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Haematological Parameters of Indigenous Goats in Batticaloa District, Sri Lanka

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Abstract

Blood samples were obtained from 10 male and 10 female goats from different veterinary ranges of Batticaloa district, Eastern Province, Sri Lanka to explore influence of sex on the haematological profile of goat. Haematological parameters such as total White Blood Cell count (WBC count), neutrophils, lymphocytes, monocytes, eosinophils, basophils counts, Red Blood Cell count (RBC), Haemoglobin (Hb), Mean Corpuscular Volume (MCV), Mean Cell Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) were analyzed. The values of lymphocytes, eosinophils, monocytes, basophils, MCV and MCHC were higher ($P < 0.05$) in male goats than female goats. The values of WBC, neutrophils, RBC, Hb and MCH were higher ($P < 0.05$) in male goats than female goats. Values of WBC, neutrophils, eosinophil, monocyte, RBC, MCV and MCH were significantly influenced by sex.

Key words: Female; goat; haematological profile; male

1. Introduction

Goat is a small ruminant and it is widely said as “poor man’s cow” (MacHugh and Bradley, 2001). Goat farming is popular all over the world due to the high demand meat and milk. The small body size, wide range of feeding ability, adaptation to the adverse climatic condition, disease tolerance and short reproductive cycle of goats give several advantages to the rural farmers. Goat farming requires low input and management and it provides various outputs to the farmers. Blood is a fluid tissue and which is crucial for the survival of the organisms (Jain, 1986). Haematology is the key make various medical examinations such as clinical diagnosis, surgical intervention and responses to therapy (Biu *et al.*, 2009; Yaqub *et al.*, 2013). Haematological examination in livestock has been widely done as an essential part of clinical examination to do various diagnoses and suggesting some prediction (Braun *et al.*, 2010; Polizopoulou, 2010). Sex, breed,

physiologic status, nutritional status, age, genetics, stress, disease, management system, location and season are some of the factors which influence the haematological properties of in domestic animals (Addass *et al.*, 2010). Sex is an important factor affects the haematological values in many animal species (Olayemi *et al.*, 2006; Oladele *et al.*, 2007). It has been reported that formulating a universal standard for haematological profile for indigenous goats is challenging because of the interaction of the above mentioned factors (Addass *et al.*, 2010). Haematological examinations provide information which helps in the health assistance of animals. Therefore, this research was conducted to explore influence of sex on the haematological profile of goat.

2. Materials and Methods

Blood samples were obtained from 20 goats (10 males and 10 females) from different veterinary ranges of Batticaloa district, Eastern Province, Sri Lanka. The goats were healthy and fed same diet on the day of sampling.

Haematological Analysis

Blood samples were collected from each goat by jugular vein puncture into 3 ml vacuum tubes containing EDTA. All of the samples were transferred to the laboratory as quick as possible in ice. From the collected blood sample White Blood Cell count (WBC count), neutrophils, lymphocytes, monocytes, eosinophils, basophils counts, Red Blood Cell count (RBC), Haemoglobin (Hb), Mean Corpuscular Volume (MCV), Mean Cell Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) were analyzed by automatic analyzer.

Statistical Analysis

The Hematological data were analyzed using general linear models of ANOVA. Differences between means of each groups were compared using the Duncan multiple comparison test in $p < 0.05$ significant level.

3. Results and Discussion

The hematological properties of the indigenous goats are shown in tables 1. The values of these properties were within the normal range for goats (Jain, 1986). White blood cells are the fighters of the body and they act as a protector of body from microorganisms. To maintain the immune system balance they increase in number (Zamfirescu *et al.*, 2009). White blood cells were significantly lower in male goats compared to female goats. This is supported by Egbe- Nwiyi *et al.*, (2015); Babeker and Elmansoury, (2013); Haldar, (2012), who received the same results. Neutrophil count was significantly higher in female goats than male goats. This is also supported by Egbe- Nwiyi *et al.*, 2015; Babeker and Elmansoury, 2013; Opara *et al.*, 2010. However, counts of lymphocytes, eosinophils, monocytes and basophils were lower in female compared to male. Eosinophils and monocytes counts were significantly higher in males than females. Similar result was observed by Babeker and Elmansoury, (2013) for eosinophils, who found high count of eosinophil counts in male goats. Although basophils counts were higher in male goats than female this was not a significant difference. This result was supported by several researchers Egbe- Nwiyi *et al.*, 2015; Opara *et al.*, (2010); Babeker and Elmansoury, (2013); Obua *et al.*, (2012). Lymphocytes count in male goats was higher than female goats and this is supported by Obua *et al.*, (2012) and Habibu *et al.*, (2014).

Table 1: Mean ($\pm$ SD) of haematological values of indigenous goats selected from different veterinary ranges of Batticaloa district, Eastern Province, Sri Lanka.

Haematological Properties	Sex	
	Male	Female
WBC ($\times 10^3/\mu\text{l}$)	8.9 $\pm$ 1.7 ^a	11.9 $\pm$ 1.4 ^b
Neutrophils (x 10/ μl)	3528.4 $\pm$ 1508.2 ^a	5568.0 $\pm$ 2458 ^b
Lymphocytes (x 10/ μl)	5498 $\pm$ 1843.4 ^a	5494 $\pm$ 2184 ^a
Monocytes (x 10/ μl)	543.4 $\pm$ 170.1 ^a	484.2 $\pm$ 292.1 ^b
Eosinophils (x 10/ μl)	570.9 $\pm$ 324 ^a	450.1 $\pm$ 231.1 ^b
Basophils (x 10/ μl)	61.3 $\pm$ 23.4 ^a	58 $\pm$ 32.1 ^a
RBC (x 106/ μl)	12.0 $\pm$ 1.8 ^a	13.5 $\pm$ 7.8 ^b
Hb (g/dl)	9.8 $\pm$ 2.2 ^a	10.2 $\pm$ 2.8 ^a
MCV (fl)	23.2 $\pm$ 2.7 ^a	21.4 $\pm$ 1.8 ^b
MCH (pg)	7.9 $\pm$ 1.5 ^a	8.4 $\pm$ 2.3 ^b
MCHC (g/dl)	35.4 $\pm$ 12.1 ^a	32.3 $\pm$ 18.5 ^a

Values in rows with different superscripts differ significantly ($p < 0.05$)

Count of RBC differed significantly among male and female goats in this study. Female goats had significantly higher count of RBC than males. Similar finding was observed by Babeker and Elmansoury, (2013) in Sudanese Desert goats but, Addass *et al.*, (2010); Opara *et al.*, (2010); Obua *et al.*, (2012) observed no significant difference in RBC count between male and female in West African Dwarf goats and Red Sokoto goats. Hb count in male and female goats showed no significant difference and Hb count in female was higher than male. This is supported by Tambuwal *et al.*, (2002); Opara *et al.*, (2010); Babeker and Elmansoury, (2013).

MCV values of male and female goats differ significantly and male goats had higher value than female goats. This is supported by Opara *et al.*, (2010) and Babeker and Elmansoury, (2013). MCH values of male and female goats differ significantly and female goats had higher value than male goats. But, Babeker and Elmansoury, (2013) observed higher values in male goats. MCHC value was higher in male goats and lower in female goats. There was no significant difference between two sexes. Similar results were observed by Opara *et al.*, (2010); Obua *et al.*, (2012). The values of RBC, Hb, MCV, MCH and MCHC help in the determination and classification of anaemia in animals (Jain, 1986).

4. Conclusion

5. This study was done as a preliminary study to be used as a reference for further studies. The values of lymphocytes, eosinophils, monocytes, basophils, MCV and MCHC were higher in male goats than female goats. The values of WBC, Neutrophils, RBC, Hb and MCH were higher in male goats than female goats. Values of WBC, Neutrophils, eosinophil, monocyte, RBC, MCV and MCH were significantly influenced by sex. The variation in haematological profile may be due to the genetic differences between sexes.

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