of neutrophil cell contain fine granules. The average number of neutrophils is 38.1%

2.4) Eosinophils : In eosinophils, the cytoplasm is pink in colour and filled with numerous small and granules. The average eosinophils count is 9.8%

2.5) Basophils : In case of basophil, not a single basophil was found in the present study. Thus, basophils can be considered to be absent in this fish, but further investigation need to be done.

3. Red blood cells and WBCs: The number of red blood cells with an average of 2.49

,10^6mm^3(Table I). The total number of WBC with an average 4.51mm^3 x Counting of blood cells 10^3 (Table I). The differential leucocyte count was done and presented as percentage (out of 100 cells)

4 . Indices blood : The values are calculated with help of PCV, Erythrocyte and Haemoglobin. MCV = PCV/Erythrocyte count X 10MCH = Haemoglobin / Erythrocyte count X 10MCHC = Haemoglobin / PCV X 100 The MCV value with an average 132.29 femolitre. The MCH average value is 44.04 pg. The average value of MCHC is 33.28 gm/dl.5.Haemoglobin: Haemoglobin content with an average 10.85 (74%) mg/dl. (Table I)

PACKED CELL VOLUME AND ERYTHROCYTE SEDIMENTATION RATE: Packed cell volume and average 32.7%. Erythrocyte sedimentation rate with an average 39mm/hr.

RESULT AND DISCUSSION

In the present study various haematological parameters such as HB, RBC count, PCV, total and differential WBC count (DLC), blood indices such as MCV, MCH, MCHC, ESR and. The values of normal haematological parameters presented shows the value for Clarias batrachus are comparable with other freshwater fishes. These values were estimated in the month of Oct, Nov, and December 2008. There may be fluctuation in these values for different seasons in the year. Seasonal fluctuation in the haematological parameters have been reported by many workers. For example, Hasan et al(1990) recorded considerable seasonal variations in fish Silurus triostegus. The haematological values have also been reported to vary with sex of fishes. The result shows that there are variations in the blood constituents of same species of the fish. The former may be attribution to ecological factor, while the latter may be corrected with size, weight, sex and maturity.

The value found for RBCs, haematocrit or percentage of packed cell and haemoglobin during the present investigation are comparable with the value reported by other. The normal RBC count normally the average RBC count is 2.49 10^6mm^3.The packed cell volume with average value 32.7%. Haemoglobin - average value 10.85mg/dl. Dawson (1933) reported that the active fishes have smaller but numerous blood corpuscles while sluggish fish have larger and less number of corpuscles. In the present study the cell were smaller and numerous than reported by Qayyam and Naseem(1967) and it appears that it is due to air breathing habit of these fishes. Total leucocyte count is done in million/ cmm It is high as compared to the leucocytes of count in human being, the leucocyte count is thoudand per cmm The total leucocyte count in present study is 4.51million/cmm. Basophils are not found at all in the whole study.Neutrophils, Eosinophils and Basophills are granulocytes. Lymphocytes and monocytes are agranulocytes. In present study the small Lymphocytes are higher number than large lymphocytes.

Blood indices MCV, MCH and MCHC count were observed. MCV values is 132.2 famolitre the. MCH value 44.04 pg . MCHC value 33.28g/dl .

OBSERVATION

Table 1: Haemoglobin, RBC counts and PCV (Packed cell volume)

Sr. No.	Haemoglobin	RBC count	PCV
1	7.0 (48 %)	1.70	22
2	8.5 (58%)	1.90	25
3	11.0 (75%)	2.22	34
4	11.7 (80%)	2.76	36
5	10.8 (74)	2.10	30
6	12.0 (82%)	3.12	38
7	12.5 (85%	3.30	39
8	10.7 (73%)	2.30	29
9	11.4 (77%)	2.60	36
10	12.9 (88%)	2.90	38
Mean	10.85 (74%)	2.49	32.7
S.D	10.85±1.81	2.49± 0.53	32.7±5.90

Table II: Total and differential leucocytes count (out of 100 cells) and ESR

Sr. No.	WBC /mm^{3}x 10^3	Neutrophils	Eosinophils	Monocytes	Small and large lymphocytes	ESR
1	4.16	41	10	06	43	39
2	2.88	45	09	08	38	30
3	4.06	30	08	08	54	34
4	4.38	32	12	08	48	45
5	4.73	34	12	06	48	40
6	4.09	32	10	07	51	37
7	5.12	35	09	06	50	35
8	4.64	39	07	08	46	48
9	5.44	45	14	05	36	33
10	5.60	48	07	08	37	49
Mean	4.51	38.1	9.8	6.9	45.1	39mm/hr
S.D	4.51±0.79	38.1± 6.40	9.8±2.29	6.9±1.15	45.1±6.31	39±6.49

Table III: Values of different Blood indices- MCV (Mean Corpuscular Volume), MCH (Mean Corpuscular Haemoglobin) and MCHC (Mean Corpuscular Haemoglobin concentration)

Sr.No.	MCV	MCH	MCHC
1	129.41	41.17	31.81
2	131.57	44.73	34
3	153.15	49.54	32.35
4	130.43	42.39	32.5
5	142.85	51.42	36
6	121.79	38.46	31.57
7	118.18	37.87	32.05
8	126.08	46.52	36.89
9	138.46	43.84	31.66
10	131.03	44.48	33.94
Mean	132.29	44.04	33.28
S.D	132.29±10.25	44.04±4.36	33.28±1.88

REFERENCES

1. Bhaskar and Rao,(1984) Influence of environmental variables on haematological ranges of milk fish,Chanos chanos (Forskal,), in brakish water culture. Aquaculture,83(1-2) 123-136.
2. Dacie and Lewis(1975) practical haematology The English language society on churchil living stone.
3. Dawson (1933) active fishes have smaller but numerous blood corpuscles while sluggish fish have larger and less number of corpuscles.
4. FasihuddinM.D,(1990) Effect of photo period and salinity on haematologyof male Anabas *testudineus* (bloch).J. Freshwater boil.:13-17.
5. Graham J.B. (1997) Air breathing fishes: Evolution, diversity and adaptation, Academic Press. Sa Diego.
6. Hall and Gray (1929), The haemoglobin concentration of the blood of marine fishes. J. Biol.Chem.,81,589-594.
7. Pradhan. V "A study of blood of few Indian fishes", proc.Ind.Acad. Sci.,1961,54, 25.
8. Qayyam. A. and Naseem. S.M. "A haematological study on mrigal, cirrhina mrigalo,curr.sci.1967,36,35.36.
9. Weber R.E. and Wells R.M.G (1989) Haemoglobin structure and function, Comparative pulmonary physiology: 279-310. Wintrobe (1967). Clinical Haematology. Lea and Febiger, Philadelphia, Liabrary of Congress, Print USA.