Bahri Dağdaş Hayvancılık Araştırma Dergisi
Journal of Bahri Dagdas Animal Research 3 (1):1-6, 2015
ISSN: 2148-3213, www.arastirma.tarim.gov.tr/bahridagdas
Araştırma Makalesi – Research Article
Geliş Tarihi (date of arrival) : 15.01.2015
Kabul Tarihi (date of acceptance) : 09.07.2015

Determination of the Slaughter and Carcass Characteristics of Kıvırcık Lambs

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Abstract

The study was aimed to determine the slaughter and carcass characteristics of 15 male and 14 female Kıvırcık lambs in integrated farms (elite and intermediate elite) which were created in the breeding programme of TUBITAK-KAMAG 109G014 project. Fattened lambs, after weaning, were slaughtered and hot carcass weights and slaughter characteristics were determined. pH of the carcasses was determined and cooling loss was evaluated by determining the cold carcass weight after preserving the carcass at +4^{o}C for 24 hours. Carcasses were dissected according to standards and the ratio of the part of the carcass was determined. There were significant differences between males and females in terms of slaughter weight, four-feet weight ($P<0.05$) and head weight ($P<0.001$). There was a high ($P<0.001$) regression (1.249) between the weight of slaughter and the weight at the beginning of fattening. Slaughter weight affected the hot and cold carcass weights, head, skin, four-feet and liver-group weights ($P<0.001$). The carcass yield percentages were 46.81% and 47.64% in male and female lambs, respectively. There were no significant differences in carcass part ratio between sexes. The total percentage of leg, shoulder-ack and arm was 72% of the full carcass. pH values were not different between sexes before (0 hour) and after (24 hour) cooling period and pH values were determined as 6.57 and 6.40 at the slaughter time (0 hour); and as 5.67 and 5.57 after the cooling period (24 hour) in male and female lambs, respectively. The slaughter and carcass properties were determined in Kıvırcık lambs farmed in Eşme region in this research.

Keywords: Kıvırcık, slaughter characteristics, carcass characteristics, Eşme country

Kıvırcık Kuzularda Kesim ve Karkas Özelliklerinin Belirlenmesi

Özet

Bu çalışmada, TÜBİTAK-KAMAG 109G014 nolu proje kapsamında yürütülen ıslah programı çerçevesinde oluşturulan tümleşik (Elit+Ara Elit) işletmelerdeki 14 baş dişi ve 15 baş erkek Kıvırcık kuzuların kesim ve karkas özelliklerinin belirlenmesi ve elde edilecek sonuçların uygulanan ıslah programına entegrasyonu olanağının araştırılması amaçlanmıştır. Sütten kesimden sonra besiye alınan kuzular besi sonunda kesilmiş ve sıcak karkas ağırlığı ve kesim özellikleri belirlenmiştir. Soğuk hava deposunda +4 ^{o}C'de 24 saat muhafaza edilen karkasların soğuk karkas ağırlığı belirlenerek pH ölçümleri yapılmış ve soğutma firesi hesaplanmıştır. Karkaslar standart parçalama ile parçalara ayrılmış ve elde edilen parçaların toplam karkasa oranları hesaplanmıştır. Çalışmada cinsiyetler arasında kesim ağırlığı, dört ayak ağırlığı ($P<0.05$) ve baş ağırlığı ($P<0.001$) bakımından önemli farklılıklar saptanmıştır. Kesim ağırlığı ile besi başı ağırlığı arasındaki regresyon çok önemli bulunmuştur ($P<0.001$). Kesim ağırlığı, sıcak ve soğuk karkas ağırlığı ile baş, deri, ayaklar ve takım ciğer ağırlıklarını önemli derecede etkilemiştir ($P<0.001$). Karkas randımanı erkek ve dişilerde sırasıyla %46.81 ve %47.64 olarak hesaplanmıştır. Karkas parçalarında cinsiyet bakımından farklılık görülmemiştir. Bu araştırmada, but, omuz-sırt ve kolun toplam karkastaki payı % 72 olmuştur. Kesimde ve kesimden 24 saat sonra yapılan pH ölçümlerinde cinsiyetler arasında farklılık görülmemiş olup erkek ve dişilerde ölçülen pH değerleri kesimde sırasıyla 6.57 ve 6.40; kesimden 24 saat sonra 5.67 ve 5.57 olarak tespit edilmiştir. Eşme yöresinde yapılan bu çalışma ile yörede yetiştiriciliği yapılan Kıvırcık ırkı kuzularda, kesim ve karkas özellikleri belirlenmiştir.

Anahtar kelimeler: Kıvırcık, kesim özellikleri, karkas özellikleri, Eşme yöresi

Introduction

Sheep breeding which takes part within animal production activities in Turkey and all over the world carries significant economic value and sheep and sheep products have an important position in human nutrition. This importance generally stems from the capability to turn sheep out to be animal products as meat, milk, wool and skin by using the areas which are not eligible for herbal production, fallowing and stubble along with inefficient pasturelands and having short natural vegetation (Akçapınar, 1994; Kaymakçı et al., 2009).

In sheep breeding, live weight and carcass quality characteristics which are distinctive for the breeds of every country or region were identified. Carcass weight of sheep is an average of 15 kg, worldwide, and it takes relatively different value according to the countries. As an example, the value is between 6-9 kg in Bangladesh, Peru and Italy, 8 kg in Portugal, 9 kg in Italy, 11 kg in Greece and Spain; and also 25 kg in Denmark, 23 kg in Holland and 21 kg in Ireland and Belgium (Akçapınar, 1994; Kaymakçı et al., 1994; Yalçın, 1990; Sanudo et al., 1998a, 1998b; Ekiz et al., 2009). Turkey is ranked at ninth in the world with her 23.9 million sheep stock, and carcass weight of sheep is between the value of 15-17 kg in our country. By considering this situation, it is seen that the most eligible way for satisfying the need for mutton and also increasing income of sheep breeder is to reclaim meat production capabilities of our sheep, to develop highly productive type and races eligible for current conditions in different regions and improve conditions for maintenance-feeding (Kor et al., 2009; Karaca et al., 2009).

The most important income in sheep breeding is obtained from lambs. Sheep, presented to market for slaughtering, comes from different resources. They may be generally classified as the ones being marketed during suckling period, the ones being slaughtered by fattening after going weaning (intensive stock), the ones being kept in pastureland and/or without going weaning and taken for fattening (extended sheep fattening or yearling lamb). Lambs being taken for fattening show great variations in terms of breed, age, gender, feed efficiency, weight per stock and slaughter weight (Akgündüz et al., 1993; Görgülü et al., 2002; Kor et al., 2009).

There are significant differences based on regions in our country in terms of meat production or lamb fattening techniques. Despite these differences; the purpose is to obtain economic and huge amount of production within a short period. In Eastern Anatolia Region in which sheep breeding becomes prominent compared to other animal production branches, loses are emerged due to late pasturing. Breeders mostly sell out lambs at the end of first pasture period in autumn. On the other hand, stockbreeders use these lambs either in long pasture period at winter or for yearling lamb at summer ranges in following pasture period (Karaca et al., 1991). In Western Anatolia, there is a change witnessed by the influence of consumer requests on sheep genotypes during the last 20-30 years. Fat tail sheep which was the dominant race within the region in the past started to change by cross breeding with genotypes as Kıvırcık and Chios. As a result of unsystematic cross breeding made by breeders, crossbreed types are emerged which are also embraced by the breeders and eligible for all territories (Karaca et al., 2000, 2002, 2009).

The purpose of this research was to present parameters related to slaughter and carcass characteristics and fattening performance in Eşme Kıvırcık lambs demanded in Aegean region, intensely.

Material and Methods

In the season of mating of sheep in the enterprises located at the county of Eşme, natural mating is realized and detailed birth records were kept during the delivery period. Lambs were selected based on delivery type, live weight and gender. The work has been carried out between April and June 2012.

In order to identify fattening performance, slaughter and carcass characteristics, a 10-week (70 days) intensive fattening has been implemented on totally 29 lambs (15 females and 14 males) after weaning. Fattening group were fed with ad-libitum fattening feed (HP: Ham Protein, %20.40, ME: Metabolic Energy, 2728.30 kcal/kg) and 100 g roughage per lamb. At the end of fattening, animals were dispatched to meat facility for letting one day rest and their live weights before slaughtering were determined. Afterwards, process for slaughtering was completed and values as; loss in weight during cooling process; weight of head; skin; parts of liver and four feet were determined. Hot carcass weights were determined and carcass dissection process was conducted after keeping them in cold storage house for 24 hours at +4 °C. Weights and rates of the parts (forearm, shoulder-back loin, loin, leg and others) obtained in carcass integration were determined.

Certificate of Ethics Committee was received through the decision of Local Ethics Committee of Animal Testing in Adnan Menderes University numbered B.30.2.ADÜ.0.06.00.00/124-HEK/2008/034.

GLM and CORR procedures in SAS (1999) packet statistics program were used to make analysis of variance on analyzed characteristics and to obtain least squares means and phenotypic correlation coefficients.

Results

Data related to slaughter and carcass characteristics were given in Table 1 and Table 2. Regarding slaughter characteristics, superiority in male animals in terms of live weight, weight of four feet ($P<0.05$), weight of head ($P<0.001$) and regression between live weight for slaughter and weight per fattening were highly significant ($P<0.001$). Live weight for slaughter also affected hot and cold carcass weight and also weight of head, skin, parts of liver and four feet ($P<0.001$). In the study, dressing percentage for male and females were 46.81% and 47.67%, respectively.

Table 1. Least square means and standard errors of slaughter characteristics ($X\pm S_x$)

Factors	Sex		Regression		OVERALL
	Male (n=14)	Female (n=15)	Beginning weight	Slaughter weight	
SLW	34.38±0.935	31.54±0.869*	1.249±0.225***	-	**32.96±0.225**
HCW	15.39±0.147	15.65±0.136	-	0.489±0.020***	**15.52±0.095**
CCW	15.04±0.145	15.26±0.135	-	0.476±0.020***	**15.15±0.095**
CL	2.30±0.188	2.47±0.174	-	0.008±0.026	**2.38±0.122**
DP	46.81±0.474	47.64±0.438	-	0.044±0.065	**47.22±0.308**
HEAD	1.96±0.020	1.64±0.018***	-	0.039±0.003***	**1.80±0.013**
SKIN	3.54±0.099	3.40±0.091	-	0.096±0.014***	**3.47±0.064**
4 FEET	0.95±0.016	0.90±0.015	-	0.021±0.002***	**0.93±0.010**
LP	1.93±0.058	1.94±0.053	-	0.059±0.008***	**1.94±0.037**
pH_0	6.57±0.103	6.40±0.095	-	-0.002±0.014	**6.49±0.067**

SLW: Slaughter live weight; HCW: Hot carcass weight; CCW: Cold carcass weight; CL: Cooling loss; DP: Dressing percentage; LP: Liver part weight;pH_0: pH in slaughter time
*: P<0.05; **: P<0.01; ***: P<0.001

Table 2. Least square mean and standard errors of carcass characteristics ($X \pm S_x$)

Traits	Sex		Regression	OVERALL
	Male (n=14)	Female (n=15)	Cold carcass weight (kg)	
Forearm (kg)	3.07±0.036	3.05±0.035	0.174±0.011***	3.06±0.024
Forearm (%)	20.29±0.258	20.06±0.249	-0.17±0.077*	20.17±0.173
Shoulder-back loin (kg)	2.69±0.056	2.81±0.054	0.194±0.017***	2.75±0.038
Shoulder-back loin (%)	17.70±0.378	18.49±0.364	0.076±0.112	18.09±0.253
Loin (kg)	1.41±0.046	1.53±0.044	0.109±0.014***	1.47±0.031
Loin (%)	9.26±0.304	10.05±0.293	0.074±0.090	9.66±0.203
Leg (kg)	4.99±0.061	5.06±0.058	0.311±0.018***	5.03±0.041
Leg (%)	32.89±0.408	33.35±0.394	-0.124±0.121	33.12±0.273
Others (kg)	1.29±0.059	1.19±0.057	0.064±0.018**	1.24±0.040
Others (%)	8.48±0.394	7.86±0.380	-0.093±0.117	8.17±0.264
pH_{24}	5.67±0.044	5.57±0.043	-0.012±0.013	5.62±0.030

*: P<0.05; **: P<0.01; ***: P<0.001

Made, no significant differences was found in pH measured during slaughtering and 24 hours after slaughtering between gender and this value measured for males and females were 6.57 and 6.40, respectively at the time of slaughtering and 5.67 and 5.57, respectively at 24 hours after slaughtering. In terms of weights and ratios related to parts of carcass after slaughtering, there is no significant difference between genders. Significant regression was determined between weight of cold carcass and weight of carcass parts (P<0.001).

In terms of slaughtering characteristics, dressing percentage were 46.81 % and 47.64 % for males and females, respectively. There was no significant difference emerged between genders in terms of weights and ratios of carcass obtained through slaughtering and regression between live weight for slaughter and weight per fattening were significantly different (P<0.001).

Discussion

In the studies, characteristics as hot and cold carcass weights, dressing percentage, cooling loss, weight of head, parts of liver and four feet obtained after slaughtering come into prominence. Weights and rates of the parts of carcass obtained through a standard dissection made after slaughtering are the issues which are emphasized in the production of carcass. While the ratios of valuable pieces of carcass (leg, loin, shoulder) are desired to be higher in a qualified carcass production, it is important for carcass to have eligible physical and biochemical specialities and store in cold eligible conditions (Sanodu et al., 1998a; Johnstone, 1983; Akçapınar et al., 1981).

In the study, data related to slaughter and carcass characteristics show similarities with many studies (Akgündüz et al., 1993; Altın et al., 2005; Akçapınar et al., 1981; Bayındır et al., 1986; Karaca et al., 1996; Karaca et al., 1999; Özbey et al., 2000; Özcan et al., 2001; Yılmaz and Altınel, 2003). Even if different races and different fattening methods were used in these studies, values emerged in fattening of sheep, are parallel. Differences are also realized among disintegration methods for carcass in a standard fattening. However, assessments are generally made on the ratios of pieces in carcass. Ratios of leg, shoulder-back loin and forearm which are generally considered as valuable pieces are desired to be high. According to this study, the rate of share of leg, back loin and

forearm was 72% of the total carcass and this rate was parallel with previous researches (Aygün et al., 1994, 1998; Cengiz and Arık, 1994; Ertuğrul et al., 1989a, 1989b; Esen and Yıldız, 2000; Karaca and Sarıcan, 1990; Karaca et al., 2003; Köycü and Özder, 1994).

In the researches being conducted related to slaughter and carcass characteristics of male and female lambs in our country and in the world, fattening characteristics are dealt with altogether. In many researches, it is clear that implementations of pasture, pasture + additional forage and intensive fattening affect slaughter and carcass characteristics of the animals. In the meaning of slaughter and carcass qualities, inaccurate systems implemented within the period from the maintenance-feeding of animals and transportation to slaughterhouse to reach out the final consumer increase losses. For a qualified production, it is very important to determine the points which should be careful for all stages in the chain reaching from the field to table and to take precautions.

Conclusions obtained from this study will provide significant contributions to related studies to be conducted for Kıvırcık cross breed lambs nurtured in the country and region of Eşme. In future, through the realization of other researches supporting this study, it identification of relevant genotype on the characteristics related to fattening, slaughter, carcass and meat quality will be possible. and combination of the results obtained with breeding programme possible. Son cümle anlaşılmıyor.

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