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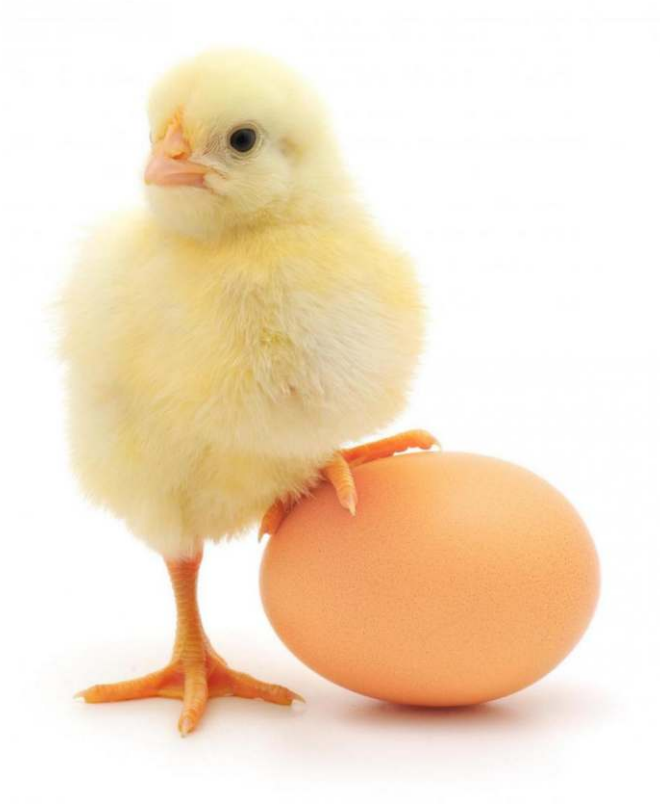

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Seasonal Variations in the Haematological Values of the Nigerian Duck (*Anas platyrhynchos*)

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Abstract: The effects of dry and wet seasons on the blood profiles of the Nigerian duck were determined. This is with a view of elucidating any seasonal variations in these parameters. The haematological values studied included the erythrocyte values (RBC, PCV, Hb., MCH, MCHC and MCV) and the leucocyte values (total and differential leucocyte counts). In the dry season, the duck had higher ($p<0.01$) RBC counts and PCV values but lower MCH ($p<0.05$) and MCHC ($p<0.001$) than in the same bird during the wet season. However, the Hb concentrations were similar in the dry and wet seasons. The total WBC, lymphocyte and heterophil counts were higher ($p<0.001$) during the dry season than during the wet season. The monocyte and eosinophil counts were however similar in the duck during the two seasons. The study revealed that there were seasonal variations in the haematological parameters of the Nigerian duck. The significance of these results is that caution should be applied when interpreting haematological values of the Nigerian duck in the two different seasons that were investigated, as the values obtained in one season cannot be extrapolated for the other.

Key words: Haematology, Nigerian duck, wet season, dry season

INTRODUCTION

It has been estimated that the duck population in Nigeria is about 11.9 million (Arowolo, 1999). The majority of these ducks are Nigerian ducks which are reared under the extensive management system. Although there are reports on the blood profiles of exotic breeds of duck (Kocan and Pitts, 1976; Mulley, 1979; Mulley, 1980; Driver, 1981; Oyewale and Ajibade, 1990; Hatipoglu and Bagci, 1996), there is, however, a dearth of information on the blood profiles of the Nigerian duck (*Anas platyrhynchos*).

In our previous publications on the haematology of the Nigerian duck, we determined the red blood cell characteristics on young and adult birds of the same species (Oyewale *et al*., 1998). This was followed with the study on the plasma chemistry in the young and adult Nigerian duck (Olayemi *et al*., 2002a). Then we proceeded to investigate the effect of sex on the blood profiles of the Nigerian local duck (Olayemi *et al*., 2002b). We took a step further to do a comparative assessment of the white blood cell values, plasma volume and blood volume in the young and adult Nigerian duck (Olayemi *et al*., 2003). We also did a comparative study of the haematological and plasma biochemical parameters in the Nigerian duck and the Nigerian laughing dove (Olayemi *et al*., 2006). The present study on the effect of season on the haematology of the Nigerian duck is a continuation on our study on the haematology of this species of bird.

This study has assumed much importance due to the fact that there are two distinct seasons in Nigeria (the dry and the wet seasons). The dry season is from October to March while the wet season is from April to September. If care is not taken, the normal seasonal variations in the haematological values may be confused with disease associated changes. Shave and Howard (1976) determined the effect of season on the haematology of exotic breeds of ducks (the mallard duck and the diving ducks). There has not been any study on the effect of seasons on the haematology of the Nigerian indigenous breed of duck. Therefore, we present in this paper the influence of seasons on the haematology of the Nigerian duck.

MATERIALS AND METHODS

Twenty eight apparently healthy adult Nigerian ducks were used for this study. They were purchased from a local market in Ibadan, Nigeria, from where they were transferred to the deep litter pen belonging to the Duck Research Unit of the Faculty of Veterinary Medicine, University of Ibadan. They were fed commercially prepared grower's mash (14.5% protein, 4.8% fat, 7.2% fiber, 0.8% calcium, produced by Bendel feeds and flour mill Ltd., Benin, Edo State, Nigeria). Water was supplies *ad libitum*. They were treated against nematodes with piperazine hydrochloride (Wormazine®, Alfansan International BV 3440AB woerden, Holland) at 1 g/liter of water. The birds were acclimatized to the new environment for 21 days before the commencement of this study. The ducks were first bleed in November, during the dry season. The bleeding for the wet season was done in the month of June.

Blood was collected from the jugular vein of each bird into bottles containing ethylene diamine tetraacetic acid (EDTA) (2 mg/ml of blood as anticoagulant). Red Blood Cells (RBC) were counted with haemocytometers. Packed Cell Volume (PCV) was determined using the microhaematocrit method. Haemoglobin (Hb) concentration was measured by the cyanmethaemoglobin method. From the values obtained the haematimetric indices (Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) were calculated (Jain, 1986). Total WBC count was determined with haemocytometer using the WBC diluting fluid (Blaxhall and Daisley, 1973). Bloods smears, made in duplicate, were fixed in alcohol and stained with Giemsa stain for differential WBC counts. The results were statistically evaluated using Student's t-test.

RESULTS

The values of RBC, PCV, Hb., MCH, MCHC and MCV as influenced by season in the Nigerian duck is presented in Table 1, in the dry season, the duck has higher ($p<0.01$) RBC counts and PCV values but lower MCH ($p<0.05$) and MCHC ($p<0.001$) than in the same bird during the wet season. However, the Hb concentrations were similar in the dry and wet seasons.

Table 2 presents the effect of season on the total and differential leucocyte values in the Nigerian duck. The total WBC, lymphocyte and heterophil counts were higher ($p<0.001$) during the dry season than during the wet season. The monocyte and eosinophil counts were however similar in the duck during the two seasons.

Table 1: Erythrocyte values (Mean ± SD) of the Nigerian duck as influenced by season

Parameters	Dry Season (n = 8)	Wet Season (n = 20)
RBC ($X10^{12}$/L)	2.02±0.56	2.46±0.45*
PCV (%)	45.00±3.54	50.25±4.42*
Hb (g/dl)	14.30±1.34	14.80±1.77
MCH (pg)	74.29±16.61	57.51±11.14**
MCHC (g/dl)	31.75±0.77	29.41±1.67***
MCV (fl)	234.24±53.80	196.06±39.59

n = Number of birds. Value significantly different from dry season at *p<0.01, **p<0.05 and ***p<0.001

Table 2: Leucocyte values (Mean ± SD) of the Nigerian duck as influenced by season

Parameters	Dry Season (n = 8)	Wet Season (n = 20)
Total WBC ($X10^9$/L)	22.55±4.69	6.58±1.60*
Lymphocyte ($X10^9$/L)	14.97±3.35	2.17±0.64*
% Value	66.25±2.82	32.90±4.87*
Heterophils ($X10^9$/L)	7.11±1.19	4.17±1.02*
% Value	31.88±3.14	63.50±3.76*
Monocyte ($X10^9$/L)	0.22±0.21	0.09±0.08
% Value	0.88±0.83	1.55±1.28
Eosinophil ($X10^9$/L)	0.21±0.21	0.10±0.08
% Value	0.88±0.83	1.60±1.10

n = Number of birds. Value significantly different from dry season at *p<0.001

DISCUSSION

The erythrocyte values obtained for the Nigerian duck in the present study is similar to our earlier reported normal adult values for the same bird (Olayemi *et al*., 2003). The significance of this is that the ducks used for the study had adequate nutrition during the experiment. The erythrocyte values were also similar to the values obtained in other Nigerian avian species such as the Nigerian fowl (Oyewale, 1988), guinea-fowl that is found in Nigeria (Oyewale, 1991) and the Nigerian turkey (Olayemi and Ojo, 2007).

The RBC and PCV values were significantly higher in the wet than the dry season (Table 1). It seems the lower ambient temperature but higher environmental humidity in the wet season favoured higher food intake with the consequent higher haematological values in the wet season than in the dry season. It was similarly observed that the common cranes (*Grus grus*) had higher RBC and PCV values in the winter when the temperature was also lower than in the summer season (Abelenda *et al*., 1973). The MCH and MCHC values were however significantly lower in the wet than in the dry season. This is similar to the finding in the Canadian geese and Mallard ducks, the Hb, MCH and MCHC values of these birds were higher in the summer, when the weather was hot and dry, than during the winter season (Shave and Howard, 1976). The significantly higher, MCH and MCHC during the dry season in the present study may be due to the of higher ambient temperature and lower relative humidity during the dry season compared with the lower ambient temperature and a higher relative humidity during the wet season. This may have resulted in changes in water content of the blood and blood viscosity due to the decrease in total body water as a result of the increase in evaporative cooling. This may have caused haemoconcentration, which resulted in the relative higher MCH and MCHC.

The total WBC of 22.55 $x10^9$/L and 6.58 $x10^9$/L obtained for the dry and wet seasons respectively were higher than the value of 3.61$x10^9$/L obtained for the same bird (Olufemi and Fatunmbi, 1980). However, the values obtained for the total WBC in the two different seasons in the present study were similar to WBC values of 6.85$x10^9$/L previously obtained for the Nigerian duck in the wet season (Olayemi *et al*., 2002b) and the total WBC value of 16.93$x10^9$/L observed in the Nigerian duck in the dry season (Olayemi *et al*., 2006). Also, the total WBC of the present study for the dry season is similar to that obtained in some exotic breeds of duck such as the black duck (19.93$x10^9$/L) (Mulley, 1979) and wood duck (23.63$x10^9$/L) (Mulley, 1980).

The total WBC, lymphocyte and neutrophil counts were significantly lower in the wet than in the dry season (Table 2). It was also reported that the Mallard duck and the Canvasback duck had higher leucocyte counts during the summer than during the winter (Shave and Howard, 1976).

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REFERENCES

Abelenda, M., M.P. Nava, A. Fernandez, J.A. Alonso, J.C. Alonso, R. Muniz-Pulido, L.M. Bautista and M.L. Puerta, 1973. Blood values of common crane (Grus grus) by age and season. Comp. Biochem. Physiol., 104: 575-578.

Arowolo, R.O.A., 1999. Protecting our livestock resources. 1995/96 Inaugural lecture, University Printery, U.I. Ventures Ltd, Ibadan, pp: 5.

Blaxhall, P.C. and K.W. Daisley, 1973. Routine haemotological methods for use with fish blood. J. Fish. Biol., 5: 771-781.

Driver, E.A., 1981. Haematological and blood chemical values of Mallard, Anas platyrhynchos drakes before, during and after remige moult. J. Wildl. Dis., 17: 413- 421.

Hatipoglu, S. and C. Bagci, 1996. Some haemotological values from Pekin ducks. Berl. Münch. Tierärztl. Wschr., 109: 172-176.

Jain, N.C., 1986. Schalm's Veterinary Haemotology, 4th Ed. Lea and Febiger, Philadelphia.

Kocan, R.M. and S.M. Pitts, 1976. Blood values of the canvasback duck by age, sex and season. J. Wildl. Dis., 12: 341-346.

Mulley, R.C., 1979. Haematology and blood chemistry of the blackduck (*Anas superciliosa*). J. Widl. Dis., 15: 437-441.

Mulley, R.C., 1980. Haemotology of the wood duck (*Chenonetta jubata*). J. Wildl. Dis., 16: 271-273.

Olayemi, F.O. and O.E. Ojo, 2007. Haematology of the Nigerian turkey. Folia Vet., 51: 43-46.

Olayemi, F.O., J.O. Oyewale and O.F. Omolewa, 2002a: Plasma chemistry values in the young and adult Nigerian duck *(Anas platyrhynchos)*. Israel J. Vet. Med., 57: 156-158.

Olayemi, F.O., R.O.A. Arowolo, A.B. Saba and S.A. Famakinde, 2002b. Effect of sex on the blood profiles of the Nigerian local duck. Bull. Anim. Hlth. Prod. Afri., 50: 67-71.

Olayemi, F., J. Oyewale, S. Rahman and O. Omolewa, 2003. Comparative assessment of the white blood cell values, plasma volume and blood volume in the young and adult Nigerian local duck (*Anas platyrhynchos*). Vet. Archive, 73: 271-276.

Olayemi, F.O, E.O. Ojo and O.A. Fagbohun, 2006. Comparative study of the haematological and plasma biochemical parameters in the Nigerian duck (A*nas platyrhynchos*) and the Nigerian laughing dove (*Streptopelia senegalensis*). Vet. Archive, 76: 145-151.

Olufemi, B.E. and O.O. Fatunmbi, 1980. Haematological study on clinically normal Nigerian ducks (*Anas* spp.). IRSC Medical Science. Experimental Animals: Haematology, 8: 87.

Oyewale, J.O. and H.A. Ajibade, 1990. Osmotic fragility of erythrocytes of the white Pekin duck. Vet. Archive, 60: 91-100.

Oyewale, J.O., F.O. Olayemi and S.A. Rahman, 1998. Blood characteristics of the Nigerian local duck (*Anas platyrhynchos*). 1. Red blood cell characteristics. Vet. Archive, 68: 199-204.

Oyewale, J.O., 1988. Some aspects of the haematology of the guinea fowl (*Numida meleagris galeata*, Pallas) Ph.D. Thesis, University of Ibadan.

Oyewale, J.O., 1991. Osmotic fragility of erythrocytes of guinea-fowls at 21 and 156 weeks of age. Vet. Archive., 61: 49-56.

Shave, H.J. and V. Howard, 1976. A hematologic survey of captive waterfowl. J. Wildl. Dis., 12: 195-201.