A STUDY ON BLOOD PARAMETERS OF *BARBUS XANTHOPTERUS* , *BARBUS SHARPEYI* AND THEIR HYBRID

Abed Al. Majeed H. Talal. Jassim H. Saleh. Amer A. .Jabir Faleh M. A L.Zaidi

Department of Marine. Vertebrate.., Marine Science Centre,University of Basrah Basrah, iraq

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ABSTRACT

The blood parameters of Red Blood Cells for *Barbus xanthopterus*, *Barbus sharpeyi* and *B. xanthopterus* X *B sharpeyi* (hybrid)were mentionted. The dimentions of Red Blood Cells (length and width) for the fish *B.xanthopterus, B.sharpeyi* and their hybrid were as follows: (6 and 4 microns; 5 and 3 microns; 6 and 4 microns). Hb content values for the above mentioned fish, were as follows: 5.18, 5.323 and 4 g /100 ml.

PCV values for the above mentioned fish were as follows: 68.25% , 100% and 42.85714%. RBC numbers for the above fish were also mentioned as follows: 3450000, 3550000 and 3300000cell/1mm^3.

INTRODUCTION

The cellular picture of fish circulating blood is much more complex compared to mammals, because of the presence, besides mature blood cells, of blastic cells capable of proliferation and maturing cells of particular development lineages. It is a result of action of many haemopoetic centers, as a lack of the most evolutionarily specialized centres - the bone marrow which is present in other vertebrate taxa from amphibians upwards (1).

The erythropoetic activities initiated in mesenchymal cells of yolk sac, this is the ontogenetically primary site of erythrocyte formation. Further development may take place in the mass of intermediate embryonic cells (2). In many species, haemopoetic were well studied but it is difficult to determine which organ produces each type of blood cell. In fishes, haemopoesis starts with a pluripotential cell-the haemocytoblast from which directed, monopotential stem cells of various development lineages arise (3 ; 4).

The study of fish blood parameters is important for determining factors related to its physiological capacity (5 ; 6). Hematocrit, hemoglobin and the erythrocytic hemoglobin concentration values indicate the oxygen carrying capacity in teleosts. Such parameters are highly varied among the species,they interfer in oxygen-carrying capacity (5; 7; 6). The blood of all species that have nucleated erythrocytes has the common property of very rapid clotting after it is removed from the body. Among these the blood of the turtle is probably the slowest to clot, while fish and eel blood are at the other extreme (8).

MATERIALS AND METHODS

The fish were taken from a clean water pond in fish breeding farm of Marine Science Centre ,the specimens are quite healthy and they were of the same size and age group (length 95-105mm, weight 90-110 g). The blood test-samples taken through heart puncture were located in Monovet units with anticoagulant ,EDTA (9). Hemoglobin estimation (g/ 100 ml) was done by using Sahli apparatus previously treated with EDTA. Red Blood Corpuscles were counted by using Neubaur Improved Haemocytometer. Ten micro liters of blood was absorbed by a special absorbing glass tube and diluted by Dacie □s fluid then Red Blood Cells in five small squares were counted (10 ; 11). Dimensions of RBC (length and width) were also measured.

Packed Cell Volume (PCV) was done by filling hypernized Microhaematocrit tubes. They were closed from one end and put in microcenterfuge (3500 revolutions/ minute) for five minutes, then the results were read by using microhaematocrit reader (12) .

RESULTS

The following tables illustrate the parameters of Red Blood Cells (RBC Count, Haemoglobin Estimation,Packed Cells Volume. Red Blood Cell Dimensions).
Table (1) illustrates RBC counts for the fish *Barbus xanthopterus*,*Barbus sharpey* and *Barbus xanthopterus* **X** *B. sharpeyi*: 34 50000, 3550000 and 3300000cell / $1mm^3$ respectively.

Table (1): shows RBC Counts for the above mentioned fish.

Fish species	Number of RBC Per $1\ mm^3$
B. xanthopterus	3450000 ±77781
B. sharpeyi	3550000 ± 52431
B.xanthopterus X *B.sharpeyi* (Hybrid)	3300000 ±67329

Hb content values for the above mentioned fish were as follows: 5.18, 5.323 and 4 g/ 1oo ml respectively (Table ,2).

Table(2): Haemoglobin estimations for the above mentioned fish.

Fish species	**Concentration of Hb (g /100 ml)**
B. xanthopterus	5.18 ±0.22
B. sharpeyi	5.3280 ±0.43
B. xanthopterus X *B. sharpeyi*(Hybrid)	4 ±0.32

Table (3) explains the PCV values for the above mentioned fish were as follows: %40.566,%50 and %30.

Table (3): Packed cell volume(PCV %) .

Fish species	**PCV%**
B. xanthopterus	40.566 ±3.55
B. sharpeyi	50 ±4.32
B. xanthopterus X *B.sharpeyi* (Hybrid)	30 ±3.87

Table (4) shows the dimentions of Red Blood Cells (length & width) for the fish *B. xanthopterus, B. sharpeyi* and their hybrid were as follows; (6 & 4 **µ** ; 5 & 3**µ** ; 6 & 4**µ**) respectively. Figures (1,2,3) show the dimentions of Red Blood Cells (length & width) for same above mentioned fish.

Table(4):Dimension of RBC for the above mentioned fish.

fish species	Dimension of RBC in microns	
	Length	Width
B. xanthopterus	6	4
B. sharpeyi	5	3
B. xanthopterus X *B.sharpeyi* (Hybrid)	6	4

Figure (1): Photographs show the RBC dimensions of the *B. xanthopterus*.

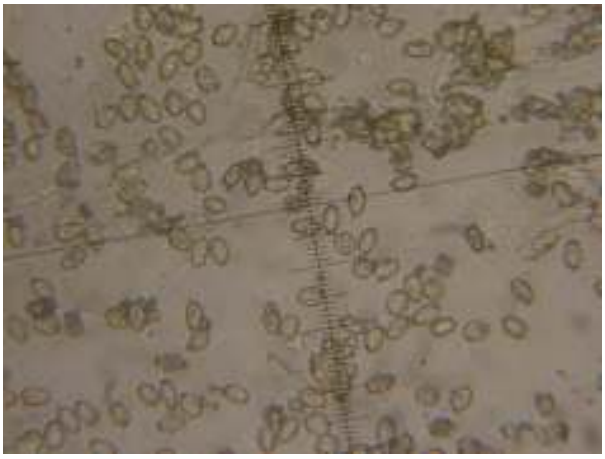

Figure (2) : Photographs show the RBC dimensions of the *B. sharpeyi*.

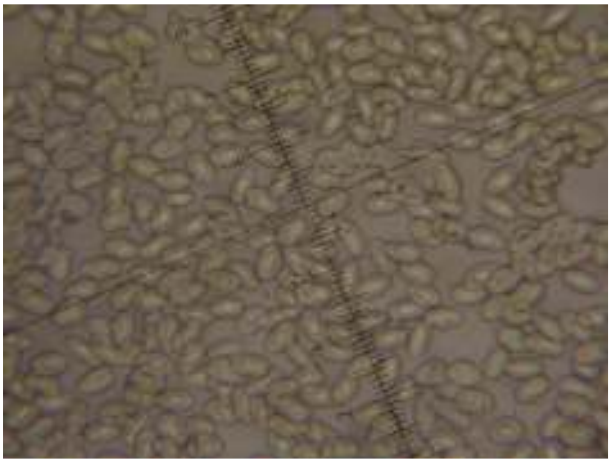

Figure (3): Photographs show the RBC dimensions of the hybrid.

DISCUSSION

The parameters of Red Blood Cells (RBC count, RBC dimensions, Hb content and PCV value) for the fish, *Barbus xanthopterus*, *Barbus sharpeyi* and *B.xanthopterus X B. sharpeyi* (hybrid of the parents) were mentioned respectively.

The results showed that RBC count for the *Barbus sharpeyi* was greater than those of *Barbus xanthopterus* and their hybrid. While the RBC dimensions (length & width) of *B. xanthopterus* and the hybrid (6and4µ) were greater than those of *B.sharpeyi*. These differences could be related to genetic variances.(13) suggested that the erythrocyte size in vertebrates reflected the phylogenetic position of the species, and their number in a unit blood volume increased with a simultaneous decrease in their size.

Hb content of *B .sharpeyi* (5.323 g / 100 ml) was greater than those of *B.xanthopterus* and the, hybrid .They were 5.18 & 4 g /1000 ml respectively. The haemoglobin Content is correlated with the erythrocyte count (4). The PCV value of *B.sharpeyi* (%50) was greater than those of the other two varieties

Large size of erythrocyte reflects a physiological acclimatization to habitat in deeper water or soft muddy bottom, as well as its sedentary life style. This confirms

the general inverse relationship between erythrocyte size and aerobic swimming ability (14).

The fish inhabits the bottom of muddy stagnant swamps or rice fields and these environments provide good dissolved oxygen supplies during part of year, but when they become stagnant and even dry up at other times, dissolved oxygen becomes low to nonexistent. So in such poor hypoxic conditions, which require relative higher ability of being able to endure hypoxic environment ,here the importance of physiological base of high Hb value and RBC value appears (15).

CONCLUSION

Erythrocyte dimensions of the hybrid , *B.xanthopterus X B. sharpeyi* (6 & 4µ) showed a genetic tendency toward the length parameter of *B. sharpeyi´*s RBC ,while they showed a genetic tendency toward the width parameter of *B. xanthopterus*. *B. sharpeyi* revealed an icrease in number of erythrocyte (3550000) and a decrese in erythrocyte size (5&3 µ).While *B.xanthopterus* showed an increase in erythrocyte size (6&4 µ) and a decrease in erythrocyte number (3450000).The hybrid fish took a position genetically nearer to the *B.xanthopterus.*

دراسة معالم دم اسماك (Barbus sharpeyi) والبنى(Barbus xanthopterus) الكطان. (Barbus sharpeyi X Barbus xanthopterus) وهجينهما

عبدالمجيد حميد طلال و جاسم حميد صالح وعامر عبدالله جابر وفالح موسى الزيدي
قسم الفقريات البحرية ، مركز علوم البحار، جامعة البصرة،البصرة، العراق.

درست معالم خلايا دم أسماك(تعداد كريات الدم الحمراء ، تقدير الهيموغلوبين ، مكداس كريات الدم الحمراء ، إبعاد الكريات الحمراء) لأسماك الكطان و البنى وهجينهما وكانت كالاتى: 3450000، 3550000، 3300000 كرية حمراء في الملمتر المكعب الواحد. اما محتوى الهيموغلوبين للأسماك المذكورة أعلاه فقد كانت كما يلى على التوالي: ، ٥ ١٨٠ ، ٥٠٣٢٣ و ٤ غم \ ١٠٠ مل•أما بالنسبة لقيم مكداس كريات الدم الحمراء للأسماك المذكورة أعلاه فهي كما يلى على التوالي :25396• 68%، ١٠٠ %و ٤٢ %•وفيما يتعلق بأبعاد الكريات الحمراء(الطول و العرض) للكطان والبنى و هجينهما فقد كانت كما يلى على . (4& microns 6)و((microns4&6،microns 3&5)) التوالي.

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