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CARCASS AND OFFAL CHARACTERISTICS OF GOATS OF DIFFERENT BREED TYPES AND FEEDING REGIMENS

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INTRODUCTION

Goat production in Texas and the United States historically has been a low-labor enterprise with little emphasis on productivity and management practices. Because of their ability to utilize minimal range resources, goats in Texas have been used primarily for brush control. Variations exist in animal availability, breed type, feeding regimen, body weights, condition at slaughter and carcass characteristics.

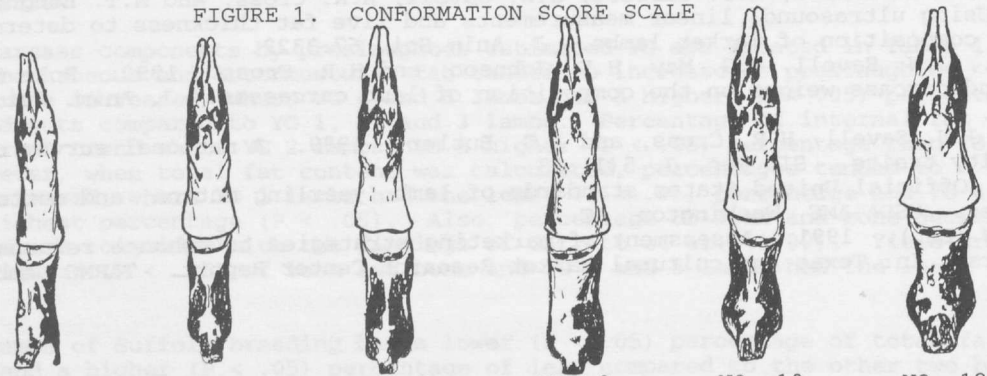
Two 1993 events will influence U.S. goat production in the future: (1) The importation of Boer goats into the U.S., and (2) The repeal of the National Wool Act and the subsequent phase-out of wool and mohair incentive payments to producers. Boer goats, which are native to South Africa, have a high meat yielding potential (Van Niekerk and Casey, 1988). However, the influence of Boers in cross-breeding systems has not been studied. With the phase-out and future elimination of the wool and mohair incentive, Angora goat producers need an outlet for their stock. Cross-breeding with meat-type Spanish, Boer or Boer cross goats could be a feasible management practice. Although the U.S. goat industry does not place emphasis on edible and non-edible offal items, these items are of significant economic concern in many areas of the world. The objectives of this study were to determine the effects of breed type and feeding regimen on carcass and offal characteristics of meat-type goats.

MATERIALS AND METHODS

Goats (n=168) of four breed types (Spanish, Boer X Spanish crosses, Angora, and Spanish X Angora crosses) from two different feed treatments (feedlot and pasture) were obtained from the Texas Agricultural Experiment Station (TAES) at San Angelo, Texas. Goats assigned to the feedlot treatment were fed either a 12.5% or 15% crude protein diet . Pasture goats were turned out on a pasture of multiple species of grasses and forbs; no supplemental feed was given. Rainfall while goats were on pasture was atypically low. All animals were intact males and were from the same kidding season (approximately 8 to 9 mo. in age).. Distribution of goats within each breed type and feeding regimen was as follows: Angora, feedlot (n=32); Spanish X Angora, feedlot (n=19); Boer X Spanish, feedlot (n=36); Spanish, feedlot(n=38); Boer X Spanish, pasture (n=18); and Spanish, pasture (n=25). After 112 days on either the feedlot or pasture treatment, animals were slaughtered at either Strube Packing Company in Rowena, Texas or at the Rosenthal Meat Science and Technology Center in College Station, Texas.

Weights of the head, hide, heart, liver, kidneys and kidney fat were collected during the slaughter process. Live weights and warm carcass weights were obtained also. Carcasses were chilled at 2 C, and at approximately 24 h postmortem, carcass measurements were obtained. Measurements taken were: longissimus muscle area at the 12th rib; actual and adjusted 12th rib fat thickness; leg circumference (measurement taken across the stifle area of the leg, encompassing both legs); and carcass length (measurement taken from the hock to the point of the shoulder). Because no official grading standards designed specifically for U.S. goat carcasses exist, number scores and general descriptions were assigned for carcass conformation based on muscle shape and thickness of the leg, loin, rack and shoulder. A scale was developed by selecting carcasses representative of eight conformation types given even-numbered scores 0-14. Animals falling between the categories were assigned odd-numbered scores, resulting in a 15-point scale. Figure 1 illustrates animals representative of conformation scores 2, 4, 6, 8, 10 and 12.

FIGURE 1. CONFORMATION SCORE SCALE



RESULTS AND DISCUSSION

Least squares means of meat goat offal items are reported in Table 1. Weights for hearts and kidneys from fed Angoras and pasture Boer X Spanish goats were not different (P>.05). All remaining offal weights for pasture goats differed (P<.05) from fed goats, regardless of breed type. Offal weights for fed Spanish X Angora goats and fed Boer X Spanish goats were similar. Weights for hearts, kidneys and kidney fat from fed Boer X Spanish goats and fed Spanish goats also were similar.

TABLE 1. LEAST SQUARES MEAN WEIGHTS OF SELECTED GOAT OFFAL ITEMS

Offal item	Angora, feedlot	Spanish X Angora, feedlot	Boer X Spanish, feedlot	Spanish, feedlot	Boer X Spanish, pasture	Spanish, pasture
Head (kg)	2.02^{c}	2.65^{a}	2.78^{a}	2.48^{b}	1.63^{d}	1.52^{d}
Hide (kg)	3.28^{b}	3.42^{ab}	3.56^{a}	2.92^{c}	1.49^{d}	1.30^{d}
Heart (kg)	.10^{b}	.15^{a}	.14^{ab}	.13^{b}	.08^{bc}	.07^{c}
Liver (kg)	.44^{c}	.59^{a}	.58^{a}	.49^{b}	.34^{d}	.32^{d}
Kidneys (kg)	.07^{b}	.09^{a}	.09^{a}	.08^{a}	.07^{bc}	.06^{c}
Kidney fat (kg)	.47^{b}	.63^{a}	.45^{b}	.40^{b}	.05^{c}	.06^{c}

^{a,b,c,d} Means in the same row with different superscripts differ (P<.05).

Table 2 provides least squares means of selected meat goat carcass characteristics. Fed Spanish X Angora goats and Boer X Spanish goats possessed similar carcass attributes; however, conformation scores for carcasses from fed Spanish X Angora goats were higher (P<.05) than scores for carcasses from fed Boer X Spanish goats. Although leg measurement, carcass length and conformation score were similar for fed Angoras and pasture Boer X Spanish goats, all other carcass measurements differed (P<.05) for feedlot versus pasture-fed animals. Muscling indicators (longissimus muscle area, leg measurement and conformation score) and fatness indicators (actual fat and adjusted fat) for fed meat-type goats were higher (P<.05) than for pasture goats.

TABLE 2. LEAST SQUARES MEAN MEASUREMENTS OF SELECTED CARCASS CHARACTERISTICS

Carcass measurement	Angora, feedlot	Spanish X Angora, feedlot	Boer X Spanish, feedlot	Spanish, feedlot	Boer X Spanish, pasture	Spanish, pasture
Warm carcass wt. (kg)	13.49^{c}	19.98^{a}	19.58^{a}	17.78^{b}	9.42^{d}	8.42^{d}
Actual fat, 12th rib (cm)	.10^{a}	.10^{a}	.10^{a}	.07^{b}	.04^{c}	.04^{c}
Adjusted fat, 12th rib (cm)	.17^{a}	.16^{ab}	.13^{b}	.10^{c}	.05^{d}	.05^{d}
Longissimus muscle area (cm^2)	3.51^{c}	4.83^{a}	4.80^{a}	4.40^{b}	2.60^{d}	2.33^{d}
Leg measurement (cm)	46.51^{c}	55.46^{a}	53.55^{ab}	51.45^{b}	43.22^{cd}	40.38^{d}
Carcass length (cm)	93.42^{c}	100.33^{b}	105.13^{a}	104.11^{a}	91.16^{cd}	90.17^{d}
Conformation score	4.53^{d}	9.21^{a}	7.50^{b}	6.05^{c}	3.08^{de}	1.74^{e}

^{a,b,c,d,e} Means in the same row with different superscripts differ (P<.05).

CONCLUSIONS

Crossbreeding with meat-type goats and feeding animals results in heavier offal weights and fatter, more muscular carcasses. The performance of the Spanish X Angora goats in this study indicates that crossbreeding Angoras with meat-type goats could be feasible. Future work should investigate Boer X Angora crossbreeding systems as a method to enhance carcass characteristics. Efforts also should be made to examine other aspects of the meat goat industry, including shelf-life, carcass composition and palatability attributes.

REFERENCES

Van Niekerk, W.A. and N.H. Casey. 1988. The Boer goat II. Growth, nutrient requirements, carcass and meat quality. Small Rumin. Res. 1:355-368.