

SHEEP SPECIES

1276 Comparison of three measuring techniques for staple length and strength in U.S. wools. F. A. Pfeiffer* and C. J. Lupton, *Texas Agricultural Experiment Station, San Angelo.*

Consignments (29) of greasy wool in Texas warehouses were used to compare three measuring techniques each for staple length (SL) and strength (SS) of greasy wool and to assist the U.S. wool industry in deciding which techniques to adopt. Samples (~4.5 kg/lot) were obtained using a bale grab sampler and were subsampled at the Wool and Mohair Research Lab (WMRL) to provide three sets of comparable staples. One complete set of staples (29 lots x 65 staples = 1,885 staples) was sent to the Australian Wool Testing Authority (AWTA) for measurement using the Automatic Tester for Length and Strength. Another set was sent to SGS Wool Testing Services (SGS) in New Zealand for testing with the Agritest Staple Breaker Model 2. A third set was measured at WMRL using an American Society for Testing and Materials manual method for SL and an Agritest Staple Breaker (manual model) for SS. Each testing lab used the same wool base and vegetable matter base values to convert "greasy" to "clean" SS. Paired t tests and linear regression were used to test for differences and calculate r^2 values between test methods. Warehouse personnel provided visual estimates of SL. Mean values of SL determined by AWTA and the visual assessments were not different (8.14 and 8.16 cm, respectively, $P > .05$; $r^2 = .63$). Measurements of SL made by SGS and WMRL were not different (7.80 and 7.92 cm, respectively, $P > .05$; $r^2 = .74$), but were smaller ($P < .05$) than the AWTA and visual results. Mean values of variability in staple length (CV) were not different ($P > .05$) among measuring techniques. The AWTA and SGS means of SS were not different (32.1 and 31.8 N/ktex, respectively, $P > .05$; $r^2 = .41$). The WMRL mean value 41.7 N/ktex for SS was greater ($P < .05$) than the other two labs, strongly suggesting that either the manual instrument and/or the WMRL technique produced excessively high values. Further testing incorporating a broader cross-section of U.S. wools is required before a recommendation can be made to the U.S. wool trade.

Key Words: Wool, Staple length, Staple strength

1277 Carcass composition and sensory characteristics of barbacoa from New Zealand imported and Mexican Pelibuey lambs. N. Torres, J. Gutierrez, M. S. Rubio, and R. D. Mendez*, *Facultad de Medicina Veterinaria y Zootecnia, Universidad Nacional Autonoma de Mexico, Mexico.*

This research was designed to determine differences in the carcass composition and sensory characteristics of three commercial types of lambs in Mexico. Twenty-eight carcasses, 10 Pelibuey (P), 8 crosses of P and Suffolk (PS), and 10 New Zealand imported carcass (I), were selected based on their commercial weight (15 kg). Dissection of primary cuts (neck, shoulder, leg, rack, skirt, loin, and shank) was used to determine carcass composition (muscle, fat, bone, and "other" tissues which includes cartilage, nerves, etc). Traditional Mexican "barbacoa" was cooked by one expert and under identical conditions for the three types of lamb. A consumer sensory panel of 160 people was used to determine aroma and flavor on the "barbacoa" samples. Carcass composition data and sensory parameters were analyzed using type of breed as the independent variable in the analysis of variance. Results from the carcass composition analyses showed that national and imported lamb had no differences in the muscle percentage. However, P lambs (19.31±2.42%) had lower ($P < .05$) bone percentage than lambs from the PS or I (21.91±2.41% and 20.96±1.50%, respectively). Even though total fat percentage was not different among lambs, P animals had more ($P < .05$) intermuscular (9.90±3.13) and internal (1.63±0.83) fat than those from I (8.02±3.26; 0.90±0.28) or PS (6.28±3.23; 1.44±0.59). On the other hand, other tissues were found in higher proportions ($P < .05$) on imported animals (11.38±1.66%) compared to national ones PS and P (10.62±2.55% and 9.03±1.98%, respectively). Consumers found no differences in the aroma or flavor from the three types of "barbacoa". Therefore, these data do not support the Mexican producers position, to base the price of their national lamb on the belief that they have a better yield and a better taste compared to the imported ones.

Key Words: Pelibuey, Meat, Carcass composition

1278 Effects of pen, fleece coats, and breed on growth, meat, and wool traits of feeder lambs. C. J. Lupton*¹, J. E. Huston¹, B. F. Craddock², J. W. Jennings³, and F. A. Pfeiffer¹, ¹Texas Agricultural Experiment Station, ²Texas Agricultural Extension Service, ³Angelo State University, San Angelo, TX.

Anticipated new marketing channels may permit greater emphasis on wool from slaughter lambs producing heavier, but leaner carcasses. Following a 3-wk uniformity period, 34 each of Rambouillet (R) and Merino x R (MR) unshorn wether lambs (~4 mo of age, BW = 33.7 ± 4.3 kg) were assigned equally to two treatment groups (blocked by initial BW and breed) to evaluate the effects of pen (area and number of animals per pen), breed, and fleece coat on growth, carcass, and wool traits. The two treatments consisted of lambs maintained in small (SP; 2 or 3 lambs / 15 m²) and large (LP; 35 lambs / 930 m²) pens. The lambs received conventional, step-up feedlot rations to produce an ADG of .21 ± .04 kg/d and were shorn on d 134, slaughtered on d 136, with carcass evaluation on d 137. The effects of pen on ADG, final shorn BW (55.6 ± 7.0 kg), warm carcass weight (30.3 ± 4.2 kg), dressing percentage (54.4 ± 1.9), back fat thickness (12th rib; 8.4 ± 2.5 mm), leg circumference (69.0 ± 3.0 cm), carcass length (111.4 ± 4.3 cm), USDA yield grade (2.63 ± .75), calculated yield grade (3.71 ± 1.01), fleece weight (3.83 ± .81 kg), staple length (7.58 ± 1.01 cm), and fiber diameter (21.5 ± 1.9 μm) were not significant ($P > .09$). Body wall thickness of LP > SP lambs (3.8 vs. 3.5 cm, $P = .02$). Coated lambs produced lighter fleeces (3.5 vs. 4.0 kg, $P = .007$) presumably due to less contamination. No other effects of coat were significant ($P > .07$). These results indicate that data collected on coated and uncoated lambs in small scale feeding trials (sometimes necessary for economical reasons and measurement of feed efficiency, for example) can be extrapolated with confidence to larger scale feeding situations. In contrast, most effects of breed were significant ($P < .06$; fat thickness and calculated yield grade being exceptions) with R > MR for growth and carcass traits and < MR for wool traits, confirming that fine-wool lambs of different breeding can be expected to perform differently in the feedlot.

Key Words: Lamb feeding, Carcass traits, Wool traits

1279 Utilizing real-time ultrasound to predict carcass quality of lambs. R. R. Panting*¹, S. N. Harrison¹, J. C. Jensen², S. Nash¹, J. H. Packham¹, D. Whittier², and S. K. Duckett¹, ¹University of Idaho, Moscow, ²Utah State University, Logan.

Real-time ultrasound technology has been successfully used to estimate carcass quality and predict retail yield in finished beef cattle; however, limited research is available on using this technology on finished lambs. The objectives of this study were to: 1) determine the accuracy and repeatability of real-time ultrasound measures of fat thickness (FT) and ribeye area (REA) to carcass measures for seven technicians, and 2) to develop equations for predicting the retail product weight from real-time ultrasound measures of FT and REA. Twenty-four lambs were weighed and scanned twice by seven ultrasound technicians in a blind trial to obtain FT and REA measures. Ultrasound measurements for FT and REA were compared to carcass measures. Standard error of prediction for REA and FT for the seven technicians ranged from 1.74 to 2.69 cm² and .084 to .137 cm, respectively. Standard error of repeatability for REA and FT for the seven technicians ranged from 1.07 to 3.25 cm² and .079 to .16 cm, respectively. Seventy-one lambs were weighed and scanned by two ultrasound technicians prior to harvest. After harvest, carcass measures and retail product weight (IMPS 207, 233A, 1204B, 1232A, all trimmed to .64 cm or less external fat cover) were obtained for all lamb carcasses. For the 71 lambs, standard error of predictions for real-time ultrasound measures of FT and REA compared to carcass measures were .16 cm and 2.32 cm², respectively. Correlation coefficients for retail product weight with live weight, ultrasound REA, carcass REA, ultrasound FT, and carcass FT were .88, .82, .70, .36, and .52, respectively. Regression equations were developed using the stepwise procedure of SAS to predict retail product (kg) from all carcass and ultrasound measures. The prediction equation developed was: retail product, kg = -1.152 + .196 x liveweight (kg) + .367 x real-time ultrasound REA (cm²) and explained 86% of the variation in retail product weight ($P = .01$; SE $P = .90$). No carcass measures met the significance level ($P = .15$) for entry into the model to predict retail product. Thus, real-time ultrasound technology can be utilized to estimate carcass quality and retail product in lamb as well as in beef.

Key Words: Lamb, Ultrasound, Carcass

1280 Body weight, fleece weight, and wool characteristics of Texel x Romney crossbred yearling sheep. T Wuliji*¹ and K.G Dodds², ¹E (Kika) de la Garza Institute for Goat Research, Langston University, ²AgResearch, Invermay Agricultural Centre, Mosgiel, New Zealand.

Live weight, fleece weight, and wool characteristics of yearling sheep were analyzed for control Romney (CR), Romney selected for high fleece weight (HR), Texel x Romney (TR_{F1}), Texel x Romney intercross (TR_{F2}), Texel x [Texel x Romney] (TTR), [Texel x Romney] x Romney (TRR), and [Poll Dorset x Romney] x [Texel x Romney] (DTR). Birth rearing rank, birth weight (BRW), weaning weight (WW), spring weight (SW), and greasy fleece weight (GF) were recorded. Wool samples were measured for oven dry yield (%), bulk, fiber diameter, wool brightness (Y), and yellowness (Y-Z). Data were analyzed by residual maximum likelihood (REML), with genotype, year, sex, birth rearing rank, and age of dam included as fixed effects, birth date as a covariate, and sire as a random effect. Crossbred genotypes had 13 to 23% higher fleece weight than CR (*P* < .05), but fleece weights were lower than for HR (*P* < .05). Wool bulk was increased by 22 to 37% and wool fibre diameter was reduced by about 1.5 μm in most crossbred genotypes compared with Romneys. Table 1. Genotype least squares means for live weight, fleece weight, and wool characteristics (^{a,b,c,d}Means with different superscripts differ, *P* < .05).

Geno- type ¹	BRW (kg)	WW (kg)	SW (kg)	GF (kg)	Yield (%)	Bulk (cm ³ /g)	FD (micron)	Y-Z
CR	4.3 ^a	21.5 ^a	45.2 ^a	2.31 ^b	65.6 ^d	23.7 ^a	32.5 ^{bc}	4.8
HR	4.5 ^{ab}	25.0 ^{cd}	50.2 ^b	3.26 ^e	64.7 ^{cd}	25.7 ^b	34.0 ^c	4.8
TRR	4.9 ^{cd}	23.2 ^b	50.8 ^b	2.85 ^d	62.6 ^b	26.4 ^b	32.6 ^b	4.9
TR _{F1}	5.0 ^d	25.8 ^d	53.6 ^c	2.66 ^c	63.7 ^{bc}	29.1 ^c	32.5 ^b	5.1
TR _{F2}	4.7 ^{bcd}	25.9 ^d	54.2 ^c	2.71 ^{cd}	60.9 ^a	30.0 ^c	32.6 ^{abc}	5.1
DTR	4.6 ^{abc}	26.1 ^d	55.3 ^c	2.62 ^c	62.7 ^b	32.5 ^d	32.5 ^{ab}	4.4
TTR	4.5 ^{ab}	24.1 ^{bc}	48.9 ^b	2.06 ^a	63.3 ^{abc}	29.0 ^c	30.8 ^a	5.1
SED	.2	.6	1.5	.10	.9	.6	.7	.3

¹Number of animals for CR, HR, TRR, TR_{F1}, TR_{F2}, DTR, and TTR were 181, 136, 470, 233, 84, 90, and 55, respectively.

Key Words: Texel, Romney, Wool

1281 Effects of sex, birth rearing, and age of dam on yearling crossbred progeny of Texel x Romney sheep. T Wuliji*¹ and K.G Dodds², ¹E (Kika) de la Garza Institute for Goat Research, Langston University, OK, ²AgResearch Invermay Agricultural Research Center, Mosgiel, New Zealand.

A total of 1,259 progeny from groups of Romney, Texel x Romney, and Texel x Romney intercross were analyzed. Birth rearing rank, birth weight (BRW), weaning weight (WW), spring weight (SW), greasy fleece weight (GF), oven dry yield (%), fiber diameter, bulk, wool brightness (Y), and yellowness (Y-Z) were measured. Data were analyzed by residual maximum likelihood (REML). Genotype, year, sex, birth rearing rank, and age of dam were included as fixed effects, birth day as a covariate, and sire as a random effect. Males were heavier, and grew more yellow and bulkier wool (*P* < .01) than females. Single born and reared animals were heavier (*P* < .05) than twin born animals, with twins that were single reared being heavier (*P* < .05) at weaning than those that were twin reared. Birth rearing rank did not affect wool characteristics, except for yield where twin born and reared animals were greater (*P* < .05) than the other rearing types. Age of dam had no effect on wool characteristics, but 2 yr-old dams had slightly lower birth and weaning weight than older dams. Table 1. Effects of sex, birth rearing, and age of dam on production parameters

	Sex ¹			Birth rearing rank			Age of Dam ²			
	Ewe	Ram	SED	SS	TS	TT	SED	2	3	4+
BW	4.5	4.8	.04	5.5 ^b	4.2 ^{ab}	4.2 ^a	.07	4.3	4.8	4.9
WW	23.8	25.2	.62	27.4 ^c	24.3 ^b	21.8 ^a	.31	23.5 ^a	25.2 ^b	24.9 ^b
SW	47.5	54.8	.37	52.9 ^b	50.5 ^a	50.1 ^a	.54	50.1 ^a	51.4 ^a	52.0 ^b
GF	2.54	2.74	.03	2.67	2.62	2.63	.04	2.61	2.67	2.64
Yield	64.4	62.4	.27	63.0 ^a	63.0 ^{ab}	63.8 ^b	.38	63.0 ^a	63.8 ^b	63.3 ^a
Bulk	31.7	32.2	.20	31.8	32.3	31.8	.29	32.1 ^b	31.6 ^a	32.1 ^b
FD	32.5	32.6	.18	32.5	32.4	32.7	.70	32.6	32.5	32.5
Y	65.3	64.0	.14	64.7	64.7	64.3	.19	64.5	64.5	64.7
Y-Z	4.6	5.1	.08	4.9	4.8	4.9	.10	4.8	4.9	4.9

¹All traits differed between sexes, *P* < .01; means within rows with a different superscript in the trait columns differ, *P* < .05; SS: single born and reared; TS: twin born and single reared; TT: twin born and reared.

²SED for BW, WW, SW, CF, Yield, Bulk, FD, Y, and Y-Z were .06, .30, .51, .04, .34, .24, .24, .17, and .10 g, respectively.

Key Words: Crossbred, Sheep, Rearing rank

1282 The economics of hair sheep production in the US Virgin Islands. R.W. Godfrey*¹ and G. D'Souza², ¹Agricultural Experiment Station, University of the Virgin Islands, ²College of Agricultural, Forestry and Consumer Sciences, West Virginia University, Morgantown.

Production of small ruminants in the US Virgin Islands (USVI) is the only option available to many livestock farmers due to limited land and resources. The use of hair sheep in the tropics is ideal because they are well adapted to the climate. Based on 14 yr of production data, establishment and annual maintenance budgets for hair sheep production in the USVI has been developed. Budgets were developed for two flock sizes: small (100 head; 24.3 ha) and large (350 head; 70.8 ha). Assumptions made when developing the budgets included locating the farm in an area of average rainfall, use of limited breeding and lambing seasons, an average lamb crop of 1.8 lambs per ewe lambing, a 10% lamb death loss, a replacement rate of 10% annually, a stocking rate of 8.6 ewes per ha, a local market price of \$3.30 per kg for lambs and \$4.96 per kg for breeding stock, and the producer already owns the land and has access to a water supply. The establishment budget for the small flock came to a total of \$39,180 with major categories of expense being the fencing (\$18,490) and purchase of animals (\$12,375). The maintenance budget for the small flock yielded total operating costs of \$11,532 with a revenue of \$16,009 and a pre-tax return of \$1,223 and a breakeven price of \$3.11/kg. The establishment budget for the large flock came to a total of \$101,388. The highest costs were fencing (\$38,850) and animals (\$43,313). The large flock can generate revenue of \$56,509 annually with operating costs of \$27,546. The pre-tax returns would be \$21,024 for the large flock with a break-even price of \$2.05 per kg. The benefits of the larger sheep flock appear to be due to an economy of scale. The estimated net present value of the large flock, assuming a 20-yr planning horizon and a 10% cost of capital is \$77,602, and the estimated internal rate of return is 20%. Even though both operations can be profitable, it appears that the larger operation would be more feasible in the long run.

Key Words: Sheep, Economics, Tropics

1283 Parasite burdens of purebred and crossbred hair lambs during the wet season in a tropical environment. R.W. Godfrey*, R.E. Dodson, and E. Panitz, Agricultural Experiment Station, University of the Virgin Islands, St. Croix.

Parasite burden and packed cell volume (PCV) were evaluated in St. Croix White (n = 11) and Barbados Blackbelly (n = 16) lambs (HAIR) and 1/4 Suffolk X 3/4 St Croix White (n = 14; WXH) lambs on pasture in September. Lambs were kept in drylot for 2 wk after weaning (66 ± 3 d of age) and then put in a .5 ha guineagrass pasture. Anthelmintic was given 14 to 28 d prior to grazing and then at 42-d intervals. Fecal samples were collected weekly for 147 d to determine parasite burden as eggs/g (COUNT) using the modified McMaster technique. Species evaluated were *Moniezia expansa* (MON), trichostrongylid ova (TRIC), and coccidia (COC). Prior to analysis, data were transformed using log₁₀(COUNT + 1). On the days of fecal collection, a jugular blood sample was collected to determine PCV and lambs were weighed. Data were analyzed using SAS procedures for repeated measures and lamb mortality rate was analyzed using the CATMOD procedure. Crossbred lambs were heavier than HAIR lambs during the 147-d grazing period (*P* < .001). The HAIR lambs had higher PCV (*P* < .0001) than WXH lambs following the second anthelmintic treatment. There was no difference (*P* > .10) in COC or MON counts between HAIR and WXH lambs. The WXH lambs had higher (*P* < .06) TRIC counts after the second anthelmintic treatment. The mortality rate of WXH lambs was higher (*P* < .06) than that of the HAIR lambs during the first 63 d of the grazing period (57.1 vs 33.3%, respectively). At the end of the 147-d period there was no difference in lamb mortality between WXH and HAIR lambs (57.1 vs 48.1%, respectively) which may be related to stress due to a hurricane which impacted the island at that time (d 70). Packed cell volume was positively correlated (*P* < .002) with body weight and COC in the WXH lambs, but not in HAIR lambs. These data show that purebred hair lambs have lower total parasite burdens than WXH lambs in the tropics. The high mortality rate of the WXH

lambs during the rainy season is most likely due to the higher parasite burden.

Key Words: Sheep, Parasites, Environment

1284 Fiber analysis of wool and hair crossbred sheep. R.W. Godfrey^{*1}, J.K. Bultman¹, and C.J. Lupton², ¹Agricultural Experiment Station, University of the Virgin Islands, St Croix, ²Texas Agricultural Experiment Station, San Angelo.

The prolificacy, parasite tolerance, and out of season breeding of hair sheep are desirable traits that can be selected for when crossing these sheep with wool breeds. The lack of any substantial fleece on the hair sheep is also a desirable trait in some circumstances. Fleeces (12) of wool X hair crossbred sheep were evaluated to compare traits among genotypes. Two Suffolk X St Croix White rams (SFK1), four Polypay X St Croix White rams (PPY), and six 1/4 Suffolk X 3/4 St Croix White lambs (SFK2) were shorn and their fleeces evaluated. The SFK1 rams were the sires of the SFK2 lambs, although exact paternity is unknown. The ages at shearing were 801, 381, and 156 d for SFK1, PPY, and SFK2, respectively. Traits evaluated for each fleece were fiber diameter (μm , DIAM), and percentages of total medullated fibers (MED), flat fibers (FLAT), objectionable fibers (OBJ), and clean yield (Y). The SFK1 and PPY rams had the phenotype of wool sheep, but SFK2 lambs had more variation in phenotype with some lambs appearing to have full wool fleeces and others having mostly hair. The SFK2 lambs, even though they were much younger, had higher percentages of medullated, flat, and objectionable fibers in their fleeces than either the SFK1 or PPY rams. Even with the low number of animals, the variation in the phenotype of the fleece on SFK2 lambs indicates that it would be possible to select for fleece type in crossbred (wool X hair) sheep.

Breed	DIAM	MED	FLAT	OBJ	Y
SFK1	33.3 \pm .6	.73 \pm .05	.02 \pm .02	.24 \pm .09	82.9 \pm 2.3
PPY	24.4 \pm 1.4	1.13 \pm .35	.05 \pm .01	.23 \pm .08	72.9 \pm 1.6
SFK2	27.5 \pm 1.1	7.93 \pm 1.53	.37 \pm .13	4.3 \pm 1.2	87.3 \pm 1.3

Key Words: Sheep, Wool, Hair

1285 Carcass characteristics and commercial cuts of Suffolk lambs at creep feeding management system. A.L.G. Monteiro¹, M. A. Neres^{1,2}, C. A. Garcia¹, G.J.M. Rosa^{*2}, and C. Costa², ¹Animal Production Dept., UNIMAR, SP, Brazil, ²Animal Nutrition Dept., UNESP, SP, Brazil.

Twenty-four single ewe Suffolk lambs were randomly assigned at birth to three treatment groups so that four males and four females were included in each one. All lambs were fed concentrate creep (21% Crude Protein) with alfalfa hay (0, 15, and 30%: treatments 1, 2, and 3, respectively) plus maize, soybean meal, and mineral salt, and were allowed to nurse their mothers. The ewes were fed with lactation concentrate and Tifton hay. All animals were grazed in *Cynodon nlemfuensis* plots until weaning (60 d), when all lambs were fed the same diet in drylot. The lambs were slaughtered when they reached 30 kg liveweight. The following measurements were taken: liveweight slaughter, ingesta-free body weight, hot and cold carcass weight, hot, cold, and true dressing-out percentages, and cooling loss. After a 24 h carcass chill, they were sectioned and the left sides were divided in five anatomical cuts: leg, shoulder, loin, racks, and neck. Cuts were weighed and their percentages were determined. It was observed that different levels of alfalfa hay in ration did not significantly affect ingesta-free body weight ($P=0.27$), hot ($P=0.24$) and cold ($P=0.22$) carcass weights, and cooling loss ($P=0.49$). Therefore, lambs fed with 15% alfalfa hay at creep ration presented higher ($P<0.05$) dressing-out percentages compared to the others. In respect to cuts, just shoulder and neck weights were influenced ($P<0.05$) by treatments, but not in a uniform trend. Cut percentages were not significantly ($P>0.05$) affected. The most important commercial cuts, loin and legs, were not significantly related to different treatments. These cuts presented average weights of 0.8 and 2.7 kg, respectively, which could be accepted commercially. It was concluded that different contents of alfalfa hay at creep ration may influence dressing-out percentages and that, although 15% presented the best results, the three levels could be recommended to lamb creep rations.

Key Words: Sheep, Dressing percentages, Cuts

1286 The effects of concentrate and soybean meal level for pregnant ewes offered grass silage on ewe and lamb performance. T.F. Crosby^{*1}, P. Nowakowski², J.V. O'Doherty¹, P.J. Quinn¹, J.J. Callan¹, B. Flynn¹, D. Cunningham¹, P. Reilly¹, and W. Byrne¹, ¹University College Dublin, Lyons Research Farm, Newcastle, Co. Dublin, Ireland, ²Agricultural University Wroclaw, Dept. of Sheep Breeding, Wroclaw, Poland.

The objective was to examine the effects of supplementing a grass silage based diet with varying levels of concentrates and soybean meal on the performance of pregnant ewes and their lambs, and on colostrum yield and quality. Twin bearing pregnant ewes ($n=63$) were individually penned and allocated to a 3 x 3 factorial experiment and offered grass silage ad libitum supplemented with three levels (0 g, 200 g, 400 g) of a barley/molassed sugar beet pulp based concentrate and three levels (50 g, 100 g, 150 g) of soybean meal per ewe/d from d 98 of pregnancy until lambing. As concentrate or soybean levels increased, there was no effect on silage dry matter (DM) intake, but total DM, metabolizable energy, and crude protein intakes did increase ($P<0.05$). Mean ewe live weight loss across all treatments from d 98 of pregnancy to 24 h postpartum ranged from 1.4 kg to 11.8 kg. The magnitude of the loss was negatively related to both the levels of concentrates and soybean ($P<0.05$). Ewe colostrum yields at 1 h, 10 h and 18 h post lambing were all increased as the concentrate level increased, resulting in the increased yield at 18 h (1346 v 1785 v 2142 ml; SEM 143: $P<0.05$) being almost linear. As soybean level increased, there was an increase in colostrum yield at all milkings, the difference reaching significance ($P<0.05$) at the 1 h milking and in total yield at 18 h. At the zero concentrate and at the 50 g soybean levels, the 1 h colostrum immunoglobulin yield (IgG) was lowest ($P<0.05$). When no concentrates were fed, lamb weight was lowered at three wk ($P<0.05$), but not at later stages up to weaning. These data quantify the need for adequate concentrate and protein supplementation in order to prevent excessive ewe weight loss, for adequate yields of colostrum with high immunoglobulin yields, and for high lamb growth rate to 3 wk of age.

Key Words: Ewe, Protein, Colostrum

1287 An evaluation of some by-product feeds as the sole diet for early-weaned lambs. T.F. Crosby^{*1}, P.J. Quinn¹, J.J. Callan¹, B. Flynn¹, P. Nowakowski², J.V. O'Doherty¹, and J.P. Day¹, ¹University College Dublin, Lyons Research Farm, Newcastle, Co. Dublin, Ireland, ²Agricultural University Wroclaw, Dept. of Sheep Breeding, Kozuchowska, 7, 51-631, Wroclaw, Poland.

Feed is the single biggest production cost factor in lamb systems based on early weaning. In Europe, there is wide variation in the cost of available feed ingredients, with by-product feeds being at the lower end and commercial concentrate mixtures being at the upper end. The present experiment was undertaken to examine the possibility of using a mixture of by-product feeds as the sole diet for the early weaned lamb on lamb growth rate, feed efficiency, carcass quality, and economic returns. Texel sired lambs ($n=108$) were weaned when 37 d old and allocated to dietary treatments based either on a mixture of molassed sugar beet pulp/corn gluten/distillers grain (T1) or an expensive high specification commercial concentrate (T2). Both diets were offered ad libitum. From birth to slaughter, T1 lambs had a higher concentrate intake (116.1 v 83.2 kg) and a poorer food conversion efficiency (5.05 v 3.58:1) which was partly due to ingredient selection by the lambs and unavoidable wastage, especially of distillers grains. Lamb growth rate from birth to slaughter was lower in T1 (330 v 302 g/d, SEM 5.7; $P<0.05$) with male lambs having a higher ($P<0.05$) growth rate than female lambs. Lambs in T1 were lighter at 82 d of age (28.0 v 30.2 kg, SEM 0.74; $P<0.05$) and took 9.9 d longer to reach slaughter weight (117.2 v 107.3 d, SEM 2.0; $P<0.05$). Although there was no difference in live weight at slaughter, lambs in T1 yielded lighter carcasses (18.59 v 19.21 kg, SEM 0.179; $P<0.05$), with a lighter fat covering and a more desirable fat consistency ($P<0.05$). The lambs in T1 realised US\$3.80 less, which was a reflection of a lower kill out proportion and a later sale date; this loss was offset by lower feed costs. The data show that very acceptable growth rates and carcasses can be obtained with cheap by-product feeds, but there is the need to reduce ingredient separation and minimise refusals of single ingredients.

Key Words: Lamb, By-product, Growth

1288 Fertility and lambing performance of Katahdin hair sheep under an accelerated breeding system. S. Wildeus* and J. R. Collins, *Virginia State University, Petersburg.*

This study evaluated ewe performance in a flock of Katahdin hair sheep (n=25) managed under an 8-mo breeding schedule. Animals were grazed on moderate quality, permanent pastures or provided hay depending on time of year, and grain mix (16% CP) was supplemented according to stage of production. Ewes were mated in single-sire mating groups during 42-d breeding seasons, starting the first of November, July, and March, respectively. Breeding rams passed a soundness examination and were fitted with marking harnesses for breeding. Conception rate was determined by transrectal ultrasonography on d 1 and 20 after the end of breeding. Ewes lambed unassisted on pasture and lambs were weaned at 9 wk of age. Data were analyzed in a model with season as main effect. Conception rates were similar for all breeding seasons (mean 88%), however, lambing rate was lower (P<.05) for July breeding (65%). Time to mating from onset of breeding was later (P<.01) for July (25.3 d) than for November and March breeding (9.1 and 14.1 d, respectively). Litter size was larger (P<.05) following July (1.67) than November (1.27) breeding, with March intermediate (1.53). Litter birth and weaning weights were larger (P<.05) following July (6.48 and 24.5 kg) than November (4.37 and 15.4 kg) and March breeding (5.27 and 20.3 kg). Litter average daily gain differed between seasons (P<.05) and ranged from 272 g/d for July breeding, to 244 g/d for March, and 196 g/d for November. Litter weight weaned as percent ewe body was not affected by mating season (range: 35-40%). Perinatal lamb survival was similar between breeding seasons (92-95%) and lamb survival to weaning ranged from 84% (March) to 92% (November). Reduced litter size and weights for November breeding in this study may have been associated with a younger ewe age. Data indicate that Katahdin hair sheep can be used in accelerated breeding systems; however, July breeding appears to coincide with the transitional period for seasonal breeding.

Key Words: Katahdin, Lambing performance, Accelerated breeding

1289 Vitamin E supplementation during late gestation and lactation on dam and lamb performance. D. G. Morrical* and A. Ali, *Iowa State University, Ames.*

The objective of this study was to determine if additional vitamin E provided orally to ewes during late gestation and lactation improved pre-weaning lamb performance. Two groups of ewes (123 and 72 hd) were used in the study during 1997 and 1998, respectively, in a split-plot design. Both years, ewes were grouped into four blocks according to ewe age and fetal counts. About one-half of the ewes from each block were supplemented orally with vitamin E (300 IU/hdd) and the other half received no additional vitamin E. Three days post-lambing, one-half of each block was switched to the other E treatment. A sub-sample of ewes and their lambs were monitored for serum vitamin E levels at d 3 pre- and post-lambing, mid lactation (d 28), and at weaning (d 56). Serum E at d 3 pre- and post-lambing was 1.9 and 1.3 mg/l for ewes supplemented with vitamin E during late gestation compared to 1.1 and .9 for non-supplemented ewes, respectively. Serum vitamin E level at d

28 was higher (P < .05) in ewes supplemented with E during lactation than non-supplemented ewes (1.5 and 1.1 mg/l, respectively). Lamb birth weight, weaning weight, and livability were not affected by vitamin E supplementation. Serum E levels at 3 d (P < .05) and 28 d (P < .10) were higher in lambs (1.9 and 1.4 mg/l, respectively) from dams receiving E in late gestation and lactation compared to lambs (1.4 and .9 mg/l, respectively) from non-supplemented ewes. It is our conclusion that additional E in late gestation and lactation had no effect on lamb pre-weaning performance due to excellent serum E levels in the control ewes.

Key Words: Vitamin E, Lamb, Growth

1290 Growth performances and retention rate of small ceramic boluses for electronic identification in fattening lambs. D. Garjn, G. Caja*, and C. Conill, *Universitat Autònoma de Barcelona, Bellaterra, Spain.*

An experiment was conducted to evaluate the effects of two sizes of bolus transponders in the electronic identification and growing performances of a total of 105 lambs (Manchega, n=69; and, Lacaune, n=36). Ceramic boluses were made in Alumina (Al₂O₃) according to the PCT/FR97/00744 patent, to be orally administered to young lambs. A glass encapsulated half-duplex passive transponder (32.5x3.8mm; Tiris®) was placed inside each bolus. Features (diameter x length and specific gravity) of empty boluses were: 'Mini' (M, 9.3 x 36.5 mm and 1.9g/cm³) and 'Small' (S, 15.0 x 39.1 mm and 3.3g/cm³) and final weights 5.6 and 20.0 g, respectively. Lambs were randomly assigned after birth to three experimental treatments (n=35 per group): Control (C, without bolus) and M or S boluses. Milk intake in suckling lambs was estimated weekly from wk1 to wk4 (weaning) by using the oxytocin method. Weaned lambs were intensively reared in groups and fed concentrate and straw *ad libitum*, and slaughtered when they reached 23kgBW. Bolus readability, BW and feed intake were recorded weekly and boluses recovered in the slaughterhouse. Administration of M boluses with a silicon probe was possible (95% confidence) during wk1 and health was not apparently altered after application. Administration of S boluses with a small balling gun was tested after weaning, but it was not feasible in all lambs until wk7. Bolus application did not affect (P>0.05) milk suckled (1.29l/d), concentrate intake (0.75kg/lamb) and growth rate (0.267kg/d) of M lambs during the suckling period. Feed intake (0.830 kg/d) and growth rate (0.309 kg/d) were also not affected (P>0.05) during the fattening period in M and S lambs. Bolus retention rates from application to slaughtering were 57.1 and 100 % for M and S boluses (P<0.001), respectively. All boluses were recovered in the rumen-reticulum, of these 83.3% of M and 77.8% of S were found in the reticulum. We conclude that boluses can be applied in very young lambs without negative effects on their growing performances. New designs are necessary to improve the retention rate of mini boluses if earlier application than 7 weeks is required.

Key Words: Transponder, Ruminal Bolus, Suckling Lambs

SWINE SPECIES

1291 The effect of age at first boar contact, feeding regime and lysine concentration in the diet on lifetime performance in female swine. M. Varley and M. Cole*, *SCA Nutrition.*

The rearing protocols used in swine breeding units for new gilt replacements have been open to question recently and in particular because modern genotypes are considerably leaner with higher mature weights compared to 20 years ago. It has also been suggested that for a long breeding life gilts should be given a diet in the rearing phase that contains reduced lysine and protein to promote increased backfat development at the time of first mating. A large-scale experiment was carried out at the SCA Feed Evaluation Unit (UK) at the time the unit was established with a new population of gilts to examine this question. 120 JSR breeding gilts were allocated at 60-kg liveweight to a 2x2x2 factorial experiment where the main factors were different elements of the rearing protocols. The 3 factors were; age at first boar exposure (180 days v 200 days), feeding regime (ad libitum v 80% ad libitum intake between 60 kg and first service) and lysine concentration in the diet (0.55% v 0.85%). At the appearance of first estrus all gilts were mated twice on consecutive days and from that time on the feeding and general management

was the same for all animals. They were then followed through 3 parities. Body weight, body fat, litter size and litter weights were measured and recorded. The culling patterns through the 3 parities were similar for all treatments but the animals on the low lysine diet in the rearing phase lost 23% of all females over 3 parities. The high lysine treatment lost only 13%. The number of piglets born alive per litter for parities 1,2 and 3 respectively were for gilts given boar introduction at 180 days of age: 11.1,11.9 and 13.2 and for gilts given boar exposure at 200 days of age were 10.6, 9.4 and 12.1 piglets (p<0.09). The management protocol, which gave maximum reproductive performance over 3 parities, was to expose the gilts at 180 days of age and to offer an ad libitum high lysine diet up to mating. It is concluded that body lean or protein mass may be a more important parameter than body fat per se in the formulation of management protocols for gilt replacements.

Key Words: Swine, Sow, Reproduction