Wednesday, June 22, 2011

SYMPOSIA AND ORAL SESSIONS

§§Graduate Student Paper Competition: Graduate Student Paper Competition

^^1 ##47204 ¤**Administration of GnRH on day 9 of a 14-day CIDR with CO-Synch 72h in lactating beef cows.** ¬R.L. Giles*, J.T. French, P.E. Repenning, J.K. Ahola, J.C. Whittier, G.E. Seidel, and R.K. Peel, %% Colorado State University, Fort Collins, CO United States.

§%§Most progestin-based estrus synchronization protocols focus on inducing one new follicular wave before progestin removal. Our objective was to determine effectiveness of an extended controlled internal drug release (CIDR) protocol with 2 induced follicular waves. Lactating beef cows (~25% primiparous) at 3 locations (n=247, n=395, n=137) were randomly assigned to 3 treatment groups. Cows in the 14-d 50 PG group received a CIDR (1.38 g progesterone) insert and 100 μg GnRH im on d 0, 100 μg GnRH im on d 9, CIDR removal and 50 mg PGF2α im on d 14, and 100 μg GnRH im with TAI 72 _ 3 h later. Cows in the 14-d 6h PG group were assigned to the same protocol as the first group except that 25 mg PGF2α im was given at CIDR removal on d 14, plus 25 mg PGF2α 6 _ 1 h later. Cows in the control group (5-d CO-Synch+CIDR) received a CIDR insert and 100 μg GnRH im on d 0, CIDR removal and 25 mg PGF2α im on d 5, 25 mg PGF2α 6 _ 1 h later, and 100 μg GnRH im with timed-AI 72 _ 3 h after CIDR removal. Body condition scores for Tx 1, 2, and 3 averaged 4.9 _ 0.73, 4.9 _ 0.65, and 4.9 _ 0.72 (SD). Post partum interval at TAI ranged from 38 to 115 d. Pregnancy status was determined on d 37 to 40 by ultrasonography. Averaged over all locations, conception rates for 14-d 50 PG (n=278) 14-d 6h PG (n=249), and 5-d CO-Synch + CIDR (n=252) protocols were 61.2, 53.4, and 50.8% respectively; the 14-d 50 PG and 5-d CO-Synch + CIDR differed ($P < 0.025$, chi-squared). Cycling status at 2 locations (n=243; n=391) and was determined from blood collected on d -7 and d 0; progesterone levels >1 ng/mL at either bleed were considered cycling. Averaged over the 2 locations, conception rates by cycling status did not interact with treatments ($P > 0.05$) (14-d 50 PG: cycling-79/117 (67.5%), not cycling-58/111 (52.3%); 14-d 6h PG: cycling-59/102 (57.8%), not cycling-54/99 (54.6%); 5-d CO-Synch: cycling-53/99 (53.5%), not cycling-58/106 (54.72%). Overall conception rates were higher for 14-d 50 PG group than the 5-d CO-Synch protocol.

Key Words: CIDR, Timed-AI, PGF2a

^^2 ##47187 ¤**Camelina meal supplementation to beef cattle: I. Effects on performance, DMI, and acute-phase protein response of feeder steers following transport.** ¬B. I. Cappellozza*[1], R. F. Cooke[1], C. Trevisanuto[1], V. D. Tabacow[1], D. W. Bohnert[1], J. Dailey[2], and J. A. Carroll[2], %% [1]Oregon State University - Eastern Oregon Agricultural Research Center, Burns, OR, USA, [2]USDA _ ARS Livestock Issues Research Unit, Lubbock, TX, USA.

§%§Sixty Angus x Hereford steers were ranked by BW on d -28 of the study and allocated to 20 drylot pens, which were randomly assigned to receive: 1) supplement containing (as-fed basis) 84 % corn, 14 % soybean meal, and 2 % mineral mix (CO) offered during preconditioning (PC; d -28 to 0) and feedlot receiving (FR; d 1 to 29), 2) supplement containing (as-fed basis) 70 % corn, 28 % camelina meal, and 2 % mineral mix (CAM) offered during PC and FR, 3) CAM offered during PC and CO offered during FR, 4) CO offered during PC and CAM offered during FR. Treatments were offered daily at a rate of 2.20 and 2.04 kg of DM/steer for CO and CAM, respectively. Alfalfa-grass hay was offered ad libitum during the study. On d 0, steers were loaded into a commercial livestock trailer, transported for 24 h, and returned to the research facility (d 1). Total DMI was evaluated daily, and shrunk BW was collected on d -31, 1, and 30 for ADG calculation. Blood samples were collected on d 0 (prior to loading), 1 (immediately upon arrival), 4, 7, 10, 14, 21, and 29 for determination of plasma cortisol and haptoglobin. Rectal temperatures

were recorded concurrently with blood sampling on d 0, 1, 4, and 7. During PC, CAM steers tended to have reduced (P = 0.10) ADG compared to CO (0.26 vs. 0.37 kg/d, respectively). No treatment effects were detected (P > 0.16) for FR and total ADG. Steers receiving CAM during PC had reduced total DMI during PC and FR compared to CO cohorts (3.07 vs. 3.35 % of BW during PC, and 3.20 vs. 3.35 % of BW during FR, respectively). Steers receiving CAM during PC had reduced mean haptoglobin concentrations vs. CO cohorts on d 0 and 1 (1.64 vs. 1.79 absorbance @ 450 nm _ 100, respectively). Steers receiving CAM during FR had reduced (P = 0.02) mean haptoglobin and rectal temperatures during FR compared to CO cohorts (1.69 vs. 2.02 absorbance @ 450 nm _ 100 of haptoglobin, and 39.05 vs. 39.14 _C for temperature, respectively). In conclusion, camelina meal supplementation alleviated the acute-phase protein response stimulated by transport, but did not benefit performance of feeder steers.

Key Words: Camelina meal, Transport, Beef steers

^^3 ##47189 ¤**Evaluation of residual feed intake in rams using the GrowSafe System.** ¬R. R. Cockrum*, R. H. Stobart, S. L. Lake, and K. M. Cammack, %% University of Wyoming, Laramie, WY, USA.

§%§The sheep industry has yet to fully investigate the effects of selecting for residual feed intake (RFI). For RFI to be an appropriate measure of feed efficiency, it must not be unfavorably correlated with growth traits, carcass merit, or reproductive efficiency. In cattle, it has been estimated that 63 d are needed to accurately estimate individual RFI. The aims of this study were to 1) determine if a relationship exists between individual RFI ranking and backfat (BF), loin eye area (LEA), body condition score (BCS), scrotal circumference (SC), and fleece weight (FW), and 2) determine an adequate length of testing period necessary to accurately estimate individual RFI ranking. Western whitefaced rams (n = 87) submitted to the Fall 2010 University of Wyoming Ram Test were evaluated for 140 d on the GrowSafe System. Twelve rams were removed from the study due to poor adaptation to the GrowSafe System, health complications, or missing data. The Growsafe System records individual animal intake data that can be used to evaluate individual RFI ranking. Rams were weighed on weeks 2, 4, 6, and weekly thereafter, with the last weight recorded on wk 20. Overall RFI ranking and weekly RFI rankings were generated in SAS using GLM and MIXED procedures (repeated measures with an unstructured model), respectively. Correlation coefficients were estimated between RFI and BF, LEA, BCS, SC, and FW using the CORR procedure. An alpha of 0.05 was assumed. There was no relationship (*P* _ 0.133) between RFI ranking and BF, LEA, BCS, and FW. However, SC tended (*P* = 0.061) to be positively correlated with RFI ranking. Weekly variation of RFI estimates was consistent from wk 7 through wk 15, and was lowest at wk 7 (d 63), suggesting that a testing period similar to that used in beef cattle (approximately 60 to 70 d) may be sufficient to estimate RFI in sheep. These preliminary results indicate that RFI ranking does not adversely affect carcass, growth, or fleece traits in sheep, and that performance test periods currently used in the University of Wyoming Ram Test are more than sufficient to accurately estimate RFI.

Key Words: Performance test, Residual feed intake, Sheep

^^4 ##47074 ¤**Effects of added dietary fat to post weaned Holstein bull calves on growth performance.** ¬L. W. Hall*[1], J. D. Allen[1], C.B Burrows[1], G. Xie[1], B. H. Carter[2], and G. C. Duff[3], %% [1]University of Arizona, Tucson, AZ, USA, [2]New Mexico State University, Las Cruces, NM, USA, [3]Montana State University, Bozeman, MT, USA.

§%§Objective was to determine if adding fat (0-6%) to rations of Holstein starter calves could improve average daily gains (ADG), feed efficiency, and total gains from weaning to 125 kg body weight. The added fat portion of the diets were taken out of the percentage of steam-flaked corn in the diet to evaluate adding fat to existing growing rations. Higher fat diets had greater caloric density. Sixty post-weaned Holstein bull calves with an average weight of 76.99 kg (n = 60, 76.99 _ 8.72 kg initial BW, *P* = 0.99) were sorted by weight into 5 blocks from heavy to light. Calves were randomly assigned to one of three diets of 0% (CON), 3% (3AF), or 6% (6AF) added dietary fat within their block for a total of 15 groups with 4 calves in each group and 5 pens per treatment. Pen was the experimental unit. The calves were hand fed

using the slick bunk method 2 times per day. Calves were fed until the first group reached the average weight of 125 kg. No differences were detected in average daily gains between treatments ($P = 0.27$), but the contrast between CON and 3AF was nearing a trend ($P = 0.12$). Feed efficiency was measured using gain to feed ratio. Analysis of overall gain to feed identified a difference between treatments ($P = 0.04$) with the 3AF having the greatest impact on gain to feed (CON vs. 3AF; $P = 0.02$, CON vs. 6AF; $P = 0.91$, and 3AF vs. 6AF; $P = 0.03$). We did not detect a difference in the total weight gained (TW) per calf between treatments with CON = 99.64 kg, 3AF = 103.99 kg, and 6AF = 101.60 kg ($P = 0.85$). We conclude that adding 3% dietary fat to the starter diet of Holstein bull calves significantly improved gain to feed ratios but had no effect on average daily gains or end weight.

Key Words: added fat, Holstein diet, weaned calf diet

^^5 ##47177 ¤**CXCL12 and CXCR4 expression in peripheral blood from pregnant and non-pregnant sheep: implications in pregnancy diagnosis.** ¬K Quinn* and R Ashley, %% New Mexico State University, Las Cruces, NM, USA.

§%§In ruminants, implantation of the blastocyst in the uterus and subsequent placentation is a prolonged process. This complex progression involves interplay between sex steroids and local signaling molecules, many of which have immune function. Chemokines and their receptors are pivotal factors in implantation and vascularization of the placenta. Chemokine receptor 4 (CXCR4) is up regulated in human endometrium during implantation and has only one recognized ligand, CXCL12. Activation of CXCR4 causes recruitment of leukocytes to the uterus of pregnant females and stimulates trophoblast proliferation and invasion. Based on known roles for CXCL12 and CXCR4 during early pregnancy, we hypothesized that expression of CXCL12 and CXCR4 would increase in peripheral blood during implantation and placentation in sheep. The objective of the study was to determine if mRNA for CXCL12 and CXCR4 is differentially expressed using real-time PCR (qPCR) in blood from pregnant and cyclic ewes. Jugular and uterine vein blood samples were collected from ewes on days 12 to15 and days 35 and 50 of pregnancy. In jugular blood samples, the greatest expression of CXCL12 mRNA was on day 35 of gestation and was significantly ($P< 0.05$) elevated compared to all days tested. A similar expression pattern of CXCL12 was observed in uterine vein samples with the greatest expression on day 35 of pregnancy. Expression of CXCR4 was detected on all days but did not differ. Ruminant pregnancy is characterized by changes in immune cell populations in the periphery and these changes are likely important for conceptus protection. The increase in CXCL12 in peripheral blood is interesting as it correlates with placentation in sheep. The CXCL12/CXCR4 system may affect migration of immune cells into the uterus and aid in fetal-maternal tolerance. In summary, gene expression of CXCL12 is increased in peripheral blood cells from pregnant sheep during critical fetal-maternal communication and it is conceivable that detection of CXCL12 in blood could serve as a pregnancy diagnostic tool.

Key Words: chemokine, pregnancy, sheep

^^6 ##47192 ¤**Relationship Between Behavioral Traits and Feedlot Performance in Finishing Steers.** ¬P. E. Repenning*, J. K. Ahola, R. K. Peel, R. L. Giles, J. T. French, J. C. Whittier, and D. H. Crews Jr., %% Colorado State University, Department of Animal Sciences, Ft. Collins, CO, United States.

§%§Our objectives were to evaluate the relationship between subjective behavioral scores with objective exit velocity, and the relationship between behavioral traits and feedlot performance. Crossbred steers (n = 186, 394.7 _ 40.95 kg) received a high energy ration for 70 d prior to slaughter. Steers were weighed every 2 wk at which time 5-point subjective chute score (1 = very calm, 5 = very aggressive), 4-point subjective gait score (1 = walk, 2 = trot, 3 = run, 4 = fall), objective exit velocity, time in chute and vocalization incidence data were collected. Animal handling prior to entering the squeeze chute was not directly measured in this study, nor was information on the handler(s) collected or accounted for in the analysis. However, consistent low-stress animal handling techniques were employed every time animals were processed. There was a positive correlation ($r = 0.32$, $P < 0.01$) between chute score and gait score. Both chute score and gait score were positively correlated ($r = 0.31$, $P < 0.01$ and $r = 0.63$, $P < 0.01$,

respectively) with exit velocity. Exit velocity was negatively correlated (r = -0.07, $P < 0.03$) with ADG. There was no significant correlation between chute score and ADG ($P > 0.10$), nor was there a correlation between gait score and time in chute ($P > 0.10$). These data suggest an effect of behavior as measured by subjective gait score on ADG. Steers categorized in the slowest gait scores (1 and 2) exhibited higher ($P < 0.05$) ADG than steers categorized in fastest categories (3 and 4). Average chute score was different ($P < 0.05$) across all 4 gait score categories. Steers with a gait score of 1 exhibited a chute score 0.35 points higher than gait score 4 ($P = 0.05$). In conclusion, subjective gait score can represent objective exit velocity as a method of characterizing behavior. Additionally, steers with faster exit velocity had lower ADG.

Key Words: ADG, Chute Score, Exit Velocity

^^7 ##47164 ¤**Improving TAI pregnancy rates in beef heifers by synchronizing follicular waves with GnRH on d 9 of a 14 d CIDR plus CO-Synch protocol.** ¬J.T. French*, R.L. Giles, P.E. Repenning, J.K. Ahola, J.C. Whittier, G.E. Seidel, and R.K. Peel, %% Colorado State University, Fort Collins, CO USA.

§%§Presynchronization of reproductive cycles with long term progestins increases estrus synchrony in heifers, but also causes persistent follicles. However, follicular waves may be synchronized with GnRH. The first objective of the study was to compare timed artificial insemination (TAI) pregnancy rates in beef heifers between a 14 d controlled internal drug release (CIDR) protocol with GnRH on d 9, to a 5 d CO-Synch+CIDR control protocol. The second objective was to compare pregnancy rates between a 50 mg PGF2α injection and a 6 h interval between two, 25 mg PGF2α injections at CIDR removal within the 14 d CIDR protocol. Angus and Angus cross heifers (n = 710) at 4 locations were assigned to 3 estrous synchrony treatments. Heifers in the 14-d 50 PG treatment (n = 242) received 100 μg GnRH im and a CIDR (1.38 g progesterone) on d 0, followed by 100 μg GnRH im on d 9, 50 mg of PGF2α on d 14 at CIDR removal, and 100 μg GnRH im at TAI 72_ 2 h after CIDR removal. Heifers in the 14-d 6h PG treatment (n = 233) received the same protocol except instead of receiving 50 mg of PGF2α, they received two 25 mg injections of PGF2α im, one at CIDR removal and a second 6 h later. The control heifers (5-d CO Synch+CIDR) (n = 235) received 100 μg GnRH im and a CIDR on d 9, and 25 mg of PGF2α at CIDR removal on d 14 with TAI and 100 μg GnRH GnRH 72 _ 2 h later. The average and SD BCS and weight of all heifers was 4.8_2.42 and 310_ 35.0 kg, respectively. Average weight and body condition score did not differ (P < 0.10) between treatments. Conception rates were determined on d 46_6 d (SD) by ultrasonography. Statistical analysis was done using chi-square methods. The 14-d 50 PG TAI rate of 54.5% (132/242) was not different from the 14-d 6h PG TAI rate of 53.6% (125/233) (P = 0.57) nor the control 5 Day CO Synch+CIDR TAI rate of 46.4% (110/235) (P = 0.18). This protocol appears to produce encouraging TAI rates. However additional ultrasonography is needed to determine whether the d 9 GnRH addresses persistent follicles.

Key Words: Artificial Insemination, Estrous Synchronization, Beef Heifers

^^8 ##47144 ¤**Comparison of protein and copper sources on bioavailability in rainbow trout.** ¬E.S. Read*[1], W. Sealey[2], R. Barrows[2], G. Gaylord[2], and J.A. Paterson[1], %% [1]Montana State University, Bozeman, MT, USA, [2]Bozeman Fish Technology Center, Bozeman, MT, USA.

§%§**ABSTRACT**: Diets that provide adequate amounts of Cu for rainbow trout are necessary to maintain fish productivity. Few studies have compared inorganic and organic forms of supplemental Cu and source of supplemental protein on rate and efficiency of gain in rainbow trout diets. The objective of this study was to compare the effects of Cu source ($CuSO_4$ vs. Cu-Lys), dietary Cu level (0, 5, 10, 15 and 20 ppm) and diets with either fishmeal or plant-based protein fed for 14-wk. Diets were formulated to contain 40% CP and 20% crude lipid. Prior to feeding experimental diets, 576 juvenile rainbow trout (average 28g) were randomly allotted to 32, 168-L tanks and fed either the plant or fishmeal-based diets without supplemental Cu for a 2 wk depuration period. Following depuration, fish were offered the experimental diets for 12 wk. At 6 and 12 wk, 3-5 fish were removed from each tank and sacrificed to determine whole body, liver, and

plasma Cu concentrations using ICP methodology. Fish fed plant-based diets had higher *(P < 0.05)* ADG, and better *(P < 0.05)* feed conversion ratio (FCR) than fish offered fishmeal-based diets. At both 3 and 6 wk, trout fed plant-based diets without Cu (0 ppm) had lower *(P < 0.05)* growth rates and higher *(P < 0.05)* feed intakes compared to fish fed Cu-supplemented plant-based diets. No growth differences were observed for trout fed the fishmeal-based diets. Liver Cu concentrations at six wk were higher *(P < 0.01)* for fish fed plant-based protein compared to fishmeal protein. A quadratic response was measured *(P < 0.05)* for increasing level of Cu supplementation. There was no effect *(P < 0.17)* of Cu source on liver Cu concentrations. In summary, supplemental Cu improved growth rate when trout were fed plant-based diets. Plant-based diets resulted in faster ADG than fishmeal based diets. No differences in uptake of Cu by the liver were detected due to Cu source at 6wk.

Key Words: Copper, Bioavailability, Rainbow Trout

^^9 ##47109 ¤**Effect of selenium source and supplementation rate in ewes on selenium transfer from ewe to lamb and on lamb growth.** ¬W.C. Stewart*, G Bobe, W.R. Vorachek, W.D. Mosher, G Pirelli, and J.A. Hall, %% Oregon State University, Oregon State University, Corvallis, OR.

§%§Selenium (Se) is an essential micronutrient of sheep. Supplementation is important in young lambs to prevent Se-deficiency. The FDA regulates Se supplementation to ruminant diets at 0.3 mg/kg Se (as fed), however bioavailability differences between organic and inorganic Se sources exist, which may modify Se transfer to the newborn lamb, and subsequently affect lamb growth. To evaluate the effect of Se source and supplementation rate in ewes on Se status and growth of their offspring, 240 ewes (Suffolk, Polypay, and crossbred) were divided into 8 treatment groups and drenched weekly (at an amount equal to their summed daily intake) for one year, including during gestation and early lactation, with no Se (deficient); at recommended levels (0.3 mg/kg) with inorganic Na-selenite, Na-selenate, or organic Se-yeast (SeY); or at supranutritional levels (0.9 and 1.5 mg/kg) with Na-selenite or SeY. Selenium administered by weekly drenching of ewes during gestation and early lactation was effective at increasing Se concentrations in ewe colostrum and milk at 30 days in milk and in improving the Se status of lambs (whole-blood and serum-Se at birth, and skeletal-muscle Se at 14 days of age) ($P < 0.001$). Selenium concentrations in ewe milk and in lambs increased linearly with higher dosages of SeY ($P < 0.001$), whereas Se concentrations did not differ in ewes receiving 0.9 or 1.5 mg/kg of Na-selenite ($P > 0.05$). Lambs from ewes (in particular Suffolk ewes) receiving 1.5 mg/kg SeY did have greater 120-day body weights and growth rates than lambs from ewes receiving SeY at 0.3 mg/kg ($P = 0.10$; $P = 0.06$; respectively). We conclude that weekly oral drenching of ewes with SeY during gestation and early lactation is an effective method for improving Se status of lambs. Furthermore supranutritional SeY supplementation to ewes during pregnancy may improve growth performance of lambs.

Key Words: selenium, sheep, lambs

^^10 ##47188 ¤**The effect of fluoxetine on early lactation and lamb growth in sheep.** ¬P. L. Black*[1], F. W. Harrelson[1], R. A. Halalsheh[1], C. M. Richardson[1], M. M. Marricle[1], S. J. Lopez[1], L. L. Hernandez[2], and T. T. Ross[1], %% [1]New Mexico State University, Las Cruces, NM, [2]University of Cincinnati, Cincinnati, OH.

§%§Fluoxetine (a selective serotonin reuptake inhibitor; **FLX**) has been shown to delay the onset of lactogenesis stage II when taken during pregnancy and lactation in women. A study was conducted to evaluate if ewes would be an appropriate model to determine the effects of FLX on milk production. Nineteen ewes (BW = 91 _ 12 kg; BCS = 2.0 _ 0.5) in late gestation carrying twins were chosen and allotted to treatments by breeding date. Ewes were orally dosed daily at 0700 h by top dressing 454 g of ground corn with 0 or 80 mg FLX. Dosing began approximately on d 126 of gestation and continued until 3 wk post-lambing. Following parturition, ewes were allowed time to bond with their lambs before being moved to an indoor facility. Light hours mimicked the natural daylight hours, with lights on at 0700 h and off at 1900 h. Ewes were housed indoors for 3 wk, and were fed ground alfalfa hay twice daily at 0700 h and 1800 h. Forage intake was measured for 3 wk post-lambing (corn remained constant at 454 g/d). Milk

yield was estimated on d 1, 2, 3, and 5 post-lambing at 1200 h and 1800 h, depending on the time of lambing. Milk yields were measured over a 3 h period during which lamb(s) were removed. Milk samples were collected at each milking, however only d 2 was analyzed for fat, protein, lactose, and somatic cell count. We observed no treatment differences ($P = 0.59$) or day effects on milk yield ($P = 0.98$). Lambs were weighed at birth (d 0), d 7 and d 14. We observed no differences ($P > 0.05$) between treatments in either birth weight or lamb gain. Milk composition did not differ ($P > 0.05$) among control and FLX ewes. Forage intake was similar amid control and FLX ewes ($P = 0.32$), but intake increased ($P < 0.001$) as days post-lambing increased. Overall, FLX had no effect on milk yield or composition, lamb birth weight or gain, or forage intake in ewes. Therefore, the ewe does not appear to be a suitable model to evaluate the FLX response in humans.

Key Words: fluoxetine, lactation, sheep

^^**11** ##47196 ¤**Effects of flaxseed level and processing on site and extent of digestion in beef cows fed native hay.** ¬N. P. Miller*[1], S. L. Kronberg[2], and E. J. Scholljegerdes[1], %% [1]New Mexico State University, Las Cruces, NM, USA, [2]USDA-ARS, Northern Great Plains Research Laboratory, Mandan, ND, USA.

§%§The objective of this study was to evaluate the effects of flaxseed level (0.17 and 0.42% of BW) and processing (whole, rolled or ground) on site and extent of digestion in beef cows consuming chopped native grass hay (10% CP, 75% NDF). Six Angus cows (BW = 590 _ 26 kg) fitted with ruminal and duodenal cannulae were used in a 6 _ 6 Latin square with a 2 _ 3 factorial arrangement of treatments. Experimental periods were 21 d in length with each period consisting of 17 d for diet adaptation and 4 d of intensive sampling. There was a level _ processing interaction (P _ 0.013) for forage and total OM intake. However, no interactions ($P > 0.23$) were observed for duodenal and fecal OM flow. True ruminal OM digestibility (% of intake) was not different ($P = 0.49$) across treatments. Nevertheless, a tendency for a level _ processing interaction was observed ($P = 0.08$) for total tract OM digestibility. There was a level _ processing interaction ($P = 0.03$) for total N intake. As expected, total N flow to the duodenum was greater ($P= 0.009$) when flaxseed was fed at 0.42% of BW compared to 0.17%. Providing flaxseed at 0.42% of BW increased ($P = 0.013$) duodenal non-microbial non-NH_3 flow. True ruminal N and NDF digestibility did not differ (P _ 0.29) due to flaxseed level or processing. Total tract NDF digestibility tended ($P = 0.07$) to be lower with processing, however, level had no affect ($P = 0.74$). Results from this study indicate that it is unnecessary to process flaxseed, irrespective of level, when supplemented to cows consuming forage-based diets.

Key Words: Flaxseed, Digestion, Processing

^^**12** ##47167 ¤**Effect of spaying and type of implant during grazing on feedlot performance and carcass characteristics of heifers.** ¬E. D. Sharman*[1], P. A. Lancaster[1], B. D. Wallis[1], D. B. Burken[1], C. R. Krehbiel[1], D. S. Secrist[2], and G. W. Horn[1], %% [1]Oklahoma Agricultural Experiment Station, Stillwater, OK, USA, [2]Ag Reserves Inc., Elberta, UT, USA.

§%§Fall-weaned crossbred heifer calves (n = 580; 197 _ 24 kg) were utilized in a split plot design to determine the effect of spaying and type of implant during grazing on feedlot performance and carcass characteristics. At the beginning of winter grazing (114 d), half of the heifers were vaginally spayed using the K-R instrument and placed on two native range pastures with equal numbers of intact and spayed heifers per pasture. At the end of winter grazing, half of the heifers within each spay treatment were implanted with Revalor-G (**REV-G**) or Component E-H with Tylan (**COMP**) for a 106-d (April 7 – July 23) summer grazing period. Following summer grazing, heifers within each of the spay x implant treatment groups were split into light and heavy weight blocks. The light block was allotted to one of 24 feedlot pens (6 pen/trt) at the research feedlot and fed for 165 d. The heavy block was fed at a commercial feedlot (1 pen/trt) for 130 d. All heifers were implanted with Revalor-IH on d 0 of finishing and re-implanted 90 d prior to slaughter with Revalor-200, and MGA was not fed. Winter ADG of intact and spayed heifers was 0.11 and 0.10 kg/d (SEM = 0.01). Feedlot performance and carcass characteristics are shown below.

Spaying did not influence DMI but increased ($P = 0.03$) ADG and G:F. Spaying did not affect ($P = 0.23$) HCW but decreased LM area ($P = 0.01$). Overall carcass maturity tended ($P = 0.13$) to be decreased by spaying and tended ($P < 0.07$) to be increased by COMP. In summary spaying increased ADG and G:F during finishing and tended to decrease overall carcass maturity.

Feedlot and carcass characteristics

	Intact	**Intact**	**Spay**	**Spay**
Item	**REV-G**	**COMP**	**REV-G**	**COMP**
ADG, kg/d	1.45[a]	1.51[ab]	1.57[b]	1.53[ab]
DMI, kg	9.40	9.71	9.64	9.56
G:F	0.155[a]	0.156[ab]	0.163[b]	0.160[ab]
HCW, kg	341[a]	349[b]	347[b]	348[b]
LM area, cm^2	89.06[a]	88.21[a]	85.35[b]	87.36[a]
Marbling score[1]	440	433	436	430
Overall maturity[2]	151[a]	159[b]	150[a]	152[ab]

[a,b]Means within a row lacking a common superscript letter differ ($P < 0.05$) [1]Marbling grid: 400 = Small; 500 = Modest [2]Overall maturity grid: 100 = "A" maturity; 200 = "B" maturity

Key Words: carcass characteristics, heifers, spaying

^^**13** ##47138 ¤**The effect of follicle age on pregnancy rate in beef cows.** ¬F.M. Abreu*[1,2], L.H. Cruppe[1], C.A. Roberts[2], E.M. Jinks[3], K.G. Pohler[3], M.L. Day[1], and T.W. Geary[2], %% [1]The Ohio State University, Columbus, Ohio, USA, [2]USDA-ARS Fort Keogh LARRL, Miles City, Montana, USA, [3]University of Missouri, Columbia, Missouri, USA.

§%§The objective of this study was to test the effect of age of the ovulatory follicle on fertility in beef cows. Ovulation was synchronized with the 5 d CO-Synch + CIDR program in multiparous (n = 171) and primiparous (n = 130) postpartum beef cows in two groups (G1 and G2) before application of treatments. Cows in G1 received estradiol benzoate (EB; 1mg/500kg BW, i.m.) 5.5 d (n = 162) and G2 received a similar dose of EB 6.5 d (n = 139) after the final GnRH of the synchronization program to create follicular turnover. Within group, PGF (25 mg, i.m.) was administered either 5.5 d (_young_ follicle, YF; n = 155) or 9.5 d (_mature_ follicle, MF; n = 146) after EB. In the MF treatment, estrous detection and AI were performed for 3 d after PGF, and timed-AI (TAI), coupled with GnRH administration, was performed at 72 h after PGF for cows not detected in estrus. In the YF treatment, estrous detection was performed for 4 d, with TAI at 96 h after PGF if estrus was not detected. Ovarian ultrasonography was performed in YF and MF at EB, PGF and AI, and 5.5 d after EB (MF only). Cows that failed to initiate a new follicular wave after EB (G1, n = 6; G2, n = 5) were excluded from further analyses. Also, cows in the MF treatment that initiated a second follicular wave after EB, but before PGF (G1, n = 25; G2, n = 22) were excluded from further analyses. Within the first 72 h after PGF, more MF cows (76.6%) than YF cows (48.3%; P < 0.01) exhibited estrus. Throughout the estrous detection period, proportion detected in estrus and interval from PGF to estrus were greater (P < 0.01) in the YF than MF treatment (88.6 vs. 76.6%, 79.0 _ 0.7 vs 56.7 _ 1.7 h, respectively). Diameter of the ovulatory follicle was greater (P < 0.01) with estrus-AI (13.3 _ 0.1mm) than TAI (12.6 _ 0.2mm) but did not differ between treatments (MF, 13.1 _ 0.2 mm; YF, 13.0 _ 0.1 mm). Pregnancy rate in the MF (72.3%) and YF (67.1%) treatments did not differ, however, pregnancy rates in estrus-AI (75.1%) was greater (P < 0.01) than in TAI (55.4%). In summary, age of the ovulatory follicle resulted in a longer interval to estrus and to AI in cows with young follicles but did not influence pregnancy rate.

Key Words: follicle age, beef cows, pregnancy rate

^^**14** ##47058 ¤**The effect of supplemental magnesium on mineral consumption and feeding behavior by primiparous beef heifers.** ¬T. M. Norvell*, R. P. Manzano, M. M. Harbac, S. D. Cash, and J. A. Paterson, %% Montana State University, Bozeman, MT, USA.

§%§**ABSTRACT:** Cattle rely on adequate intakes of Mg to meet metabolic requirements and to aid in the prevention of hypomagnesmia. Little critical evidence has been presented to show that cattle will consume mineral supplements based on nutritional wisdom. The objective of this study was to compare two free-choice mineral supplements with 0.0 or 10.0% Mg from MgO on consumption when animals either grazed a pasture or were fed in a drylot. In Dec., 23 Angus heifers were weighed (average BW = 513kg) and randomly assigned to one of two locations (11 heifers drylot, and 12 heifers pasture). The groups were rotated between locations after 15 d for 30 d of measurements. Individual mineral consumption (g/d), feeder attendance (trips/d), and feeding duration (s/d) were measured using a GrowSafe¯ individual feeding system. Heifers were offered barley hay (15.0% CP, 56.6% TDN, 0.39% Ca, 0.21% Mg, and 1.27% K) in both locations twice daily. Supplements were provided in feeders at each location, and were rotated among feeders every 5 d. Hay intakes were similar (P=0.91). However, hay plus supplemental Mg intakes were 175% of NRC requirements for 513 kg gestating beef heifers. Heifers consumed 54.4% more (P<0.01) 0.0% Mg supplement each day (121.6 g/d) than the 10.0% Mg (55.5 g/d). Heifers made almost twice as many (P<0.01) trips to the feeder (3.1 vs. 1.8 trips/d), and spent an additional 91.3 s consuming (186.4 vs. 95.1 s/d) the 0.0% Mg than the 10.0% Mg. Total mineral intakes were 46.5% greater (P<0.01) when supplemented on pasture (115.4 g/d) compared to drylot (61.7 g/d). During the first 15 d, total mineral intakes were higher (P<0.01) than for the second 15 d (111 vs. 66.1 g/d). The amount of 0.0% Mg consumed was correlated (P<0.01) with feeder attendance (r = 0.72) and duration (r = 0.60), but no correlation with 10.0% Mg was measured. The addition of MgO to the mineral decreased overall mineral consumption, feeding attendance, and feeding duration.

Key Words: Feed intake, magnesium, mineral preference

^^**15** ##47009 ¤**Effect of bird depredation on nutrient composition of cattle diets fed at 2 Southwestern research facilities.** ¬J.D. Allen*[1], L.W. Hall[1], J.E. English[1], and G.C. Duff[1,2], %% [1]University of Arizona, Tucson, Arizona, USA, [2]Montana State University, Bozeman, Montana, USA.

§%§Two trials were performed to determine the effect of bird depredation on nutrient composition of cattle diets at 2 Southwestern research feedlots. In trial 1 and over the course of 5 wk during the summer, samples from 9 different diets (concentrate level ranging from 52 to 77.5% as fed) were collected from feed troughs at 0, 6, and 24 h after feeding at a research beef feedlot and analyzed for nutrient composition. Dry matter, ash, and CP increased (P < 0.01) at 6 and 24 h after feeding. Starch decreased (P < 0.01) while fiber components did not differ (P > 0.10) over time. To determine the preference of the bird population on diet components, samples of ground corn, steam-flaked corn, whole corn, soybean meal, and a high-concentrate diet were sampled from a feed trough not accessible to cattle. All corn feedstuffs were preferred (P < 0.01) over soybean meal, and nearly 50% (P < 0.01) of the starch in the diet was consumed. In trial 2, samples of a calf pellet diet (59% corn, 25% commercial pellet, 10% beet pulp, 6% molasses) were collected from feed buckets inaccessible to adjacent individually-housed calves at 0, 8, and 24 h after feeding at a research dairy calf farm. Most components (DM, CP, fiber components, ash) increased (P < 0.01) while starch decreased (P < 0.01) between 0 and 8 after feeding. All components remained unchanged (P > 0.10) between 8 and 24 h after feeding. For trial 1, bird depredation was mainly from pigeon (*Columbia livia*) and mourning dove (*Zenaidura macroura*). Bird depredation on the starch component of the diet in trial 2 was observed from mourning dove, pigeon, and great-tailed grackle (*Quiscalus mexicanus*). The economical loss of bird depredation at a southwestern cattle operation can be attributed to both quantitative loss and loss of energy from starch.

Key Words: pigeon (*Columbia livia*), mourning dove (*Zenaidura macroura*), bird depredation

§§Growth & Development: Growth and Development Oral

^^**16** ##47127 ¤**Effects of four levels of zeranol implants on lamb growth, carcass characteristics, nitrogen balance, and blood hormones.** ¬S. R. Eckerman*[1,2], G. P. Lardy[1], M. M. Thompson[2], M. L. Van Emon[1,2], B. W. Neville[3], P. T. Berg[1], and C. S. Schauer[2], %% [1]North Dakota State University, Department of Animal Sciences, Fargo, ND 58103, [2]North Dakota State University, Hettinger Research Extension Center, Hettinger, ND 58639, [3]North Dakota State University, Central Grasslands Research Extension Center, Streeter, ND 58483.

§%§The objective of this research was to compare the growth performance, carcass characteristics, nitrogen balance, and blood hormones of feedlot lambs implanted with four levels of zeranol. We hypothesized that increased zeranol dose would cause improved growth performance without altering carcass quality, increased nitrogen retention, and increased concentrations of triiodothyronine, thyroxine, and IGF-1. One-hundred forty-four crossbred lambs (29.6 _ 0.3 kg BW) were allotted randomly to sixteen pens (4 pens/treatment) for a 116 d finishing study. Lambs were fed a 84.7% corn and 15.3% market lamb pellet (DM basis) ration ad libitum. Lambs were implanted with 0, 12, 24, or 36 mg zeranol (Ralgro–, Schering-Plough) on d 0. Blood samples were collected on d 0, 28, 56, 70, 82, 99, and 116 from 64 lambs (29.6 _ 2.1 kg BW; 4 lambs/pen) and analyzed for thyroxine, triiodothyronine, and IGF-1. Thirty lambs (67.6 _ 3.4 kg BW) and 96 lambs (65.8 _ 5.1 kg BW) were harvested on d 84 and d 118, respectively. Carcass data were collected 24 h post-chill. A nitrogen balance study was also conducted to compare the effects of 0, 12, 24, or 36 mg zeranol on nitrogen balance in 16 crossbred lambs (34.8 _ 2.1 kg BW). There were no differences among treatments for final BW, ADG, DMI, and G:F (P _ 0.33) in the feedlot study. However, as zeranol dose increased, percent prolapse and percent mortality increased linearly (P _ 0.006). Carcass characteristics, nitrogen balance, blood urea nitrogen, and hormone concentrations were not affected by treatment (P _ 0.07). These data indicate zeranol may increase percent prolapse and morbidity in feedlot lambs without increasing growth performance. Therefore, its use in feedlot lambs is not recommended.

Key Words: feedlot, lamb, zeranol

^^**17** ##47143 ¤**Feedlot performance and carcass characteristics of calves from dams with different levels of winter supplementation developed with or without feed restriction during the postweaning period.** ¬R. L. Endecott*[1], B. L. Shipp[2], M. D. MacNeil[2], L. J. Alexander[2], and A. J. Roberts[2], %% [1]Montana State University, Miles City, MT, USA, [2]USDA-ARS, Fort Keogh Livestock and Range Research Laboratory, Miles City, MT, USA.

§%§Harvested feedstuffs are a major input cost for beef cattle production. The objective of this research was to evaluate the impacts of 2 levels of supplemental feed provided to cows during late gestation and 2 levels of feed provided to their sons during postweaning development on subsequent feedlot performance and carcass characteristics. Bull calves (n = 56) were born from dams receiving adequate (1.8 kg/d; **ADEQ**) or marginal (1.2 kg/d; **MARG**) winter supplementation. After weaning, bulls were developed on ad-libitum (**Control**) or 27% less feed (**Restricted**) for ~140 d. Bulls were then band-castrated and placed on an 80% corn finishing diet ad libitum. Individual intakes were measured with a GrowSafe system for the final ~100 days of the finishing period. Cattle were harvested at commercial packing plant and carcass data were collected. The analysis of variance model included dam winter supplementation, bull postweaning treatment, and their interaction. Restricted calves gained less ($P < 0.01$) during the postweaning phase than Control calves (0.63 vs 1.16 _ 0.03 kg/d, respectively). Postweaning treatment did not impact feed intake during the finishing phase ($P = 0.30$; 13.0 vs 12.6 _ 0.34 kg/d for Restricted and Control, respectively; as-fed basis). However, ADG during the finishing phase exhibited a postweaning _ dam treatment interaction ($P = 0.03$), where Restricted steers from MARG dams gained the most (1.55 _ 0.05 kg/d) and Control steers from MARG dams gained the least (1.26 _ 0.05 kg/d). Steers from ADEQ dams were intermediate (1.45 and 1.36 _ 0.05 kg/d for Restricted and Control). Restricted and Control steers had similar (P _ 0.63) final BW (601 vs 622 _ 7 kg), HCW (357 vs 374 _ 5 kg), back fat thickness (1.12 vs 1.19 _ 0.05 cm), ribeye area (86.5 vs 88.4 _ 1.35 cm^2), intramuscular fat percentage (5.86 vs 5.69 _ 0.21%),and yield grade

(2.69 vs 2.81 _ 0.08). Calves restricted during postweaning development gained more efficiently, and had similar carcass characteristics to their ad libitum-fed counterparts.

Key Words: Postweaning development, Uterine programming, Finishing

§§Physiology: Physiology I Oral

^^**18** ##47180 ¤**Effect of calving period on ADG, reproduction, and first calf characteristics of heifer progeny.** ¬R.N. Funston*, J.A. Musgrave, T.L. Meyer, and D.M. Larson, %% University of Nebraska, West Central Research and Extension Center, North Platte.

§%§Records from 1997 through 2009 were used to determine the effect of calving date on ADG, reproduction, and first calf characteristics in spring born heifer calves (n = 1066) at the Gudmundsen Sandhills Laboratory near Whitman, NE. Heifers were classified as being born in the first, second, or third 21 days of the calving period within year. Continuous data were analyzed using MIXED procedure of SAS and binomial data with GLIMMIX. Calf birth BW was lower ($P < 0.01$) for calves born in the first period compared to the second or third. Calf ADG from birth to weaning increased ($P < 0.01$) with advancing date of birth. Calf weaning BW was lower ($P = 0.03$) if birth occurred in the third period. Calf ADG from weaning to pre-breeding and pre-breeding BW was greatest ($P < 0.01$) for calves born in the first period, however, ADG from the beginning of the breeding season to pregnancy diagnosis was similar ($P = 0.17$). The percentage of heifers cycling at the beginning of the breeding season decreased ($P < 0.01$) with advancing calving date (64, 54, and 37%, respectively) and 45 d pregnancy rates were lowest ($P = 0.05$) for heifers born in the third calving period (88, 85, and 74%, respectively). Birth date of the heifer_s first calf and birth BW decreased ($P < 0.01$) if the heifer was born in the first calving period. Also, more ($P < 0.01$) calves were born in the first 21 d of the calving season if the heifer herself was born in the first calving period. First calf progeny had the greatest ($P < 0.10$) weaning BW if born to a heifer that was born in the first calving period. Heifer calves born during the first 21 d of the spring calving season had greater weaning, pre-breeding, and pre-calving BW, and greater percent cycling before breeding and greater pregnancy rates compared to heifers born in the third calving period. First calf progeny also had earlier birth date and greater weaning BW. Calving period of heifer progeny significantly impacts development and first calving characteristics.

Key Words: ADG, Beef Cattle, Reproduction

^^**19** ##47185 ¤**Evaluating conventional and sexed semen in a commercial beef heifer development program.** ¬T.L. Meyer*[1], Kelly Ranch[2], Sexing Technologies[3], ABS Global[4], J.M. McGrann[5], and R.N. Funston[1], %% [1]University of Nebraska West Central Research and Extension Center, North Platte, NE, USA, [2]Kelly Ranch, Sutherland, NE, USA, [3]Sexing Technologies, Navasota, TX, USA, [4]ABS Global, DeForest, WI, USA, [5]Ag Management Group, College Station, TX, USA.

§%§Objectives of this study were to evaluate the use of sexed semen in a commercial heifer development program. Heifers (n=500) were fed 0.5 mg/d of MGA per animal for 14 d and 19 d later, administered $PGF_{2\alpha}$ and Estrotect heat detection patches were placed on their tail heads. Following $PGF_{2\alpha}$ injection, heifers were detected for standing estrus and AI approximately 18-24 hr following detection of standing estrus. Three days following $PGF_{2\alpha}$ injection, heifers with activated Estrotect patches and observed in standing estrus prior to 8 a.m. were sorted for breeding late the same day. Heifers detected the previous morning and early afternoon were AI early morning on d 3. Heifers detected in heat late on d 2 were inseminated early afternoon of day 3. Following the early afternoon AI, heifers not detected in estrus were given a GnRH injection and AI. Following timed AI, heifers detected the morning of d 3 were inseminated as late as possible with consideration given to the number of heifers to inseminate and remaining daylight. Heifers were AI with one of two sires, either conventional or sexed semen, creating four possibilities for AI sire. At each AI session, heifers were divided evenly to receive either sexed or conventional semen from the same sires. Pregnancy was determined via ultrasonography 55-58 d after AI. Heifers were identified as

pregnant by AI, bull, or non-pregnant and sorted accordingly. Pregnancy rate was greater (P < 0.01) for heifers inseminated with conventional than sexed semen (58 vs. 41 %). In addition, more (P < 0.01) heifers detected in standing estrus were pregnant (56% or greater) than heifers time AI (24 %). Non-pregnant heifers (n=124) and heifers pregnant by bull (n=247) were returned with bulls and checked for pregnancy via ultrasound approximately 60 d later. Overall pregnancy rate was 93%.

Key Words: Artificial Insemination, Beef Heifer, Sexed Semen

^^**20** ##47193 ¤**Effect of residual feed intake on temporal patterns of glucose, insulin, and NEFA concentrations after a glucose challenge in Targhee ewes.** ¬R.R. Redden[2], R.B. McCosh[1], R.W. Kott[1], and J.G. Berardinelli*[1], %% [1]Montana State University, Bozeman, MT, USA, [2]North Dakota State University, Fargo, ND, USA.

§%§The objective of this study was to evaluate the effect of a glucose challenge on glucose, insulin, and NEFA concentrations in high and low residual feed intake (RFI) ewes. The null hypotheses were that temporal concentrations of glucose (Gluc), insulin (I), and NEFA in response to a glucose challenge do not differ between high and low RFI ewes. Residual feed intake was determined for 49, 9-mo-old Targhee ewe lambs fed a commercially available pelleted-diet formulated for growing lambs during a 49-d trial using the GrowSafe system. Ewes were ranked by RFI score and the 6 highest and 6 lowest RFI scoring ewes were selected for the glucose challenge. The glucose challenge began 10 d after the GrowSafe trial. Ewes were fasted and fitted with a jugular catheter 24 h before the start of the glucose challenge. Blood samples were collected at -30, -15, 5, 10, 15, 20, 25, 30, 45, 60, 90, 120, 150, 180, 210, and 240 min after infusion of glucose (59 mM/kg BW) at time = 0 h (1015 h). Gluc, I, and NEFA assayed using colorimetric assays and insulin was assayed by RIA. Temporal patterns of Gluc, I, and NEFA were analyzed by repeated measures of SAS. Concentrations of Gluc, I, and NEFA over time did not differ ($P > 0.10$) between ewes of the RFI classes. However, time to 50% disappearance of Gluc from circulation, estimated from quadratic equation fitting of concentrations after the maximum concentration tended ($P = 0.07$) to be greater in high RFI ewes that in low RFI ewes (110 and 86 min, respectively). Futhermore, Gluc to I ratios tended ($P = 0.08$) to be greater in high RFI ewes than low RFI ewes (273 and 204, respectively) . Thus, Targhee ewes selected for high RFI appeared to be more insulin-resistant than ewes selected for low RFI.

Key Words: RFI, ewe, eneregy metabolism

^^**21** ##47201 ¤**Superimposing Melengestrol Acetate pre-feeding and(or) Controlled Intravaginal Drug Release on the Select Synch Estrous Synchronization Protocol in Beef Cows.** ¬J.K. Ahola*[1], V.A. Aznarez[1], G.E. Seidel, Jr.[2], R.K. Peel[1], and J.C. Whittier[1], %% [1]Department of Animal Sciences, Colorado State University, Fort Collins, CO, USA, [2]Department of Biomedical Sciences, Colorado State University, Fort Collins, CO, USA.

§%§The combined effect of melengestrol acetate (MGA) and controlled intravaginal drug release (CIDR) on estrous and pregnancy response in beef cows (n = 507) was compared with 3 Select Synch-based estrous synchronization protocols over 2 years. Angus-based cows (BCS = 5.1 _ 0.52) were randomized by BCS and assigned to 1 of 4 treatments. All cows received Select Synch (100 ug GnRH im followed by 25 mg $PGF_{2\alpha}$ im 7 d later); progestin treatments included: 1) MGA fed for 14 d beginning 26 d before Select Synch (MGA), 2) CIDR for 7 d concurrent with Select Synch (CIDR), 3) MGA fed for 14 d beginning 26 d before Select Synch and CIDR for 7 d concurrent with Select Synch (MGA+CIDR), and 4) no progestin with Select Synch (Control). Range cubes with or without MGA (carrier) were fed daily in 2 separate pastures. Cows were observed for behavioral signs of estrus for at least 60 min twice daily for 72 h following $PGF_{2\alpha}$. Cows observed in estrus within 72 h of $PGF_{2\alpha}$ were inseminated half a day later. Remaining cows were inseminated 77.4 _ 1.68 h after $PGF_{2\alpha}$ and given GnRH. There were no ($P > 0.10$) yr _ MGA or yr _ CIDR interactions for estrous or pregnancy response. Hence, data were pooled across yr. Estrous response was greater ($P < 0.001$) in CIDR (46.4%) and Control (41.3%) cows than MGA+CIDR (20.2%) or MGA (17.8%) cows. Overall, 62.1% of cows became pregnant to AI, but pregnancy rate did not

differ ($P > 0.10$) among treatments: MGA = 61.8%, CIDR = 63.6%, MGA+CIDR = 63.0%, and Control = 56.8%. When data were evaluated for a progestin effect, there was no effect ($P > 0.10$) of either MGA or CIDR presence on pregnancy rate. In contrast, estrous response rate within 72 h of $PGF_{2\alpha}$ was markedly less ($P < 0.001$) for cows that received MGA (19.0%) vs. no MGA (43.7%), but was not different ($P > 0.10$) among cows that received CIDR (33.2%) compared with cows not receiving CIDR (29.9%). Results indicate that combining both MGA feeding and CIDR with Select Synch does not increase pregnancy rate to AI. However, estrous response within 72 h of $PGF_{2\alpha}$ was decreased in MGA-treated cows.

Key Words: Beef cows, Estrous synchronization, Progestins

^^**22** ##47205 ¤**Effects of digested and undigested snakeweed ingestion on blood components of female sprague-dawley rats.** ¬R. A. Halalsheh*[1], L. J. Yates[1], D. T. Yates[2], A. F. Montoya[1], and T. T. Ross[1], %% [1]New Mexico State University, Las Cruces, NM, USA, [2]The University of Arizona, Tucson, AZ, USA.

§%§Snakeweed (*Gutierizia sarothrea*) is a noxious plant infesting rangelands in the western U.S., northern Mexico, and southern Canada. An experiment was conducted and replicated over time (Exp. 1 and 2) to examine effects of snakeweed (SW) ingestion on serum components in female Sprague-Dawley rats. In both experiments, 36 rats were offered either *In Vitro* ruminally digested (DSW) or undigested (USW) snakeweed. Treatments were 15% digested SW (15% DSW; n = 6), 15% undigested SW (15% USW; n = 6), or 20% digested SW (20% DSW; n = 6) of 5001 Rat Chow⁻ diet. Additionally, each of these rats was assigned a pair-fed, non-snakeweed control 5001 Rat Chow⁻diet (control; n = 6/treatment). Pair-fed control rats were fed based on the intake of their treated pairs to eliminate any nutritional variation due to feed intake. The pair-fed control diet was adjusted using corn meal and the 5001 Rat Chow⁻ diet to make the diet iso-caloric and iso-nitrogenic. Data were analyzed as a completely randomized design and feed intake as a repeated measures. Rats were fed for 10 d, after which blood samples were collected via heart venipuncture. In Exp. 1, daily feed intake and BW were similar ($P > 0.05$) among treatments compared to controls. In Exp. 2, rats consumed 15% DSW and 15% USW had greater ($P < 0.05$) feed intake than rats consumed 20% DSW. Additionally, rats consumed 15% DSW had greater ($P < 0.05$) feed intake compared to rats fed 15% USW on d 3, 5, 6 and 9. In Exp. 2, BW decreased ($P < 0.05$) in all treatments compared to controls. In Exp 1 and 2, serum constituents were similar ($P > 0.05$) among treatments except for triglycerides which decreased ($P < 0.05$) in Exp. 2 in rats consuming SW treatments compared to pair-fed controls. This may be an effect of reduced BW in treated rats compared to pair-fed controls, as body fat is most likely being mobilized. These results indicate that SW ingestion causes mild toxic effects in rats.

Key Words: Snakeweed, Sprague- Dawley rat, Enzymes

§§Environment & Livestock Management: Environment and Livestock Managment Oral

^^**23** ##47004 ¤**Comparison of feeding dry distillers grains in a bunk or on the ground to cattle grazing subirrigated meadow.** ¬J. A. Musgrave*, L. A. Stalker, T. J. Klopfenstein, and J. D. Volesky, %% University of Nebraska, Lincoln, NE, US.

§%§The objective of this study was to compare feeding dry distillers grains with solubles (DDGS) in a bunk or on the ground to cattle grazing subirrigated meadow. One hundred fourteen, March-born steers (279 _ 29 kg BW) were assigned to one of two feeding treatments: DDGS fed in a bunk or on the ground. Six pastures were used and pasture served as the experimental unit. Steers were fed the daily equivalent of 0.9 kg/steer (DMB) and supplement was delivered 3 d/wk. Dry distillers grains with solubles was in meal form as received directly from the ethanol plant. The experiment was conducted during a 72 d period at the University of Nebraska, Gudmundsen Sandhills Laboratory near Whitman, NE from March 10 to May 20, 2010. Steers continuously grazed the same pasture throughout the experiment. For bunk fed steers, bunks were not moved for the duration of the study. Steers fed on the ground received supplement in a different

location within the pasture at each feeding. Steer BW was recorded on two consecutive days at the initiation and completion of the feeding period. Steers were not limit fed prior to weighing. After completion of the feeding period, soil samples were collected from three sites where DDGS was fed on the ground and three control sites. At each site, six samples were collected and composited into one. Samples were analyzed for pH, OM, nitrate, phosphorous, sulfate, and potassium. No significant differences were seen in soil components between DDGS and control sites ($P > 0.30$). Steers fed in a bunk had greater ADG than steers fed on the ground (0.53 vs. 0.42 kg; $P < 0.001$). The NRC (1996) was used to retrospectively calculate the DDGS intake difference between treatments. For steers fed in a bunk, a reduction in DDGS intake between 0.36 and 0.41 kg/day would have resulted in a 0.11 kg/day reduction in ADG. This is the equivalent of 36-41% waste. At $200 (DMB) per ton for DDGS, the cost of the wasted distillers grains was between $0.08 and $0.09 per day. An advantage in animal performance to feeding DDGS in a bunk versus on the ground was seen in this study.

Key Words: DDGS, bunk, supplementation

§§Pastures and Forages: Pasture & Forages Oral

^^**24** ##47150 ¤**High-tannin forage utilization by beef cows I. Intake and digestion of Tallgrass prairie hay contaminated with sericea lespedeza (*Lespedeza cuneata*).** ¬G. J. Eckerle*[1], K. C. Olson[1], J. R. Jaeger[2], J. W. Waggoner[2], J. L. Davidson[3], and L. A. Pacheco[1], %% [1]Kansas State University, Manhattan, KS, USA, [2]Western Kansas Agricultural Research Center, Hays, KS, USA, [3]Greenwood County Extension, Kansas State University, Eureka, KS, USA.

§%§Mature, non-pregnant, non-lactating beef cows (n = 24; initial BW = 463 _ 69 kg) were used to assess voluntary DMI of Tallgrass prairie hay contaminated with sericea lespedeza in a 30-d trial. Cows were assigned randomly to 1 of 2 dietary treatments: uncontaminated Tallgrass prairie hay (UC; 5.4% CP, 40% ADF) or Tallgrass prairie hay contaminated with sericea lespedeza (C; 5.5% CP, 41% ADF). These forages were similar in botanical composition with the exception of sericea lespedeza. Sericea lespedeza constituted 19.3% of C by weight (DM basis); condensed tannin concentration in sericea lespedeza plants selected from C ranged from 200 to 250 g/kg forage DM. All cows were individually fed UC for *ad libitum* intake using a Calan-gate feeding system for 20 d. Voluntary forage DMI was not different (P=0.32) between treatments during that time and averaged 113 _ 3.0 g/kg BW0.75. On d 21, hay contaminated with sericea lespedeza was abruptly substituted for uncontaminated hay in the diets of cows assigned to C. Voluntary forage DMI was monitored for an additional 10 d. Voluntary forage DMI by cows assigned to UC remained relatively stable (112 _ 2.8 g/kg $BW^{0.75}$) during that time, while voluntary forage DMI by cows assigned to C decreased (treatment x time, $P<0.01$) sharply and averaged 61 _ 8.9 g/kg $BW^{0.75}$. Nutrient digestion was assessed during the last 6 d of the trial using ADIA as an internal marker. Total-tract DM, CP, and NDF digestibilities were not different (P_0.29) between C and UC. In contrast, total digestible DMI by cows fed UC was greater ($P<0.01$) than that by cows fed C (64 vs. 29 _ 6.2 g/kg $BW^{0.75}$ for UC and C, respectively). Our results were interpreted to suggest that Tallgrass prairie hay contaminated with sericea lespedeza may be a useful model for the study of the appetite-suppressing effects of that plant. Furthermore, differences in voluntary DMI between contaminated and uncontaminated hays of similar chemical composition were manifested rapidly after introduction of C into beef cow diets.

Key Words: condensed tannins, forage intake, *Lespedeza cuneata*

^^**25** ##47152 ¤**High-tannin forage utilization by beef cows II. Effects of corn steep liquor (CSL) supplementation on intake and digestion of Tallgrass prairie hay contaminated with sericea lespedeza (*Lespedeza cuneata*).** ¬G. J. Eckerle*[1], K. C. Olson[1], J. R. Jaeger[2], J. W. Waggoner[2], J. L. Davidson[3], and L. A. Pacheco[1], %% [1]Kansas State University, Manhattan, KS, USA, [2]Western Kansas Agricultural Research Center, Hay, KS, USA, [3]Greenwood County Extension, Kansas State University, Eureka, KS, USA.

§%§Mature, non-pregnant, non-lactating beef cows (n=24; initial BW=546 _ 131 kg) were used to evaluate the effects of CSL (45% DM, 15% CP) supplementation on voluntary DMI of Tallgrass prairie hay contaminated with sericea lespedeza during a 29-d trial. Sericea lespedeza was 19.3% of forage DM by weight; condensed-tannin concentration in sericea lespedeza plants selected from C ranged from 200 to 250 g/kg forage DM. Cows were assigned randomly to 1 of 4 feeding levels of CSL: 0, 0.6, 1.2, or 1.8 kg DM/d. Cows were individually fed contaminated hay for *ad libitum* intake using a Calan-gate feeding system. Cows were offered contaminated hay only during the first 14 d of the trail. Voluntary forage DMI was not different (P=0.52) between treatments during that time and averaged 83 _ 2.2 g/kg $BW^{0.75}$. Beginning on d 15, supplemental CSL was abruptly introduced into cow diets at assigned feeding levels; it was offered once daily and was consumed by cows within 30 min. Cows supplemented with CSL ate more (P_0.01) forage DM from d 15 to d 29 than unsupplemented cows (70 g/kg $BW^{0.75}$); however, there was no difference (P_0.38) in forage DMI between CSL feeding levels (81, 81, and 85 g/kg $BW^{0.75}$ for 0.6, 1.2, 1.8 kg CSL, respectively). Diet digestion was monitored using ADIA as an internal marker from d 23 to d 29. Total-tract DM digestibility was greater (P<0.01) for cows fed 1.2 or 1.8 kg CSL than for cows fed 0 or 0.6 kg CSL. Total-tract CP digestion was least (P<0.01) in cows fed no CSL (-1.5%), was higher (P<0.01) in cows fed 0.6 kg CSL (18.6%), and was greatest (P<0.01) in cows fed either 1.2 or 1.8 kg CSL (51.7 and 52.3%, respectively). Total digestible DM intake by cows fed 1.2 or 1.8 kg CSL was greater (P_0.03; 75 and 88 g/kg $BW^{0.75}$, respectively) than by cows fed 0 or 0.6 kg CSL (41 and 55 g/kg $BW^{0.75}$, respectively). Under the conditions of our study, CSL ameliorated the effects of condensed tannins on forage DMI and digestion in cows fed Tallgrass prairie hay contaminated with sericea lespedeza.

Key Words: condensed tannins, forage intake, *Lespedeza cuneata*

^^**26** ##47154 ¤**High-tannin forage utilization by beef cows III. Effects of corn steep liquor supplementation on voluntary selection of Tallgrass prairie hay contaminated with sericea lespedeza (*Lespedeza cuneata*) and uncontaminated Tallgrass prairie hay.** ¬G. J. Eckerle*[1], K. C. Olson[1], J. R. Jaeger[2], J. W. Waggoner[2], J. L. Davidson[3], and L. A. Pacheco[1], %% [1]Kansas State University, Manhattan, KS, USA, [2]Western Kansas Agricultural Research Center, Hays, KS, USA, [3]Greenwood County Extension, Kansas State University, Eureka, KS, USA.

§%§Mature, non-pregnant, non-lactating beef cows (n = 16; initial BW = 525 _ 76 kg) were used to evaluate the effects of corn steep liquor (CSL; 44.7% DM, 14.7% CP) supplementation on voluntary selection of uncontaminated Tallgrass prairie hay (5.4% CP, 40% ADF) and Tallgrass prairie hay contaminated with sericea lespedeza (5.5% CP, 41% ADF) during a 24-d trial. These forages were similar in botanical composition with the exception of sericea lespedeza. Sericea lespedeza was 19.3% of forage DM by weight; condensed-tannin concentration in sericea lespedeza plants selected from C ranged from 200 to 250 g/kg forage DM. Cows were assigned randomly to be fed either 0 or 0.6 kg CSL/d (DM basis). Cows were individually penned and fed uncontaminated hay and contaminated hay in separate feed bunks for ad libitum intake. Access to both forages was simultaneous. Supplement was offered once daily and was consumed by cows within 30 min. Cows were allowed to adapt to supplement treatments for 14 d before forage intake measurements began. Uncontaminated hay DMI was not different (P=0.65) between supplemented and unsupplemented cows. Cows supplemented with CSL ate more (P<0.01; 63 g/kg $BW^{0.75}$) contaminated forage DM from d 11 to d 24 than unsupplemented cows (50 g/kg $BW^{0.75}$). In addition, cows supplemented with CSL ate more (P=0.05; 105 g/kg $BW^{0.75}$) total forage DM from d 11 to d 24 than unsupplemented cows (94 g/kg $BW^{0.75}$). Diet digestion was monitored using ADIA as an internal marker from d 19 to d 24. Total-tract DM and CP digestibilities were not different (P_0.17) between treatments. Total digestible DM intake by cows fed CSL was greater (P<0.01; 64 g/kg $BW^{0.75}$) than that by unsupplemented cows (49 g/kg $BW^{0.75}$). Under the conditions of our study, supplemental CSL was associated with increased beef cow selection of Tallgrass prairie hay contaminated with sericea lespedeza. We interpreted these data to suggest that supplemental CSL may increase beef cow tolerance for high-tannin forages.

Key Words: condensed tannins, forage intake, *Lespedeza cuneata*

§§Breeding and Genetics: Breeding and Genetics Oral

^^**27** ##46992 ¤**Feed intake and efficiency of F1 lambs.** ¬D. P. Kirschten*[1], D. R. Notter[2], T. D. Leeds[3], M. R. Mousel[1], J. B. Taylor[1], and G. S. Lewis[1], %% [1]USDA, ARS, Dubois, ID, USA, [2]Virginia Tech, Blacksburg, VA, USA, [3]USDA, ARS, Leetown, WV, USA.

§%§Objective estimates of feed efficiency for progeny of terminal-sire breeds of sheep are needed to improve the value of market lambs. Because recent terminal-sire breed-comparison data are lacking, we determined effects of terminal-sire breed on feed efficiency of F1 lambs. Each year for 3 yr, Columbia, USMARC Composite, Suffolk, and Texel rams were mated with mature Rambouillet ewes. From weaning until harvest each year, F1 lambs (561 wethers; 548 ewes) were fed a step-up finishing diet for ad libitum intake. Pen was the experimental unit, with 1 self feeder per pen. There were 3 pens per year for each sex and each sire breed. Measured amounts of feed were delivered weekly or biweekly; feed remaining at the end of each period was removed and weighed. Days on feed varied across years (84 to 105 d). Dry matter intake, BW gain, G:F, feed conversion (FC), residual feed intake (RFI), and residual BW gain (RGN) were measured or calculated. General linear models, with sire breed, year, and sex as fixed effects, were used to analyze all traits. Year was significant in all models ($P < 0.01$). Sex affected ($P < 0.03$) DMI and FC, tended to affect G:F ($P < 0.07$), but did not affect any other traits. The DMI was greatest ($P < 0.01$; 156.9 kg) for Suffolk-sired, least (137.6 kg) for Texel-sired, and intermediate (145.7 kg) for Columbia- and Composite-sired lambs. Gain in BW was greatest ($P < 0.01$) for Suffolk-sired lambs (27.7 vs. 23.8 kg for all other sire breeds). Compared with other sire breeds, FC was least ($P < 0.03$) and G:F was greatest ($P < 0.02$) for Suffolk-sired lambs (FC, 5.8 vs. 6.2 kg of DMI/kg of gain; G:F, 0.177 vs. 0.167 kg of gain/kg of DMI). Breed did not affect RFI. The RGN for Suffolk-sired was greater ($P < 0.02$; 1.5 kg) than RGN (-0.5 kg) for Columbia- and Composite-sired lambs; RGN (-0.3 kg) for Texel-sired lambs did not differ from of any of the others. Producers can use these results to select a terminal-sire breed to improve the value of their market lambs.

Key Words: Lamb, Feed Efficiency, Feed Intake

^^**28** ##47140 ¤**Correlations between measures of feed efficiency and feedlot return for F1 lambs.** ¬D. P. Kirschten*[1], D. R. Notter[2], T. D. Leeds[3], M. R. Mousel[1], J. B. Taylor[1], and G. S. Lewis[1], %% [1]USDA, ARS, Dubois, ID, USA, [2]Virginia Tech, Blacksburg, VA, USA, [3]USDA, ARS, Leetown, WV, USA.

§%§Objective estimates of feedlot return for progeny of terminal-sire breeds of sheep are needed to improve lamb profitability. Thus, we used recent economic data to determine the effects of terminal-sire breed on returns of F1 lambs. Annually for 3 yr, Columbia, USMARC Composite, Suffolk, and Texel rams were mated with mature Rambouillet ewes. From weaning until harvest, F1 lambs (561 wethers; 548 ewes) were fed a step-up finishing diet for ad libitum intake. Pen was the experimental unit, with 3 pens of lambs per year for each sex and sire breed and 1 self feeder per pen. Measured amounts of feed were delivered weekly or biweekly. Feed remaining at the end of each period was removed and weighed. Days on feed varied across years (84 to 105 d). Feed intake (FI), BW gain, G:F, feed conversion (FC), residual feed intake (RFI), residual BW gain (RGN), and feedlot return ($R) were determined. Return was based on 2010 Idaho feeder and slaughter lamb prices, feed costs, and other typical costs; no discounts were applied for excessively fat lambs. Year and breed, but not sex, affected ($P < 0.01$) $R. The $R for Suffolk-sired ($38.15) was greater than that for Columbia- ($28.49) and Texel-sired ($27.22), but not different from $R for Composite-sired lambs ($32.54). Pearson correlations between $R and BW gain, G:F, and FC were 0.76, 0.85, and -0.84, respectively ($P < 0.01$). Correlations were not significant between $R and RFI ($P > 0.76$), RGN ($P > 0.10$), and FI ($P > 0.39$). Even though BW gain accounted for less variation in $R than did G:F and FC, BW gain does not require measurement of FI, which is not typically measured in the industry. Selecting terminal-sire breeds with increased genetic merit for postweaning BW gain should simultaneously improve returns from feedlot lambs.

Key Words: Lamb, Feed Efficiency, Profit

^^**29** ##47155 ¤**Genetic associations between bovine respiratory disease and carcass traits in feedlot steers.** ¬C. M. McAllister*[1], B. W. Brigham[1], R. K. Peel[1], H. Van Campen[1], G. H. Loneragan[2], R. L. Weaber[3], J. L. Salak-Johnson[4], C. C. L. Chase[5], and R. M. Enns[1], %% [1]Colorado State University, Fort Collins, CO, United States, [2]Texas Tech University, Lubbock, TX, United States, [3]University of Missouri, Columbia, MO, United States, [4]University of Illinois, Urbana, IL, United States, [5]South Dakota State University, Brooings, SD, United States.

§%§**ABSTRACT:** Bovine respiratory disease (**BRD**) is one of the most prevalent and economically burdening diseases facing the beef cattle industry. The economic impact of the disease makes it a primary candidate for research to improve health and profitability of feedlot cattle. Therefore, the primary objectives of this study were to estimate variance components for BRD in feedlot cattle using feedlot treatment records (**Trt**) and to evaluate genetic and environmental correlations of the disease with HCW, LM area, marbling score (**MS**) and subcutaneous backfat thickness (**FAT**). Data included health and carcass records on 2,870 crossbred steers managed in a commercial feedlot in Southeast Colorado over a two year period. Two multivariate models were fitted to estimate direct genetic effects and associated correlations between Trt and carcass traits where lean and fat traits were evaluated independently. Heritability estimates were 0.17 _ 0.06, 0.30 _ 0.05, 0.39 _ 0.05, 0.62 _ 0.04, and 0.24 _ 0.04 for Trt, HCW, LM area, MS and FAT, respectively. Genetic correlations of Trt with carcass traits were 0.19 _ 0.30 with HCW, 0.03 _ 0.25 with LM area, -0.30 _ 0.21 with MS, -0.004 _ .26 with FAT. Environmental correlations were low and favorably correlated with estimates of -0.05 _ 0.02, -0.01 _ 0.02, -0.06 _ 0.02, and -0.05 _ 0.02, between Trt and HCW, LM area, MS, and FAT, respectively. Results indicate that genetic improvement for a lower probability of being infected with BRD is possible through selection over time. Estimates of genetic correlations were generally low with high standard errors with respect to the estimates indicating no major antagonisms between higher carcass merit and Trt. Though low, the environmental correlations suggest a benefit from well implemented preventative protocols for bovine respiratory disease in the feedlot.

Key Words: Beef cattle, Bovine respiratory disease, Carcass traits

^^**30** ##47162 ¤**Random Regression Methodologies Used For a Days to Weight Genetic Prediction in Beef Cattle.** ¬S. E. Speidel*, D. H. Crews Jr., and R. M. Enns, %% Colorado State University, Fort Collins, CO, USA.

§%§The idea of reducing the number of required days for livestock to reach their desired endpoint is not new, with its economic importance first discussed in 1957. Given this economic relevance, genetic evaluation research for reducing these required days has received very little attention throughout the pertinent literature with the exception of swine industry. There are many different production scenarios present in today_s beef industry, and a prediction for the required number of days to reach a single weight endpoint does not lend itself well to these diverse production systems. Random regression is an attractive alternative to calculate days to weight (DTW) genetic predictions due to their inherent properties. The methodology results in the ability to calculate regression curves for growth, which allow EBV to be calculated for any age or number of days on feed. The objective of this study was to develop a linear random regression model for the prediction of the required number of DTW. Data were obtained from the Agriculture and Agri-Food Canada Research Centre, Lethbridge, Alberta, consisting of pedigree and weight observations on 1,324 cattle spanning the years 1999 _ 2007. Individual animals averaged 5.77 weight observations with weights and ages ranging from 293 kg to 863 kg and 276 to 519 days, respectively. A linear random regression model, with Legendre polynomials as its base function, was used to regress age of the individual animals in days on weight. Fixed effects in the model included an overall fixed regression of age on weight to account for the mean relationship between age and weight as well as a contemporary group effect where contemporary group contained breed of the animal, feedlot pen and year of measure. Heritability estimates for DTW ranged from 0.56 _ 0.09 for the number of days to reach 290 kg all the way to 0.93 _ 0.01 for the number of days to reach 860 kg. These high heritability estimates indicate that placing selection pressure in an effort to reduce the number of days to reach a finish weight endpoint

can result in relatively rapid genetic trend.

Key Words: Beef Cattle, Days to Finish, Random Regression

^^**31** ##47166 ¤**Genetic parameters for ultrasound measurement in Brangus Cattle.** ¬E.M. Huff*, C.M. McAllister, D.H. Crews Jr., and R.M. Enns, %% Coloarado State University, Fort Collins, CO 80523.

§%§The use of ultrasound as an indicator of carcass performance in live animals can be used in an economically efficient and timely manner to make breeding and/or terminal decisions that influence genetic improvement in carcass traits. Given the utility of ultrasound and that ultimately ultrasound should be combined with actual carcass data to calculate expected progeny differences (EPD), the objective of this study was to estimate genetic parameters for ultrasound and carcass characteristics in Brangus Cattle as a step in the development of a more accurate carcass evaluation. Traits included ultrasound measures of 12th rib fat thickness (UBF), longissimus muscle area (UREA), and percent intramuscular fat (UIMF). There were 64,058 Brangus bulls and heifers with observations in the International Brangus Breeders Association data base. Also obtained was historical pedigree information on 1,257,211 animals representing at least three ancestral generations. These observations were taken between 300 and 430 days of age per BIF guidelines. Of the 64,058 Brangus cattle with at least one ultrasound observation, 25,101 had UBF data, 25,119 had UREA data, and 20,783 had UIMF data. The data were analyzed using a three trait animal model and ASREML in order to estimate heritability and genetic correlations. The fixed effects of the model included contemporary group (defined as animals with the same sex, same weaning contemporary group, and same yearling management group), age of dam (a categorical fixed effect per BIF guidelines), and age at ultrasound scanning. The heritability estimates for UREA, UIMF, and UBF were 0.29 _ 0.01, 0.34 _ 0.02, and 0.30 _ 0.01 respectively. Genetic correlations between UREA and UIMF, UIMF and UBF, and UREA and UBF were -0.01 _ 0.04, and 0.36 _ 0.04 and 0.10 _ 0.04 respectively. These parameters will serve as a basis for use in genetic evaluation of carcass characteristics with the next step in that development being estimation of genetic correlations with actual carcass measures.

Key Words: Genetic parameters, Ultrasound

§§Ruminant Nutrition: Ruminant Nutrition I Oral

^^**32** ##47007 ¤**The Role of Rumen-Protected Methionine on Amino Acid Metabolism in Late Gestation Beef Heifers in the Northern Great Plains.** ¬V Ujazdowski[2], R. C. Waterman*[1], and M. K. Petersen[1], %% [1]USDA-ARS, Fort Keogh Livestock and Range Research Laboratory, Miles City, MT 59301, [2]University of Wisconsin, Madison School of Veterinary Medicine, Madison, WI 53706.

§%§This study evaluated changes in plasma amino acids in late-gestating (beginning 58 _ 1.02 d prior to calving), primiparous, winter-grazing range heifers receiving a wheat middling based supplement without (**CON**; n = 12) or with rumen-protected methionine (**MET**; n= 12). Plasma was collected on d -2 and 0 (just prior to heifers receiving their initial daily supplement at 0700 h). Plasma was sampled again on d 40, 42 and 44 prior to supplementation at 0700 h and 1100 h (4 h after receiving daily supplement). Data were analyzed with heifer as the experimental unit. Continuous variables were analyzed by the main effects of treatment, date, or time and their interaction when appropriate. Comparable BW ($P = 0.74$) and BCS ($P = 0.65$) over the 44-d metabolism trial were found between both MET- and CON-fed heifers. Heifers receiving the MET supplement had greater ($P < 0.0001$) plasma methionine concentrations indicating that the rumen-protected technology successfully presented methionine to the small intestine for absorption. Notable decreases in plasma AA concentrations in MET-fed heifers after 44 d included leucine ($P = 0.04$), valine ($P = 0.03$), and serine ($P = 0.05$). Glycine, the most abundant amino acid in maternal blood, was lower ($P = 0.05$) in MET-fed heifers than CON-fed heifers. Lower glycine concentrations in MET heifers were due to the role of glycine in catabolism of methionine. Serine is also involved in the catabolism of methionine which may result in lower overall serine concentrations. Branched chain amino acids (BCAA)

are instrumental in metabolism of maternal protein and there were several significant differences in BCAA between MET and CON fed heifers. The percent change of isoleucine, leucine and valine declined from d 0 to 44 ($P = 0.06$, $P = 0.04$, $P = 0.03$, respectively) for MET-fed heifers. These results imply methionine is a limiting amino acid in late-gestating beef heifers grazing dormant range forages and when supplemental methionine was provided utilization of other amino acids is improved.

Key Words: Amino Acids, primiparous heifers, rumen-protected methionine

^^**33** ##47055 ¤**METHANE EMISSIONS FROM CATTLE DIFFERING IN FEED INTAKE AND FEED EFFICIENCY FED A HIGH CONCENTRATE DIET.** ¬H. C. Freetly* and T. L. Brown-Brandl, %% USDA, ARS, U.S. Meat Animal Research Center, Clay Center, NE, USA.

§%§Methane gas released by cattle is a product of fermentation of feed in the digestive tract and represents a loss of feed energy. In addition to being a dietary energy loss, methane is considered a greenhouse gas. Developing strategies to reduce methane emissions from cattle have the potential to increase production efficiency as well as reducing the impact of cattle on the environment. We hypothesized that steers with a higher feed efficiency would have a lower methane production. One hundred thirteen steers were fed a dry-rolled corn-based ration to determine feed intake and growth over a 64-d period. Steers had ad libitum feed access (82.75% corn, 12.75% corn silage, and 4.5% Biegerts, Bradshaw, NE (contains 0.066% monensin)), and feed intake was calculated as the sum of feed intake over the 64-d period. Steers for methane emissions measurement were selected by regressing gain on feed intake and selecting the 40 steers that were outside the 60% elliptical confidence interval. Thirty-seven of the 40 selected steers were chosen to measure methane emissions based on their temperaments. Five d following the collection of growth and feed intake data, methane emissions were determined over a two-wk period using indirect calorimeters (headboxes) to determine gas exchange. A six-hr sampling period was chosen to mitigate the potential reduction in feed intake during sample collection. Collection began at 0800 when fresh feed was offered. Steers had ad libitum access to feed and water during gas collection. Residual feed intake was determined as the residuals resulting from the regression of feed intake on ADG, and middle metabolic body size ($R^2 = 0.70$). Steers that were evaluated had a methane emission of 2.6 _ 0.1 g/h, a BW of 573 _ 12 kg, a DMI of 696 _ 17 kg/64 d, a gain of 104 _ 3 kg/64 d, and a residual feed intake of -0.1 _ 0.1 kg. Methane emissions did not differ with DMI ($P = 0.52$) or gain ($P = 0.26$). Methane emissions did not differ with residual feed intake ($P = 0.88$). Our findings do not support that variation in methane emissions from cattle fed high-corn diets containing monensin can be explained by DMI and gain.

Key Words: Cattle, Efficiency, Methane

^^**34** ##47124 ¤**Effects of field peas fed with distillers grains with solubles and dry-rolled corn on finishing performance and carcass traits of feedlot cattle.** ¬A. C. Pesta*, S. A. Furman, M. K. Luebbe, G. E. Erickson, and K. H. Jenkins, %% University of Nebraska- Lincoln, Lincoln, Nebraska.

§%§A finishing study was conducted to evaluate feeding field peas in dry-rolled corn-based diets with or without wet distillers grains with solubles (WDGS). Crossbred steers (n = 352, initial BW 356 _ 27 kg) were used in a randomized complete block design using a 2 _ 2 factorial treatment structure. Cattle were stratified by BW and assigned within strata to 32 pens, and fed for 140 or 159 d. Pens were assigned randomly to one of four treatments (8 pens/treatment) with 11 steers/pen. Factors consisted of 0 or 20% dry, whole field peas and either 0 or 30% WDGS. Diets also contained 7.5% alfalfa hay and 6% supplement. There was a small (3 kg) difference in initial BW for the main effect of peas ($P = 0.04$), therefore initial BW was used as a covariate in the model. There was an interaction for DMI ($P < 0.01$), in which WDGS had no effect ($P = 0.07$) in diets with no peas, but increased DMI by 1.2 kg in diets containing peas ($P < 0.01$). Peas decreased DMI by 0.6 kg in diets with no WDGS ($P < 0.01$), but had no effect ($P = 0.10$) on DMI in diets containing WDGS. Feeding WDGS increased ADG by 0.3 kg/d ($P < 0.01$), while peas had no effect on ADG ($P = 0.33$). A peas by WDGS interaction was also observed for G:F ($P < 0.01$), with WDGS increasing G:F by 12% in diets without peas ($P < 0.01$), but having no impact ($P = 0.12$) in diets containing peas. Feeding peas increased G:F ($P = 0.04$) in diets with no WDGS, but

decreased G:F ($P = 0.03$) in the presence of WDGS. Feeding WDGS increased final BW and HCW by 41 kg and 27 kg, respectively ($P < 0.01$). Dressing percentage, 12th rib fat thickness, and calculated yield grade were greater for cattle fed WDGS ($P < 0.01$), but LM area was not different ($P = 0.99$). A peas by WDGS interaction ($P = 0.01$) was observed for marbling score, as WDGS resulted in a numerical decrease in marbling score in cattle fed no peas, but increased marbling score in the presence of peas ($P = 0.04$). The impact of WDGS on G:F was diminished in the presence of peas from 40 to 24% improvement relative to corn. However, the effect of WDGS on ADG was similar with or without peas.

Key Words: distillers grains, feedlot, field peas

^^35 ##47161 ¤**Supplemental branched-chain amino acids improve performance and immune response of newly-received feedlot calves.** ¬B. H. Carter*[1], C. P. Mathis[1], G. C. Duff[2], J. B. Taylor[3], K. M. Taylor[1], B. C. Graham[1], L. W. Hall[2], J. D. Allen[2], D. M. Hallford[1], and C. A. Löest[1], %% [1]New Mexico State University, Las Cruces, NM, [2]University of Arizona, Tucson, AZ, [3]USDA-ARS, Dubois, ID.

§%§Supplemental branched-chain AA (**BCAA**) improved N balance of steers during a simulated pathogen challenge. The objective of this study was to determine the effect of supplemental BCAA on growth and health of newly-received feedlot steers. Steers (n = 120; initial BW = 376 _ 5 kg) were blocked by BW and assigned to 12 pens and 2 treatments in a randomized complete block design. Treatments were no supplemental AA (**CON**) and rumen-protected BCAA, which was top-dressed to a receiving diet that was fed for 28 d after initial processing (d 0). On d 0 and 14, steers were vaccinated against ovalbumin (OVA). On d 0, 14, 28, and 56, blood samples and BW were collected. Morbidity was recorded throughout the experiment. No BCAA _ day interactions (P _ 0.29) were detected for serum anti-OVA IgG, insulin, white blood cell count, or plasma Ile, Leu, or Val. Serum anti-OVA IgG was greater ($P = 0.02$) for BCAA vs CON steers. Serum insulin and plasma Ile, Leu, and Val concentrations were not different between treatments (P _ 0.30). White blood cell count was not different ($P = 0.56$) between treatments, but differential proportion of neutrophils among total white blood cells was greater ($P < 0.05$) for BCAA than CON. From d 0 to 14, DMI, ADG, and G:F were not different between treatments (P _ 0.44). From d 15 to 28, DMI was less ($P < 0.05$), and ADG and G:F tended to be greater (P _ 0.11) for steers fed BCAA than CON. From d 29 to 56, DMI was not different ($P = 0.50$), and ADG and G:F were greater ($P < 0.05$) for BCAA than CON steers. From d 57 to finish, DMI, ADG, and G:F of steers were not different between treatments (P _ 0.60). Overall, DMI and ADG were not different (P _ 0.25), and G:F was greater ($P = 0.05$) for steers supplemented with BCAA compared to CON. Morbidity was not different ($P = 0.99$). Transportation and translocation stresses predispose newly-received feedlot calves to infection, which may increase the metabolic demand for BCAA. Our results demonstrate that BCAA supplementation may improve the adaptive immune response and efficiency of gain in feedlot receiving steers.

Key Words: Branched-chain AA, Feedlot, Steer

^^36 ##47179 ¤**Effects of amino acid supplementation on nitrogen metabolism and immune response of bottle-fed calves exposed to an endotoxin.** ¬K.M. Taylor*[1], B.H. Carter[1], M.R. McDaniel[1], L. Chen[1], G.C. Duff[2], D.M. Hallford[1], and C.A. Löest[1], %% [1]New Mexico State University, Las Cruces, NM, [2]Montana State University, Bozeman, MT.

§%§Stressed calves that are predisposed to infection may have increased demand for AA to support immune function. This study evaluated effects of lipopolysaccharide (LPS) injection and AA supplementation on N metabolism and immune response of 32 bottle-fed Holstein bull calves (28 d of age, 44 _ 0.8 kg BW). The experiment was a randomized complete block with 15-d adaptation, 1-d blood collection, and 5-d fecal and urine collection. Calves were fed milk replacer (0.454 kg/d of 20% CP powder) twice daily and calf starter (18% CP; 0.454 kg/d) once daily. Treatments (2 _ 2 factorial) were daily supplementation of 10 essential AA (0 vs 25 g/d dissolved in milk; **-AA** vs **+AA**) and subcutaneous injection of LPS (0 vs 4 μg/kg BW; **-LPS** vs **+LPS**) on d 16. Rectal temperature (RT) and blood samples were collected at 0, 4, 8, 12, and 24 h after LPS injection. No LPS _ AA _ h interactions occurred ($P >$

0.18). Cortisol was greater at 4 h only, haptoglobin was greater at 24 h only, and RT was greater at 4, 8, and 12 h for +LPS vs -LPS calves (LPS _ h, $P < 0.05$). Insulin was greater (LPS, $P < 0.05$) for +LPS vs -LPS. Plasma Gly, Ser, Asn, Hyp, and Thr of +LPS calves decreased at 4 h and was lower than -LPS calves at 8, 12, and 24 h after LPS injection (LPS _ h, $P < 0.05$). Plasma Pro was lower at 8 and 24 h in +LPS vs -LPS calves (LPS _ h, $P < 0.05$). Plasma Asp, Glu, Gln, and Met were lower ($P < 0.05$) for +LPS than -LPS calves. Plasma Met, Leu, Ile, His, Phe, Thr, Trp, and Orn were greater for +AA than -AA calves at 0, 4 (except Leu, Ile, His, Trp), 12 (except Ile), and 24 h after LPS injection (AA _ h, P _ 0.05). Plasma Gly was lower ($P < 0.05$), and Val was higher ($P < 0.05$) in +AA than -AA calves. No LPS _ AA interactions ($P > 0.12$) or LPS effects ($P > 0.19$) were observed for N balance. Calves fed +AA vs -AA had greater ($P < 0.05$) intake and digested N, and tended to have greater urinary N excretion ($P = 0.07$) and N retention ($P = 0.12$). In summary, LPS increased inflammation and decreased plasma AA, but did not alter N retention. Supplementing milk replacer with AA did not significantly improve N retention.

Key Words: Essential amino acid, Lipopolysaccharide, Holstein calves

POSTER PRESENTATIONS

§§Behavior: Behavior Poster

^^**37** ##47147 ¤**Range Cattle Winter Water Consumption in Northern Great Plains.** ¬MK Petersen*[1], JM Muscha[1], AJ Roberts[1], and JT Mulliniks[2], %% [1]USDA-ARS Fort Keogh Livestock and Range Research Laboratory, Miles City, MT USA, [2]New Mexico State University, Las Cruces, NM USA.

§%§Water consumption and DMI has been found to be positively correlated and may interact to alter range cow productivity. Environmental conditions can have a significant influence on water consumption during the winter. The objective of this study was to determine influences of water and air temperature on quantity and pattern of water intake. Six paddocks (320 ha) were grazed from December through February in 2009-2010 and 2010-2011 by 79 pregnant range cows at USDA-ARS Fort Keogh Livestock and Range Research Laboratory in Miles City, MT. Three paddocks provided cold (8.2 _0.4_C) and three paddocks provided warm (31.1 _ 1.3_C) stock water. Warm water drinkers were heated by a Rheem outdoor tankless propane water heater. Water intake was measured daily for each paddock (0830) by an electronic water flow meter. Days were categorized by daily high temperature: warm (> -3_C), cool (-9.5_C to -3_C), and cold (< -9.5_C). In order to determine drinking patterns for each paddock a motion activated camera was set up at each water source to determine, time of day water was consumed and the number of trips/d. Water temperature, daily high temperature, yr, and their interactions were evaluated and analyzed as a 2 _ 3 _ 2 factorial arrangement of treatments with paddock serving as the experimental unit. Cows in warm water paddocks consumed more water than cows provided cold water ($P < 0.01$; 27.7 and 19.5 _ 1.0 L/d for cows drinking warm and cold water, respectively). Year _ water temperature _ daily high temperature interactions ($P < 0.01$) were observed for number of trips to water and time at water per day. However, percent of cows drinking each day was not influenced by water temperature ($P = 0.56$; 65 and 68 _ 3% for cold and warm water, respectively). Results from this study shows that daily water intake is increased when heated water is provided to cows grazing winter range.

Key Words: cows, water temperature, water intake

^^**38** ##47207 ¤**Ram and ewe reproductive behavior and serum testosterone during the early and mid- breeding season.** ¬B. M. Alexander, K. C. Otto*, and K. J. Austin, %% University of Wyoming, Laramie, WY, USA.

§%§The expression of sexual behavior is necessary for any successful sheep breeding program. Expression of behavior varies among rams and may be influenced by stage of the breeding season. Successful reproduction may depend on the expression of ewe behavior when ram sexual interest is diminished. Each

sexually experienced ram (2 – 3 yr; n = 3) was exposed to 15 ewes in estrus during the early (September) and mid- (November) breeding season. Ewes were synchronized with intravaginal progesterone release devices (EAZI-BREED CIDR). Rams were introduced to ewes approximately 30 hrs following the CIDR removal and behavior was monitored. Observed behaviors included anticipatory (vocalizations, ano-genital sniffs, flehmen, fore-leg kicks, nudges) and consummatory (mount attempts, mounts, ejaculations) behavior. Purposeful seeking behavior of both ewes and rams was recorded. Blood samples for the analysis of serum concentrations of testosterone were obtained from each ram prior to and following exposure to ewes during each breeding period. Rams were removed from ewes following a one hour observation period, and reintroduced for subsequent observations. Rams were observed for five and four total hours in a 48 hour period in September and November, respectively. Data were analyzed using non-parametric analysis (NPAR1WAY, SAS). Serum concentrations of testosterone prior to exposure to estrous ewes were lower (P = 0.04) at mid- compared to early breeding season (1.7 vs 5.7 _ 1.1), but magnitude of the increase following exposure to estrous ewes remained similar (P = 0.5) at both time points. Expression of sexual behaviors in this limited number of rams did not differ (P > 0.2) with season. Although the number of times a ram sought a ewe did not change with stage of the season, the number of times ewes sought the ram tended to be increased (P = 0.09) in the mid-breeding season (4.7 vs 11.3 _ 2.1). Based on this limited data, it appears that seeking behavior in the ewe increases as serum concentrations of testosterone decrease in the ram. This behavior may help insure pregnancy when sexual interest in the ram has diminished.

Key Words: Ram, Ewe, Reproductive Behavior

§§Environment & Livestock Management: Environment and Livestock Management Poster I

^^**39** ##47118 ¤**Conception rates and serum progesterone profiles in Rambouillet ewes treated with intravaginal progesterone and prostaglandin F2α injections.** ¬C. D. Felker*, S. M. Fields, G. E. Powers, and D. M. Hallford, %% New Mexico State University, Las Cruces, NM, USA.

§%§Eighty-one Rambouillet ewes (64.5 _ 1.0 kg BW) were used to examine serum concentrations of progesterone (P4) and conception rates of ewes treated with a P4 containing intravaginal insert (CIDR, 0.3 g of P4) and PGF2α (10 mg; i.m., Lutalyse) during a fall breeding season. Ewes were kept in an outdoor pen (10 x 30 m) and fed alfalfa hay (1.6 kg/ewe daily). Twenty-seven ewes were randomly assigned to serve as either controls (CIDR plus saline injection), PG1 (CIDR plus 10 mg PGF2α injected at CIDR removal), or PG2 (CIDR plus 5 mg PGF2α injected at CIDR removal and 4 h later). The CIDR inserts remained in place for 14 d. Four Rambouillet rams were joined with ewes 24 h after CIDR removal for a period of 6 d, removed for 6 d, and reintroduced for 6 d. Blood was collected on alternate days beginning on d 0 (CIDR insertion) until d 14 (CIDR removal) after which sampling continued daily until d 21. On d 14, blood was collected before CIDR removal and 4 h later before the second PGF2α injection. During the 14-d period the CIDR was in place, serum P4 differed among days (P < 0.001; 8.0 _ 0.2 ng/mL 48 h after insertion, 2 ng/mL immediately before CIDR removal). Serum P4 before CIDR removal and 4 and 24 h later did not differ (P > 0.25) among treatment groups. Progesterone declined (P < 0.02) in all 3 treatment groups 4 h after CIDR removal with both PGF2α-treated groups declining further (P < 0.008) by 24 h after CIDR removal. Progesterone values from 24 h to 7 d after CIDR removal were similar among treatment groups (P = 0.26). Pregnancy rates of ewes lambing to two 6-d service periods were 55.6, 85.2, and 77.8 % respectively for control, PG1, and PG2 ewes (P = 0.04). Number of lambs born per ewe did not differ among treatment groups when considering only ewes lambing (P = 0.16). Offspring ADG tended to be heavier for lambs born to control ewes (P = 0.09). Treatment with CIDR inserts for 14 d and PGF2α after CIDR removal resulted in an increased lambing percentage compared with control ewes.

Key Words: CIDR, PGF2α, Sheep

^^**40** ##47119 ¤**Reproductive cyclicity and progesterone profiles in postpartum Rambouillet**

ewes treated with a progesterone containing intravaginal insert and PMSG. ¬S. M. Fields*, G. E. Powers, C. D. Felker, and D. M. Hallford, %% New Mexico State University, Las Cruces, NM, USA.

§%§Twenty-four mature fall-bred Rambouillet ewes (69.8 _ 1.7 kg) were used to study effects of a progesterone (P4) containing intravaginal insert (CIDR; 0.3 g P4) in combination with PMSG on serum P4 profiles and induction of estrus cyclicity in postpartum ewes. Ewes lambed between March 18 and 24 and produced a single lamb. At 30 d (range 26 to 32 d) after lambing, ewes were randomly assigned to 1 of 3 treatments (n = 8/group): control (no CIDR, no PMSG), CIDR only, and CIDR+PMSG. All CIDR were inserted 30 _ 0.3 d after lambing and were removed after 5 d. At CIDR removal (d 0), ewes in the CIDR+PMSG group received an i.m. injection containing 500 IU of PMSG (Prospec-Tany TechnoGene Ltd., Rehovot, Israel). Ewes were kept in an outdoor pen (8 x 12 m) and fed alfalfa hay and cracked corn at levels appropriate for the lactation period. Jugular blood samples were collected daily beginning at CIDR insertion and continuing for 30 d and P4 was determined by RIA. On the day after CIDR removal and PMSG injection, 2 vasectomized rams with marking paint were joined with ewes and marks were observed 4 times daily. The CIDR-treated ewes had elevated ($P < 0.01$) serum P4 over controls throughout the 5-d period that the insert was in place. From d 1 through 4 after PMSG treatment, serum P4 was similar ($P > 0.15$) among groups. However, P4 in CIDR+PMSG-treated ewes rose from 2.1 _ 0.3 ng/mL on d 5 to a peak value of 16 _ 1.2 ng/mL on d 10 and then declined to 2.4 _ 0.8 ng/mL on d 19. During this same 19-d period, P4 values in control and CIDR-treated ewes remained less than 1.0 ng/mL. In the 8 CIDR+PMSG-treated females, time from PMSG treatment until P4 returned to baseline averaged 18.1 _ 0.4 d. All CIDR+PMSG-treated ewes were marked by the vasectomized rams within 2 d of treatment compared to none of the control or CIDR-treated ewes ($P = 0.001$). Data indicate that use of a CIDR in combination with 400 IU PMSG effectively induced out-of-season cyclicity at 30 d postpartum in anestrous Rambouillet ewes.

Key Words: Anestrus, CIDR, Sheep

^^**41** ##47159 ¤**Response of suckling calves to BRD vaccination and treatment with vitamin E.** ¬T.C. Pickrel*[1], J.M. North[1], R.D. Landeis[1], B.A. McCoy[2], T.M. Dearinger[1], B.M. Alexander[3], S.L. Lake[3], D.L. Montgomery[3], and G.E. Moss[3], %% [1]Sheridan College, Sheridan, WY, USA, [2]Pfizer Animal Health, Buffalo, WY, USA, [3]University of Wyoming, Laramie, WY, USA.

§%§Timing of vaccinations is often dictated by management practices. Vaccination at the wrong time, however, may have little if any measurable effect. Trials conducted over 3 yr determined antibody titers to bovine respiratory disease (BRD) pathogens and effects of a MLV BRD vaccine in suckled beef calves. In yr 1, 3 to 4-month-old calves were given a BRD vaccine intramuscularly (IM; n = 80), intranasally (IN; n = 80), or were not vaccinated (NV; n = 80). Serum was collected from a sub-sample (n = 15) of each group before vaccination and at the end of the summer grazing season to determine titers for bovine virus diarrhea (BVD), infectious rhinotracheitis (IBR), respiratory syncytial virus (BSRV), and parainfluenza-3 (PI-3). Morbidity rates of 5, 5, and 0 % occurred in IM, IN, and NV calves, respectively. Weight gains (76.0 _ 1.6 kg) over the 80 d grazing season did not differ (P > 0.05) between groups. Titers to all viruses varied but were typically higher in pre-vaccination sera compared to samples collected 80-d later. In yr 2, no calves (n ≈ 300) were vaccinated. As in yr 1, titers to all viruses were typically higher in sera (n = 40) of 3 to 4-month-old calves than at the end of the grazing season. During yr 2, no mortalities or signs of morbidity were noted. In yr 3, suckled calves from a different herd were vaccinated IM (n = 189) or IM plus 1800 IU Vitamin E (vitE; n = 134). During the 113-d grazing season, calves gained 101 _ 1.7 kg and illness was observed in only 5 IM and 2 vitE calves. Titers during yr 3 were comparable to yr 1 and 2 and were not influenced by vitamin E. Residual maternal antibodies against BRD in calves 3 to 4-months-of-age may interfere with the ability of BRD MLV vaccine to elicit an antibody response. These results do not imply vaccine failure because a cell-mediated response was not assessed. Evaluating management practices and timing of vaccinations are important on a herd-by-herd basis.

Key Words: BRD, vaccination, vitamin E

^^42 ##47163 ¤**Evaluating glycerin supplementation on reproductive performance of sheep.** ¬J.A. Walker[1], C.S. Schauer[2], R. Salverson[1], P. Nester*[1], G.A. Perry[1], K.C. Olson[1], and J.E. Held[1], %% [1]South Dakota State University, Rapid City, [2]Hettinger Research Extension Center, North Dakota State University, Hettinger, ND.

§%§This 3-year study evaluated the effect of glycerin supplementation on ewe reproductive efficiency, blood glucose and insulin concentrations. Mature Rambouillet ewes (n = 225) were orally dosed with glycerin following estrus synchronization at rates of 0, 50, 100, 200 or 300 g/hd. In year 3 an additional 16 ewes were supplemented (SUP) with 0.57 kg of range cake for 21 days prior to breeding. Blood samples were collected (n = 25 ewes) for 10 hours post drenching. Blood was analyzed for insulin and glucose concentrations. Ewes were exposed to rams for 35 days. Pregnancy was determined by ultrasonography evaluation. Number of lambs born per ewe was not different (P > 0.10) between treatments (TRT) in year 1 and 2. Pregnancy rates were not different (P = 0.55) by TRT in year 3. In yr 1, a TRT x time interaction (P < 0.01) for insulin (ng/ml) concentration was observed, with 200 g glycerin having lower insulin than 100 g glycerin. Insulin showed a quadratic response (P < 0.01) with peak between 3 to 5 hr and returning to baseline by hr 10. In yr 1, glucose exhibited a TRT x time interaction (P < 0.01); 50 g glycerin having lower glucose (mg/dl) than 0 g glycerin and 200 g glycerin having lower levels than 100 glycerin. Glucose concentrations exhibited a quadratic response with a peak at hr 1 and returned to baseline by hr 7. In yr 2 insulin peaked at hr 4 and declined to hr 10. Glucose was higher (P < 0.05) for 200 and 300 g glycerin than 0, 50 and 100 g glycerin in yr 2. Glucose exhibited a quadratic response (P < 0.01) with a peak at hr 2. Glucose increased linearly in year 3, (P < 0.01; 135.8, 176.44, 163.12, 175.12, 195.63, and 161.44 mg/dl for 0, 50, 100, 200, 300 g of glycerin and SUP, respectively). Glucose had a quadratic response (P < 0.01); glucose peaked at hr 1 and return to baseline by hr 7. In yr 3, insulin had a treatment by time interaction (P < 0.05); insulin peaked at hr 2, 50 and 100 g glycerin returned to baseline by hr 7; however, 200 and 300 g glycerin did not. Insulin (P < 0.01) increased with increasing levels of glycerin. Glycerin changed blood glucose and insulin concentrations; however, it did not influence reproductive performance.

Key Words: Sheep, Glycerin

^^43 ##47172 ¤**Hay Substitution Using a Controlled Release Distillers Dried Grain Supplement.** ¬D. G. Landblom*, S. Senturklu, and K. A. Ringwall, %% Dickinson Research Extension Center, North Dakota State University, Dickinson, ND, USA.

§%§Determining the forage replacement value of a 24.0% CP controlled release distillers dried grain supplement was the basis for this study. Mixed age (3-10 yr) range beef cows (n=108) were used to evaluate the effect of supplementation that began either 56d before calving or at the onset of calving. The research objective was to determine the substitution effect on potential change in cow weight, body condition score (BCS), 12th rib fat depth, reproductive performance, and calf weaning weight. Control, pre- and post-calving treatment groups consisted of 4 pen replicates of 9 cows per replicate; a total of 36 cows per treatment. The data was analyzed using the generalized least squares procedure of PROC MIXED. Once supplementation was initiated, it was fed continuously until May 1 (89.5d; 56d pre-calving, 33.5d post-calving). During the supplementation periods, and due to the 56d longer pre-calving supplementation period, pre-calving cows consumed the least amount of hay (P = 0.0001) and a greater amount of supplement per cow (P = 0.061). The post-calving treatment group consumed 29.5% more supplement per head per day overall (P = 0.055; 0.2735 vs. 0.3881 kg/day). Cow starting, ending, and overall weight change did not differ (P = 0.213), however, weight decline was numerically less among supplemented groups, and ending BCS did not differ (P = 0.469). Although ending BCS was not different, ending 12th rib ultrasound fat depth tended to be greater for supplemented cows (P = .0092). Rebreeding pregnancy performance following pre- and post-calving supplementation did not differ for 1st (P = 0.564), 2nd (P = 0.172) and 3rd (P = 0.765) breeding cycles. The overall pregnancy rate (P = 0.66), and the percent of cows that did not become pregnant (P = 0.62) during a 63d breeding period also did not differ. At weaning, cow BCS did not differ (P = 0.825), weaning weight did not differ (P = 0.971), and calf weight gain per day of age did not differ (P = 0.484). Using a 24.0% CP controlled release distillers grain supplement as a forage replacement strategy resulted in comparable cow wintering, rebreeding, and calf performance.

Key Words: Distillers Dried Grain, Beef Cows, Forage Replacement

^^**44** ##47176 ¤**Effects of calf weaning method on calf stress, hormone concentration, growth performance, and carcass ultrasound characteristics.** ¬M. M. Thompson*[1], C. R. Dahlen[2], M. L. Van Emon[1,2], R. F. Cooke[4], T. C. Gilbery[2], B. W. Neville[3], and C. S. Schauer[1], %% [1]North Dakota State University, Hettinger Research Extension Center, Hettinger, ND, USA, [2]North Dakota State University, Department of Animal Sciences, Fargo, ND, USA, [3]North Dakota State University, Central Grasslands Research Extension Center, Streeter, ND, USA, [4]Oregon State University, Eastern Oregon Agricultural Research Center, Burns, OR, USA.

§%§**ABSTRACT**: The objective was to determine the effects of calf weaning method on calf stress associated, hormone concentration, growth performance, and carcass ultrasound characteristics. Crossbred steer and heifer calves (n = 71) were stratified by BW and allotted randomly to 1 of 2 weaning treatments (**TRT**): abrupt weaning (**CON**) or two-step weaning (**2P**) in a completely randomized design. Blood samples were collected, concurrently with rectal temperature assessment, on d -7, -6, -4, 0, 1, 3, 7, and 10 relative to weaning (d 0) for determination of plasma cortisol and haptoglobin concentrations. A subset of calves (n = 12; 6 calves/TRT) were fitted with human pedometers to measure steps taken before and after weaning. On d 0, calves were allotted by sex and TRT to 12 feedlot pens (6 pens/TRT) for a 65 d background period. Calves were fed a growing diet (11.5% CP, 4.08 Mcal of NE_g; DM basis) for a 1-kg/d predicted ADG. Calf age at weaning and initial BW averaged 160 _ 2 d and 239 _ 3.8 kg for both treatments, respectively. Calf BW, DMI, and ADG during backgrounding were similar (*P* _ 0.12) across TRT; however, CON G:F from d 0 to 65 was greater than 2P G:F (0.19 vs. 0.15; *P* = 0.05). Rectal temperatures, cortisol concentrations, and haptoglobin absorbance were comparable (*P* _ 0.10) for weaning method. Pedometer steps recorded were similar (*P* _ 0.10) across TRT. Carcass ultrasound characteristics (rib-eye area, 12th rib fat thickness, fat thickness, marbling score and intramuscular fat) did not differ (*P* _ 0.15) for weaning method. These results suggest that two-step weaning may not alleviate calf stress from weaning as compared with the conventional method of abrupt weaning.

Key Words: calf stress, acute-phase protein, weaning method

§§Extension: Extension Poster

^^**45** ##47102 ¤**A procedure to reduce collected sample size for nutrient analysis of hay cores.** ¬D. W. Bohnert*, R. F. Cooke, B. I. Cappellozza, C. Trevisanuto, and V. D. Tabacow, %% Oregon State University - Eastern Oregon Agricultural Research Center, Burns, OR, USA.

§%§When sampling large lots of hay for nutrient analyses, the number and quantity of cores required to obtain a representative sample often results in producers arbitrarily subsampling in order to reduce the volume of sample sent to a testing lab. This can bias results due to improper subsampling technique; consequently, we compared 2 methods of sampling 4 different baled hays from eastern Oregon (alfalfa, alfalfa/grass, grass, and grass seed straw) using a Penn State Sampler. We obtained 2 cores (A & B) from each bale, 13 cm apart, from 4 lots of 20 bales of each forage type. The A & B cores were grouped by forage type within lot. The first method used 100% of the A cores from each lot (CON) and the second method involved subsampling the B cores from each lot via a quadrant method (SUB) in which the cores were mixed well, spread out on a plywood sheet labeled with 9 quadrants (13 _ 13 cm), and approximately 33% of the overall sample (the middle, vertical column of a tic-tac-toe arrangement) was obtained for analyses. Samples were dried (55_C; 96 h), ground (1-mm screen), and analyzed for CP, NDF, and ADF. In addition, TDN was estimated for all forages [82.38-(0.7515*ADF)]. Results were analyzed with the MIXED procedure of SAS and LSMEANS were separated using LSD protected by a significant F-test (P _ 0.05). In tests of fixed effects, no differences were noted between CON and SUB (sampling method; P > 0.30) or the interaction of sampling method and forage type (P _ 0.09) for NDF, ADF, TDN, and CP; differences were noted due to forage type (P < 0.001) for each nutrient. The take home message from this data is that CON and SUB LSMEANS for NDF (61.4 vs 61.2%), ADF (32.1 vs 31.9%), TDN (58.2 vs 58.4%), and CP (12.0 vs 12.1%) were not affected by sampling procedure. We do not recommend routine subsampling of cored hay samples; however, these data indicate that subsampling can be used to reduce sample size if proper attention to procedures is followed.

Key Words: Hay, Forage Testing, Sampling

^^**46** ##47156 ¤**The viability and economics of composting on-farm feedstuffs and animal waste in northern Montana.** ¬J.M. Dafoe[1], T.M. Bass[2], J. Schumacher[2], and D.L. Boss*[1], %% [1]Montana State University, Northern Agricultural Research Center, Havre, MT 59501, [2]Montana State University, Bozeman, MT 59717.

§%§**ABSTRACT: The objective of this demonstration project was to examine the technical and economic viability of composting in northern Montana during winter months. Composting occurred at Northern Agricultural Research Center in November and December of 2008 and 2009. The compost consisted of cattle manure/bedding material, wheat straw, and spoiled corn silage. Windrows were constructed in 2008 (W1 and W2) and 2009 (W3, W4 and W5) on a flat clay loam soil. Moisture content of the blend was analyzed at the beginning and windrows were irrigated until 50% was achieved to optimize aerobic composting. The compost was turned, with an elevating face Vermeer compost turner, twice weekly. A 90 cm probe with data logger was utilized to record internal temperatures and oxygen levels of the winrows. Ambient temperature readings were recorded daily. Maximum and minimum mean daily ambient temperatures in 2008 were 6.9 and -31.1_C, respectively. In 2008, W1 and W2 reached a high temperature of 60.6_3.97_C 7 d after irrigation and 63.6_4.55_C 9 d after irrigation, respectively. Core temperatures in W1 and W2 exceeded 40_C 120 and 24 h after irrigation, respectively. Core temperatures remained above 40_C for day 26 and 30 d. In 2009, maximum and minimum mean daily ambient temperatures during the study were -2.1 and -15.4_C. High temperatures in W3, W4, and W5 were reached on d 10, 4, and 5 after irrigation (52.9_6.16, 65.7_3.36, 67.6_7.95_C), respectively. Temperatures exceeded 40_C immediately after irrigation in W4 and W5 and 5d after irrigation in W3. Core temperatures remained above 40_C for 14, 25, and 25 d. Costs were tracked for cleaning the pens ($2.10/yard), composting ($4.74/yard) and spreading manure or finished compost ($1.14/yard). Even though the minimum ambient temperature reached -31.1_C, there was no lasting negative effects on the**

composting process. During the coldest periods the core temperatures remained above 35_C. It was determined that composting is a technically viable option in northern Montana.

Key Words: Compost, Animal Waste, Beef

^^47 ##47158 ¤Determining the viability of beef cattle mortality composting in northern Montana. ¬J.M. Dafoe*[1], T.M. Bass[2], and D.L. Boss[1], %% [1]Montana State University, Northern Agricultural Research Center, Havre, MT 59501, [2]Montana State University, Bozeman, MT 59717.

§%§ABSTRACT: The object of this demonstration project was to determine the viability of composting mortalities in northern Montana. Mature cows (n=3) were composted in individual bins (B1, B2 and B3) and calves (n=11) were composted in two bins (B4 and B5) containing multiple calves. The animals that were composted included calving losses from the 2010 calving season and animals euthanized according to best management practices for animals that were unsalvageable. The bins for the mature cows were constructed with 4 large straw square bales (0.91 x 0.91 x 2.44 m). Bins were constructed in February, 2010 at Northern Agricultural Research Center on flat clay loam soil surface and composting continued through March 2011. Sawdust was used as a base material (approximately 45 cm) for moisture retention and to prevent runoff, the animal was then placed on the base material, covered with year old spoiled corn silage and capped with a layer of sawdust. The bins were recapped with sawdust as needed. The bins for the calves were constructed using small square straw bales (45 x 45 x 91 cm) on three sides and a large square straw bale on one side, base and fill material were the same as used in the cow bins. Calves were placed in the bins as mortalities occurred and then covered with year old spoiled corn silage. Once the bin was full it was capped with sawdust and another bin was constructed. No predator, varmint or domestic animal disturbance was observed. Very little insect and fly activity was observed. The maximum temperature for B1, B2, B3, B4 and B5 was 65.7_1.72, 63.5_2.84, 64.8_4.00, 70.4_1.10, 68.1_2.33_C occurring 22, 7, 32, 22, and 32 d after mortality was placed in bin, respectively. All bins containing mature cows reached 40_C temp 24 hours after construction. Bins containing calves reached 40_C 9 d after construction. Bins were excavated at 130 d and no soft tissue remained only skeletal structures and hair. Additional work is planned; however it appeared that large domestic animal composting can occur in northern Montana.

Key Words: Mortality Compost, Beef

§§Growth & Development: Growth and Development Poster

^^48 ##47202 ¤Effect of level of wet distiller grains and organic copper supplementation on visceral organ mass, and intestinal cellularity and vascularity in finishing beef steers. ¬C. Terpening*[1], G. Orosco[1], P. P. Borowicz[2], M. S. Brown[3], C. H. Ponce[3], J. B. Osterstock[4], R. Yunuzova[2], and S. A. Soto-Navarro[1], %% [1]New Mexico State Univ.,, Las Cruces 88003, [2]North Dakota State Univ.,, Fargo, ND, [3]West Texas A&M, Canyon, TX, [4]Texas AgriLife Research, Amarillo, TX.

§%§Thirty-two steers (401 _ 50 kg initial BW) were used to determine effects of dietary wet distillers grains (WDG) level (0, 30, and 60%, DM basis) and 30% WDG plus Cu on visceral tissue mass, intestinal cell growth, and intestinal cellularity and vascularity. Because S reduces Cu absorption in the gut, high-S distillers grains diets may cause Cu deficiency. Diets were offered daily to individual steers in an electronic feeding system. After 84 to 112 d, steers were slaughtered and individual visceral tissue weights determined. Visceral organ weights of duodenum, jejunum, small intestine, large intestine, stomach complex, and liver mass were not affected (P _ 0.13) by treatment. Conversely, ileal mass tended (P = 0.07) to decrease linearly and mesenteric mass tended (P = 0.07) to increase quadratically with increasing WDG level. Expressing visceral organ mass as g/kg of empty BW, resulted in a linear (P _ 0.04) increase of stomach complex and liver mass with increasing WDG

level. Also, ileal and mesentery mass (g/kg of empty BW) tended (*P* = 0.09) to decrease with increasing WDG level. There were no Cu effects (*P* _ 0.24) on the total amount of DNA, RNA, and protein in the small intestinal tissue. Total amount of ileal DNA (*P* = 0.07), ileal RNA (*P* = 0.10), and jejunal protein (*P* = 0.05) tended to decrease linearly with the increasing levels of WDG. Cell proliferation in jejunal tissue (*P* = 0.50), vascularity (*P* = 0.78) or total microvascular volume (*P* = 0.95) were not affected by treatment. Conversely, the total number of proliferating jejunal cells tended to be greater (*P* = 0.09) for steers receiving 30% WDG than those receiving 30% WDG plus organic Cu. There were not major differences of visceral tissue mass, intestinal cell growth, or intestinal cellularity. Therefore, metabolic activity and/or energy used by visceral organs most likely were not affected by treatment.

Key Words: cellular growth, WDG, intestine

§§Pastures and Forages: Pasture & Forages Poster

^^49 ##47168 ¤Potential use of a new forage barley variety for ruminant livestock diets. ¬C.J. Mueller*, J.M. Thompson, P.M. Hayes, A.E. Corey, and G.L. Tschida, %% Oregon State University, Corvallis, OR, US.

**§%§A new forage barley variety (Hooded; HB) was compared to grain barley (Strider; SB), forage oats (Everleaf; EO), and grain oats (Grey; GO) for use in ruminant livestock diets.
Use of interseeded legumes (Austrian field peas; PEAS) with each variety was also evaluated. Varieties were fall planted in a randomized complete block design using 4 field replicates of 20 plots. Within replicate each variety (including PEAS) was planted in 4 randomly allotted 37m^2 plots, with 2 plots containing interseeded peas, and harvested when seed maturity reached soft dough stage. Four subplots (0.5m^2) were harvested within each plot to evaluate hay or silage production (DM/hectare). Hay subplots were allowed to wilt in a covered area for 30 d, while silage subplots were chopped and sealed in oxygen-limiting bags within 8 h of harvest and allowed to ferment for 60 d. Subplots were analyzed for nutrient content, with composites of each variety evaluated for DM and fiber digestibility (24 h) using four ruminally-fistulated steers. Comparing barley varieties for either harvest method, CP was similar (P > 0.10) while ADF content was greater (P < 0.01) in HB resulting in a lower (P < 0.01) TDN value. Digestibility of DM was lower (P = 0.02) for HB when harvested as hay (40.0%), but greater (P = 0.05) when harvested as silage (41.2%) versus SB (41.5 and 37.9% for hay and silage, respectively). In comparison to EO, HB had greater (P < 0.01) CP and TDN, but reduced (P < 0.01) DM production across harvest methods. The HB variety had greater (P < 0.05) digestibility versus EO across harvest methods. Barley varieties had greater (P < 0.01) CP, TDN, and overall digestibility; but lower (P < 0.01) DM production versus oat varieties regardless of harvest method. Use of PEAS increased (P < 0.05) CP content and DM production across all varieties with a greater impact on silage values versus hay, while impact on digestibility was inconsistent across varieties. In conclusion, HB was similar to SB in nutrient content and rumen digestibility, and both barley varieties were better than the oat varieties in nutrient comparisons, but had lower DM production/hectare.**

Key Words: Hooded barley, forage grains, ruminants

^^50 ##47060 ¤Influence of ruminally-undegradable protein (RUP) supplementation and advancing gestation on forage use and performance by beef cows consuming low-quality, warm-season forage. ¬E. A. Bailey*, R. C. Cochran, E. C. Titgemeyer, T. J. Jones, and K. C. Olson, %% Department of Animal Sciences and Industry, Kansas State University, Manhattan, KS, USA.

§%§Concurrent experiments were conducted to evaluate the effects of RUP supply and advancing gestation on low-quality forage use by spring-calving beef cows. Cows were fed 1 of 3 supplements daily that supplied similar amounts of ruminally-degradable protein (RDP; 0.09% BW) and

increasing amounts of RUP: 0.05% BW (LOW), 0.07% BW (MOD), or 0.09% BW (HI). Supplements were formulated such that RDP was equal to 11% of predicted digestible OM intake and were fed for 15-wk before expected onset of calving. In trial 1, 18 pregnant cows (initial BW = 426 _ 32 kg; BCS = 4.5 _ 0.45) were fed tallgrass prairie hay (2.1% CP, 54% ADF) for ad libitum intake. Intake and digestion (via ADIA) were measured weekly between wk 14 and 4 pre-partum. Forage DMI, total DMI, and total digestible DMI of cows fed LOW was greater (P<0.01) than that of cows fed MOD and HI. Total tract DM digestibility by cows fed HI (52.4%) was greater (P < 0.01) than by cows fed LOW (51.8%), although the difference was not large; MOD was intermediate. Forage DMI, total DMI, and total digestible DMI increased (P _0.03) cubically between 14 and 4 wk prepartum, while total tract DM digestibility decreased (P=0.01) linearly over time. In trial 2, 117 pregnant beef cows (initial BW = 526 _ 52 kg; BCS = 5.2 _ 0.60) grazing dormant native tallgrass pastures (2.3% CP, 54% ADF) were assigned randomly to the same supplements and feeding rates used in trial 1. Cow ADG (P=0.12) and BCS change (P=0.14) did not differ among treatments during the pre-partum period. Subsequent pregnancy rate (P=0.62) and calving interval (P=0.72) did not differ among treatments. Under the conditions of our study, pregnant cows consuming low-quality warm-season forage and fed supplemental RDP at 0.09% of BW daily and RUP at 0.05% of BW daily appeared to receive sufficient MP to maximize performance within the constraints of energy supply. Cows appeared to compensate for the nutritional demands of pregnancy by increasing forage intake between 14 and 4 wk prepartum but DM digestibility decreased as DMI increased.

Key Words: forage, ruminally-undegradable protein, supplementation

^^51 ##47059 ¤Botanical composition of diets grazed by mature, lactating cows with calves and mature, non-lactating cows maintained on burned or unburned native Tallgrass prairie. ¬N. A. Aubel*[1], K. C. Olson[1], J. R. Jaeger[2], G. J. Eckerle[1], L. A. Pacheco[1], M. J. Macek[1], L. R. Mundell[1], and L. W. Murray[3], %% [1]Department of Animal Sciences and Industry, Kansas State University, Manhattan, KS, USA, [2]Western Kansas Agricultural Research Center, Kansas State University, Hays, KS, USA, [3]Department of Statistics, Kansas State University, Manhattan, KS, USA.

§%§Our objective was to compare diet selection preferences of 32 mature, lactating beef cows (L; initial BW = 566 _ 56 kg) suckling calves with 32 mature, non-pregnant, non-lactating beef cows (NL; initial BW = 551 _ 53 kg) grazing burned or unburned native Tallgrass prairie during summer. Our study was conducted on 8 pastures (97 _ 40 ha); 4 were burned in mid-April and 4 had no recent burning history. Grazing commenced in mid-May. Predominant forage species were *Andropogon geradii*, *Schizachyrium scoparium*, *Bouteloua curtipendula* (BC), *Bouteloua gracillis* (BG), *Panicum virgatum* (PV), *Sorghastrum nutans* (SN), *Amorpha canescensi* (AC), *Symphyotrichum ericoides* (SE), *Liatris punctata* (LP), and *Dalea purpurea* (DP). Four L and 4 NL cows were grouped randomly and assigned to graze a single burned or unburned pasture for 120 d. Fecal samples were collected from each animal on d 30, 60, 90, and 120 of the grazing period. Range-plant fragments in fecal samples were quantified using a modified microhistological technique; plant fragment prevalence in fecal material was assumed to equal % botanical composition of the diet. Selection of SN decreased (P < 0.01) over time while selection of PV, BG, AC, and SE increased (P < 0.01) over time. Cows selected more PV, AC, and DP (P < 0.03) in unburned pastures than in burned pastures. Conversely, cows selected more (P < 0.01) BC in burned pastures than in unburned pastures. Total graminoid selection was greater (74.2%; P < 0.01) on burned than unburned pastures (71.8%). In contrast, selection of forbs was greater (28.2%; P < 0.01) for unburned than burned pastures (25.8%). Cows tended to select more (burn x period; P < 0.09) PV and AC in unburned pastures and selected more (burn x period; P < 0.01) BC in burned pastures over time. There were no differences (P > 0.05) in diet selection patterns between L and NL cows. We interpreted these data to suggest that botanical composition of beef cow diets was influenced by spring burning of native Tallgrass pastures but was not influenced by lactation and pregnancy status.

Key Words: beef cows, diet selection, grazing

§§Ruminant Nutrition: Ruminant Nutrition Poster I

^^52 ##47017 ¤Whole corn and wet distillers grains substitution in steam-flaked corn diet alters rumen fermentation and bacterial dynamics. ¬L.N. Tracey*[1], M.R. McDaniel[1], J. Browne-Silva[1], N.A. Cole[2], C.A. Löest[1], and S.L. Lodge-Ivey[1], %% [1]New Mexico State University, Las Cruces, NM, USA, [2]USDA-ARS Conservation and Production Research Laboratory Renewable Energy and Manure Management Research Unit, Bushland, TX, USA.

§%§A study evaluated effects of whole shelled corn (WSC) in steam-flaked corn (SFC) finishing diets containing differing amounts of wet distillers grains with solubles (WDGS) on rumen fermentation and shifts in ruminal bacterial populations. A total of 642 heifers (initial BW = 412 _ 18 kg) were blocked by BW and randomly assigned to 36 pens in a 108 d experiment. Treatments were arranged as a 2 x 3 factorial with two amounts of WSC (0 and 20% DM) and three amounts of WDGS (0, 15, and 30% DM) replacing SFC. Ruminal fluid samples, collected from 2 heifers/pen on d 98,were analyzed for VFA, ammonia, pH, and shifts in ruminal bacterial populations using denaturing gradient gel electrophoresis (DGGE) targeting the 16S rDNA gene. Richness and Shannon-Weiner indices evaluated bacterial presence and diversity. Similarity matrix of DGGE banding patterns were constructed using Dice (binary) coefficient. Microbial indices and ruminal samples were evaluated for effects of WSC, WDGS, and interactions using Mixed Procedure of SAS with block as the random variable and pen as experimental unit. Addition of 0 to 15% WDGS to 0% WSC increased total VFA; however, total VFA decreased from 0 to 30% WDGS with 20% WSC (WSC x WDGS interaction, *P* = 0.02). Ammonia was not affected (*P* = 0.19). Diets with 0% WSC had 3.9% lower pH (*P* < 0.01), 4.4% less acetate (*P* = 0.05), 7.4% greater propionate (*P* = 0.02), and lower acetate:propionate (*P* = 0.02). Inclusion of WDGS decreased acetate (quadratic, *P* < 0.01), increased propionate (quadratic, *P* = 0.03), and decreased acetate:propionate (quadratic, *P* = 0.03). Bacterial diversity based on DGGE showed Richness and Shannon-Weiner indices did not differ with inclusion of WSC (*P* = 0.63), but decreased with WDGS (quadratic, *P* = 0.03). All samples were 70.42% similar according to Dice. Microbial population shifts and fermentation characteristics imply use of WSC in SFC based diets may negatively alter rumen use of WDGS.

Key Words: cattle, wet distillers grains, rumen bacteria

^^53 ##47191 ¤Access to Warm Drinking water prevents rumen temperature drop without affecting in situ NDF disappearance in grazing winter range cows. ¬M. K. Petersen[1], M. S. Reil[1], J. M. Muscha[1], and J. T. Mulliniks*[2], %% [1]USDA-ARS Fort Keogh Livestock and Range Research Laboratory, Miles City, MT, [2]New Mexico State University, Las Cruces, NM.

§%§Ingestion of large quantities of cold water or frozen forage may result in changes in temperature of ruminal contents. Rumen microorganisms may be sensitive to temperature changes in the ruminal environment. Therefore, this study was conducted to assess the variability in ruminal temperature and extent of in situ OM and NDF disappearance during winter in grazing range cows supplied with drinking water at either 8.2 _ 0.4_C (cold) or 31.1 _ 1.3_C (hot). Two adjacent paddocks (average 320 ha) were grazed from December through February in 2010–2011 by 24 pregnant range cows of which 4 were fitted with rumen cannulas at USDA-ARS Fort Keogh Livestock and Range Research Laboratory in Miles City, MT. Each paddock provided cold or warm stock water delivered in Ritchie waters. Warm water drinkers were heated by a Rheem outdoor tankless propane water heater. The four cannulated cows had Kahne rumen temperature continuous recording boluses (KB1000; recorded temperature at 5 min intervals) for 22 d in January. The recorded data were used to determine the frequency of timed events when rumen contents were below 38_C. Two separate in situ trials were conducted 1 wk apart for approximately 72 h. Six nylon bags containing approximately 5 g of winter range forage extrusa collected in November were placed in each rumen at 1400 h and incubated for 72 h for OM and NDF disappearance analysis. Cows in warm water paddocks had less (*P* < 0.05) variability in ruminal temperature than cows in the cold water paddocks. During a 22–d period only 1.5% of the time did ruminal temperature drop below 38_C

while the cows that had access to colder water were below 38_C 9.4% of the time. In situ NDF and OM disappearances were not influenced by the temperature of water the cow had access to drink (*P* _ 0.64). Results from this study show that daily rumen temperature is less variable when heated water is provided to cows grazing winter range with no influence on extent of in situ NDF and OM disappearance.

Key Words: Cows, Water Temperature, Water Intake

^^54 ##46167 ¤Growth performance and carcass characteristics of beef steers grazing tall fescue without or with nitrogen fertilization. ¬C. T. Noviandi[1], J.-S. Eun[1], D. R. ZoBell*[1], R. D. Stott[1], B. L. Waldron[2], and M. D. Peel[2], %% [1]Department of Animal, Dairy, and Veterinary Sciences, Utah State University, Logan, UT, USA, [2]Forage and Range Research Laboratory, USDA-ARS, Logan, UT, USA.

§%§A grazing study was conducted to determine if growth performance and carcass characteristics of beef steers would be affected by N fertilization on pasture. Eighteen Angus crossbred steers (394 _ 5.5 kg of BW) were grazed on the following two treatments: tall fescue without N fertilizer (TF_NF) and tall fescue with N fertilizer (TF+NF). A total of 168 kg/ha N fertilizer was applied in 3 split applications of 56 kg/ha to the TF+NF. The treatments were arranged in a randomized complete block design with 3 pasture replicates and 3 steers per pasture. Replicated 0.47-ha paddocks were established during spring 2010 and were grazed with beef steers from May through September 2010 for total of 16 wk. Grazing was for 7 d per paddock on a 28-d rotation interval. After the completion of 16-wk grazing, ultrasound measurements were performed to assess carcass characteristics. Intake of DM averaged 7.28 kg/d throughout grazing, and it did not differ between treatments ($P > 0.60$). Body weight of grazing steers also did not differ in response to N fertilization ($P > 0.16$). Average daily gain was higher in steers on TF_NF than those on TF+NF at wk 4 (1.26 vs. 1.08 kg/d; $P = 0.01$), but afterward it was similar between the treatments ($P > 0.29$). With progression of grazing season, ADG and G:F gradually declined regardless of treatments. Ruminal pH averaged 7.27, and it was similar between treatments ($P > 0.35$). Concentration of ruminal ammonia-N was similar between treatments at wk 4 and 12 ($P > 0.10$), but it increased due to N fertilization at wk 16 (17.7 vs. 13.0 mg/dL; $P = 0.04$), indicating that there was an imbalance between dietary N and energy on TF+NF at the end of grazing season. Sizes of rump and rib fat, rib eye area, and intramuscular fat percentage did not differ between grazing treatments ($P > 0.35$). Overall results of this grazing study showed that applying N fertilizer to tall fescue did not influence growth performance and carcass characteristics of grazing beef steers.

Key Words: grazing beef steers, tall fescue, N fertilization

^^55 ##47194 ¤The effects of age at weaning and post-weaning management on feedlot performance and carcass characteristics of beef steers. ¬E Smith*, S Lake, S Paisley, and J Ritten, %% University of Wyoming, Laramie, WY, USA.

§%§To assess impacts of weaning date and post-weaning management on carcass quality and feedlot performance, eighty steer calves were randomly assigned to be weaned at 120 d (EW) or 205 d (NW). Early weaned calves were immediately acclimated to a typical corn-based high concentrate diet targeting an ADG of 1.4 kg. At 205 d of age, EW steers were randomly assigned to either remain on a high concentrate diet until finish (n = 20; EWF), or a low input management system grazing corn crop residue for 60 d and then returned to a high concentrate corn based diet until finish (n = 20; EWC). Normal weaned steers were randomly assigned to either a typical corn based feedlot ration (n = 20; NWF) or a low input management system where they were allowed to graze corn crop residue for 60 d then returned to a high concentrate corn based diet until finish (n = 20; NWC). All steers remained on study until a 12th rib fat thickness of 1.3 cm was achieved. Individual feedlot performance was collected for 90 days during the finishing period utilizing Growsafe technology. Dry matter intake during the Growsafe period tended ($P = 0.09$) to be greater for calves that were

maintained in the feedlot rather than grazed corn stalks, while G:F tended (*P* = 0.10) to be greater for calves that had grazed corn stalks. Total number of days on feed was greater (*P* < 0.01) for the EW calves compared to the NW calves, as well as calves that were maintained in the feedlot compared to those allowed to graze cornstalks. Calves that were weaned early and kept in the feedlot (EWF) tended to have heavier (*P* = 0.09) HCW compared to NWC and EWC calves. However, no differences were detected for ADG (*P* = 0.41), 12th rib fat depth (*P* = 0.72), LM area (*P* = 0.54), YG (*P* = 0.77), marbling score (*P* = 0.45), or quality grade (*P* = 0.50) due to weaning date or nutritional strategy. This data suggest that placing weaned beef calves on a low plane of nutrition for 60 d prior to feedlot entry will not negatively affect feedlot performance or carcass characteristics.

Key Words: Early wean, low input, carcass characteristics

^^56 ##47197 ¤Effect of level of dry distillers grains plus soluble and supplementation of organic copper on fatty acid composition in feedlot lambs. ¬F. Castillo, Y. Diaz, A. Islas, M. F. Martinez-Perez, N. J. Dupass, and S. A. Soto-Navarro*, %% New Mexico State Univ.,, Las Cruces 88003.

§%§The objective was to evaluate the effect of corn dry distillers grains plus solubles (DDGS) and chelated Cu on fatty acids in muscle and adipose tissue of feedlot lambs. Thirty Rambouliet lambs (27.8 _ 1.47 kg initial BW, and 60 d of age approx.) were used in a 63-d finishing experiment. Diets were 80% concentrate based on rolled corn with 15% sudangrass hay and 5% alfalfa hay. Treatments consisted of 4 levels (8, 16, 24, and 32% of diet DM) of DDGS replacing dry rolled corn, and 32% DDGS plus 1.008 mg of Cu (32Cu). Fatty acids were determined in semitendinosus (ST) and longissimus dorsi muscles, liver (L), adipose tissue from the tail head (THAT), adjacent to the 12th rib (AT), and KPH. Data were analyzed in a completely randomized design. Orthogonal contrasts were used to test for linear, quadratic, and cubic effects of increasing DDGS amounts. Also, orthogonal contrast was used to compare 32 vs 32Cu. Longissimus dorsi and AT fatty acid profiles were not affected (*P* _ 0.05) with increasing DDGS level. In ST, C16:1 increased (cubic, *P* < 0.05) and C18:2n6 and polyunsaturated fatty acids (PUFA) increased (linear, *P* < 0.05) with increasing DDGS amount. For L, CLAc9t11 increased (*P* = 0.04) quadratically and C20:5n3 increased (*P* = 0.02) linearly with increasing DDGS amount. Data for KPH showed that CLAt10c12 increased linearly (*P* = 0.02) and C20:5n3 increased quadratically (*P* = 0.01) with increasing DDGS amount. For THAT C18:2n6, C20:4n6, PUFA, and total unsaturated fatty acids increased linearly (*P* _ 0.03), and C14:0, C16:0 and C18:3n3 increased quadratically (*P* _ 0.02) with increasing DDGS amount. Also, concentration of C16:0 and 22:5n6 were greater (*P* _ 0.04) for 32 than 32Cu. Feeding lambs with DDGS during this productive stage resulted in increased PUFA content in fatty acid profile which is considered a favorable response for human diets.

Key Words: fatty acids, DDGS, lambs

^^57 ##47203 ¤Effects of distillers dried grains with soluble on wether lambs performance. ¬Gamaleden Abdelrahim*[1], Janak Khatiwada[2], and Jorge Vizcarra[1], %% [1]Alabama A&M University, Normal, AL, USA, [2]North Carolina A&T State University, Greensboro, NC.

§%§The objective of this study was to determine the influence of feeding dried distillers grains plus solubles (DDGS) on carcass characteristics in lambs. Twenty-four wether lambs (40.1 _ 2.2 kg initial BW, and 8 to 9 mo of age) were assigned to 1 of 2 blocks on BW basis and were randomly allocated to 1 of the 3 dietary treatments, giving 8 lambs per treatment. Animals were grouped in 2 pens per treatment (4 lambs/pen) with pen serving as the experimental unit. Lambs were fed dietary treatments containing 0, 10, or 20% on a DM basis DDGS. All diets contained 50% fescue/bermudagrass mix hay, and 50% of the respective concentrate mixes. The concentrate mixes containing DDGS were formulated to be isonitrogenous at 16% CP and isocaloric (on a NEg basis). The DDGS replaced corn and soybean meal in the concentrate mixes so that diets contained desired amounts of DDGS. After 135-d feeding period final, BW was determined, lambs were slaughtered,

and data were collected after a 48-h chill. Both growth and carcass quality data were analyzed using the GLM procedures. Body weight was not different among treatments (*P* = 0.82). Also, no differences were observed in hot carcass wt (*P* = 0.79), cold carcass wt (*P* = 0.73), body wall fat (*P* = 0.90), ribeye area (*P* = 0.34), 12th rib fat (*P* = 0.88), and kidney and pelvic fat (*P* = 0.71) among treatments. Based on these findings, DDGS can replace a portion of corn and soybean meal commonly fed to lambs without any negative effect on carcass characteristics.

Key Words: distillers dried grains with soluble, carcass, lamb

^^58 ##47208 ¤Feeding value of peanut skins for meat sheep. ¬Gamaleden Abdelarhim*[1], Janak Khatiwada[2], and Jorge Vizcarra[1], %% [1]Alabama A&M University, Normal, AL, USA, [2]North Carolina A&T State University, Greensboro, NC.

§%§The overall objective of the study was to gain a thorough understanding of the feeding value of Peanut skins (PS) for meat sheep. The specific objective was to investigate the effects of varying levels of dietary PS inclusion on dry matter intake, growth, and carcass characteristics of meat sheep. Twelve Gulf Coast ewe lambs (27.8 _ 2.3 kg initial BW, and 7 to 8 mo of age) were assigned to 1 of 2 blocks on BW basis and were randomly allocated to 1 of the 3 dietary treatments, giving 4 lambs per treatment. Animals were grouped in 2 pens per treatment (2 lambs/pen) with pen serving as the experimental unit. Lambs were fed dietary treatments containing 0, 20, or 40% PS on a DM basis. All diets contained 50% fescue/bermudagrass mix hay, and 50% of the respective concentrate mixes. The concentrate mixes containing PS were formulated to be isonitrogenous at 16% CP and isocaloric (on a NEg basis). The PS replaced corn and soybean meal in the concentrate mixes so that diets contained the desired amounts of PS. lambs were slaughtered, and data were collected after a 48-h chill. Both growth and carcass quality data were analyzed using the GLM procedures. BW was not different among treatments (*P* = 0.15). Also, no differences were observed in hot carcass wt (*P* = 0.57), cold carcass wt (*P* = 0.24), body wall fat (*P* = 0.06), 12th rib fat (*P* = 0.1), and kidney and pelvic fat (*P* = 0.65) among treatments. However, the rib eye area (REA) was greater in lambs fed 0% and 20% PS than the REA in lambs fed 40% PS (*P* = 0.01). Based on these findings, PS can replace a portion of corn and soybean meal commonly fed to lambs without any negative effect on carcass characteristics.

Key Words: carcass, peanut skins, meat sheep

Thursday, June 23, 2011

SYMPOSIA AND ORAL SESSIONS

§§Physiology: Physiology II Oral

^^59 ##47033 ¤First parity evaluation of peak milk yield for range cows developed in the same ecophysiological system but receiving different concentrations of harvested feed inputs. ¬R. C. Waterman*[1], A. J. Roberts[1], R. L. Endecott[2], M. K. Petersen[1], T. W. Geary[1], L. J. Alexander[1], and M. D. MacNeil[1], %% [1]USDA-ARS, Fort Keogh Livestock and Range Research Laboratory, Miles City, MT 59301, [2]Department of Animal and Range Sciences, Montana State University, Miles City, MT 59301.

§%§Can range livestock producers reduce harvested feed inputs, during heifer development, and maintain production goals? To address this, we conducted a two year study measuring milk production (kg/d) and milk constituent concentrations (g/d) in primiparous beef heifers (n = 32; 16/yr reared under two different feed inputs). Heifers were born from dams receiving 1.8 or 1.2 kg/d winter supplementation for approximately 80 d and then randomly assigned to heifer development

treatments that provided ad-libitum or 20% less feed post weaning. Heifers that were developed on the ad-libitum treatment also received the 1.8 kg/d winter supplementation for life, whereas heifers that were developed on the 20% less treatment received the 1.2 kg/d winter supplementation for life. Milk production was measured with a portable milking machine every other week from d 28 to126 post partum. Milk yield for the 126-d lactation period was calculated from area under the lactation curve approximated by trapezoidal summation. The analysis of variance model included dam winter nutrition, heifer development treatment, and their interaction. Total milk yield, day of peak yield, and peak yield did not differ between dam winter nutrition (*P* _ 0.57) or heifer development treatment (*P* _ 0.09). Milk urea N, butterfat, lactose, and solids non-fat did not differ due to dam winter nutrition (*P* _ 0.09) and milk urea N, protein, lactose and solids non-fat did not differ between heifer development treatment (*P* _ 0.09). Milk butterfat was greater (*P* = 0.04) in heifers receiving ad-libitum feeding during heifer development (212 vs. 182 _ 9.7 g/d, respectively). Heifers born from dams receiving 1.2 kg/d winter supplementation had greater (*P* = 0.03) milk protein than heifers born from dams receiving 1.8 kg/d of winter supplementation (211 vs. 184 _ 8.3 g/d, respectively). In summary a heifer_s dam (*in utero*) and development/lifetime winter plane of nutrition influenced first parity milk composition but not first parity milk yield.

Key Words: Feed intake, milk constituents and yield, primiparous beef cow, rangeland

^^60 ##47056 ¤First parity evaluation of body condition, weight, and blood beta-hydroxybutyrate during lactation of range cows developed in the same ecophysiological system but receiving different harvested feed inputs. ¬W. L. Kelly*[1], R. C. Waterman[1], A. J. Roberts[1], R. L. Endecott[2], M. K. Petersen[1], T. W. Geary[1], L. J. Alexander[1], and M. D. MacNeil[1], %% [1]USDA-ARS, Fort Keogh Livestock and Range Research Laboratory, Miles City, MT 59301, [2]Department of Animal and Range Sciences, Montana State University, Miles City, MT 59301.

§%§Reduction of harvested feed inputs during heifer development could optimize range livestock production and improve economic feasibility for producers. The objective of this study was to measure body condition and weight as well as blood beta-hydroxybutyrate (BHB) concentrations for primiparous beef heifers born from dams receiving 1.8 or 1.2 kg/d of winter supplementation during late gestation and developed on ad-libitum or 20% less feed post weaning. Heifers that were developed on the ad-libitum treatment also received the 1.8 kg/d winter supplementation for life, whereas heifers that were developed on the 20% less diet received the 1.2 kg/d winter supplementation for life. Heifer body weight and BHB concentrations were measured (n = 32; 16/yr reared under two different feed inputs) every 7 days from d 21 to 126 post partum and body condition was measured every 14 days from d 21 to 119 post partum. The analysis of variance model included dam nutritional plane, heifer development feed intake, day of collection, and their interaction. Body condition tended to be greater (*P* = 0.08) during the 126-d trial in first parity heifers that were developed in the ad-libitum treatment group. Body condition was not influenced by dam winter nutrition (*P* = 0.21). Weekly body weights were greatest (*P* = 0.0002) in first parity heifers that were developed with ad-libitum feed (433 vs. 379 _ 8.90 kg, respectively for ad-libitum or 20% less feed treatment). Weekly body weights were not influenced by dam winter nutrition (*P* = 0.63). BHB concentrations did not differ (*P* = 0.33) between heifers developed differently, but tended (*P* = 0.09) to be greater in heifers born from dams that received the 1.2 kg/d winter supplementation. These results indicate that reducing feed during heifer development may decrease first parity body weight and condition, while dam plane of winter nutrition influenced the metabolism of their offspring.

Key Words: Feed intake, primiparous beef cow, rangeland

^^61 ##47098 ¤Does pure dinoprost tromethamine (prostaglandin $F_{2\alpha}$) inhibit growth *in vitro* of *Staphylococcus aureus* associated with bovine mastitis? ¬C. Autran*[1], J. Dalton[2], and A. Ahmadzadeh[1], %% [1]University of Idaho, Moscow, [2]University of Idaho, Caldwell R&E Center.

§%§Certain fatty acids have antimicrobial properties on mastitis-causing pathogen, *Staphylococcus aureus (S. aureus)*. The objective of this study was to determine the effects of prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$), in a pure and solid form of dinoprost tromethamine on growth of *S. aureus*. Glass tubes containing tryptic soy broth were inoculated with a strain of *S. aureus* Novel, and subsequently treated with $PGF_{2\alpha}$ at concentrations of 0, 2.4, 4.8 and 9.6 mg/mL. Cultures were incubated at 37_C and sampled every 6 h for 24 h. Bacterial growth was assessed by measuring turbidity using optical density at 600 nm (OD_{600}) and counting colony forming units (log CFU). Data were analyzed by analysis of variance (repeated measures), where the model included treatment, repeated factor (time), and their interaction. There was an effect of treatment and treatment by time interaction ($P < 0.05$) on mean OD_{600} and log CFU, indicating that bacterial growth over 24 h was different across treatments. Pre-planned contrasts were conducted to compare the mean OD_{600} and log CFU values between treatment concentrations at 24 h. At time of inoculation (0 h), mean OD_{600} and log CFU values were not different ($P > 0.5$) between treatments and averaged 0.13 _ 0.18 OD_{600} units and 7.1 _ 0.05 log CFU. However, at 24 h, mean OD_{600} units at for each $PGF_{2\alpha}$ treatment was different ($P < 0.05$) from control (16.67 _ 0.17). Mean OD_{600} value of 2.4 mg/mL (7.45 _ 0.17) was different ($P < 0.05$) from 4.8 mg/mL (5.92 _ 0.17) and 9.6 mg/mL treatments (5.81 _ 0.17) at 24 h. In contrast, mean OD_{600} values of 4.8 mg/mL and 9.6 mg/mL treatments were not different ($P > 0.2$) from each other at 24 h. Log CFU values (number of live cells) at 24 h, for each $PGF_{2\alpha}$ treatment, was different ($P < 0.05$) from control (10.77 _ 0.06), in a dose dependent manner. Mean log CFU values at 24 h were 9.85 _ 0.06, 8.66 _ 0.06, and 8.42 _ 0.06, for $PGF_{2\alpha}$ treatments 2.4, 4.8, and 9.6 mg/mL, respectively. These results provide evidence for the first time that $PGF_{2\alpha}$ in the form of pure dinoprost tromethamine has inhibitory effects on growth of *S. aureus in vitro*.

Key Words: mastitis, prostaglandin $F_{2\alpha}$, *Staphylococcus aureus*

^^62 ##47128 ¤Camelina meal supplementation to beef cattle: III. Effects on acute-phase and thyroid responses. ¬B. I. Cappellozza*[1], R. F. Cooke[1], C. Trevisanuto[1], V. D. Tabacow[1], D. W. Bohnert[1], J. Dailey[2], and J. A. Carroll[2], %% [1]Oregon State University - Eastern Oregon Agricultural Research Center, Burns, OR, USA, [2]USDA _ ARS Livestock Issues Research Unit, Lubbock, TX, USA.

§%§Fourteen halter-trained Angus steers were ranked by initial BW (average 191 _ 2.1 kg), and assigned (d 0) to receive supplements containing (as-fed basis): 1) 84 % corn, 14 % soybean meal, and 2 % mineral mix (CO); and 2) 70 % corn, 28 % camelina meal, and 2 % mineral mix (CAM). Treatments were offered individually, at a daily rate of 1.65 and 1.52 kg of DM/steer for CO and CAM, respectively. Alfalfa-grass hay was offered ad libitum during the study (d 0 to 36). On d 24, steers were fitted with a jugular catheter and were infused (i.v.) on d 25 with 0.5 _g of bovine corticotropin-releasing hormone (CRH)/kg of BW. Blood samples were collected hourly from _2 to 0 h and 4 to 8 h, and every 30 min from 0 to 4 h relative to treatment infusion (0 h). Blood samples were also collected via jugular venipuncture every 6 h from 12 to 72 h, and every 24 h from 96 to 168 h. All samples were analyzed for plasma concentrations of cortisol, ceruloplasmin, and haptoglobin. No treatment effects were detected (P = 0.28) for cortisol concentrations, which peaked for both treatments at 0.5 h relative to CRH infusion (time effect; P < 0.01). Ceruloplasmin concentrations were greater for CO vs. CAM steers at 6, 18, 42, 120, 144, and 168 h relative to CRH infusion (treatment _ time interaction, P < 0.01). Mean haptoglobin concentrations tended to be greater (P = 0.10) for CO vs. CAM steers (1.73 vs. 1.54 absorbance @ 450 nm _ 100, respectively). On d 34, steers were again fitted with a jugular catheter and were infused (i.v.) on d 35 with 0.33 _g of bovine thyrotropin-releasing hormone (TRH)/kg of BW. Blood samples were collected hourly from _2 to 0 h and 4 to 8 h, every 30 min from 0 to 4 h, and every 4 h from 8 to 24 h relative to treatment infusion (h 0) for determination of serum T_3 and T_4. No treatment effects were detected for T_3 (P = 0.58) and T_4 (P = 0.54) concentrations, which peaked, respectively, at 3 and 5 h relative to TRH infusion in both treatments. In conclusion, camelina meal supplementation did not affect thyroid gland function following a TRH challenge, but alleviated the acute-phase protein response following a CRH

challenge in beef steers.

Key Words: Camelina meal, Thyroid, Acute-phase

^^63 ##47151 ¤Estrous response following the PG 6-d CIDR protocol for heifer that do and do not exhibit estrus prior to CIDR insertion and its usefulness as a fixed-time AI protocol. ¬G. A. Perry*[1], B. L. Perry[1], and C. A. Roberts[1,2], %% [1]Department of Animala nd Range Sciences, South Dakota State University, Brookings, South Dakota, USA, [2]USDA-ARS, Fort Keogh LARRL, Miles City, Montana.

§%§Inducing luteal regression 3 d prior to an injection of GnRH and CIDR insertion has increased control of follicular development in beef heifers and pregnancy success in beef cows. However, a proportion of animals exhibit estrus during this 3 d period of time. Therefore, the objectives of these studies were to determine if estrous response following CIDR removal differed between heifers that did or did not exhibit estrus prior to CIDR insertion and to determine whether the PG 6-d CIDR protocol could be used for fixed-time AI in beef heifers. In experiment 1, heifers at one location (n=159) were synchronized with the PG 6-d CIDR protocol [$PGF_{2\alpha}$ (25mg; i.m.) on d -9, GnRH (100μg; i.m.) and insertion of a CIDR on d -6, $PGF_{2\alpha}$ (25mg; i.m.) and CIDR removal on d 0]. Estrotect estrous detection patches were placed on each heifer on d -9. At time of CIDR insertion, activated patches were recorded. At time of CIDR removal, all activated patches were replaced and estrus was observed visually. In experiment 2, heifers at one location (n=517) were randomly assigned to one of two treatments: 1) PG 6-d CIDR or 2) GnRH and insertion of a CIDR on d -5 and CIDR removal with 2x $PGF_{2\alpha}$ (6 h interval) at CIDR removal (5-d CIDR). Heifers were time-inseminated at 66 h (PG 6-d CIDR) or at 72 h (5-d CIDR) after CIDR removal. In experiment 1, interval to estrus following CIDR removal did not differ (P=0.18) between heifers that did (n=72) and did not (n=87) exhibit estrus before CIDR insertion (51.8 _ 1.0 and 53.6 _ 1.0 h, respectively). Variance for the interval to estrus tended to differ (P=0.07) between heifers that did (47.5) and did not (76.0) exhibit estrus before CIDR insertion. In experiment 2, pregnancy rates were greater (P<0.01) for heifers receiving PG 6-d CIDR (64%) compared to 5-d CIDR (42%). In summary, interval to estrus did not differ between heifers that did or did not exhibit estrus prior to CIDR insertion, and timed AI pregnancy rates were improved by using the PG 6-d CIDR protocol compared to the 5-d CIDR protocol.

Key Words: Estrous synchronization, Fixed-time AI, Heifers

^^64 ##47178 ¤Growth and reproductive performance of beef replacement heifers fed winter development diets containing soybean meal or wet distillers grains plus solubles. ¬J. R. Jaeger*[1], J. W. Waggoner[2], K. C. Olson[3], and J. W. Bolte[1], %% [1]Western Kansas Agricultural Research Center, Kansas State University, Hays, KS, USA, [2]Southwest Research and Extension Center, Kansas State University, Garden City, KS, USA, [3]Kansas State University, Manhattan, KS, USA.

§%§Our objective was to determine the effects of replacing soybean meal with wet distillers grains plus solubles (WDG) in replacement heifer development diets on growth and reproductive performance. Spring-born Crossbred heifers (n =172; initial BW 319 _ 2 kg; age 282 _ 1 d), previously preconditioned, weaned, and fed a grower diet for 60 d, were stratified by BW and age. Heifers were then assigned randomly to be fed development diets containing either soybean meal (CON) or WDG as a protein supplement. Within treatment, heifers were allotted equally to 4 pens and adapted to diets for 14 d. Diets were formulated to be isonitrogenous and isocaloric and were fed ad libitum for 94 d. Heifer BW was measured every 28 d during the feeding period; paired serum samples were also collected at these times to define puberty status. Following the 94 d feeding period, heifers were removed from treatment pens and combined in a native-range pasture. Equal proportions of heifers from each treatment were exposed to ovulation synchronization and bred by fixed-time AI either 23 or 51 d after development diets ended and 10 d later were exposed to bulls for 35 d. Total DM delivered was 4695 kg lower (P < 0.01) for WDG than for CON. Likewise, daily DMI

by WGD was 0.58 kg less ($P < 0.1$) than that by CON, which resulted in greater ($P < 0.01$) ADG throughout the development period for CON heifers (0.47 kg/d) than for WDG heifers (0.32 kg/d). Proportion of pubertal heifers was greater ($P < 0.01$) for CON compared to WDG after 28 and 56 d on feed but was not different ($P > 0.10$) after d 84 on feed or at ovulation synchronization for each breeding-group of heifers. Conception to fixed-time AI (46%) and pregnancy rate (86%) was not different ($P > 0.50$) between treatments. Under the conditions of our study, developing replacement heifers with WDG-containing diets may have some negative impacts on growth performance and age at puberty. Further research is needed to determine the effects of WDG inclusion rate, duration of feeding and diet composition on the reproductive performance of replacement heifers.

Key Words: beef heifers, distillers grains, puberty

§§Ruminant Nutrition: Ruminant Nutrition II Oral

^^65 ##47222 ¤Effects of a long acting trace mineral rumen bolus upon range cow productivity. ¬J. E. Sprinkle*[1], D. W. Schafer[1], S. P. Cuneo[1], D. Tolleson[1], and R. M. Enns[2], %% [1]University of Arizona, Tucson, [2]Colorado State University, Fort Collins.

§%§The objectives were to determine if strategic supplementation of range cows in central Arizona with either 2 or 4 long acting (six mo) trace mineral rumen boluses containing Cu, Se, and Co would: (1) decrease yearly calving interval; (2) increase cow body condition, milk production, or calf adjusted weaning weights; and (3) to see if any of the above traits varied by cow breed. There were 194 Hereford (H) and 132 Composite (CGC; 50% Red Angus, 25% Tarentaise, 25% Charolais) control cows, 173 H and 125 CGC 1X treated (2 boluses in spring) cows, and 183 H and 117 CGC 2X treated (2 boluses in autumn and 2 in spring) cows used over the four year period. Cows were weighed and scored for body condition (1 to 9, 9 = fattest) in February, May, and September of each year. Milk production was determined by weigh-suckle-weigh on a subset of cows (n = 169) at 50 d lactation. The outcomes were analyzed using a restricted maximum likelihood-based mixed-effects model that included the categorical, fixed effects of breed, bolus, and year with the interactions of breed x bolus, and year x bolus. A random effect of cow was also included. Calving interval and milk production means were separated by breed and treatment using t-test comparisons for pooled variance with unequal sample sizes and equal variance. Cow body condition score and calf adjusted weaning weights differed by breed ($P < .05$) but not by treatment ($P > .05$). Milk production did not differ by either breed or treatment ($P > .05$). Calving interval was 381 _ 4.0, 378 _ 4.2, 370 _ 3.6, 404 _ 5.4, 382 _ 10.9, and 385 _ 5.4 d for CGC and H control, 1X, and 2X treatments, respectively and calving interval declined ($P < .05$) from the control to the 2X treatment group. Except for the 1X treatment, CGC had less ($P < .05$) calving interval days than H. Strategic supplementation via a long acting trace mineral bolus was successful in decreasing calving interval for cattle grazed in an extensive rangeland environment.

Key Words: cattle, calving interval, copper, minerals, selenium

^^66 ##47146 ¤Effects of wet distiller_s grain inclusion on finishing performance and carcass characteristics of beef steers fed a sorghum-based finishing diet. ¬J. W. Waggoner*[1], J. R. Jaeger[2], and K. C. Olson[3], %% [1]Southwest Research and Extension Center, Kansas State University, Garden City, KS, USA, [2]Western Kansas Agricultural Research Centers, Kansas State University, Hays, KS, USA, [3]Kansas State University, Manhattan, KS, USA.

§%§A large portion of the grain sorghum produced in the U.S. is used as livestock feed; however, there is limited information regarding the effects of wet distiller_s grain (WDG) in sorghum-based finishing rations on finishing cattle performance and carcass characteristics. Crossbred steers (n = 464; initial BW = 468 _ 38 kg) were utilized in a finishing study to evaluate the effects of WDG inclusion. Steers were stratified by BW and ultrasonically-measured 12th-rib fat thickness and LM

characteristics and assigned randomly to 1 of 4 ration treatments (4 pen replicates per treatment). Ration treatments were: 1) soybean meal protein supplement (CON); 2) 15% (diet DM basis) wet distillers grain plus solubles (15WDG); 3) 30% (diet DM basis) wet distillers grain plus solubles (30WDG); and 4) 40% (diet DM basis) wet distillers grain plus solubles (40WDG). Steers were adapted to treatment rations for 14 d and fed for 93 d until harvest. Final weight tended ($P = 0.12$) to be greater for steers fed 40WDG (621 kg) than for steers fed 15WDG or 30WDG (613 and 607 kg, respectively). Steers fed 40WDG had greater ($P < 0.01$; 1.67 kg/d) ADG than CON (1.55 kg/d), 15WDG (1.53 kg/d), or 30WDG (1.55 kg/d) but feed efficiency was not influenced by ration ($P = 0.22$). Steers fed 40WDG produced heavier carcasses than steers fed 15WDG (390 vs. 379 kg, respectively; $P < 0.05$) and tended ($P = 0.09$) to produce heavier carcasses than CON but LM area was not different ($P = 0.23$) between steers fed 15WDG and 40WDG. Marbling score and 12th-rib fat thickness were not influenced by ration ($P > 0.05$) as cattle were managed to achieve a common endpoint of 11.5 mm of subcutaneous fat over the 12th-rib. These results suggest that the inclusion of WDGS in a sorghum-based finishing ration improved ADG but had no effect on feed efficiency. Further research is needed to determine the optimum inclusion level of WDGS in sorghum-based finishing rations.

Key Words: beef cattle, distillers grains, sorghum

^^67 ##47126 ¤Evaluation of whole corn substitution in steam-flaked corn-based diets containing different concentrations of wet distiller_s grains. ¬M. R. McDaniel*[1], D. A. Walker[1], K. M. Taylor[1], N. A. Elam[2], N. A. Cole[3], and C. A. Loest[1], %% [1]New Mexico State University, Las Cruces, NM, [2]Nutrition Services Associates, Hereford, TX, [3]USDA-ARS Conservation and Production Research Laboratory Renewable Energy and Manure Management Research Unit, Bushland, TX.

§%§Substituting steam-flaked corn (SFC) with whole shelled corn (WSC) in finishing diets containing wet distiller_s grains with solubles (WDGS) could reduce grain processing costs without affecting feedlot cattle performance, feed conversion, and carcass characteristics. This study used 642 Angus-cross heifers (412 _ 18 kg initial BW) assigned to 36 pens in a randomized complete block design (3 blocks based on initial BW). Treatments (2 _ 3 factorial) were 6 finishing diets based on SFC with 0 or 20% WSC replacing SFC, and 0, 15, or 30% WDGS replacing SFC (DM basis). Diets were formulated to contain equal concentrations of RDP and fat, and were fed to heifers for 108 d. No WSC _ WDGS interactions (P _ 0.08) occurred for DMI, ADG, G:F, and carcass characteristics. Heifers fed diets containing 20 vs 0% WSC had greater ($P < 0.01$) DMI, but final BW, ADG, and G:F were not affected (P _ 0.11). The percentage of carcasses grading USDA Choice or better tended to be lower ($P = 0.07$), and the percentage grading USDA Select were higher ($P = 0.03$) for cattle fed diets with 20 vs 0% WSC. Other carcass characteristics, morbidity, and mortality were not affected (P _ 0.16) by WSC. Increasing WDGS in SFC diets decreased final BW (linear, $P < 0.01$), tended to decrease ADG (linear, $P = 0.10$), tended to increase DMI (linear, $P = 0.08$), and decreased G:F (linear, $P = 0.01$). Addition of WDGS to SFC diets tended to decrease HCW (linear, $P = 0.09$), but other carcass characteristics, morbidity, and mortality were not affected (P _ 0.18). In summary, substituting SFC with 20% WSC in finishing diets did not affect animal performance and feed conversion, but decreased carcass quality. In contrast, substituting SFC in finishing diets with increasing amounts of WDGS decreased animal performance and feed conversion, but did not affect carcass characteristics. Limited responses to the substitution of 20% WSC could in part explain the lack of WSC _ WDGS interactions. Thus, it is not clear if grain processing could be reduced in finishing diets containing WDGS without affecting feedlot cattle performance and feed conversion.

Key Words: Corn processing, Distiller_s grains, Heifers

^^68 ##47195 ¤Effects of continual or step-up ractopamine hydrochloride supplementation on feedlot performance and carcass characteristics of finishing steers. ¬K Culp*[5], M Claeys[2], R

Lemenager[2], C Rusk[3], G Bridges[4], and S Lake[1], %% [1]University of Wyoming, Laramie, WY, USA, [2]Purdue University, West Lafayette, IN, USA, [3]South Dakota State University, Brookings, SD, USA, [4]University of Minnesota, Grand Rapids, MN, USA, [5]Ohio State University, Columbus, OH, USA.

§%§Thirty-six Angus-Simmental cross steers (510 _ 4.99 kg initial BW) individually fed identical finishing diets were randomly assigned to receive one of three ractopamine hydrochloride (RH) treatments during the last 42 d of the finishing period to evaluate the effects of continuous (CNT) or step-up (STEP) RH supplementation on feedlot performance and carcass characteristics of beef steers. Treatments were 0 (CON) or 200 (CNT) mg RH from d 0 to d 42, or daily supplementation of 100 mg RH from d 0 to d 21, no RH from d 21 to 28, and daily supplementation of 300 mg RH from d 28 to d 42 (STEP). Steers were fed ad libitum and weights were taken at 14 d intervals. Carcass characteristics were collected following a 24-h chill. Dry matter intake ($P = 0.61$), total BW gain ($P = 0.52$), G:F ($P = 0.36$), or final BW ($P = 0.41$) were not different due to RH supplementation during the last 42 d of the finishing period. Treatment did not affect (P _ 0.26) initial BW, DMI, ADG, G:F, or total BW gain throughout the feeding period. Likewise, those carcass measurements closely associated with live weight gain such as HCW, dressing percent, 12th rib fat thickness, LM area, % KPH, or yield grade did not differ (P _ 0.19) across treatments. However, CON had greater ($P = 0.04$) marbling scores than CNT, with STEP being intermediate to both treatments. This effect likely contributed to the trend ($P = 0.08$) in quality grade differences between CON and CNT, with STEP again being intermediate. This data suggests that supplementation of 200 mg per day RH continuously or feeding a step up protocol did not improve feedlot performance or final BW and decreased marbling score compared to CON steers.

Key Words: beta-agonist, ractopamine, step-up

^^69 ##47112 ¤Effects of rumen-protected arginine supplementation on serum amino acid concentrations in forage-fed steers. ¬A. M. Meyer*[1], S. I. Klein[1], D. V. Dhuyvetter[2], R. E. Musser[3], and J. S. Caton[1], %% [1]Center for Nutrition and Pregnancy, Department of Animal Sciences, North Dakota State University, Fargo, ND, [2]Ridley Block Operations, Mankato, MN, [3]SODA Feed Ingredients, LLC, Mankato, MN.

§%§Four ruminally cannulated steers were used in a 4 x 4 Latin square with the following treatments (2x/d): ad libitum grass hay (7.2% CP and 67.6% NDF; CON), hay and 27 mg Arg/kg BW injected intravenously (Arg-INJ), hay with 90 mg rumen-protected Arg/kg BW (Arg-180), and hay with 180 mg rumen-protected Arg/kg BW (Arg-360). Arginine in Arg-180 was estimated to be equal to Arg-INJ. Each period consisted of a 7-d adaptation then 14 d of treatment. Immediately prior to feeding, rumen-protected Arg was dosed ruminally and Arg-HCl or saline was injected in the jugular vein. Daily blood samples were taken from the contralateral jugular vein 2 h post-feeding from d -1 to 14 of treatment. On d 8 of treatment, blood samples were taken at -0.3, 0, 0.5, 1, 2, 4, 6, 8, 10, and 12 h relative to feeding to estimate 12-h circulating AA. Data were analyzed with treatment as a fixed effect and steer and period as random effects. As expected, daily and 12-h serum Arg area under the curve (AUC) was greater ($P < 0.08$) in Arg-INJ than all other treatments. Additionally, Arg was greater ($P < 0.1$) in Arg-360 than CON, with Arg-180 intermediate. Although daily and 12-h total AA were unaffected by treatment ($P > 0.16$), total daily essential AA were greater ($P < 0.01$) for Arg-INJ than Arg-180. Daily citrulline (Cit) AUC was greater (P _ 0.05) for Arg-360 and Arg-INJ than CON, greater ($P = 0.09$) for Arg-360 than Arg-180, and greater ($P < 0.1$) for Arg-180 than CON. Steers fed Arg-360 also had the greatest ($P < 0.06$) 12-h Cit AUC, and CON had less ($P < 0.03$) Cit than Arg-180 and Arg-INJ. Daily and 12-h ornithine (Orn) AUC was greatest for Arg-INJ ($P < 0.01$) and was greater ($P = 0.03$) for Arg-360 than CON. Daily Lys AUC was greatest ($P < 0.03$) in CON, and Arg-180 had greater ($P = 0.07$) Lys than Arg-360. There was no effect ($P = 0.17$) of treatment on 12-h Lys AUC. Steers fed Arg-360 had greater ($P < 0.05$) daily and 12-h Gln AUC than CON and Arg-INJ, whereas Pro and Glu were unaffected ($P > 0.34$) by treatment. Results indicate that circulating Arg, Arg metabolites (Cit and Orn), and associated AA can be altered with rumen-protected Arg supplementation.

Key Words: amino acids, arginine, supplementation

^^70 ##47182 ¤Effects of summer supplementation on long yearling steers grazing native range. ¬K. M. Rolfe*, W. A. Griffin, T. J. Klopfenstein, and G. E. Erickson, %% Department of Animal Science, University of Nebraska, Lincoln, 6858-0908.

§%§A 3-yr study was designed to evaluate the effects of supplementing modified wet distillers grains with solubles (MDGS) on long yearling steer performance grazing native range and subsequent feedlot performance. Annually, steers (n=240; BW = 271 _ 46 kg) were backgrounded on cornstalks from late fall to mid-spring (144 d). While grazing corn residue calves were supplemented 2.27 kg/steer daily of Sweet Bran. Following backgrounding steers were allowed to graze smooth bromegrass pastures for 21 d. After grazing smooth brome, calves were weighed, stratified by BW, assigned randomly to summer grazing treatments, and relocated to graze Sandhills range (cool and warm season grasses). Summer grazing treatments included: grazing native range with no supplement (CON); and grazing native range with MDGS supplementation equivalent to 0.6% BW (SUPP). Modified wet distillers grains with solubles was fed daily on the ground. Steers were allowed to graze Sandhills range for the remainder of the summer grazing period (136 d) before entering the feedlot in early fall. At the time of summer treatment assignment, BW was not different ($P = 0.22$) between SUPP and CON steers. However at feedlot entry, SUPP steers were 49 kg heavier ($P < 0.01$) than CON steers. Therefore, SUPP steers had 0.36 kg/d greater ($P < 0.01$) ADG than CON steers during summer grazing. Feedlot harvest date was targeted to equal fat thicknesses (1.27 cm) between CON and SUPP steers; thus, rib fat thicknesses were not different ($P = 0.57$) between the two treatments. As a result of the harvest goal, final BW was not different ($P = 0.92$) between CON and SUPP steers; however, it required 24 fewer days in the feedlot ($P <0.01$) for SUPP steers to reach this point. Feedlot ADG tended to be greater ($P = 0.07$) for CON steers than SUPP steers, but feed efficiency and DMI were not different ($P > 0.16$). Supplemental MDGS can be fed, increase cattle gains during summer grazing, and decrease days on feed in the feedlot.

Key Words: beef cattle, supplementation, distiller grains

^^71 ##47184 ¤Influence of weaning date and pre-partum plane of nutrition on cow-calf productivity. ¬K. M. Rolfe*, L. A. Stalker, T. J. Klopfenstein, J. A. Musgrave, and R. N. Funston, %% Department of Animal Science, University of Nebraska, Lincoln, 68583-0908.

§%§A 3- year trial began in 2008 to elucidate effects of weaning date and pre-partum plane of nutrition on cow-calf productivity in a spring calving system. Treatments were imposed on crossbred beef cows (n= 156; BW = 477 _ 68 kg) in a factorial arrangement: 1) cows were weaned in early October or early December; 2) during the last trimester of pregnancy, cows received either 0.00, 0.45, or 0.91 kg/hd daily of a 30% CP supplement on dormant upland range. An additional winter treatment was cornstalk grazing with no supplement. October weaned cows grazing winter range had greater ($P < 0.01$) average BCS and BW compared to December weaned counterparts. Level of supplementation on upland range did not impact ($P > 0.11$) BCS or BW. Subsequent pregnancy rates (96.5% - 98.2%) were not influenced ($P > 0.55$) by weaning date or any winter treatments. Calves born to October weaned dams grazing winter range had greater ($P < 0.01$) birth BW than December weaned contemporaries; however, adjusted weaning BW was not different ($P > 0.06$). The first year of steer progeny from cows grazing winter range showed no differences ($P > 0.19$) in feedlot entry BW, final BW, feedlot DMI, feedlot ADG, or carcass characteristics. Average pre-breeding BW of heifers born to October weaned dams on upland range was greater ($P < 0.04$) than December weaned contemporaries. However, there were no differences ($P > 0.66$) in percent cycling before breeding or pregnancy rates. Body condition and BW of cows grazing cornstalks were greater ($P < 0.01$) than cows on winter range. Calves born to dams grazing cornstalks had greater ($P < 0.01$) birth and weaning BW, compared to progeny from cows on upland range without supplement; however steer feedlot performance and heifer reproduction were similar ($P > 0.19$). Cows weaned in December had

decreased BW and BCS with similar pregnancy rates as cows weaned in October. Weaning date and supplementation had minimal affect on steer and heifer progeny.

Key Words: beef cattle, maternal nutrition, supplementation

§§Extension: Extension Oral

^^72 ##47084 ¤Extension programming results in natural resource improvement and collaboration. ¬B.A. Riggs[1], C.T. Parsons*[2], and T.L. Deboodt[1], %% [1]Oregon State University Extension Service, Crook County, Prineville, OR, U.S., [2]Oregon State University Extension Service, Baker County, Baker City, OR, U.S.

§%§In 1993, the Oregon Legislature charged the Oregon Department of Agriculture with enforcement of agricultural sources water pollution. This legislation caused an evolution of agricultural water quality planning and enforcement that culminated in 2009. As a result, Oregon State University Extension Service (OSUES) worked cooperatively with Soil and Water Conservation Districts (SWCD) to provide educational workshops (Cows and Creeks (CC)) over a seven year period (540 participants) to improve collaboration among stakeholders (governmental agencies, non-profits and landowners) and reinforce scientific-based decision making to improve management and regulatory oversight of natural resources and water quality. Evaluation of the program was conducted via printed, multiple-choice survey, mailed to 151 participants (33% return rate). The respondents (n=50) were livestock/land owner/manager (84%), governmental agency (30%) and non-profit (20%). Respondents (affiliation not a variable) stated relationships improved with government agencies (49%), land/livestock owners (45%), and non-profit organizations (38%). Forty-two percent of respondents indicated they utilized financial and/or technical aid from various agencies. The respondents secured more than $1,000,000 in grant funding and personal contributions to enhance riparian function. Of 21 people that received funding, 70% believed the projects resulted in a return on investment as indicated by livestock performance, recreational opportunities, habitat for wildlife and fisheries, water quality standards and/or farm/hay production. Forty-eight percent of respondents implemented at least one restoration project or changed management to improve riparian function. As a result of CC, the respondents (n=50) observed improvement with the following; cow/calf performance (24%), riparian vegetation (42%), fish habitat (20%), bank stabilization (36%), and stream flow (18%).

Key Words: Extension Service, collaboration, natural resource improvement

^^73 ##47131 ¤VACCINE STORAGE AND BEEF QUALITY ASSURANCE PRACTICES AMONG IDAHO BEEF PRODUCERS. ¬J.B. Glaze, Jr.[1], K.S. Jensen[2], S. Williams[3], S. Etter*[4], T. Fife[1], R. Wilson[5], D. Gunn[6], J. Church[7], S. Nash[8], N. Rimbey[4], S. Baker[9], S. Kane[11], and G. Keetch[10], %% [1]University of Idaho, Twin Falls, [2]University of Idaho, Marsing, [3]University of Idaho, Salmon, [4]University of Idaho, Caldwell, [5]University of Idaho, Emmett, [6]University of Idaho, Fort Hall, [7]University of Idaho, Grangeville, [8]University of Idaho, Blackfoot, [9]University of Idaho, Challis, [10]University of Idaho, Council, [11]University of Idaho, Moscow.

§%§To be fully effective and provide consumers with safe, high quality beef, animal health products must be stored and administered properly. It is recommended that many animal health products be stored at temperatures ranging from 2 to 7_C. Data recorders were used to log refrigerator temperatures at 10-min intervals for 48 h on 129 Idaho beef cattle operations. On-site surveys were used to gauge the use and adoption of animal health product management and basic beef quality assurance (BQA) practices. Operations in the study included cow-calf (91%), feedlot (4%), and a combination of cow-calf and feedlot (5%). Size of operation was categorized as follows: 1 to 25 cows (7%), 26 to 50 cows (5%), 51 to 100 cows (15%), 101 to 200 cows (12%), and more than 200 cows (61%). Refrigerator locations included: kitchens (19%), mud rooms (15%), barns (13%), garages

(10%), and on porches (11%). Refrigerator ages were _ 5 yr (16%), 6 to 10 yr (27%), 11 to 15 yr (23%) and > 15 yr (34%). One-third of refrigerators maintained temperatures in the recommended range for more than 95% of the recording time and 32% of refrigerators maintained temperatures in the recommended range for less than 5% of the recording time. Forty-seven of the surveyed producers were BQA certified and 47 were not certified and had not attended a training session. Equal proportions (34%) of certified and non-certified producers_ refrigerators maintained temperatures in the recommended range 95% of the time. Thirty percent of certified producers_ refrigerators and 36% of non-certified producers_ refrigerators maintained recommended temperatures less than 5% of the time. On-site surveys show that Idaho beef producers have implemented basic BQA practices. Almost all (95%) producers cited the use of the neck region of cattle for injections. Producers have implemented acceptable chute-side practices for vaccines, such as mixing modified live vaccines on an as-needed basis (113 operations), protecting vaccines from sunlight (113 operations), and keeping vaccines in coolers (121 operations). Vaccines may be compromised if stored in faulty refrigerators or when thermostats are improperly set.

Key Words: Vaccine, Storage, Beef Quality Assurance

^^74 ##47157 ¤Case Study: Low-input bunker storage of corn-based wet distiller_s grain. ¬J. W. Waggoner*[1] and J. R. Jaeger[2], %% [1]Southwest Research and Extension Center, Kansas State University, Garden City, KS, USA, [2]Western Kansas Agricultural Research Centers, Kansas State University, Hays, KS, USA.

§%§Traditionally the use of wet distiller_s grains (WDG) as a feedstuff has been limited to livestock producers with the capability of using truckload quantities of WDG within 7 to 21 d due to the short shelf life of WDG. Wet distiller_s grains can be stored in bags or mixed with forages and packed into bunkers. These storage methods require additional inputs (purchase and processing of forages, mixing and bagging equipment, fuel, labor) that increase the cost of storing WDG. Therefore, storage methods that require fewer inputs and less labor must be explored. The objective of this case study was to examine the feasibility of storing WDG in concrete bunkers without the addition of forage as a bulking agent. Approximately 68 metric tons (3 truckloads) of corn-based WDG was unloaded directly into 2 concrete bunkers and covered with 6 mil black plastic and tires. Samples of WDG were obtained from each truckload upon arrival and composited (d 0). Samples were then obtained from 3 locations within each respective bunker using a grain probe and combined to form a composite sample every 14 _ 5 d thereafter for the duration of the study (208 d). Samples were submitted to a commercial laboratory and analyzed for DM, CP, ADF, NDF, ADIN, Ca, P, S, and pH. Bunker served as the replicate and data were analyzed using the Mixed procedure of SAS (SAS Inst. Inc., Cary, NC) as a repeated measures design. Days in storage had no effect on DM, ADF, ADIN, Ca, S, or pH of WDG ($P > 0.05$), but did impact CP, NDF and P concentration ($P < 0.05$). Crude protein concentration of WDG tended to be greater from d 0 (30.92%) at d 42 (31.86%; $P = 0.09$), and was greater on d 167 (33.88%; $P < 0.05$). Concentrations of NDF tended to be greater than d 0 on d 69, 94, 181 (P _ 0.07) and were greater on d 55, 137, 161, 167, 194, and 208 ($P < 0.05$). Phosphorous content tended to be less than d 0 on d 151, 161, 167 (P _ 0.12) and tended to be greater on d 194 and 208 (P _ 0.18). The results of this case study imply that low-input bunker storage of WDG, without the use of forage as a bulking agent, may be a feasible storage option for livestock producers interesting in using WDG in their operations.

Key Words: distiller_s grain, bunker, storage

POSTER PRESENTATIONS

§§Breeding and Genetics: Breeding and Genetics Poster

^^75 ##47063 ¤EVALUATION OF OVSYNCH AND TARGETED BREEDING EFFECT ON GESTATION AND DAYS OPEN IN DAIRY CATTLE. ¬M. P. Gallegos*[1], H. L. Castro[1], C. A. Carmona[1], J. S. Saucedo[2], and A. Perez[2], %% [1]Universidad Juarez del Estado de Durango, Durango, Durango, M_xico, [2]Universidad Aut_noma de Baja California, Mexicali, Baja California, M_xico.

§%§In order to evaluate the effect of two hormonal protocols on pregnancy rates, days open, body condition (BC) and dairy cattle, the study was conducted in the dairy the Unit FMVZ-UJED (August, 2009 to September 2010), which used 56 Holstein cows calving. After calving were randomized to two groups: Group I (n = 30) received IM PGF_ on 28, 42 (detected estrus and AI) and 56 days postpartum (AI was detected estrus and cows that were not AI after 42 days (Targeted Breeding) Group II (n = 26) after 45 days postpartum and to determine the uterine involution was applied Ovsynch (GnRH + GnRH + PGF2_ + Fixed Time AI). The body condition was assessed at calving, 25 and 50 days after delivery was also determined calving difficulty and retention of fetal membranes (RFM). The body condition was similar (3.0 ± .05 at delivery, 2.5 ± .06-25 and 2.6 ± .08 at 50 d, respectively) between groups (P> 0.05). We obtained 7.14% of dystocia and 15.7% retained fetal membranes (RFM). The Group I, 2.7 required doses of PGF to first service. In Group II, treatment was initiated to 52.5 _ 5.4 days postpartum. The first service postpartum in Group I and II was to 64.03 _ 2.9 and 62.5 _ 5.8 days (P> 0.05). Pregnancy rate to first service was 76.9 vs 30% and service seconds was 95.9 vs 44% for Group I and II, 77.24 _ 3.9 and 110 _ 19.7 (P <0.05) days open, respectively. The conception services were better in Group I (1.25 _ .10) than in group II (1.6 _ .12). The cows of Group I showed better results on the reproductive parameters assessed although this would be strengthened if an economic study be carried out short, medium and long term.

Key Words: Dairy cattle, postpartum period, Synchronization of oestrus

^^76 ##47170 ¤Genetic Evaluation of Postpartum Interval in Charolais Cows. ¬X. Zeng*, R. M. Enns, S. Speidel, and D. H. Crews, %% Department of Animal Sciences, Colorado State University, Fort Collins,CO,USA.

§%§Shorter postpartum intervals have been known to be widely correlated with higher reproductive efficiency. The objective of this research was to estimate heritability, repeatability and EBV using postpartum interval data (PPI; from the calving date to the next breeding date), totaling 25,568 PPI records from 13,256 Charolais cows owned by 3,941 breeders in the Canadian Charolais Association (CCA). The AI date was recorded as breeding date in the data and was subsequently used to calculate unreasonable PPI records. Females with PPI > 108 d and < 30 d were eliminated from the data. The mean PPI was 78.6 d (SD = 14.99). One PPI record was calculated for 13,256 cows, whereas 6,305 cows had more than one record. Postpartum interval records were divided into those recorded from cows giving birth in spring (from January to June, n = 24,673), and those recorded from cows calving in fall (from July to December, n = 894). Genetic parameters were estimated by using a repeated records maternal animal model with REML. The model contained the random effect of breeding value and fixed factors of breeder, age, calving year and parity. A low heritability (0.038 _ 0.008) was estimated from this population and the estimated repeatability was 0.209. By applying regression analysis, all factors had significant effects (P<0.01) upon PPI based on a simple model that included the linear effect of age of cow. Similar significance levels were calculated when a quadratic term for age of cow was included in the model. The low heritability of PPI in Canadian Charolais suggests that selection for reduced PPI would require high data density to be effective.

Key Words: PPI, heritability, genetic

^^77 ##47186 ¤Genetic and phenotypic parameters for carcass and ultrasound traits of American Shorthorn Beef Cattle. ¬H. M. Saad*, B. W. Brigham, S. E. Speidel, D. H. Crews, Jr., and and R. M. Enns, %% *Colorado State University*, *Fort Collins.*

§%§Assessing the genetic relationship between carcass and ultrasound traits plays an important role

in increasing accuracy of selection for carcass traits. The objective of this study was to estimate (co)variance components for fat-related carcass and ultrasound traits of Shorthorn cattle. Data were obtained from the American Shorthorn Association (ASA) for all available carcass and ultrasound traits. The data included 4,222 observations on 12–13th-rib fat thickness (FAT) and marbling score (MS). For live animal measurements 1,614 observations on ultrasound 12–13th-rib fat thickness (UFAT) and ultrasound intramuscular fat (IMF) were available. Also, historical pedigree information on 714,903 animals was obtained from the ASA. From this pedigree, a reduced, 3 generation pedigree (21,272) was constructed beginning with animals that had either a carcass or ultrasound measure. Traits were analyzed with a multivariate animal model and average information REML procedures to estimate heritabilities, genetic, and phenotypic correlations among traits. Fixed effects included contemporary group and the linear effect of age at measurement for all traits. For ultrasound traits, the linear effect of percent Shorthorn breed was included as another fixed effect. The random effect of animal also was included. Heritability estimates for FAT, MS, UFAT, and IMF were 0.46 _ 0.06, 0.51 _ 0.06, 0.36 _ 0.07, and 0.24 _ 0.06, respectively. The estimated genetic correlation between FAT and MS was 0.46 _ 0.09. MS had a moderately positive genetic correlation with IMF (0.55 _ 0.26). UFAT also had a moderately positive genetic correlation with IMF (0.43 _ 0.17). All other estimates of genetic correlations between traits were not significant. The phenotypic correlation between MS and FAT (0.24 _ 0.01) was low. Including ultrasound data to evaluation models increased the average accuracy of carcass traits 2.8 and 2.5 % for FAT and MS, respectively. These results indicate that genetic improvement in carcass traits can be achieved through including ultrasound traits as indicator traits which makes the genetic prediction more accurate.

Key Words: Shorthorn, Beef cattle, carcass traits

^^78 ##47198 ¤Differential gene expression combined with phenotypic data for animal genetic evaluation. ¬S. -F. Guo*, %% Animal Technology Institute Taiwan, Chunan, Miaoli, Taiwan.

§%§Gene expression data were typically used for identification of candidate genes for economically important traits. In the Bayesian framework, differential expression data can be utilized to construct the prior distribution for breeding value estimation. Expression levels were normalized before analysis. Normalized data of identified genes were fitted to the phenotypic measures in a principle component model to reduce the multicollinearity among variables. Genetic contribution to the particular trait was predicted with the expression level of identified genes and corresponding regression coefficient estimates. Predicted genetic values for each animal then were implemented in a linear mixed model as the mean of the prior distribution of breeding value. The breeding value was obtained from the fully conditional posterior distribution. Microarray data associated to the drip loss were used for testing the model. Phenotypic measures for drip loss for the 74 animals were simulated within the range from 0.87% to 3.32% based on the correlation coefficients between drip loss and expression levels of identified genes. The method developed here is an improvement of BLUP method. It has additional benefit in estimation of breeding value as the weighted average of expression levels and phenotypic measures. This method has the advantage of giving more reliable estimate for young sire without many performance records from progeny.

Key Words: Gene expression, Breeding value, Bayesian

§§Environment & Livestock Management: Environment and Livestock Management Poster II

^^79 ##46247 ¤IMMUNOGLOBULIN TRANSFERENCE FROM MATERNAL COLOSTRUM AND COLOSTRUM SUBSTITUTE IN HOLSTEIN CALVES IN MEXICALI. ¬J. S. Saucedo*[1], A. Perez[1], E. Avelar[1], L. Avenda_o[1], and M. P. Gallegos[2], %% [1]Universidad Aut_noma de Baja California, Mexicali, Baja California, Mexico, [2]Universidad Ju_rez del Estado de Durango,

Durango, Durango, Mexico.

§%§The objective of this study was to evaluate Holstein cows' colostrum quality and immunoglobulin transfer in calves (TIGS). A colostrum meter (hydrometer) was used to evaluate colostrum of the first four milkings after calving of 188 cows. Calves at birth were assigned to two groups: Group 1 (100 bull calves) received maternal colostrum (CM) consuming two liters during the first six and 12 hours after birth; and Group 2 (83 heifer calves) that received substitute colostrum (CS), 0.250 kg dissolved in two liters of warm water during the first 6 and 12 hours after birth. Blood samples were obtained (10 ml) at 12 and 24 h of age, in order to evaluate TIGS in both groups. Immunoglobulin analysis was carried out by ELISA technique. In both groups 2 liters of milk substitute were given every 12 hours until weaning and an initiation concentrate was provided (21 % CP) beginning the first week of life. Analyses were carried out by GLM procedure (General Linear Models) of the Statistical Analysis System program (SAS Institute Inc). IGS concentration of colostrum was higher (P<.0001) in the first milking (96.530 ± 1.580 mg/dl) as compared to the following three milkings, (63.673 ± 1.580; 40.498 ± 1.580 and 25.260 ± 1.580 mg/dl, respectively). IGS concentration in colostrum was higher (P<.0001) in cows that calved during summer and winter (60.932 ± 1.738 and 59.272 ± 2.014 mg/ml, respectively), than during autumn (49.266 ± 2.099mg/dl). According to the lactation number, cows with two to seven lactations had a higher (P<.0001) IGS concentration (52.003 ± 2.255, 57.591 ± 1.523, 56.706 ± 1.961, 58.990 ± 2.140, 62.922 ± 2.271 and 61.871 ± 3.475 mg/dl, respectively), than first calving heifers (45.349 ± 1.359 mg/dl). TIGS was higher (P<.0001) in calves that consumed CM (1143 ± 111.41 mg/dl) than calves that consumed CS (409. 59 ± 120.53 mg/dl). It is concluded that there is a noticeable effect on IGS concentration and colostrum quality by time after calving, season of calving, and lactation number. Maternal origin IGS were absorbed better than the ones from substitute colostrum.

Key Words: Calves, Colostrum substitute, Holstein cows

^^80 ##47072 ¤Effects of temperament on performance and carcass traits of range-originated feeder calves. ¬R. F. Cooke*[1], D. W. Bohnert[1], and R. R. Mills[2], %% [1]Oregon State University - Eastern Oregon Agricultural Research Center, Burns, OR, USA, [2]Oregon State University - Umatilla County Extension Office, Pendleton, OR, USA.

§%§The objective was to evaluate the effects of temperament on performance and carcass traits of feeder calves originated from a range cow-calf operation. Ninety-seven Angus _ Hereford calves (62 heifers and 35 steers) were evaluated for BW and temperament at weaning (d 0). Temperament was assessed by chute score (1–3 scale) and exit velocity (EV), which was subsequently converted into an EV score (1 = EV < 1 SD from the mean; 2 = EV within 1 SD from the mean, and 3 = EV > 1 SD from the mean). Calves were classified for temperament according to combined chute and EV scores (calm < 2 [n = 56], moderate = 2 [n = 25], and aggressive > 2 [n = 16]). All calves were managed similarly in a single group during the preconditioning (60 d), growing (137 d), and finishing (110 d) phases. Calf BW was determined at the end of each phase. Trained personnel and a USDA grader evaluated carcass traits following a 24-h chill. Weaning age was similar (P = 0.59) across temperament classes. Weaning BW tended (P = 0.10) to be reduced for aggressive vs. moderate and calm calves (185.8, 192.0, and 197.8 kg, respectively). Average weaned calf value was $629.5, $656.5, and $656.7 for aggressive, calm, and moderate calves, respectively. No temperament effects were detected (P > 0.17) on performance during preconditioning, growing, or finishing phases. However, hot carcass weight tended (P = 0.15) to be reduced for aggressive vs. moderate and calm calves (352.5, 363.3, and 362.2 kg, respectively). Backfat thickness and KPH were reduced (P < 0.03) for aggressive vs. moderate and calm calves (1.20, 1.47, and 1.33 cm of backfat; 2.02, 2.44, and 2.46% for KPH, respectively). Carcass yield grade was improved (P = 0.04) whereas marbling score tended to be reduced (P = 0.09) for aggressive vs. moderate and calm calves (2.71, 3.15, and 2.99 for yield grade; 422, 460, and 445 for marbling score, respectively). Average carcass value was $1,102.5, $1,151.7, and $1,119.2 for aggressive, moderate, and calm calves, respectively. In summary, aggressive temperament is detrimental to performance and profitability of range-originated feeder calves at weaning and upon slaughter.

Key Words: Performance, Range calves, Temperament

^^81 ##47085 ¤Effects of isoflavones on puberty and pregnancy rates in ewe lambs. ¬K.C. Ede, M.W. Salisbury*, G.R. Engdahl, and B.J. May, %% Angelo State University, San Angelo, TX, USA.

§%§Soy isoflavones in humans have shown to increase circulating estrogen levels. Female infants consuming formula high in soy proteins tends to cause early onset of puberty and the development of secondary sex characteristics from high levels of estrogen in their blood. This study was designed to determine if ewe lambs consuming diets high in soy proteins would have increased levels of circulating estrogen and have an earlier onset of puberty and ultimately higher conception rates. Sixty-six Rambouillet and 15 Suffolk ewe lambs (98 d of age) were blocked by breed and randomly assigned to one of three treatments. Treatment differences were only the source of protein ingredient in the diet, either cottonseed meal (CSM) or soybean meal (SBM). Treatment 1 was the control diet without any SBM, only CSM as the protein, treatment 2 diet had half SMB and half CSM as the protein and treatment 3 had only SMB as the protein. Diets were formulated to be isonitrogenous and isocaloric. At weaning ewe lambs were weighed and a serum sample was collected to measure estrogen. Ewe lambs had ad libitum access to their diets for 90 d. At which time they were weighed and another serum sample was collected to measure change in circulating estrogen levels. Additionally, twice per week serum samples were collected to measure serum progesterone levels as an indicator of attainment of an estrous cycle. On d90 fertile males were placed with the ewe lambs for 45 d while remaining on their treatment diets. Following ram removal ewes were joined into one group until lambing. On d175 pregnancy rates and number of multiple fetuses were determined using ultrasound. No differences (P > 0.05) in weight gain or conception rates were observed among treatments. However, ewe lambs receiving soy protein in their diets, regardless of level, had 7 times higher (P < 0.05) levels of serum estrogen levels than those not receiving soy proteins in their diet. Therefore, results indicate that consumption of diets containing soy proteins, post-weaning, will result in elevated serum estrogen levels.

Key Words: Estrogen, Isoflavones, Ewe Lambs

§§Physiology: Physiology Poster

^^82 ##47083 ¤Developmental potential of oocytes derived from mature cows and fattened heifers. ¬M Barcelo-Fimbres*[2], JF De La Torre-Sanchez[3], CM Checura[4], and GE Seidel[1], %% [1]Colorado State University, Fort Collins, CO, USA, [2]Universidad Aut_noma de Chihuahua, Chihuahua, Chihuahua, Mexico, [3]Centro de Investigaciones Regional Pac_fico Centro, Guadalajara, Jalisco, Mexico, [4]University of Wisconsin, Madison, WI, USA.

§%§In exp 1, we compared developmental capacity of oocytes from ovaries from a slaughterhouse processing only feedlot steers and heifers and a second slaughterhouse specializing in culled cows; 2,248 oocytes were subjected to a factorial experimental design with 2 oocyte sources (cull cows and feedlot heifers); 3 sperm concentrations (0.25, 0.5, and 1.0 million sperm/mL), and semen from 2 bulls. Exp 2 was a retrospective evaluation of cleavage of oocytes from ovaries from heifers vs mature cows and subsequent embryonic development; we analyzed 72 in vitro production cycles (33,982 oocytes) in a factorial design with 2

ovary sources (heifers = 53 in vitro embryo production (IVP) cycles; cows = 19 IVP cycles) and semen from 4 bulls. In exp 1, oocytes from cows were superior to those from heifers in production of 8-cell embryos (74 _ 1.7 vs 62 _ 2.2%, P < 0.01), blastocyst rates (34 _ 1.4 vs 16 _ 1.3%, P < 0.01), and blastocyst cell number (138 _ 6.2 vs 116 _ 5.8 cells, P < 0.01). No difference was observed between 0.25, 0.5, and 1.0x106 sperm/mL in blastocysts/oocyte (24 _ 3.0 vs 26 _ 3.2 vs 25 _ 2.5%, respectively, P > 0.10). In exp 2, more grade-1 oocytes were obtained per ovary of heifers than those from cows (10.0 _ 0.3 vs 8.0 _ 0.5, P < 0.01); no differences in cleavage or 8-cell rates were found between heifer- and cow-derived embryos (P > 0.1). However, more blastocysts per oocyte (25.2 _ 1.9 vs 13.2 _ 1.2%) and per 8-cell embryo (45.5 _ 2.7 vs 25.5 _ 1.6%) were obtained from cow- than feedlot heifer-derived ovaries (P < 0.01). There was a positive correlation (r = 0.59) between blastocysts per oocyte and percent of ovaries per batch with corpora lutea for ovaries derived from heifers but not from mature cows (r = .03, P < 0.01), likely because batches of ovaries with few corpora lutea were from heifers fed melengestrol acetate. In conclusion, oocytes from mature cows were greater than those from feedlot heifers.

Key Words: in vitro fertilization, cow, heifer

^^83 ##47117 ¤Beef Cow Pregnancy Rates While Grazing Wheat Pasture or Native Rangeland. ¬S. Johnson*[1] and K. Harmoney[2], %% [1]Northwest Research-Extension Center, Kansas State University, Colby, KS, [2]Western Kansas Agricultural Research Centers, Kansas State University, Hays, KS.

§%§Complementary forage systems extend the grazing season of native rangelands alone, but anecdotal reports have been made concerning lowered fertility in beef cows bred on lush forage such as wheat pasture. The objective of this study was to compare pregnancy rates (PR) of spring calving cows while consuming either wheat pasture or native mixed-grass rangeland before and during the early breeding season. Primiparous and second parity, crossbred cows (n=105) were assigned to one of two grazing systems by age, sire breed and calving date in y 1 (2001) of a 5 y study. Grazing treatments were 1) grazing mixed-grass native rangeland from early spring until late fall in a season-long continuous grazing system (Native), or 2) grazing winter annual wheat in early spring followed by mixed-grass native rangeland until late fall in a seasonal complementary forage system (Wheat). Native cows were in 3 replicates of 13-15 hd each and Wheat cows were in 6 replicates of 8-10 hd each. Wheat cows grazed on wheat 21-50 d prior to breeding, depending on the year. The first day of the breeding season consisted of fixed-time AI following a MGA-Select protocol. Data were analyzed with MIXED and GLIMMIX procedures of SAS. Replication within treatment was considered a random effect and was used to test treatment differences. Cows that grazed wheat prior to breeding had a similar PR to fixed-time AI as cows that grazed native rangeland prior to breeding, 51.7% and 57.7% (P=0.41), respectively. Pregnancy rates averaged across grazing groups tended (P<0.11) to vary between years, mostly because of lower AI PR the first year of the study when cows were all 2 and 3 year-olds. Final PR was not different between the two grazing groups, and over years averaged 94.4 and 95.9% for the Wheat and Native groups, respectively. Cow weight prior to breeding was

higher for Native cows in years 2003, 2004 and 2005 (P<0.01), but had no effect on either AI or final PR (P_0.47). Pregnancy rate was similar in beef cows grazing either native range or wheat pasture before or during the breeding season.

Key Words: beef cow, wheat pasture, pregnancy rate

^^84 ##47123 ¤Serum concentrations of progesterone, IGF-I, insulin, and glucose and pregnancy rates of ewes treated with dexamethasone before breeding. ¬G. E. Powers*, S. M. Fields, C. D. Felker, and D. M. Hallford, %% New Mexico State University, Las Cruces, NM, USA.

§%§Sixty-six Rambouillet ewes (59.1 _ 2.3 kg) were used to examine effects of injecting dexamethasone (DEX) before breeding on serum hormone profiles and pregnancy rates. Before initiation of a fall breeding period, ewes received an intravaginal insert containing 0.3 g of progesterone (P4) for 12 d to synchronize onset of estrus. At insert removal (d 0) ewes received 10 mg of PGF2α (Lutalyse, Pfizer, i.m.) and either 0 (saline control, n = 22), 5 (n = 22), or 10 (n = 22) mg of DEX (Vet One, Vetpharm Group Ltd, i.m.). Ewes were joined with fertile rams after treatment for 2 breeding cycles. Blood samples were collected from all ewes daily from d 0 through 18. Serum P4 concentrations were similar (P = 0.55) among groups for 6 d after treatment (treatment x day, P = 0.85) indicating that DEX had no adverse impact on CL development. Serum IGF-I was lower (P < 0.01) on d 1 and 2 in DEX-treated ewes compared to control ewes. Serum insulin concentrations were 0.64, 1.78, and 1.90 (_ 0.11) ng/mL on d 1 in ewes receiving 0, 5, and 10 mg of DEX, respectively (L, Q, P < 0.01). A similar linear and quadratic response in insulin was observed on d 2 (P < 0.01). Serum glucose values on d 1 were 52, 101, and 116 (_ 5.7) mg/dL in ewes administered 0, 5, and 10 mg of DEX (L, Q, P < 0.02). Pregnancy rates immediately after DEX treatment (determined by P4 profiles) were 27, 54, and 23% for ewes receiving 0, 5, and 10 mg of DEX (P = 0.057) while percentages of 64, 73, and 73, respectively, resulted after 2 breeding cycles (P = 0.75, estimated by P4 measured 4 mo after treatment). Treatment with DEX induced elevated serum insulin and glucose levels and decreased IGF-I for 2 d and resulted in an increase in pregnancy rate in the 5-mg group after the first breeding period. However, pregnancy rates among treatment groups were not different across the entire breeding period.

Key Words: Dexamethasone, Reproduction, Sheep

^^85 ##47160 ¤Effects of dietary selenium and nutritional plane during gestation on mammary gland growth, cellular proliferation, and vascularity in ewe lambs. ¬T. L. Neville*, A. M. Meyer, A. Reyaz, L. M. Brockway, D. A. Redmer, L. P. Reynolds, J. S. Caton, and K. A. Vonnahme, %% Center for Nutrition and Pregnancy, Department of Animal Sciences, North Dakota State University, Fargo, USA.

§%§Objectives were to examine the effects of Se supply and maternal nutritional plane during gestation on mammary gland growth, cellular proliferation, and vascularity at parturition and d 20 of lactation. Rambouillet ewe lambs (n = 84) were allocated to treatments in a 2 x 3 x 2 factorial. Factors were dietary Se (adequate Se [ASe, 11.5 _g/kg BW] or high Se [HSe, 77.0 _g/kg BW]), nutritional plane (60% [RES], 100% [CON], or 140% [HIH]), and necropsy period (parturition [PRT] or d 20 of lactation [LCT]). At parturition, lambs were removed, and 42 ewes (7/treatment) were necropsied. Remaining ewes were fed a common diet meeting requirements for lactation and mechanically milked twice daily until necropsy on d 20. At both necropsy periods, mammary glands were dissected and tissues harvested. Samples were analyzed for RNA, DNA, protein, proliferation, and vascularity. Where interactions were present (*P* _ 0.05), least square means from the highest order interaction are presented. Ewes necropsied at parturition had greater (*P* < 0.001) mammary gland weights than LCT. High Se ewes had greater (*P* = 0.05) mammary gland weights compared to ASe. Mammary gland weight was decreased (*P* = 0.002) in RES compared to HIH, with CON intermediate. Concentration of RNA (mg/g) and total RNA (g) were greater (*P* < 0.03) in LCT compared to PRT. Total DNA (g) was greater (*P* < 0.001) in PRT compared with LCT. A tendency (*P*

= 0.07) for a nutritional plane effect on total DNA was found where HIH was greater (*P* = 0.03) than RES with CON intermediate. Increased (*P* < 0.001) RNA:DNA was found in LCT compared to PRT. No differences (*P* > 0.40) were found in protein:DNA. Proliferation of cells was greater (*P* < 0.001) in LCT compared to PRT. Vascular area was greater (*P* < 0.001) in PRT compared to LCT. There was a nutritional plane by necropsy period interaction (*P* = 0.05) for alveoli per area where RES-LCT ewes were decreased (*P* _ 0.03) compared to all others. Results of this study indicate that proper maternal nutritional plane during gestation is important for mammary gland development, even out to 20 d of lactation.

Key Words: mammary gland, nutrition, selenium

^^86 ##47165 ¤Heifer response to GnRH in a 7-day CIDR synchronization protocol. ¬DE Eborn*, EE Blair, and DM Grieger, %% Kansas State University, Manhattan,Kansas,USA.

§%§GnRH is commonly administered at the time of CIDR insertion in 7-day CIDR synchronization protocols for both beef heifers and cows. The necessity of GnRH administration in heifer synchronization is questionable. Our objective was to compare heat response and fertility in heifers with or without GnRH administration at the time of CIDR insertion. In 2009 (2 locations) and 2010 (1 location), yearling beef heifers were randomly assigned within breed to either receive (Select Synch+CIDR) or not receive GnRH (7-day CIDR-PG) at the time of CIDR insertion (d 0). Seven days later $PGF_{2\alpha}$ was given and the CIDR was removed (d 7). At both d 0 and d 7, follicles larger than 5mm were measured by transrectal ultrasonography and a blood sample was taken for progesterone assays. Heifers at location 1 (n=147) were artificially inseminated approximately 12 hours after onset of estrus or were given an injection of GnRH at a fixed-time insemination 54 hours after CIDR removal (n=93; location 2; 2009 only). Conception (# pregnant / # inseminated) and pregnancy (# pregnant / # treated) rates were determined by a transrectal ultrasonography scan 30 to 35 days after insemination. More than 90% of heifers had progesterone concentrations > 1.0 ng/ml at d 0 or d 7. At location 1, onset of estrus was similar between treatments with more than 85% displaying estrus from 48 to 72 hours after $PGF_{2\alpha}$. Synchronization rate (% of heifers that displayed estrus; 88% vs. 89%), conception rate (58% vs. 59%) and pregnancy rate (56% vs. 58%) did not differ between the Select Synch+CIDR and 7-day CIDR-PG treatments respectively. Pregnancy rates to a 54 hour fixed-time insemination for heifers at location 2 were similar between the Select Synch+CIDR and 7-day CIDR-PG treatments (56% vs. 53%, respectively). These results demonstrate no advantage in administering GnRH to beef heifers at the beginning of a 7-day CIDR synchronization protocol.

Key Words: beef heifer, CIDR, estrous synchronization

^^87 ##47181 ¤Effects of realimentation after nutrient restriction during early to mid-gestation on umbilical blood flow in pregnant beef cows. ¬L. E. Camacho*, C. O. Lemley, B. W. Neville, C. R. Dahlen, and K. A. Vonnahme, %% Center for Nutrition and Pregnancy, Department of Animal Sciences, North Dakota State University, Fargo, North Dakota, USA.

§%§The objective was to examine the effect of maternal realimentation after nutrient restriction during early to mid-gestation on fetal cardiovascular hemodynamics. Multiparous beef cows (30 d pregnant; initial BW = 667.5 _ 13.4 kg, BCS = 6.2 _ 0.1) were assigned to 1 of 3 treatments: 1) 100% NRC requirements from d 30 to 156 of gestation (CCC; n = 6); 2) 60% NRC from d 30 to 85, then realimented to 100% NRC to d 156 (RCC; n = 5); or 3) 60% NRC from d 30 to 140, then realimented to 100% NRC to d 156 (RRC; n = 6). Cows were individually fed once daily at 1500 h. Cows were weighed every 14 d to adjust diets throughout the experiment, and BCS were assigned to cows once a month. Umbilical measurements were obtained using Doppler ultrasonography at 0700 h on d 85, 87, 89, 91, 100, 140, 142, 146, and 148. Measurements included fetal heart rate (HR), umbilical blood flow (BF), pulsatility index (PI), and resistance index (RI). There was a treatment by day interaction

for cow BW ($P < 0.01$), with cows exhibiting different patterns of weight change throughout gestation. Only day affected ($P < 0.01$) BCS, as BCS dropped to 5.5 _ 0.5 by d 156. There was no treatment by day interaction for BF, PI, and RI measurements (P _ 0.26). However, there was a day effect for PI ($P < 0.01$; d 85 = 1.61 _ 0.05 mL/min, d 148 = 0.96 _ 0.03 mL/min) which decreased as gestation proceeded and a day effect for BF ($P < 0.01$; d 85 = 46.0 _ 3.6 mL/min, d 148 = 244.7 _ 21.5 mL/min) which increased as gestation proceeded. There was a tendency for a treatment by day interaction ($P = 0.09$) for HR, where fetuses from RRC cows had a greater HR (P _ 0.07) than RCC and CCC fetuses on d 85. From d 87 to 140 HR did not differ (P _ 0.17) for the 3 treatments. On d 142 and 144 fetuses from CCC cows had a decreased (P _ 0.09) HR compared to RCC and RRC fetuses. There was no treatment effect ($P = 0.55$) for fetal biparietal distance (3.02 _ 0.09 cm) on d 85. Maternal diet restriction during early to mid-gestation did not affect umbilical blood flow; however, there was evidence to indicate that it may alter fetal cardiac output.

Key Words: Nutrient restriction, Pregnancy, Umbilical blood flow

^^88 ##47190 ¤Progesterone concentrations and lambing rates in ewes given human chorionic gonadotropin. ¬C.M. Richardson*, P.L. Black, R.A. Halalsheh, S.M. Fields, D.M. Hallford, and T.T. Ross, %% New Mexico State University, Las Cruces, NM USA.

§%§The objective was to determine if hCG injected on d 4 or 7 after mating would increase serum progesterone (P4) concentrations in ewes and increase number of lambs born. Sixty-two mixed aged Suffolk ewes (mean BW= 75.15 kg _ 9.36 kg) received an intravaginal P4-containing pessary (CIDR; 0.3 g P4) for 10 d. Ewes were mated with fertile rams on the second estrus after CIDR removal and were randomly assigned to one of three treatments. Ewes received 600 IU (4.8 mL) of hCG i.m. on d 4 (n= 21) or d 7 (n= 21) of the estrous cycle (d 0 = mating); control ewes (n=20) received 4.8 mL of saline on d 4. Jugular blood samples were taken from 10 ewes of each treatment group starting on d 1 and through 7 d after administration of treatments and continued twice weekly through d 34. Ewes treated with hCG on d 4 had greater ($P < 0.05$) P4 concentrations, beginning on d 6 than control ewes and remained elevated through d 14. Ewes treated on d 7 with hCG had greater ($P < 0.05$) P4 concentrations than controls beginning on d 8 and through d 14. Ovulation rates, corpora lutea (CL) counted laproscopically on the ovaries 35 d after mating, differed ($P > 0.05$) among treatments. Fifty-five and 88% of ewes given hCG on d 4 and 7, respectively, had > 2 CL; whereas, 0% of control ewes had > 2 CL. Fetal numbers ($P > 0.36$) and lambs born per ewe ($P > 0.19$) were similar among treatments. In conclusion, hCG administered to ewes on 4 or 7 d after mating elevated serum P4 concentrations through d 14, increased number of CL on d 35 but did not appear to alter fetal numbers or the incidence of multiple births in Suffolk ewes.

Key Words: lamb crop, progesterone, human chorionic gonadotropin

^^89 ##47200 ¤Estrus synchronization in sheep using gonadotropin-releasing hormone, prostaglandin, and controlled internal drug release inserts. ¬C. G. Jackson*, T. L. Neville, C. R. Dahlen, and R. R. Redden, %% Department of Animal Sciences, North Dakota State University, Fargo, North Dakota, USA.

§%§The objective of this experiment was to evaluate the effects of combinations of controlled internal drug release (CIDR) inserts, prostaglandin (PG), and GnRH on days to estrus and concentrations of progesterone (P4) in Columbia and Hampshire ewes (n = 47 and 38, respectively). Treatment and period were randomly assigned to ewes during the anestrous transition period (August). Ewes were assigned to 1 of 3 periods 1 week apart, then assigned to 1 of 4 treatments; 1) Untreated (U, n = 21); 2) CIDR (0.3 g progesterone) inserts for 5 d (C, n = 22); 3) 5 d CIDR and PG (dinoprost, 10 mg i.m.) at CIDR removal (P, n = 21); and 4) GnRH (gonadorelin, 0.02 mg i.m.) at CIDR insertion and PG at CIDR removal (G, n = 21). Rams equipped with marking harnesses were introduced at CIDR removal and ewes were checked at 0800 h and 1700 h daily for marks. Blood samples were collected via jugular venipuncture on d -7, 0, 5, 7, 9, 11, 13, 15, and 17 relative to CIDR removal (d 5). Serum was analyzed for progesterone concentration in the Hampshire ewes. There was a treatment by breed interaction ($P < 0.05$) for days to estrus. Days to detected estrus were greater ($P < 0.01$) for U (14.6 _ 1.98) than C (5.8 _ 1.48), P (3.6 _ 1.62), and G (2.83 _ 1.77) ewes within the Hampshire breed. In contrast, no differences were detected ($P = 0.21$) among treatments for days to detected estrus within the Columbia breed. There was a treatment by time effect ($P < 0.005$); for P4 concentrations; therefore, means were compared within time. No differences ($P > 0.05$) were detected among treatments on d -7, 0, 13, 15, or 17. On d 5, C, P, and G treated ewes had ($P < 0.005$) greater concentrations of P4 than U ewes. Ewe P4 concentrations were lower ($P < 0.05$) in G than U ewes on d 7, 9, and 11; whereas P and C treated ewes did not differ ($P > 0.05$) from U or G. In conclusion, efficacy of CIDR based estrus synchronization techniques varied depending upon breed. Furthermore, in Hampshire ewes, those treated with GnRH at insertion and PG at removal appeared to most consistently synchronize estrus among 5 d CIDR treatment groups.

Key Words: Ewe, Estrus Synchronization, CIDR

§§Ruminant Nutrition: Ruminant Nutrition Poster II

^^90 ##47061 ¤Effects of pre-partum and post-partum bolus injections of trace minerals on performance of beef cows and calves grazing native range. ¬L. R. Mundell*[1], J. R. Jaeger[2], J. S. Stevenson[1], D. M. Grieger[1], L. A. Pacheco[1], J. W. Bolte[2], N. A. Aubel[1], G. J. Eckerle[1], M. J. Macek[1], L. J. Havenga[3], and K. C. Olson[1], %% [1]Department of Animal Sciences and Industry, Kansas State University, Manhattan, KS, USA, [2]Western Kansas Agricultural Research Center, Kansas State University, Hays, KS, USA, [3]Multimin USA, Ft Collins, CO, USA.

§%§Our objective was to evaluate the effects of pre- and post-partum bolus injections of a trace mineral solution on beef cow reproductive performance, BW change, and BCS change, and on performance of suckling calves. Mature beef cows (n= 460; initial BW = 497 _ 89 kg, initial BCS = 5.4 _ 0.74) were stratified by BCS, age, parity, and predicted calving date and assigned randomly to 2 treatments: 1) s.c. trace mineral (TM) injection containing 15 mg/mL Cu, 5 mg/mL Se, 10 mg/mL Mn, and 60 mg/mL Zn or 2) s.c. injection of physiological saline (SA). Injections were administered to cows (1 mL / 90 kg BW) 180 d before the first projected calving date and again 30 d before fixed-time AI. Calves received the same treatment as their dams and were injected (1 mL / 45 kg BW) at birth and again at 71 _ 21 d of age. Cows grazed native pastures for the duration of the study; trace mineral supplements and white salt were available to all cattle ad libitum before and during the study. Ovulation was synchronized using a 5-d CO-Synch + CIDR protocol and cows were inseminated 60 to 64 h after CIDR removal. Cows were exposed to fertile bulls for natural-service breeding 10 d after AI for 35 d. Conception to AI and final pregnancy rate were assessed 36 d after

AI with ultrasound and 120 d after AI via rectal palpation. Change in cow BW and BCS from initiation of the study to calving and from AI to weaning did not differ ($P > 0.12$) between TM and SA cows. Conversely, TM cows had greater ($P = 0.04$) BCS increase than SA cows between calving and AI. Calf BW at birth, ADG, and age-adjusted weaning BW did not differ ($P > 0.36$) between treatments. Proportion of cows with estrus cycles 21 d before ovulation synchronization was similar ($P = 0.51$) between treatments. Conception to AI was greater ($P = 0.05$) for cows receiving TM (60%) than for cows receiving SA (49%); however, overall pregnancy did not differ ($P = 0.24$) between treatments and averaged 92%. Under the conditions of our study, pre- and post-partum TM injections improved conception to fixed-time AI by beef cows.

Key Words: beef cows, fixed-time AI, trace minerals

^^91 ##47089 ¤Response of beef cows and calves after supplementation with a novel distiller_s grain during gestation. ¬N.L. Hojer*[1], M.B. Hubert[1], D.L. Gay[1], V.N. Owens[1], A.D. Ressett[1], R.H. Pritchard[1], K. Karges[2], and K.C. Olson[1], %% [1]South Dakota State University, Rapid City, SD , USA, [2]Poet Nutrition, Sioux Falls, SD, USA.

§%§Refinements in ethanol manufacturing create novel co-products. Dry milling to remove the germ and bran of corn grain before fermentation creates distiller_s grains with reduced oil and higher CP [deoiled, dried distiller_s grains with solubles (dDGS), 42% CP, 80.3% TDN]. Our objective was to determine the suitability of dDGS as an iso-nitrogenous alternative to soybean meal (SBM, 51.7% CP, 82.1% TDN) to provide supplemental CP to gestating beef cows consuming low-quality forage. In experiment 1, 2- and 3-yr-old beef cows (n=84) in the last trimester of gestation were used in a randomized complete block design with a 2 supplement _ 2 cow-age factorial treatment structure. The study was conducted in 12 drylot pens, creating three pen replicates of each supplement _ cow age combination. All cows had ad libitum access to a mixture of grass straw and grass hay (5.25% CP, 50.5% TDN). Responses measured were cow BCS and cow and calf BW after the supplementation period, and subsequent fall pregnancy rate. In experiment 2, six ruminally cannulated 2-yr-old beef cows were used in a completely randomized crossover design to evaluate the influence of dDGS vs. SBM on in-situ rate of CP and NDF degradation from straw, hay, dDGS, and SBM. Protein supplement did not affect ($P > 0.1$) cow BW at breeding or weaning, cow BCS at breeding, cow BW gain and BCS change from breeding to weaning, cow pregnancy rate, calf BW at weaning, calf BW gain from breeding to weaning, and hay and straw NDF and CP rates of degradation. Calves of SBM-supplemented cows had greater ($P = 0.03$) BW at breeding than those of dDGS-supplemented cows (100.2 _ 1.928 and 105.6 _ 1.928 kg, respectively). Cow BCS at weaning was different ($P = 0.09$) between dDGS and SBM (4.808 _ 0.084 and 4.686 _ 0.084, respectively). There tended to be a difference ($P = 0.13$) in rate of CP degradation between dDGS and SBM (11.4 _ 4.79 and 23.8 _ 5.28 %/hr, respectively). In conclusion, dDGS can be used as a substitute for SBM as a protein supplement for low-quality forages.

Key Words: beef cows, protein supplement, ethanol coproducts

^^92 ##47108 ¤Camelina meal supplementation to beef cattle: II. Effects on DMI, in situ forage digestibility, and plasma cholecystokinin concentrations. ¬B. I. Cappellozza*, R. F. Cooke, C. Trevisanuto, V. D. Tabacow, and D. W. Bohnert, %% Oregon State University - Eastern Oregon Agricultural Research Center, Burns, OR, USA.

§%§Nine Angus _ Hereford steers, ranked by initial BW (average 250 _ 9 kg), were assigned (d 0) to receive: 1) supplement based (as-fed basis) on 84% corn, 14% soybean meal, and 2% mineral mix (CO); and 2) supplement based (as-fed basis) on 70% corn, 28% camelina meal, and 2% mineral mix (CAM). Treatments were offered daily (0700 h) at a rate of 2.20 and 2.04 kg of DM/steer for CO and CAM, respectively. Treatment intakes were formulated to be iso-caloric and iso-nitrogenous. Mixed alfalfa-grass hay was offered ad libitum from d 0 to 15, and hay DMI was recorded daily. Intake recorded from d 8 to 15 was used to determine treatment effects on hay and total DMI. From d 16 to

d 19, steers were restricted to receive 90% of their voluntary hay DMI (BW basis). Immediately before treatment feeding on d 16, polyester bags (pore size 50-60 µm) containing 4 g of hay (DM basis) were suspended within the rumen of each steer, and incubated in triplicate for 0, 1, 3, 5, 8, 12, 24, 36, 48, 72 and 96 h. After removal, triplicates were washed, dried for 96 h at 50_C, weighed, and combined for NDF analysis. From d 20 to 21, steers received hay ad libitum and blood samples were collected on d 21 at 0, 1, 2, 3, 4, 5, 6, 9, and 12 h relative to treatment feeding for determination of plasma cholecystokinin (CCK) concentrations. Hay DMI tended ($P = 0.15$) to be reduced whereas total DMI was reduced ($P = 0.01$) in CAM vs. CO steers (2.71 vs. 2.91% of BW for hay and 3.46 vs. 3.76% of BW for total DMI, respectively). No treatment effects were detected ($P > 0.35$) for rate of ruminal degradation of DM (7.91 vs. 8.58%/h for CAM and CO) and NDF (7.49 vs. 7.39%/h for CAM and CO). Similarly, no treatment effects were detected ($P > 0.55$) for effective ruminal degradability of DM (64.3 vs. 64.9% for CAM and CO) and NDF (70.1 vs. 71.0% for CAM and CO). No treatment effects were detected ($P = 0.35$) for plasma CKK concentrations (22.7 vs. 26.8 pg/mL for CAM and CO). In conclusion, camelina meal supplementation did not impact forage digestibility and plasma CCK, but decreased total DMI in forage-fed beef steers.

Key Words: Camelina meal, Beef steers, Digestibility

^^93 ##47115 ¤Supplemental rumen-protected fish oil increases concentrations of long-chain *n*-3 fatty acids in tissues of grass-fed beef. ¬D.C. Rule*[1], B.W. Hess[1], S. Paisley[1], W.J. Means[1], K. Underwood[2], and O. Kucuk[3], %% [1]University of Wyoming, Department of Animal Science, Laramie, Wyoming, USA, [2]South Dakota State University Department of Animal Science, Brookings, South Dakota, USA, [3]Erciyes University School of Veterinary Medince, Kayseri, Turkey.

§%§Our hypothesis was dietary rumen-protected *n*-3 PUFA will increase concentrations of these fatty acids in tissues of grass-fed beef cattle. Forty half blood LowLine Angus steers (290.5 _ 6.62 kg initial BW) were allotted to either a control (CON; no supplemental fat), saturated fatty acid Ca salt (SAT), or fish oil fatty acid Ca salt (N3) treatment in a completely randomized designed experiment. Beet pulp supplements that contained 7.6% molasses, 4.0% $CaCO_3$ for CON, 4.4% mineral mix, and 1.8% Poloxalene were formulated to provide 0.25% of BW as fat for SAT and N3. Individual supplement intakes were recorded. Irrigated pasture consisted of 25% bromegrass, 25% wheatgrass, and 50% alfalfa (CP = 20.9%; 36.7 kg DM _ $head^{-1}$ _ d^{-1}), and was rotated weekly from June 1 through October 15, 2008 when steers were fed forage harvested from the same pastures until December 8. Blood was sampled at 45 and 93 d. Steers were shipped 136 km for slaughter at a commercial plant; liver was sampled upon evisceration. Twelve days post mortem, 100 g each of LD (12th rib), supraspinatus (SS) and semitendinosus (ST) muscles were obtained. Fatty acids extracted from serum, liver, and muscles were analyzed by GLC with C13:0 as internal standard. In liver compared with CON, SAT caused increased ($P < 0.01$) C16:0, C18:0, C18:1 *n*-9, C18:2 *n*-6, C20:3 *n*-3, and C20:4 *n*-6, and decreased ($P = 0.01$) C18:3 *n*-3. Compared with CON, N3 supplementation resulted in greater ($P < 0.01$) C18:1 *t*-11, C20:5 *n*-3 (eicosapentaenoic acid, EPA) and C22:6 *n*-3 (docosahexaenoic acid, DHA), and less ($P < 0.01$) C18:1 *n*-9, C18:2 *n*-6, C20:3 *n*-3, and C20:4 *n*-6 in liver. In muscle, concentrations of C18:2 *n*-6 and C20:4 *n*-6 increased ($P < 0.01$) for SAT compared with CON. For each muscle, N3 resulted in greater ($P < 0.01$) EPA and DHA compared with CON. Serum concentrations of fatty acids reflected differences in supplemental intake of C16:0 and C18:1 *n*-9 of SAT, as well as EPA and DHA of N3. Overall, supplementation of N3 resulted in 86.4% and 85.6% increases in concentration of EPA + DHA in liver and muscle, respectively.

Key Words: Grass-Fed Beef, Supplemental Omega-3 Fatty Acids, Muscle

^^94 ##47125 ¤Comparison of total lipid fatty acid profiles of bovine serum and plasma. ¬D.C. Rule, J.M. Kern*, and J.D.C. Molle, %% Department of Animal Science, University of Wyoming, Laramie, Wyoming, USA.

§%§Our hypothesis was concentrations of fatty acids measured in lipid extracts of bovine liquid

serum and plasma, as well as in freeze-dried serum and plasma will not be different. Blood was sampled from five beef cows to obtain plasma and serum. Ten milliliters of each fraction from each cow was freeze-dried and mixed. For liquid fractions, lipids were extracted from duplicate 2.5-mL samples with 9.3 mL of 1:2 (vol/vol) chloroform and methanol. Extracts were then subjected to transesterification with 4.0 mL of 0.545 *N* HCl in methanol for 1 h at 80_ C to prepare fatty acid methyl esters (FAME). Duplicate 200-mg samples of each freeze-dried fraction were either reacted directly with 4.0 mL of 0.545 *N* HCl in methanol for 1 h at 80_ C for FAME preparation or extracted with 3.8 mL of 1:2:0.8 (vol/vol/vol) chloroform, methanol, and water overnight to obtain total lipids for subsequent FAME preparation. Fatty acids were analyzed by GLC with 1.0 mg of C13:0 as internal standard. Total lipid extracts of the liquid serum and plasma, as well as direct transesterification of freeze-dried serum and plasma yielded consistent FAME results. However, lipid extraction of the freeze-dried serum and plasma did not provide repeatable or reliable results; these data were not analyzed. Concentrations (mg/100 mL) of C16:0, C16:1 *n*-7, C18:0, C18:1 *n*-9, C18:2 *n*-6, C18:3 *n*-3, C20:4 *n*-6, C20:5 *n*-3, and C22:6 *n*-3 were not different (*P* = 0.47 to 0.98) when liquid fractions were compared. Direct transesterification of freeze-dried fractions also did not result in differences (*P* = 0.19 to 0.78) in concentrations (mg/g) of any of the aforementioned fatty acids. Concentrations expressed as mg of fatty acid/100 mg of total FAME were similar (*P* = 0.66 to 0.99) when liquid and freeze-dried fractions were compared. We conclude that FAME prepared from total lipid extracts of liquid serum and plasma, as well as by direct transesterification of freeze-dried serum and plasma will yield similar fatty acid profiles; however, total lipid extraction of freeze-dried serum and plasma will not provide adequate results when chloroform, methanol, and water are used as extraction solvent.

Key Words: Fatty Acid Profile, Serum, Plasma

^^95 ##47148 ¤In vitro evaluation mimics influences of winter cold water ingestion on ruminal function. **¬MS Reil*[1], JT Mulliniks[2], JM Muscha[1], RC Waterman[1], and MP Petersen[1], %% [1]USDA-ARS Fort Keogh Livestock and Range Research Laboratory, Miles City, MT USA, [2]New Mexico State University, Las Cruces, NM USA.**

§%§Ingestion of cold feed and water may suddenly reduce ruminal temperature, which could result in decreased microbial activity and diet digestibility. The objective of this study was to investigate the association between critical rumen in vitro incubation temperature and activity of ruminal microorganisms to produce gases and degrade NDF. Lyophilized ruminal extrusa (0.25 g) collected from ruminally cannulated cows grazing winter range in November 2010 (81.13% NDF, OMB) was weighed into thirty 100-ml glass syringes. Warmed McDougall's buffer mixed 4:1 with rumen liquor donated by winter-grazing cows was added and syringes were placed in a 39_C water bath. After 12 h, syringes were randomly allocated to one of 3 water baths of different incubation temperatures, 39_C, 37_C or 35_C. These temperatures were selected based on previous findings that showed ruminal contents can drop intermittently below 35_C. Syringes were incubated for another 36 h. Rate and total gas production at 48 hours was reduced (*P* < 0.05) by lower incubation temperatures (rate: 0.63, 0.49, and 0.34 _ 0.01 mL/h; production: 29.3, 24.2, and 18.1 _ 0.51 mL/g of OM for 39_, 37_ and 35_, respectively). Extent of NDF disappearance was reduced (*P* < 0.001) by incubation temperature (21.7, 18.6 and 17.2 _ 0.49% for 39_, 37_ and 35_, respectively). Maximum gas production and NDF disappearance were found at 39_C. These data show the impact small differences in ruminal temperature due to cold water ingestion may have on rumen function.

Key Words: range cows, water temperature, invitro

^^96 ##47153 ¤PROTEIN AND ENERGY SUPPLEMENTATION OF BRAHMAN HEIFERS IN THE WESTERN PLAINS OF VENEZUELA. **¬J.L. Bello-Faria*[1], R.E. Mora[1], A.M. Herrera[1], B. Acosta[1], and C.F. Chicco[2], %% [1]Universidad Nacional Experimental del T_chira (UNET), Venezuela, [2]Universidad Central de Venezuela (UCV).**

§%§To evaluate the effect of energy and energy-protein supplementation on BW, ADG, percent pregnancy (PP) and blood chemistry (BC), 57 Brahman heifers, with 309.1 _ 3.09 kg BW and 1,067 _ 8.49 d old were assigned to 3 treatments :1) pasture only (P); 2) P + 200 g_animal^{-1}_d^{-1} of bypass fat (F, 6.7 Mcal ME/kg DM); and 3) P + a protein-energy mix (PE) with 45% CP and 3.25 Mcal ME/kg DM (1 kg_animal^{-1}_d^{-1}) containing mainly hydrolyzed feather meal, corn meal and bypass fat. All animals had free access to a complete mineral supplement. The experiment lasted 102 d, located in the western plains of Venezuela. The animals were kept in a rotation pasture system of *Brachiaria arrecta*, with an average stocking rate of 0.75 animals/ha. Body weight and blood samples were taken every 28 d. The breeding period started 57 d after the beginning of the supplementation period and lasted for 45 d. Heifers were bred by AI. Data of BW, ADG, and BC were treated by ANOVA, in a complete randomized design, with measurements repeated in time. A contingency table with chi-squares was used for PP. Forage contained 8.0 _ 0.26% CP and 69.3 _ 0.55% NDF. Body weight showed a significant interaction for treatment x time ($P < 0.01$), being similar during the initial 84 d of supplementation (335.6 _ 3.43 kg), but different at end of the experiment (347.5, 338.4, and 331.1 kg, respectively for F, PE, and P). Average daily gain (g/d) was greater ($P < 0.01$) for F (358) than PE (285.4) and lower for P (206.3) in relation to the other treatments. Pregnancy (%) was improved ($P < 0.05$) by protein-energy supplementation, with values of 35, 45 and 63 respectively for P, F, and PE. Concentration of blood urea was not influenced by treatment ($P > 0.05$), with an overall mean of 31.2 _ 0.76 mg/100 mL, while cholesterol was higher ($P < 0.05$) for PE. Energy and protein-energy supplementation improved BW and ADG of heifers, while PP and cholesterol levels were increased only by energy-protein supplement.

Key Words: Brahman heifers, supplementation, energy

^^97 ##47206 ¤Effects of ruminal protein degradability on site and extent of digestion in beef cows grazing summer rangelands and fed flaxseed. ¬E. J. Scholljegerdes*[1] and S. L. Kronberg[2], %% [1]New Mexico State University, Las Cruces, NM, USA, [2]USDA-ARS, Northern Great Plains Research Laboratory, Mandan, ND, USA.

§%§Metabolizable protein can be limiting in animals supplemented fat and grazing summer pasture. Therefore, our hypothesis was that the provision of supplements high in RUP would increase intestinal protein supply. Eight ruminally and duodenally cannulated cows (698 _ 25 kg) were used in a completely randomized design to evaluate the effects of ruminal protein degradability on site and extent of digestion when grazing summer rangelands and fed flaxseed. Starting on June 3, 2009 cows grazing a 15 ha native pasture were individually fed one of four treatments (DM basis): 1) ground flaxseed (2.5 kg, FLX); 2) ground flaxseed + soybean meal (2.5 kg flaxseed, 0.31 kg soybean meal, SBM); 3) ground flaxseed + dried distillers grains plus solubles (2.3 kg flaxseed, 0.20 kg soybean meal, 0.72 kg dried distillers grains plus solubles, DDGS); or 4) ground flaxseed + Soyplus (2.4 kg flaxseed, 0.52 kg Soyplus, SOYPLS). Diets containing protein sources were formulated to provide similar quantities of RDP (449 g/d) with the distillers dried grains plus solubles and Soyplus providing an additional 93 g/d RUP. There were three experimental periods that were 15 d in length. Dietary supplement did not influence ($P = 0.29$) forage OM intake. Likewise, duodenal flow of total OM did not differ between dietary treatments ($P = 0.28$). Microbial OM flow to the small intestine was greater ($P = 0.02$) for DDGS and SOYPLS compared to SBM. True ruminal OM digestibility (% of intake) was not different ($P = 0.29$). Total duodenal N flow was similar ($P = 0.40$) in spite of the fact that microbial N flows were greater for DDGS and SOYPLS ($P = 0.03$) compared to SBM. Non-microbial non-NH_3 flow tended ($P = 0.08$) to be greater for protein supplemented cows than FLX. True ruminal N digestibility was unchanged ($P = 0.27$) with protein supplementation. Ruminal molar proportions of acetate were greater ($P = 0.02$) for SBM than DDGS and SOYPLS. The provision of supplemental RUP fed at the levels reported herein did not increase intestinal metabolizable protein supply in beef cows grazing summer rangelands and supplemented flaxseed.

Key Words: Grazing, Digestion, Flaxseed