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23: CARCASS AND MEAT TRAITS WITH INCREASED SLAUGHTER WEIGHT OF SPANISH AND SAVANNAH-SPANISH CROSSBRED KID BUCKLING GOATS

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Objectives: More than 50 % of the goat meat consumed in the U.S. is imported due to the increased demand for goat meat. More meat from each animal could be made available by increasing the current slaughter weight of kid goats. The objective of this research was to compare live, carcass and goat meat properties of Spanish and Savannah-Spanish crossbred kid goats fed on concentrate and hay diets to 27, 36, and 45 kg live weight.

Materials and Methods: Spanish (n = 30) and Savannah-Spanish (n = 30) male kid goats (bucklings) were obtained from two commercial herds and assigned to 10 pens based on weight and breed with *ad libitum* access to concentrate feed and hay with 15.8 crude protein and 75.36 calculated total digestible nutrients on an as-fed basis. Goats were weighed weekly and linear dimensions were measured prior to overnight fasting and humane slaughter when goats reached 27 kg, 36 kg, or 45 kg. Temperature and pH of the *M. Semimembranosus* were measured after hide removal and 1 h, 3 h and 24 h after stunning. Carcasses were chilled overnight at 2°C before determination of carcass characteristics (McMillin and Pinkerton, 2008). Loin eye area and body wall thickness were measured on carcasses after ribbing at the 13th rib. After splitting carcasses into sides, L*, a*, and b* color were measured on the *Rectus abdominis* flank muscle. Right sides were fabricated into USDA IMPS food service style cuts with an additional transverse cut between the 4th and 5th ribs. The *Semimembranosus* and *Longissimus dorsi* muscles were vacuum packaged and held at 4°C for 7 days before grilling on a conveyor oven to an internal temperature of 75°C. Cook yield was determined as proportion of cooked weight and raw weight. Three 1.27-cm cores were removed parallel to the muscle grain for Warner-Bratzler shear force. Data were analyzed with Statistical Analysis System 9.4 Proc Mixed procedures with separation of least squares means and significance set at P < 0.05.

Results: Spanish goats averaged 5.73 kg heavier at the start of the feeding trial, but with 0.09 kg/d average daily gain (P = 0.001) did not grow as rapidly as the Savannah-Spanish crossbred goats (0.13 kg/d). Carcass dressing percentage was higher (P = 0.05) at heavier weights. Percentage of carcass shrink from overnight chilling was 2.93 % for carcasses from Spanish and 2.32 % for Savannah-Spanish goats (P > 0.05). Carcasses at 27 kg slaughter weight had decreased (P = 0.001) external fat scores of 1.46 compared to the other two weights (2.27 and 2.10). Additionally, the Savannah goats had decreased actual kidney, pelvic and heart fat percentage (P = 0.048) of 2.91 % when compared to the Spanish goats at 3.36 %. Carcass conformation (P = 0.0008) and loin eye area increased (P < 0.0001) with increased weight. Boneless lean yield and *Semimembranosus* shear force did not vary (P > 0.05) with breed or weight at slaughter.

Conclusion: **Conclusions:** There were no major differences between the two breeds except for growth rate and length of feeding to reach one of the target slaughter weights. Weight at slaughter affected dressing percentage, fatness and muscling, but not boneless meat yields or shear force.

Reference: McMillin, K. W. and F. Pinkerton. 2008. Meat Goat Selection, Carcass Evaluation & Fabrication Guide. Louisiana State University Agricultural Center, Baton Rouge, LA. Publication 2951. 8 pp.

Keywords: Goat meat

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24: EFFECTS OF MATERNAL LINES AND MATING SYSTEMS ON LAMB CARCASS MERIT

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Objectives: The objective of this study was to analyze the carcass composition of lambs produced from different mating systems.

Materials and Methods: Lambs (n = 1,237) were produced by a multi-sire mating of three maternal lines (Katahdin (KN), Polypay (PP), and Easycare (EZ)) in two mating systems: a purebred mating system, in which each maternal line was mated with rams of the same genetic line, and a terminal mating system, in which ewes were mated with Texel (TL) rams. Lambs were born (late May/Early June) in a pasture-lambing, low-input production system. Lambs were weaned at about 9 wk of age, moved to feedlot pens, weighed, and transitioned to finishing rations using feedstuffs high in fermentable fiber. When lambs were about 24 wk of age, they were weighed and assigned to one of four slaughter groups with an equal number of lambs in each slaughter group and with the goal of maximizing the number of lambs that produced carcasses with acceptable carcass weights. The four groups of lambs (308 to 310 head per group), ranked from heaviest to lightest, were fed an additional 21, 49, 77, and 103 d, weighed, transported 645 km to a commercial packing plant, held overnight, and harvested. The commercial packing plant uses the VSS 2000 lamb carcass imaging system to evaluate each carcass as the hot carcasses move from the harvest floor to the chiller. Valid VSS data was obtained for 1,108 of the carcasses. Data were analyzed with PROC GLIMIX using dam line, mating system, and sex as fixed effects with hot carcass weight included in the model as a covariate.

Results: Lambs born from EZ ewes had a lighter ($P < 0.05$) body weight than those from PP ewes, and a greater proportion of EZ lambs were assigned to later marketing groups. Consequently, lambs from EZ ewes were older ($P < 0.05$) at time of slaughter, had a lower ($P < 0.05$) dressing percentage and had a lower ($P < 0.05$) HCW. Relative to the purebred mating system, terminal crossing improved ($P < 0.0001$) the yield grade (i.e., reduced fat thickness) of lambs produced from EZ (2.99 vs 3.20) and KN (2.79 vs 3.11) ewes. However, terminal crossing did not ($P > 0.05$) affect the yield grade (2.83 vs 2.87) of lambs produced from PP ewes, which had lower yield grade than purebred KN, purebred EZ and TL × EZ lambs. Indicative of greater muscularity, terminal crossing with TL rams increased ($P < 0.0001$) conformation scores of lambs produced from all maternal lines and conformation scores differed ($P < 0.05$) among each breed combination (TL × EZ = 388 > TL × KN = 385 > TL × PP = 382 > EZ = 377 > KN = 373 > PP = 360). The increased prolificacy of EZ ewes relative to PP and KH, in the low-input production system, offset the reduction in growthiness and leanness of EZ as more ($P < 0.01$) pounds of carcass was produced per ewe exposed for breeding for EZ (38.7 kg/ewe exposed) than PP (30.9 kg) and KN (28.5 kg).

Conclusion: Use of TL rams in a terminal mating system improved growthiness, carcass leanness and carcass conformation of lambs from EZ ewes; however, complementarity of sire breed for other growth and carcass traits should be investigated further.

Keywords: camera grading, lamb, mating system

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25: EVALUATION OF WARM-SEASON ANNUAL GRASSES FOR SOUTHERN FORAGE-FINISHED BEEF SYSTEMS

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Objectives: In the southeastern United States, long growing seasons allow for near year-round forage production but high summer temperatures and drought can negatively impact forage production, nutritive value, and, consequently, performance of grazing animals. Warm-season annual grasses are typically higher in nutritive value than common warm-season perennial forages in the Southeast. Drought tolerant warm-season annuals may provide forage-finished beef producers with alternative options during the summer months. The objective of this research was to evaluate and compare drought tolerant warm-season annual grasses for beef forage-finishing systems in the Southeast across a 3-yr grazing trial in central Georgia (2014-2016).

Materials and Methods: Sixteen 0.81-ha paddocks were blocked by previous land management and randomly assigned to 1 of 4 forage treatments with 4 replications. Treatments included: 'Tifleaf 3' pearl millet (PM), 'Tifleaf 3' pearl millet plus 'Red River' crabgrass (PMCG), 'Sugar Grazer II' sorghum sudangrass (SS), and 'Surpass' brown mid-rib sorghum sudangrass (BMR) which were planted in mid to late spring of each year. Each year 32 previously stockered Angus crossbred steers (434±19 kg) were stratified by weight, paired, and randomly assigned to treatment paddocks. Paddocks were split into two sub-paddocks for rotational grazing. Additional steers and heifers were used as "put-and-take" animals to maintain forages in a vegetative stage. All treatment steers were weighed after an 8-h fast at the beginning, mid-point, and end of the grazing period and average daily gain (ADG) and total body weight gain (BWG) were calculated. Steers were slaughtered under USDA inspection in September of 2014, 2015, and 2016 after 70, 63, and 56 d on treatment, respectively. Carcass quality and yield data were collected 24-h post-mortem and boneless strip loin (longissimus lumborum) sub-primals were removed from the right side of each carcass, vacuum packaged, boxed, and allowed to age (0±2°C) for 21 d. After aging, steaks (2.54-cm) were fabricated from each strip loin starting at the anterior end and allocated to proximate analysis, Warner-Bratzler shear force (WBSF), and trained sensory analysis. Data were analyzed using PROC GLIMMIX (SAS v9.4). Pasture served as the experimental unit with steer as the observational unit. Year was included as a fixed effect, while block and pasture were included as random effects. Means were separated using the PDIF option of LSmeans at $\alpha \leq 0.05$.

Results: No differences ($P > 0.05$) were observed among treatments for ADG, BWG, dressing percent, subjective lean and fat color, fat L*, a*, and b*, lean L*, marbling, lean and skeletal maturity, fat thickness, adjusted fat thickness, kidney pelvic and heart (KPH) fat, yield grade, percent lipid, protein, and moisture, WBSF, beef flavor intensity, or off-flavor intensity. Treatment effects ($P < 0.05$) were observed for lean a*, lean b*, ribeye area (REA), percent ash, and juiciness, however, these differences were small in magnitude. Differences ($P < 0.05$) in initial and sustained tenderness were observed among treatments in 2014 only. Differences were observed across years for most variables, which were attributed to variability in weather conditions for the given year.

Conclusion: This data shows that PM, PMCG, SS, and BMR are viable warm-season annual options for beef forage-finishing systems in the southeastern United States.

Keywords: Beef, Forage-Finished, quality, tenderness