

Haematological Profiling of the African Cat Fish (*Clarias gariepinus*) in Selected Fish Farms in Bayelsa State.

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Abstract- The profiling of specific haematological parameters of Table sized *Clarias gariepinus* was conducted using fish from three fish farms in Yenagoa, Bayelsa State. This was done to obtain baseline values for these parameters and as a standard to gauge the effect of diet, toxicant or physiological stress on the blood of *Clarias gariepinus*. Blood was collected randomly from four fishes in each of the three fish farms by cardiac puncture technique. Blood samples were examined for Haemoglobin (Hb), packed cell volume (PCV) and Total White Blood Cell Count (TWBCC) using standard procedures. Data were subjected to statistical analysis with the aid of the SPSS^(R) version 20.0 tool kits. Result reveals that the mean TWBCC ranged from 356.82 – 377.65, PCV ranged from 19.50 – 27.50% and Hb ranged from 6.5 – 9.17g/dl. Analysis of Variance (ANOVA) showed no significant difference ($P>0.05$) in all parameters from fish farm to fish farm. It may therefore be concluded that the pond fish were all uniformly healthy and that the values obtained in this study can thus be accepted as baseline values for healthy fish in a pollution free or non-impacted environment.

Indexed Terms- *Clarias gariepinus*, Haemoglobin, Packed cell volume, White Blood Cell Count, Fish farm, Yenagoa, Bayelsa State.

I. INTRODUCTION

The absence of fixed and defined ranges of hematological parameters for healthy fish species have proven to be a major hindrance in the diagnosis and treatment of fish diseases and ailments in culture systems. Like in human medicine, blood analysis provides a veritable tool for evaluating the physiological condition of cultured fish and determining the effect of diet and other stress factors on fish health. Also, hematological parameters in

combination with biochemical parameters are useful means to gauge fish well-being [1].

Sadly, unlike human medicine fixed ranges for blood parameters for healthy fish is yet to be established for *Clarias gariepinus* and other cultivable species in Nigeria. More so, certain blood parameters such as Hb, PCV and TWBCC give a snap shot of the health status of the organism without the need and trouble of going into further investigation. These test are also inexpensive and take minimal time to conduct. The culture of fish in ponds, tanks and other receptacles require the monitoring of their haematological characteristics and well-being if optimal harvest is expected. Also, the haematological evaluation of fish in polluted waters is standard procedure to gauge the health status of fish in receiving water bodies. This research is therefore an effort to profile healthy fish stocks from selected fish farms in Bayelsa state in order to possibly obtain baseline ranges for healthy fish for some selected hematological parameters. This will aid in the diagnosis, measurement and treatment of fish diseases in aquaculture and aquatic toxicological research.

II. MATERIALS AND METHODS

2.1 Collection of Experimental Fish

Twelve (12) table size *Clarias gariepinus* of mixed sexes of mean weight of $(420\pm 5.5\text{g})$ and length of $(34.2\pm 1.8\text{cm})$ were obtained from three different fish farms located in Bayelsa State. The fish farm locations are as follows; (i) Baron fish farm at Captain Ayeni road, Kpansia. (ii) Agro farms, Etegwé. (iii) Department of Fisheries, Niger Delta University, Amassoma.

They were transported under the cool and favorable conditions in a plastic basin containing cold water, to the Biological science laboratory of the Niger Delta University, Amassoma, Bayelsa.

2.2 Method of Blood Collection

The blood samples were collected from the heart by the cardiac puncture technique. This technique involves the use of 0.5mm×40mm gauge needle and syringes. The needle was gradually inserted into the chest region of the fish and the syringe pulled up a bit to allow blood flow into it. The samples were collected using physical restrain of the head and tail of the fish. The blood collected were immediately transferred from the syringe into previously labeled Ethylene Diamine Tetra Acetic acid (EDTA) bottles to prevent the blood from clotting. This process was carried out on the fish in each of the basins from the three different fish farms. Blood samples were then analyzed for Total White Blood Cell Count (TWBCC), Pack Cell Volume (PCV) and Haemoglobin (Hb).

2.3 Blood Analysis

Blood samples were analyzed for the haematological parameters using standard procedures. The determination of PCV was done using the PCV reader as described by Snieszko [2]. Haemoglobin was determined using the colometric determination of the cyanment-hemoglobin method. While the white Blood cell count were determined from a counting chamber after using Turks solution.

III. RESULT AND DISCUSSION

3.1 Result

The result of the study are presented in table 1 and figures 1 to 4 below.

Table 1: Mean Blood parameters of *Clarias gariepinus*

Ponds	Blood Parameters		
	TWBCC ($\times 10^9/L$)(%)	PCV (%)	Hb (g/dl)
A	356.82 ± 30.24^a	24.25 ± 5.31^a	8.85 ± 1.57^a
B	373.30 ± 31.48^a	19.50 ± 5.25^a	6.50 ± 1.74^a
C	377.65 ± 16.24^a	27.50 ± 5.19^a	9.17 ± 1.72^a

*Means \pm Standard Deviation. Same letter superscript (a) show no significant difference

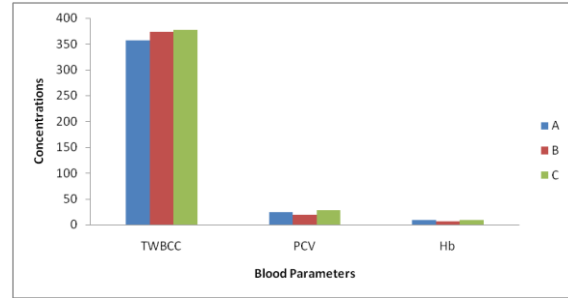


Figure 1: Blood parameters from the three pond fish

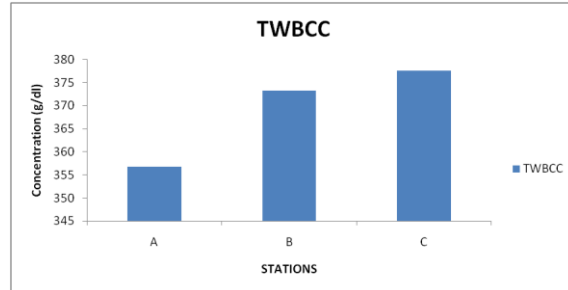


Figure 2: Blood TWBCC from the three pond fish

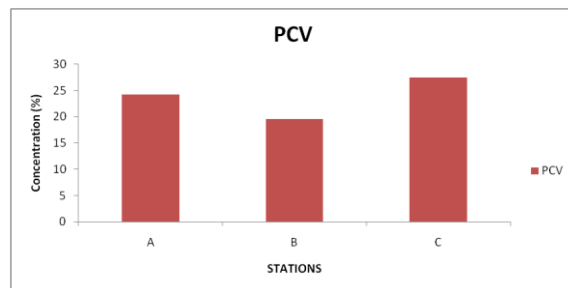


Figure 3: Blood PCV from the three pond fish

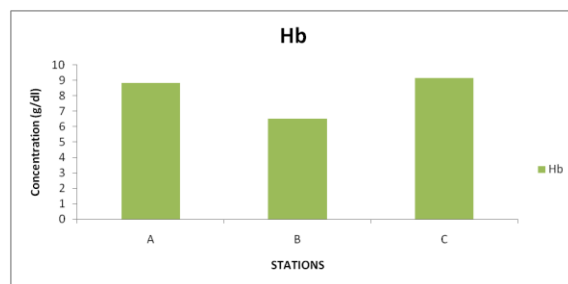


Figure 4: Blood Hb from the three pond fish

3.2 Discussion

The result of this study show that TWBCC ranged from $356.82 \times 10^9/L$ to $377.65 \times 10^9/L$, PCV values ranged from 19.50% to 27.50% and Hb values ranged from 6.50g/dl to 9.17g/dl. This result of this study is in variance with the results obtained by Alagoa [3] and Alagoa and Ekweozor [4] for *Clarias gariepinus*

fish population under controlled laboratory conditions.

The baseline study for blood parameters of TWBCC, PCV and Hb revealed that there is no significant difference ($p>0.05$) in all the blood parameters across all the sampled ponds in Bayelsa State. This may be due to the fact that all the pond fish are in good health condition and thus show similar blood characteristics. Also, the study observed narrow and similar standard deviation ranges across the three farms. This may also be as a result of health stability of the evaluated fish.

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CONCLUSION

This study has provided us with baseline data for perhaps the three most fundamental blood parameters governing health and well-being in animals. The lack of significant differences in the values obtained from the different fish farms is suggestive that all the fish sampled are in optimal health. Therefore the values can be adopted as acceptable baseline for healthy fish pollution of table sized *Clarias gariepinus* in unpolluted waters. In these times when aquaculture contributes a significant amount to fish protein demands, the need to adequately monitor fish health can contribute to the sustainability and profitability in aquaculture. It is necessary to monitor fish blood parameters routinely to assess the well-being and health of fish.

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