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Clinico-epidemiological studies in Kenguri sheep maintained under semi-intensive farming system in dry zone of Karnataka

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Abstract

The current study was carried out at Livestock Farm Complex, Veterinary College, Gadag to study the clinico-epidemiological parameters in Kenguri sheep reared under semi-intensive farming system. A total of thirty-seven animals of about one year of age of either of gender and approximately similar body weight with body condition score (2.8 to 3.0) were selected for the study. During the study period, all the animals were allowed for grazing (6hr) during daytime and were supplemented with commercial concentrate feed mixture (CFM) and fresh green fodder. Hematological studies indicated total red blood cell count (RBC) of $8.7 \times 10^{12}/L$ (7.37-9.86), total white blood cell count (WBC) of $11.5 \times 10^9/L$ (8.2-14.6), total lymphocyte count of 39.8% (23.6-45.9), Granulocytes of 55% (48.9-69.5), Hemoglobin 89 g/L (88.4-107), Packed cell volume 22.45fL (13.2-29) and total platelets count of $89.1 \times 10^9/L$ (614-1073). The biochemical studies showed values of 73 IU/L (25.55-142) for Aspartate amino transferase, 51.7 IU/L (28.2-79.07) for Gamma-glutamyl transferase, 7.9 mg/dl (5.01-11.69) of Blood urea nitrogen and Creatinine levels of 0.81mg/dl (0.43-1.53). The results of the present study concluded that the Kenguri sheep breeds maintained under semi-intensive farming system in central part of Karnataka revealed significant values for the species-specific standard values reported earlier.

Keywords: Biochemical, feed mixture, hematological, semi-intensive, sheep

Introduction

India ranks second in the world with 72.26 million sheep populations, which is about 4.77% of total world sheep population. Sheep provides livelihood and nutritional security to small, marginal and landless laborers though sheep farming is low input rearing system. Sheep provide a variety of products like meat, milk, skin, wool and manure. Sheep breeds observed in Karnataka are Deccani, Ballari, Bannur, Hasan and Kenguri. Kenguri sheep breed found in the Northern Districts of Karnataka state such as Koppal, Gadag, Raichur and the neighboring district of Bagalkot and Gulbarga. Krishna River in the North and Tungabhadra in the south bind Kenguri sheep distribution. This sheep is well adapted to the agro climatic conditions of Northern Karnataka and red soils. Due its dark red body colour or the colour resembling coconut husk it named as Kenguri or Tenguri. Some of them have black belly those known as "JODKA". In addition, some are referred as "MASAKA"; those had mixture of brown and black colour. They have larger body size, medium sized droopy ears and short tail. Breeding tract of Kenguri sheep falls in Northern Dry Zone of Karnataka state. The rainfall is scares and the soil is red sandy loam or red loam in major area and shallow black in limited areas. These sheep can thrive well in the semi-arid and arid regions and in sparse vegetation. In Northern Districts of Karnataka state, mainly semi-intensive system of sheep rearing is practiced by the small and marginal farmers' i.e. the sheep were allowed for grazing during daytime and supplemented with commercial concentrate feed mixture (CFM) including green fodder during evening and night times in the sheds. In southern part of India sheep reared primarily for mutton purpose, the promising growth rate of Kenguri sheep lambs makes sheep rearing a remunerative and sustainable means of livelihood and employment for the farmers in this area. A considerable portion of small, marginal and landless workers in rural areas are engaged in small ruminant rearing as a livelihood since it consumes top feeds and agricultural by products to suit their

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needs (FAO, 1991) [12]. Animals with good blood composition are likely to show good performance and better growth (Isaac *et al.*, 2013) [13]. Since, the studies regarding the normal range of hematological values were not reported or may be scanty from this particular area under semi-intensive system of rearing. Therefore, the current study was undertaken to know the influence of semi-intensive farming system on clinico-epidemiological parameters of sheep in northern dry zone of Karnataka.

Materials and Methods

The present study was carried out in the Department of Livestock Farm Complex (LFC), Veterinary College Gadag. A total of thirty-seven animals of about one year of age (13-16 months) of both male and female and approximately similar body weight with body condition score (2.8 to 3.0) were selected for the study. The insertion of Electronic Microchip method was followed for the identification of animals and RFID reader was used to read the microchips during the experiment trails. During the study period, all the animals were allowed for grazing (6hr) during daytime and supplemented with commercial concentrate feed (CFM) (i.e KMF feed) including green fodder during the evening and night times. The vaccination and deworming was carried out routinely as per the schedule. The animals selected for the study were free from the all type of infectious diseases and were in good body condition. All the animals were maintained under standard managerial conditions. Sheep were housed in elevated slatted floor type of house and regular cleaning of the sheds was practiced. Body condition scoring was done by physical observation. The blood samples were collected in EDTA and serum was collected in clot activator vacutainer on the day of experiment. The blood samples were immediately analyzed for hemoglobin concentration, packed cell volume (PCV), Total Erythrocyte count (RBC), Total leukocyte count (WBC), Total platelets count, total lymphocyte and Granulocytes count by using automatic blood analyzer (SWEMED, Artocell 200).

The serum was analyzed for biochemical parameters like, Aspartate amino transferase (AST/SGOT), Gamma-glutamyl transferase (GGT), Blood urea nitrogen (BUN) and Creatinine as per the standard procedure prescribed in the commercial Kits (Erba Mannheim). The obtained data was subjected to descriptive statistics.

Results and Discussions

The blood is the major transport system of the body; helps to transport various nutrients and materials to different organs of the body (Schalm, 1975) [21], the hematological parameters are related to blood and blood forming organs. The red blood cells are carrier of the haemoglobin, which directly involves in carrying of oxygen and carbon dioxide in the body (Chineke *et al.*, 2006, Johnston *et al.*, 1996), Daramola *et al.* (2005) [4, 15, 5] stated that hematological values serve as baseline information for better understanding of the nutritional deficiencies, physiology and health status of farm animals. The measures of various blood parameters studied are represented in the Table No.1 The values for red blood count (RBC) ranged between 7.37-9.86 $\times 10^{12}/L$ and were comparatively lower than the normal physiological values of 9-15 $\times 10^{12}/L$ as reported by Jain (1986) [24] for sheep. The hematological values in present study are in agreement with Pralhad *et al* (2019) [25], who reported the average RBC count in Kenguri sheep

maintained on grazing was $8.97 \pm 0.42 \times 10^{12}/L$. The RBC count in semi-intensively reared Kenguri sheep ($8.7 \times 10^{12}/L$) were comparatively lower than the Deccani sheep reared under similar system ($11.99 \times 10^{12}/L$). The primary function of hemoglobin is to transport oxygen to the tissue of animals (Soetan *et al.*, 2013) [22]. The normal range of hematological values for hemoglobin for sheep is 9-15 g/dL (Jain-1986) [24]. The hemoglobin value in present study varied from 8.84-10.7 g/dL (Avg. 8.8 g/L ± 0.38), these are in agreement with the with Pralhad *et al.* (2019) [25], who reported the average haemoglobin Kenguri sheep maintained on grazing was 8.64 ± 0.52 g/dL. The haemoglobin, packed cell volume, and mean corpuscular are indices for evaluating circulatory erythrocytes, and are significant in the diagnosis of anaemia (Peters *et al.* (2012) [20] and Etim *et al.* (2014a) [7]. In current study the packed cell volume ranges from 10.69-24.8% (Avg. 19.41 ± 0.15) which is lower than the normal physiological values given by the Jain N. C. (1986) [24] which is 27-45% in sheep-. Similar PCV values were reported by Pralhad *et al* (2019) [25] which was varied from 19.34-26% (Avg. 22.97 ± 0.16) in Kenguri sheep. Blood platelets involved in blood clotting. Low platelet concentrations suggest that clot formation (blood clotting) will be prolonged resulting in excessive loss of blood in the case of injury. Etim *et al.* (2014a) [7]. During this study, the platelet count ranges from 614 to 1073 was within the normal physiological values of 700-1100 in sheep (Jain, 1986) [24].

The white blood cells (WBC's) will help the body to fight against infection by phagocytosis of the foreign organism and to produce and distribute antibodies in immune response Etim *et al.* (2014a) [7]. During this study, the WBC count range of 8.2-14.6 $\times 10^9/L$ and was within the normal physiological values of 4-12 $\times 10^9/L$ reported by Jain (1986) [24] for sheeps. The outcomes shown in current study were not in consistent with Pralhad *et al* 2019 [25], who has reported the WBC's ranges from 12.82-16.78 $\times 10^9/L$ in grazing kenguri sheep. As reported by Etim *et al.* (2014b) [8] immune status is a function of leucocytes, lymphocytes and neutrophils. The WBC values were within normal range is an indication of good health of experimental animals (Bello and Tsado (2014) [2]. As a result, animals with low white blood cell counts are more susceptible to infections, whereas those with high counts have a high level of disease resistance, which improves adaptability to the environment and the presence of disease (Etim *et al.*, 2014c) [9]. In current study, the lymphocyte counts ranges from 23.6-45.9%, but these were lower than the normal physiological values of 40-50% (Jain (1986) [24] and for the grazing kenguri sheep was 57%-83% (Pralhad *et al* 2019) [25]. A significantly lower level of lymphocyte count is an indication of a reduction in the ability of the experimental animals to produce and release antibodies when infections occur [Campbell JR 1975, Togun VA, 2007] [3, 23]. In current study the neutrophil count ranged from 49-84.8%, were not in agreement with the normal physiological values reported by the Jain (1986) [24]. These values were also not in agreement with the Pralhad *et al* (2019) [25] who had reported the neutrophil values range of 18-41% in grazing kenguri sheep. According to Campbell and Lasley (1975) [3] and Etim (2010) [10] a significant increase in neutrophils proportions relative to lymphocyte accompanies temporary stress conditions in farm animals. (Etim *et al.*, 2010) [10].

The values of SGOT/AST obtained in the current study were 50-142 U/L, and these values lies in normal range of the SGOT values reported by Kaneko *et al.* (1997) ^[16] which was 60-280 U/L for sheep. The SGPT/GGT values in current study were range from 28-68 U/L and were in the normal range of SGPT values reported by Kaneko *et al.* (1997) ^[16]. In Present study the reported BUN values range from 5-11.69mg/dl and creatinine values range from 0.43-1.53 mg/dl, which are slightly lower than the normal values given by Kaneko *et al.*, (1997) ^[16] for sheep. The quantity of creatinine formed each day depends on the total body content of creatinine, which in turn depends on dietary intake, rate of synthesis of creatine, and muscle mass (Pankaj *et al.*, 2015) ^[19]

Table 1: Hematological parameters of Kenguri sheep reared under semi-intensive system

Parameter	Range	Average
RBC	7.37-9.86 x10 ¹² /L	8.7 x10 ¹² /L
Hb	8.84-10.7 g/dL	8.89 g/dL
PLT	814-1073	891
PCV	10.69-24.8%	19.41%
WBC	8.2-14.6 x10 ⁹ /L	11.5 x10 ⁹ /L
Lymphocytes	23.6-45.9%	39.8%
Neutrophil	49-84.8%	67%
SGOT	50-142 U/L	96 U/L
SGPT	28-68 U/L	48 U/L
BUN	5-11.69 mg/dl	8.35 mg/dl
CREATININE	0.43-1.53 mg/dl	0.98 mg/dl

Conclusion

The study of hematological and biochemical parameters for Kenguri sheep showed normal values for the species with mild variations in the normal range, but this variation was found to be non-significant. The current study gave an indication of normal range or reference values for the species.

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