

HAEMATOLOGICAL INDICES OF CAPTIVE BLACK NECK OSTRICHES

F.A.MOHAMED AHMED^{1*}, R.A.YOUSIF¹ EL HESSAN, R.R.MOHMMED SALIH²

¹Department of Fisheries and Wildlife Science College of Animal Production Science and Technology, Sudan University of Science and Technology P.O.BOX204, Khartoum North, Sudan

²Department of Clinical Medicine College of Veterinary Medicine University of Khartoum P.O. Box 32, Khartoum North, Sudan

*E-mail: fawziali38@yahoo.com

ABSTRACT: This study was conducted at Sudan University of Science and Technology College of Veterinary Medicine and Animal Production Department of fisheries science and wildlife in June 20 11 to determine hematological values of Black Neck Ostrich *Struthio Camelus massaicus* collected from El Safa farm North Khartoum. Values of some hematological parameters of 14 Black Neck Ostrich 7 male and 7 female age from 3-4 year, and 70–75 kg in weight were examined to determine the mean values obtained for White Blood cells Count (WBC), Erythrocytes Count (RBC), Hemoglobin Concentration Rates (Hb), Packed Cell Volume (PCV), Mean Corpuscular Volume (MCV/cl) and Erythrocytes Sedimentation Rate (ESR). The result of this study show that there are no significant different in all blood values between samples collected from male and female at p ($P < 0.05$), except in Red Blood Cells (RBC) there is significant different at ($P < 0.05$). The main target of this study is to comparison between hematological values of Black Neck Ostrich in both male and female.

Key words: Hematological, Ostrich, Parameters, Captivity, Birds

INTRODUCTION

Clinical haematology has been used for many years in avian medicine for evaluation of health in birds. Hematological and biochemical values can be helpful in assessing infection, organ function and many diseases. The fact that physiological and pathological factors may cause qualitative and quantitative changes in hematological values makes such studies an important aspect of the diagnostic panel and of the monitoring of sick birds (Levi et al., 1989; Perelman, 1999). Qualitative and quantitative hematologic changes in ostriches depend on age, sex, different physiological and pathologic status, stress, nutrition and conditions in particular geographic areas. The results of hematologic parameters in the blood of ostriches should be strictly interpreted because they are necessary together with good anamnesis and physical examination for reaching a proper diagnosis (Perelman, 1999; Raukar, 2004).

Ostriches are peculiar flightless birds with vestigial wings and have well-developed legs. They are the largest living birds, and their adult body weight is ranging from 70 kg to 150 kg (Palomeque et al., 1991; Spinu et al., 1999). Since rapid growth and size achieved at slaughter age are important properties of ostriches, they are considered as a considerable commercial species characterised by economic advantages with relatively low costs. Moreover, ostrich meat is high in protein and low in fat, and its taste is appreciated by consumers (Minelli et al., 1995).

The hematological parameters and the levels of certain plasma metabolites may provide highly valuable information on the physiological status and allow the detection of possible diseases (Jenni-Elermann, 1998; Spinu et al., 1999). Clinical hematology and blood chemistry are known to be influenced by various factors such as diseases, nutritional status, body condition, sex, age, diet, circadian rhythms, captivity etc. (Woerpel et al., 1984; Palomeque et al., 1991; Tully et al., 1998; Spinu et al., 1999; Quintavalla et al., 2001). Therefore, determination of blood constituents for birds are not only relevant diagnostic tools in veterinary medicine, but can also be used as physiological indicators (Perelman, 1999).

The aim of the present study was to present values of certain blood hematological parameters in Black Neck Ostriches between male and female. For this purpose, some haematological parameters used as diagnostic tools in avian medicine were determined.

MATERIAL AND METHODS

Research was carried out on 14 clinically healthy 3-4 years old sexed Black Neck ostriches species *Struthio camelus massaicus* 7 male and 7 female weighted about 70-75 kg. The birds were kept in El Safa farm Northern Khartoum, Sudan at least about two year.

ORIGINAL ARTICLE



hematological investigations were conducted in physiology laboratory at college of veterinary medicine and animal production in June 2011 to determine the following parameters of total number of Red Blood Cells (RBC), total number of White Blood Cells (WBC), Packed Cells Volume (PCV), ESR, Mean Corpuscular Volume Cells (MCVC) and Mean Corpuscular Hemoglobin Concentration (MCHC) we collected individual samples of blood on heparin, which were processed by classical hematological techniques (5, 9). The finding data of this experiment were analyzed by T-test (student test) and SPSS version 17 as described by Comez and Comez 1984.

RESULTS

Results of total erythrocyte count (TRBC), hemoglobin concentration (Hb), hematocrit (Hct), the mean corpuscular values (MCV, MCH, MCHC) and (ESR) in blood of 14 examined old ostriches 7 male and 7 female are presented in Table 1., Figure 1 and 2.

The reported results show the following: the lowest value for erythrocyte count in female was $16.8 \pm 8.7^b/L$ and the highest value in male was $19.66 \pm 7.7^a /L$. The lowest level of hemoglobin concentration (Hb) was 79.3 g/L in male and the highest level was 80.03 g/L in female.

The mean value of the MCV was 8.6 fL and the standard deviation was 1.14 fL in male. The mean value for the MCV was 5.35 fL and the standard deviation was 1.5% (Table 1).

The mean value of the MCH was 31.8 pg and the standard deviation was 0.45 pg in male and mean value of the MCH was 31.8 pg and the standard deviation was 0.49 pg in female.

The mean value of the total White blood Cells (WBC) was 3010.57 and the standard deviation was 365.28 in male and the mean value of the (WBC) in female was 3013.23 and the standard deviation was 344.63.

The mean value of the PCV was 41.66 and the standard deviation was 3.9 in male. The mean value for the PCV was 42.01 and the standard deviation was 6.1 in female (Table 1).

The mean value of the ESR was 1.36 and the standard deviation was 0.45 in male. The mean value for the ESR was 1.40 and the standard deviation was 0.03 in female (Table 1).

Table 1 - Haematological values of Black Neck Ostrich samples collected from El Safa ostrich farm

Parameters	Units	Male	Female	Sig
RBC	10^6	19.66 ± 7.7^a	16.77 ± 8.7^b	*
WBC	10^3	3010.57 ± 365.28	3013.00 ± 344.63	NS
PCV	%	41.66 ± 3.9	42.00 ± 6.1	NS
Hb	%	79.3 ± 3.9	80.03 ± 3.0	NS
ESR	Mm/h	1.36 ± 0.45	1.40 ± 0.03	NS
MCVC	$10^{-4}(cm)$	8.6 ± 1.14	5.35 ± 1.5	NS
MCHC	%	31.8 ± 0.45	31.80 ± 0.49	NS

^{a,b} within the same row followed by different superscript are significantly different ($P \leq 0.05$). NS: No significant, *: significant at $P < 0.05$.

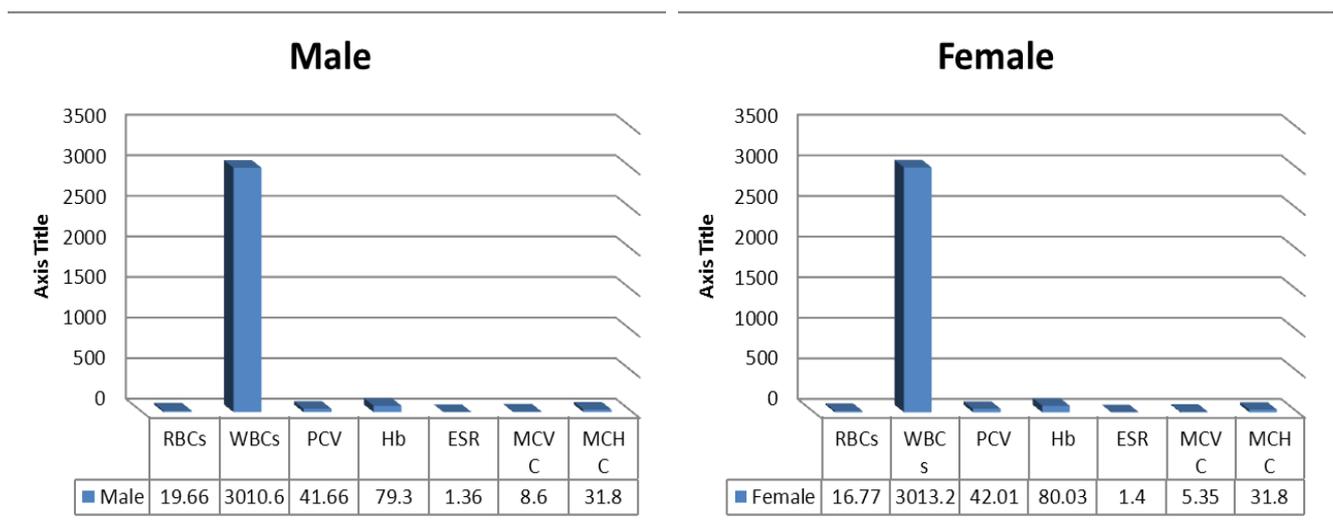


Figure 1 - Hematological values of Black Neck Ostrich male

DISCUSSION

Hematological studies have been widely used as means of assessing the state of health of Ostrich and the establishment of the hematological characteristics of Avian generally serves as a standard for physiology, pathological or toxicological studies.

The main objective of this study is comparison of blood parameters of Black Neck Ostrich collected from El Safa farm the results obtained revealed no significant different ($P < 0.05$) between the male and female in all parameters examined except (RBC) there is high significant different between male and female.

In case of White Blood Cells (RBCs) there was significant different in RWBCs count between male and female, White Blood cells in male and female were count at high range (19.66 ± 7.7^a), (16.77 ± 8.7^b) respectively in ostrich male and female were an agreement with Palomeque et al. (1991) who find that the average RBC length and width observed slightly larger in adult avian.

Also in case of Red Blood Cells (WBCs) there was no significant different in TRBCs count between male and female, Red Blood cells in male and female were count at range (3010.57 ± 365.28), (3013 ± 344.63) respectively in the studied ostrich, our findings were similar to those reported by Palomeque et al. (1991) and Spinu et al. (1999), but were higher than those of Levy et al. (1989a) and Polat et al. (2001). Although Levy et al. (1989a) reported that growers may have relatively higher numbers of white blood cells.

The result revealed that there was no significant different in PCV% between male and female ($P \leq 0.05$). PCV% in male and female were count at range (41.66 ± 3.9), (42.0 ± 6.1) respectively this finding with agreement to palomeque et al. (1991) and Brown and Jones (1996) who reported mean PVC% similar to our finding.

In this study, comparing the haematocrit with sex groups, it was found that haematocrit values in the ostrich male were similar to ostrich female, the revealed no significant different in haematocrit between the two group ($P < 0.05$). The mean haematocrit values were similar to those reported by (Palomeque et al. 1991; Brown and Jones 1996), but were higher than the values noted by Levy et al. (1989a) for ostrich chicks. In addition, for most birds, it was reported that the values of haematocrit are greater in adults than in juveniles (Palomeque et al. 1991; Peremann, 1999). The age-related increase in haematocrit values might be due to the greater oxygen demand of young ostriches for activity. Besides, Brown and Jones (1996) mentioned that haematocrit in ostriches is well regulated and even ehydrated. Birds show no or little haemoconcentration. The findings in this study for the MCH and MCHC were in agreement with those previously obtained by Palomeque et al. (1991), while the values for MCV were slightly lower in ostrich female than male. Perelman (1999) stated that the MCV, MCH and MCHC in ostriches tend to increase with age, but we study mature bird with same age.

The obtained that there was no significant different in haemoglobin concentration (Hb) between male and female ($P \leq 0.05$). Haemoglobin concentration (Hb) in male and female were count at range (79.3 ± 3.9), (80.03 ± 3.0) respectively this finding is agreement some authors have reported that haemoglobin levels of ostriches were within the range of most birds (Palomeque et al., 1991; Perelman, 1999). The values for the haemoglobin concentration were in accordance with those of Levy et al. (1989a). Although our findings were lower than the values obtained by Alomeque et al. (1991) for juvenile and adult ostriches, it was higher than those determined by Polat et al. (2001) for adult ostriches. This may be ascribed to differences in breed and in the physical and environmental condition.

The present study obtained that there is no significant between mean value of the ESR in ostrich male and female. The mean value for the ESR was (1.36 ± 0.45), (1.40 ± 0.03) respectively the findings in this study for the ESR were in agreement with those previously obtained by Palomeque et al. (1991).

REFERENCES

- Levi A, Perelman B, Waner T, Van Grevenbroek M, Van Creveld C, and Yagil R (1989). Haematological parameters of the ostrich (*Struthio camelus*), Avian Pat, 18: 321-7.
- Perelman B. (1999). Health Management and Veterinary Procedures, In: Deeming D. C. editor, The Ostrich Biology, Production and Health, CABI Publishing, Wallingford and Oxon, UK, 321-46.
- Raukar J (2004) Hematolo{ki pokazatelji u nojeva (*Struthio camelus*), Veterinarska stanica, 35, 1, 33-41.
- Minelli G, Santoto P, LO Fiego DP, Fautitano L and Mazzone D (1995). Studio preliminare sulle caratteristiche della carne di struzzo (*Struthio camelus*). Atti della Società Italiana delle Scienze Veterinarie, XLIX, 1053-1054.
- Palomeque J, Pinto D and Viscor G (1991). Hematologic and blood chemistry values of The Masai Ostrich (*Struthio Camelus*). J. Wildl. Dis. 27(1): 34-40.
- Perelman B (1999). Health Management and Veterinary Procedures in "The Ostrich: Biology, Production and Health", p 321-346, CABI Publishing, (ISBN: 0851993508), New York.
- Quintavalla F, Bigliardi E and Betroni P (2001). Blood biochemical baseline values in the ostrich (*Struthio Camelus*), 61-71, Università degli Studi di Parma Annali della. Facoltà di Medicina Veterinaria Vol. XXI.
- Spinu M, Spinu O and Degen A (1999). Haematological and immunological variables in a domesticated and wild subspecies of ostrich (*Struthio Camelus*). Br. Poult. Sci. 40: 613-618.
- Tully TN and Shane SM (1998). Ratites. The Veterinary Clinic of the North America: food animal practice. W.B. Saunders Company, Philadelphia.
- Woerpel R and Roskopf WJ (1984). Clinical experience with avian laboratory diagnostics. Vet. Clin. North. Am. Small. Anim. Pract. 14: 249-272.
- Jenni-Elermann S and JENNI L (1998) What can plasma metabolites tell us about the metabolism, physiological state and condition of individual birds? An overview. Biol. Cons. Fauna. 102: 312-319.
- Gomez K A and Gomez A A (1984). Statistical procedures for agricultural Research 2 ed, wiley sons, Inc.
- Levy A, Perelman B, Waner T, Van Grevenbroek M, Van Creveld C and Tagil R (1989a) Hematological parameters of the ostrich (*Struthio camelus*). Avian Pathol. 18: 321-327.



- Polat U, Aydin C and AK I (2001). Some serum biochemical values and hematological parameters of ostriches (*struthio camelus*) raised in condition of Bursa region. *J.Fac. Vet. Med.* 20, 65-70.
- Brown CR, and Jones GE (1996). Some blood chemical, electrolyte and mineral values from young ostriches. *J. S. Afr. Vet. Assoc.* 67(3): 111-114.
- Palomeque J, PINTO D and Viscor G (1991). Hematologic and blood chemistry values of The Masai Ostrich (*Struthio Camelus*). *J. Wildl. Dis.* 27(1): 34-40.
- Perelman B (1999). Health Management and Veterinary Procedures in "The Ostrich: Biology, Production and Health", p 321-346, CABI Publishing, (ISBN: 0851993508), New York.

