The Relationship Between Body Weight and Body Condition Score in Karacabey Merino Ewes

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The relationships between Body Condition Scores (BCS) and Body Weights (BW) have been investigated in three different physiological status such as mating, lambing and weaning time of ewes. The data were collected from 317 Karacabey Merino ewes in different age groups which were bred in Marmara Animal Research Institute. The results obtained from the regression analyses on BCS and LW for the status were based on the equations like LW=50.072+5.630*BCS, LW=50.914+5.722*BCS, LW=49.807+7.659*BCS respectively. The correlations (r) established by similar methods were 0.627, 0.651, 0.709 and statistically significant (P<0.01). The regression coefficients of BCS on BW were 5.630kg, 5.722kg, 7.659kg at mating, lambing, weaning respectively and also significant (P<0.01).

Keywords: Merino sheep, body condition score, body weight.

Karacabey Merinosu Koyunlarda Canlı Ağırlık ve Vücut Kondüsyon Puanı Arasındaki İlişkiler

Canlı ağırlık ve Vücut Kondüsyon Puanı (VKP) arasındaki ilişkiler koç katımı, kuzulama ve sütten kesim gibi üç farklı fizyolojik dönemde incelenmiştir. Marmara Hayvancılık Araştırma Enstitüsü'nde yetiştirilen 317 baş Karacabey Merinosu koyun çalışmanın hayvan materyalini oluşturmuştur. Her dönemdeki canlı ağırlık ve vücut kondüsyon puanı arasındaki regresyon analizi sonuçları için sırası ile CA=50.072+5.630*VKP, CA=50.914+5.722*VKP, CA=49.807+7.659*VKP denklemleri kurulmuştur. Benzer şekilde aralarındaki korelasyonlar (r) sırası ile 0.627, 0.651, 0.709 ve istatistiksel olarak önemli olmuştur (P<0.01). Vücut Kondüsyon Puanındaki bir birimlik değişime eşdeğer olan canlı ağırlıklar koç katımında 5.630, kuzulama da 5.722 ve sütten kesimde 7.659kg olarak belirlenmiştir (P<0.01).

Anahtar kelimeler: Merinos koyunu, vücut kondüsyon puanı, canlı ağırlık.

Introduction

The Body Condition Score (BCS) is described as the ratio of total fat and other tissues on a live animal. Body condition can be determined by hand examining to feel the fat tissue thickness and the muscling on the waist and spine. Knowledge on the BCS makes it possible to obtain the sudden condition loss which can not be observed easily by appearance. It provides also feeding control and effective use of feed stocks by observing the Body Weight (BW) changes. Some physiological and metabolic limitations and poorly breeding conditions prevent desired amounts of feeding. The surpass ability of the organism is related to the amount of stock nutrition which can be used as metabolic burden in bad physiologic period (Özder et al., 1995).

Condition score is important to obtain the desired performance in certain physiological status of extensive sheep breeding. There can be variable scores within different genotypes and physiological status of ewes that are notified. It is necessary to do basic studies in obtaining these scores (Biçer, 1991).

BCS was studied for fat-tailed Awassi sheep; BCS at mating was positively correlated with ewe BW at lambing and shearing, and also with greasy fleece weight (r=0.93). On the other hand, a correlation like (r=0.55) was obtained for Lincoln Longwool sheep between BW and BCS and it was proposed that twin–born ratio gets higher when BCS increases (Hossama et al., 1986; Beceril et al., 1988; Barth and Neumann, 1991).

In a study on Manchega sheep it was shown that age of ewe had a significant effect on BW

at mating, lambing and weaning and age also significantly affected BCS at mating and weaning. The correlations between BCS and BW were 0.92, 0.80 and 0.91; 0.50, 0.45 and 0.55; 0.79, 0.76 and 0.56; 0.92, 0.84 and 0.92 at mating, lambing, weaning and dry period of ewes lambing in May, September and January respectively (Molina et al., 1991a).

In a study on Kıvırcık sheep, a significant correlation coefficient (r=0.248) was observed between BCS and BW at mating (Ada et al., 2004).

The relationships between BW and BCS of Türkgeldi sheep were studied for different physiological status. It was determined that each BCS unit is equivalent to the changes of 10.961kg, 10.376kg, and 7.310kg at mating, lambing and weaning weights respectively (Arık et al., 1997).

The relationships between BCS, BW and internal fat weights of Manchega sheep were studied. Statistical significant correlations like 0.79, 0.82, 0.67, 0.92 and 0.58, 0.58, 0.79, were calculated for both BW and omental, mesenteric, pelvic, total interior fat weight and for BCS, mesenteric, total fat weight respectively (Molina et al., 1991b).

The relationships between BCS and body fat composition and fat distribution were examined on Churra sheep. It was determined that BW is not enough for only itself, but also for both BCS and BW results obtained in the experiment (Frutos et al., 1997).

Materials and Methods

317 Karacabey Merino ewes aged between 2 and 7 were used as the animal material of this study. The BCS and BW of the ewes were defined at mating, lambing and weaning within the day of mating, ten days of the lambing period and approximately the 90th day after lambing in the weaning period respectively. The BW was weighed by an electronic scale which is sensitive for 100g (Khan et al., 1992).

Ewes were bred at semi-intensive conditions of the research institute at which the study is carried out. In general the amount of feed supply was a little bit increased before mating from the beginning of April to the beginning of September and then they were only benefited from pasture. During the period between September and December, 600g concentrated feed per ewe was allocated while the ewes were benefited from the pasture. In December and January, 600g concentrated feed and 600g forage crops were also included into the ratio as long as the good weather conditions have been realized. In February 700g concentrated feed and 1.0kg forage were added to the diet. The concentrated feed mixture of feed was contained 2500 ME kcal/kg and 15 % HP.

The data which were obtained from this study were evaluated by the regression analysis method. The statistical analysis of data was made by means of the SAS statistical program (SAS Institute Inc., 1998).

Results and Discussion

Tables 1 and 2 show the descriptive statistics related to the data of BCS and BW at mating, lambing and weaning by age periods. Data concerning the BCS and BW for studied periods and the result of regression analysis were summarized on Table 3, 4, 5 and Figure 1.

The overall means for LW averages at mating, lambing and weaning periods were 71.357±0.410kg, 70.104±0.431kg, 67.257±0.445kg respectively.

Table. 1. Least-squares means of BW for different physiologic status and age classes (kg).

Period	Mating		Lambing		Weaning	
Age	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$
2	35	61,854±0,806	33	60,961±0,799	32	61,200±0,924
3	62	67,934±0,693	57	68,658±0,818	56	66,057±0,881
4	88	74,677±0,832	78	72,331±0,739	77	69,032±0,843
5	62	73,026±0,683	57	71,868±0,908	55	68,364±0,977
6	24	76,225±1,302	22	74,145±1,463	24	70,021±1,674
7	46	72,991±0,885	44	70,584±1,074	38	67,179±1,249
Mean	317	71,357±0,410	291	70,104±0,431	282	67,257±0,445

Table 2. Least-squares means of BW for different physiologic status and the ewes' body condition score BCS (kg)

Period	Mating		Lambing		Weaning	
Age	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$
2	35	3,186±0,120	33	2,758±0,090	32	2,063±0,077
3	62	3,395±0,100	57	3,342±0,115	56	2,134±0,084
4	88	4,023±0,082	78	3,641±0,093	77	2,481±0,087
5	62	3,968±0,096	57	3,360±0,105	55	2,328±0,101
6	24	4,292±0,120	22	3,591±0,139	24	2,355±0,143
7	46	3,772±0,108	44	3,182±0,139	38	2,145±0,103
Mean	317	3,781±0,046	291	3,354±0,049	282	2,279±0,042

The minimum BCS average was observed on 2 years old ewes for all physiological status. Maximum BCS values were given by 6 years old ewes at mating period, but however by 4 years old ewes at lambing and weaning. BCS averages that were obtained for mating, lambing and weaning were 3.781±0.046kg, 3.354±0.049kg and 2.279±0.042kg respectively.

Table 3. Relationship between body weight (BW) and body condition score (BCS) at mating

Age	n	r	Regression Equation	p
2	35	0,361	LW=54,088+2,438*BCS	*
3	62	0,508	LW=55,913+3,541*BCS	**
4	88	0,508	LW=54,649+4,568*BCS	**
5	62	0,550	LW=52,286+5,644*BCS	**
6	24	0,651	LW=50,192+6,066*BCS	**
7	46	0,559	LW=56,488+4,376*BCS	*
Mean	317	0,627	LW=50,072+5,630*BCS	**

* :($p<0.05$), ** :($p<0.01$)

Each BCS unit was equivalent to the BW changes of 5.630kg, 5.722kg 7.659kg at mating, lambing and weaning, respectively and statistical significant ($P<0.01$).

According to Sanson et al. (1993), a relation between carcass lipids and BCS for each 1 unit increase of BCS by 5.0kg change was obtained ($R^2=0.78$). That is why BCS can be used to obtain the useful energy stocks.

Table 4. Relationship between body weight (BW) and body condition score (BCS) at lambing

Age	n	r	Regression Equation	p
2	33	0,480	LW=49,192+4,268*BCS	*
3	57	0,569	LW=55,102+4,056*BCS	**
4	78	0,638	LW=53,851+5,075*BCS	**
5	57	0,627	LW=53,557+5,450*BCS	**
6	22	0,475	LW=56,082+5,030*BCS	*
7	44	0,745	LW=52,255+5,761*BCS	**
Mean	291	0,651	LW=50,914+5,722*BCS	**

* :($p<0.05$), ** :($p<0.01$)

The average values of BW changes (Table 1 and 2) were in comparison with the similar experiments on some Britain crossbreeds (Geisler and Fenlon, 1979) and Türkgeldi Ewes (Arık et al., 1997); however, higher results were obtained from the other experiments for Awassi Ewes (Treacher and Filo, 1994) and Rasa Aragonesa sheep (Teixera et al., 1989).

Table 5. Relationship between body weight (BW) and body condition score (BCS) at weaning

Age	n	r	Regression Equation	p
2	32	0,324	LW=53,178+3,889*BCS	N.S.
3	56	0,635	LW=51,826+6,669*BCS	**
4	77	0,775	LW=50,373+7,522*BCS	**
5	55	0,692	LW=52,730+6,717*BCS	**
6	24	0,815	LW=47,500+9,566*BCS	**
7	38	0,746	LW=47,779+9,045* BCS	**
Mean	282	0,709	LW=49,807+7,659*BCS	**

* :(p<0.05), ** :(p<0.01), N.S.: Not Significant

For all three physiological status, the relationship between BCS and BW is statically significant (p<0.01). The variation observed in BCS for defining BW increases from mating to weaning (Mating; r=0.627, Lambing; r=0.651, Weaning; r=0.709).

When the regression analysis of BCS and BW was carried out on 6 years old Karacabey Merino sheep by the ages, it was observed a maximum regression coefficient (r=0.651) at mating, but a minimum (r=0.475) at lambing and it was reached again maximum (r=0.815) at weaning. For the other age groups, it was found that the ratio increases according to the ages for all physiological status. It could be said that the variation observed within the lipid contents of organism was related to age.

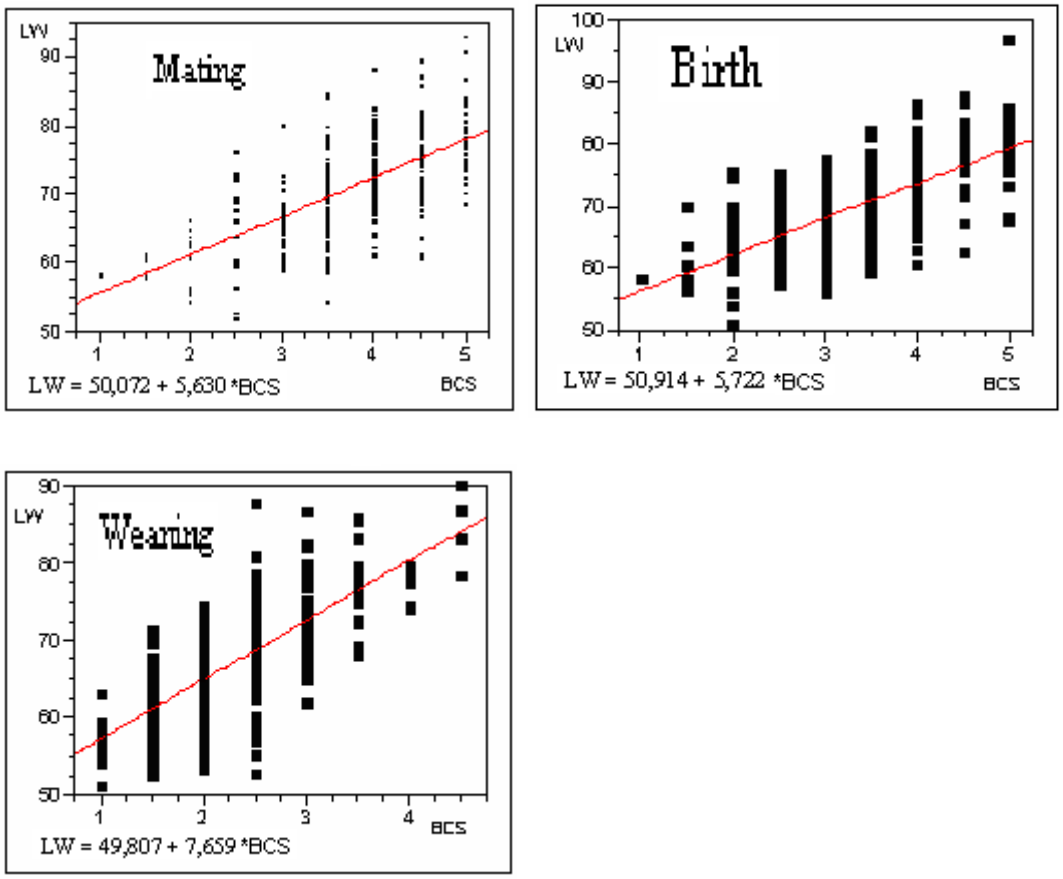

Figure1. Relationship between body weight (BW) and body condition score (BCS) at different physiologic status

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