The Relationship between Some Blood Components and Wool Production and Some of its Physical Traits in the Local Arabian Sheep

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Abstract

The variation in the wool traits of Iraqi sheep is very large and is affected by non-genetic and genetic factors. The study was carried out in the fields of Al-Kafeel station in Karbala governorate on a sample consisting of 26 heads of local Arabian sheep to find out the relationship between wool production (raw wool weight, clean wool weight) and some of its physical traits (tuft length, fiber length, fiber diameter) with some Blood components (glucose, total protein, growth hormone, thyroxine hormone), as the results showed a positive significant regression of the raw and clean wool weight and the diameter of the fiber on the percentage of glucose in the blood and with a regression coefficient of 0.117, 0.023, and 0.224 respectively, while the two traits of the strand length and the length of the fiber did not record a significant regression on the level of glucose in the blood.

Keywords: *Arabian sheep, thyroxine hormone, fibrous diameter.*

Introduction

Iraqi sheep are one of the types of producing coarse wool that is used in the manufacture of carpets, floor furnishings and blankets, and the wool industry needs an integrated plan that begins first with improving its production in quantity and quality for the purposes of the carpet industry. The variation in the wool traits of Iraqi sheep is very large and is affected by non-genetic and genetic factors[1] the weight of the wool is the main indicator of wool production, and this in turn depends on a number of physical traits of wool, such as the ratio of clean wool, the length of the strand, the length of the fiber, the diameter of the fiber, the density and other traits, and its direct relationship with many internal, physiological and health factors that occur on the animal and therefore it is an economic traits. Important because it plays an influential role in the manufacturing process and its yields according to the types of wools produced from these animals [2]. The production of wool and its physical traits can be predicted through the association with chemical blood traits, some hormones and metabolic enzymes to improve the wool production trait through early selection. Where some researchers noticed a significant relationship between wool production and some of its traits with some blood components such as total protein, glucose and others [3]. From this standpoint, the aim of this study came to know the relationship between some blood components such as glucose, total protein, growth hormone, and thyroxin in a sample of local Arabian sheep for selection purposes and to improve wool production and traits at an early date to accelerate improvement programs.

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Materials and Method

This study was carried out in the fields of Al-Kafeel station in Karbala governorate on a sample of 26 heads of local arabian sheep to find out the relationship between wool production (raw wool weight, clean wool weight) and some of its physical traits (tuft length, fiber length, fiber diameter) with some blood components (Glucose, total protein, growth hormone, thyroxine hormone).

Collection and analysis of blood samples: Blood samples were collected in clean and sterile plastic test tubes without anticoagulant and serum was isolated using a 3000 rpmcentrifuge. For the purpose of separating the blood from the rest of the components. the concentration of biochemical parameters was measured according to the method of work attached to each kit by the French company Biolabo SA in measuring the concentration of glucose and total protein using a Spectrophotometer. and it was adopted to measure the concentration of growth hormone and thyroxin hormone on the method described on the measuring kit provided by the American company Monobind Inc.

Measuring wool production and its physical traits: Sheep were sheared at the beginning of April and weighed directly to know the weight of the raw wool. Before shearing, a wool sample of 10×10 cm was taken from the area in the center of the right side of the animal (the last six ribs) as the best sampling area, according to[4]. After taking the weights of raw wool samples, these samples were washed in three containers on liquid soap to remove dirt and dirt with stirring and squeezing, and then dried at room temperature for 48 hours, then weighed the clean wool samples to extract the ratio of clean wool and clean wool weight as in the following formula:

Clean wool ratio = (clean sample weight/raw sample weight) × 100

Clean wool weight = Clean wool% × Raw wool Weight

The length of the tuft was measured after taking three tufts randomly from each sample and their lengths were measured using the usual ruler and without tensile or pulling, from the tuft base to the end of it. Special clips to be as tight and straight as possible to adjust their true length. The diameter of the fiber was measured using a German-born Primo microscope containing an Axiocam in the Histology and Anatomy Laboratory of the Faculty of Veterinary Medicine/Al-Qasim Green University, where ten fibers were taken from each sample and the general rate was extracted. The fiber was placed under the microscope and appears on the computer screen Connected to the microscope, a straight line is drawn between the ends of the fiber diameter using the mouse, and the diameter of the fiber appears in the micron [5].

Statistical Analysis: The program[6] was used in the statistical analysis to estimate the regression coefficients (trait of wool production on the studied blood trait) and the values of the parameter of determination, to be used in the selection and improvement programs.

Results and Discussion

The average weight of the raw and clean wool was 1.53, 0.97 kg, while the general averages of the traits were the length of the strand and the length of the fiber was 11.81, 14.54 cm and the diameter of the fiber 24.97 microns, which is similar to the results of [3,5]. As for the blood components, the mean of glucose was 66.57 mg/100 ml, total protein 5.68 g/100 ml, 9.83 ng/ml for growth hormone, and 31.74 nmol/liter for thyroxine (Table 1), and these rates are within the normal limits recorded by [7].

Table (1): General mean ± standard error for studied traits

Traits	Means	Standard error
Raw wool Weight (kg)	1.53	0.30
Clean wool Weight (kg)	0.97	0.21
Length of tuft (cm)	11.81	1.17
Length of fiber (cm)	14.54	1.16
Diameter of fiber (microns)	24.97	2.88
Glucose (mg/100mL)	66.57	6.13
Total protein (g/100ml)	5.68	0.98
Growth hormone (ng/ml)	9.83	1.19
Thyroxine hormone (nmol/L)	31.74	2.86

The current study shows that there is a positive significant regression at the level of P≤0.05 for the weight of the raw and clean wool and the diameter of the fiber on the percentage of glucose in the blood and with a gradient factor of 0.117, 0.023, 0.224, respectively, where the high level of glucose in the blood mg/100 ml gives an increase in the weight of the raw and clean cotton of 0.117 0.023 kg, respectively, and 0.224 microns in the diameter of the fiber, with a determination factor of 0.31, 0.25, and 0.20, respectively (Table 2). In agreement with [8,9], the two characteristics of tuft length and fibril length did not record a significant regression on the level of glucose in the blood.

Table (2): Regression of the production of studied wool traits on blood glucose

Traits	Regression coefficient b-	Straight line equation	Significance	Coefficient of determination -R^2
Raw wool Weight	0.171	y^ =0.821 +0.0117X	*	0.31
Clean wool Weight	0.032	y^ =0.838 +0.0023X	*	0.25
Length of tuft	0.0405	y^ =9.048 +0.0403X	NS	0.05
Length of fiber	0.0506	y^ =10.65 +0.0582X	NS	0.07
Diameter of fiber	0.223	y^ =10.27 +0.224X	*	0.2
Not significant : NS, (P≤0.05) : *				

It is evident from Table (3) that there is a highly significant positive regression at the level (P≤0.01) for the wool weight of the raw jelly over the total protein in the blood and with a gradient coefficient of 0.169, meaning that an increase in the level of total protein in the blood g/100 ml leads to an increase in the weight of the raw jute by 0.169 kg. With a determination factor of 0.39, the two trait of the clean wool weight and the length of the fiber also significantly decreased by (P (0.05) on the crude protein percentage and with a regression factor of 0.083 and 0.383 respectively, meaning that increasing the level of total protein in the blood g/100 ml leads to an increase in the clean wool weight by 0.083 Kg, with a determination factor of 0.29, an increase in fiber length by 0.383 cm, and a determination factor of 0.23. in the blood

Table (3) Regression of the production of studied wool recipes on total blood protein

Traits	Regression coefficient b-	Straight line equation	Significance	Coefficient of determination -R^2
Raw wool Weight	0.169	y^ =0.605 +0.169X	**	0.39
Clean wool Weight	0.083	y^ =0.501 +0.083X	*	0.2
Length of tuft	0.185	y^ =10.69 +0.185X	NS	0.02
Length of fiber	0.383	y^ =12.306 +0.383X	*	0.23
Diameter of fiber	0.836	y^ =20.422 +0.836X	NS	0.08
Not significant: NS, (P≤0.01) : **,(P≤0.05) : *				

Table (4) shows the presence of a negative significant regression at the level of P≤0.05 for the weight of the raw and clean wool at the level of growth hormone in the blood and with a regression factor of 0.016 - 0.048, respectively, meaning that an increase in the level of growth hormone in the blood ng/ml gives a decrease in the weight of the raw wool. And clean by 0.016 and 0.048 kg, respectively, with a determination factor of 0.34 and 0.19, respectively. as for the diameter of the fiber, it recorded a positive significant regression with the level of P≤0.05 on the growth hormone in the blood, with a regression factor of 0.673 and a determination factor of 0.503, meaning that the increase in the level of growth hormone ng/ml gives an increase the fibril diameter was 0.673 microns, while the strand length and fibril length did not record a significant decline in the level of growth hormone in the blood.

Table (4) Regression of the production of wool traits studied on the level of growth hormone

Traits	Regression coefficient b-	Straight line equation	Significance	Coefficient of determination-R^2
Raw wool Weight	-0.016	y^ =1.776 -0.016X	*	0.34
Clean wool Weight	-0.048	y^ =01.487 -0.048X	*	0.19
Length of tuft	0.064	y^ =11.12 +0.0095X	NS	0.02
Length of fiber	0.202	y^ =12.53 +0.202X	NS	0.03
Diameter of fiber	0.673	y^ =18.58 +0.673X	*	0.05
Not significant : NS, (P≤0.05) : *				

The current study did not show a significant regression for all the studied traits (raw wool weight, clean wool weight, length of tuft, fiber length, and fiber diameter) on the level of thyroxine hormone in the blood.

We conclude from this study the possibility of using some metabolic and hormonal compounds in the blood to accelerate the selection programs and improve some of the productive trait of the local Arabian sheep.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: None

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