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RESEARCHARTICLE

SOME BLOOD VALUES THAT CAN BE USED FOREVALUATION OFSHEEP PRODUCTION IN IRAQ

***Al-Samarrae, S. H.**

Department of Veterinary Public Health, College of Veterinary Medicine, Diyala University, Iraq

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ABSTRACT

This study was conducted to indicate the association among blood potassium types and level,and with white blood cells count and hemoglobin percentage.Group of animal consist of 200 Awassi sheep, 40 Arabi sheep and 59 karrdi sheep, were typed for blood potassium concentration.
The results revealed the fallowing :-
1- Potassium level of Awassi, Arabi and Karadi sheep blood showed a bimodal distribution, the low potassium (LK) and the high potassium (HK).
2- Awassi sheep (HK) had significantly higher WBCs count,5133, than that in LK Awassi sheep, 4814/ml.
3-No significant differences was conducted in WBCs count among the three breed of sheep.
4- Haemoglobin percentage showed significantly differences in Awassi and Karadi (HK) sheep (10.97 and 10.34%) compared with LK sheep (10.24 and 7.6%) respectively.
5- Significant differences were shown in haemoglobin percentages among Awassi, Arabi and Karadi sheep these values were 10.84, 9.28 and 10.15% respectively.

INTRODUCTION

In the present day the hope still entices the researchers in livestock's projects to improving the animal production and reproduction, especially after the discovering the inheritance of some biochemical variation in sheep, and cows, for the purpose of finding a relationship between these traits with the animal productivity and the ability of the animal to adapt to a certain atmosphere and the acquisition of resistance to some diseases, (Raadsma *et al.,*1998).Where they showed that genetic improvements achieved reasonable results on increasing genetic resistance to about three most important diseases of ruminants in general, are parasites of the stomach and intestines, skin myiasis and hoof rot, Vanimisett,(2003), explained the possibility of genetic selection of sheep on the basis of parasite resistance Haemoncuhc Contortus. This kind of relationships are important from the viewpoint to clarify the causes of physiological differences, and to be exploited as a base for accurate and early election of the animals according to their productivity, The most important of these differences is the potassium concentration in red blood cells in sheep which has been investigated by many workers in several countries, and they have confirmed that this a trait is hereditary character,(EvansandKing, 1955; Erkoc *et al.,*1987; Reddy *et al.,*1990; Nihat *et al.,*2003; Shaharbabak *et al.,*2006; Nedjar-Arroume *et al.,* 2008; Shaharbabak *et al.,*2009; Gurcan *et al.,* 2010), and controlled by two alleles on a single gene,

****Corresponding author: Al-Samarrae, S. H.***
Department of Veterinary Public Health, College of Veterinary Medicine, Diyala University, Iraq.

and there are KH allele which is responsible for high potassium concentration in blood and KL which is responsible for low potassium concentration in blood, and the KL is completely dominant and KH allele is completely recessive, so there are three genotype of this character; KHKH homozygous recessive which give rise to HK phenotype (high potassium concentration), KLKH heterozygous dominants which give rise to LK phenotypes (so the LK blood type either homozygous or heterozygous) and the last genotype is KLKL homozygous dominant which give rise to LK phenotypes (low potassium concentration). Different results are to be expected since the various studies were conducted in several countries, used a number of breeds and sample sizes and there would be differences in adaptive forces "natural selection" (Schreiber and Prosi, 1988; Mohri *et al.,*2005; Al-Samarrae, 2006; Salako *et al.,*2007; Shaharbabak *et al.,*2007; Jiang *et al.,*2008; McManus *et al.,*2009; Akinyemi and Salako2010).

In Iraq there is no any study in this field except; the study of the Alsamarrae, (2006). In those studies were discover that 80% of Awassi sheep was possessed a status of high potassium concentration (HK).Perhaps one of the most important reasons that led us to this study is to find the cause of an increased frequency of recessive trait in the breed of high potassium concentration Awassi sheep (KHKH), which is recessive homozygous and decreased numbers of sheep that of low potassium concentration sheep (KLKL), and the heterozygous dominant genotype is (KLKH), and in spite of that, where we believe in the existence of facts and basic rings through series of natural selection that carry status which made this type of genotype

(KHKH) which is and more suited to the environmental conditions and disease resistanceand because Awassi sheep represent the largest breeds, and most numerous in Iraq(Alsamarrae, 2006), so of this study aimed to know this trait in wider and innermost form and the purpose to come up with scientific ideas in order to improve this strain as well as to study the effects of these environment and the external environment on the proportion of genetic frequency for this trait, and to know if there is any change in the genetic structure due to of the harsh conditions experienced by the country, especially in the center and south.

As well as this study was designed to study some variables such as, number of white blood cells and hemoglobin ratio of their direct relationship with some sheep production and reproduction traits, where researchers explained this relationship as well as to the resistance to some diseases that infect livestock), (Raadsma *et al.,*1998; Albenzioand Caroprese, 2011; Alsamarrae, 2009; Al-Samarraeand Younis, 2011). In addition of this study to include the two other breeds of sheep; and there are, Arabi and Karadi, for the same purpose.

MATERIALS AND METHODS

Random blood samples were collected from Awassi sheep from many localities and flocks, and the same was done with blood collection from Arabi and Karadi sheep. Blood samples were taken from 200 of Awassi, 40 Arabi, and 59 karadi sheep. Blood potassium (m-equiv. K/l RBC's) was determined by the use of "GBC 933 plus Atomic Absorption Spectrometer (scientific equipment pty-2TD)". The results showed that 82% of the Awassi, 74% of theArabi and 91% of the Karadi were of high potassium (HK) type, and be only homozygous (K^HK^H). The remaining percentage represents the number of low potassium (LK) sheep; and that can be either homozygous LK (K^LK^L) or heterozygous LK (K^LK^H). The gene frequency of the high potassium level gene (K^H) in the Awssi, Arabi, and Karadi breeds were 0.91, 0.86, and 0.95 respectively, (Table 1).

Table 1. HK phenotype and its gene frequency inthe three breeds

Breed	HK%	Gene freq.
Awassi	82	0.91
Arabi	74	0.86
Karadi	91	0.95

White blood cell count was calculated by using "Haemacytometers, counting chambers.Ratio of hemoglobin was calculated by Sahli method.

RESULTS AND DISCUSSION

The number of white blood cells

The numbers of white blood cells in Awassi, arabi and Karadi (Table 2) 5075,4868 and 5048 cells/ml blood, did not observe any significant differences between different breeds.

Table 2. Numbers of leukocytes and hemoglobin ratioin different breeds of sheep

Breed	White blood cells /ml blood	Hemoglobin 100gm/ml blood	Numbers of animals
Awassi	5075±41	10.84±0.13 A	200
Arabi	4868±137	9.28±0.27 B	40
Karadi	5048±78	10.15±0.27 A	59

The different capital letters in column indicates significant difference $p \leq 0.01$

With regard to the number of cells according to the types of potassium levels within the same breed, In Awassi sheep (Table 3) for a HK 5133 cells / ml of blood, compared to their number within LK 48114cell/ml where been obtained significant differences ($p < 0.01$).In Arabi sheep (Table 3) the number of white blood cells in the type of HK was 4800 cells / ml blood, and in LK type 5070 cells / ml blood, they did not record any significant differences. The HK Karadi sheep take the same path of HK Awassi sheep (Table 3), where the number of white blood cells was5088 cells / ml of blood, compared with the LK Karadi sheep 4620 cells / ml of blood, but did not reach significant differences.

The number of white blood cells in Awassi Ram 5156 cells / ml, in Ewe the average was 5039 and the difference was not significant, (Table 4).

The number of white cells in the LK and HK in Ram were 5199 and 4925 cells / ml, respectively, and did not reach to the level of significance. In Ewe the numbers of white blood cells in HK was 5101 compared with LK Awssi Ewe was 4772, and the differences were significant ($p < 0.01$), (Table 5). The Arabi male and female data were 4842 and 4880, respectively,(Table4), and did not reach significant differences. Regarding Arabi male (ram) the numbers of white blood cells in HK and LK were 4881 and 4780 and did not get significant differences, while in the female the numbers of white blood cells in HK and LK were 4770 and 5360 (not significant), (Table 6).

The average of white blood cells in Karadi male and female were 4886 and 5085 cells / ml respectively and did not reach the level of significance, (Table 4). The number of white cells in the HK male Karadi was 5022 and no comparison was done with LK female Karadi because there were only two animals. The Karadi Ewes HK white cells was 5101 in compared with Karadi rams 4850 cells/ml blood, and did not reach to the level of significance (Table 7). The three strains did not show any significant difference in the number of white blood cells in the blood, while it was getting significant differences between HK and LK Awassi sheep, and not not significant for the Arabi and Karadi,this result came close to what brought by Khalidi(2004), as shown in the study that the number of white blood cells in Awassi sheep of the control group reached 5060 cell / cm 3, taking into account that one of the reasons for the convergence of these two studies is the approximate ages and weights of animals in addition to the lack of exposure to any risk trial or therapeutic intervention. To illustrate the relationship between some biochemical variables and their relationship to efficient production of sheep, Taneja,(1966) proposed that HK sheep has more white blood cells than LK sheep, and suggested that this discrepancy shows the animal's ability to resist disease.

Table 3. Leukocyte number and Hb distribution according to K levelin different breeds

Blood value	Awassi		Arabi		Karadi	
	HK 165	LK 35	HK 30	LK 10	HK 54	LK 5
Whiteblood cells	5133±41	4814±121	4800±119	5070±552	5088±79	4620±334
Hemoglobin%	10.97± 0.134	10.24±0.37	9.37±0.03	9.00±0.56	10.34 ±0.27	7.6±0.51
	a	b			A	B

The different capital letters in column indicates significant difference $p \leq 0.01$
Different small letters indicates significant difference $p \leq 0.05$

Table 4. Leukocyte number and Hb distribution according to sexes between different breeds

Blood value	Awassi		Arabi		Karadi	
	male	female	male	female	male	female
White blood cells	5156±80	5039±47	4842±162	4880±190	4886±174	5085±88
Hemoglobin%	11.08±0.21	10.74±0.16	9.10±0.47	9.37±0.33	10.45±0.95	10.08± 0.306

As well as Omer *et al.*(2003),Concluded through his studies on sheep in" Tuj" in the Province of Turkey, Where he studied various qualities of blood value of the sheep, including the account number of the white cells, and the expense ratio of the differential count of white cells, where the numbers of white blood cells declined during pregnancy (7.7 ± 1.9x103) than it is during the period before oestrus and postpartum period (9.3 ± 1.9x103) and (9.7 ± 2.5x103) respectively. This emphasizes the contrast of these numbers by health conditions and physiological and environmental experienced by the animal.

Hemoglobin percentage

The proportion of hemoglobin in the blood showed variation between the three strains, (Table 2), were the proportion of hemoglobin in sheep. Awassi, Arabi and Karadi 10.84, 9.28 and 10.15, respectively, each of Awassi and Karadi strain Outperformed Arabione ($p < 0.01$).The results were close to what came out by the Alrawi(Al-Rawi, 1997),where the proportion of hemoglobin ratio for Awassi in his study was 9.7%, while AlKhalidi(Taneja, 1966), found the average of hemoglobin ratio in Awassi sheep 11.46%.As for the ratio of hemoglobin variation between the two types of potassium level i.e. HK and LK within each breed, showed; HK Awssi significant superiority ($p < 0.05$) on that of LK Awassi, 10.97 and 10.24 respectively, (table 3). In Arabi sheep, the same path taken like Awassi sheep, but the differences did not reach significance level (Table 3) where the ratio of hemoglobin for HK and LK 9.37 and 9.0 respectively. While the ratio of hemoglobin in Karadi sheep (Table 3), in both HK and LK types were 10.34 and 7.6, respectively and the differences were significant ($p < 0.01$).

As for the differences in the ratio of hemoglobin between male and female according to the potassium levels, each were as follows, in Awassi sheep the ratio of hemoglobin in males was 11.08 while in females was 10.74 and the difference not significance, but in the HK male, the average was 10.96 compared with 11.70 in LK male and did not reach significant differences. The ratio of hemoglobin saw significant difference ($p < 0.01$), (Table 5), in females under both high and the low potassium as it was in HK females 10.97 compared to 9.70 in LK.The ratio of hemoglobin in arabi male was 9.10 while in arabi female was 9.37 (not significant). The hemoglobin ratio in HK and LK Arabi male were 8.75 and 9.60 compared with HK and LK Arabi female data, 9.59 and 8.40 and the difference not significance (Table 6). There were no significant results between the hemoglobin levels within. Karadi male and female, (10.45, 10.08). Hemoglobin ratio of HK male karadi sheep was 10.90, no comparison was done with LK male because of the presence of two animals only (Table 7). While the female karadi sheep; the amount of hemoglobin value between HK and LK were 10.29 and 7.00, respectively, and the differences were significant ($p < 0.01$).Omer *et al.* (2003), found variation in the percentage of hemoglobin according to the difference in ages and sheep breeding systems as well as the physiological situation experienced by the animal, where the percentage of hemoglobin in sheep by the age of 5-7 months, which graze in pastures significantly higher ($p < 0.05$) than what is in the sheep by the age of 2-3 months, which was part of inbreeding, the percentage of hemoglobin has decreased by 0.05 during pregnancy compared to the natural situation. While Mohri *et al.* (2005). Not find any significant difference in the percentage of hemoglobin and red blood cell count and pcv between the different strains, which included in his studying, as well as between different ages and among males and females of each strain.

In general the three breeds of sheep which have high potassium (HK) in their blood have more hemoglobin ratio than found in low potassium sheep, Except Arabi sheep which did not reach to the level of scientific results, which once again confirms the suitability of the genotpe of the high potassium to survive in difficult environmental circumstances where there are sheep Iraq.

Correlation coefficients (r)

Observed in Awassi sheep that there is a significant correlation coefficients ($p < 0.05$) between the concentration of blood potassium level and the number of white blood cells (0.181). In Karadi sheep it has been observed that there is a positive correlation ($p < 0.05$) between the level of potassium in the blood and the percentage of hemoglobin (0.30

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