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Growth and Development Traits of Morkaraman Lambs under Breeder Conditions

Morkaraman Kuzuların Yetiştirici Şartlarında Büyüme ve Gelişme Özellikleri

Zeki Şahinler[1], Ömer Faruk Güngör[2], Yücel Demir[3]

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Abstract: The aim of this study was to determine the growth and development characteristics of singleton unweaned male Morkaraman lambs extensively raised under breeder conditions from birth to the end of the grazing season. A total of 45 singleton male Morkaraman lambs were used in this study and live weight changes from birth to the end of pasture period (140th day of age) and some body measurements at the end of pasture period were determined of these lambs. The means of the live weight values of the lambs at the birth, 15, 30, 45, 60, 75, 90, 115, and 140th days were 4.04, 7.42, 10.03, 13.22, 16.74, 20.83, 25.91, 29.67, and 33.43 kg, respectively. At the end of the grazing season (140th day), the mean values of the lambs' wither height, chest depth, chest girth, rump height, and rump length were 61.73, 29.47, 75.13, 60.33, and 19.73 cm, respectively. As a result of the study, it was found that Morkaraman singleton male lambs raised on the pasture only grazing without weaning for up to 140 days provided adequate growth and development. However, when the live weight changes are evaluated, it can be said that it would be beneficial to make additional feeding after 90 days age. It would be appropriate to evaluate the longer feeding.

Keywords: Birth Weight, Live Weight Gain, Live Weight, Body Measurement

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Öz: Çalışmada, tekiz-erkek Morkaraman kuzuların yetiştirici koşullarinda büyüme ve gelişme özelliklerinin belirlenmesi amaçlanmıştır. Kuzular yetiştirici koşullarına uygun şekilde sütten kesim uygulanmadan doğumdan mera sonuna kadar mera olanakları ile yetiştirmiştir. Çalışma kapsamında 45 baş tekiz erkek Morkaraman kuzudan doğumdan mera sonuna (140. gün) kadar canlı ağırlık değişimleri ve mera sonu bazı vücut ölçüleri tespit edilmiştir. Kuzularda ortalama doğum ağırlığı, 15, 30, 45, 60, 75, 90, 115 ve 140. gün (mera sonu) canlı ağırlık değerleri sırasıyla 4.04, 7.42, 10.03, 13.22, 16.74, 20.83, 25.91, 29.67 ve 33.43 kg olmuştur. Kuzuların mera sonu (140. gün) ortalama cidago yüksekliği, göğüs derinliği, göğüs çevresi, sağrı yüksekliği ve sağrı uzunluğu değerleri ise sırasıyla 61.73, 29.47, 75.13, 60.33 ve 19.73 cm olmuştur. Çalışma sonucunda, Morkaraman tekiz erkek kuzuların sütten kesim yapılmadan sadece mera ile besleme yapılarak 140. güne kadar yetiştirmenin yeterli büyüme ve gelişme sağladığı belirlenmiştir. Ancak büyüme sonuçları incelendiğinde, 90. gün sonrası imkân dahilinde ilave besleme yapmanın faydalı olacağı ve beslemenin daha uzun yapılarak değerlendirilmesinin uygun olacağı önerilebilir.

Anahtar Kelimeler: Doğum Ağırlığı, Canlı Ağırlık Artışı, Canlı Ağırlık, Vücut Ölçüleri

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[1] Assist. Prof. Dr. Zeki Şahinler, Bolu Abant Izzet Baysal University, Department of Vegetable and Animal Production, sahinlerzeki@ibu.edu.tr
[2] Assoc. Prof. Dr. Ömer Faruk Güngör, Bolu Abant Izzet Baysal University, Department of Veterinary, gungoromerfaruk@ibu.edu.tr (Corresponding author)
[3] Assist. Prof. Dr. Yücel Demir, Agrı Ibrahim Cecen University, Department of Animal Production and Technologies, ydemir@agri.edu.tr

INTRODUCTION

Animal-based foods have a significant role for balanced and healthy diet of the people. The species of animals raised to produce these foods and the proportion of these species in total animal population vary according to the sociocultural and geographical structures of the countries. In this context, sheep are the most common livestock species utilizing pastures in regions that have steppe or continental climate condition. (Saatci et al., 2003; Elmaz et al., 2012; Güneş and Akin, 2017) The animal products obtained from sheep make a significant contribution to the economy and the production of animal food in these regions. (Akçapınar, 2000; Güngör and Ünal, 2020a; Güngör et al., 2022a). Türkiye has 54 million small ruminant population, of which 43 million are sheep, according to June 2024 data. (TUIK, 2024). Sheep breeding is carried out mostly in an extensive system. Similarly, it is known that sheep farming in Turkiye is extensive farming, and the different regions of Turkiye have their own indigenous sheep breed which are well adapted to the conditions of own region. Morkaraman, an indigenous sheep breed of the East Anadolu region, is well adapted to the climate and grazing conditions of this region. This fat-tailed sheep has low combine yields. Mutton production is the main source of income for sheep farmers in this region. (Akçapınar, 2000; Akçapınar and Aydın, 1984; Güngör and Ünal, 2020b; Güngör et al., 2022b). For these reasons, the evaluation of the growth and development traits of this breed under breeder conditions gives very valuable information for the sheep production in the region.

The growth and development traits of Morkaraman lambs in Ağrı province have not been studied yet. There are also few studies on Morkaraman lambs under breeding conditions because nearly all of the research on Morkarman sheep was conducted at the university farms (Elazig Firat University, Erzurum Atatürk University, Kars Kafkas University, and an Yüzüncü Yıl University). In addition, some body measurements of Morkarman lambs are not well described due to few studies on body measurements of Morkarman lambs. It is known that the variation of genotype in the native breeds is high, and the quality of the pasture and the length of the grazing season differ from region to region. Therefore, evaluating the growth and development of Morkaraman lambs under traditional breeding conditions is important in this region.

This study aimed to evaluate the growth and development characteristics of Morkaraman singleton male lambs traditionally raised with pasture grazing without weaning under breeder conditions in Ağrı province from birth to the end of the grazing season.

MATERIAL AND METHOD

According to the data of 2023, a total of 333 thousand cattle and 1200 thousand head of sheep and goats are raised in Ağrı province. The sheep population is 1140 thousand head in this province (TUIK, 2024). Sheep breeding is obviously understood to be an important animal husbandry in Ağrı province. Most of the income of the sheep farms in this region is derived from mutton production, and sheep production is generally depended on pasture quality and length of the grazing season. In addition, the lambs are traditionally raised on pasture without weaning during the grazing season in the breeder condition in Ağrı province.

This study was conducted on routine livestock practices in the Agri Province region of Turkiye and was supported by the "General Directorate of Agricultural Research and Policies (TAGEM)" as part of the "National Genetic Improvement Project for Small Ruminants at Breeders Conditions".

Material

The study was conducted in the central province of Ağrı (39°56'44.6"N 43°08'56.5"E) in the East Anatolian Region of Türkiye. The farm has 300-head Morkaraman stock herd. Data were obtained from 45 Morkaraman singleton male lambs born in this Morkaraman herd.

Method

In this study, A flock of 300 Morkaraman stock ewes between 2 and 8 years ages was followed. The lambs were randomly selected within the singleton male Morkaraman lambs born within three days of the peak of the births in this Morkaraman herd. The obtained data was therefore not interpolated. When the lambs

were about 45 days ages, they began grazing with their dams. The herd went out to pasture at sunrise in the morning and returned to the sheepfold around 7:00 pm. The animals were provided with potable water three times a day. No additional feeding was applied to the dams and lambs except for pasture. Birth weights of lambs were determined 8-12 hours after birth and the ear tags have been applied. Live weight measurements of the 45 male lambs were determined every 15 days until day 75th. The 15 lambs were randomly selected from these 45 lambs for the slaughter and these lambs were grazed by their dams until 140th days of age without weaning. The live weight of these lambs continued to be determined at the 90th, 115th, and 140th day of age. The growth rate is high in the early stages of the ages. Therefore, measurements were taken at 15-day intervals until day 90. In addition, body measurements (wither height, chest depth, chest girth, rump height, and rump length) of these lambs were taken at the end of 140 days (end of grazing period). A 150 kg scale with a sensitivity of 50 g was used to determine live weights.

The SPSS package program was used to calculate descriptive statistics of the live weight and the body measurements.

RESULTS AND DISCUSSION

Live Weights of The Lambs

Means of lamb live weights determined at 15-day intervals from birth to 90 days of age and at 25-day intervals from 90 days to 140 days of age were shown in Table 1.

Table 1. Means of lamb live weights (kg) of Morkaraman lambs.
Çizelge 1. Morkaraman kuzularda ortalama canlı ağırlık (kg) değerleri.

Lamb live weights	n	$\bar{X} \pm S_{\bar{x}}$	CV
Lambing period			
Birth	45	4.04±0.09	15.19
15th day	45	7.42±0.17	15.71
30th day	45	10.03±0.26	17.29
45th day	45	13.22±0.28	14.05
Grazing period			
60th day	45	16.74±0.30	12.08
75th day	45	20.83±0.42	13.63
90th day	15	25.91±0.68	10.12
115th day	15	29.67±0.70	9.12
140th day	15	33.43±0.73	8.42

$S_{\bar{x}}$: Standard error, CV: Coefficient of variation

For the live weight means, the coefficient of variation results showed the values lower than 20%. This was an indication that live weights were homogeneously distributed around the mean. The mean birth weight of the lambs in the study was 4.04±0.09 kg. This mean value determined in this study was similar to the values reported for Morkaraman lambs by Akçapınar and Kadak (1982) in Elazığ province (4.0 kg), Küçük et al. (2002) in Van province (4.0 kg), Arslan et al. (2003) in Van province (3.9 kg), Öztürk et al. (2012) in Van province (4.1 kg), and Şahin (2021) in Erzurum province (3.9 kg). However, this mean birth weight was lower than the results reported by Akçapınar and Aydın (1982) (4.9 kg), Esenbuğa and Dayıoğlu (2002) (4.2 kg), Aksakal and Macit (2009) (4.2 kg) and Macit et al. (1996) (4.7 kg) for Morkaraman lambs in Erzurum province, but higher than the results reported for Morkaraman lambs by Laçin and Aksoy (2003) (3.8 kg), and Ulusan and Aksoy (1996) (3.2 kg) in Kars province, and by Arslan et al. (2003) (3.4 kg), and Odabaşıoğlu et al. (1996) (3.7 kg) in Van province. It is clear that the Morkarman lambs born in Erzurum province have higher lamb birth weights than those of Kars, Van, and Elaziğ provinces. The Food and Livestock Application and Research Centre of the Faculty of Agriculture at Ataturk University has conducted most of these Morkarman studies in Erzurum province. The high birth weights of Morkaraman lambs may be caused by a result of the selection programs at this research centr, which has been breeding Morkaraman since 1967 (Emsen and Dayıoğlu, 2011).

The 15th, 30th, 45th, 60th and 75th day live weight values obtained in this study were very similar to the results obtained from Morkaraman lambs in the in the experimental farm of Veterinary Faculty of Yüzüncü Yıl University in Van Province (Öztürk et al., 2012). However, the results of this study in these ages were higher than those of in the experimental farm of Veterinary Faculty of Kafkas University in Kars Province (Laçin and Aksoy, 2003) and Firat University in Elazığ province (Özbey and Akcan, 2003).

The 75th-day mean live weight of the lambs was 20.83±0.42 kg in this study. This value was higher than the results of the studies conducted on Morkaraman lambs at 75th days by Odabaşıoğlu et al. (1996) in Van province (19.0 kg), Esenbuğa and Dayıoğlu (2002) in Erzurum province (17.1 kg), Laçin and Aksoy (2003) in Kars province (13.6 kg), and Arslan et al. (2003) in Van province (18.7 kg). However, this value was similar or partly similar to the result of the study by Öztürk et al. (2012) in Van province (20.2 kg), by Akçapınar (1983) in Elazığ province (21.0 kg), and by Küçük et al. (2002) in Van province (22.4 kg). The 90th day mean live weight of the lambs was 25.91±0.68 kg in this study. This value was generally higher than the results of the studies conducted on Morkaraman lambs at 90 days by Akçapınar (1983) in Elazığ province (23.7 kg), Odabaşıoğlu et al. (1996) in Kars province (22.3), Ulusan and Aksoy (1996) in Kars province (21.2 kg), Laçin and Aksoy (2003) Kars province (16.1 kg), Arslan et al. (2003) in Van province (22.0 kg) and Öztürk et al. (2012) in Van province (23.2 kg), but this value was partly similar to the result of the study by Küçük et al. (2002) in Van province (26.6 kg).

When the birth weight, 75th and 90th day mean live weights of the lambs in this study are compared with the results of other studies at these times for Morkaraman lambs, it can be said that the results obtained in this study for Morkaraman lambs are adequate and even better than the results of many studies on Morkaraman lambs raised different provinces. However, the mean lamb live weight result obtained at the end of the grazing period in this study (33.43 kg) was lower than the results obtained from male Morkaraman lambs raised in Erzurum province (Macit et al., 1996; Aksakal and Macit, 2009; Esenbuğa and Dayıoğlu, 2002) (37.3, 35.5, and 36.6 kg). This can be due to the difference in the length of the grazing season between these two regions, because Macit at al. (1996) reported that the average age of Morkaraman lambs at the end of the grazing period in Erzurum province is 161 days.

The 75th and 140th-day mean the live weights of Morkaraman lambs in the study were 20.83 kg and 33.43 kg, respectively. Özbey and Akcan (2003) in Elazığ province and Aksoy et al. (1996) in Van province started their fattening studies using 21.5 kg and 20.2 kg male Morkaraman lambs, respectively. The mean lamb live weight obtained on the 75th day in this study is similar to the initial live weights of lambs in these two fattening studies. In these fattening studies with concentrated feed, the live weights of the male lambs in the Özbey and Akcan's fattening study were 31.7 kg on the 56th day and 35.6 kg on the 70th day. It can be calculated from these results that the mean live weight of the lambs on the 65th day was 34.2 kg in Özbey and Akcan's fattening study. The live weights of the male lambs in the Aksoy et al.'s fattening study were 30.8 kg on the 56th day and 31.8 kg on the 70th day. It can be calculated from these results that the live weight of the male lambs on the 65th day was 31.4 kg in Aksoy et al.'s fattening study. If the results obtained at 65 days of fattening in these two studies are compared with the results obtained at 65th days (140th day) after 75th days in this study, it is understood that feeding only with pasture until 140 days without weaning provides a sufficient result for adequate growth of Morkaraman male lambs in Ağri province.

The curve of mean live weight changes of singleton male Morkaraman lambs determined according to the time points was shown in Figure 1.

When the graph curve of the lamb live weights determined in the study is evaluated, it appears that the lambs' live wight changes show a slightly positive growth curve from the 15th day to the 90th day, but the lambs' mean live weight changes show a linear curve between 90th and 140th days. Based on this result, it can be said that it is appropriate to provide nutritional support to the lambs after 90 days of age.

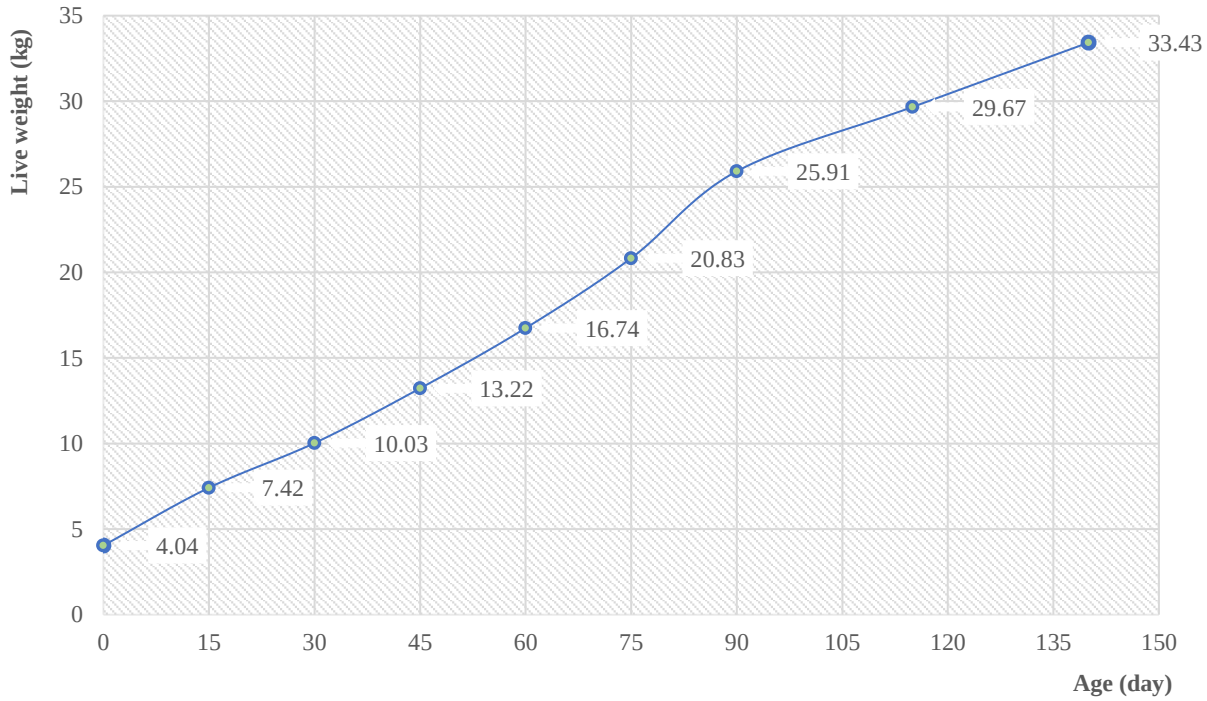

Figure 1. The curve of mean live weight changes of Morkaraman lambs over time.
Şekil 1. Morkaraman kuzularda canlı ağırlık ortalamalarının zamana göre değişim grafiği.

Body Measurements

The mean values of the body measurements (wither height, chest depth, chest girth, rump height, rump length) taken from the lambs on day 140 were presented in Table 2.

Table 2. The mean values of some body measurements (cm) of Morkaraman lambs at 140 days of age.
Çizelge 2. Morkaraman kuzularda 140 günlük yasta bazı vücut ölçüleri (cm).

Body measurements	n	$\bar{X} \pm S\bar{x}$	CV
Wither height	15	61.73±0.72	4.52
Chest depth	15	29.47±0.59	7.79
Chest girth	15	75.13±0.88	4.55
Rump height	15	60.33±0.98	6.32
Rump length	15	19.73±0.27	5.23

$S\bar{x}$: Standard error, CV: Coefficient of variation

Body measurements were understood to be more homogeneously distributed around the mean because the coefficients of variation values for body measurements were lower than 20%, as for live weight. It is reported that the ratio of wither height to chest depth is very important ratio, and that the 1/2 or close to it is a good proportion (Akçapınar and Özbeyaz, 2021). This morphological conformation can be said to be important for grazing in regions where long-term grazing is required. . Consistent with the report, the mean wither height value in this study is approximately twice the mean chest depth value. The wither height and the chest girth of the lambs in this study were 61.73±0.72 cm and 75.13±0.88 cm at the end of the grazing period (day 140), respectively. A study conducted by Ulusan and Aksoy (1996) in Kars province reported the 6-month age wither height and chest girth of Morkaraman male lambs as 57.8 cm and 73.8 cm, respectively. There is no study on Morkaraman lambs other than the study of Ulusan and Aksoy (1996) on the body measurements that were determined in this study. Comparing the results of Ulusan and Aksoy and this study, it is clear that the body measurements determined in this study were higher than those of male Morkaraman lambs in Kars. Rump height (60.33 cm) was less than wither height (61.73 cm) in this study. Rump height (63.2 cm) was reported to be higher than wither height (62.0 cm) in a study reported one year body measurements of Morkaraman (Özbey and Akcan, 2003). The difference was not high, and

this may be due to different developmental stages. It is known the high genotype variation in native breeds, and the environmental conditions (pasture quality and length of grazing season) differ from region to region; therefore, the differences between Morkaraman lambs in different provinces were due to high genotype variation and environmental differences.

CONCLUSION

Lamb live weight changes and body measurements in this study were similar or better to other studies for this breed. These results show that traditionally raising Morkaraman singleton male lambs in Ağrı province on pasture only grazing without weaning until day 140 (until the grazing period) under breeder conditions provides adequate growth and development. According to the live weight change curve up to 90 days, the lamb live weight had an upward trend. It can be suggested to try to continue this trend with supplementary feeding after 90 days. In conclusion, pasture feeding without weaning until day 90 provided adequate growth and development in this region.

CONFLICT OF INTEREST

The authors must report under this title that there are no conflicts of interest.

DECLARATION OF AUTHOR CONTRIBUTION

The authors contributed equally to the article.

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