

there were no significant differences in the number of transferable embryos collected among groups (9.2 LITTER; 9.3 SBM; 9.1 CON). The number of degenerate embryos or unfertilized ova did not differ among dietary groups. High-protein diets elevated PUN, but did not affect the number or quality of embryos collected.

Diet	CP (%)	Soluble CP (%)	Degradable CP (%)	TDN (%)
LITTER	16.4	78.0	71.1	65.6
SBM	17.9	27.9	64.8	55.1
CON	9.2	29.0	49.9	57.5

Key Words: Cattle, Dietary Protein, Embryo

396 Prostaglandin synchronization before synchronized ovulation for first insemination in lactating dairy cows. S.J. LeBlanc* and K.E. Leslie, *University of Guelph, Ontario, Canada.*

Previous research has shown that conception risk with the Ovsynch breeding program is maximized when the program is initiated 5 to 12 days after estrus. The objective of this double-blinded field trial was to assess the effect of one injection of prostaglandin F_{2α} (PGF_{2α}), 10 days before the Ovsynch program, on the risk of pregnancy at first insemination in lactating dairy cows. The hypothesis was that cows that underwent luteolysis in response to PGF_{2α} would be between 5 and 8 days post-estrus at the start of Ovsynch. In 5 commercial dairy herds in Ontario, Canada, at 52 (±12) DIM, 506 cows were assigned at random to receive either one i.m. injection of 500 µg cloprostenol or saline. Ten days later, all cows received 100 µg GnRH i.m., followed in 7 days by 500 µg cloprostenol i.m. and 100 µg GnRH i.m. 48 hours later. All cows were artificially inseminated 0 to 20 hours after the second injection of GnRH, without regard to detection of estrus. Pregnancy was diagnosed by trans-rectal palpation at least 35 days after insemination. The probability of pregnancy after first insemination was modeled with logistic regression, accounting for the correlation of cows with herd. Overall, there was no difference in pregnancy risk between cows that received PGF_{2α} presynchronization and controls (37.3% and 36.6%, respectively; odds ratio = 1.02, 95% confidence interval, 0.87 to 1.19, P = 0.84). Herd, parity, and DIM at insemination covariates were not significant. However, among 248 cows bred before 71 DIM, pregnancy risks were 34.2% and 39.8% for presynchronized and control cows, respectively. Conversely, among 258 cows bred after 70 DIM, pregnancy risks were 40.2% and 33.3%, respectively. These apparent differences may merit further investigation. Although progesterone measurements were not performed, we speculate that overall, many cows did not undergo luteolysis and subsequent estrus following the injection of PGF_{2α}. These results are consistent with the necessity for cows to be cyclic to benefit from PGF_{2α} pre-synchronization for increased pregnancy risk following Ovsynch timed insemination.

Key Words: Presynchronization, Prostaglandin, Timed Insemination

397 Administration of human chorionic gonadotrophin (hCG) or gonadotrophin releasing hormone (GnRH) analogue at day 5 after oestrus and plasma progesterone in the cow. LM Hicking*, APF Flint, and GE Mann, *University Of Nottingham, UK.*

Adequate progesterone (P₄) secretion is critical during early pregnancy in the dairy cow. Low P₄ levels on day 5 lead to poor embryo development and pregnancy loss. In this study, cows were treated on day 5 of a synchronised cycle with hCG or GnRH, to investigate effects on P₄ secretion. In experiment 1, 4 non-lactating multiparous Holstein-Friesian cows were treated with GnRH analogue (Buserelin[®], 10µg i.m.) or left as untreated controls during two consecutive cycles in a Latin square design. Jugular venous blood samples were collected at 4-hourly intervals for 72 hours following GnRH administration. Plasma P₄ concentration was not affected by GnRH treatment (GnRH, 3.7±0.6ng/ml; control, 3.1±0.7ng/ml). In experiment 2, a similar protocol was employed with 12 cows receiving hCG (Chorulon[®], 1500 IU i.m.) or left as untreated controls during two consecutive cycles. On day 8 of the second cycle animals were slaughtered and ovaries recovered. Mean plasma P₄ was raised (P<0.05) throughout the sampling period (hCG, 5.6±0.5ng/ml; control, 4.0±0.3ng/ml). Original corpus luteum (CL) weight was higher (P<0.001) in treated animals (hCG, 8.4±0.5g; control, 5.4±0.4g). P₄ secretion by luteal tissue *in vitro* (30min incubation) revealed no effect of treatment (hCG, 8.3±1.7; control, 7.7±1.1ng/mg/ml). There was an increase (P<0.001, ng/mg luteal tissue; P<0.05, µg/CL) in P₄ production by luteal tissue from all animals when incubated with LH (100ng/ml). There was no treatment*LH interaction. P₄ content of the CL was greater (P<0.05) for treated animals prior to incubation. In conclusion, administration of hCG, but not GnRH, on day 5 resulted in sustained stimulation of P₄ production associated with increased CL size without a reduction in P₄ content. This treatment should provide a suitable approach to raising P₄ in animals exhibiting a deficiency and hence to improving postpartum pregnancy rates. Supported by Intervet UK Ltd, DEFRA, MDC. LMH was funded by the Dartington Cattle Breeding Trust.

Key Words: hCG, GnRH, Progesterone

398 The effect of bromocryptine on the ovulation rate of ewes of different fecundity and ovulation rate. V. Fuentes¹, R. Sanchez, and P. Fuentes, ¹*Centro Universitario de los Altos Universidad de Guadalajara, México.*

Bromocryptine was administered im in doses of 1 mg at 12 hour intervals, to ewes of different fecundity and ovulation rate with the objective of decreasing blood prolactin levels during a complete estrous cycle and to observe this effect on their ovulation rate. The experiment was carried out in November 1999 and repeated in January 2000. For this purpose Finnish Landrace and Scottish Black Face ewes were used because of their high and low ovulation rates respectively. On the first study ovulation rate was not affected by the low prolactin levels induced by the drug. Ovulation rate in Finish Landrace was 3.85 ± 0.69 for the control and 3.42 ± 0.53 for the treated group. Similar results were observed in Scottish Black Face ewes ovulation rate was 1.12 ± 0.35 in the control group in treated ewes ovulation rate was 1.37 ± 0.51. When the experiment was repeated on January 2000 the results were similar.

Key Words: bromocryptine, ewes, ovulation

Production, Management, and the Environment Beef and Swine Management

399 Cooling and feeding strategies to reduce heat load in feedlot cattle. J.B. Gaughan*¹, S.M. Holt², and T.L. Mader³, ¹*The University of Queensland,* ²*South Dakota State University,* ³*University of Nebraska.*

Six Bos taurus steers (mean wt = 288 kg) were used in a 102-d 2 x 2 Latin Square study. The steers were housed in individual stalls in a controlled climate room. Cooling treatments (ENV) were (i) sprinkling during hottest part of day (0800 # 1500 h) (DC), and (ii) sprinkling at night (1600 # 0700 h) (NC). The dietary treatments (DIET) were (i) control (CON), and (ii) protected fat (PF). The diets (60/% concentrate # sorghum based and 40/% roughage) were iso-caloric and iso-nitrogenous (90/% DM; 23.6/% NDF; 12 MJ ME/kg DM; 16.3/% CP/kg DM). A

rumen protected fat was added at the rate of 5/% to the PF diet. Feed was offered ad libitum. Mean THI between 0800 h # 1500 h was 89, and between 1600 # 0700 h was 78. Respiration rate (RR; breaths/min; bpm) and rectal temperature (oC; RT) were measured hourly over 12 24 h periods, while DMI was measured using load cells. ENV had a significant effect on mean daily RR (P<.001; DC = 88.3 ± 2.4 bpm; NC = 56.1 ± 2.4 bpm), and on mean daily RT (P<.001; DC = 39.2 ± .1 oC; NC = 38.7 ± .1 oC). The DC steers had a RR greater than 100 bpm (max 133) for 10 hours, and 80 bpm or lower for 10 h each day. The NC steers spent 3 hours per day with a RR greater than 100 bpm (max 200), and 17 h with a RR of 80 bpm or lower. There were no ENV x DIET interactions or DIET effects for RR or RT. There were ENV x DIET

interactions for total DMI. DMI was 6/% lower ($P < .05$) for DC steers fed PF (6152 268.6 g/h/d) vs CON fed steers (7280.9 382.4 g/h/d). There were no effects for NC steers. The DMI between 0800 h and 1500 h was greater ($P < .05$) for the DC steers fed CON (3233.1 190.6 g/h/d), than for DC (2671.3 133.9 g/h/d) and NC (2305.6 190.6) fed PF, and NC (2288.6 133.9) fed CON. The NC steers had greater ($P < .001$) DMI for the period 1600 h to 0700 h (PF = 4978.8 289.1; CON = 4752.9 203.7) than the DC steers (PF = 3481.4 203.1; CON = 4047.8 289.1). In conclusion, night cooling improved the overall comfort of the steers, and feeding PF did not improve DMI.

Key Words: Beef cattle, Cooling strategies

400 Effects of shade and implant strategy on performance by finishing heifers. J. E. Stockstill¹, F. M. Mitloehner^{*2}, M. L. Galyean¹, and J. J. McGlone¹, ¹Texas Tech University, Lubbock, ²University of California, Davis.

One hundred sixty-eight Angus and Angus-cross heifers (black hair coats) were used to evaluate the effects of shade and implant strategy during heat stress conditions in West Texas. Treatments were arranged factorially and included: 1) shade with a Revalor H (Intervet, Millsboro, DE) implant on d 0 (SHII); 2) shade with a Revalor H implant delayed until d 56 (SHDI); 3) no shade with a Revalor H implant on d 0 (NSII); and 4) no shade with a Revalor H implant delayed until d 56 (NSDI). Heifer performance (DMI, ADG, and feed:gain), carcass traits, behavior, and respiration rates were measured. Heifers that were initially implanted had a greater ($P < 0.05$) DMI (9.62 vs 9.38 kg/d) than heifers that received the delayed implant. For ADG (shade x implant strategy, $P < 0.07$), SHII heifers had a greater ADG (1.80 kg/d) than heifers in the SHDI, NSII, and NSDI groups (1.67, 1.71, and 1.69 kg/d, respectively). Similar shade x implant strategy ($P < 0.05$) interactions were noted for final BW and hot carcass weight, indicating that shade benefited heifers with an initial implant but not those with a delayed implant. Feed:gain ratio did not differ ($P > 0.10$) among treatments. Delayed implanting decreased carcass fat thickness in unshaded but not in shaded heifers (shade x implant strategy, $P < 0.07$). Shaded heifers had more ($P < 0.07$) kidney, pelvic, and heart fat than unshaded heifers, and delayed implanting tended to decrease ($P < 0.10$) carcass yield grade. With the exception of wk 6 and 7, respiration rates were less ($P < 0.06$) for shaded than for unshaded heifers. Under the conditions of this study, feedlot performance was best when shade was provided to heifers that received an implant at initial processing; however, shade did not benefit heifers implanted after 56 d on feed.

Key Words: Beef cattle, Shade, Implants

401 Implant strategies for production of high quality beef for Japanese export market. K. S. Eng^{*1}, R. Bechtel², and D. P. Hutcheson³, ¹Eng, Inc., San Antonio, TX, USA, ²Advance Agricultural Testing, Petersburg, Ont, Canada, ³Animal-Agricultural Consulting, Inc., Amarillo, TX, USA.

Recent research indicates early management practices may have a significant impact on the final performance and carcass quality grades of feed lot steers. However, most of these studies have been conducted on young lightweight calves as opposed to heavier yearling steers. The premium Japanese export market requires heavy high quality carcasses. The purpose of this experiment was to study the impact of three different low and medium initial implants followed by a high dose combination re-implant on interim and final performance and carcass characteristics. Three hundred and twenty four non-implanted black yearling steers from Western Canada were allotted to 3 implant treatments with 9 head per pen and 12 reps. Initial implant treatments were Synovex C, Ralgru or Synovex S and all treatments were re-implanted at 100 days with Synovex Plus. Average daily gain, dry matter consumption and feed conversions were calculated at reimplant time and at completion of trial (198 days). Carcass data was collected included carcass weight, dressing percentage, USDA quality grade and yield grade. Overall performance and carcass data is presented in Table 1. There were no differences in interim or final performance data due to implant strategies. Carcass data indicated an improvement in USDA retail yield grade for initial Synovex S treatment. There were no differences due to implant strategies for USDA quality grade. USDA quality grade was high and averaged 97.1 to 98.1 percent for Choice and Prime for the implant strategies. The results indicate a variety of low or medium dose initial implants

followed by a high dose combination final implant will give excellent overall performance and desirable final carcass quality grade.

Table 1	SYN C	RAL	SYN S
Final Weight, Kg	723.2	729.1	723.2
ADG, Kg/d	1.87	1.85	1.86
DMI, Kg/d	10.05	10.00	9.95
DM Feed/Gain	5.38	5.40	5.35
Choice and Prime, %	97.1	98.1	98.1
Select %	2.9	1.9	1.9
USDA Yield Grade	3.01 ^{a,b}	3.25 ^b	2.90 ^a

^{a,b} Means with the same superscript within a row are not significantly different ($P \geq 0.05$)

Key Words: Implant, Strategies, Beef

402 Effect of early calf weaning on cow and calf performance in Florida. J. D. Arthington^{*1} and R. S. Kalmbacher¹, ¹University of Florida, Range Cattle Research and Education Center, Opa.

Forages of central and south Florida are conducive to high yields, but are of limited quality, especially for supporting the reproductive performance of young post-partum cows. The objective of this study was to investigate the effectiveness of early calf weaning for improving the reproductive performance of these females. Forty, post-partum, 3 year-old Braford and Brangus sired heifers were randomly assigned to one of two treatments; early weaned (EW; n=20) and normal weaned (NW; n=20). At the time of early weaning (January 23) cow body condition score (BCS) was low but similar between treatments (3.90 and 3.88 for EW and NW cows, respectively). Calves were similar in age (84 d) and body weight at the time of early weaning (90.7 vs. 87.1 kg for EW and NW calves, respectively). Following EW all cows were returned to bahiagrass pastures with the mature cowherd and provided 2.27 kg of molasses supplement (16% CP) daily. Early -weaned calves were maintained on ryegrass pastures at a rate of 1.35 calves/ha and were provided supplemental grain (14% CP) at a rate of 1.0% BW daily. Normal-weaned calves remained with their dams in the mature cowherd. Over 112 d of ryegrass grazing, EW calves had a higher ($P < 0.01$) ADG compared to NW calves left with their dams (0.86 and 0.67 kg/day for EW and NW, respectively). Early weaning resulted in heavier ($P < 0.01$) cows that were in better body condition at the time of normal (August 1) weaning (487.1 and 445.4 kg/cow with a body condition score = 6.25 and 4.50 for EW and NW, respectively). This improvement in body condition was associated with a higher ($P < 0.05$) pregnancy rate and lower ($P < 0.05$) calving interval for EW vs. NW cows (89.5 vs. 50.0% pregnant and 391 vs. 412 d calving interval for EW and NW, respectively). These initial data suggests that EW will improve cow body condition resulting in an increased pregnancy rate for low body condition heifers maintained on winter ryegrass provide Florida cattlemen with the ability to optimize early weaned calf performance, while capitalizing on low cost of gain and favorable spring markets.

Key Words: Early Weaning, Ryegrass, Calves

403 Effects of periparturient disorders and other factors on calf related traits. M. L. Wiederhold^{*1}, M. A. Faust¹, and S. L. Berry², ¹Iowa State University, Ames, ²University of California, Davis.

Objectives were to evaluate cow related factors for calf traits at birth. Data were records for as many as 9,900 cows (parity ≥ 2) from 10 California dairy herds collected as part of a study of periparturient disorders. Health events were coded as 1 for cows that had at least one incidence of the event during the previous lactation and zero otherwise. Three categories of calving ease were defined: no, slight, and at least moderate assistance. Mixed model procedures were used to evaluate fixed effects of calving ease and season from the current lactation and mature equivalent yield, number of services, and incidences of cystic ovaries, lameness, and other health events for the previous lactation; year, herd and residual were random effects. Response variables studied included calf livability at birth, number of calves born (90.4%, 9.6%, 0.06% single,

twin, and triplet births, respectively) and calf sex. Dams that were not lame during the previous lactation had more female calves ($P < 0.01$). Number of calves was lowest for cows that conceived from May to July and greatest for third and fourth parity calvings ($P < 0.01$). Cows that did not experience cystic ovaries during the previous lactation had the fewest number of calves ($P < 0.01$). Livability was defined at birth as at least one live calf (coded as 1) or no live calves (0). Livability was lowest for calves born when conception required the greatest number of services ($P < 0.05$). However, livability rate was highest for female calves and calves born with no assistance; rates for no assistance and at least moderate assistance were $92.9 \pm 0.04\%$ and $66.7 \pm 0.05\%$ for twins and $98.3 \pm 0.01\%$ and $79.7 \pm 0.02\%$ for single calves, respectively. Single calves born to dams with highest milk yield had greatest livability ($P < 0.05$); livability was higher by 0.28% for each additional 1,000 kg milk during the previous lactation. Health disorders during the previous lactation may influence calf related traits for cows that conceived and calved subsequently.

Key Words: Calf Livability, Periparturient Disorders, Calving Ease

404 Development of antibiotic resistance among *Escherichia coli* in feedlot cattle. H.W. Busz^{*1}, T.A. McAllister¹, L.J. Yanke¹, M.E. Olson², D.W. Morck², and R.R. Read³, ¹*Agriculture and Agri-Food Canada, Lethbridge, AB*, ²*University of Calgary, AB*, ³*Calgary Regional Health Authority, Calgary, AB*.

Widespread feeding of subtherapeutic levels of antimicrobial agents (SAA) to livestock is commonly implicated in the emergence of antibiotic-resistant bacteria. To date, most research on this topic has focused on poultry and swine. This study examined development of antibiotic-resistant *Escherichia coli* in 300 feedlot steers receiving SAA ($n = 50$). Feedlot diets were top dressed with 1) no additive; 2) Aureo S-700 (350 mg/hd-d); 3) Aureomycin 100 (11 ppm); 4) Virginiamycin (240 mg/hd-d); 5) Monensin (26 ppm); or 6) Tylosin (11 ppm) beginning on d 18 of backgrounding. The SAA were fed for 56 d during backgrounding, withdrawn for 91 d, reintroduced for 42 d during finishing, and withdrawn 109 d prior to slaughter. Fecal swabs were plated on MacConkey agar \pm ampicillin (**Amp**, 50 $\mu\text{g}/\text{mL}$), ciprofloxacin (**Cf**, 2 $\mu\text{g}/\text{mL}$), gentamicin sulfate (**Gm**, 4 $\mu\text{g}/\text{mL}$) or tetracycline hydrochloride (**Tet**, 4 $\mu\text{g}/\text{mL}$) to assess populations of total and antibiotic-resistant *E. coli*. Irrespective of treatment, steers shedding antibiotic-resistant *E. coli* were notably more prevalent during finishing than during backgrounding. Withdrawing SAA did not lessen the prevalence of animals with resistant *E. coli*. No resistance to **Cf** was detected at any time, whereas across treatments, overall prevalences of steers carrying **Gm**-, **Amp**- or **Tet**-resistant *E. coli* were 23.3, 18.8 and 63.6%, respectively. Resistance to **Tet** was observed in 8.24% of total *E. coli* isolates, compared with 0.80% (**Gm**) and 0.007% (**Amp**). All 300 steers tested positive for **Tet**-resistant *E. coli* at least once during the study. The Aureo S-700 group consistently recorded higher ($P < 0.05$) prevalences of steers with **Amp**-resistant *E. coli* (44.4%) and steers with **Tet**-resistant strains (86.7%) than did the other groups (which averaged 13.7% and 58.9%, respectively). Feeding SAA did not promote **Cf** or **Gm** resistance, however high levels of **Tet** and **Amp** resistance were evident, particularly when Aureo S-700 was fed.

Key Words: *Escherichia coli*, Antibiotic Resistance, Cattle

405 Effects of the fibrolytic enzyme preparation Cattle-AseTM on growth of prepuberal crossbred heifers. T. A. Strauch^{*1}, D. A. Neuendorff¹, C. G. Brown¹, C. Cobb², J. L. Kerby¹, R. D. Randel¹, and F. M. Rouquette¹, ¹*Texas Agricultural Experiment Station, Overton, TX*, ²*Loveland Industries, Hereford, TX*.

Objectives were to determine the effects of Cattle-AseTM, a fibrolytic enzyme preparation, on growth of crossbred heifers. In trial 1 (TR1), Cattle-AseTM was delivered in a commercial molasses-urea lick (24% CP with 18% NPN, 3% fat) to 54 fall-born, prepuberal, crossbred heifers grazing coastal bermudagrass (CBG) for 84 d. Heifers were assigned to three treatments in two replicate pastures according to breedtype, age, and BW: pasture only (P), P + molasses-urea lick (M), and P + M + Cattle-AseTM (MC). Cattle-AseTM was added at 30g/8.8 kg to 60g/4.8 kg molasses. Average molasses consumed was 1.15 kg/hd/d; thus, urea intake was ~ 21 kg/hd/d. In trial 2 (TR2), heifers from TR1 were reassigned to two treatments: Cattle-Ase (CSE) or control (C). The MC heifers were assigned to CSE, M assigned to C, and P were divided equally between treatments. Heifers had ad libitum access to

CBG hay and were group fed 2:1 corn:soybean meal (33% CP) at 1% BW, with Cattle-AseTM provided to CSE heifers at 1.85 g/hd/d for 126 d. Supplement was adjusted for changing BW each 28 d. Weights and body condition scores (BCS) were recorded at initiation and 28 d intervals in TR1, and biweekly in TR2. Blood samples were collected at initiation and weekly throughout both trials. Serum samples from TR1 were assayed for concentration of IGF-I by RIA. There was no treatment effect ($P > .10$) on BW, BCS, or serum concentrations of IGF-I throughout TR1, nor was there an effect on ADG ($P = .36$) with ADG as follows: .54, .65, .64 \pm .06 kg/hd/d for P, M, MC, respectively. However, in TR2, Cattle-AseTM increased ADG ($P < .04$) as follows: .42 \pm .03 and .34 \pm .02 kg/hd/d for CSE and C, respectively. Molasses + urea supplement with or without Cattle-AseTM failed to improve ADG. Cattle-AseTM addition to a dry supplement, however, improved ADG. Differences in effects of Cattle-AseTM between trials may be related to the carrier, NPN, or to nutritive value of the forage offered.

Key Words: Fibrolytic enzyme, Heifers, Bermudagrass

406 Predicting the nutritional status of mature beef cows. D. S. Horsley^{*}, J. B. Hall, D. E. Eversole, J. P. Fontenot, and M. L. Wahlberg, *Virginia Polytechnic Institute and State University, Blacksburg, VA*.

Improved prediction of forage quality and cow performance may enhance the nutritional management of beef cows. In two 12 mo trials, mature beef cows ($n=136$) grazing tall fescue pastures were used to compare estimates of forage quality and animal performance. Forage quality was estimated by proximate analysis of forage samples (FOR) or by near infrared reflectance spectroscopy of fecal samples (FNIR). Nutritional Balance Analyzer (NutBal), NutBalPro and 1996 NRC Nutrient Requirements of Beef Cattle (NRC) programs were used to predict animal performance. The objectives were to compare FOR and FNIR estimates of CP and TDN and to evaluate the accuracy of cow performance predicted by FNIR-NutBal, FNIR-NutBalPro and FOR-NRC systems. Initial BW, body condition score (BCS), hip height and breed were used to establish cow biotypes for prediction programs. Every 28 d, cow BW and BCS were measured and forage and fecal samples collected. Weather data, cow status and FOR or FNIR results were entered into NutBal, NutBalPro and NRC programs. Forage CP estimated by FNIR (CPFNIR) or FOR (CPFOR) were similar. In trials 1 and 2, correlation coefficients between CPFNIR and CPFOR were $r = .24$ and $r = .43$, respectively. Forage TDN estimated by FNIR was greater ($P < .05$) and lowly or moderately correlated to FOR estimates. Actual BW change between weigh periods (BWCHG) and ADG were similar to NRC predictions, but less ($P < .0001$) than predicted by NutBal or NutBalPro. The NutBal or NutBalPro mean BCS change between weigh periods (BCSCHG) were greater ($P < .001$) than NRC or Actual BCSCCHG. Actual and NRC BCSCCHG were similar ($P > .2$, trial 1) or tended ($P < .1$, trial 2) to be similar. Cow performance estimated by NRC was highly correlated to Actual. In trials 1 and 2, NutBal and NutBalPro over-predicted BWCHG, ADG and BCSCCHG by 40 kg, 1.25 kg/d and .75 BCS, respectively, compared to actual cow performance. It appears that FNIR is a promising predictor of forage CP but not TDN. Also, the FOR-NRC is a satisfactory predictor of cow performance.

Key Words: Cow performance, Nutrition, Forage

407 Using adjusted 205-day weight ratios to predict beef cow-calf performance. T. R. Troxel^{*1}, Z. B. Johnson², and W. T. Wallace¹, ¹*University of Arkansas Cooperative Extension Service, Little Rock, AR*, ²*University of Arkansas, Fayetteville, AR*.

Twenty-one commercial beef herds were used to determine if future cow-calf performance could be predicted based on adjusted 205-d ratios. Adjusted 205-d ratios were determined within each herd and ranked in descending order. Each herd was divided into thirds - top (T), middle (M), and bottom (B). The data set included 8,928 cow records with 4,379 cows having records in two consecutive years and 1,958 cows having records in three consecutive years. Data were analyzed using chi-square, and the overall chi-square statistic was significant ($P < 0.001$). Cows ranked T had a 50.9%, 31.5% and 17.6% probability of ranking T, M and B, respectively, the next year. Cows ranked M had a 32.8%, 36.9% and 30.3% probability of ranking T, M and B, respectively, the next year. Cows ranked B had a 19.5%, 30.6% and 49.9% probability of ranking T, M and B, respectively, the next year. Cows ranked T and B had a 33.3% and 26.7% probability of ranking T and B, respectively, for each of the

next two consecutive years. The T ranked cows had a 17.7% probability of ranking B in their third year, and B cows had a 21.0% probability of ranking T in their third year. Stepwise regression analysis was used to determine which other production traits available affected ranking of cows. Included in the model were age of cow, ranking from the previous year, cow weight, preweaning ADG of calf, 205-d weight, adjusted hip height ratio, and muscle score for both current and previous years. All variables were kept in the model ($P < 0.15$) except age of dam and previous year adjusted hip ratio. Adjusted 205-d weights from the T, M, and B cows were 263.2 ± 0.41 , 237.2 ± 0.41 and 208.5 ± 0.41 kg, respectively ($P < 0.001$). Calf preweaning ADG from the T, M and B rankings were 1.08 ± 0.002 , 0.95 ± 0.002 and 0.81 ± 0.002 kg, respectively ($P < 0.001$). In conclusion, adjusted 205-d weight ratios can be used to predict future cow performance and assist in making culling decisions.

Key Words: Cow-calf performance, Ranking, 205-day ratios

408 Factors affecting the market value of cows sold through Arkansas auction barns, Part I: Management. M. S. Gadberry, T. R. Troxel*, D. Urell, J. Foley, R. Wiedower, S. Cline, and G. Ford, *University of Arkansas Cooperative Extension Service, Little Rock, AR.*

A study was conducted to determine the factors affecting the market price of cull cows. Data was collected from 15 auction barns in the spring (14 wk) and fall (13 wk) of 2001. The final dataset represented 43.5% of the cows marketed. Management aspects examined included pregnancy and stage of pregnancy, fill, brands, horns, health and USDA quality grade. Management factors were analyzed individually and included cow type, replacement cows (R) vs. slaughter cows (S), as a main effect, and their interaction. Week, cow age and weight were covariates. Values are reported on a 45.45 kg basis. There were significant interactions ($P < 0.001$) for cow type and each management factor. In all instances, except health, R received a higher price ($P < 0.001$) per unit than S. Third trimester R sold for a higher price ($P < 0.001$) than non-pregnant R, \$50.33 and \$43.86, respectively. Slaughter cow value was not affected by stage of pregnancy. Shrunken R received the highest price (\$49.78; $P < 0.001$), and tanked R received the lowest (\$44.35; $P < 0.01$). Gaunt (\$38.29) and full (\$38.43) fill S was lowest in value ($P < 0.001$) and did not differ ($P = 0.65$). Brands did not affect sale price of R ($P > 0.70$). Slaughter cows with 2 or more brands sold for \$40.98 compared to \$39.11 for S without brands ($P < 0.01$). Replacements with horns sold for less than R without horns ($P < 0.001$); however, S without horns sold for less than S with horns ($P = 0.02$). Healthy S sold at a higher price ($P < 0.001$) compared to S with lumps, sickness, bad eye(s) or lame S and did not differ from sick R. Market price for S quality grade differed ($P \leq 0.01$). Utility averaged the highest and canner the lowest, \$39.29 and \$34.96, respectively. The study showed that cow prices were affected by whether cows are purchased as R or S. The impact of cow characteristics, attributable to management, on sale price differed between R and S.

Key Words: Value, Replacement cows, Slaughter cows

409 Evaluation of ultrasound exam at feedlot entry as a predictor of carcass grade at slaughter. G Keefe*, I Dohoo, J Valcourt, and R Milton, *Atlantic Veterinary College.*

Five hundred and thirty-six feeders, 347 steers and 189 heifers, from 8 Prince Edward Island feedlots were scanned ultrasonically at entry into the feedlot. Duplicate ultrasonic images, in the longissimus dorsi muscle region between ribs 12 and 13 were created by a certified technician using an ALOKA 500 ultrasound unit with a 3.5 MHz 17 cm ultrasound probe. Critical Vision analysis software was used in the assessment of back fat depth, rib eye area and, using image analysis, to create a score for intramuscular fat. Data were analyzed using an adjacent category ordinal regression model in STATA version 7.0 with carcass grade at slaughter (A, A, AAA) as the outcome. This model assumes that the effect of a factor on the odds of moving from A to AA is the same as on the odds of moving from AA to AAA. For analysis, the two measurements for each of the ultrasound variables were averaged. Intramuscular fat values less than 1.85 were set to a value of 1.85 to reflect the lower detection threshold level of the ultrasound equipment. In total, 487 animals had a complete set of all data required for the analysis. Several factors were significantly associated with grade. Two of the 8 feedlots were significantly different than the reference farm. From the regression model, heifers were 1.73 times more likely than steers to be AA than

A and a further 1.73 times more likely to be AAA than AA. Animals weighing less at scanning were more likely (Odds Ratio 1.22/100 lbs) to be in the lower grade classes versus the next highest one. Feeders that were on feed for 100 days more than comparison animals were 2.1 times more likely to be in a higher category. For each increase in back fat of 1 mm at scanning, animals were 1.27 times more likely to be in a higher-grade class. For each 1 sq cm increase in ribeye area an animal would be 1.08 times less likely to be in a higher category. For each percentage increase in marbling at scanning feeders were 1.57 times more likely to be in a higher-grade class. Ultrasound scanning at feedlot entry can be used to predict carcass traits at slaughter.

Key Words: Ultrasound, Feedlot, Intramuscular Fat

410 Use of a modified yeast cell wall preparation to alleviate endophyte toxicosis in cattle. I. Production characteristics. D. G. Ely*¹, D. K. Aaron¹, B. T. Burden¹, C. L. Schultz¹, J. Wyles¹, V. Akay², and K. A. Dawson², ¹University of Kentucky, Lexington, KY, ²Alltech Biotechnology, Inc., Nicholasville, KY.

Ninety-two Angus and Angus x Beefmaster cow/calf pairs were randomly allotted to nine, 10.5#ha KY 31 tall fescue endophyte-infected pastures (> 90%) on May 2 to evaluate the potential of a modified yeast cell wall (MYCW) preparation, from *S. cerevisiae*, to adsorb toxins contained in fescue forage. Three replicate pastures were randomly allotted to each of the following treatments: MYCW [0.45 kg/d⁻¹ d⁻¹ ground shelled corn (95.6%) + MYCW (4.4%) supplement], PC (positive control, ground shelled corn only), and NC (negative control, no supplement). Initial cow and calf weights were taken on two consecutive days (May 2, 3). Cows averaged 5.4 yr of age, weighed 539 kg, and expressed an average BCS of 6.3 when the experimental period began. Calves were 67 d of age and weighed an average of 107 kg on these days. Interim weights of cows and calves and BCS and rectal temperatures of cows were taken at 35-d intervals until weaning on October 22 (consecutive weights on October 22, 23). Cow weight changes from May 2 to July 12 were +0.7, -8.9, and +2.3 kg/hd for NC, PC, and MYCW, respectively. From July 12 to October 22, gains were +12.2, +20.2, and +30.0 kg/hd ($P < 0.05$). Body condition scores were 6.3, 6.1, and 5.9 on May 2, 6.3, 6.0, and 6.0 ($P < 0.05$) on July 12, and 6.4, 6.2, and 6.3 ($P < 0.10$) on October 22 for NC, PC, and MYCW, respectively. Rectal temperature differences were nonsignificant on all dates. Overall calf ADG (175 d) values were .89, .85, and .91 kg/hd for NC, PC, and MYCW, respectively. Results of this study indicate consumption of MYCW by cows grazing tall fescue has the potential to alleviate some of the endophyte toxicosis associated with consumption of this forage. The MYCW appears to exert its greatest influence from July to late October.

Key Words: Fescue, Cows, Calves

411 Use of a modified yeast cell wall preparation to alleviate endophyte toxicosis in cattle. II. Tympanic temperature response. D. K. Aaron*¹, D. G. Ely¹, B. T. Burden¹, C. L. Schultz¹, J. Wyles¹, V. Akay², and K. A. Dawson², ¹University of Kentucky, Lexington, KY, ²Alltech Biotechnology, Inc., Nicholasville, KY.

Tympanic temperatures were continuously measured at 30-min intervals during three, 3-d trials (June 14-17, July 17-20, August 20-23) to evaluate effects of a modified yeast cell wall (MYCW) preparation on deep body temperatures of 27 Angus and Angus x Beefmaster cows grazing endophyte-infected KY 31 tall fescue. Three cows were randomly selected from each of nine pastures previously allotted (May 2) to MYCW [0.45 kg/d⁻¹ d⁻¹ ground shelled corn (96.6%) + MYCW preparation (4.4%); PC (positive control, ground shelled corn only), and NC (negative control, no supplement) treatments. Temperature data collection began at 1700 of each trial start date and ended at 1700 of the last day of the trial (72-h period). Data logger difficulties allowed only 24, 20, and 25 cows to be instrumented during the June, July, and August trials. Each cow's average, maximum, and minimum tympanic temperatures were found for each day of the trial. Daily diurnal ranges and daily differences between maximum and average tympanic temperatures (partial differences) were calculated. Data were averaged for each trial. Average maximum and minimum ambient temperatures were 30.6 and 19.2, 30.5 and 19.7, and 28.1 and 16.1°C for the June, July, and August trials. Maximum tympanic temperatures were lower ($P < 0.10$) for MYCW

than NC cows in all trials (June: 39.1 vs. 39.6; July: 39.1 vs. 39.3; August: 38.9 vs. 39.2°C). Daily diurnal ranges and partial differences were lower for MYCW than NC cows in June (1.13 and 0.64 vs. 1.40 and 0.84°C; $P < 0.05$) and August (1.11 and 0.54 vs. 1.29 and 0.70°C; $P < 0.05$). Although not statistically significant, temperature differences between MYCW and PC cows also tended to support MYCW supplementation as a potential means of alleviating the problem of elevated body temperature associated with fescue toxicosis.

Key Words: Temperature, Fescue, Cows

412 Comparison of an early weaning management system with a conventional weaning system on cow and calf performance while grazing tall fescue pastures. C. L. Schultz*, D. G. Ely, B. T. Burden, D. K. Aaron, and J. Wyles, *University of Kentucky, Lexington, KY.*

Twenty-four, Angus x Beefmaster 2-yr-old heifers and their calves were used in a completely randomized design to compare cow and calf performance in two management systems. In the early weaning (EW) system, calves were weaned at 100 d (May 21) to fescue pastures and supplemented with a concentrate mix. Calves in the normal weaning (NW) system grazed fescue pastures with their dams until weaning at 210 d. Twelve EW calves and 12 NW cow/calf pairs were allotted to eight pastures on June 6 with four pastures per treatment. Cow and calf weights and cow BCS changes were measured at 28-d intervals from May 21 (EW) to September 4 (NW). Cow gain, from EW to NW, was greater ($P < 0.05$) for cows with EW calves (50.5 vs. -3.2 kg). Cows with EW calves gained .5 BCS; those with NW calves lost .5 BCS ($P < 0.05$). Calf gains were not different (.88 vs. .83 kg/d; EW vs. NW). To determine DMI and nutrient digestibility, steers in each pasture were dosed with n-alkane boluses on June 18, July 20, and August 20 [Period (P) 1, 2 and 3, respectively]. Fecal grab samples were collected once daily from d 10 through d 14 post-bolus. Total DMI was similar in P1 and 2, but EW calves consumed more ($P < 0.01$) during P3. Although forage DMI was greater ($P < 0.01$) for NW calves during P1 and 2, CP intake was greater ($P < 0.05$) for EW calves in P1. Intake of NDF and ADF was greater for EW calves during P3. Digestibility of DM and CP was ($P < 0.10$) higher in the NW treatment in P1 and 2 and digestibility of NDF and ADF was greater ($P < 0.08$) for NW calves during all periods. These data indicate weaning beef calves at 100 d can improve cow gains and condition, but calf gains from fescue pasture are

not increased because neither dietary intake nor nutrient digestibility are increased above that of NW calves.

Key Words: Gain, Dry Matter Intake, Digestibility

413 Evaluation of four ractopamine use programs on pig growth and carcass characteristics. S.A. Trapp*, J.P. Rice, D.T. Kelly, A. Bundy, A.P. Schinckel, and B.T. Richert, *Purdue University, West Lafayette, IN.*

Barrows (n=143) and gilts (n = 149) were used in a six week study evaluating different ractopamine use programs for late finishing pigs. Pigs were allotted by weight (Initial BW = 70.8 kg), sex and ancestry to one of five ractopamine (RAC) treatments (trt): 1) control, no RAC; 2) 5 ppm RAC wk 0-6; 3) 5 ppm RAC wk 0-4, 10 ppm RAC wk 5-6; 4) 5 ppm RAC wk 0-3, 10 ppm RAC wk 4-6; 5) 5 ppm RAC wk 0-2, 7.5 ppm RAC wk 3-4, 10 ppm RAC wk 5-6. Barrows were fed a 1.1% Lys diet and gilts were fed a 1.2% Lys diet. Pigs fed RAC had increased ADG (1089 vs 984 g/d; $P < .002$) and increased G:F (.390 vs .363 $P < .03$) compared to the control trt during wks 0-2. RAC trts during weeks 2-6 had greater ADG (911, 969, 1015, 1041, 1003 g/d; trt 1-5 respectively, $P < .05$) than the control trt. Pigs fed trt 4 had greater ADG ($P < .02$) than trt 2 during wk 2-6. Overall, pigs fed RAC had increased ADG (936, 1015, 1033, 1083, 1008 g/d; trt 1-5 respectively, $P < .01$) and G:F (.359 vs .324; $P < .001$) compared to pigs fed control, with no significant differences in ADFI among trts. Pigs fed trt 4 had greater overall ADG ($P < .05$) than the other RAC trts. Pigs fed RAC had increased final BW (110, 113.5, 114.2, 116.2, and 112.7 kg; trt 1-5 respectively, $P < .01$) and trt 4 had greater ($P < .05$) final BW than the other RAC trts. Pigs fed RAC had increased hot carcass weight (83.0 vs 87.5 kg; $P < .001$) and yielded greater dressing percent (76.41% vs 75.40%; $P < .02$) than the control trt. Loin eye area (LEA) was greater for pigs fed RAC (41.0, 43.2, 43.9, 44.2, 43.2 cm²; trt 1-5 respectively, $P < .01$) than the control trt. No significant differences in backfat measurements were found among trts. All RAC use programs increased pig growth rate and feed efficiency. The RAC step up programs sustained the RAC growth response during weeks 5 and 6 better than constant level of RAC. However, the 3 wk-3 wk RAC program with levels of 5 and 10 ppm, respectively, had the greatest increase in pig growth rate and provides an effective step-up program that will maximize pig performance while using RAC.

Key Words: Ractopamine, Pig, Growth

Ruminant Nutrition Feed Additives and Fiber

414 Use of feed enzymes to improve feed utilization by ruminants. K. A. Beauchemin¹, D. Colombatto¹, W. Z. Yang¹, and D. P. Morgavi², ¹*Agriculture and Agri-Food Canada, Research Centre, Lethbridge, Alberta, Canada*, ²*INRA Centre Clermont-Theix, Saint-Genes-Champanelle, France.*

Research has demonstrated that supplementing dairy cow and feedlot cattle diets with fiber-degrading enzymes has significant potential to improve feed utilization and animal performance. Ruminant feed enzyme additives are concentrated fermentation products with specific enzyme activities, primarily xylanases and cellulases. Improvements in animal performance through enzyme supplementation can be attributed mainly to improvements in ruminal fiber digestion resulting in increased digestible energy intake. Animal responses are greatest when fiber digestion is compromised and when energy is the first limiting nutrient in the diet. When viewed across a variety of enzyme products and experimental conditions the response to feed enzymes by ruminants has been variable. This variation can be attributed to experimental conditions in which energy is not the limiting nutrient, as well as the activities and characteristics of the enzymes supplied, under or over-supplementation of enzyme activity, and inappropriate method of adding the enzyme to the diet. A limited number of ruminant enzyme products are now commercially available and this list of products is expected to grow. However, random use of enzymes on feeds, without consideration for specific situations and substrate targets, will only discourage or delay on-farm adoption of enzyme technology. Research is needed to understand the mode of action of feed enzymes so that efficacy can be assured. While much progress has been made in advancing enzyme technology for ruminants, considerable research is still required to reduce the variability

of response. With increasing consumer concern about the use of growth promoters and antibiotics in livestock production, and the magnitude of increased animal performance obtainable using feed enzymes, there is no doubt that these products will play an increasingly important role in the future. This paper reviews the research on enzyme selection, the animal responses to feed enzymes and the mechanisms by which these products improve nutrient utilization.

Key Words: Feed Enzymes, Fiber Digestion, Nutrient Utilization

415 Bacterial direct-fed microbials in ruminant diets: Performance response and mode of action. C.R. Krehbiel* and S.E. Gilliland, *Oklahoma State University.*

Direct-fed microbials (DFM) have been shown to increase daily gain and feed efficiency in feedlot cattle, enhance milk production in dairy cows, and improve health and performance of young calves. However, effects of DFM on performance have been mixed, and the mode of action remains unclear. Bacteria used as DFM have been defined as mono or mixed cultures of live organisms that beneficially affect the host by improving the properties of the indigenous microflora. The original concept of feeding DFM to livestock was based on potential intestinal effects, including improved establishment of gut microflora and prevention of the establishment of pathogenic organisms. More recently, however, there has been some indication that certain bacterial DFM may have beneficial effects in the rumen, such as reducing the potential for ruminal acidosis. In 13 experiments, supplementing feedlot steers with lactate-utilizing and (or) lactate-producing bacteria has been shown to improve feed efficiency (range = -3.0 to 9.6%; avg = 3.3%) and daily