DON-contaminated barley will reduce the DON content of the grain, thereby increasing its value as a feedstuff for swine. One hundred gram samples of hulled barley, with varying DON concentrations (4.8, 9.8, & 21.1 ppm), were subjected to an abrasive-type dehulling procedure, using a Strong-Scott pearling machine, for 0, 15, 30, 45, 60, 75, 90, 105, & 120 seconds (n=4 per time point per barley sample). Following the prescribed pearling times, the remaining grain fractions were analyzed for weight remaining (%), DON (ppm), crude protein (%CP), neutral detergent fibre (%NDF), ash (%ASH), gross energy (GE; kcal/kg), and calculated digestible energy values (DE; kcal/kg). Following the initial 15 seconds of pearling, 85.0±0.2 (lsmean±SEM)of the grain mass remained. Additional pearling resulted in a linear decline of 4.5% of grain mass per 15 seconds. The initial 15 seconds of pearling reduced the DON content of the grain to 34.0±0.7 % of the orginal value, irrespective of the initial level of contamination (ppm). Additionally, the initial 15 seconds of pearling produced a grain sample containing (as a % of un-pearled values) 103.6±0.4% CP, 70.8±1.1% ASH, 60.3±1.2% NDF, 101.2±0.5% GE, and 113.3±0.7% DE. Further pearling resulted in continued significant (P<0.05) reductions in the % of DON remaining to a level of 7.9±0.7% after 120 seconds but with significant losses in grain mass. These data provide evidence that pearling (de-hulling) can serve as an effective means of reducing the DON content of barley, with improvements in the nutrient content of the resulting samples. However, the need to reduce the DON content of contaminated barley to less than 1 ppm will necessitate the removal of a significant amount of the grain mass for highly contaminated samples. Funding: Manitoba Pork Council and A.R.D.I.

Key Words: Deoxynivalenol, Decontamination, Pearling

901 Effect of quality and enzyme supplementation of wheat based diets on feed consumption and growth performance of pigs from 19 to 89 kg live weight. T.A. Van Lunen[1], K.D. Foote*[2], and P.H. Simmins[3], [1]*Agriculture and Agri-Food Canada, Charlottetown, PEI,* [2]*Atlantic Veterinary College, Charlottetown, PEI,* [3]*Finnfeeds International, Marlborough, UK.*

A study was conducted to evaluate the effects of quality of wheat based diets and graded levels of a commercial enzyme mixture on growth performance and feed consumption of pigs. Eight replicates of 1 pig per pen were placed on test at 19 kg live weight to dietary treatments containing one of two wheat cultivars and 5 levels of an exogenous enzyme mixture in a 2 by 5 factorial design. The wheat cultivars represented high quality and low quality grains as measured in a previous growth trial. Enzyme levels consisted of 0, 0.25, 0.5, 0.75 and 1.0 kg/T of Porzyme 9300 which contained a minimum of 4000 U/g xylanase. The pigs were fed, ad libitum, a 75% wheat based diet formulated to meet the nutrient requirements of a fast growing genotype. Water was available ad libitum via nipple drinkers. At 57 kg, all pigs were evaluated by real-time ultrasound to measure back fat depth and longissimus dorsi (LD) muscle at the P2 site. The trial ended when the pigs reached 89 kg live weight. The animals were cared for in accordance with the guidelines of the Canadian Council on Animal Care. The results indicated that wheat quality had a significant ($P < 0.05$) effect on growth rate (ADG) and feed intake (FI) with the high quality wheat resulting in a higher ADG and FI than the low quality wheat. Wheat quality had no significant effect on feed conversion ratio (FCR). The 0.75 kg/T enzyme inclusion level tended to reduce FI ($P = 0.13$)in the grower stage and significantly ($P = 0.04$)improved FCR over the length of the trial as compared to the 0 kg/T treatment. Significant differences ($P < 0.05$)in FI and FCR, for the 0.75 vs 0 kg/T treatments, were achieved in the grower stage when the data from pigs wasting feed were removed. The interaction between wheat variety and enzyme level reduced FCR by 18% ($P < 0.05$) in the grower stage with the low and high quality wheat diets at 0.75 and 0.50 kg/T xylanase levels, respectively. P2 backfat and LD depth were unaffected by dietary treatment. The results of this study indicate that some negative performance aspects of growing pigs associated with poor quality wheat-based feeds can be overcome by the use of exogenous xylanase.

Key Words: Pigs, Wheat, Xylanase

Production, Management, and the Environment
Livestock Management

902 Comparison of silvopastures and open pastures for cow-calf production. S.M. DeRouen* and T.R. Clason, *Louisiana State University Agricultural Center, Homer.*

The objective of this study was to compare cow-calf production on pine silvopastures with open pastures. Cow-calf production data were collected for 4 yr. Land areas were composed of: two 4.85-ha silvopastures on a 34-yr old pine plantation (62 trees/ha) (SP); and two 4.85-ha open pastures (OP). Bahiagrass, common and Coastal bermudagrasses and sod-seeded ryegrass forages were established in both land areas and rotationally grazed. Within land areas, low rate of nitrogen (N) fertilization (LN; 112 kg/ha split over 2 applications) and high rate of N fertilization (HN; 224 kg/ha split over 4 applications) were evaluated. At the initiation of the study, 40 mature F_1 Brahman x Hereford cows were blocked by age, BW and previous calf 205-d weight (205W) and assigned to each land type x N fertilization regime (TRT). An equal stocking rate (2.06 cow-calf units/ha) of 10 cows per TRT was maintained. Cows were assigned shortly after calving in late February and remained on their respective TRT until weaning in early October. Fertile Angus bulls were used for a 60-d spring breeding season. After weaning, all cows were combined and managed equally during the fall and winter. Each of the 4 herds was rotated annually to a different TRT. Cows culled from the study were replaced with cows of the same breed type and similar age. Statistical analyses were conducted with a generalized linear mixed model procedure. A total of 160 cow and 156 calf records were collected. Cow BW and body condition score (BCS) changes were similar ($P > .22$) among TRT. Pregnancy rates were similar ($P = .76$) and were 98, 96, 92 and 94% for SP-LN, SP-HN, OP-LN and OP-HN, respectively. Calf birth date, birth weight, preweaning ADG, actual weaning weight and 205W did not differ ($P > .12$) among TRT. The 205W by SP-LN, SP-HN, OP-LN and OP-HN were 244, 251, 233 and 245 kg, respectively. In conclusion, similar cow-calf productivity was observed among silvopastures and open pastures and no differences in animal performance were found among the two levels of nitrogen fertilization applied to either land area.

Key Words: Cow-calf production, Silvopastures, Fertilization

903 Commercial Evaluation of Prototype Meishan Hybrid Pigs for Reproductive Performance and Carcass Composition Traits. C. Okere*, J. Cosgrove, and L. Nelson, *Genex Swine Group Inc., Regina, Saskatchewan, Canada.*

The Genex Meishan Hybrid (GMH) (50% Landrace: 25% Chinese Meishan: 25% Large White) was evaluated against the standard Genex F1 gilt - Genex Hybrid (GH) (50% LW: 50% LR) in a commercial setting. Principal areas of evaluation were female reproductive performance and carcass traits of progeny following specific terminal crosses (GH x GNX3000 vs GMH x GNX3000). Non-significant genotype differences were noted for all carcass composition traits with the exception of hot carcass weight (88.7 3.6 vs 90.2 3.6 kg, $P = 0.001$) for GMH and GH progeny respectively. Compared to GH, GMH had slightly lower grade fat depths (19.1 3.9 vs 19.5 4.2 mm, $P = 0.48$), loin depths (58.2 7.2 vs 59.1 8.5 mm, $P = 0.38$), and similar estimated lean yield (60.2 1.8 vs 60.1 1.8 %, $P = 0.72$). Carcass index varied from a low of 90.0 to a high of 116.0 and were similar for both genotypes (109.5 3.8 vs 109.2 4.1, $P = 0.50$). The sexes did not differ in carcass composition traits with the exception of grade fat depths (19.2 vs 15.6 mm, $P = 0.04$) for barrows and gilts. Age at first service (220.5 vs 222.9, 198.9 vs 197.7 d; P=0.89) and wean to first service (5.0 vs 4.9, 6.9 vs 8.8 d; $P = 0.67$) were similar for both genotypes. Mean number born alive, number weaned and weaning weights were10.4 vs 11.1 (Farm A), 11.1 vs 11.0 (Farm B), 9.8 vs 9.6, 8.9 vs 9.2, 7.1 vs 6.7, 7.0 vs 6.7 for GH and GMH respectively. Significant genotype effects were observed for number born ($P = 0.007$) and born alive ($P = 0.02$). The average parity of sows was 1.6, 1.9,

1.6 and 1.7 for GH and GMH in Farms A & B respectively. A number of conclusions can be drawn from this study 1) concerns over potential carcass performance of slaughter generation from Meishan-derived dam lines to have been overstated and 2) the prototype line containing 25% Meishan had increased number of pigs born alive and weaned per litter that must be considered in light of other features of this genotype such as carcass composition traits.

Key Words: Prototype Meishan, Reproduction, Carcass quality

904 Location and breed effects on cashmere production by goats. C. J. Lupton*[1], A. R. Dooling[2], K. Lankford[3], and F. A. Pfeiffer[1], [1] *Texas Agricultural Experiment Station, San Angelo,* [2] *Pioneer Mountain Farm, Inc., Dillon, Montana,* [3] *Susitna Ranch, Willow, Alaska.*

Three groups of contemporary, fiber-producing goats representing two genotypes (Cashmere (C), higher producing and Spanish (S), lower producing; initially, 20 yearling castrate goats/genotype/group) were maintained for three years at three diverse locations in the USA to study the effects of location (equals environment including local customary management) on cashmere production and fiber characteristics. Initially (using yearling weights and fleeces) and within genotype, body weight (BW), raw fleece weight (RFW), cashmere yield (CY), cashmere down production (CDP), cashmere average fiber diameter (CAFD), and cashmere average staple length (CASL) were not different among groups. The goats were maintained on pasture and supplemented with local hays in an attempt to achieve and maintain target body weights. The three locations were close to San Angelo (TX), Dillon (MT), and Willow (AK). Each year, fleeces were shorn before the commencement of shedding in January (TX), March (MT), and April (AK). The main effects of location (both genotypes, data from three production years) were: BW in AK $<$ MT $<$ TX (31.0, 39.2, and 49.4 kg, respectively, $P < 0.0001$); RFW in AK $<$ MT = TX (445, 491, and 513 g, respectively, $P < 0.005$); CY in AK $>$ MT $>$ TX (27.3, 21.3, 17.4 %, respectively, $P < 0.0001$); CDP in AK $>$ MT $>$ TX (4.0, 2.7, and 1.8 g/kg BW, respectively, $P < 0.0001$); CAFD in AK = MT $<$ TX (17.3, 17.4, 18.6 microns, respectively, $P < 0.0001$); and CASL in AK = MT $>$ TX (7.5, 7.1, and 6.3 cm, respectively ($P < 0.0001$). The main effects of breed (data from four production years, $P < 0.0001$ for all reported differences) were: BW of C $<$ S (31.4 vs 38.5 kg); RFW of C $>$ S (454 vs 353 g); CY of C $>$ S (22.4 vs 16.7 %,); CDP of C $>$ S (3.21 vs 1.47 g/kg BW,); CAFD of C and S were not different (17.2 microns); and CASL of C $>$ S (6.8 vs 5.2 cm). This information may assist producers and scientists in this country and abroad to better understand the effects of environment on cashmere production and fiber characteristics.

Key Words: Cashmere, Goat, Environment

905 Polymer assisted solid separation is similar for gestation, farrowing, nursery and grow-finish swine surry. P. Walker and J. Olson*, [1] *Illinois State University, Normal.*

Four concentration rates of Percol 757®, a copolymer acrylamide, were evaluated as floculants to coagulate the solids fraction of anaerobic swine slurry collected from gestation (G), farrowing (F), nursery (N), and grow-finish (G-F) pits. Fourteen samples of slurry were collected with a 2.4m probe from a pump station that was drained from each of four G, F, N and G-F .61m deep pits on 16 separate occasions during a 30 day time period. For each collection, .75g and .375g of polymer (PM) were each mixed with 6-500mL samples of slurry, stirred at 30 RPM for 10 minutes, poured into cone-shaped settlelometers and diluted with 500mL of de-ionized water. For each collection 2-500mL slurry samples were poured into settlelometers without PM addition and diluted with 500mL of de-ionized water to serve as controls. Following a 1h settling time all samples were analyzed for separable solids (SS), total suspended solids (TSS), dissolved oxygen (DO), chemical oxygen demand (COD), phosphorus (P) and nitrogen (N). In addition, two collections of G-F slurry were mixed and evaluated with .125g and .0625g of PM using the previously described procedure. No differences ($P>0.05$) were observed in any of the parameters evaluated between .75g and .375g of PM addition. Compared to control .75g and .375g PM increased the SS concentration(mL:L), 19.43± 8.80% and 24.78± 7.89%, respectively. TSS(mg:L) removal was similar for all slurry types between .75g and .375g PM addition comparing 93.12± 9.79% and 91.64± 10.22% respectively. No differences ($P>0.05$) in P or N% removal were observed for .75g or .375g of PM. Mean P removal was 71.1% and mean N removal was 72.76% across all slurry types. Compared to control .125g and .0625g PM increased the SS concentration 49.12% and 42.50%, removed 100.00% and 100.00% of the TSS(mg/L), removed 50.00% and 55.72% of the N and removed 100.00% and 95.13% of the P, respectively. PM had little effect on DO and COD. The mean solids concentration of the four slurry types were 2.84± .14% G-F, 3.61± .06% N, 2.65± .01% F and 2.85± .11% G. This study suggests PM concentrations as low as .24L PM : 3800L slurry or 3.78kg PM:dry ton of solids can effectively separate the solid and liquid fractions of swine slurry.

Key Words: Polymer Assisted Separation, Swine Slurry

906 The use of two types of reduced size boluses for the electronic identification of fattening lambs. D. Garin, G. Caja*, J. Ghirardi, and M. Hernandez-Jover, *Universitat Autonoma de Barcelona, Bellaterra, Spain.*

Two types of cylindrical ceramic boluses: Mini (**M**; 9.5×37.4 mm, and 9 g), and Small (**S**, 15.5×38.0 mm, and 25 g) were used to evaluate the effects of application age in a total of 276 lambs. In Exp. 1, newborn lambs (n= 161) were assigned to treatments according to the bolus application procedure: **C** (n= 40), control without bolus; **MP** (n= 40), M bolus applied $<$ 7 d old with a plastic probe; **MH** (n= 40), M bolus applied $<$ 7 d old by hand; and S (n= 41), S bolus applied $>$ 8 wk old with a balling gun. Differences ($P<0.05$) were observed in age (4.8 and 7.6 d) and weight (5.5 and 7.0 kg) for MP and MH application procedures, respectively. Values at application of S boluses were 54.8 d and 16.0 kg BW, but eight lambs (20%) reached the final experimental BW (23 kg) before wk 8 and they were not applied. Lambs mortality (7.5%) and ADG (251 g/d) were not affected by treatments. However, three lambs of MP treatment died as a result of infections induced at application. Bolus retention rate (100%), and abattoir recovery (100%) and forestomach location (reticulum, 85.7%; and rumen, 14.3%) were not affected by bolus types. In Exp.2, only M boluses were used in new born lambs (n= 115) to evaluate the breed effects on age and weight at application. Breeds were: Manchega (n= 53), Lacaune (n= 30), and Ripollesa (n= 32). Lambs were intensively fattened after weaning until 24 kg BW. Ripollesa lambs had a greater application age (17.0 d; $P<0.05$) than both dairy breeds that had similar application age (11.5 d). For all breeds application BW was similar (6.8 ± 0.2 kg). Growth performances were in accordance with the breed. Bolus retention rate was 99.1% on average. Forestomach location was incomplete (reticulum, 82.5%; rumen, 12.4%) and 5.1% M boluses were found in the abomasum. As a conclusion, the M boluses could be safely applied by hand, when young lambs had surpassed 6.8 kg BW. Our results also indicate the loss of M boluses via the reticulo-omasal opening when small diameters are used and the need to evaluate the long-term retention of mini boluses in sheep.

Key Words: Transponders, Electronic Identification, Sheep

907 Using blood urea nitrogen to predict nitrogen excretion in cattle, horses, pigs, sheep, goats, and rats. M. M. Dinneen* and R. A. Kohn, *University of Maryland, College Park.*

The ability to predict how much nitrogen (N) animals excrete may help decrease N pollution and reduce excess feeding of protein on farms. The objective of this study was to evaluate the potential for predicting urine N from blood urea N (BUN) and body weight (BW) for several domestic species. Means (n=119) were used from 23 studies where BUN and total urine N were reported. Urine N (mg/d) per kg body weight was regressed for each species against BUN (mg/L) as a fixed effect and study as a random effect. For each species, the intercept was not significant, and was subsequently set to 0. The N clearance rate (liters of blood cleared of urea N per d per kg body weight) was calculated as the slope coefficient of BUN and differed from 0 ($P < 0.05$) for each species. Herbivores had lower N clearance rates than pigs, and rats had higher clearance rates than other species ($P < 0.01$). Urine N (mg/d/kg BW) would be predicted as clearance rate (see table) times BUN (mg/L). Root mean square prediction errors as a percentage of mean urine N were 39, 49, 41, 44, 11, 55 and 8% for dairy, beef, pigs, sheep, horses, rats, and goats respectively. The percentages of mean square prediction error attributed to study differences were 56, 93, 81, 86, and 36% for dairy, beef, pigs, sheep, and rats (only 1 study was used for each of horses and goats). Urine N can be predicted from BUN if methods are consistent within a study.

Species	Studies No.	Means No.	N Clearance L/d/kg BW	SE
Dairy	6	31	1.4	0.13
Beef	2	8	1.0	0.17
Horses	1	3	0.9	0.06
Pigs	4	18	2.0	0.19
Sheep	6	36	1.2	0.09
Goats	1	7	0.7	0.08
Rats	3	16	8.3	1.69

Key Words: Nitrogen excretion, Blood urea nitrogen, Waste management

908 Effect of bovine somatotropin on pregnancy rates in beef cows following presynchronization with MGA and synchronization with GnRH and $PGF_{2\alpha}$. M.L. Borger and W.A. Greene*, *The Ohio State University, Wooster USA*.

Eighty beef cows were allotted to two similar groups (bST and control) based upon breed, age, postpartum interval, and postpartum cyclicity (as determined by ultrasonography). All cows were presynchronized by receiving .5 mg/d melengesterol acetate (MGA) in their ration from d -26 to d -12. Each cow was synchronized with 50 μg GnRH i.m. on d 0 and 25 mg prostaglandin ($PGF_{2\alpha}$) i.m. on d 7. Cows were observed for estrus 0730 and 1930 and were artificially inseminated (AI) 8-16 h after estrus was observed. If estrus was not observed, cows received 50 μg GnRH i.m. and were AI 90 h after $PGF_{2\alpha}$. At the time of AI, cows in the bST group received 500 mg bovine somatotropin (bST) s.c. while the control group received no bST. Following the synchronization period, repeat breedings were done until d 49. Cows were pregnancy diagnosed by ultrasonography on d 80. PR to synchronization (PR-SYNC) and overall PR were similar for both groups (P>.05). PR-SYNC for bST and control groups were 57.5 and 50.0%. Overall PR for bST and control groups were 90.0 and 85.0%. PR-SYNC tended to be higher for cycling cows (56.7 vs. 45.0%, P=.36) while overall PR was not affected (P>.05) by postpartum cyclicity status at time of presynchronization.

909 Location and season effects on mohair production by Angora goats. F. A. Pfeiffer*[1], C. J. Lupton[1], and A. R. Dooling[2], [1]*Texas Agricultural Experiment Station, San Angelo,* [2]*Pioneer Mountain Farm, Inc., Dillon, Montana*.

Angora goats, which produce long, white, lustrous fibers known as mohair, were introduced into the US from Turkey in 1849. They have since been raised under many diverse environments with mixed results. This experiment was designed to determine effects of two different US environments on mohair production and fiber characteristics. Sixty yearling, castrated goats obtained from a Texas source were shorn so that mohair fleece (6-mo growth) and fiber properties could be determined. Subsequently, 20 relatively uniform goats were assigned to each of two groups such that average body weight (BW), grease fleece weight (GFW), clean yield (CY), clean fleece weight (CFW), clean mohair produced/unit of bodyweight (CFW/BW), average fiber diameter (AFD), average staple length (ASL), and medullation (MED, KEMP, TOTMED) were not different between groups. One group (TX) remained close to San Angelo, Texas, and the other (MT) was re-located to Dillon, Montana. The goats were maintained on pasture and supplemented with local hays for 3 yr. Each year, animals were shorn and weighed in February or March (Spring, S) and again in August or September (Fall, F) and their fleeces were re-tested. Location X season interactions were significant for all properties measured except CY, AFD, MED, KEMP, and TOTMED. The CY in MT > TX, whereas AFD in MT < TX (79.9 vs 76.1 % and 32.9 vs 36.0 microns, respectively, P < 0.0001). The MED, KEMP, and TOTMED were not different (0.85, 0.15, and 1.00 %, respectively, P > 0.14) between locations. In MT, BW, GFW, CFW, CFW/BW, and ASL were greater (P < 0.05) in F than in S (41.6 vs 32.4 kg, 3.3 vs 2.1 kg, 2.6 vs 1.7 kg, 65.9 vs 53.4 g/kg, 13.5 vs 10.4 cm, respectively). Differences are consistent with harsh, cold winters and summers in which abundant feed was available. In contrast, GFW and ASL in TX were smaller (P < 0.05) in F than in S (3.2 vs 3.7 kg and 11.4 vs 13.3 cm, respectively). The TX goats had similar (P > 0.05) BW, CFW, CFW/BW, and AFD in F and S (46.6 vs 47.9 kg, 2.5 vs 2.7 kg, 55.2 vs 56.6 g/kg, and 35.9 vs 36.1 microns, respectively). The TX data are consistent with relatively mild winters and harsh, hot summers. The lower production of MT goats would be offset to some degree by greater unit value of the finer mohair.

Key Words: Angora goat, Location, Season

910 Animal performance and carcass quality of stocker calves on grass pasture with ad libitum access to a high energy diet. W. A. Phillips*[1], M. A. Brown[1], J. W. Holloway[2], and H. S. Mayeux[1], [1]*USDA-ARS Grazinglands Research Laboratory, El Reno,OK,* [2]*Texas Agricultural Experiment Station, Uvalde*.

With improved cattle genetics and stocker management, stocker calves are heavier at the end of the production cycle and are sometimes discounted when sold in the spring as feeders. The objective of this experiment was to compare animal performance, carcass quality and feed inputs of stocker calves finished on pasture with ad libitum access to a high grain diet to a conventional confinement feeding system. Beef calves (N=278) were born in the spring, weaned in the fall, and transported from Booneville, AR or Uvalde, TX to El Reno, OK to grazed winter wheat and/or dormant native prairie during the winter and wheat pastures in the spring. In June of each year(1996 and 1997),calves were blocked by breed, source and any previous treatments. They were then randomly assigned within block to a conventional total confinement finishing system (FEEDLOT) or to a new system (GRAIN-ON-GRASS) where calves grazed warm season grass pastures at a stocking rate of 9.9 calves/ha with ad libitum access to a high grain diet. A common high grain diet was feed to both FEEDLOT and GRAIN-ON GRASS each year. Pen and pasture were used as the experimental unit. The statistical model contained group (which was a combination of year, source and calf gender), system (FEEDLOT vs GRAIN-ON -GRASS) and the two-way interaction. Average final BW (526 kg) and overall ADG (1.16 kg) were similar across finishing system. Calves in the GRAIN-ON-GRASS group were on feed for 10 d less (P < 0.01) than the calves in the FEEDLOT (137 vs 147) and consumed less (P < 0.05) feed (1087 kg vs 1312 kg). Calves in the GRAIN-ON-GRASS group had similar hot carcass weights (320 vs 326 kg), less (P < 0.04) carcass fat thickness (10.6 vs 11.1 mm), lower quality grade (10.6 vs 11.1; choice = 13.0), and lower yield grade (2.55 vs 2.86) than calves finished under the FEEDLOT system. We conclude that heavy stocker calves can be finished on grass pastures with less feed inputs as compared to a conventional feedlot system.

Key Words: Feedlot, Beef Cattle, Gain

911 Time of suckling implant influences on weaning weight and post-weaning performance in steer calves. S. M. Holt*[1], R. H. Pritchard[1], and H. M. Blalock[1], [1]*South Dakota State University*.

The effect of time of suckling implant (IMPL) on weaning weight (WW) and post-weaning performance of steer calves was evaluated in a complete randomized study replicated over two consecutive years. Calves were born in March and April of both years. In year 1, (n=194) and year 2, (n=196) steer calves were either not implanted (NI) or were implanted with Synovex C either in MAY, or August (AUG). Dam age was divided into immature dams of ages <4 yr (IMM, n=143) or mature dams ≥4 yr (MAT, n=247). Calves were reared on native range prior to weaning. Age groups of dams were managed separately on the ranch. At weaning (late October) all calves were transported 600km to the SDSU Research Feedlot. After resting (10 h) calves were individually weighed and processed, and BW recorded was considered the WW. All calves received a Synovex S implant during arrival processing. Calves were sorted into feedlot pens by IMPL treatment (8 to 9 steers per pen; 8 pens per treatment; 24 pens per yr). A corn silage-rolled corn diet was fed (1.85 Mcal/kg NEm and 1.18 Mcal/kg NEg) for 64 d (Yr 1) and 66 d (Yr 2). IMPL increased WW (254.6 ± 2.98) 11.5 and 8.6 kg for MAY and AUG respectively (P<.05). An IMPL x dam age interaction occurred. In MAT dams WW was increased (P<.05) 18.1and 7.8kg for IMPL treatment MAY and AUG respectively. In IMM dams, WW was increased (P<.05) 3.7 and 7.7kg for MAY and AUG calves respectively. Post-weaning DMI was increased by IMPL (P<.05), with intakes of 6.9, 7.2 and 7.0kg for NI, MAY and AUG respectively. This difference in DMI occurred in the first 4 wk post-weaning. Final BW (350.0 ± 2.46) was increased (P<.05) 11.1 and 8.2kg for MAY and AUG calves compared to NI calves. This BW difference was unchanged from WW differences. Post-weaning ADG (1.58 ± 0.025) and feed efficiency

(0.22 ± 0.001) were not affected by IMPL. Calves from MAT dams benefited most from MAY implant while calves from IMM dams benefited more from AUG implant. Suckling implants had minimal effects on post-weaning performance.

Key Words: Implants, Weaning, Feedlot

912 Effects of feed form and placement immediately postweaning on the growth performance of piglets. B. P. Corrigan*, M. Ellis, B. F. Wolter, J. M. DeDecker, and S. E. Curtis, *University of Illinois, Urbana, IL/USA*.

This study evaluated effects of feed form and feed placement for 4 d postweaning on piglet performance to 8 wk postweaning. Two trials were carried out in commercial wean-to-finish facilities using a randomized block design with a 2×2 factorial arrangement with treatments being feed form (dry-pellet vs gruel [1:1 ratio of weight of water to pellet]) and feed placement (feed trough only vs floor mat and feed trough [mat feeding]). Pigs also had ad libitum access to water and feed. Pigs (n=864) were allotted in each trial at weaning (17±2 d of age) to pens of 27 animals on the basis of sex (equal ratio of barrows to gilts) and weight (4.9 and 6.1±0.02 kg BW for Trials 1 and 2). Floor, feeder-trough, and mat spaces were 0.64 m^2, 2.3 cm, and 0.05 m^2/pig, respectively. Feed form did not affect ($P>0.05$) ADG in Trials 1 or 2; however, gruel-fed pigs had higher ADFI ($P<0.05$) from start to wk 3 (328 vs 289±10.8 and 362 vs 332±7.8 g, for Trials 1 and 2, resp.) and showed a trend ($P=0.10$) for reduced G:F (0.60 vs 0.66±0.023 and 0.68 vs 0.74±0.224, resp.). In Trial 1, mat feeding resulted in higher ($P<0.05$) ADG (92 vs 76±4.6 g) and ADFI (246 vs 150±8.4 g) in wk 1 and higher ($P<0.05$) ADFI (331 vs 286±10.8 g) from start to wk 3, and tended ($P=0.07$) to increase ADG (197 vs 186±3.3 g) from start to wk 3. In Trial 2, mat feeding increased ($P<0.05$) ADFI in wk 1 (258 vs 155±5.9 g) and start to wk 3 (369 vs 326±7.8 g), however, ADG was not affected ($P>0.05$). There were no treatment effects ($P>0.05$) for mortality in either trial. Mat feeding reduced morbidity in the first 3 wk in Trial 1 (0.23 vs 1.27%; $P<0.01$) but not Trial 2 (0.58 vs 1.16%) and gruel feeding reduced morbidity in Trial 2 (0.35 vs 1.39%; $P<0.05$) but not Trial 1 (0.46 vs 1.04%). Growth rates to 8 wk postweaning were not affected ($P>0.05$) by feed form or feed placement. These results suggest providing newly weaned pigs access to gruel feed or feeding at the mat may reduce morbidity and that mat feeding may increase growth rate in the first week postweaning.

Key Words: Wean-to-finish, Mat feeding, Gruel feeding

913 Reducing cattle impact on water quality through the use of off-stream waterers. D Veira* and L Liggins, *AAFC Range Research Unit, Kamloops, BC*.

The response of a post-partum herd to free choice access to both natural and aritifical watering points was characterized and the frequency of urination and defecation in and near the natural watering point during drinking events was quantified. All cows and first calf heifers in a 172 pair commercial beef herd were tagged with Allflex transponders prior to the 2001 calving season. After calving, animals were moved into a 21 ha partially treed pasture and fed hay until turnout. During this time (Feb. 23 - Apr. 20) animals had free choice access to river water via either a traditional watering point or a water trough. Daytime use of the river was recorded using a time-lapse video system. All use of the trough was detected and recorded by a Growsafe System, which read the transponders. Over the course of 56 days, 13,111 daytime drinking events were observed. Chi-square goodness of fit test showed that the herd's use of water sources was not random (P<0.001) with 91.6% of these events occuring at the off-stream source. The 56 days were divided into 3 periods based on changes in climate and management; the first 17 days were characterized by the presence of snow and puddles and the last 17 days by an increased trough size. Kruskal-Wallis analysis showed that use of the trough on a per animal basis, in terms of both liters per day and number of visits, was significantly lower (P<0.001) while snow was present. Of the 1,101 daytime drinking events recorded at the natural watering point, 168 (15.3%) resulted in the deposition of urine and/or feces in either the river (92) or the immediate riparian area (76). At this rate of deposition, off-stream watering is assumed to have prevented a further 1,833 incidents of the deposition of urine and/or feces. When winter feeding post-calving herds, the use of natural watering points and the associated pollution of water can be substantially reduced by the introduction of free choice off-stream water. Changes in climate may affect the success of off-stream watering.

Key Words: Cattle, Water Quality, Off-stream water

914 The effects of additional lighting and glucose supplemented drinking water on the performance of dairy calves. V. R. Osborne*, B. W. McBride, and R. R. Hacker, *University of Guelph, Guelph, Ontario, Canada*.

An experiment was conducted to test the effects of supplemental lighting and the addition of a 5 % glucose solution into the drinking water offered to calves on performance from birth to 8 wk of age. Twenty four Holstein heifer calves at birth were randomly assigned to a factorial design were treatments included 18 or 10 h of continuous light (650 lux) in combination with an addition of 50 g/L of glucose to the drinking water of calves or normal water. All calves received 4 L of whole milk daily. Overall body weight gain from birth to 8 wk of age was greater for the calves on the 18 h vs 10 h of light (38.8 vs 30.7 kg; $P < 0.01$). Daily water intake (5.0 vs 3.9 L /d) and calf starter intake (592 vs 317 g/d) were also greater ($P< 0.01$) with calves exposed to the longer photoperiod. The addition of glucose to the water had no effect on body weight gain, feed or water intake. The results of this trial demonstrate that extended light given to calves during the nursery period increases feed and water intake and body weight gain.

Key Words: photoperiod, growth, dairy calves

915 Effect of shade in feedlot pen on growth performance of Brahman bull calves during heat raining season under Mexican dry tropic environment. R. Barajas*[1] and J.A. Felix[1], [1] *FMVZ-Universidad Autonoma de Sinaloa (Mexico)*.

To determinate the effect of shade in feedlot pen on growth performance of Brahman bull calves during heat raining season under Mexican dry tropic environment, two experiments involved 128 animals were conducted. Experiment one was conducted from July to end September of 2000, sixty four bull calves Brahman cross (BW=219 kg), were grouped by weight, and in a complete random block experiment design, were assigned to be placed in two types of pens in that consisted the treatments: 1) Pens with shade inside (four pens) that supply 3.14 m2 of shade by head (Shade treatment); or 2) Pens (four pens) without shade (NO shade treatment). Experiment two, was carry out from July to September 2001, and sixty four bull calves Brahman cross (BW=195 kg), were used in experiment with similar methodology than experiment one. Results two years experiments were pooled and analyzed as a factorial 2 X 2 arrangement of treatments (two years X shade level), using each pen as repetition. The shade diminished (P<0.01) 5% maximum air temperature (37.9 vs. 35.9C), and in 19% ground temperature (46.6 vs. 37.5C). Final weight was not impacted (P=0.20) by shade (304 vs. 312 kg). Shade increased (P=0.03) ADG in 10% (1.24 vs. 1.37 kg/day). Shade decreased (P<0.01) in 3.6% dry matter intake (8.35 vs. 8.05 kg/day). Feed/gain ratio was improved (P<0.01) in 12.9% by shade in pen (6.77 vs. 5.90). Shade improved in 9% the use de NEm from the diet (1.49 vs. 1.63 Mcal/kg), and in 13% NEg (0.90 vs. 1.02 Mcal/kg). Observed/expected ratio of NEm retained from diet was increased (P<0.01) in 8.8% with shade in pen (1.05 vs. 0.96), and improved (P<0.01) in 12.9% observed/expected NEg from diet (0.97 vs. 0.86). Not interaction (P>0.10) shade X year was found for any variable. This results suggests, that the use of shade inside of feedlot pens is a recommendable built facility for feedlots located in the Mexican dry tropic environment areas.

Key Words: Shade, Feedlot, Brahman, Bull Calves, Performance

916 Utilization of forage cubes to deliver feed additives to cattle on all-forage diets. K. Ominski* and K. Wittenberg, *University of Manitoba, Winnipeg, Manitoba, Canada*.

Beef and dairy producers utilizing all-forage rations are faced with the challenge of ensuring that animals receive sufficient quantities of trace minerals, ionophores and/or other feed additives on a daily basis. As such, a study was initiated to compare mineral consumption in cattle receiving supplemental mineral in a fortified cube with those receiving supplemental mineral on a free-choice basis. Thirty-six Simmental-cross/Charolais-cross gestating cattle in the second trimester of pregnancy were placed in 18 pens and fed a barley silage:barley grain (85:15,

DM basis) ration containing 100 mg Mo and 4 g S kg-1 for a period of 42 days. Following the depletion stage, a 42-day stabilization phase was achieved by feeding low copper hay (3.3 ppm, DM basis). Successful depletion of stored copper was confirmed via examination of blood and liver copper concentrations at the end of the stabilization phase. During the repletion phase, cows were fed hay and one of the following three alfalfa:barley concentrate (87:13) cubes: A - no additives (salt and mineral provided on a free-choice basis); B - salt and mineral added; and C - salt, mineral and an ionophore added. Each pen received 4 kg of cubes on a daily basis. Daily intake of mineral was 41 g 2.3 per head per day when delivered on a free-choice basis and 28 g 0 per head per day when delivered via a cube. When mineral was provided on a free-choice basis, the coefficient of variation for daily intake was 81% while the coefficient of variation for pen intake was 36%. There were no significant differences among treatments for cow or calf serum copper or zinc concentrations or for cow plasma ceruloplasmin activity in the last trimester of gestation and in the initial 6 weeks post calving. There was, however, a significant difference between treatments for calf ceruloplasmin activity (P=0.0432). This data indicates that there is significant day-to-day and pen-to-pen variation in consumption when mineral is offered on a free-choice basis. Fortified cubes may be used as an effective means of eliminating the variability in intake associated with free-choice consumption of feed additives.

Key Words: Forage cubes, Feed additives, Free-choice consumption

917 Optimization of dairy heifer purchasing decisions under herd constraints with a genetic algorithm. A. de Vries*, *University of Florida*.

The objective of this study was to develop a method that is able to optimize dairy heifer purchasing decisions under herd constraints, such as a monthly net return constraint. Currently, advanced replacement models determine optimal replacement policies based on an unlimited availability of heifers and fixed herd sizes. Typically, dynamic programming (DP) is used. The optimal replacement policies are then calculated independently of the policies for other cows in the herd. Consideration of herd constraints make optimal policies dependent on policies for other cows. As a result, the number of potential policies becomes too large to optimize with DP. A genetic algorithm (GA) can be considered a search method motivated by genetic principles. Applied here, the GA combines sequences of non-optimal purchasing decisions (genes) such that the total purchasing policy (chromosome) becomes more profitable (fit). The optimal purchasing policy for 36 months was searched under Florida conditions for 4 scenarios: [A] fixed herd size, no constraint, [B] fixed herd size, monthly return > \$60 per average cow, [C] expansion from 80% to 100% of fixed herd size, no constraint, [D] same expansion, monthly return > \$0 per average cow. The herd was simulated using a Markov chain. An additional 24 months were simulated with the optimal DP policy. The number of heifers considered to be purchased each month ranged from 0% to 5% of the maximum herd size [A, B] or 0% to 20% [C, D], in 11 equal steps each. Thus, the number of potential policies was 11^{36} for each scenario. The GA was run 10 times with 50 random starting policies for 50 generations for each scenario. For [A], the optimal policy returned \$5984, based on DP. The best GA policy returned \$5964 [A], \$5935 [B], \$4879 [C], \$4629 [D], up from average starting policies returning \$5762, \$5272, \$2300, \$2377, respectively. The return constraint was not violated in any of the final generations for both [B] and [D]. The conclusion is that a GA is a promising method for optimizing dairy heifer purchasing decisions under herd constraints. However, the optimal policy may not be found.

Key Words: Genetic algorithm, Heifers, Economics

918 The effect of feeding period length on performance, carcass traits and net return of finishing steer calves. J.D. Arseneau*, M.C. Claeys, and R.P. Lemenager, *Purdue University*.

A total of 128 Angus-sired steer calves (initial BW 304 1.2 kg) were used to evaluate the effects of feeding period length on live performance, carcass traits, and net return. Steers were randomly allotted by weight to one of four harvest dates (131, 152, 173 or 208 d on a high grain ration). Harvest d 152 was projected to be the optimum market endpoint for this group of cattle. For calculation of net return, cattle were priced using either a common carcass grid (\$120/cwt base) or live price (\$76.36/cwt). Days on feed increased (linear;P<.01) final BW, HCW, YG, % YG 4/5's, and % premium choice and prime. A quadratic (P<.05) response was observed for ADG, G/F and DP as days on feed increased. When utilizing a common live price for all harvest dates, net return/hd increased linearly (P<.01), while grid pricing approached significance in a quadratic manner (P=.12). Price and cost assumptions used in this study resulted in greater profits when steers were sold on a constant live price basis, however, true value is more accurately reflected by the grid pricing mechanism. It appears from this study that net returns were maximized when calves were fed approximately 173 days (1.53 cm BF, >93% choice).

	Days	on	feed		Effect	
Item	131	152	173	208	Linear	Quad.
Final BW, kg	520	563	604	640	**	NS
ADG, kg	1.64	1.71	1.73	1.62	NS	*
F/G	5.55	5.64	5.78	6.33	**	*
HCW, kg	324	352	378	409	**	NS
DP	63.7	63.2	64.0	64.8	**	**
YG	2.25	2.46	3.09	3.43	**	NS
YG 1/2, %	70.9	56.6	9.3	6.2	**	NS
YG 4/5, %	0.0	3.3	18.7	31.2	**	NS
Ch^-, %	58.0	63.3	56.2	34.3	*	NS
Prem. Ch., %	6.4	16.6	28.1	34.3	**	NS
Prime, %	0.0	0.0	9.3	21.8	**	NS
Net return,\$/hd						
Grid	11.95	44.50	60.97	35.10	NS	NS
Live	39.79	77.05	103.61	107.59	**	NS

*P<.05; **P<.01.

Key Words: Beef, Calves, Days on feed

919 A comparison of the performance and injury scores of broiler breeder flocks illuminated by high-pressure sodium, compact fluorescent and incandescent lighting. C.M. Vandenberg*[1] and T.M. Widowski[1], *University of Guelph, Guelph, Ontario/Canada*.

Gas discharge lamps, such as compact fluorescent (CF) and high-pressure sodium (HPS) offer advantages to poultry producers because of energy savings and longer lamp lives. However, the spectral characteristics of these light sources are considerably different from those of standard incandescent (IN) lamps, which may influence bird behaviour and performance. Four pens, each holding 39 Ross broiler breeder hens and 3 Ross broiler breeder males, were illuminated by either HPS (84 lux), CF (38 lux) or IN (38 lux) from 23 to 65 wks of age. Each pen contained a feeder, nipple drinker, 10 nest boxes and a raised roost area. Hen-day egg production, during wks 25 through 65 was the same for all light sources (P>0.89). Overall fertility (averaged from samples taken at 30, 36, 44, 50, 57 and 63 wks of age) was 91.4 ± 0.85% for CF, 92.3 ± 1.5 % for IN and 94.3 ± 0.94 % for HPS (P>0.10). The percentage of eggs laid on the floor instead of in the nest boxes was significantly higher in pens illuminated by CF (9.5 ± 0.61 %) than in IN (7.4 ± 0.61%) and HPS (5.7 ± 0.61%) (P<0.02). Frequency distributions of hens scored for severity of scratches behind the wings and on the upper back differed across light source at both 52 (P<0.02) and 65 weeks of age (P<0.01) with hens in HPS having significantly fewer scratches. Percentages of hens with None, Mild or Moderate-Severe scores were 58.7%, 36% and 5.3% for CF, 51%, 40% and 9% for IN and 68.6%, 24.4% and 7% for HPS, respectively at 52 wks of age and 61.7%, 36.9% and 1.3% for CF, 54%, 42% and 4% for IN and 78.2%, 18.5% and 3.3% for HPS, respectively at 65 wks. While egg production and fertility were not affected, light source appeared to influence behaviour as indicated by nesting site and injury scores.

Key Words: Broiler breeders, Light source, Production