



BREED-SPECIFIC HAEMATOLOGIC REFERENCE VALUES IN ADULT TURKEYS (*Meleagris gallopavo*) IN THE HUMID TROPICS OF NIGERIA

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ABSTRACT

One hundred (50 males and 50 females) B-not strain indigenous turkeys, *Meleagris gallopavo*, were used to determine the reference values for their haematological parameters. The turkeys were housed in the poultry unit and jugular venepunctures were used to collect their blood. The haematological parameters were determined using standard procedures. The mean values of: the packed cell volume (PCV; $37.29 \pm 0.37\%$), red blood cell (RBC) counts ($2.50 \pm 0.44 \times 10^6 \mu\text{l}^{-1}$), haemoglobin concentration (Hbc; $10.89 \pm 0.34 \text{ g.dl}^{-1}$), mean corpuscular volume (MCV; $150.63 \pm 0.73 \text{ fl}$), mean corpuscular haemoglobin (MCH; $44.29 \pm 1.78 \text{ pg}$), mean corpuscular haemoglobin concentration (MCHC; $29.10 \pm 0.73 \text{ g.dl}^{-1}$), and white blood cell (WBC) counts ($12.41 \pm 0.83 \times 10^3 \mu\text{l}^{-1}$) were determined. No significant differences were found between the male and female B-not strain turkeys in this study. The results will help in the interpretation of cases of disease when there are variations in the values and serve as baseline data for B-not strain of turkeys in the humid tropics.

Key words: breed-specific; haematology; indigenous; Nigeria; turkey

INTRODUCTION

The turkey is an important species for the poultry industry in Nigeria, which is usually raised for economic benefits [2, 10]. Haematological values are an important tool in monitoring the health of poultry species [1]. These values have also been shown to be markers of ongoing events in the body [23, 25]. It can be used as a diagnostic tool to assess the health status of an individual and/or a flock [5]. Haematological parameters also provide valuable information on the immune status of animals [14]. Reference values for the erythrocytic indices are vital for the diagnosis of anaemia and polycythaemia and also for the assessment of the efficacy of therapy instituted to correct these abnormalities [9]. Establishing an accurate set of reference values is critical in the interpretations of the results of clinical pathology [15, 22].

This study was carried out to determine the normal haematological parameters of indigenous B-not strain of

turkeys raised in the humid tropics under intensive management system. The result of this study would help to improve diagnostic evaluation of sick turkeys and serve as baseline information for the interpretation of laboratory data in research.

MATERIALS AND METHODS

Animals and sampling

The College of Veterinary Medicine, Michael Okpara University of Agriculture, Umudike ethical committee approved this study. A total of 100 adult B-not strains of apparently healthy indigenous turkeys (50 males and 50 females) were used for this study. They were housed in the poultry unit of Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria. They were fed a commercially prepared growers mash by Top feeds Nigeria Limited*. Feed and water were provided *ad libitum* to the turkeys. The turkeys were vaccinated against known infectious diseases in the area and preventive medications were given to them as endorsed by the National Veterinary Research Institute (NVRI), Vom, Nigeria, and they were cared for in accordance with the principles of humane laboratory animal care throughout the study.

Blood samples (1 ml) were collected from the right jugular vein into sample bottles containing potassium ethylenediamine tetra-acetic acid (EDTA). The blood samples were collected in the morning and analyzed immediately.

Methods of blood analysis

The packed cell volume (PCV) was determined by the microhaematocrit method [24] using a microhaematocrit centrifuge and reader (Haskley, England); the haemoglobin concentration (Hbc) was determined by the cyanomethaemoglobin concentration method [11, 13] using digital colorimeter (Lab Tech, India); the red blood cell count (RBC) and white blood cell count (WBC) were carried out following the haemocytometer method [9, 24] using an improved Neubaur counting chamber (Marienfeld, Germany). The mean corpuscular values were calculated using a standard formula [9, 24].

Statistical analyses

The results were presented as the mean \pm standard error of the mean (SEM) with minimum and maximum val-

ues. The results were subjected to descriptive statistics and the differences between the sexes (males and females) were analyzed using the Student's *t*-test. All statistics were carried out using the SPSS 15 Statistical Package (SPSS 15.0 for windows, SPSS Inc., Chicago, IL, USA). Significant differences were accepted at $P < 0.05$.

RESULTS

The overall means and ranges for the PCVs, Hbc, RBC counts and basic indices (MCV, MCH, MCHC) and WBC counts of the turkeys are shown in Table 1. There were no significant differences ($P > 0.05$) between the male and female turkeys used for this study (Table 2).

DISCUSSION

Haematologic reference ranges were established in this study for live clinically healthy B-not strain of indigenous turkeys. The PCV, Hbc, RBC values obtained in the present study were within the range as reported for other domestic

TABLE 1. The haematological variables of apparently healthy B-not strain turkeys (*Meleagris gallopavo*)

Parameter	Mean \pm SEM [n = 100]	Range
PCV [%]	37.29 \pm 0.37	35.00—39.00
Hbc [g.dl ⁻¹]	10.89 \pm 0.34	8.60—12.17
RBC count [10 ⁶ . μ l ⁻¹]	2.50 \pm 0.44	2.28—2.81
MCV [fl]	150.63 \pm 2.78	133.08—163.79
MCH [pg]	44.29 \pm 1.78	34.34—51.77
MCHC [g.dl ⁻¹]	29.10 \pm 0.73	23.89—31.61
WBC count [10 ³ . μ l ⁻¹]	12.41 \pm 0.83	7.70—17.40

PCV — packed cell volume; Hbc — haemoglobin concentration; RBC — red blood cell; MCV — mean corpuscular volume; MCH — mean corpuscular haemoglobin; MCHC — mean corpuscular haemoglobin concentration; WBC — white blood cell; SEM — standard error of the mean

Table 2. Sex differences in the haematological variables of apparently healthy B-not strain turkeys (*Meleagris gallopavo*)

Haematological parameter	Males		Females	
	Mean \pm SEM (n = 50)	Range	Mean \pm SEM (n = 50)	Range
PCV [%]	37.43 \pm 0.65	35.00—39.00	37.29 \pm 0.42	36.00—38.50
Hbc [g.dl ⁻¹]	11.20 \pm 0.56	9.03—12.17	10.57 \pm 0.40	8.60—11.98
RBC count [10 ⁶ . μ l ⁻¹]	2.53 \pm 0.55	2.32—2.63	2.46 \pm 0.71	2.28—2.81
MCV [fl]	149.35 \pm 4.76	133.08—163.79	151.91 \pm 3.21	137.01—161.70
MCH [pg]	45.42 \pm 2.97	34.34—51.77	43.15 \pm 2.11	37.26—50.98
MCHC [g.dl ⁻¹]	29.84 \pm 1.04	25.80—31.61	28.36 \pm 1.03	23.89—31.53
WBC count [10 ³ . μ l ⁻¹]	13.91 \pm 0.95	10.30—16.05	10.91 \pm 1.16	7.70—17.40

PCV — packed cell volume; Hbc — haemoglobin concentration; RBC — red blood cell; MCV — mean corpuscular volume; MCH — mean corpuscular haemoglobin; MCHC — mean corpuscular haemoglobin concentration; WBC — white blood cell; SEM — standard error of the mean

[3, 4, 12, 16], foreign [3, 12] and crossbred [12] turkeys. In contrast to earlier findings [3, 16], the total WBC count of the current study was higher which agreed with the findings of Bounous et al. [7] and Azeez et al. [6] who also observed higher value for the WBC counts. Isidahomen et al. [12] also observed higher WBC count in local turkeys. Other avian species had been reported to have higher WBC counts as observed in the Nigerian ducks [19] and chestnut-breasted mannikins [17].

In this study, the PCV and Hbc values were slightly but not significantly higher in males than in females. The observed slight decrease in PCV and Hbc values as well as RBC counts in females could be attributed to the presence of oestrogens in female turkeys [21]. Oestrogens have been reported to decrease Hbc and RBC counts by inhibiting erythropoiesis [8, 18, 21], thus the males have higher values of RBC [3, 20, 21]. The erythrocytic indices of MCV, MCH and MCHC showed no significant sex variations in this study. However, the MCV of the current study do not support the previous reports of Azeez et al. [6] who reported higher MCV value in males.

CONCLUSIONS

This study has demonstrated that there were no significant differences in the haematologic variables studied between males and females of apparently healthy B-not strain indigenous turkeys raised in humid tropics under intensive system of management. The reference intervals established in this study provide a useful baseline for the assessment of haematologic data in B-not strain indigenous turkeys in Nigeria.

CONFLICT OF INTERESTS

The authors declare that there was no conflict of interests concerning the publication of this paper.

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