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THE IMPROVEMENT STUDIES ON MUTTON SHEEP FOR MARMARA REGION CONDITIONS 2. FATTENING AND CARCASS CHARACTERISTICS OF LAMBS

A. CEYHAN, H. HANOGLU, T. SEZENLER and I. ERDOGAN
Bandirma Marmara Livestock Research Institute, 10200 Bandirma, Turkey

Abstract

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The purpose of this study was to compare the fattening performance, slaughter and carcass characteristics of lambs which were produced by crossbreeding with Kivircik sheep, the local breed in the Marmara region with German Black-Headed Mutton (GBM), the mutton breed which import from Germany. Forty lambs, the live weights of which were around 25.0 kg, were divided into 4 groups according to genotype and sex at the beginning of the fattening period. The average daily live gains were found 279, 210, 283 and 201 day/g, and fed conversion efficiencies were 5.018, 6.286, 4.854 and 6.197 kg, respectively in genotype groups of the Bandirma-I male, female, the Bandirma-II male and female lambs. The crossbred male lambs gained weight faster and consumed less feed per unit weight gain during the fattening program than the female lambs. Whereas, there were no fattening and carcass traits differences between crossbreds Bandirma-I and Bandirma-II genotype lambs.

Key words: lamb, crossbreeding, fattening, carcass characteristics

Introduction

The sheep population in Turkey is mainly composed of native breeds. They are mostly adapted to the poor range conditions of the country. A high percentage of the sheep population is managed under semi extensive system, utilizing the ranges as the major source of feed. Mutton is the most important source of red meat in Turkey, but domestic sheep breeds cannot meet lean quality for consumers increasing demand. Low productivity of the native breeds and improper feeding are among the main factors for this severe shortage. Crossbreeding may be one of the several methods for improving the efficiency of lamb production.

The Marmara region has a climate and grassland conditions which are suitable for the production of commercial slaughter lambs. The crossbred lamb breeding is increasing in number in Marmara region because of being near to the big cities and the taste of lamb meat is preferred to other meats, and the lamb meat is more expensive. In this region sheep breeder need new type crossbreed sheep which is early growth,

E-mail: ayhan73ceyhan@hotmail.com

suitable intensive fattening program and has high quality carcass trait.

The dominant genotype of the Marmara region is Kivircik has the ratio 6.3 % of sheep population of the country (Kaymakci and Sonmez, 1996). Kivircik is a satisfying sheep among the native sheep breeds about milk production and carcass. But Kivircik is not satisfying breed for intensive breeding because of its low prolificacy and growth characteristics of lambs.

In recent years, the number of studies of the production of crossbred slaughter lambs has risen. Crossbreed lambs are expected to have fast growth characteristics, a high survival rate, to reach maturity for slaughter through a fattening program of 2-3 months' duration, and to yield better quality carcasses (Ozcan et al., 200; Altinel et al., 1998; Ozbey et al., 2002; Tekin et al., 2005; Yilmaz et al., 2002; Elicin et al., 2002; Esen and Ozbey, 2001 and Kaymakci et al., 2002).

At the end of 56 days intensive lamb fattening program, the daily live weight gain of some crossbreed lambs were rang from 166 to 367 g; feed conversion rate were range from 3.0 to 5.0 kg. Some carcass characteristics of these lambs were found 13.0 to 21.0 kg for chilled carcass weight, 44.0 to 50.99% for chilled carcass percentage, 10.68 to 16.2 cm^2 for MLD area (Ozcan et al., 2001; Kucuk et al., 2002; Altinel et al., 1998; Ozbey et al., 2002; Tekin et al., 2005; Yilmaz et al., 2002; Elicin et al., 2002; Esen and Ozbey, 2001; Esen and Yildiz, 2000; Kaymakci et al., 2002; Akgunduz et al., 1994 and Akmaz et al., 2000).

Nowadays, there are number of study from different countries on crossbreeds lamb fattening and carcass trait. The daily live gain some of the different county for crossbred lambs were 199 to 268 g, feed conversion rate were range from 3.84 to 6.13. (Momani et al., 2004; Baranowski et al., 2007; Softic et al., 2002 and Petev et al., 2004).

The general aim of this study was to compare the fattening and carcass traits of lambs which were of the Bandirma-I and Bandirma-II crossbred male and female lambs. The lambs which was produced crossbreeding studies with German Black Head Mutton has been found to be the mutton breed which exhibits the best adaptation to the environmental conditions of the Marmara region and Kivircik sheep, the predominant breed in the Marmara region.

Material and Methods

Animals. Forty single birth female and male crossbred lambs were used for fattening. These lambs were the product of the normal management system followed by Marmara Livestock Research Institute in which lambs are weaned at 60 days of age.

At the beginning of the study German Black-Headed Mutton (GBM) x Kivircik (K) crossbreeding F1 was obtained after than F1 ewes were divided in to two groups. GBM rams were mated first group F1 ewes and were getting first back cross to GBMB1 ewes which were named "Bandirma-I" genotype. The Bandirma-I new type would have 75% GBM and 25% Kivircik genotype. Second group F1 ewe's were mated GBMB1' rams and obtained GBMB1F1 which

Table 1
The feed contents of the ration and Chemical composition of concentrate feed used for the fattening program

Feed contents	Amount %
Barley	74
Sunflower oilcake	24
Marble powder	1-Apr
Salt	0.5
Vitamin + Mineral Premix	0.1
Total	39637.1
Dry matter	87.01
Organic matter	84.06
Crude protein	15.28
Ether extract	Jan-97
Crude fiber	10-Apr
N-free extractives	56.77
Ash	Feb-95
Metabolizable energy, kcal/kg DM	2470.42

was named "Bandirma-II" genotype and have 62.5% GBM and 37.5% Kivircik genotype.

Feed. The feed mixture ratios are given in Table 1. It was produced in the institute and lambs in groups feed were exposed to this ration *ad libitum* during the fattening program in the four sections.

Methods

Fattening. Two new crossbreed genotype groups which are consist of male and female lambs were formed in the study: The first group is Bandirma-I (75% GBH + 25% K) which is obtained GBM rams with Kivircik ewe by second backcross. The second group is Bandirma-II (62.5 % GBM + 37.5%K), which is obtained by the crossbreeding of GBMB1 rams with F1 (GBM x Kivircik) ewes. After weaning at the age of 3 months, to determine the fattening characteristics of the female and male lambs, 10 lambs from each genotype were selected. In order to minimize environmental differences in these lambs, single-born, male and female lambs were selected. The lamb groups were put into the sections. In the study to determine the live weight, daily live-weight gain, daily feed consumption and feed consumed per 1 kg live weight gain during fattening, data were recorded by fortnightly weighing of both the lambs and the consumed feed. The fattening program lasted for 56 days.

Carcass quality measurements. After fattening program 5 male lambs from each genotypes were slaughtered to determine the slaughter and carcass characteristics. The lambs with live weights closest to the live-weight means of their groups were chosen. Slaughter and carcass dressing were performed the methods of Colomer-Rocher et al. (1987). Dress-off items (hearth, Liver+heart+lungs, hide, four feet, four stomachs, and head) were weighted during slaughter-dressing. After hot carcasses were weighted, carcasses were placed in a chiller operating at 4°C for 24 hours. After overnight storage at +4°C, kidney and fat were taken the carcass measurements (Gursoy, 1991; Yilmaz, 1998) were taken. Chilled carcasses were weighted and split down at the vertebral column. The two sides were as symmetrical as possible with each containing one kidney and the perinephric and pelvic fat. The left sides were jointed into five anatomical regions. The *Musculus Longissimus Dorsi* (MLD) section area and back-fat thickness were also determined.

***The statistical analysis*:** The data were evaluated with the analysis of variance according to the following model for fattening traits and carcass traits which are omitted the sex from model.

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

The symbols in this model are: Y_{ijk} = Live weight of lambs, μ = Average of the population for the characteristic examined, a_i: Effect of genotypes (Bandirma-I and, Bandirma-II), b_j: Effect of sex (male and female), e_{ijk}: Random error. The statistical comparisons between the genotype groups in respect of the fattening and carcass characteristics were made by variation analysis; the significancy between the groups for fattening was determined with Duncan test and for carcass trait was determined t-test (Ozdamar, 2004).

Results and Discussion

The results which are related to beginning and final weight, fattening period, live weight and average daily weight gain of male and female crossbred Bandirma-I and II lambs are presented in Table 2.

The female crossbred Bandirma-I and Bandirma-II lambs showed the lowest final live weight 36.81 kg, 36.29 kg) and daily live gain (210 g/day and 201 g/day) compared to male crossbred Bandirma-I and Bandirma-II lambs, which gained 40.79 kg and 40.99 kg and 279 g/day and 283 g/day, respectively.

There were no significant differences among the male groups in terms of total live weight end of the fattening. But there was significant difference among the female and male groups in terms of total live weight.

The effect of sex on daily live gain at lambs fattening were found significant ($P \leq 0.05$). Daily concentrated feed consumption and evaluation for 1 kg live-weight gain of Bandirma-I and Bandirma-II crossbred lambs are given in Table 3.

The female crossbred Bandirma-I and Bandirma-II lambs consumed amount less than male crossbred

Table 2

Live weights and daily live-weight gain during fattening of Bandirma-I and Bandirma-II crossbred lambs, kg

Fattening period	Bandirma-I		Bandirma-II	
	Male (n=10)	Female(n=10)	Male(n=10)	Female(n=10)
Live weight, kg	$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$
Beginning live weight	25.17±0.703	25.05±0.968	25.17±1.169	25.06±0.685
14th day live weight	29.29±0.912	28.23±0.990	29.12±1.321	28.58±0.941
28th day live weight	34.08±0.844	31.95±1.046	33.50±1.355	31.85±1.040
42nd day live weight	37.51±0.963a	34.37±0.988bc	37.49±1.253ab	34.09±1.157c
56th day live weight	40.79±0.920a	36.81±1.052b	40.99±1.196a	36.29±1.284b
Live weight gain (0-56)	15.62±0.771a	11.75±0.693b	15.82±0.655a	11.23±0.790b
Daily live gain, g				
Beginning-14th day	294±9.11a	227±0.16b	282±0.20ab	252±0.26 ab
14-28th day	342±8.43a	265±0.22bc	313±0.28ab	233±0.18c
28-42nd day	245±9.63a	173±0.16b	285±0.18a	161±0.22b
42-56th day	234±9.20a	174±0.15b	250±0.21a	157±0.19b
Beginning-56th day	279±7.70a	210±0.12b	283±0.12a	201±0.14b

a, b c: The differences between the means of genotype groups denoted by different letters in the same line are significant (P≤0.05)

Table 3

Concentrated feed consumption and evaluation for 1 kg live-weight gain of Bandirma-I and Bandirma-II crossbred lambs, kg

Fattening Characteristics	Bandirma-I		Bandirma-II	
	Male (n=10)	Female(n=10)	Male(n=10)	Female(n=10)
Feed consumption kg/day				
Beginning-14th day	1.142	1.277	1.155	1.128
14-28th day	1.387	1.286	1.292	1.270
28-42nd day	1.563	1.350	1.484	1.257
42-56th day	1.507	1.368	1.556	1.317
Beginning-56th day	1.400	1.320	1.372	1.243
Evaluation rate				
Beginning-14th day	3.884	5.621	4.059	4.478
14-28th day	4.057	4.826	4.126	5.451
28-42nd day	6.373	7.778	5.205	7.824
42-56th day	6.436	7.866	6.232	8.380
Beginning-56th day	5.018	6.286	4.854	6.197

lambs. Because of less consumption daily feed for female lambs were not showed enough live weight gain end of the fattening period. The evaluation for 1 kg live weight gain of the Bandirma-II male lambs more efficient than the Bandirma-I male lambs.

The slaughter traits of crossbred lambs in the groups

Table 4
Some slaughter and carcass characteristics of Bandirma-I and Bandirma-II crossbreed male lambs

Items	Bandirma-I n=5	Bandirma-II n=5	Means
	$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$
Live weight before slaughter, kg	41.48±1.421	40.76±1.373	41.12±0.939
Hot-carcass weight, kg	21.30±0.892	21.10±0.956	21.20±0.618
Hot-dressing percentage, %	51.22	51.76	51.49
Chilled-carcass weight, kg	20.82±0.847	20.64±0.877	20.73±0575
Chilled-dressing percentage, %	50.19	50.63	50.41
Losses during chilling, %	42370.00	39783.00	41640.00
Left carcass weight, kg	10.10±0.443	10.00±0.407	10.05±0.284
Right carcass weight, kg	9.90±0.363	9.64±0.494	9.77±0.292
Tail weight, kg	0.25±0.019	0.29±0.043	0.27±0.023
Head weight, kg	1.50±0.063	1.34±0.040	1.42±0.044
Four feet weight, kg	1.02±0.049	0.92±0.049	0.97±0.036
Liver+heart+lungs weight, kg	1.96±0.24	1.84±0.51	1.90±0.033
Four stomachs weight (full), kg	9.56±0.487	9.52±0.288	9.54±0.267
Testicle weight, kg	0.30±0.014	0.30±0.036	0.30±0.018
Hide weight, kg	4.60±0.238	4.64±0.150	4.62±0.133
Shoulder Weight, kg	1.97±0.119	1.83±0.082	1.90±0.072
Flank weight, kg	0.75±0.073	0.78±0.039	0.76±0.039
Long leg weight, kg	3.18±0.085	3.04±0.143	3.11±0.082
Neck weight, kg	0.90±0.055	0.89±0.059	0.89±0.038
Loin-rib weight, kg	2.94±0.169	3.13±0.139	3.03±0.108
Kidney weight, kg	0.11±0.032	0.12±0.061	0.11±0.037
Inner fat weight, kg	0.43±0.057a	0.60±0.0337b	0.51±0.043

a, b: The differences between the means of genotype groups denoted by different letters in the same line are significant

are presented in Table 4.

The differences among the Bandirma-I and Bandirma-II groups all carcass trait were not significant ($P>0.05$). But, the differences of inner fat weight were significant ($P \leq 0.05$) for Bandirma-I and II genotypes. These results show that Bandirma-I and II crossbred's lambs were showed similar slaughter and carcass traits.

Bandirma-I and II crossbreed lambs carcass measurements are given in Table 5. These results show that the Bandirma-I and Bandirma-II crossbreeds lamb carcass measurements are similar except for MLD area and body length.

When the fattening characteristics of the Bandirma-I and Bandirma-II crossbred lambs are evaluated, the Bandirma-I and Bandirma-II crossbred lambs seemed to have similar values for all fattening and carcass characteristics, but there are differences fattening performance male and female crossbred lambs.

In this study, 56th day live weight of the Bandirma-I male, female and Bandirma-II male and female crossbred lambs were 40.79, 36.81, 40.99, 36.29 kg, respectively and beginning to 56th day daily live gain crossbred lambs were 279, 210, 283 and 201g/day,

Table 5

Some carcass measurements of Bandirma-I and Bandirma-II crossbred lambs

Carcass Characteristics	Bandirma-I N=5	Bandirma-II n=5	Means
	$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$
Body length, cm	71.60±0.68a	74.20±0.86b	72.90±0.67
Breast width, cm	16.00±1.05	16.60±0.93	16.30±0.67
Breast circumference, cm	73.60±1.83	76.80±1.39	75.20±1.21
Breast depth, cm	23.40±0.40	24.40±0.81	23.90±0.46
Exterior leg length, cm	31.80±0.97	31.20±0.58	31.50±0.54
Inner leg length, cm	20.20±0.58	20.20±0.58	20.20±0.39
Rump circumference, cm	37.20±2.22	34.60±0.68	35.90±1.18
Rump width, cm	8.20±0.37	8.60±0.24	8.40±0.22
Back-fat thickness (mm)	1.000±0.063	0.920±0.086	0.960±0.052
MLD area (cm^2)	18.71±15.28a	17.39±49.77b	18.05±26.09

a,b: The differences between the means of genotype groups denoted by different letters in the same line are significant ($P \leq 0.05$)

respectively, feed efficiency were 5.018, 6.286, 4.854 and 6.197 kg, respectively.

These results were higher than purebred Kivircik ewe reported fattening and carcass traits by Akgunduz et al. (1994), and Yilmaz et al. (2003). It means that Bandirma-I and Bandirma-II crossbred male lambs have fattening and carcass performance than dam line Kivircik lambs.

The results were similar to the fattening performance of Bandirma-I and Bandirma-II crossbred lambs obtained by crossbreeding with Somez type (25% Chios + 75% 75 Tahirova) single male lambs (Kaymakci et al., 2002), for Guney Karaman, Kangal-Akkaraman and Akkaraman lambs (Tufan and Akmaz, 2001), for Hasmer, Hasak, Hasiv and Linmer types (Tekin et al., 2005). On the other hand the results were higher the fattening performance of Bandirma-I and Bandirma-II crossbred lambs obtained by crossbreeding with Somez type (25% Chios + 75% 75 Tahirova) single female lambs (Kaymakci et al., 2002) and for crossbred lambs (Softic et al., 2002), for Chios x Akkaraman F1 and B1 crossbred lambs (Esen and Ozbey, 2001), for White Karaman and Chios x White Karaman (F1) crossbred lambs (Esen and Ylidiz, 2000), for Kivircik, GBM rams with x Kivircik, GBM rams with F1 (Chios x Kivircik) and Turkish Merino (Ozcan et al., 2001), for Karayaka Lambs (Balci and Karakas, 2007). In this study, the results found with Bandirma-I and Bandirma-II crossbred lambs were lower than those reported from German Blackheaded Mutton (GBM) x Akkaraman (A) F1, GBM x (GBM x A) B1, Hampshire Down (HD) x AF1 and HD x (HD x A) B1 lambs (Akmaz et al., 2000), for German Blackheaded Mutton (GBM) x Awassi (A) F1, Hampshire Down (HD) x A (F1) and HD x (HD x A) B1 (Akmaz et al., 2000), Turkish Merino (M), Hampshire Down (HD) x MF1 , HD x (HD x M) B1, German Blackheaded Mutton (GBM) x M F1 and GBM x (GBM x M) B1(Akmaz et al., 1999), For Ile de France (IF) x Akkaraman (AK) (G1) crossbreed male lambs (Elicin et al., 2001).

The daily live weight gain of Bandirma-I and Bandirma-II crossbred lambs was higher than some results reported for local Morkaraman lambs by Kucuk et al. (2002), for Bulgarian Cordele by Petev et al. (2004), for crossbred lambs Softic et al. (2002), for Awassi, Awassi x Charollais, Awassi x Romanov lambs (Momani Shaker et al., 2004), for 50% Booroola and 50% Olkuska Sheep (Baranowski et al., 2007), for Turkish Merino x Kivircik, Turkish

Merino x F1 (Chios x Kivircik), for Kivircik, Kivircik x Hampshire Down and Kivircik x German Black Heat Mutton (Akgunduz et al., 1994), and Turkish Merino (Yilmaz et al., 2002). On the other hand the daily live weight gain of Bandirma-I and Bandirma-II crossbred lambs was found lower than reported Kivircik x Morkaraman G1 by Kucuk et al. (2002).

The feed efficiency of Bandirma-I and Bandirma-II crossbred lambs were general agreement with Kucuk et al. (2002), for Awassi, Awassi x Charollais, Awassi x Romanov lambs (Momani Shaker et al., 2004), for Hasmer, Hasak, Hasiv and Linmer types (Tekin et al., 2005), for Karayaka Lambs (Balci and Karakas, 2007). These results were obtained lower than reported for Sonmez type lambs (Kaymakci et al., 2002), for Bulgarian Cordele (Petev et al., 2004), for crossbred lambs (Softic et al. 2002), for 50% Booroola and 50% Olkuska Sheep (Baranowski et al., 2007), for Turkish Merino x Kivircik, Turkish Merino x F1 (Chios x Kivircik) and Turkish Merino (Yilmaz et al., 2002), for Chios x Akkaraman F1 and B1 crossbred lambs (Esen and Ozbey, 2001), for White Karaman and Chios x White Karaman (F1) crossbred lambs (Esen and Yildiz, 2000), For GBM rams with x Kivircik, GBM rams with F1 (Chios x Kivircik) and Turkish Merino (Ozcan et al., 2001).

While the Bandirma-I and Bandirma-II crossbred male lambs were similar to each other in terms of fattening, slaughter and carcass characteristics, and these two genotypes male lambs produced better fattening performance than crossbreed female lambs.

In this study, the hot-carcass weights of the Bandirma-I and Bandirma-II crossbred lambs were 21.30 kg and 21.10 kg. Similarly, the chilled-carcass weights of the Bandirma-I and Bandirma-II crossbred lambs were 20.82 kg and 20.64 kg, respectively.

The hot-carcass weights of the Bandirma-I and Bandirma-II crossbred lambs were higher than obtained by Bulgarian Cordele (Petev et al., 2004), for Turkish Merino and Turkish Merino x Lincoln crossbred lambs (Tekin and Akcapinar, 1993), and were lower than for from German Blackheaded Mutton (GBM) x Akkaraman (A) F1, GBM x (GBM x A) B1, Hampshire Down (HD) x A F1 and HD x (HD x A) B1 lambs (Akmaz et al., 2000), for German Blackheaded Mutton (GBM) x Awassi (A) F1, Hampshire Down (HD) x A (F1) and HD x (HD x A) B1 (Akmaz et al., 2000), Turkish Merino (M), Hampshire Down (HD) x M F1 , HD x (HD x M) B1, German Blackheaded Mutton (GBM) x M F1 and GBM x (GBM x M) B1(Akmaz et al., 1999) and were lower than for Chios x Akkaraman F1 and B1 crossbred lambs (Esen and Ozbey, 2001)

The chilled-dressing percentages of the genotypes were 50.19% - 50.63%, and the differences between the groups were not significant. These results of the Bandirma-I and Bandirma-II crossbred lambs were higher than obtained by Bulgarian Cordele (Petev et al. 2004) and for GBM x A (F1), GBM x (GBM x A) B1, HD x A (F1) and HD x (HD x A) B1 lambs (Akmaz et al., 2000) and were similar for GBM x A (F1), HD x A (F1) and HD x (HD x A) B1 (Akmaz et al., 2000), for Turkish Merino x Kivircik, Turkish Merino x F1 (Chios x Kivircik) and Turkish Merino (Yilmaz et al., 2002), for GBM x F1 (Chios x Kivircik (Akgunduz et al.,1994), for Chios x Akkaraman F1 and B1 crossbred lambs (Esen and Ozbey, 2001), for White Karaman and Chios x White Karaman (F1) crossbred lambs (Esen and Yildiz, 2000), for Kivircik, GBM rams with x Kivircik, GBM rams with F1 (Chios x Kivircik) and Turkish Merino (Ozcan et al., 2001), for Karayaka Lambs (Balci and Karakas, 2007), for Turkish Merino and Turkish Merino x Lincoln crossbred lambs (Tekin and Akcapinar, 1993), for Kivircik, Turkish Merino, GBM X F1crosbred lambs (Altinel et al., 1998).

When the MLD area was investigated, which is an important characteristic for determining the valuable meat content of the carcass, it was seen that the Bandirma-I (18.71 cm^2) and Bandirma-II (17.39 cm^2) crossbred lambs produced different results.

The MLD area of the Bandirma-I and Bandirma-II crossbred lambs were higher than obtained by Bulgarian Cordele (Petev et al., 2004), German Blackheaded Mutton (GBM) x Akkaraman (A) F1, GBM x (GBM x A) B1, Hampshire Down (HD) x A F1 and HD x (HD x A) B1 lambs (Akmaz et al., 2000), for German Blackheaded Mutton (GBM) x Awassi

(A) F1, Hampshire Down (HD) x A (F1) and HD x (HD x A) B1 (Akmaz et al., 2000), Turkish Merino (M), Hampshire Down (HD) x M F1, HD x (HD x M) B1, German Blackheaded Mutton (GBM) x M F1 and GBM x (GBM x M) B1(Akmaz et al., 1999), for Turkish Merino x Kivircik, Turkish Merino x F1 (Chios x Kivircik) and Turkish Merino (Yilmaz et al., 2002), for Chios x Akkaraman F1 and B1 crossbred lambs (Esen and Ozbey, 2001), For Kivircik, GBM rams with x Kivircik, GBM rams with F1 (Chios x Kivircik) and Turkish Merino (Ozcan et al., 2001), for Karayaka Lambs (Balci and Karakas, 2007), For GBM x (Chios x Kivircik) F1 (Akgunduz et al., 1994), for Turkish Merino and Turkish Merino x Lincoln crossbred lambs (Tekin and Akcapinar, 1993).

The average fat thickness on MLD obtained in this study as 1 cm in Bandirma-I crossbred lambs, and 0.99 cm in Bandirma-II crossbred lambs. However, differences between the genotypes were not significant for the fat thickness on the MLD. Different results were reported by Ozcan et al. (2002) in pure and crossbred lambs, Yilmaz (2002) in Turkish Merino x Kivircik, Turkish Merino x F1 (Chios x Kivircik) and Turkish Merino purebred lambs Momani (Shaker, 2002) in Awwasi and crossbred lambs and general agreement with Esen and Yildiz (2002) in Karaman and crosbred lambs and Esen and Ozbey (2000) and Akmaz et al. (2000) in German Blackheaded Mutton (GBM) x Awassi (A) F1, Hampshire Down (HD) x A (F1) and HD x (HD x A) B1 male lambs. The results show that the crossbreds had well developed loin and the greatest MLD width and depth in comparison with the other crossbred lambs

When the carcass measurements of the lambs were investigated, it was seen that the Bandirma-I and the Bandirma-II crossbred lambs have similar results in terms of important carcass parts except for MLD, Inner fat weight and body length.

Similar carcass measurements were found in the present study with (Yilmaz et al., 2003; Akmaz et al., 1999) and different with (Akgunduz et al., 1994; Altinel et al., 1998; Yilmaz et al., 2002; Elicin et al., 2001; Ozcan et al., 2002).

Conclusion

In conclusion, it was determined that the Bandirma-I and Bandirma-II crossbred lambs were similar in terms of the fattening, slaughter and carcass characteristics and these results were higher than fattening performance of the female lambs. It is shown that the Bandirma-I and Bandirma-II crossbred lambs can be suitable for fattening and carcass performance in the environmental conditions of the Marmara region and these new genotypes can be used to lambs produce for early growth.

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