72 **Effect of marbling degree on palatability, meat yield, and caloric content of beef.** T.L. Wheeler*, L.V. Cundiff, R.M. Koch, M.E. Dikeman and J.D. Crouse, USDA, ARS, R.L. Hruska U.S. Meat Animal Res. Center, Clay Center, NE, Univ. of Nebraska-Lincoln, and Kansas State Univ., Manhattan.

Bos taurus and *Bos indicus* sired F1 steers (n = 2888) produced by 22 breeds of sire mated to Angus and Hereford cows in Cycles I, II, III, and IV of the Germplasm Evaluation project at MARC were evaluated. Shear force and tenderness rating were not different (P > .05) in meat from *Bos taurus* cattle with Slight through Moderate marbling. Meat with Slight and Small marbling in *Bos indicus* cattle was not different (P > .05) in shear force or tenderness rating. Variation in meat tenderness tended to increase as marbling degree decreased in meat from *Bos taurus* cattle from Cycles I, II, and III, although this tendency was not apparent in meat from *Bos indicus* cattle, nor in meat from Cycle IV. The percentage of meat with unacceptable tenderness follows this same pattern. Meat with Modest and Moderate marbling from *Bos taurus* cattle was more juicy (P < .05) than meat with Traces or Slight marbling. Juiciness was not affected (P > .05) by marbling score in *Bos indicus* cattle and beef flavor intensity was not affected (P > .05) by marbling score in either *Bos taurus* or *Bos indicus* cattle. Meat from *Bos indicus* cattle was less tender than meat from *Bos taurus* cattle, regardless of marbling degree. A strong inverse relationship between marbling degree and percentage yield of retail product at 0-cm fat trim was detected. Regression of shear force and sensory traits on marbling resulted in coefficients of determination of 1 to 5%. Generally, chemical fat, calories, and percentage calories from fat increased (P < .05) as marbling score increased in both cooked and uncooked longissimus muscle. These data show that the merit of using marbling degree as a predictor of meat palatability relative to the disadvantages should be reevaluated.

Key Words: Marbling, Tenderness, Retail Yield

73 **Predicting lean tissue of lamb carcasses from electromagnetic scans.** E.P. Berg, J.C. Forrest, D.L. Thomas and R.G. Kauffman. Purdue University, W. Lafayette, IN and University of Wisconsin, Madison.

Twenty-one hot and twenty-two cold (24 hr chill) lamb carcasses, avg. wt. 26.8 (± 9.2 kg) and 26.4 (± 8.9 kg) kg, respectively, were measured for total body electrical conductivity (TOBEC; model MQ-25, Meat Quality Inc. Springfield, IL). The MQ-25 generates a constant electromagnetic (EM) field which is sensitive to perturbation by a conductive mass. Since lean tissue is approximately 20 times more electrically conductive than fat tissue, the amount of EM energy lost (to the carcass) is highly correlated to lean tissue. Two hundred and fifty points of measurement were recorded as the carcass passed through the EM tunnel. Absorption of energy rises over time as more lean tissue enters the EM field. The location where the entire carcass is in the EM field is the point of "peak" absorption. A plot of the absorption units over time should reveal the lean composition of the major primal cuts. This study utilized the difference in curve height between two points (D), peak phase measurement (PEAK) and linear carcass measurements (hot or chilled carcass wt; HCWT or CWT and length of outermost points; LENG) to predict total dissected lean (TOLN), dissected leg lean (LEGLN) and all other dissected lean tissue (OTHLN). A consistent geometry of the subject is vital to accurate scans. Two geometric orientations were tested for statistical accuracy in this study: A) carcass entered the EM tunnel leg first, lying on its side, neck facing the right side of the tunnel; and B) the carcass entered the EM tunnel leg first, breast down and neck up. Orientation A proved more statistically efficient for hot carcasses while orientation B was better for cold carcasses. Linear regression models, coefficient of determination R^2 and residual standard deviation (RSD) are listed in the table below. The results of this preliminary study indicate that EM scanning has remarkable potential as a means of predicting total lean and lean components of of primal cuts in lamb carcasses.

Carcass	Dependent Variable	Geometric Orientation	Independent Variables[a]	R^2	RSD(g)
Hot	TOTLN	A	HCWT, LENG, D43-58	.980	352
Hot	LEGLN	A	HCWT, LENG, D43-58	.950	109
Hot	OTHLN	A	HCWT, LENG, D43-58	.976	257
Hot	TOTLN	B	HCWT, PEAK, D50-65	.951	550
Hot	LEGLN	B	HCWT, D73-93, D70-130	.951	187
Hot	OTHLN	B	HCWT, PEAK, D50-65	.939	407
Cold	TOTLN	A	CWT, PEAK, D13-28	.895	786
Cold	LEGLN	A	CWT, D13-28, D60-100	.916	240
Cold	OTHLN	A	CWT, D13-28, D90-120	.881	561
Cold	TOTLN	B	CWT, PEAK, D5-20	.942	586
Cold	LEGLN	B	CWT, D5-20, D70-110	.922	230
Cold	OTHLN	B	CWT, D5-20, D45-115	.961	321

[a] Numbers following D indicate proportional location on the phase absorption curve.

Key Words: Lamb, electromagnetic, scanning, carcass

74 **The use of electromagnetic scanning to determine the yield of retail product and boxed beef from beef carcasses and carcass primals.** D. L. Schaefer*, G. H. Rouse, D. E. Wilson, and D. G. Olson, Iowa State University, Ames, IA.

The research objectives of this study were to evaluate the usefulness of electromagnetic scanning (EMS) for determining retail product and boxed beef yield from chilled beef carcasses and carcass primals. EMS technology is based on the absorption of energy by lean tissue within an electromagnetic field. Beef quarters from thirty steer sides were electromagnetically scanned. The brisket, shank, and a portion of the plate were removed from the forequarter to facilitate scanning (streamlined forequarter). The quarters were then fabricated into carcass primal cuts. The primals were scanned and fabricated into closely trimmed boxed product and total retail product. All boxed beef was fabricated according to current industry specifications and trimmed to .64 cm. Retail product consisted of boxed product plus the weight of lean trimmings arithmetically adjusted to 80% lean. Hot carcass weights ranged from 280 kg to 421 kg with a mean and standard error of 352 ± 6.9 kg. USDA yield grades ranged from 2.3 to 5.1. Boxed product weight as a percent of cold side weight ranged from 32.9% to 42.2% and retail product as a percent of cold side weight ranged from 56.5% to 70.9%. The highest R^2 values resulting from stepwise regression of hot carcass weight, streamlined forequarter peak, and hindquarter peak to determine boxed product weight, percent boxed product, retail product weight, and percent retail product were .85, .66, .93, and .89, respectively. In comparison, the USDA retail yield equation had a correlation of .84 (R^2=.71) to actual percent boxed beef and .89 (R^2=.79) to actual percent retail yield. The use of EMS peak and primal weight in a regression model for determining the yields from primal cuts resulted in the R^2 values shown in the table below. EMS is more accurate in determining the yield of boxed and retail product weight than percentage yields, since EMS measures conductive lean mass, not the ratio of lean to fat. This research shows that boxed and retail product weight can be accurately determined in beef quarters and rounds using EMS.

R^2 values for determining product yields from carcass primals.

Independant Variables	Primal Boxed Wt.	Primal Boxed %	Primal Retail Wt.	Primal Retail %
Round Wt., Round Peak	.86***	.22	.94***	.41**
Loin Wt., Loin Peak	.49***	.24	.80***	.69***
Rib Wt., Rib Peak	.71***	.60***	.39*	.37*
Chuck Wt., Chuck Peak	.34*	.22	.70***	.31*

***p<.0001 **p<.001* p<.01

Key Words: Beef, Electromagnetic Scanning, Carcass Composition

75 **Influence of genotype, sex, and dietary lysine on subprimal cut distribution of 127 kg finishing pigs.** B.L. Dunn*, J.A. Unruh, K.G. Friesen, J.L. Nelssen, R.D. Goodband, and M.D. Tokach, Kansas State University, Manhattan.

Seventy-six pigs were fed from 44 to 127 kg to determine the interrelationships among genotype, sex, and dietary lysine on subprimal cut distribution. The experiment was designed in a 2×2×2 factorial arrangement and analyzed as a randomized complete block. Pigs were derived from genotypes previously characterized based upon lean gain potential (high vs medium lean gain; HLG and MLG, respectively). Within genotype, pigs were split by sex (barrows or gilts) and fed either a .90 or .70% lysine corn-soybean meal diet. When the pen average weight equaled 104 kg, the diets were decreased from .90 or .70% to .75 or .55% dietary lysine, respectively. Pigs were slaughtered when the weight of the 2 pigs per pen averaged 127 kg. At 24 h postmortem, carcass data were collected and left sides were fabricated into closely trimmed, bone-in and boneless (BNLS), subprimal cuts according to Institutional Meat Purchase Specifications. Carcasses from HLG pigs had (P<.05) heavier hot carcass weights, larger longissimus areas (LMA) and higher dressing percentages than MLG pigs. High lean gain carcasses had (P<.05) a higher percentage of their chilled side in trimmed shoulder (406 Boston butt+405 picnic shoulder), BNLS shoulder (406A BNLS Boston butt+405A BNLS picnic shoulder), 410 loin, and BNLS loin (413 BNLS loin+415 tenderloin) than MLG carcasses. Also, HLG carcasses tended to have a higher percentage of 402C BNLS ham (P=.06), and a lower percentage of 416 spareribs (P=.08) and 408 belly (P=.09) than MLG carcasses. Carcasses from gilts had (P<.05) less 10th rib fat and larger LMA resulting in a higher percent lean than barrow carcasses. Gilt carcasses had (P<.05) a higher percentage of 410 loin, BNLS loin, 402 ham, and 402C BNLS ham; and tended to have a higher percentage of BNLS shoulder (P=.08) than barrow carcasses. In a sex × lysine interaction (P<.05), gilts fed high lysine diets had (P<.05) a higher percentage of trimmed shoulder than barrows fed high lysine diets. Dietary lysine had minimal influences (P>.05) on other subprimal cut yields. These data suggest that the highest percentages of BNLS subprimals for pigs fed to 127 kg can be realized by feeding HLG gilts.

	Genotype		Sex		Dietary lysine		
Trait	HLG	MLG	Barrow	Gilt	.90/.75	.70/.55	CV
Lean, %	46.5	45.4	44.3[b]	47.6	45.5	46.4	6.7
BNLS ham, %	16.7	16.0	15.9[b]	16.8	16.2	16.5	5.7
BNLS loin, %	13.8[a]	12.5	12.9[b]	13.5	13.1	13.3	8.8
BNLS shoulder, %	14.6[a]	13.9	14.0	14.4	14.0	14.4	6.9

[a]Genotype effect (P<.05). [b]Sex effect (P<.05).

Key Words: Finishing Pigs, Meat Yield, Genotype