CARCASS COMPOSITION OF NAEEMI, TEXEL, CHIOS, NAEEMI X TEXEL AND NAEEMI X BORDER LEICESTER-MERINO LAMBS

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SUMMARY

Thirty nine lambs of 5 genetic groups including fat-tailed Naeemi (N), thin-tailed Texel (T), and semi-fat tailed Chios (C), NxT and N x Border Leicester-Merino (NxBLM) were fed a 17% crude protein diet with a 4: 1 ratio of concentrate to alfalfa hay and were slaughtered at a mean weight of 45 kg. A side of each carcass was dissected into subcutaneous fat, muscle and bone, and dissected components were weighed separately to determine composition of individual carcasses. Dressing percentage was calculated as 100 x dressed hot carcass weight/fasted liveweight. The aim of the trial was to compare dressing percentage and carcass composition of lambs of the 5 genetic groups adjusted to the same slaughter weight.

Overall least squares means for dressing percentage, tail weight, half-carcass weight and weights for subcutaneous fat, muscle and bone were 44.9% and, 1.12, 10.1, 0.79, 7.4 and 1.69 kg, respectively. Dressing percentage was the lowest for N (39.4 %) and the highest for NxT (47.5%); subcutaneous fat was the lowest for T (0.32 kg) and the highest for NxT (1.39 kg) and muscle was the lowest for N (6.6 kg) and the highest for NxT (8.1 kg). Tails of the N lambs were 5.4, 3.1, 3.9 and 3.3 times heavier than the T, C, NxT and NxBLM lambs. Genetic group differences were significant for dressing percentage, half-carcass weight, tail weight and subcutaneous fat ($P<0.01$), but were not significant for muscle and bone. The effect of sex, and genetic group x sex interaction was not significant for any of the traits studied.

In this study, Texel carcasses were superior in composition to those of C, N and N cross lambs.
Keywords: intensive management, lamb, carcass composition

INTRODUCTION

Lamb and mutton are traditional meats preferred in Kuwait. Recent studies showed a per capita consumption of 42.4 kg of red meat in Kuwait of which 32.5 kg was lamb (Malik *et al.* 1994). The demand for sheep meat exceeds several times the amount produced locally. This calls for greater efforts to produce substantially more lamb locally than the current production of less than 5% of the demand. The Kuwait Institute for Scientific Research in collaboration with the Kuwait Livestock Transport and Trading Company, and the Kuwait Foundation for the Advancement of Science has evaluated a number of sheep breeds in straightbred and crossbred combinations for net reproductive rate and lamb growth with a view to identifying genotypes suited for high performance in the intensive sheep management conditions of Kuwait.

The carcass is the most significant product of a sheep enterprise; therefore, it is important to determine the carcass composition of straightbred and crossbred lambs. However, there are no published comparisons between the fat-tailed Naeemi (the main type of sheep breed in the area) and other breeds and crosses raised under Kuwait's conditions. This paper reports the carcass composition of Naeemi, Chios (semi-fat-tailed breed of Mediterranean origin), Texel, Naeemi x Texel and Naeemi x Border Leicester Merino lambs fattened to 45 kg average liveweight.

MATERIALS AND METHODS

Animals and management

Lambs for this study were produced in 1994 at the Kuwait Livestock Transport and Trading Company's farm, situated about 20 km south-west of Kuwait City. A total of 39 lambs (17 males and 22 females) from 5 genetic groups available for the study consisted of 6 Naeemi (N), 8 Texel (T), 10 Chios (C), 6 NxT and 9 N x Border Leicester-Merino (NxBLM). The lambs were weaned at 8 weeks of age. None of the lambs had their tails docked. After weaning, the lambs were housed and fed individually in 1 x 1.5 m pens. All lambs were fed a 17% protein diet *ad libitum*. The diet was composed of 80% concentrate and 20% alfalfa hay. The concentrate con&ted of 50% corn, 29.5% barley, 19.5% soybean meal and other supplements necessary to balance the diet. Mineral licks were provided in the feeding troughs and fresh desalinated water was available in each pen. The lambs were fed to an average weight of approximately 45 kg. They were less than 7 months of age at slaughter.

Slaughter procedure

Lambs were slaughtered in 2 batches over 2 successive days. They were fasted for 24 hours, weighed and slaughtered immediately thereafter by severing the jugular veins and carotid arteries. In order to facilitate skinning, air was pumped under the skin using a compression pump and carcasses were dressed according to the normal commercial procedure, which included the removal of liver, kidneys, channel fat, and testes in the ram lambs. The head was removed at the occipito-cervical junction and the tail was removed between the first and second coccygeal vertebrae and weighed. Hot carcass weight was recorded. The carcasses were then carefully sawed 2 two equal sides. The right side was stored in a plastic bag in a deep freezer until required for dissection.

The stored sides were thawed at room temperature, weighed and physically dissected into subcutaneous fat, muscle including inter- and intra-muscular fat, and bone. Subcutaneous fat was defined as fat overlaying all the tissues and lying directly under the skin. The bone component also included cartilage and small quantities of muscle, fat and other tissues that were difficult to separate. The method of carcass fabrication followed was the same as described by Kleemann *et al.* (1988). A side was defined as the sum of the subcutaneous fat, muscle and bone weights of 1 side of the whole carcass.

Statistical analysis

The data for dressing percentage, tail weight, side weight and weights of subcutaneous fat, muscle and bone on a side basis were analysed by the least squares and maximum likelihood computer programme (Harvey 1990). The model included fixed effects for genetic group, sex and their interaction. Slaughter weight was included as a covariate for the analysis of all the traits except dressing percentage. Residual mean square was used to test the significance of the main effects, interaction and regression.

RESULTS

Overall means for dressing percentage, tail weight, side weight and weights for subcutaneous fat, muscle and bone calculated on a side basis were 44.9%, and 1.12, 10.1, 0.79, 0.74 and 1.69 kg, respectively (Table 1).

Table 1. Least squares means ± SE for dressing percentage, tail weight (kg) and side components (kg) of Naeemi (N), Texel (T), Chios (C), Naeemi x Texel (NxT) and Naeemi x Border Leicester-Merino (N xBLM) adjusted to slaughter weight

Factor	n	Dressing percentage	Tail	Weight of side components (kg)			
				Half-carcass	Subcutaneous fat	Muscle	Bone
Overall mean	39	44.9 ± 0.5	1.12 ± 0.10	10.1 ± 0.2	0.79 ± 0.06	7.4 ± 0.3	1.69 ± 0.05
Genetic group							
Naeemi (N)	6	39.4 ± 1.4[a]	2.83 ± 0.23[a]	8.7 ± 0.5[a]	0.54 ± 0.16[ab]	6.6 ± 0.7[a]	1.69 ± 0.12[a]
Texel (T)	8	46.5 ± 1.1[b]	0.53 ± 0.24[b]	10.3 ± 0.5[a]	0.32 ± 0.13[a]	7.3 ± 0.6[a]	1.81 ± 0.10[a]
Chios (C)	10	45.0 ± 1.1[b]	0.90 ± 0.18[b]	9.7 ± 0.5[ab]	0.77 ± 0.13[bc]	7.4 ± 0.6[a]	1.58 ± 0.10[a]
N x T	6	47.5 ± 1.3[b]	0.72 ± 0.22[b]	11.3 ± 0.5[b]	1.39 ± 0.15[d]	8.1 ± 0.7[a]	1.77 ± 0.11[a]
N x BLM	9	46.1 ± 1.3[b]	0.86 ± 0.22[b]	10.4 ± 0.5[b]	0.94 ± 0.15[c]	7.8 ± 0.7[a]	1.64 ± 0.11[a]
Sex							
Male	17	44.8 ± 0.8[a]	1.14 ± 0.14[a]	10.3 ± 0.3[a]	0.77 ± 0.10[a]	7.8 ± 0.4[a]	1.74 ± 0.07[a]
Female	22	45.0 ± 0.7[a]	1.12 ± 0.13[a]	9.9 ± 0.3[a]	0.81 ± 0.09[a]	7.1 ± 0.4[a]	1.65 ± 0.06[a]
Regression on							
Slaughter weight			0.03 ± 0.01*	0.18±0.02**	NS	0.18±0.03**	NS

Genetic groups without the same superscripts for a particular trait differ significantly (P<0.05).
*P<0.05; **P<0.01; NS = not significant.

There was no genetic group x sex interaction for any of the traits studied. Significant differences were observed between genetic groups for weight of the tail (P <0.01). Tails of the N lambs (2.83 kg) were 5.4, 3.1, 3.9 and 3.0 times heavier than the T, C, NxT and NxBLM lambs. The mean dressing percentage for the N carcasses ranked the lowest (39.4%) and for NxT carcasses the highest (47.5%). Side weight was the highest for NxT (11.3 kg) and the lowest for N (8.7 kg). On a side weight basis, T lambs had the least (0.32

kg) and NxT had the greatest amount of subcutaneous fat (1.39 kg) among the 5 genetic groups studied. Genetic group differences for dressing percentage, side weight and subcutaneous fat weight were significant ($P<0.05$). Side muscle and bone weights ranged from 6.6 to 8.1 and 1.58 to 1.8 1 kg, respectively, with no differences between genetic groups. The effect of sex was not significant, although males tended to have slightly more muscle and bone, and less subcutaneous fat than the females.

After adjustment for fixed effects, linear regressions of side, tail and muscle weights on slaughter weight were significant. Regressions of subcutaneous fat or bone weights on slaughter weight were not significant, although increase in liveweght would normally be expected to result in increased subcutaneous fat deposition.

DISCUSSION

Texel had the most desirable carcasses of the 5 genetic groups. They had significantly less subcutaneous fat than the C, NxT and NxBLM carcasses, and significantly heavier side weights than the N. The low subcutaneous fat weight recorded for the T lambs in this study concurs with the results of Clarke and Kirton (1990) and Sakul *et al.* (1993) who found that Texel carcasses were leaner subcutaneously than the several other breeds studied by them. Naeemi (N) carcasses were similar to the T and C carcasses for subcutaneous fat, but had significantly lower amounts of subcutaneous fat than the NxT and NxBLM carcasses. The observations of Epstein (1985) of the Awassi breed (N is a strain of Awassi) as being lean is supported by the present results. The main deficiency of the N was in its lower dressing percentage due to the fat tail and consequently lower dressed carcass weight than the T, C, NxT and NxBLM. Gaili (1992) reported that about a third of the total body fat in the Awassi sheep was laid down in the tail, which contributes nothing to carcass value. The data of the present study indicate that after the tail had been removed, the N carcasses were 15.5, 10.3, 23.0 and 16.3 per cent lighter than the T, C, NxT and NxBLM carcasses. Our results are based on a small sample size and have to be treated with caution. However, they suggest that carcass yield can be significantly improved by crossing N sires with T and BLM ewes.

It is concluded that the Texel sheep produce carcasses with the same amounts of muscle and bone, but less subcutaneous fat compared to the Chios and Naeemi cross lambs. · Naeemi produce lean carcasses similar to those of Texel, but low dressing percentages and low dressed carcass weights are the major disadvantages of the N breed. Relatively higher amounts of subcutaneous fat in the NxT and NxBLM carcasses indicate that these lambs should be slaughtered at a lower weight in order to avoid excessive accumulation of fat under the skin.

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