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Effect of Age and Physiological Status on Few Blood Biochemical Parameters of Apparently Healthy Nellore Sheep from Hot and Humid Areas of Andhra Pradesh

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Abstract

Nellore brown sheep are the most commonly reared in the state of Andhra Pradesh. The present study was conducted to report the affect of age and physiological status on few blood biochemical parameters of apparently healthy goats from the hot and humid areas of Andhra Pradesh. A total of 18 sheep of age 0-1 year, pregnant and lactating were used for our study. The results evidenced significantly higher RBC, Hb in pregnant group compared to others. The PCV were found to be significantly higher in 0-1 year group. The total protein, creatinine were significantly higher in lactating group compared to the other two. The albumin levels were found to be significantly higher in pregnant group. The cholesterol, calcium, phosphorus levels were found to be significantly higher in 0-1 year group and decreased in periparturient period. The study established baseline values of Nellore sheep in the hot and humid areas of Andhra Pradesh and therefore can be used as reference values for further studies on these species.

Keywords: *Physiological Status, Hematological, Biochemical, Nellore Brown Sheep*

INTRODUCTION

In Andhra Pradesh, rearing of small ruminants is a major source of livelihood for poor farmers. The number of small ruminants and their distribution vary widely in different districts with heavy concentration of sheep population in some districts like Anantapur, Nellore, Kadapa and Prakasam .The sheep in Andhra Pradesh are mostly reared by the landless laborers and marginal farmers, who are considered as the socially and economically disadvantaged sections in the rural society. It provides gainful employment and income to the weaker sections especially to the rural poor. Total sheep population in the country is 74.26 million while Andhra Pradesh has 17.6 million. (Livestock census, 2019).Nellore sheep is the tallest sheep breed in the country which is reared for high quality mutton.

The hemato biochemical parameters are key indicators of the physiological condition of the animals (Saikiran et al., 2020). Determination of serum biochemical profile is useful for evaluating the health condition and monitoring the nutritional and metabolic status of the animals (Soliman et al., 2014) .These parameters are also important indicators of the health condition and metabolic activity in lactating animals . The metabolic changes not only occur in producing animals but also in fast growing young animals. In this context, studying the blood biochemical profile across different physiological states is of paramount importance. Hence, the present study is aimed to determine influence of physiological status (young & growing, pregnant and lactating) in Nellore brown sheep in Krishna district of Andhra Pradesh.

MATERIALS AND METHODS

The present study was conducted on apparently healthy Nellore brown Sheep belonging to small farmers at Krishna District, Andhra Pradesh during the months of April-May. The animals (n=18) were divided into three groups of 0-1 yr, pregnant and lactating. Animals were maintained semi intensively with ad libitum green fodder and drinking water. Concentrate feed was provided as per the physiological status of the animals. Blood samples were collected by jugular vein puncture and the serum was separated by centrifugation at 1500 rpm for 20 minutes, transferred into clean sterile cryo vials and stored at $-20^{o}C$ until further analysis. All the biochemical parameters were determined spectrophotometrically using standard diagnostic kits. The heamatological parameters such as total erythrocytic count (TEC), heamoglobin (Hb), packed cell volume (PCV) were estimated using Mindray heamoanalyzer BC 2800.

Statistical Analysis

The data obtained on various parameters were statistically analysed using one way analysis of variance (ANOVA) (Snedecor and Cochran, 1994). The whole data was analysed using computerized software programme SPSS Ver.20.0.

RESULTS AND DISCUSSION

The results of the hemato biochemical parameters studied has been mentioned in Figure 1 to 9 as shown below. Determination of the hemato biochemical profile is used for evaluating the health conditions, to monitor the nutritional and metabolic conditions of the animals (Carlos et al., 2015). Most parameters showed results within the reference values given by the various authors (Radostits *et al.*, 2002; Kaneko *et al.*, 2008 and Carlos et al., 2015).The RBC count, Hb levels were found to be significantly higher in pregnant group. The PCV were found to be significantly higher in 0-1 year group. The total protein, creatinine were significantly higher in lactating group compared to the other two. Our results with respect to total protein were contrary to that of Meira *et al.*, 2009. This could be due to physiological variations between the different breeds. The lower creatinine in suckling lambs might be due to increased GFR

and lowered muscle mass (Sarmin et al., 2021). The albumin levels were found to be significantly higher in pregnant group compared to other groups. Plasma albumin levels decreased during the peri-partum period in dairy goats which further indicates that animals were exposed to oxidative stress during the peri-partum period (Celi et al., 2008). The cholesterol, calcium, phosphorus levels were found to be significantly higher in 0-1 year group and decreased in periparturient period. The present study showed that the age factor also affected the serum cholesterol levels, which was similar to that observed in sheep breeds (Antunovic et al., 2004 and Carlos et al., 2015). More absorption of minerals occurs due to high rate of bone development, higher renal reabsorption and bone mobilization (Da Cruz et al., 2017). Decreased serum calcium levels in late-pregnancy in ewes causes hypocalcaemia; which was reported by Jensen and Swift, 1982. The decreased levels of Ca, P in pregnant ewes indicated that there are some disturbances in electrolytes and some minerals which might be attributed to the stress of starvation, dehydration. The observed metabolic response during pregnancy results from a higher lipid mobilization in response to high energy needs (Lotfollahzadeh et al., 2016). The variations in the obtained results might be due to the different management, climatic conditions, and nutrition level of the animals.
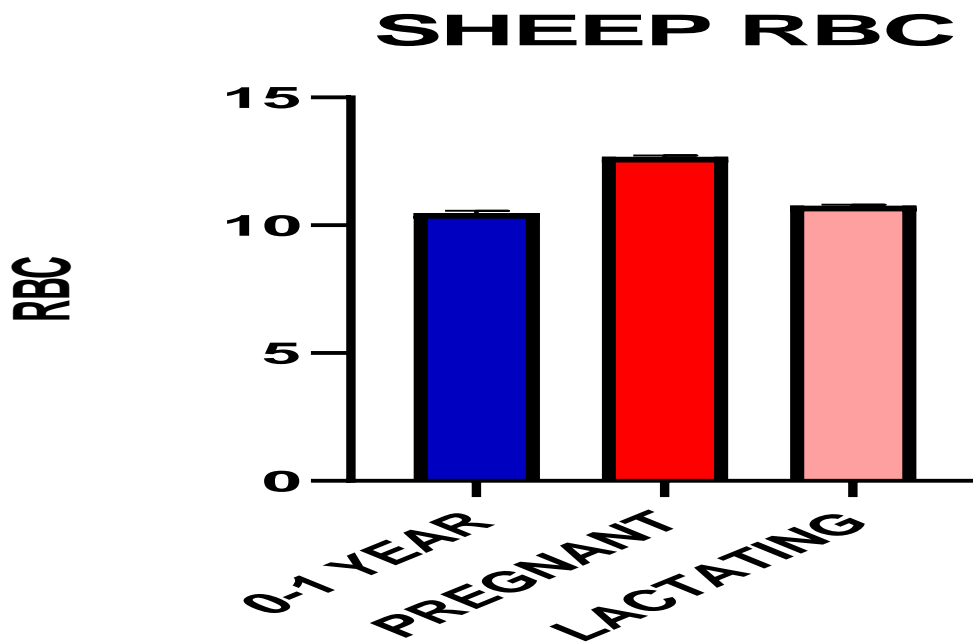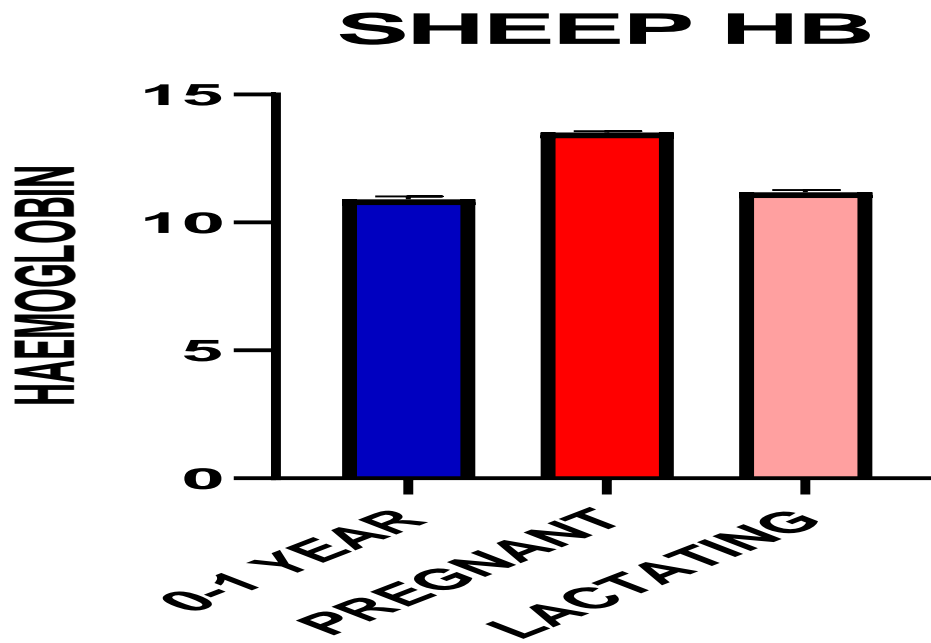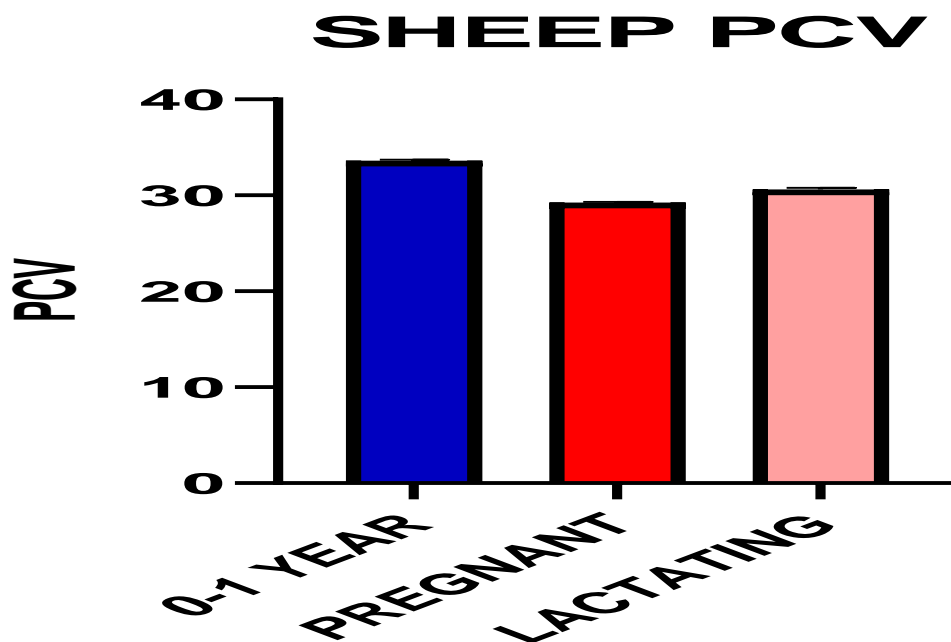
fnhgrr

Fig-1

SHEEP HB

Fig-2

SHEEP PCV

Fig-3
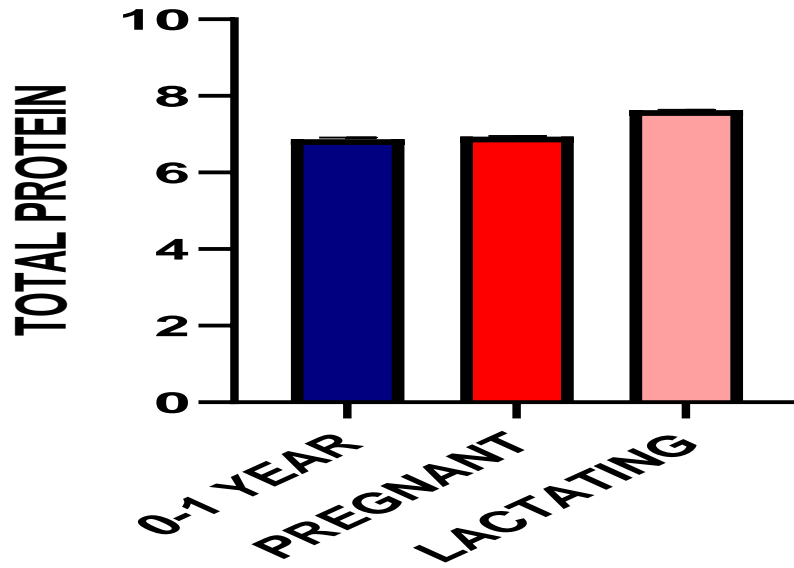
Fig-4
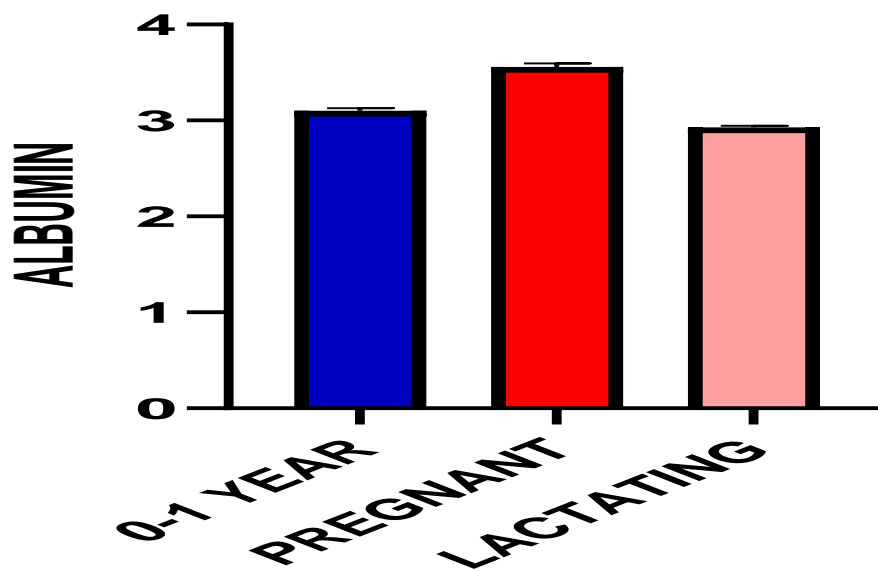
Fig-5

SHEEP CHOLESTEROL
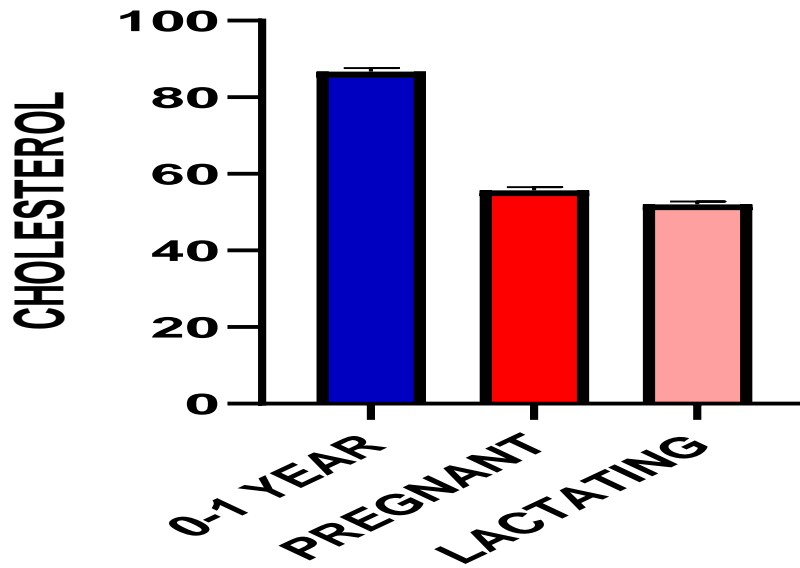
Fig-6

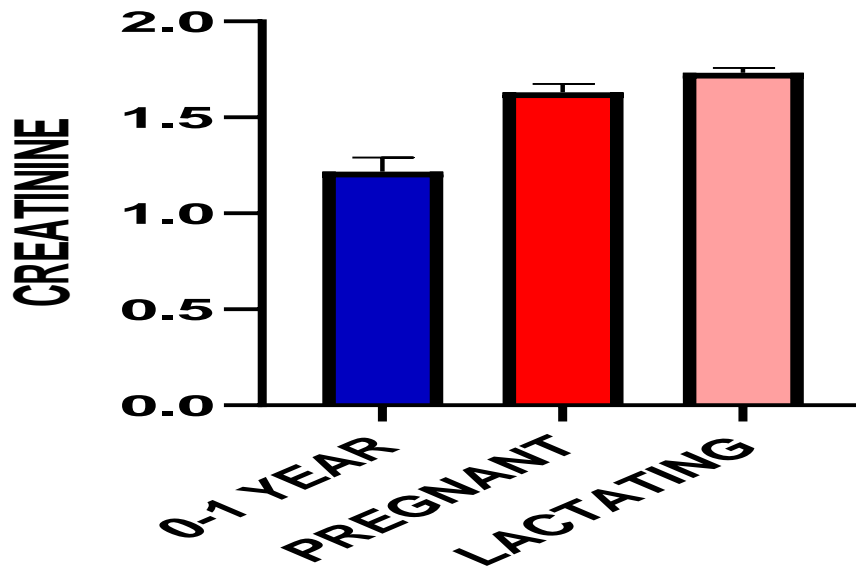# SHEEP CREATININE
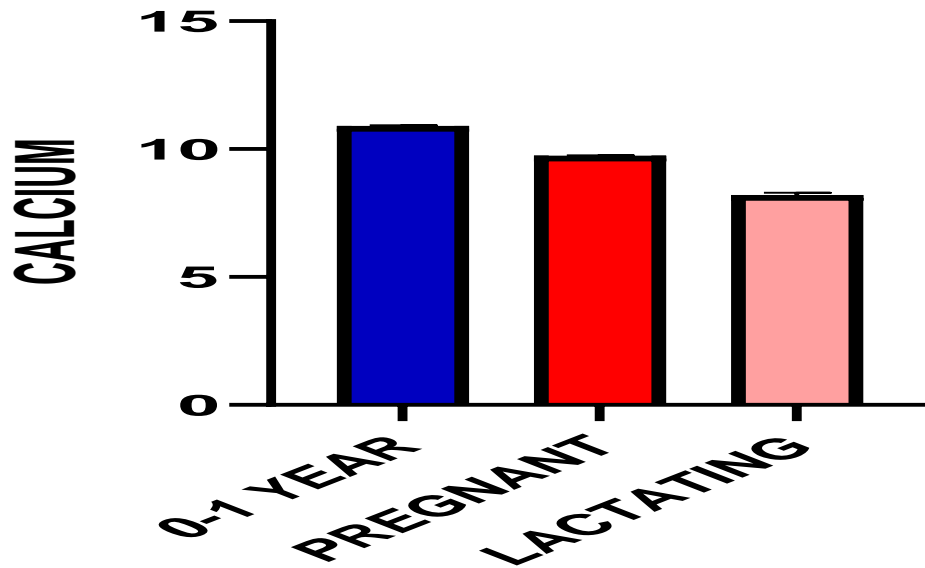

Fig-7

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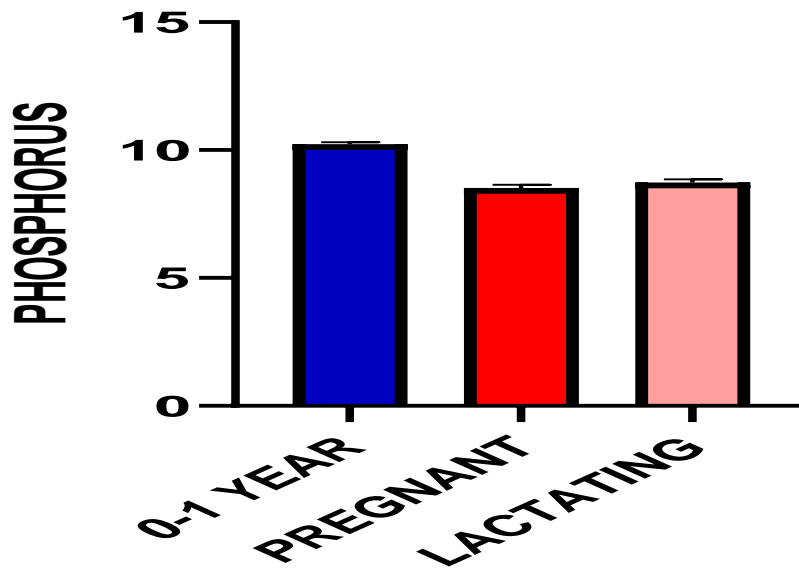
SHEEP CALCIUM

Fig-8

SHEEP PHOSPHOROUS

Fig-9

Conclusion

Biochemical parameters are important indicators of the health condition and metabolic activity in lactating animals (Carlos et al., 2015). Hence, these can also be used for the diagnosis of various livestock diseases (Cetin *et al.,* 2009; Ram Gowry et al., 2020). The variations in hematological parameters is multifactorial some of which are altitude, feeding level, age, sex, breed, diurnal and seasonal variation, temperature and physiological status of animals (Bishu, 2016). The baseline values obtained from this study across different physiological status and age groups could be used as a reference for further experimentation on sheep located in these areas.

Acknowledgements

Conflict of Interest

The authors declare that there is no any conflict of interest for this manuscript.

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