The Body Weight after Shearing and the Greasy Wool Yield of Red Karaman Ewes at Different Raising Conditions in Turkey

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***Abstract*—In this study, the body weight after shearing, the greasy wool yield and, the clean fleece percentage of "Red Karaman" ewes in different raising conditions were investigated. Animal material consisted of a total of 248 head of Red Karaman ewes in different flocks maintained in the villages of Alican (n= 50), Boyuncuk (n= 50), Bozbulut (n= 48), Çiçekli (n= 50) and, Yukarısızma (n= 50). Red Karaman ewes were sheared using shearing scissors at the beginning of June and beginning of July. Each of body weight of ewes after shearing and ewes' greasy fleece was weighed using electronic digital weighing scale. Fleece samples were taken from area of the last rib on the right shoulder of 12 head of ewes in each flock. Then, analysis of clean fleece percentage was performed in the laboratory. For Red Karaman ewes, the effect of shearing age on greasy wool yield was not significant but the effect of body weight after shearing on greasy wool yield was significant ($p<0.01$) in all villages. When all the farms were generally evaluated, the effect of shearing age and the farm on greasy wool yield was found insignificant but the effect of live weight after shearing was statistically significant ($p<0.01$). Least-squares means for greasy wool yield of Red Karaman ewes raised in Alican, Boyuncuk, Bozbulut, Çiçekli and, Yukarısızma villages were 1.51±0.05, 1.45±0.05, 1.39±0.05, 1.41±0.05 and, 1.20±0.06 kg, respectively. General least-squares mean for greasy wool yield of Red Karaman ewes was 1.41±0.021 kg. Effect of age on live weight after shearing in all villages was significant ($p<0.01$). The averages of body weight after shearing in Alican, Boyuncuk, Bozbulut, Çiçekli and, Yukarısızma villages were found as 54.26±0.96, 51.78±0.74, 52.96±0.76, 51.76±0.68 and, 58.22±0.86 kg, respectively. The average of live weight after shearing in all the villages was found as 53.80±0.40 kg. General mean for clean fleece percentage Red Karaman ewes was found as 64.55±5.80% in all the farms.**

***Index Terms*—clean fleece percentage, greasy wool yield, live weight, red Karaman, shearing**

I. Introduction

Sheep breeding has taken place in the cultural textures, the lifestyles and, the beliefs of the societies. It has also determined the lifestyles of communities. The geographical structure of Turkey has provided suitable ecological conditions for sheep husbandry. Sheep husbandry in Turkey has an important position in animal production. Even though it has an important place in the sheep breeding of Turkey, the yield per sheep in native breeds is low.

Sheep husbandry is an industrial sector that they transforms the natural vegetation cover pasture and the pasture not used in the agriculture into the products such as meat, milk and, wool. There are breeds such as White Karaman, Red Karaman, Awassi, Dağlıç Kıvırcık, and Karayaka among local sheep breeds of Turkey [1].

The most of sheep production in Turkey are carried out in extensive or semi-intensive systems. Muş city in located at East Anatolia region of Turkey is important for sheep production. The most of sheep breeds reared in Turkey are characterized as rough-mixed wool genotypes and their wools are usually used to carpet, blanket, quilt and weaving socks. Turkey has an important place in the production of fleece with carpet type in the world. However, the wool industry and production in Turkey have not developed and fluctuations of the wool prices negatively affected the wool of production. Recently, there has been an increase for sheep production in Turkey and for use of rough-mixed wool in the world [2]-[4].

In recent years, the use of coarse wool in the world textile industry has increased. By reducing the amount of fine fleece in Turkey's textile industry, it should be emphasized coarse wool and the production of rough-mixed wool should be increased [4], [5]. Wool is the most important raw material of the textile industry. Wool is a valuable woven material that shows superior clothing physiology such as protection from cold, good heat holding, high humidity take-up, low wetting capability and, felting ability [6]. The wool is still able to compete with many artificial fibers due to its unique properties.

Along with the effect of spreading of environmental awareness rapidly in the world, the demand for organic products in the textile sector has also increased and the use of natural fibers instead of synthetic fibers has gradually widespread [7].

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Detailed descriptions regarding the overall performances of Turkey's native breeds in local conditions are not sufficient. However, the improvement programs should be efficiently developed in livestock at direct breeders. Investigations should be conducted to identify the morphological and the physiological characteristics of native breeds under normal breeder conditions. By obtaining the more synthesis of this information, the more sensitive animal breeding programs and the policies can be developed [8]-[10]. In Turkey, the identification of information regarding the wool techniques in sheep is limited according to the regions and districts.

Red Karaman sheep breed represents 21.5% of sheep breeds in Turkey. This breed is widely raised in the east of the country. Traits of Red Karaman sheep breed such as the herd and the maternal instinct are good. They are resistant to cold. They have also the ability to adapt to living conditions and poor environmental conditions. Their tails are fatty. The fat tail is used as an energy source during the long and insufficient winter feeding period [3].

This research was carried out in order to determine the live weight after shearing, the greasy wool yield and, the clean fleece percentage in Red Karaman ewes under different raising conditions in Muş province of Turkey.

II. Materials and Methods

A. Animals and Research Area

The animal material consisted of a total of 248 head of Red Karaman ewes including 50 head ewes in different flocks bred in the farms of Alican (farm 1; n= 50), Boyuncuk (farm 2; n= 50), Bozbulut (farm 3; n= 48), Çiçekli (farm 4; n= 50) and, Yukarısızma (farm 5; n= 50) villages in Muş province, Turkey. Animals in this study were fed in forage at experiment.

Muş district is located on the Eastern Anatolia region of Turkey. Its surface area is 8196 km^2. Its sea level height (altitude) is 1350 meters. Average annual minimum and maximum temperatures of the region ranges from -29 ℃ to +37 ℃, respectively. It snows too much in the winter months in Muş province.

B. Shearing and Assay

Red Karaman ewes were sheared using shearing scissors at the beginning of June and beginning of July. Each of body weight of ewes after shearing and ewes' greasy fleece was weighed using electronic digital weighing scale. Fleece samples were taken from area of the last rib on the right shoulder of 12 head of ewes in each flock according to the sampling technique. Then analysis of the clean fleece percentage was performed in the laboratory of Department of Animal Science, Agricultural Faculty at Van Yüzüncü Yıl University.

For analysis of the clean fleece percentage, a sample of approximately 25g was taken. Samples were weighed on a precision scale sensitive to 0.01g. Then, the samples were washed three times in warm water with 0.2% soapy. Subsequently, the samples within the aluminum foil were dried in stove with 105 ℃ until a constant weight. The samples were waited for 10 or 15 minutes and then their dry weights were determined [11]. The clean fleece percentage (fleece yield) of samples with dry weights was calculated according to the following equation;

Fleece yield (%) = Dry weight x (Dry weight x 0.14) / The greasy fleece weight

C. Statistical Analysis

The mathematical model included fixed effects due to farm and age and random effect due to residual error. The effect of farm and age on the live weight after shearing and the greasy fleece yield was analyzed. The significance of fixed effects for farm and age was tested on live weight after shearing by using the SAS GLM procedure [12].

The following model was used statistically to analyze the live weight after shearing of the ewes:

$$Y_{ijk} = \mu + a_i + b_j + e_{ijk}$$

The following model was used statistically to analyze the fleece yield characteristics of the ewes:

$$Y_{ijk} = \mu + a_i + b_j + b_1(X_{ijk} - \overline{X}) + e_{ijk}$$

where is;

Y_{ijk}: The live weight after shearing and the greasy fleece yield associated to *k*. ewe with *i*. farm and *j*. age,

μ: Expected mean value,

a_i: The effect of i. farm (1, 2, 3, 4, and, 5),

b_j: The effect of j. age (2, 3, 4, 5≤),

b_1: The regression effect of the live weight after shearing on the greasy fleece yield,

X_{ijk}: Live weight associated to k. ewe with i farm and with j age,

$\overline{X}$: Average value of greasy fleece yield,

e_{ijk}: The random residual error normally distributed with mean 0 and variance σe^2.

III. Results and Discussion

A. The Greasy Wool Yield and the Live Weight after Shearing of Red Karaman Ewes

Least squares means of the greasy wool weight and the live weight after shearing of Red Karaman ewes are presented in the Table I.

As seen from Table I, the effect of shearing age ($p<0.05$) and the farms ($p<0.01$) on the greasy wool weight was significant. Also, the effect of live weight after shearing on the greasy wool weight was significant ($p<0.01$) when all the farms were generally evaluated in Red Karaman ewes.

When all the farms were generally evaluated, least-squares mean for the greasy wool weight of Red Karaman ewes was 1.41±0.02 kg. The means of greasy wool weight of ewes with two, three, four, five and, six years of age were 1.54±0.04, 1.37±0.04, 1.36±0.04, 1.42±0.05 and, 1.28±0.09 kg, respectively. Least-squares means for greasy wool weight of Red Karaman ewes raised in Alican, Boyuncuk, Bozbulut, Çiçekli and, Yukarısızma villages were 1.51±0.05, 1.45±0.05, 1.39±0.05, 1.41±0.05 and, 1.20±0.06 kg, respectively (Table I).

TABLE I. LEAST SQUARES MEANS FOR THE GREASY WOOL WEIGHT AND THE LIVE WEIGHT AFTER SHEARING OF RED KARAMAN EWES

Factors	n	Greasy Wool Weight (kg)	Live Weight After Shearing (kg)
General	248	1.41±0.02	53.80±0.40
Age		*	**
2	64	1.54±0.04[a]	49.71±0.80[b]
3	62	1.37±0.04[bc]	54.78±0.80[a]
4	63	1.36±0.04[bc]	54.94±0.79[a]
5	43	1.42±0.05[ab]	56.26±0.97[a]
6	16	1.28±0.09[c]	55.14±1.66[a]
Farms		**	**
Alican	50	1.51±0.05[a]	54.86±0.95[b]
Boyuncuk	50	1.45±0.05[b]	51.74±0.95[b]
Bozbulut	48	1.39±0.05[b]	52.81±0.93[b]
Çiçekli	50	1.41±0.05[b]	51.70±0.89[b]
Yukarısızma	50	1.20±0.06[c]	59.72±0.97[a]
Regression (Linear)			
-Live weight (kg)		0.0404±0.0034**	--

*: p<0.05; **: p<0.01; a, b, c: Values in same column not having a common superscript differ significantly (p<0.05).

When it was reviewed the literature studies on the greasy wool yield of other sheep races, the average greasy wool weight of 1.41 kg determined in Red Karaman ewes at all the farms was found lower than the average values of 2.91 kg reported by Yılmaz and Denk [13], of 2.22 kg reported by Tuncer [14], of 1.96 kg reported by Karakuş *et al.* [15] for Norduz ewes, and 2.05 kg reported by Veziroğlu and Aygün [16] for Norduz ewes.

The effect of the ewe's age and the farm on the live weight after shearing in all the farms was statistically significant (p<0.01) when all the farms were generally evaluated (Table I).

For Red Karaman ewes, the average of body weight after shearing in all the farms was found as 53.80±0.40 kg. The means of body weights in Red Karaman ewes were 49.71±0.80 kg in 2 years old ewes, 54.78±0.80 kg in 3 years old, 54.94±0.79 kg in 4 years old, 56.26±0.97 kg in 5 years old and, 55.14±1.66 kg in 6 years old. As a result, the highest average of the live weight after shearing was found in ewes with 5 years old. The live weights of the Red Karaman ewes in Alican, Boyuncuk, Bozbulut, Çiçekli, and Yukarısızma villages were found as 54.86±0.95, 51.74±0.95, 52.81±0.93, 51.70±0.89, and 59.72±0.97 kg, respectively. According to this data, the highest body weight after shearing was in Yukarısızma village.

Average of live weight after shearing of 53.80 kg found in Red Karaman ewes at all the farms is similar to 53.76 kg reported for Norduz ewes [16] and 52.85 kg reported for Awassi ewes [17]. If other findings from the literature are considered together with the results of this research, it can be said that there is a significant relationship between the live weight after shearing and the ewes's age [16]-[22].

Compared to native sheep breeds in Turkey, it was seen that average greasy wool yield of Red Karaman sheep was similar to some breeds, higher than some breeds and, lower than some ones. In this study, the greasy wool yield of Red Karaman ewes was found to be lower than the means of the greasy wool yield of Norduz, Karakaş, Dağlıç and Hamdani breeds but to be higher than that of Kıvırcık and Sakız breeds. The yield of fleece in Red Karaman sheep was found to be lower than the crossbred genotypes reported in the literature in Turkey. The reasons for this difference between sheep breeds for fleece yield in Turkey may be:

-The genotypic level observed in the herd,
-Shelter conditions,
-Structure of the farms,
-Climate features,
-Disease and internal-external parasites,
-Region where fleece samples from animal were taken
-Level of knowledge on management and
-Planning of research and researcher factor.

It has been thought that wool yield will be obtained much higher than sheep if the factors listed above which reduce the greasy fleece yield and the fleece yield value of sheep are improved [16], [22].

When compared to native sheep breeds in Turkey, it was understood that average the live weight after shearing of Red Karaman ewes was similar to some sheep breeds, higher than some breeds and, lower than some ones. In this study, for example, the live weight after shearing of Red Karaman ewes was found to be lower than the body weight of Kangal genotype but to be higher than that of Akkaraman breed. This difference may be due to the maintenance and the feeding and, the diversity in breeding conditions.

B. The Clean Fleece Percentage of Red Karaman Ewes

Descriptive means of the clean fleece percentage of Red Karaman ewes are presented in the Table II.

TABLE II. DESCRIPTIVE MEANS FOR THE FLEECE YIELD VALUE OF RED KARAMAN EWES

Factors	n	Fleece Yield Value (%)
General	60	64.55±5.80
Farms		NS
Alican	12	61.48±2.53
Boyuncuk	12	68.47±5.93
Bozbulut	12	66.31±8.17
Çiçekli	12	62.95±6.21
Yukarısızma	12	63.54±6.17

NS: No significant.

Average fleece yield value of Red Karaman ewes in all farms was found as 64.55%. In the study conducted, the highest mean of fleece yield value was found in Boyuncuk village (68.47%) while the lowest mean in Alican village (61.48%). This difference may be due to the maintenance, the feeding and the breeder conditions

between the farms. In addition, the fleece yield values in Çiçekli and Yukarısızma villages are close to each other.

Uzun [6] reported that the averages of fleece yield value in the races of Çine Çaparı, İmroz, İvesi, Karayaka, Kıvırcık, Karacabey Merino, Sakız, Menemen, Karakaş, Norduz, and Tahirova were 60.62, 59.46, 70.81, 68.57, 66.91, 51.91, 65.26, 62.90, 61.41, 66.08, and 66.44 %, respectively. Yılmaz and Denk [13] found that the average yield of fleece in Norduz ewes was 68.25%. This average is higher than the average we found. Tuncer [14] and Karakuş *et al.* [15] identified that the average yield of fleece in Norduz ewes was 60% and 55.76%. These averages were lower than the average in this study. Average of fleece yield value of 64.55% found in Red Karaman ewes at all the farms is similar to 65.25% reported for Norduz ewes [16].

The average of fleece yield value obtained in the study is similar to those reported for other literatures on Red Karaman sheep. The difference between fleece yield values can be explained by the diversity of conditions in farms. The fleece yield value is also influenced by shelter and pasture conditions as well as breed characteristics. In addition, it can be said that it is also affected from materials such as the greasy, the moisture, the fertilizer, the plant materials, the dust and, the soil. The fleece yield values may especially arise depending on the environmental conditions of animals.

IV. Conclusion

Studies about Red Karaman sheep breed have been mostly performed in the Eeastern Anatolia of Turkey. The results of this study would be the basis for the scientific studies taking into account the greasy wool yield, the live weight after shearing and, the clean fleece percentage of Red Karaman ewes and the wool problems in the region. Even so, in order to obtain a more definite conclusion is required to detailed works in native sheep populations in Eastern Anatolia region of Turkey.

When the greasy wool yield, the live weight after shearing and, the clean fleece percentage of Red Karaman ewes was compared with other the domestic genotypes reported in the literature, they was close to each other. It is concluded that the wool yield varies depending on many external factors such as maintenance, nutrition, business structure, reproductive activity, soil type, climate, disease and parasites. Especially, the differences in the yield value of wool due to the environmental conditions may occur.

The findings of this study have suggested that the ram factor used in villages can be significant. In particular, the source of the observed variation in the greasy wool weight may be the genetic and the environmental in Red Karaman sheep.

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References

[1] Y. Öztürk and F. Odabaşı, "The investigation of yield and morphological characteristics of Hamdani sheep in Van area: I. Various yield characteristics of sheep," *Yüzüncü Yıl Üniversitesi Veteriner Fakültesi Dergisi*, vol. 2, no. 2, pp. 75-80, 2011.

[2] DAKA (Doğu Anadolu Kalkınma Ajansı), "Küçükbaş hayvancilik çalıştay raporu," Van, Turkey, June 2012, pp. 13-42.

[3] M. Ş. Kayalık and M. Bingöl, "All characteristics of Morkaraman sheep," *Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, vol. 5, no. 2, pp. 89-97, 2015.

[4] A. Çivi, "Fleece weight and characteristics in Karakaş and Norduz lambs," Ph.D. thesis, Department of Animal Science, Van Yüzüncü Yıl University, Institute of Natural & Applied Sciences, Van, Turkey, 1999.

[5] F. Alkan, *The World Carpet Markets and Stocktaking of Turkey*, İstanbul Tekstil ve Konfeksiyon İhracatçı Birlikleri AR-GE ve Mevzuatlar Şubesi Yayınları, İstanbul, Turkey, 2008, pp. 1-31.

[6] Ş. K. Uzun, "An investigation on the fleece characteristics of native sheep breeds of Turkey and some crossbred sheep genotypes and the availability of their wools in the industry," Ph.D. thesis, Department of Animal Science, Uludağ University, Institute of Natural & Applied Sciences, Bursa, Turkey, 2008.

[7] M. Karaboyacı and Ş. S. Uğur, "Using cotton printing dyes as an alternative method for organic wool dyeing," *Electronic Journal of Textile Technologies*, vol. 4, no. 2, pp. 24-29, 2010.

[8] M. Kaymakçı, *Advanced Sheep Husbandry*, Third ed., Bornova, İzmir, Turkey: Ege University Press, 2010.

[9] T. Aygün, "Serum FSH *(Follicle Stimulating Hormone)* concentrations in prepubertal female Norduz lambs," presented at the 5th International Conference on Asia Agriculture and Animal, Madrid, Spain, June 15-16, 2015.

[10] G. Gürsu and T. Aygün, "Some characteristics of milk yield in Awassi ewes maintained at village conditions," *Journal of Advanced Agricultural Technologies*, vol. 1, no. 1, pp. 19-23, 2014.

[11] M. Ertuğrul, *Küçükbaş Hayvan Yetiştirme Uygulamaları*, Ankara Üniversitesi Ziraat Fakültesi, Yayın No: 1446, 426, Ankara, Turkey, 1996, pp. 126-135.

[12] *PC SAS User's Guide: Statistics*, SAS Inst, Cary, NC, USA, 2015.

[13] O. Yılmaz and H. Denk, "Fleece yield and characteristics of Norduz sheep," *Veteriner Bilimleri Dergisi*, vol. 20, no. 3, pp. 81-85, 2004.

[14] S. S. Tuncer, "The relationships between fleece follicle and fleece characteristics in Norduz and Karakaş sheep," Ph.D. thesis, Department of Animal Science, Van Yüzüncü Yıl University, Institute of Natural & Applied Sciences, Van, Turkey, 2008.

[15] K. Karakuş, S. S. Tuncer, and S. Arslan, "Comparison of the fleece characteristics of Karakaş and Norduz sheep (local ewes in Turkey)," *J Anim. Vet. Adv.*, vol. 4, no. 6, pp. 1-10, 2005.

[16] B. Veziroğlu and T. Aygün, "Weight after shearing and greasy fleece weight of Norduz ewes in different breeding conditions," *Van Yüzüncü Yıl University, Agric. Sci.*, vol. 27, no. 2, pp. 231-235, 2017.

[17] M. Elibol, "Ereğli Koyunculuk Üretme İstasyonu'nda yetiştirilen Akkaraman, İvesi ve İvesi x Akkaraman Melezi (F_1 x G_1) koyunlarında kırkım sonu canlı ağırlık ve bazı yapağı verim özelliklerini etkileyen faktörlerin parametrelerinin tahmini," M.Sc. thesis, Department of Animal Science, Selçuk University, Institute of Natural & Applied Sciences, Konya, Turkey, 2004.

[18] M. Yılmaz, "Milk and wool yields of Kıvırcık sheep in the rural farm conditions," M.Sc. thesis, Department of Animal Science, Adnan Menderes University, Institute of Natural & Applied Sciences, Aydın, Turkey, 2003.

[19] A. Altıoğlu and O. Gürsoy, "Characterization of sheep husbandry in the villages of Tufanbeyli County of. Adana Province," *Çukurova University, Journal of Institute of Natural & Applied Sciences*, vol. 16, no. 5, pp. 88-99, 2007.

[20] H. Üstüner, "Main productivite performance and adaptation ability of Awassi sheep in Central Anatolian Region," Ph.D. thesis, Department of Animal Science, Uludağ University, Institute of Health Sciences, Bursa, Turkey, 2007.
[21] R. Sönmez, M. Kaymakçı, A. Eliçin, E. Tuncel, R. Wassmuth, and T. Taşkın, "Türkiye koyun ıslahı çalışmaları," *Journal of Agricultural Faculty of Uludağ University*, vol. 23, no. 2, pp. 43-65, 2009.
[22] S. Hakan, "Live weight after shearing and greasy fleece yield of Karakaş ewes in different breeding conditions," M.Sc. thesis, Department of Animal Science, Van Yüzüncü Yıl University, Institute of Natural & Applied Sciences, Van, Turkey, 2013.



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