EFFECT OF DROUGHT ON WHITE BLOOD CELL INDICES IN GOATS

G. S. Gottam[1], N. Kataria and A. K. Kataria[2]
Department of Veterinary Physiology, College of veterinary and Animal Science
Rajasthan University of Veterinary and Animal Sciences, Bikaner-334 001, Rajasthan, India

Received: 26.04.2016
Accepted: 19.09.2016

ABSTRACT

The experiment was designed to assess the effect of drought on white blood cell indices in 100 goats of both sex in western part of Rajasthan. All animals belonged to farmers' stock. The parameters included total leucocyte count (TLC) (10^3/µl), differential leucocyte count (DLC) viz .Neutrophils (%), Lymphocytes (%), Eosinophils (%), Basophils (%) and Monocytes (%) and the over all mean values were 7.967 ± 0.085, 36.900 ± 0.570, 53.090 ± 0.224, 2.760 ± 0.124, 0.710 ± 0.065 and 3.210 ± 0.142, respectively in goat. The effect of sex and age was also observed. It was found that the sex and age effect was significant ($p \leq 0.05$) only on the mean values of total leucocyte count (TLC) in goats.

***Key words*:** TLC, DLC

Introduction

Goat is the most prolific ruminants under tropical and sub tropical condition. Although low rain fall and scanty vegetation are common to this area. Generally during drought particularly in western part of Rajasthan the changes are into environment includes scarcity of water and scarcity or no vegetation. The knowledge of blood norms is important in diagnosing many diseases in animals (Vaidya *et al*., 1970). It would be of great importance to estimate the different blood values during drought conditions particularly regarding management of the animals in such emergency conditions. In this way these values become a real aid to the diagnosis of normal vs. pathological conditions of the animals.

Materials and Methods

The experiment was designed to evaluate the effect of stress due to drought on white blood cell indices in goats (up to 5 years of age). The effects of sex and age were also determined non various parameters during drought. The animals belonged to farmers' stock of drought stricken area of western part of Rajasthan particularly area in and around Jaisalmer district. The animals belonged to similar environmental habitat and managemental practices. Field grazing pattern was adopted for the animals. Animals browsed *Ziziphus nummularia* leaves and also received small amounts of loppings of *Prosopis cineria* trees. Blood was collected from jugular vein under complete aseptic condition in to the test tubes with anti coagulant. All the samples were collected in duplicate and processed on the same day of

collection. White blood cell indices i.e. total leucocyte count (TLC) (10^3/µl) and DLC i.e. Neutrophils (%), Lymphocytes (%), Eosinophils (%), Basophils (%) and Monocytes (%) were determined by standard technique as described by Jain (1986). To determine the effect of age and sex the mean values were compared statistically by using 't' test (Snedecor and Cochran, 1967) from the respective mean value.

Results and Discussion

The overall values of various white blood indices i.e. total leucocyte count (TLC) and differential leucocyte count (DLC) and their mean values according to sex and age are presented in Table 1.

The overall mean values of various white blood cell indices viz. WBC (10^3/µl), neutrophils (%), Lymphocytes (%), eosinophils (%), basophils (%) and monocytes (%) were 7.967 ± 0.087, 36.900 ± 0.570, 53.090 ± 0.224, 2.760 ± 0.124, 0.710 ± 0.065 and 3.210 ± 0.142, respectively in goats. The ranges were 7.15 to 9.97, 35 to 43, 49 to 57, 1 to 5, 0 to 3 and 0 to 5, respectively in goats.

The over all mean value of total leucocyte obtained in the present investigation were lower than those reported by Parwe *et al.* (1990), Kataria *et al.* (1992), Kumar *et al.* (1997), Wadwa and Prasad (2001) and Singh *et al.* (2001) in goats.

The overall mean value of total leucocyte obtained in the present investigation was higher than those reported by Khan *et al.* (2014) and Sandhu *et al.* (2001) in goats.

The overall mean value of total lymphocyte in the present investigation were higher than those reported by Parwe *et al.* (1990) but lower than those reported by Kataria *et al.* (1992), Kumar *et al.* (1997), Wadwa and Prasad (2001) and Singh *et al.* (2001) in goats.

The overall mean value of nuetrophil in the present investigation was lower than those reported by Bhargava (1980) and more or less corroborated the values recorded by Kataria *et al.* (1992) and Singh *et al.* (2001) but higher than those reported by Pyne *et al.* (1982), Kumar *et al.* (1997), Wadwa and Prasad (2001), Rastogi and Singh (1990) and Sandhu *et al.* (2001) in goats.

The overall mean value of eosinophils, basophils and monocytes in the present investigation were lower than those values reported by Rastogi and Singh (1990) and Kataria *et al.* (1992) but higher than those reported by Wadwa and Prasad (2001) and Singh *et al.* (2001) in goats.

Effect of sex and age was found non significant ($p>0.05$) on the different white blood cell indices in the present study. However, the age effect was significant ($p \leq 0.05$) on monocyte in goats and a significant ($p \leq 0.05$) effect of sex

[1]Assistant Professor., PGIVER, RAJUVAS, Jaipur; [2]Professor, Apex Centre, CVAS, Bikaner

Table 1: Effect of drought on white blood cell indices in goats

S.N.	Effect	TLC ($10^3/\mu l$)	Neutrophils (%)	Lymphocytes (%)	Eosinophils (%)	Basophils (%)	Monocytes (%)
1.	Overall (100)	7.967 ± 0.085 (7.15-9.97)	36.900 ± 0.570 (35-43)	53.090 ± 0.224 (49-57)	2.760 ± 0.124 (1-5)	0.710 ± 0.065 (0-3)	3.210±0.142 (0-5)
2.a.	Sex Male (30)	7.635 ± 0.176 (7.15 - 8.92	37.433 ± 0.360 (35-40)	53.266 ± 0.420 (51-56)	2.966 ± 0.227 (1-5)	0.666 ± 0.099 (0-2)	3.033± 0.232 (1-5)
b.	Female (70)	8.110^b ± 0.091 (7.25-9.97)	36.671^a ± 0.800 (35-43)	53.014^a±0.266 (49-57)	2.671^a±0.147 (1-5)	0.728^a± 0.083 (0-3)	3.285^a ± 0.177 (0-5)
3.a.	Age 0-2 yrs (51)	8.191 ± 0.124 (7.15-9.97)	37.882 ± 0.324 (35-43)	52.921± 0.312 (49-56)	3.196 ± 0.168 (2-5)	0.764 ± 0.106 (0-3)	2.941±0.182 (1-5)
b.	Above 2 yrs (49)	7.735^b ± 0.108 (7.25 - 8.95)	35.877^a ± 1.101 (35-40)	53.265^a ± 0.323 (51-57)	2.306^a ± 0.160 (1-5)	0.653^a ± 0.074 (0-3)	3.489^a±0.214 (1-5)

(i) Figures in the parentheses indicate numbers of animals for the effects and range for the different parameters.
(ii) In sex effect mean values of all parameters of female animals have been compared with respective mean values of animals.
(iii) In age effect mean values of all parameters of the animals of above 2 years of age group have been compared with respective mean values of animals of below 2 years of age group
(iv) Mean superscribed by letter "a" do not differ significantly ($p>0.05$) and letter "b" differ significantly ($p\leq 0.05$) from the respective means (male and 0 to 2 years age group)

and age was observed on the mean values of total leucocytic count.

Selenium and vitamin E appear to be important nutrients in maintaining neutrophils function. Copper deficiency may also adversely affect neutrophil function in drought condition. Several studies indicate that neutrophils may modulate the adaptive immune response to infectious agents (Kaneko *et al*., 2008). During drought conditions due to scanty vegetation long transportation is common so the effect of critical environmental, transportation and exercise on neutrophil is noticed. Neutrophils become activated during transportation despite the potentially suppressive effects of cortisol on neutrophil function.

References

Bhargava, S. C. (1980) *Indian Vet. J.* **57** : 485-486.

Jain, N.C. (1986) *In: Schalm's Veterinary haematology*. 4th ed. Lea and Febiger, Philadelpia.

Kaneko, *et al*. (2008) *Clinical Biochemistry of Domestic Animals*. 6th ed. Acedemic Press, U.S.A.

Kataria, A. K. *et al.* (1992) *Indian Vet. J.* **69**: 551-552.

Khan, A. *et al*. (2014) *Vet. Pract.* **15**(1) : 114-115

Kumar, N. *et al.* (1997) *Indian J. Ani. Sci.* **67** (4) : 312-313.

Parwe, G.B. *et al.* (1990) *Indian Vet. J.* **67** : 415-418.

Rastogi, S. K. and Singh, S. P. (1990) *Indian J. Ani. Sci.* **60**(11) :1338-1339.

Sandhu, A. K. *et al.* (2001) *Indian Vet. J.* **78** : 590-593.

Singh, H. *et al.* (2001) *Indian Vet. J.* **78** : 130-132.

Snedecor, G.W. and Cochran, W.G. (1967) *Statistical Methods*. 6th ed. Oxford and IBH Publishing Co.

Vaidya, M.B. *et al*. (1970) *Indian Vet. J.* **47** : 642-647.

Wadwa, D.R. and Prasad, B. (2001) *Indian Vet. J.* **78** : 167-169.