filtration (P=0.31). Percent motile, progressive, and rapid sperm did not differ (P=0.87, 0.91, and 0.94, respectively) across treatments. Across bulls, the percent motile sperm declined by ~50% from 0 to 4 h of culture, and by another ~33% from 4 to 8 h of culture. The VAP and VSL were similar (P≥0.09) across treatments, whereas VCL was greater (P=0.00) for both filtration and swim-up than for percoll. Sperm LIN and STR were similar across treatments (P=0.24 and 0.89). The ALH was greater for filtration and swim-up than for percoll (P≤0.01). The BCF for filter selected sperm was greater than that of either percoll or swim-up (P≤0.00). Sperm head elongation and area were also greater for filter selected than either swim-up or percoll (P≤0.00), whereas these parameters were similar for percoll and swim-up (P≥0.68). Based on total motile sperm recovered, percoll separation is superior to the other methods. Overall, results suggest that the method used for selection of motile sperm can influence some of the parameters related to motility and sperm head morphology. Further study is needed to determine if these differences are related to fertilization rate or developmental competence after IVF.

Key Words: Bovine, Sperm Parameters, CASA

Production, Management & the Environment - Livestock and Poultry III

W239 Effect of soaking dairy cows at the feed line on animal body temperature in a tunnel ventilated barn equipped with evaporative pads located in a tropical climate, Thailand. D. V. Armstrong*[1], M. J. VanBaale[1], S. Rungruang[2], V. Wuthironarith[2], M. J. Brouk[3], and J. F. Smith[3], [1]*The University of Arizona*, *Tucson*, [2]*Charoen Pokphand Group Co., Ltd.*, *Bangkok, Thailand*, [3]*Kansas State University*, *Manhattan*.

An experiment was conducted on ten lactating Holstein cows to evaluate the effect of soaking dairy cows at the feed line. The cows were housed in a two row tunnel ventilated free stall barn equipped with evaporative pads and a feed line soaker system. The free stall barn is 16 m by 113 m with a ceiling height of 2.6 m. The barn is equipped with 55.7 sq m of 2.4 cm thick evaporative pads on one end and eleven 130 cm fans on the opposite end of the barn. Air speed in the barn at animal shoulder height averages 9.7 km per hour. Air exchange is every 42 sec. Two treatments were utilized in this experiment: no feed line water spray (C) and feed line spray (FLS) from 1100 to 0600. Treatments were reversed every 4 days in a 2 × 2 Latin square design. The soaker cycle was 1 minute on and 4 minutes off. Water application was 2.8 liters of water per cow per cycle. Nozzles are located every 1.87 m on the line located at a height of 1.6 m from the floor. The average ambient temperature was 29.1°C, with relative humidity (RH) at 68%, and a temperature humidity index (THI) of 79. The average temperature inside the barn was 25°C, with the RH at 91% and a THI of 78. Individual cows were fitted with stainless steel temperature data loggers that recorded their core body temperature (CBT) at five-minute intervals throughout the study. Average CBT for the control group was higher, 39.08°C, than the cows with FLS, 38.99°C and is significant (P<0.01). The results of this trial suggest that feed line soaking has an additive effect for cooling cows in a tunnel ventilated barn located in a tropical climate. The difference between treatment CBT was from 06:00 to 09:00 when the ambient relative humidity is the highest and the difference between ambient and barn temperature is the lowest.

Key Words: Body Temperature, Feed Line Cooling, Tropical Climate

W240 Effect of soaking dairy cows at the feed line on animal behavior in a tunnel ventilated barn equipped with evaporative pads located in a tropical climate, Thailand. D. V. Armstrong*[1], M. J. VanBaale[1], S. Rungruang[2], V. Wuthironarith[2], M. J. Brouk[3], and J. F. Smith[3], [1]*The University of Arizona*, *Tucson*, [2]*Charoen Pokphand Group Co., Ltd.*, *Bangkok, Thailand*, [3]*Kansas State University*, *Manhattan*.

An experiment was conducted on ten lactating Holstein cows to evaluate the effect of soaking dairy cows at the feed line. The objective of the study was to observe if there are any changes in animal behavior for dairy animal that are soaked at the feed manger for 19 hours per day. The cows were housed in a two row tunnel ventilated free stall barn equipped with evaporative pads and a feed line soaker system. The free stall barn is 16 m by 113 m with a ceiling height of 2.6 m. The barn is equipped with 55.7 sq m of 2.4 cm thick evaporative pads on one end and eleven 130 cm fans on the opposite end of the barn. Total air exchange for the barn takes place every 42 sec. Treatments were no feed line water spray (C) and feed line spray (FLS) from 1100 to 0600 (19 hours). Treatments were reversed every four days in a 2 X 2 latin square design. The soaker cycle was 1 minute on and 4 minutes off. Water application was 2.8 liters of water per cow per cycle. Nozzles are located every 1.87 m on the line, which is at a height of 1.6 m from the floor of the feed line. Cow behavior data was collected every 15 minutes for 24 hours (96 observations per cow) over a 5 day period. Each pen of cows was on the C or FLS treatment for 5 days and then the groups were reversed. Twenty-four hour cow observation took place on day 5 of each period. The results would indicate three of the measurements of dairy animal behavior were changed with the addition of a feed line water soak for 19 hours per day. The time that cows spent eating was increased from 14.9% in the control group to 16.7% for the FLS. Standing time at the feed line was also increased to 6.2% for FLS compared with 4.4% for C. Time spent at the water trough was higher for C at 4.9% than 3.3% for FLS. All other observations were not measurably different.

Table 1.

Item	Control	% of time per day Feed line water soak	Remarks
Eating at manger	14.9	16.7	@
Standing at feed line	4.4	6.2	@
Lying at feed line	0.0	0.0	
Standing in free stall	17.8	16.1	
Lying in free stall	47.7	46.4	
At water trough	4.9	3.3	@
At milking area	10.9	11.3	

@ P<0.05

Key Words: Animal Behavior, Feed Line Cooling, Tropical Climate

W241 Thermal status for different breeds of dairy cattle exposed to summer heat stress in a grazing environment. J. N. Spain*[1], L. Parsons[1], R. Crawford[2], C. Brown[2], and D. E. Spiers[1], [1]*University of Missouri*, *Columbia*, [2]*Soutwest Research Center*, *Mt. Vernon, MO*.

There are few studies that have measured the long-term thermal status of different breeds of dairy cows maintained simultaneously in a pasture environment to determine differences in thermoregulatory responses to summer heat stress. A study was conducted to investigate thermal balance of lactating dairy cattle managed in an intensive managed rotational grazing system. The farm was located at the University of Missouri Southwest Research Center in Vernon County, MO. Thirty six lactating cows were blocked by parity, days in milk, milk production and breed. Cows were grouped by breed with 100% Holstein (H, n=8), 75%H:25% Jersey (J) (75H, n=5), 50%H:50%J (50H, n=8), 25%H:75%J (75J, n=7), and 100% J (J, n=8), and maintained on the same pastures from June 15 through August 1, 2006. Cows were rotated to paddocks to maintain ad libitum access to pasture. Ambient variables, including air temperature (Ta) and relative humidity, were measured continuously by a weather station at the Center. Ranges of Ta and calculated THI were 12 to 38C and 55 to 87, respectively. Thermal balance was evaluated prior to morning (0500) and afternoon (1600) milking by measuring rectal temperature (Tre), respiration rate (RR) and skin temperature on 16 days throughout the study during periods of maximum and minimum heat stress. Breed groups had different body weights ($p < 0.0001$) ranging from 530 kg (H) to 378 (J). However, body weight was similar for 75J and 75H (460 kg versus 501 kg, respectively). Although body weights were different across breed, change in rectal temperature with Ta ($r = 0.89$) and THI ($r = 0.92$) was predictable ($p < 0.0001$). Change in Tre with increasing Ta and THI was slowest for J and 75J, and highest for H and 75H. Change in Tre was influenced more by breed more than body weight. Respiration rate was highest for H and lowest for J at Ta below 30C. At Ta greater than 35C, J and 75J had RR similar to 50H. Cows with the highest percentage H (H and 75H) had lowest RR. These results suggest that breed selection can be used to improve thermal balance of cows managed in intensively managed rotational grazing systems.

Key Words: Heat Stress, Thermal Balance, Grazing

W242 Labor, housing, feeding, and bedding affects on herd turnover rate and mortality rates of Southeastern Pennsylvania dairy herds. C. D. Dechow[1] and R. C. Goodling*[2], [1]*The Pennsylania State University*, *University Park*, [2]*The Pennsylvania State University Cooperative Extension*, *University Park, PA*.

Various aspects of dairy operations were surveyed and compared to herd turnover rate and herd mortality rates. 269 Southeastern Pennsylvania dairy herds were surveyed to determine hours of full time and part time labor, type of facilities, bedding source, feeding system, and other herd management systems for each facility. Of these, 239 had viable 2005 DHI culling information to derive comparisons. Herd sizes ranged from 17 to 760 cows. Herds had at least nine test days, and at least ten cows per test day to be included in the analysis. Herd turnover rate groups were designated as low (≤0.20), low-to-moderate (0.21 to 0.30), moderate-to-high (0.31 to 0.40) and high (>0.40). Data were analyzed using the MEANS and GLM procedures of SAS version 9.1. Hours worked with lactating cows by part-time employees tended to be higher (P<0.03) in herds with higher turnover rates. Herds with higher turnover rates had more prevalent bST use (P<0.03). Lower turnover rate herds had greater access to pasture (P<0.007) and more ventilation (P<0.009). Lower mortality rate herds also tended to have greater access to pasture (P<0.07). Herds that fed lactating cows a TMR had moderately higher turnover rates than herds using component feeding (P<0.0001). No bedding types showed tendencies for higher or lower turnover and mortality rates. Further investigation into dry cow and heifer management, and potential confounding effects of herd size and production level with management type should be considered.

Key Words: Herd Turnover Rate, Mortality Rate, Management

W243 Body weight and condition score of four dairy genetic groups in summer or winter under low-input management. D. G. Johnson*[1], B. J. Heins[2], L. B. Hansen[2], A. J. Seykora[2], and J. G. Linn[2], [1]*University of Minnesota*, *Morris*, [2]*University of Minnesota*, *St. Paul*.

Holsteins selected for high production (H), Holsteins maintained at 1964 breed average level (C64), crossbreds including combinations Holstein, Jersey, and/or Montbeliarde selected for high production (HJM), and crossbreds including combinations of Holstein, Jersey, and/or Scandinavian Red selected for durability (HJS) were weighed and scored for body condition(1-5) on two consecutive months during summer and winter over three years. Groups studied were cows, bred heifers in second trimester, heifers being bred, and calves 8-10 months of ages. Animals within age group were fed and managed as a group. All groups were grazed during summer, only calves and lactating receiving cereal supplementation. Diets during winter were total mixed rations fed to requirements for growth and/or lactation and comprised of corn silage, alfalfa silage, grass hay, corn grain, soybean meal, distillers dried grains, and vitamin mineral supplements. Animals were housed on pasture or outdoor bedded packs during winter. All animals were located in west central Minnesota. Analysis by age group utilized SAS Mixed procedure with the model year, season, breed, year (breed), season (breed). Animal numbers were cows, 343; bred heifers, 298; breeding heifers, 269; and calf, 236; with 1 to 6 opportunities for an animal to appear in the data set. H and C64 cows were heavier then HJM or HJS, with cow weights higher in winter than in summer. Rank of condition scores was C64, 3.45, HJS, 3.15; HJM, 3.11; and H, 2.96.

Springer weights did not differ, but condition scores of H were lower than the other breeds. Breeding heifers and calves displayed a similar pattern. Winter weights tended to be higher than summer weights across all groups, but the pattern of condition scores was less consistent.

Key Words: Reduced Input, Dairy, Crossbred

W244 Phosphorus removal capacity of forages used on South Florida dairies. Y. C. Newman*, J. M. Scholberg, M. B. Adjei, and L. E. Sollenberger, *University of Florida*, *Gainesville*.

Excess accumulation of soil phosphorus (P) associated with intensively managed dairy operations has been linked to degradation of natural ecosystems. Warm-season perennial forages offer a complimentary and cost effective approach in remediation of soils with high P accumulation for livestock operations in the Lake Okeechobee region in South Florida. The objective of the study was to determine the P removal capacity, herbage production, and nutritive value of two warm-season species when managed for hay under intensive N fertilization. Bahiagrass (BG; Paspalum notatum) and limpograss (LG; Hemarthria altissima) were evaluated in an on-farm study during 2004 and 2005. Treatments were four levels of N fertilization rates (0, 50, 67, and 100 kg N ha^{-1} per harvest). Experimental units were 116-m^2 plots replicated four times in a randomized block design for each forage type. Data were analyzed using mixed model methodology through MIXED procedure of SAS and the nature of the N effects was assessed using orthogonal polynomial contrasts. Averaged across years, annual P removal of bahiagrass and limpograss had a linear ($P \leq 0.01$) increase with increasing N fertilization rate (26.2, 34.2, 40.5, and 39.4 kg P ha^{-1} yr^{-1} for bahiagrass, and 26.4, 40.0, 40.1, and 42.0 kg P ha^{-1} yr^{-1} for limpograss when fertilized with 0, 50, 67, and 101 kg N ha^{-1}, respectively). Herbage production and crude protein increased linearly ($P \leq 0.01$) with N fertilization treatment for both grasses in both years but crude protein values were consistently lower for LG compared to BG (average of 70 and 126 g kg^{-1}, respectively). Hay crop production using bahiagrass and limpograss is a feasible practice for removing excess soil P.

Key Words: Phosphorus, Bahiagrass, Limpograss

W245 Efficiency of use of imported magnesium, sulfur, copper, and zinc in Idaho dairy farms. A. N. Hristov*, W. Hazen, and J. W. Ellsworth, *University of Idaho*, *Moscow*.

Six commercial dairies from south central Idaho were surveyed to estimate the whole-farm surpluses of magnesium (Mg), sulfur (S), copper (Cu), and zinc (Zn). Mineral imports and exports were monitored in a 12-mo period and samples from the diets, feeds, feces, urine, and manure were collected at regular farm visits. Soils from manure-amended fields were sampled in the spring and fall. In all cases, the largest import of Mg, S, Cu, and Zn to the dairy was with purchased feeds, from 91 (S) to 97% (Zn) of all imports. The major mineral export item was manure (from 60%, S to 89%, Cu of all exports) and forages, in the case of a dairy with a large land base. Export with milk represented on average only 8.6, 25, 2.1, and 11% (Mg, S, Cu, and Zn, respectively) of all exports. Thus, the conversion of the imported feed Mg, S, Cu, and Zn into milk was rather low (on a whole-farm scale): 5.6, 11, 1.4, and 5.2%, respectively. Concentrations of Mg, Cu, and Zn in the lactating cow diets from the participating dairies exceeded current NRC recommendations on average by 85, 34, and 73%, respectively, which contributed to the inefficient use of imported minerals. Whole-farm Mg surplus varied from 4 to 54 t/yr (SD = 21.5; or 3 to 19 kg/cow per year). The efficiency of use of imported Mg varied from 27 to 88% (SD = 24.0). Sulfur surpluses were from 9 to 52 t/yr (SD = 18.0; or 12 to 40 kg/cow per yr). Copper and Zn surpluses were also significant (average of 59 and 585 kg/yr; SD = 59.9 and 711; or 0.05 and 0.4 kg/cow per year, respectively). The average efficiency of use of imported S, Cu and Mg was 44, 62, and 56% (SD = 12.3, 25.1, and 12.6), respectively and, as with Mg, varied significantly among the dairies. The results from this study suggest that reduction in the concentration of dietary Mg, Cu, and Zn is potentially the most efficient way of reducing overall excretions and whole-farm surpluses of these minerals.

Key Words: Dairy Farm, Nutrient Management

W246 Reproductive status of dairy herds in Alberta: An objective assessment based on milk progesterone (P4) concentrations. D. J. Ambrose*[1], M. G. Colazo[1], and J. P. Kastelic[2], [1]*Alberta Agriculture and Food*, *Edmonton, AB, Canada*, [2]*Agriculture and Agri-Food Canada*, *Lethbridge, AB, Canada*.

To identify the factors contributing to poor reproductive efficiency 23 dairy herds were evaluated. Milk samples from 637 cows (26±2 cows/herd) were collected 2x/wk, from 7 to 120 d postpartum (pp), and P4 determined; health and reproductive records were also obtained. The interval from calving to first rise in P4 pp was 32.0±0.7 d. The % of cows cycling by 3, 6, 9, and >9 wk pp was 27, 75, 90, and 96, respectively. Only 4.4% of cows remained anestrus by 90 d pp. The first estrous cycle was short (<17 d), normal (17 to 24 d), or long (>24 d) in 42, 45, and 13% of the cows, respectively. Mean d from calving to first service was 88.5±1.4 (range 32 to 267 d). By 80, 100 and 125 d pp, 42, 62 and 77% of the cows, respectively, were inseminated. Based on milk P4 at AI (n=266) 89% of the cows were in a stage conducive (P4<1 ng/mL) to conception. Conception rate (CR) to first service (38.4%) was influenced by parity (P<0.03), with higher CR in young cows (1st+2nd: 46) than in mature cows (3rd+4th: 39; >4th: 32%). Cows that had their first rise in P4 within 3 wk pp had higher CR to first service than cows that had a delayed rise (46 vs. 31%; P<0.03). The % of cows pregnant by 80, 100 and 125 d pp was 18, 31, and 43%, respectively. Cows with reproductive disorders during the pp period had lower CR by 125 d (P<0.01; 26 vs. 49%). Parity affected (P<0.01) cumulative CR at 125 d pp: 50, 43, and 31%, for 1st+2nd, 3rd+4th, and >4 lactations, respectively. The mean d from first to second service (n=205) was 41.6±1.7 and that from second to third service (n=54) was 34.2±2.9. When whole-herd DHI records were analyzed, the mean (±SE) 21-d submission rate (SR), CR, and pregnancy rate (PR) was 36.9±0.54, 32.6±0.80, and 12.4±0.34, respectively, and differed among herds. The highest and lowest CR was during winter (45.7%) and fall (35.5%). The greatest % of abortions occurred from January to April (10.2); the least from September to November (3.0). Mature cows (≥3 lactations) had a higher risk of abortion than those in their second lactation.

Key Words: Dairy Herds, Reproductive Status, Milk Progesterone

W247 Incidence and interrelation of some common hoof problems in a Southeast US dairy herd. A. H. Sanders*[1], J. K. Shearer[1], L. C. Shearer[1], S. R. van Amstel[2], D. W. Webb[1], and A. De Vries[1], [1]*University of Florida*, *Gainesville*, [2]*University of Tennessee*, *Knoxville*.

Lameness is a costly problem affecting the US dairy industry. Besides the direct costs of treatment and culling, lameness can negatively effect production, reproduction, and udder health. This study quantified hoof problems identified on a large (>2100 cows) commercial dairy farm in Georgia. Data were collected during 33 months (April 2004 to December 2006). Cows identified as lame by staff were presented for treatment to hoof trimmers certified through the Master HoofCare program (University of Florida) and employed full-time on this farm. Defects were recorded using the system recommended by the American Association of Bovine Practitioners and included superficial diseases (e.g. hairy warts), whiteline disease (WLD; 3 hoof zones), ulcers (UL; 3 hoof zones), thin soles (TS), sole punctures (SP), laminitis, and mechanical defects. Each month, between 1 and 11% of cows were treated, and treated cows averaged 1.6 problems per year. Of problems seen, 31% were WLD, 26% UL, and 12% TS. All of these were more common in the summer (July-September) than the winter (January-March; odds ratios were 0.19, 0.15, and 0.16, respectively). This is contrary to reports of lameness by season in European herds. Wet conditions, most common in winter in Europe, are more common in summer in Georgia. Leg injury (6% of treated problems), is also associated with wet/slippery conditions and was also more common in the summer (OR = 0.48). Second and later parity cows were more prone to UL, WLD, and TS than fist parity cows (OR were 0.44, 0.28, and 0.42, respectively). Incidence of WLD and UL was increased among cows with TS earlier in the same lactation. In these cows, WLD was more likely to be reported in the toe (7% increase) than in the rest of the herd. Contrary to reports that a majority of WLD is in the posterior zone, in this herd, WLD was more common farther forward. Thin soles may have been a predisposing factor, but without causing observed lameness. These data summarize some aspects of hoof health under different climate and management conditions from previous studies. Further investigation of the relationship of hoof health to other production and reproduction functions is planned.

Key Words: Lameness

W248 Economic analysis of bovine somatotropin to increase pregnancy rates in lactating dairy cows. A. A. Bell*, P. J. Hansen, and A. De Vries, *University of Florida*, *Gainesville*.

The economic value of a single injection of bovine somatotropin (bST) for improving pregnancy rate in the hot season, cold season, or year round in Florida was evaluated. bST can increase pregnancy rates in cows subjected to timed artificial insemination. A dairy farm was modeled using DairyVIP (http://dairy.ifas.ufl.edu/tools) assuming typical conditions in Florida (seasonality in milk production and probability of conception) to estimate the economic benefit of bST. Service rate at first breeding was 100% and 50% afterwards. A single injection of bST ($6 a dose) was incorporated into the first breeding protocol during the cool season (November-May), the hot season (June-October), or year round. Modeling was performed assuming that bST increased the probability of conception by 8, or 16 percentage units. Each scenario was described as (response in hot season, response in cool season). Effects of three heifer prices ($1600±400) and three milk prices ($35±9per 100 kg) were evaluated. Base probability of conception was ±5 percentage unit to determine effects of different levels of reproductive management. Profit per slot per year was determined for incremental increases in probability of conception due to the use of bST to identify the breakeven point. Default profit per slot per year (no use, no use) was $338.11 and default pregnancy rate was 19%. The economic value of the use of bST ($1600 heifer price, $35 milk price) in the scenarios of (no use,8), (no use,16), (8,no use), (16,no use), (8,8), and (8,16) resulted in a profit over the default of $4.57, 12.50, 0.33, 1.09, 4.90, and 12.84, respectively. Changes in heifer price or decreasing milk price from $35 to $26 did not change trends for profit due to bST. When milk price was increased to $44, the profit due to bST was of reduced magnitude. Farms with greater probability of conception showed lower increased profit with bST use than farms with lower probability of conception. The breakeven point was determined to be an increased probability of conception of between 3 and 4 percentage units. Results showed a positive economic benefit of using bST to increase pregnancy rates.

Key Words: Bovine Somatotropin, Profit, Pregnancy Rate

W249 Performance of beef calves weaned by traditional, fenceline, and two-step methods. D. D. Buskirk, J. M. Siegford, and B. A. Wenner*, *Michigan State University*, *East Lansing*.

Abruptly weaning calves and isolating them from their dams introduces stressors which slow growth and suppress immune function. Gradual weaning methods may reduce acute stresses of weaning, resulting in improved animal performance and welfare. A total of 227 Angus-Simmental calves from two locations, averaging 173 d of age, were allocated by weight and gender into three weaning method treatments: 1) abrupt-weaned (AW); 2) fenceline-weaned (FW); and 3) two-step-weaned (TW). On d 0, all calves were assigned to one of nine pastures and prevented from nursing their dams. Dams of AW calves were moved to remote pastures, dams of FW calves were moved to adjoining pastures with fenceline contact, and TW calves had a plastic nose flap fitted. On d 5, TW calves had the nose flap removed, and all dams were moved to remote pastures. Body weights were obtained on d 0, 5, 14, 28, and 42 for all calves. Blood samples taken on d 0, 5, 14, 28, and 42 were analyzed for plasma haptoglobin, an acute-phase protein released in response to stress stimuli. There were no significant differences in weights through d 42. Although FW calves had greater ($P<0.001$) average daily gain (ADG) between d 0 and 14 than AW and TW calves, there was no significant difference in ADG from d 0 to 42 among treatments. Haptoglobin levels were greatest on d 5, and were higher ($P<0.001$) in both AW and TW calves than FW calves (827, 1019, and 409 μg/mL, respectively). Haptoglobin returned to baseline levels by d 14. Following backgrounding, 152 calves were transported to a feedlot and allotted by weaning treatment to 21 pens. Calves were fed for an average of 207 d. Initial and final body weights were not different ($P>0.63$) among weaning treatments, nor were there differences in ADG ($P=0.60$). There was also no significant difference in the percentage of calves that received one, or two or more medical treatments during finishing. Although FW calves gained more weight and had lower haptoglobin levels shortly after weaning, there were no sustained differences in performance due to weaning method.

Key Words: Weaning, Stress, Calf

W250 A comparison of visual and palpation-based body condition scoring systems. J. M. Bewley*[1], R. E. Boyce[2], D. J. Roberts[3], M. P. Coffey[3], A. Bagnall[3], and M. M. Schutz[1], [1]*Purdue University*, *West Lafayette, IN*, [2]*IceRobotics Ltd.*, *Roslin, Scotland, UK*, [3]*3Scottish Agricultural College Dairy Research Centre*, *Dumfries, Scotland, UK*.

Body condition scoring (BCS) as an indirect measure of body fat in cattle has been widely adopted as a research and field management tool. Numerous BCS systems are utilized around the world. However, reports on how well the various systems correlate with each other are scarce. Two BCS systems were compared for assessing cows at the Scottish Agricultural College's Crichton Royal Farm. The weekly BCS were collected for a period of 12 weeks (9/5/2006-11/21/2006). Scores were obtained using the primary systems utilized within the United Kingdom (developed by Mulvany) and the United States (developed by Edmonson and Ferguson). The Mulvany (UKBCS) system involves palpation of specific body parts using a 0-4 scale. The Edmonson/Ferguson (USBCS) system is based entirely upon visual assessment using a 1-5 scale. The USBCS were obtained by the same observer each week, while UKBCS were obtained by two observers during alternate weeks. Individual scores were removed from the data set when the absolute differences with the preceding and subsequent scores were both greater than 0.25. Scores of 203 individual cows were obtained with a mean of 8.9 (±2.5) pairs of BCS per cow. Means were 2.11 (±0.36) and 2.91 (±0.39), modes were 2.25 and 2.75, and ranges were 1-3.5 and 1.5-4.5 for the UKBCS and USBCS, respectively (N=1809). The mean difference between paired observations was 0.80 (±0.26). The UKBCS and USBCS were highly correlated (r=0.766, P<0.0001). A regression equation to convert scores from the UKBCS to USBCS was developed using PROC GLM. The resulting equation was USBCS=1.6069+0.3912*UKBCS+0.1041*UKBCS^2 (R^2=0.59). This equation may be used to interpret scores within the literature obtained using these two BCS systems, though the equation should be corroborated with other scorers.

Key Words: Body Condition Scoring, International Comparison

W251 Effect of discontinuous roughage delivery in a feedlot diet on liveweight gain and feed efficiency of beef steers. M. Avila[3], J. I. Arroquy*[1,2], and J. J. Saravia[1], [1]*INTA Santiago del Estero*, *Santiago del Estero, Argentina*, [2]*Consejo Nacional de Investigaciones Científicas y Técnicas*, *Argentina*, [3]*Universidad Nacional de Santiago del Estero*, *Santiago del Estero, Argentina*.

The objective of this study was to evaluate the effect of feeding a total mixed ration compared to feeding the roughage portion of the diet once every 2-d and separated from the daily concentrate mix. Thirty beef steers (Braford, Criollo, and Braford × Criollo; initial body wt = 259 ± 27 kg) were used in a 69-d study. Treatments were: a total mixed ration (TMR) and the same proportion of ingredients but roughage offered once every 2-d and separated of the daily delivered concentrate portion of the diet (roughage every other day, REOD). Treatments were arranged in a completely randomized design (three pens/ treatment). Steers were fed ad libitum once a day. In both treatments diet had the following proportion of feedstuffs, 10% grass hay, 82% dry ground corn, 7% ground cottonseed, 0.65% urea, and 0.35% mineral-salt mix. But in REOD the amount of hay delivered once every 2-d was twice the quantity of hay daily offered in TMR. Final body weight did not differ between treatments (final liveweight = 331 ± 26 kg). Average daily gain did not differ among treatments (1013 vs. 1080 g/d for TMR vs. REOD respectively; SEM = 95 g/d). Intra-pen variability for ADG was similar between TMR and REOD. Dry matter intake was significantly greater in TMR compared to REOD (dry matter intake, 8.53 vs. 6.77 kg/d for TMR vs. REOD; $P < 0.01$). Gain to feed ratio tended to be better for REOD than TMR (0.15 vs. 0.13 kg of gain/ kg of DM for REOD vs. TMR; $P = 0.07$). The proportion of concentrate in the ingested diet did not differ between treatments (86.9 vs. 85.5% for TMR vs. REOD). However, steers in REOD adjusted the proportion of ingredients selecting grass hay (14.4% REOD vs. 13.0% TMR; $P < 0.01$). Steer in REOD selected a diet with a lower concentration of fiber (31.2 vs. 31.7% NDF for REOD and TMR respectively; $P < 0.01$) and a higher concentration of CP (14.6 vs. 14.2% CP for REOD and TMR respectively; $P < 0.01$). In conclusion, steers fed a separated roughage source once every 2-d had similar liveweight gain and tended to be more efficient in feedstuff use compared to a TMR delivered daily.

Key Words: Forage Delivery, Gain, Feed Efficiency

W252 Simulation model of fat deposition and distribution in beef steers: 1. Empirical models converting fat thickness to subcutaneous fat and KPH to visceral fat. M. J. McPhee*[1,2], J. W. Oltjen[1], J. G. Fadel[1], D. Perry[2], and R. D. Sainz[1], [1]*University of California*, *Davis*, [2]*NSW DPI*, *Armidale, Australia*.

Empirical models were developed to convert carcass characteristics into kilograms of fat or vice versa to be used in the Davis Growth Model of fat deposition and distribution in beef steers. Allometric equations ($y = ax^b$) that include frame size (1 to 9) were developed between: 12th-rib fat thickness (fat thickness, mm) and subcutaneous fat (kg); and between KPH (kg) and visceral fat (kg). The results of the non-linear regression were: subcutaneous fat, kg = (frame size × fat thickness, mm)$^{0.79}$ ($n = 12$; $P < 0.01$) with $R^2 = 0.99$ and SE = 0.36; and visceral fat, kg = $3.92 \times KPH^{0.87}$ ($n = 28$; $P < 0.01$) with $R^2 = 0.99$ and SE = 0.032. Several techniques were used to evaluate the model: (a) mean bias (observed – model-predicted); (b) modeling efficiency (values close to 1 indicate a perfect model and values < 0 indicate a very poor model); (c) Kolmogorov-Smirnov (KS) 2-sample test; and (d) linear regression. The KS was a test of the hypothesis that the observed and model-predictions have the same parent distribution. The linear regression tested slope = 1 intercept = 0 and bias using the simultaneous F-statistic for both slope = 1 and intercept = 0. The results were: mean bias of 2.90 and -1.65 kg; modeling efficiency of 0.59 and 0.85, for subcutaneous and visceral fat respectively; the KS test indicated that the observed and model-predicted values were from the same parent distribution for both subcutaneous and visceral fat and the linear regression indicated that there was some bias ($P = 0.02$ and $P < 0.01$, for subcutaneous and visceral fat, respectively). The inclusion of frame size is an important addition to the subcutaneous fat vs. fat thickness (mm) model. Further evaluation and improvements are required before the equations are incorporated into the Davis Growth Model.

Key Words: Cattle, Subcutaneous, Visceral

W253 Simulation model of fat deposition and distribution in beef steers: 2. Empirical models to initialize fat deposition models. M. J. McPhee*[1,2], J. W. Oltjen[1], J. G. Fadel[1], and R. D. Sainz[1], [1]*University of California*, *Davis*, [2]*NSW DPI*, *Armidale, Australia*.

Empirical models were developed to predict initial conditions for first-order differential equations to be used in the Davis Growth Model of fat deposition and distribution in beef steers. Allometric equations ($y = ax^b$) were developed between: empty body weight (EBW) for both DNA (g) and fat contribution (FC, %) for four fat depots: intermuscular (INTER), intramuscular (INTRA), subcutaneous (SUB), and visceral (VIS). The results for DNA were: INTER = $0.005\times(EBW)^{0.63}$; INTRA = $0.00000751\times(EBW)^{1.46}$; SUB = $0.000213\times(EBW)^{1.01}$ (n = 20; $P < 0.01$), and VIS = $0.12\times(RA)^{-0.11}$ (n = 20; P = 0.71) with $R^2 = 0.81$, 0.84, 0.74, and 0.04 and SE = 0.06, 0.13, 0.12, and 0.10, respectively; and FC were: INTRA = $155.66\times(EBW)^{-0.46}$; SUB = $3.24\times(EBW)^{0.39}$ (n = 21, 66; $P < 0.01$), and VIS = $52.22\times(EBW)^{-0.16}$ (n = 66; P = 0.89) with $R^2 = 0.66$, 0.55, and 0.09 and SE = 0.26, 0.12, and 0.17, respectively; INTER FC was found by difference. The models were challenged with independent data sets (INTER, INTRA, SUB, and VIS with n = 6, 5, 6, and 6 for DNA challenge; and n = 9, 9, 9, and 9 for FC challenge, respectively). Several techniques were used to evaluate the model: (a) mean bias (MB, observed – model-predicted); (b) modeling efficiency (MEF, values close to 1 indicate a perfect model and values < 0 indicate a very poor model); (c) Kolmogorov-Smirnov (KS) 2-sample test; and (d) linear regression. The KS was a test of the hypothesis that the observed and model-predictions have the same parent distribution. The linear regression tested slope = 1, intercept = 0, and bias using the simultaneous F-statistic for both slope = 1 and intercept = 0. The results for the DNA challenge were: MB of 0.03, -0.02, 0.02, and 0.02 g; the results for the FC challenge were: MB of 3.44, -1.72, -0.57, and -1.15 kg; and MEF of 0.64, 0.04, 0.84, and 0.68 for INTER, INTRA, SUB, and VIS, respectively; the KS test indicated that the observed and predicted values were from the same parent distribution. The linear regression for FC indicated that bias ($P < 0.01$) only existed for INTRA fat. These equations will be used to initialize the DNA and fat depot differential equations in our ongoing program for modeling beef cattle growth and carcass quality.

Key Words: Differential, DNA, Fat

W254 Pasturing to decrease greenhouse gas emissions from feedlot cattle operations: A whole system approach. H. Koknaroglu[1], T. Akunal[1], T. Purevjav*[2], and M. P. Hoffman[2], [1]*Suleyman Demirel University*, *Isparta, Turkey*, [2]*Iowa State University*, *Ames*.

A three-year study integrating pasture and drylot feeding systems was used to assess effect of pasturing on greenhouse gas emission from cattle operations. For this purpose, each year, 84 fall-born and 28 spring-born calves of similar genotypes were used. Fall-born and spring-born calves were started on test in May and October, respectively. Treatments were: 1) fall-born calves directly into feedlot; 2 and 3) fall-born calves put on pasture with or without an ionophore and moved to the feedlot at the end of July; 4 and 5) fall-born calves put on pasture with or without an ionophore and moved to the feedlot at the end of October; 6 and 7) spring-born calves put on pasture with or without an ionophore and moved to the feedlot at the end of October. In the feedlot, steers were provided an 82 % concentrate diet containing whole-shelled corn, ground alfalfa hay, ionophore and molasses. Pens of cattle were harvested at approximately 522 kg. Research conducted on greenhouse gas emission generally measures carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) emissions in feedlot or on pasture. In this study we considered CO2 sequestered by pastures. CH4 production in the feedlot and on pasture was calculated by multiplying gross energy of feed consumed and percent of gross energy converted to CH4. N2O production on pasture was calculated by using the actual nitrogen fertilizer amount and percent of nitrogen converted to N2O on pasture. Fall-born cattle directly going into feedlot and spring-born cattle grazed for nearly a month had greenhouse gas emission of 2285 and 1029 kg per head CO2 equivalent, respectively. Cattle grazed until July and October sequestered more CO2 equivalent then they emitted meaning that they did not contribute to global warming. Net CO2 equivalent sequestered increased as time on pasture increased ($P<0.05$). Results show that pasturing is an important method to decrease greenhouse gas emission from cattle operations and when calculating the greenhouse gas emission from cattle operations, the amount of greenhouse gas sequestered by pastures should be taken into consideration.

Key Words: Global Warming, Greenhouse Gas, Feedlot Cattle

W255 Evaluation of a delayed-release anabolic implant in finishing steers. W. Nichols[1], J. Hutcheson[1], D. Yates[1], M. Streeter[1], D. Smith*[2], and M. Brown[2], [1]*Intervet, Inc.*, *Millsboro, DE*, [2]*West Texas A&M University*, *Canyon*.

Two experiments were conducted to evaluate the efficacy of a delayed-release implant. In Exp. 1, 360 yearling steers (177 d on feed) were assigned to either no implant, Revalor-IS (80 mg trenbolone acetate [TBA] and 16 mg estradiol [E]) on d 1 and a reimplant of Revalor-S (120 mg TBA and 24 mg E) on d 75 (IS/S), or Revalor-XS on d 1 only (XS; 200 mg of TBA and 40 mg of E). All cattle were removed from their home pen and moved through the handling facility on d 75. Overall ADG was 23.1% greater, DMI was 10.7% greater, and feed efficiency was improved by 10.1% ($P < 0.01$) for implanted steers. Dressing percent was greater ($P < 0.01$) for implanted than for non-implanted steers; implanting resulted in 38 kg more carcass weight ($P < 0.01$). Implanted steers had a larger LM area, greater rib fat thickness, more body fat, a higher average yield grade, but a lower marbling score ($P < 0.04$) than non-implanted steers. Growth performance and carcass characteristics did not differ between IS/S and XS ($P > 0.05$). Implanted steers produced fewer carcasses grading at least low Choice ($P < 0.01$; 45% vs 69%), but carcass quality did not differ among IS/S and XS. In Exp. 2, 720 steer calves at three locations were assigned to receive XS on d 1 only or sham implanting on d 1 (198 d on feed). Steer ADG was 19.9% greater and DMI was 10.5% greater ($P < 0.05$) for XS; feed efficiency was improved ($P < 0.05$) by 7.3% for XS. Dressing percent was similar across treatments (P = 0.16). Steers receiving XS produced carcasses that were 34 kg heavier, had a larger LM area, more external fat, a higher average yield grade, and more body fat ($P < 0.01$) than sham-implanted steers, but marbling score was similar across treatments. The number of carcasses grading at least low Choice was slightly reduced (P = 0.05) by XS (62% vs 69%). Steers receiving XS on d 1 only performed as well as steers given Revalor-IS/S. Implanting steers fed for 198 d on d 1 only with XS resulted in more carcass weight at slaughter, improved feed efficiency by 7%, and resulted in slightly fewer carcasses grading at least low Choice than non-implanted steers.

Key Words: Growth Promotant, Anabolic Implant, Implant Payout

W256 Temperament, assessed upon feedlot entry, did not impact performance of Texas A&M Ranch to Rail steers. K. O. Curley, Jr.*[1], J. J. Cleere[2], J. C. Paschal[3], T. H. Welsh, Jr.[1], and R. D. Randel[4], [1]*Texas Agricultural Experiment Station*, *College Station*, [2]*Texas Cooperative Extension*, *College Station*, [3]*Texas Cooperative Extension*, *Corpus Christi*, [4]*Texas Agricultural Experiment Station*, *Overton*.

As poor temperament negatively impacts multiple facets of cattle production an investigation of the linkage between cattle behavior and economic endpoints within the beef industry is warranted. The objective of this study was to identify any relationship of exit velocity (EV) measures obtained at entry to the feedlot with subsequent growth performance. Exit velocity measured during processing of 161 steers at a south Texas feedlot was utilized to identify calm (C; those slower than 0.5 SD below the mean EV; n = 55) and temperamental (T; those faster than 0.5 SD above the mean EV; n = 49) steers. At this time the cattle were weighed, tagged, implanted, vaccinated and sorted by weight (45 kg increments) into lots for feeding. Cattle were evaluated for USDA frame and muscle score and assigned an initial value. Animals were from various ranches (n = 6) and of variable breed types, both ranch of origin and Brahman influence (identified as greater than 1/8) were incorporated into statistical analyses. Linkage between temperament and stress physiology was confirmed as serum cortisol concentrations differed ($P < 0.01$; C = 6.40 ± 1.59, T = 11.77 ± 1.59 ng/ml) with temperament. Initial BW differed ($P < 0.01$) with temperament as the calm steers were heavier upon arrival to the feed yard (C = 310 ± 17, T = 256 ± 17 kg). The length of the feeding period differed ($P < 0.05$) with temperament as temperamental steers were fed longer (C = 207.0 ± 2.0, T = 214.0 ± 2.0 d). Weight gain of the steers differed with temperament ($P < 0.01$; C = 280 ± 15, T = 324 ± 15 kg), but the final BW did not ($P = 0.53$). While the initial value was greater for the calm steers ($P < 0.02$; C = $576.65 ± 27.30, T = $508.11 ± 27.30) the compensatory gain exhibited by the temperamental cattle contributed to no difference ($P = 0.94$) in the net income received from each of the temperament groups. Although temperament appraisals at weaning have been identified as a possible indicator of post-weaning growth, exit velocity measured upon arrival to the feedlot was not indicative of steer performance during the feeding period.

Key Words: Temperament, Exit Velocity, Feedlot Performance

W257 Effect of frame score on performance and carcass characteristics of steers finished in the feedlot or backgrounded for various time on pasture and finished in the feedlot. H. Koknaroglu[1], T. Akunal[1], T. Purevjav*[2], and M.P. Hoffman[2], [1]*Suleyman Demirel University*, *Isparta, Turkey*, [2]*Iowa State University*, *Ames*.

A three-year study integrating pasture and drylot feeding systems was used to examine effect of frame score on performance and carcass characteristics of steers. Each year, 84 fall-born and 28 spring-born calves of similar genotypes were used. Fall-born and spring-born calves were started on test in May and October, respectively. Treatments were: 1) fall-born calves directly into feedlot; 2 and 3) fall-born calves put on pasture with or without an ionophore and moved to the feedlot at the end of July; 4 and 5) fall-born calves put on pasture with or without an ionophore and moved to the feedlot at the end of October; 6 and 7) spring-born calves put on pasture with or without an ionophore and moved to the feedlot at the end of October. Frame scores were determined by taking steersâ€™ age and live weight into consideration. Cattle that grazed the same duration on pasture were regarded as the same treatment regardless of whether they received an ionophore or not. In the feedlot, steers were provided an 82% concentrate diet containing whole-shelled corn, ground alfalfa hay, and a protein, vitamin and mineral supplement containing ionophore and molasses. Pens of cattle were harvested at approximately 522 kg. Cattle having a higher frame score at the entry to pasture and grazed until July and October tended to have higher and lower daily gain on pasture than those having lower frame score, respectively ($P>0.05$). Fall-born and spring-born cattle grazed until October, which had higher frame scores at the entry to pasture tended to have higher daily gain in the feedlot showing a compensatory growth. In the feedlot, within each treatment cattle having higher frame score tended to have higher daily gain ($P>0.05$) and had higher dry matter intake ($P<0.05$). Results showed that cattle with higher frame scores had higher growth potentials in the feedlot and if the grazing season is extended then daily gain of cattle having higher frame score decreases.

Key Words: Feedlot Cattle, Frame Score, Pasture

Ruminant Nutrition III

W258 Biological treatment of peanut hay as ruminant feed. B. Borhami*[1], S. Soliman[2], M. EL-Adawy[1], E. Ghonaim[2], M. Yacout[3], and H. Gado[4], [1]*Department of Animal Production, Faculty of Agriculture, Alexandria Univ.*, *Alexandria, Egypt*, [2]*Central Lab for food and Feed (CLFF), Ministry of Agriculture, Dokki*, *Gizza, Egypt*, [3]*Animal Production Research Institute, Ministry of Agriculture, Dokki*, *Gizza, Egypt*, [4]*Department of Animal Production, Faculty of Agriculture, Ain Shams Univ.*, *Cario, Egypt*.

This work was carried out to evaluate the effect of two biological treatments on the nutritive value of peanut hay (PNH). Three Barki rams and three ewes (fitted with permanent rumen fistula) were used for the digestibility and rumen fermentation trials, respectively. Six crossbred Friesian cows were used for the lactation trial. All animal were fed a restricted amount of commercial concentrate and ad libitum PNH either untreated (control) or treated with Tricoderma viride or ZAD probiotic. Higher crude protein content and higher losses in fiber, except for hemicellulose, were observed with the treated PNH. Total digestible nutrients ranged between 55.8 and 64.62% for control or fungi treated diets, respectively. Highest values of nitrogen balance were observed with the ZAD probiotic diet and the lowest value was observed in sheep fed the control diet. Rumen ammonia concentration and its rates of production were significantly ($P<0.05$) higher with ZAD probiotic. VFA were significantly higher ($P<0.05$) with fungi treatment than other diets. Milk production was increased with the fungi and ZAD diet. Biological treatment leads to increase milk fat and total solids compared with the control diet. Long term feeding of such material with analysis of metabolites (blood and milk) of animals fed such material is necessary.

Key Words: Biological, Sheep, Peanut Hay