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## Slaughter and Carcass Characteristics of Norduz Male Kids Raised in Either Intensive or Pasture Conditions

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**Abstract:** The aim of this study was to determine of the slaughter and carcass characteristics of Norduz male kids raised in either intensive or pasture conditions. Hot and chilled carcass dressing percentages in intensive and pasture groups were appeared to be  $42.94 \pm 0.484$  % and  $41.49 \pm 0.503$  %;  $46.26 \pm 1.050$  % and  $44.63 \pm 1.03$  %, respectively. In intensive and pasture groups, the omental fat and heart-lungs-liver proportions at slaughter weight of kids were determined as  $1.18 \pm 0.209$  %,  $0.29 \pm 0.065$  %;  $4.75 \pm 0.107$  %,  $4.08 \pm 0.134$  %, respectively. The kidney-knob and pelvic fat proportions at left half carcass weight were determined as  $2.05 \pm 0.196$  % for kids raised in intensive conditions and  $1.06 \pm 0.182$  % for kids raised in pasture conditions. In the rack joints, the lean portions of the intensive group and pasture group kids were  $46.42 \pm 0.892$  %  $50.50 \pm 1.990$  %, respectively. Total fat portions which contain subcutaneous fat and intermuscular fat were determined as  $10.05 \pm 1.020$  % in intensive group and  $4.16 \pm 0.477$  % in pasture group. In this study, it was concluded that; pasture group kids had similar slaughter and carcass characteristic values as intensively raised ones due to the special environmental condition and rich flora of the mentioned Norduz region of Van province.

**Key words:** Omental fat, dressing percentage, wholesale rack

### Introduction

Small ruminant animal husbandry is the most important and usually the only living source for people inhabiting in forest regions or regions are not suitable for crop cultivation and cattle production. Norduz is a native hairy goat which is actually distributed onto 23 villages of an area in Van Province and it has been bred in the plateaus and pastures of the region having a rich flora for at least 250 to 300 years (Daskiran *et al.*, 2004; Bingol, 1996). The Norduz region has micro climatical conditions related with endemic and plentiful flora or rich pasture; therefore, is suitable for small ruminant animal production. For example, a plant species called "Heliz" (*Prangos sp.*) in the region is effective against the external parasites, especially against hard ticks belonging the family of *Ixodidae*, and there is no need of drug applications against that. Furthermore, it has been observed that the birth period in this region is shorter than the other regions. It is thought that the presence of plants with beneficial effects synchronize the ovulation (Bingol, 1996).

There has been no other scientifically conducted and finished researches on the yield criteria of Norduz goat yet. The present study is going to be a pioneer for the establishment of their yield capacity and for their evaluation as a genetic resource. Moreover, this study will help future studies contributing to the world goat literature.

### Materials and Methods

A total of 15 Norduz male kids were weaned at 2.5 age of month and 10 of them fed with a mixture given at

Table 1 for 56 days at the Research and Experiment Farm of Yüzüncü Yil University and 5 of which were purchased from a farmer at Norduz plateau were constituted of the animal material.

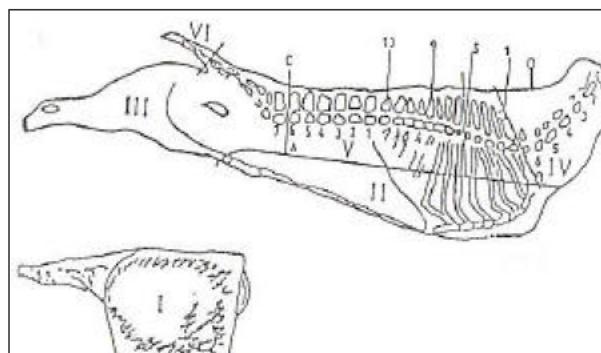
The feed mixture, was given to the ad-libitum intensively raised kids. Additionally, kids were daily fed with 150 g of minced clover per head. The second group of kids was freely grazed at Norduz plateau by the farmer.

In this research, the cutting lines described as "standard method for goat carcass evaluation in Mediterranean Countries" were used (Colomer-Rocher *et al.*, 1987). Dress-off items (heart, lungs-liver, spleen, omental and mesenteric fat, hide, four feet and head) were weighted during slaughter-dressing. The dressed carcasses had the skinned tail, thymus, diaphragm, kidneys, perinephric and pelvic fat and also the testicles. After hot carcasses were weighted, carcasses were placed in a chiller operating at 4°C for 24 hours. 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 which are shown in the scheme in Fig. 1. Each joint was also separately weighted. The wholesale rack (6th through 12th ribs) was removed from left side of each carcass and separated into soft tissues (lean, subcutaneous and intermuscular fat, waste-ligament) and bone; tissues were investigated.

For the carcass characteristics, means of groups were compared with the one-way procedure using the SAS program (SAS, 1998).

Table 1: Composition and analytical values of feed mixture used to feed intensive group kids

Materials in the mixture	Proportions (%)
Barley	68.6
Cotton seed pulp	30.2
CaCO <sub>3</sub>	0.3
Salt	0.5
Preliminary vitamin mix. (Rovimix302 S)	0.3
Preminary mineral mix. ( R Mineral 2)	0.1
Crude Protein (%)	14-15
Energy (NB/kg)	690-700



I. Shoulder II. Flank III. Hind leg IV. Neck V. Back loin

Fig. 1: Primal cuts of goat carcass

## Results and Discussion

Slaughter characteristics are presented at Table 2 for Norduz male kids. Significant difference was found ( $P < 0.01$ ) between the hot dressing percentages of the groups. The dressing percentage of intensively raised kids (42.94 %) was 3.32 % lower than that of kids raised in pasture. Pinkerton *et al.* (1994) reported that the dressing percentage in male kids varied from 45 to 52% due to the various factors. Acharya (1988) determined the dressing percentage between 42.7% and 55.4% depending on the slaughter age, nutrition and the race of the kids. Bhattacharyya and Khan (1988) stated that empty body weight or the amount of rumen and intestine contents might have affected the dressing percentage. Therefore, the low dressing percentage of intensively raised goats obtained from subtracting rumen content from slaughter weight was considered as normal. On the other hand, Kor (1991) and Ertugrul (1994), reported that the dressing percentage of goats raised in pasture condition was lower than that of intensively raised ones. One of the important factors in goat carcass is the form of fat deposited in the body. Goats usually store fat as omental and mesenteric fat (Colomer-Rocher *et al.*, 1987). Gaili (1978) reported that while the percentage of omental fat in extensively raised and weak goat carcasses ranged from 0.4% to 2.6%, those of intensively raised ones increased up to 34%. Omental fat deposit of intensively raised Norduz Goat male kids based on the literature was significantly ( $P < 0.01$ ) higher

both for amount and the proportion to slaughter weight than that of goats raised in pasture. Omental fat amount determined in this study is in line with the findings of other studies (Gaili, 1978; Kor, 1997). It can be said that the increase in omental fat is a disadvantageous of intensive farming practices.

It was also determined that kidney and testicle weights ( $p < 0.05$ ) and their proportions to slaughter weight ( $p < 0.01$ ) were also significantly different in both groups. The values of other traits in intensively raised male kids were nonsignificantly higher than those of the other group.

There were significant differences ( $P < 0.01$ ) in both cold carcass dressing percentages and omental fat weights. The result in cold carcass dressing percentage was a rather expected one because of the pre-determined hot carcass dressing percentage. However, this was not case in omental fat amount. The overall results were agreed with the results of other researchers (Koyuncu *et al.*, 1996; Smith *et al.*, 1982).

There were no significant differences in left carcass traits. In both groups, hind legs followed by back loin, shoulder, flank, and neck had the highest proportion in carcass. These were all agreeing with the results of other researchers (Kirton, 1970; Hogg *et al.*, 1992; Warmington and Kirton, 1990; Gaili *et al.*, 1972). As it is known, tissue analysis on whole or half carcass requires pretty much time and labour beside the economical loss in carcass. For this reason, only wholesale racks from 6th to 12th ribs were used in tissue analysis in order to fast and cost-effective determination of tissue composition (Crouse and Dikeman, 1974).

Table 3-4 summarizes the tissue amounts and proportions of wholesale rack joint and the area of *Musculus longissimus dorsi* (MLD). There was a significant difference in fat tissue amount between two groups. Fat content of intensively raised Norduz male kids was pretty higher than that of other group. When we looked at the proportional rate of wholesale rack tissues, there was a difference which is negatively correlated with fat proportion in muscle proportion in favor of kids raised in pasture. These findings were in agreement with the results of other researchers (Koyuncu *et al.* 1996; Smith *et al.*, 1982; Hogg *et al.*, 1989; Colomer-Rocher *et al.*, 1992; Kor and Ertugrul, 2000).

Devendra and Owen (1983) stated that there was a positive correlation between the muscle amount and the MLD area in goat and sheep, and MLD area from various studies ranged from 4.03 to 16.12 cm<sup>2</sup>. Norduz goat male kids raised in pasture had more muscle tissue percentage and MLD area than intensively raised ones. In this study, slaughter and carcass characteristics of either intensively or pasture raised Norduz Goat male kids were determined. There were significant increase

Table 2: Mean weights and proportions of slaughter data (mean±s.e) for kids raised in intensive or pasture conditions

Characteristics	Weights (kg)		Proportion at Slaughter Weight (%)	
	Intensive group	Pasture group	Intensive group	Pasture group
Slaughter weight	25.43±1.450	22.11±2.050	-	-
Hot carcass weight	10.96±0.724	10.28±1.090	-	-
Hot dressing percentage	-	-	42.94±0.484 <sup>a</sup>	46.26±1.050 <sup>b</sup> **
Head	1.76±0.103	1.71±0.134	6.99±0.293	7.77±0.245
Four feet (g)	771.00±92.50	660.00±41.10	3.161±0.497	3.030±0.142
Pelt	2.40±0.159	2.36±0.222	9.42±0.274	10.73±0.506
Omental fat (g)	325.8±73.40 <sup>a</sup>	65.2±19.00 <sup>b**</sup>	1.18±0.209 <sup>a</sup>	0.29±0.065 <sup>b**</sup>
Heart, lungs, liver	1.21±0.078 <sup>a</sup>	0.89±0.085 <sup>b*</sup>	4.75±0.107 <sup>a</sup>	4.08±0.134 <sup>b***</sup>

P<0.05; \*\*P<0.01

<sup>a,b</sup>Differences between two weights (proportion) means in same group at the same line having unlike superscript are different

Table 3: Mean weights and proportions of carcass characteristics and parts (mean±s.e) for kids raised in intensive or pasture conditions

Characteristics	Weights (kg)		Proportion (%)	
	Intensive group	Pasture group	Intensive group	Pasture group
Cold carcass weight	10.60±0.709	9.92±1.07	-	-
Cold dressing percentage	-	-	41.489±0.503 <sup>a</sup>	44.630±1.03 <sup>b**</sup>
Half left carcass weight	5.17±0.336	4.86±0.507	Proportions at cold carcass weight (%)	
Testicle weight (couple) (g)	180.8±19.80	218.8±35.10	1.66±0.077 <sup>a</sup>	2.15±0.159 <sup>b**</sup>
Kidney weight (couple) (g)	89.20±4.75	82.80±3.26	0.85±0.031	0.86±0.065
Kidney-knob and pelvic fat (g)	225.8±32.20 <sup>a</sup>	109.6±27.00 <sup>b***</sup>	2.05±0.196 <sup>a</sup>	1.06±0.182 <sup>b***</sup>
	At Half left carcass (kg)		Proportions at half left carcass weight (%)	
Hind leg	1.60±0.093	1.54±0.168	31.09±0.430	31.09±0.430
Neck	0.56±0.049	0.57±0.051	10.82±0.369	11.96±0.573
Shoulder	1.02±0.064	0.97±0.095	19.82±0.257	20.03±0.391
Flank	0.85±0.120	0.63±0.088	16.56±2.410	12.77±0.702
Back loin	1.22±0.093	1.14±0.121	23.58±0.378	23.41±0.412

\*\*P<0.01. <sup>a,b</sup>Differences between two weights between the values in same group at the same line having unlike superscript are different

Table 4: Mean weights MLD area (cm<sup>2</sup>) and proportions in dissected tissues of rack joint

Characteristics	Tissue weights (g)		Proportions of tissue (%)	
	Intensive group	Pasture group	Intensive group	Pasture group
Rack	403.3±30.10	384.2±46.70	-	-
Lean	187.7±15.30	195.8±28.10	46.42±0.892 <sup>a</sup>	50.50±1.990 <sup>b*</sup>
Bone	154.4± 9.13	154.4±16.90	38.89±1.630	40.57±1.290
Subcutaneous fat	15.6 ±3.24 <sup>a</sup>	6.00±1.67 <sup>b*</sup>	3.68±0.573 <sup>a</sup>	1.53±0.313 <sup>b**</sup>
Intermuscular fat	27.0 ± 4.80 <sup>a</sup>	10.20±2.06 <sup>b*</sup>	6.36±0.804 <sup>a</sup>	2.63± 0.377 <sup>b***</sup>
Total fat	42.6±6.69 <sup>a</sup>	16.20±3.02 <sup>b*</sup>	10.05±1.020 <sup>a</sup>	4.16±0.477 <sup>b***</sup>
Waste	14.8±1.32	14.00±2.21	3.71±0.246	3.77±0.613
MLD area (cm <sup>2</sup> )	7.02±0.380 <sup>a</sup>	8.88±0.922 <sup>b*</sup>	-	-
Evaporation losses	-	-	0.93±0.177	1.01±0.161

\*P<0.05; \*\* P<0.01. <sup>a,b</sup>Differences between two weights (proportion) means in same group at the same line having unlike superscript are different

n omental, inter-muscle, and subcutaneous fat in intensively raised goats. Increase in omental fat was a disadvantage trait in intensively raised goats. However, increase in either inter muscle or crust fat might have been an advantage because of organoleptic contribution of them to goat carcass that considered as none fat and because of the prevention of carcass loss due to evaporation. Amount and proportions of various left carcass parts that are among important carcass traits were not significantly different between two groups. It could be said that group raised in pasture had similar

values as intensively raised ones due to the special environmental condition and rich flora of the mentioned Norduz region. Therefore, it is advisable that the indicated Norduz Goat should be considered as a new genetic resource for goat literature.

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