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DETERMINATION OF HEMATOLOGICAL PARAMETERS OF OSTRICH IN IRAN

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ABSTRACT

Ostrich breeding is a new and progressive industry in Iran. To ensure the industry is going success, monitoring and diagnosis of ostrich health to be done routinely. Thus, clinical hematology is widely used as a diagnostic tool. There is a paucity of information about hematologic parameters reference value of ostrich in Iran. The purpose of this study was to determine reference value in hematology of ostrich in Iran. Blood samples (2.5 ml) were taken from 50 clinically healthy ostrich (*Struthio Camelus*) by jugular vein puncture and were collected in EDTA tubes. Total erythrocyte count (TRBC), total white blood cell count (TWBC), Platelets count (Plt), Hematocrit (Hct/PCV), and mean corpuscular value (MCV) were determined. Fresh blood smears were prepared and then stained with Wright's stain to perform heterophils, lymphocytes, monocytes, eosinophils and basophils percentage. TRBC was $(1.80 \pm 0.50) \times 10^6 / \text{mm}^3$, TWBC was $(14.58 \pm 2.14) \times 10^3 / \text{mm}^3$, Plt was $21125 \pm 7894.03 / \text{mm}^3$, PCV was $38.6 \pm 8 \%$, and MCV was 265.5 ± 13.90 fl. Heterophils percentage was 79.22 ± 3.96 , lymphocytes percentage was 11.53 ± 4.01 , monocytes percentage was 0.69 ± 0.53 , eosinophils percentage was 2.78 ± 1.72 , basophils percentage was 1.21 ± 0.89 .

Keywords: Hematological Parameters, Ostrich, Iran

INTRODUCTION

The ostrich (order Struthioniformes, family Struthionidae) grouped under ratites, are flightless birds, without keel to their breastbone. The ostrich is characterized by its elongated neck and relatively long, heavily muscled and powerful legs with the presence of two toes (Alexander *et al.*, 1979).

Ostriches are easy to grow and adaptable to various climatic conditions. The average weight is approximately 120-150 kg; the height is 3 m and can live on average 75 years. The ostriches can produce every year 20-40 eggs, the weight of the egg is roughly on an average 1500g. The meat of this flightless bird is healthy food with low cholesterol. Moreover, its taste great and is similar to beef. Meat quality and blood hematology in Slaughter ostrich has been described (Wolmarans, 2011). Ostrich diet normally consists of the same components that is given to cows or used in poultry. The diet contains granary products, alfalfa, fruits, vegetables and other berries (Orumbay and Tanatarov, 2010, 2011). Depending upon techniques of feeding and raising ostriches, 9-12 month old chick can weight 90 kg and produce roughly 30 kg of meat as suggested by Orumbay and Tanatarov (2009).

The ostrich (*Struthio camelus*) industry in Iran is still young, and as such, there is scant information on hematology of the ostrich. Veterinary clinical hematology is a useful tool for the diagnosis of disease in both domestic mammals and birds (Campbell and Coles, 1986, Woerpel and Roskopf, 1984). Clinical hematology is a useful diagnostic tool in avian medicine (Stoskopf *et al.*, 1983, Woerpel and Roskopf, 1984). Interpretation is dependent on established baseline levels for the species. Furthermore, these parameters may be influenced by climatic conditions prevalent in the particular geographic location and by different management systems. The purpose of this study was to establish baseline hematology values for juvenile and adult farmed ostrich in Iran.

MATERIALS AND METHODS

This study was conducted on 50 clinically healthy adult ostriches from farms near Tehran Providence (20 male and 30 female). Blood samples were taken from jugular vein. Blood was collected into heparinized

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vacutainer tubes. Hemoglobin (Hb) was determined colorimetrically in a hemoglobinometer using the principle of cyanmethemoglobin release (Jane, 1986). Six drops of lysing solution were dispensed in the diluted blood for 30 minutes, after which the cyanmethemoglobin reagent–blood mixture was centrifuged at 30,000 g for 10 minutes to remove the cell debris and the nuclei, which would interfere with spectrophotometric transmission. The packed cell volume (PCV) was determined using a hematocrit centrifuge at 10,000 g for 5 minutes. The total red blood (TRBC) and total white blood cell (TWBC) counts were determined using Natt Herrick diluent as previously described (Stoskopf *et al.*, 1986). The differential white cell count was determined by fixing air dried monolayers of blood for 3 minutes using the Leishman/Wright stain. The staining was completed by addition of a phosphate buffer (pH 6.8) and then staining for 6 minutes. Stain was washed off gently with running tap water, and the slide was dried and then examined in a light microscope. The calculated erythrocyte indices of mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC) were determined by the standard formulas. 9 Blood smears were prepared to differentiate white blood cells.

RESULTS AND DISCUSSION

Results

Total erythrocyte count (TRBC), total white blood cell count (TWBC), Platelets count (Plt), Hematocrit (HcT/PCV), and mean corpuscular value (MCV) were determined. Fresh blood smears were prepared and then stained with Wright's stain to perform heterophils, lymphocytes, monocytes, eosinophils and basophils percentage. TRBC was $(1.80 \pm 0.50) \times 10^6/\text{mm}^3$, TWBC was $(14.58 \pm 2.14) \times 10^3/\text{mm}^3$, Plt was $21125 \pm 7894.03/\text{mm}^3$, PCV was $38.6 \pm 8\%$, and MCV was 265.5 ± 13.90 fl. Heterophils percentage was 79.22 ± 3.96 , lymphocytes percentage was 11.53 ± 4.01 , monocytes percentage was 0.69 ± 0.53 , eosinophils percentage was 2.78 ± 1.72 , basophils percentage was 1.21 ± 0.89 . Hematological Parameters of adult ostrich was recorded in table 1.

Table 1: Haematological parameters of ostrich

| Parameters | Mean±S.D. | Range |
|--|------------------|-------------|
| Leucocytes ($\times 10^9/\text{L}$) | 14.68 ± 2.98 | 12.95-15.96 |
| Heterophils (%) | 79.22 ± 3.96 | 76.87-83.42 |
| Heterophils ($\times 10^9/\text{L}$) | 11.81 ± 2.63 | 10.54-13.67 |
| Lymphocytes (%) | 11.53 ± 4.01 | 7.53-15.34 |
| Lymphocytes ($\times 10^9/\text{L}$) | 1.85 ± 0.55 | 1.14-2.12 |
| Monocytes (%) | 5.22 ± 2.96 | 2.87-7.34 |
| Monocytes ($\times 10^9/\text{L}$) | 0.69 ± 0.53 | 0.01-1.12 |
| Eosinophils (%) | 2.78 ± 1.72 | 1.14-3.98 |
| Eosinophils ($\times 10^9/\text{L}$) | 0.39 ± 0.37 | 0.02-0.74 |
| Basophils (%) | 1.21 ± 0.89 | 0.33-2.14 |
| Basophils ($\times 10^9/\text{L}$) | 0.18 ± 0.19 | 0.01-0.35 |

Discussion

The TWBC count for the ostriches in this study were similar to those in ostriches in previous studies (De Villiers, 1938) and to those listed for other bird species (Leonard, 1982). The TWBC counts were higher in juvenile ostriches than in adults, a finding contrary to the observations of other workers (Levi *et al.*, 1977). This difference may have been due to variation among ostriches in cellular response to the stress of handling (Maxwell, 1993). The individual white cell types in the differential cell counts did not show any particular trends. The haematological and serum biochemistry values compiled in this study are not appropriate to be used as reference due to the small sample size. In order to establish values that can be

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considered as referral values specifically for ostrich reared in Malaysia, a bigger sample size has to be done. Better handling of animal and Also proper technique of sampling, storage and transportation of samples are highly recommended to overcome problem that was found in our study.

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