

single treatment of GnRH on d 5 (estrus = d 0), that is, 4 d prior to initiation of FSH treatments. Another group of cows (n=14; GnRH2x) received two GnRH treatments, first on d 5, then on d 14 concurrent with the first AI. The uteri of cows were flushed nonsurgically for recovery of embryos 7 d after insemination. Total number of CL and presence of anovulatory follicles were determined by transrectal ultrasonography. Mean (\pm SEM) number of CL (11.6 \pm 1.5), eggs recovered (5.0 \pm 1.7), and number of anovulatory follicles (3.7 \pm 0.8) did not differ amongst treatment groups. The proportion of fertilized eggs tended to be higher ($P < 0.08$) in control (4.6 \pm 1.0) than in GnRH1x (1.9 \pm 1.0), but not different from GnRH2x (3.7 \pm 1.0). The number of transferable quality embryos was also greater in Control (3.7 \pm 0.6) than in GnRH1x (0.6 \pm 0.6, $P < 0.01$) and GnRH2x (1.8 \pm 0.6; $P < 0.05$). GnRH treatment given prior to, or prior to and after ovarian stimulation with FSH neither improved superovulatory response or total eggs collected, nor reduced anovulatory follicles. The number of fertilized eggs was reduced in cows of the GnRH1x group. Transferable embryos were reduced in both GnRH treatment groups relative to control.

Key Words: GnRH, Superovulation, Embryo

M144 Effect of source of supplemental Se on uterine health and embryo quality in high-producing dairy cows. R. L. A. Cerri¹, H. M. Rutigliano¹, F. S. Lima¹, D. S. Brito¹, J. Hillegass¹, W. W. Thatcher², and J. E. P. Santos¹, ¹University of California Davis, Tulare, ²University of Florida, Gainesville.

Objectives were to determine the effect of source of supplemental Se on embryo quality and uterine health of dairy cows. Holstein cows, 135, were assigned to Se yeast (SY, Sel-Plex[®]) or sodium selenite

(SS) supplemented at 0.3 ppm from 25 d prior to calving to 80 d in milk (DIM). Cows were fed as group in 4 pens/treatment, 2 prepartum and 2 postpartum pens. Health of cows was evaluated daily and rectal temperature taken in the first 10 DIM. Uterine cytology was performed at 30 \pm 3 DIM by flushing the previously gravidic horn with 20 mL of saline. The collected material was then classified according to visual appearance, and evaluated for concentration of leukocytes and proportion of neutrophils. Cows were presynchronized at 33 \pm 3 DIM (d 33 GnRH + CIDR insert, d 40 PGF2a + CIDR removal), and subjected to the Ovsynch protocol 2 d after presynchronization (d 42 GnRH, d 49 PGF2a, d 51 GnRH). Cows were time inseminated 12 h after the final GnRH of the Ovsynch with semen from a single sire. Uteri of cows were flushed 6 d after AI and collected structures were evaluated. Ovarian responses were evaluated by ultrasonography, and blood was analyzed for progesterone throughout the study and for glutathione peroxidase (GPx) activity at the day of embryo flushing. Incidence retained placenta (SY = 2.9 vs SS = 10.8 %), acute postpartum metritis (SY = 17.4 vs SS = 25.7 %), fever (SY = 21.7 vs SS = 29.7 %), mastitis (SY = 26.1 vs SS = 35.2 %), ketosis (SY = 11.6 vs SS = 12.2 %), and clinical endometritis (SY = 14.7 vs SS = 14.3 %) did not differ ($P > 0.10$) between treatments. Plasma GPx activity was similar ($P = 0.35$) for SY and SS, and averaged 571.18 nMol/mL/min. Fertilization rate did not differ ($P = 0.22$) between SY and SS (73.2 vs 84.1 %). Embryos classified as excellent and good as a percentage of fertilized (SY = 73.3 vs SS = 59.4 %) and total structures (SY = 53.6 vs SS = 50.0 %) were similar ($P > 0.10$) between treatments. Replacing a source of inorganic Se with Se yeast did not improve uterine health or embryo quality in lactating dairy cows.

Key Words: Selenium, Embryo quality, Dairy cow

Production, Management and the Environment I

M145 Post-ruminal survivability of *Fusarium graminearum* in infected barley kernels. Y. Wang^{*1}, D. L. McLaren², G. D. Inglis¹, S. L. Scott², T. K. Turkington³, and T. A. McAllister¹, ¹Agriculture and Agri-Food Canada Research Centre, Lethbridge, Alberta, Canada, ²Agriculture and Agri-Food Canada Research Centre, Brandon, Manitoba, Canada, ³Agriculture and Agri-Food Canada Research Centre, Lacombe, Alberta, Canada.

Survival of *Fusarium graminearum* (FG) in the post-ruminal environment was assessed following passage through the bovine intestinal tract, or incubation in fecal pats. FG infected barley kernels were studied as whole barley kernels (WBK), kernels halved longitudinally (H), steam pressure-treated whole (SPTW), tempered whole (TW), and tempered whole with surfactant (TSW). In Exp. 1, kernels of each treatment were sealed in mobile nylon bags, deposited through duodenal cannulae into three early-lactating Holstein cows (triplicate bags per treatment per cow), and retrieved from feces upon excretion. In Exp. 2, kernels sealed in nylon mesh bags (triplicate bags per treatment) were embedded in fecal pats from steers fed a barley-based finishing diet, and held at room temperature for 0, 2, 4, 7, 14, or 21 d. Upon retrieval of bags, 20 kernels per bag from Exp. 1 and 30 kernels per bag from Exp. 2 were surface sterilized with 0.3% NaClO, transferred onto selective medium (10 kernels per plate), and incubated for 5 d at 22°C. Survival of FG was expressed as the percentage of kernels plated that gave rise to FG colonies. With no intestinal or fecal incubation, FG grew in 36.7, 20.0, 0.0, 26.7 and 16.7% of WBK, H, SPTW, TW, and TSW kernels, respectively. No kernels from intestinal

incubations (Exp. 1) gave rise to FG colonies. In Exp. 2, viability was detected in 1 of 90 kernels in each of WBK, H, TW and TSW after 2 d of fecal incubation, but not after 4 d or beyond. A previous study revealed similar impairment of FG viability upon ruminal incubation of infected kernels. Thus, FG is unlikely to be spread by feeding infected barley grain to cattle. Contact of spilled grain with manure (e.g., pen floor) for ≥ 4 d will also inhibit FG survival. Care must be taken, however, to prevent spread of kernels during transportation and processing of infected barley.

Key Words: Viability, Intestinal digestion, Fecal incubation

M146 Response of bovine lateral saphenous vein to increasing concentrations of lysergic acid and ergovaline. J. L. Klotz^{*1}, B. C. Arrington², L. P. Bush², and J. R. Strickland¹, ¹USDA-ARS, FAPRU, Lexington, KY, ²University of Kentucky, Lexington.

Lysergic acid (ergoline alkaloid) and ergovaline (ergopeptide alkaloid) have been proposed as toxic components of endophyte-infected tall fescue. As many of the symptoms of fescue toxicosis are a result of compromised circulation, the objective of this study was to examine the vasoconstrictive potentials of D-lysergic acid (n = 12) and ergovaline (n = 12) using a bovine lateral (cranial branch) saphenous vein bioassay. Segments (2-3 cm) of the cranial branch of lateral saphenous vein were collected from healthy mixed breed cattle at local abattoirs. Veins were trimmed of excess fat and connective tissue, sliced into 2-3 mm sections and suspended in a myograph chamber containing 5 mL

of oxygenated Krebs-Henseleit buffer (95% O₂/5% CO₂; pH = 7.4; 37°C). Tissue was allowed to equilibrate at 1 g of tension for 90 min prior to initiation of treatment additions. Increasing doses of ergovaline or lysergic acid (1x10⁻¹¹ to 1x10⁻⁴ M) were administered every 15 min following buffer replacement. Data were normalized as a percent of contractile response induced by a reference dose of norepinephrine (1x10⁻⁴ M). Exposure of vein segments to increasing concentrations of lysergic acid did not result in an appreciable contractile response until the addition of 1x10⁻⁴ M lysergic acid (15.6 ± 2.3 %). Conversely, a vascular response to increasing concentrations of ergovaline was apparent at 1x10⁻⁸ M (4.4 ± 0.8%) and increased to a maximum of 69.6 ± 5.3% with the addition of 1x10⁻⁴ M ergovaline. These data indicate that only suprphysiological concentrations of lysergic acid results in vasoconstriction, but concentrations as low as 1x10⁻⁸ M ergovaline could elicit a vascular response. If other physiological systems in the animal are affected similarly, lysergic acid may only play a minor role in the manifestation of fescue toxicosis, whereas exposure to ergovaline, a much more potent vasoconstrictor, could result in appearance of fescue toxicosis symptoms.

Key Words: Bovine, Ergovaline, Lysergic acid

M147 Evaluation of the vasoconstrictive capacity of tall fescue alkaloids using fescue naïve bovine lateral saphenous veins. J. L. Klotz*¹, B. H. Kirch¹, G. E. Aiken¹, L. P. Bush², B. C. Arrington², and J. R. Strickland¹, ¹USDA-ARS, FAPRU, Lexington, KY, ²University of Kentucky, Lexington.

Vasoconstriction is associated with consumption of toxic endophyte-infected tall fescue. Because it is not known if endophyte-produced alkaloids act alone or in concert, the objective of this study was to examine the vasoconstrictive potentials of D-lysergic acid (LSA) and ergovaline (ERV) individually or in combination with N-acetyl loline (NAL) using bovine lateral saphenous veins biopsied from fescue naïve cattle. Segments (2-3 cm) of vein were surgically biopsied from healthy cross-bred yearling cattle (n=5; 360 ± 20 kg). Veins were trimmed of excess fat and connective tissue, sliced into 2-3 mm sections and suspended in a myograph chamber containing 5 mL of oxygenated Krebs-Henseleit buffer (95% O₂/5% CO₂; pH = 7.4; 37°C). Tissue was allowed to equilibrate at 1 g of tension for 90 min prior to initiation of treatment additions. Increasing doses of ERV or LSA (1x10⁻¹¹ to 1x10⁻⁴ M) with or without NAL (1x10⁻⁵ M) were administered every 15 min following buffer replacement. Data were normalized as a percent of contractile response induced by a reference dose of norepinephrine (1x10⁻⁴ M). Increasing concentrations of LSA did not result in an appreciable contractile response until the addition of 1x10⁻⁴ M LSA (22.6 ± 4.1%). A vascular response to increasing concentrations of ERV was apparent at 1x10⁻⁸ M (4.7 ± 2.2%) and increased to a maximum of 104.2 ± 6.0% with the addition of 1x10⁻⁴ M ERV. The presence of NAL did not alter the onset or magnitude of vascular response to either LSA or ERV (maximum responses of 24.9 ± 4.5 and 101.5 ± 10.9%, respectively). These data indicate that ERV is a more potent vascular toxicant than lysergic acid. Further, the presence of NAL did not inhibit or potentiate the effects of the ergot alkaloids on vascular activity. If these data persist in additional physiological systems, then tall fescue forages containing LSA and/or NAL should be safer for animal consumption than those containing ERV.

Key Words: Bovine, Alkaloids, Saphenous vein

M148 Effect of pulse grains on feedlot performance of newly weaned steers. V. L. Anderson*¹ and J. P. Schoonmaker², ¹North Dakota State University, Carrington, ²Land O' Lakes Inc., Madison, WI.

Pulse grains, especially field peas, are increasing in acres in the Northern Plains. Livestock feed is the default market for this relatively new category of nutrient dense grains that are 1.37 to 1.54 MCal/kg NEg and 22 to 26% crude protein. This study evaluated feed grade pulse grains in feedlot receiving diets. One hundred seventy six spring born steer calves from 40 different ranches in North Dakota and Montana (initial BW 253 ± 18.5 kg) were allotted by weight and source to one of four receiving diets that include approximately 17% (DM basis) chick peas, field peas, or lentils as the protein source compared to canola meal in the control diet. The 60% concentrate diets (15.75% CP, 115 Mcal/kg NEg) fed for 40 days included corn grain, corn silage, chopped hay, and an ionophore supplement. Steers were fed in 16 pens (11 steers per pen; 4 pens per treatment). Steers fed chick pea, field pea, or lentils during the first 20 d period gained 25.9% faster (1.41 vs 1.12 kg/d) and consumed more dry matter per day (5.40 vs 4.62 kg/d) compared to steers fed the control diet (P < 0.01). Feed efficiency did not differ (P > 0.32) among treatments for the first 20 d period. During the second 20 d period, no difference in gain, dry matter intake, or feed efficiency occurred (P > 0.38). Over the entire 40 d receiving period, steers fed pulse grains gained 9.2% faster (1.82 vs 1.67 kg/d; P < 0.05), and tended (P = 0.11) to consume more dry matter per day (7.39 vs 6.80 kg/d) compared to cattle fed the control diet. No differences were observed among the three pulse grains. Steers fed pulse grains during the receiving period continued to show increased gains (.25kg/d) for at least 7 weeks after the termination of the receiving trial when fed a standard finishing diet (13.3% CP, 137 Mcal/kg NEg). Field peas, chickpeas and lentils appear to support excellent feedlot performance.

Key Words: Pulse grains, Feedlot, Beef

M149 Effect of using a sheath protector at time of insemination on the pregnancy rate of beef cattle synchronized with CIDRs. W. A. Greene and M. L. Borger*, *The Ohio State University, Wooster.*

The main objective of this study was to determine the effect of using sheath protectors at time of artificial insemination on pregnancy rates (PR) in beef cattle synchronized with CIDRs. Ninety-three animals were allotted to two similar groups, sheath protector (P) and no sheath protector (N), based upon breed, age, postpartum interval, and postpartum cyclicity (as determined by estrus observation d -21 d to d 0). All cattle received an intravaginal releasing device (CIDR), containing 1.38 g progesterone, and 100 µg GnRH i.m. on d 0. On d 7, CIDRs were removed and all animals received 25 mg PGF_{2α} i.m. Each removed CIDR was evaluated for signs of vaginal infection and scored from 1 to 5 (1= clear, 5=heavy pus). Animals were observed for estrus 0700 and 1900 and were artificially inseminated (AI) 11-13 h after estrus was observed. If estrus was not observed, animals were timed AI (TAI) and received 100 µg GnRH i.m. 70-72 h after PGF_{2α}. Following the synchronization period, repeat breedings were done until d 53. Cows were pregnancy diagnosed by ultrasonography on d 83. P and N groups had similar (P>.05) PR to synchronization (50.0 and 66.6%) and overall PR (84.8 and 87.2). Estrus detection rates were higher (P<.05) for anestrous (60.9%) than cycling (37.9%) cattle following synchronization. Anestrous (n=64) and cycling animals had similar (P>.05) PR to synchronization (62.5 and 48.5%), and overall PR (79.3 and 89.1%). PR to synchronization were higher (P<.05) for

animals AI after estrus observation (70.0%, n= 50) than those TAI (44.2%). Cattle with high vaginal scores (4&5, n= 61) and low vaginal scores (1, 2, & 3) had similar ($P > .05$) PR to synchronization (59.0 and 56.3%) and overall PR (85.3 and 87.5%). Eleven of the 12 heifers compared to 61.7% of the cows had high vaginal scores. There were no apparent benefits to the addition of sheath protectors at time of AI in a beef synchronization program using CIDRs.

Key Words: Sheath protector, CIDR, Synchronization

M150 Intake and performance of beef steers with ad-libitum access to a balanced ration or the same ingredients of the balanced diet but delivered in separated bunks. J. Arroquy^{1,2}, J. Saravia¹, A. Fumagalli^{1,3}, F. Moretto³, A. Lopez³, and C. Lopez³, ¹*Instituto Nacional de Tecnología Agropecuaria, EEA-Santiago del Estero, Santiago del Estero, Argentina*, ²*Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina*, ³*Universidad Nacional de Santiago del Estero, Santiago del Estero, Argentina*.

The objective of this experiment was to evaluate the effect of feeding an uniform mixed diet compared with feeding the same proportion of each ingredient of the balanced diet delivered in separated bunks. Thirty beef steers (Braford, Criollo, and Braford × Criollo; initial average liveweight = 260 ± 21 kg) were used in a 87-d finishing study. Treatments consisted of a uniform mixed concentrate diet (control) vs. the same ingredients offered separately in equal proportion of the mixed ration (free-choice). Treatments were arranged in a completely randomised design (three pens/ treatment). Animals were fed daily ad libitum with the following proportion of feedstuffs, 75% whole corn grain, 10% whole cotton seed, and 15% grass hay (*Setaria italica*). All steers had ad libitum access to water and a mineral-salt. Final body weight did not differ between treatments (final average liveweight = 331 ± 28 kg; $P = 0.78$). Average daily gain was numerically superior to the control, but did not differ between control vs. free-choice (847 vs. 800 g/d for control vs. free-choice respectively; SEM = 100 g/d). Intra-pen variability for ADG was similar between control and free-choice ($P = 0.59$). Dry matter intake did not differ between control and free-choice (average dry matter intake, 7.2 vs. 7.1 kg/d for control vs. free-choice respectively, $P = 0.99$). Similarly feed to gain ratio was not affected by treatments (feed: gain ratio, 8.47 vs. 8.96 kg of DM/ kg of gain for control vs. free-choice respectively, $P = 0.30$). The proportion of whole corn grain was similar between treatments (75.4 vs. 74.2% for control vs. free-choice respectively, $P = 0.39$). However, steers in free-choice adjusted the proportion of ingredients selecting grass hay (14.6% control vs. 19.4% free-choice; $P < 0.01$) and rejecting whole cotton seed (10.0% control vs. 6.5% free-choice; $P < 0.05$). In conclusion under the conditions of this trial, free-choice selection of the components of a mix ration did not improve feed intake, liveweight gain, and feed efficiency with regard to a uniform mixed diet.

Key Words: Liveweight gain, Intake, Feed efficiency

M151 Evaluation of forage-based weaning systems in spring-born cross-bred beef calves. J. F. Odhiambo*, E. E. Felton, R. A. Dailey, and P. I. Osborne, *West Virginia University, Morgantown*.

Preconditioned calves have more market value per unit weight than normal-weaned calves. Therefore, development of a low cost forage-based weaning system allows producers to add value to their calf-crop. This study evaluated calf performance in three forage-based weaning systems; early-weaned calves were backgrounded in legume/grass forage plots and supplemented with commercial preconditioning

feed (Treatment I) or corn-mix (Treatment II). Control (Treatment III) calves suckled their dams for an additional 45 days. Diets were formulated to provide 2.17 kg TDN/calf/day. Weights were collected on days -30, 0 and 45 of the experiment from 135 and 150 calves in years 1 and 2, respectively. The effects of treatment, sex, age of dam, year and their interactions on calf weight gain were analyzed by analysis of covariance using GLM procedures of SAS. The data are reported as least squares means. Treatment affected ($P < 0.05$) calf weight gain in a similar fashion in both years. Overall calf weight gains averaged 1.21, 0.94 and 1.05 kg/calf/day, for commercial supplement, corn-mix and controls, respectively. Year by sex of calf interaction was significant ($P < 0.005$) for calf weight gain. Steer calves gained more ($P < 0.0003$) weight in year 1 compared to year 2 (54.6 and 46.8kg, respectively). Heifer weight gains did not differ between years (43.2 and 47.1 kg in year 1 and 2, respectively). Cow age also affected ($P < 0.005$) calf weight gain; calves from 2-year-old cows gained less weight compared to those from cows 3-5 and > 5 years of age (44.2, 48.8 and 50.8 kg, respectively). In year 1, there was a tendency ($P = 0.07$) for cow age by treatment interaction on steer weight gain; early-weaned steers from 2-year-old cows gained considerably more weight compared to control steers (59.9 and 46.7 kg, respectively). In conclusion, calf weight gain and profit potential can be improved by forage-based weaning systems as long as other inputs such as feed costs and labor are held within reasonable limits.

Key Words: Early weaning, Calves, Weight gain

M152 Relationship of two measures of disposition and gain performance of steers. R. L. Weaber and F. E. Creason*, *University of Missouri, Columbia*.

Data were collected on Angus cross steers (n=111) with known pedigree, to determine the effect of disposition on weight gain (WG) during the short-term post-weaning growing period. Disposition was measured by pen score (PS; 1=gentle, 5=aggressive) and exit velocity (EV; m/sec). Exit velocity was measured using infrared electronic triggers to start and stop an electronic recording device to time a steer as it traveled a fixed distance (1.83 m) upon exiting a squeeze chute. Exit velocity data were recorded when the initial weights were recorded, vaccinations for clostridial diseases and BRDC given, and the steers fit with electronic identification and visual ear tags. Pen scores were recorded when the final weights were collected and blood drawn. Steers weighed 242.70 (± 2.45) kg at the start (initial) of the trial and finished at 318.93 (± 3.08) kg 55 days later revealing an average WG of 76.23 ± 1.12 kg. Exit velocity averaged 2.25 ± 0.05 m/sec while PS averaged 2.09 ± 0.11. Pearson correlation coefficients (r) and PROC MIXED were used for statistical analysis. A linear model for WG was developed with EV and PS as fixed effects and sire as a random effect. In this model, EV ($p < 0.05$) was the only significant source of variation in WG. In a reduced model consisting of EV (fixed) and sire (random) effects, both EV ($p < 0.02$) and sire ($p < 0.05$) were significant sources of variation in WG. The estimated effect of EV on WG was -5.39 ± 2.13 kg/sec. Exit velocity was correlated with PS, $r = 0.36$ ($p < 0.001$), and WG, $r = -0.24$ ($p < 0.02$). Pen score was correlated with WG, $r = -0.21$ ($p < 0.03$). While the correlations between EV and WG were not significantly stronger ($p > 0.05$) than correlations between PS and WG, as an objective measure of temperament, EV was more desirable for explaining temperament effects on WG. Increases in EV (faster flight times) were negatively associated with WG during a short-term post-weaning growing period.

Key Words: Temperament, Gain, Beef cattle

M153 Effect of a mineral mix containing Tasco® meal on performance and reproduction in mature beef cows. J. E. Stegner^{*1}, B. Laudermilch¹, W. D. Whittier¹, R. Kasimanickam¹, D. Colling², and J. B. Hall¹, ¹Virginia Polytechnic Institute and State University, Blacksburg, ²Acadian Agritech, Dartmouth, NS, Canada.

The objective of this study was to examine if inclusion of Tasco® meal into mineral supplements would improve reproduction in beef cows grazing endophyte infected fescue. Mature crossbred spring-calving beef cows (n = 1060) from 6 farms in Virginia were randomly assigned within farm to TASCOS (n = 465) or CONTROL (n = 595) mineral supplements. TASCOS and CONTROL mineral supplements were designed to provide equivalent amounts of macro and micro minerals except TASCOS contained 10% Tasco® meal. Mineral supplementation began 30 to 45 d before the initiation of breeding (April) and continued until the end of the breeding season (July). Cows were bred by AI plus natural service or natural service only. Body condition scores (BCS; 1 = emaciated to 9 = obese) and hair scores (HS; 1 = slick summer coat to 4 = winter coat) were obtained at the initiation and completion of mineral feeding. Pregnancy rates were obtained by ultrasound and via palpation between d 45 and d 60 after end of the breeding season. Body temperatures at AI were obtained on 205 and 254 cows for TASCOS and CONTROL, respectively. Cows had similar (P > 0.5) BCS and HS at the beginning of the study. Mineral supplement did not affect (P > 0.5) final BCS or HS. Hair scores improved (P < 0.05) but BCS did not change during the study. Body temperature at AI was similar (P > 0.5) between supplements and averaged 102.3 ± 0.2°. Overall pregnancy rate was not different (P > 0.4) for TASCOS (85.4%, 344/403) or CONTROL (83.7%, 462/552) cows. However, pregnancy rate was affected by farm (P < 0.04). We conclude that TASCOS supplementation was unable to overcome the effects of endophyte infected fescue on pregnancy rates in cows under conditions of this study.

Key Words: Nutrition, Reproduction, Beef cow

M154 Relationships between endocrine status, temperament, growth and carcass traits in replacement beef heifers supplemented with dietary fat. A. R. Dos Santos^{*1,2}, S. T. Willard¹, R. C. Vann², and B. Macoon², ¹Mississippi State University, Starkville, ²Brown Loam Experiment Station, Raymond, MS.

The use of dietary fat supplementation can stimulate reproductive function by enhancing metabolic hormone secretions. Feeding dietary fat increases circulating cholesterol (CHOL) and progesterone (PROG). In addition, supplementation with dietary fat may improve carcass traits and hasten puberty in beef cattle; while the effects of temperament on these factors have yet to be determined. The objective of this study was to evaluate the effects of dietary fat supplementation on endocrine status and its relationship with growth, temperament and carcass traits in beef heifers grazing ryegrass. Yearling beef heifers were assigned to treatments for 84 d as follows: Ryegrass pasture (RYP; n=14); flaxseed (FlaxLic™, FLX; n=14; 3% fat; 0.35 kg/hd/d), and pelleted whole cottonseed (Fuzzpellet™, FUZ; n=14; 1.5% fat; 0.8 kg/hd/d). Measurements for carcass traits and blood samples were collected on d 0, 21, 42, 63, and 84 for ribeye area (REA), rib fat (BF), rump fat (RF), gluteus medius depth (GMD), percent intramuscular fat (%IMF) and IMF stress score (IMF-S), with serum PROG, total CHOL and cortisol (CORT) determined by RIA. Heifer temperament was determined at d 77. Overall, FLX and RYP heifers had greater (P<0.03) CHOL than FUZ heifers. Among cycling heifers, PROG (d 0 to 63) tended to be greater (P<0.10) for RYP than FLX and FUZ heifers. CORT did not differ (P>0.10) among treatments throughout the study. Change in BF and RF were correlated (0.33; P<0.04) with CHOL

and not CORT (P>0.10). %IMF, GMD and REA were not correlated with CORT or CHOL (P>0.10) among treatments over time. Heifers stratified as temperamental were correlated (0.49, P<0.01) with IMF-S but did not differ (P>0.10) in %IMF (d 63 and 84), with no relationship (P>0.10) between temperament and CORT observed. Average daily gain (ADG) was not influenced (P>0.10) by CORT, CHOL or temperament. In conclusion, dietary fat supplementation did not enhance endocrine status over heifers grazing ryegrass pastures alone. Moreover, while some carcass traits had positive associations with CHOL (BF and RF), temperamental heifers had higher IMF-S.

Key Words: Carcass, Beef, Endocrine

M155 Crop-livestock production system for fattening lambs under desert farming. N. Eweedah^{*}, Faculty of Agriculture, Kafu El-Sheikh, Egypt.

The present study was designed to investigate the response of growing lambs to different feeding systems under desert agriculture conditions. 255 Barki lambs with an average live body weight of 31.27 kg were used in feeding trials lasting 120 days. Animals were divided into three similar groups. The feeding systems based on grazing the lower portion of alfalfa remaining after cattle grazed the fodder in addition to different experimental rations were: RI, Concentrate feed mixture (CFM) + wheat straw (control). RII, Cracked barley grain (BG) + wheat straw (WS). RIII, CFM and BG 2:1 ratio + wheat straw. The concentrate portion was fed at a level 2% of live body weight with ad libitum wheat straw. Nutrient digestibility, determined previously using the acid insoluble ash technique, was (P<0.01) significantly lower for RI compared to RIII. Ration II had intermediate values between the lowest values for RI and the highest values for RIII. The differences between neither RI and RII nor RII and RIII were not significant for DM, OM and EE digestibilities. Moreover, no significant difference was detected between RI and RII for DM, OM, CP, CF and EE digestibilities. Nutritive values were significantly (P<0.01) higher for RIII than the other two rations. No significant differences were observed among the different feeding groups in ruminal pH values. Ammonia-N and total volatile fatty acids concentrations were significantly (P<0.01) increased for rations II and III compared to the control ration. Average daily gain was 135, 155 and 178 g/day for lambs fed rations I, II and III, respectively. It increased by 14.8 and 31.9% for rations II and III compared to the control ration. Feed conversion efficiency values (kg DM/kg gain) for animals fed rations RII or RIII were better than those fed the control ration, it improved by 4.0 and 13.7% for rations II and III, respectively. Moreover, economical efficiency improved by 30.5 and 17.0%, while feed cost, as LE/kg gain was decreased by 23.2 and 14.3% for lambs fed rations II and III, respectively compared to the control ration.

Key Words: Lambs, Feeding value, Animal performance

M156 Predicting fineness of instrument-classed wool lines using an Optical-based Fibre Diameter Analyser (OFDA2000). C. J. Lupton and F. A. Pfeiffer^{*}, Texas Agricultural Experiment Station, San Angelo, TX.

The portable, computerized OFDA2000 (BSC Electronics, Ardross, Western Australia) was developed for measuring properties related to fiber diameter and staple length of raw wool. It has been widely used to facilitate sheep selection in the field based on the economically important wool trait average fiber diameter (AFD). This experiment

was conducted to establish the accuracy of predicting AFD of instrument-classed wool lines produced by measuring a single mid-side staple removed from each skirted fleece in the line. Two important assumptions are involved in the prediction: the AFD of a mid-side sample is not different than whole fleece AFD; and, fleeces are of equal weight. To take full advantage of the USDA's Wool Loan Deficiency Payment Program, target AFD ranges during the time period of the experiment (2003 to 2005) were typically < 18.6, 18.6 to 19.5, and > 19.5 μm . Actual AFD values (range 17.5 to 21.2 μm) of the lines were established by measuring representative core samples using standard methodology. Over the 3-yr period, 8 clips were measured and 26 classed lines (weight range 200 to 7500 kg) were evaluated. Actual were greater than predicted AFD values (0.25 μm , P for paired t-test = 0.0259). The relationship between actual (y) and predicted (x) AFD was $y = 6.02 + 0.70 * x$, $r^2 = 0.88$, SE of the y estimate = 0.35 μm . The range in (predicted – actual) AFD values was -1.2 to 0.7 μm . The r for actual versus (predicted – actual) AFD was 0.50 that indicates a positive and significant bias (P < 0.01). In summary, the technique used here did not provide accurate estimates of AFD for classed wool lines in the range 17.5 to 21.2 μm . The accuracy of the estimates varied considerably among clips (flocks) indicating the inadequacy of mid-side sample AFD values (and presumed constant fleece weights) to predict fleece and ultimately classed line AFD. The variable accuracy of prediction may also be a function of the varying degrees of uniformity present in the fleeces of the flocks tested.

Key Words: Fineness, OFDA2000, Wool

M157 Twin rate influences milk yield in Sarda dairy sheep in organic and conventional farms. G. Canu¹, C. Dimauro², A. Natale³, C. Patta¹, and G. Pulina^{*2}, ¹Istituto Zooprofilattico Sperimentale per la Sardegna, Sassari, Italy, ²Università di Sassari, Sassari, Italy, ³Associazione Regionale Allevatori della Sardegna, Cagliari, Italy.

Several studies have reported higher milk yields in dairy and non-dairy sheep with multiple births. The aim of this experiment was to investigate the influence of twin rate on milk yield in Sarda dairy sheep in both organic (O) and conventional (C) farms. Data derived from the PERSEO-ARA database and consisted of 235 farms (54 O and 181 C); 64,908 ewes (24.7 % in O); 7 years (1996-2002), and the 4 provinces of Sardinia (Italy), i.e. Sassari (SS), Nuoro (NU), Oristano (OR), and Cagliari (CA). Twin rate (expressed as the percentage of lambed ewes which had multiple births) was classified into four classes: low (L \leq 14%); medium-low (14% \leq ML \leq 24%), medium-high (24% \leq MH \leq 29%), and high (H \geq 29%). Mixed procedure of SAS was used to analyse the following model: $Y_{ijklmn} = \mu + Tc_i + F_j(Tc_i) + T_k + C_l + P_m + T * Tc + Tc * C + I_n + \epsilon$, where Y = total milk yield (in kg/ewe per year), μ = overall last square mean, Tc_i = twin-rate class, $F_j(Tc_i)$ = farm j on twin-rate class i (random effect), T_k = year, C_l = farm type, P_m = province, and I_n = abortion incidence (covariate). Twin rate ($\mu \pm se = 23.74\% \pm 0.54\%$) influenced total milk production ($\mu \pm se = 143.33 \pm 1.33$ kg/ewe per year) in farms belonging to the MH or H classes only, especially in the H class of O farms (149.0 and 164.8 kg/ewe per year in the H class of C and O farms, respectively), with a different trend among the years (interaction P=0.0127). Year and province contributed significantly to explain a relevant part of the variance, similarly to the covariate abortion incidence (P=0.0073; $\mu \pm se = 2.31\% \pm 0.15\%$). There were no differences in milk yield between O and C farms, even if the interaction between farm type and twin-rate class was highly significant (P=0.002).

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Table 1. Contribution of twin rate class, year, province and farm type to milk yield expressed as deviation from a mean of zero.

Twin rate class	Milk yield	Year	Milk yield	Province	Milk yield	Farm type	Milk yield
kg/ewe per year							
L	-8.11 a	1996	-7.01 ab	CA	+25.29 a	C	-0.72 a
ML	-5.44 a	1997	-8.36 a	NU	+1.60 b	O	+0.72 a
MH	+7.60 b	1998	+0.14 bcd	OR	-47.16 b		
H	+5.95 b	1999	-3.83 abc	SS	+20.27 a		
		2000	+4.45 $\chi\delta$				
		2001	+5.62 δ				
		2002	+9.01 δ				

Means with different letters within the column are significantly different at P<0.05.

Key Words: Dairy sheep, Twin rate, Organic farm

M158 The effect of two management systems of dairy ewes on milk production. S. A. Maestá, E. R. Siqueira, M. M. Stradiotto, C. C. Boucinhas, A. Piccinin, and R. M. S. Emediato*, São Paulo State University, Botucatu, São Paulo, Brazil.

Most of Brazilian breeds present capability for meat or wool production, but it is possible to find animals with dairy properties. Bergamasca ewes, for example, introduced in Brazil in 1940, are raised in the Northeast for meat production. Considering their Italian origin, they could be used for milk production; however, the amount of milk produced by lactation and its characteristics are not well known. In view of this, the objective of the present work, carried out at the Ewe Milk Production Research Unit of the College of Veterinary Medicine and Animal Science of the São Paulo State University (UNESP), is to evaluate the effect of the different management systems on milk production of Bergamasca ewes. Eighty seven ewes were used and submitted to two milk production systems. In the group without lambs, these were separated from their mothers 48h after birth, while, in the mixed group, lambs were kept with their mothers until to 60 days of age, when they were weaned. Both ewes from the group without lambs and from the mixed group were machine-milked for a period of 90 days and milk production was daily measured during the whole experimental period. The statistical analysis was performed by means of the GLM procedure of the Statistical Analysis System (SAS, 1985). Ewes managed in the group without lamb presented higher (P<.05) daily average milk production in comparison to the mixed group. This difference may be explained, in part, by milk injection inhibition during machine-milking. In the beginning of lactation, the absence of a proper sign during machine-milking, which is usually present when females are nursing their lambs, inhibits the release of oxytocin and milk ejection reflex.

Key Words: Dairy sheep, Machine-milking, Milk yield

M159 Effect of suckling management on skeletal development and productive performance of Comisana lambs. A. Ciarlariello¹, G. Maiorano^{*1}, C. Cavone¹, R. J. McCormick², and A. Manchisi¹, ¹University of Molise, Campobasso, Italy, ²University of Wyoming, Laramie.

A study on restricted suckling of lambs was conducted to evaluate skeletal development and productive performance of growing lambs.

Twenty-one naturally suckled male *Comisana* lambs were divided into three equal weight groups differing in suckling regimen: 1) only maternal milk (C); 2) only maternal milk until 14d of age and, from 15d of age to slaughter, maternal milk, concentrate and Lucerne hay *ad libitum* (T1); 3) only maternal milk until 14d of age and, from 15d to 30d of age, maternal milk, concentrate and Lucerne hay *ad libitum*, and from 30d of age to slaughter only concentrate and Lucerne hay *ad libitum* (T2). Average daily weight gain and milk and feed intake were calculated. At slaughter (63d) live weight and carcass traits (dressing percent, shrink losses, kidney fat and shoulder percent) were recorded. In addition *longissimus dorsi* (LD) muscle area, pH and color (45 min and 24 h *post mortem*) were recorded. Metacarpal and metatarsal bones were measured for length, diaphyseal diameter, weight, and moisture content. Metacarpal growth plate width was also assessed after AgNO₃ staining. ANOVA was performed and comparisons were tested by Scheffé's test. Suckling management system significantly affected milk and feed intake and ADG, while live weight, hot and chilled carcass weights and shrink losses were not different. Compared to T1 and T2, C had heavier (P<0.05) hot (71.34b, 67.53a and 66.97a %, respectively) and cold (69.79b, 66.30a and 65.22a %, respectively) dressing percentages. T2 compared to T1 and C groups showed a greater shoulder percentage (8.00b, 7.78ab and 7.50a %, respectively; P<0.05) and a lower kidney fat percentage (0.54a, 1.27b and 1.96c %, respectively; P<0.001). LD area, pH and color values were similar among experimental groups. No difference was observed in bone measurements. Suckling management appears to be an important factor affecting lamb growth and carcass quality.

Key Words: Lamb, Suckling management, Productive performance

M160 Effects of an aluminum-water treatment residual on performance and mineral status of feeder lambs. R. Van Alstyne, L. R. McDowell*, P. A. Davis, N. S. Wilkinson, and G. A. O'Connor, *University of Florida, Gainesville.*

Manure, which is often applied to grazing land, contains P that when in excess may lead to water pollution. Previous studies suggest that application of an Al containing water treatment residual (WTR), a byproduct of water purification, increases the soil's capacity to bind and retain P. An experiment was conducted to see if WTR was detrimental to ruminants. A 14 week experiment was conducted using 42 feeder lambs. Individual feeding was recorded between weeks 11 and 14. Diets, containing 0.25% P (as fed), included 1) control 10% sand, 2) 9.7% sand and 0.3% AlCl₃, 3) 2.5% WTR and 7.5% sand, 4) 5% WTR and 5% sand, 5) 10% WTR and 0% sand, and 6) 10% WTR, 0% sand, and additional P with double the supplemental trace minerals. Total Al varied from 910 to 8,000 ppm. Lambs fed the control and WTR had no decline in intake, BW or ADG which may be attributed to the non-available Al found in WTR. Whereas lambs fed AlCl₃ repeatedly had lower BW and intakes. During week 6, all treatments declined in plasma P, but the AlCl₃ treatment declined the most. Accumulations of Al in brain were greatest for lambs given 2,000 ppm Al from AlCl₃ and increased incrementally when Al as WTR was fed at levels higher than 2,000 ppm. With the exception of the brain, soft tissues did not accumulate large amounts of Al during this 14 week experiment. Apparent P absorption from a 14 day metabolic study was positive (P<0.05) (10.9-31.8%) for all lambs except those receiving 2,000 ppm Al via AlCl₃, with a negative P absorption of -12.9%. Aluminum, as AlCl₃, fed at 2,000 ppm reduced dietary P retention, but varying amounts of Al as WTR had no effect on P apparent absorption with similar absorption rates as the control. Therefore when dietary P is supplied in amounts of 0.25% or higher, Al (via WTR) fed to lambs

in amounts as high as 8,000 ppm did not negatively impact the feed intake, gain, BW, tissue P, plasma P, or P absorption.

Key Words: Aluminum, Phosphorus, Status

M161 Effects of age, location, and nutrition on body weight, fiber production, and fiber quality characteristics of penned alpaca males. C. J. Lupton*¹, R. P. Elvestad², F. A. Pfeiffer¹, and K. MacKinnon², ¹*Texas Agricultural Experiment Station, San Angelo, TX,* ²*Natural Fibre Centre & Testing Laboratory, Olds, Alberta, Canada.*

Yearling alpaca males (36, offspring of 9 sires, BW = 40.0 ± 7.7 kg) from a single Canadian flock were obtained for this study. Half the animals were re-located to research facilities in Alberta and the other half to Texas. The animals were sheared annually in April or May and 26 fleece and fiber traits were measured on each of the 5 fleece components. At both locations, alpacas were assigned to three groups (6 alpacas per treatment, 3 per rep) blocked by yearling BW and fleece weight (FW). In year 2, local hays and mixed ration (50/50) combinations were evaluated to produce monthly gains in BW of 3%. At the end of year 2, three nutrition treatments were imposed consisting of the diets that produced the 3% gain, and 10 and 20% less (hay and ration). Animals were weighed and assessed for body condition monthly and diets were adjusted accordingly. As the alpacas aged (1 to 3 yr), BW, FW, fiber fineness (AFD), staple strength (SS), resistance to compression (R2C), total medullated (TM) and objectionable fibers, and AFD of TM fibers all increased. In contrast, fiber production / unit BW, fiber curvature, and staple length (ASL) showed declines. Body condition score, clean yield (CY), vegetable matter present, and flat fibers did not change with age (P > 0.05). In year 3, the BW, FW, AFD, TM and R2C of AB > TX alpacas (P < 0.05). In contrast, CY and SS of TX > AB fleeces. Most other characteristics were unaffected by location. Young alpaca males fed to gain at moderate rates (2 to 3% increase in BW / mo) produced more fiber (actual and g/kg BW, P < 0.05) that tended to be slightly coarser (P = 0.1) and more heavily medullated (P < 0.05) than animals that received 20% less feed. In all other measured traits, fleeces produced in the three nutrition treatments were similar. In addition to the stated objectives, this study documented variability in and correlations between alpaca traits.

Key Words: Alpaca, Fiber, Nutrition

M162 Gestation length in Alaskan reindeer. M. P. Shipka* and J. E. Rowell, *University of Alaska Fairbanks, Fairbanks, AK.*

Estimates of gestation length for reindeer vary from 198 – 240 d, exceeding mean estrous cycle length (24 d) and limiting practicality in predicting calving. A negative correlation between conception date and gestation length has recently been identified in Alaskan (n=8) and Norwegian (n=13) reindeer. The negative correlation implies that females bred early in the season have a longer gestation. We investigated the relationship between gestation length and breeding date by examining historical data for captive reindeer at the University of Alaska Fairbanks to look at the impact of early or late breeding dates on gestation length and the association between gestation length and calf sex, birth weight, and dam body weight at conception. Historical data included only individuals that had known breeding dates confirmed by systemic progesterone analysis along with recorded date of parturition. These data include 39 individual cows from two separate reindeer facilities at UAF. When the historical data were

pooled, there was a negative correlation between gestation length and breeding date ($r = -0.628$; $P < 0.001$; $n = 39$). Neither birth weight ($P = 0.794$; $t_{df=31} = 0.264$) nor gestation length ($P = 0.239$; $t_{df=36} = 1.198$) differed between male and female calves and there was no significant correlation between pooled birth weight and gestation length ($r = 0.323$; $P = 0.067$; $n = 33$). Dam body weight at conception was positively correlated with gestation length ($r = 0.466$; $P = 0.016$; $n = 26$). While sample size in the historical data set is small, the negative relationship between conception date and gestation length coupled with the poor association between gestation length and both calf gender and birth weight is intriguing. The idea that gestation length may vary in response to social and environmental cues has been suggested in other species, although hard evidence and a mechanistic explanation are lacking. To address the phenomenon of a negative relationship between conception date and gestation length, a controlled study was initiated during the 2005 breeding season that included early and late season breeding to synchronized estrus in reindeer cows. These cows will calve in April/May, 2006.

Key Words: Reindeer, Gestation length

M163 The diversity of bacterial community in the gut differs between different hatches of broiler chicks. G. W. Tannock¹, S. Musa¹, K. Munro¹, and V. Ravindran^{2*}, ¹University of Otago, Dunedin, New Zealand, ²Monogastric Research Centre, Massey University, Palmerston North, New Zealand.

The aim of the experiment was to determine whether the gut microbiota of chicks entering a broiler shed was consistent in composition between

different hatches. A variable degree of contamination of the chick gut at hatching might influence the subsequent development of gut microbiota in the broiler and disease resistance. Male, day-old chicks (Ross) were obtained at monthly intervals from six different hatches from the same commercial hatchery. Upon arrival at the farm, the chicks were placed in the same broiler facility and fed the same standard commercial diet (without antibiotics). Twenty four hrs after the introduction into the facility, the chicks were killed by cervical dislocation and, digesta samples were collected from the crop, ileum and cecum of 10 chicks. Denaturing gradient gel electrophoresis (DGGE) of DNA fragments obtained by polymerase chain reaction (PCR) amplification was used to define the microflora profile. Bacterial DNA was extracted from each sample and the V2-V3 regions of the 16S ribosomal RNA gene were amplified by PCR using bacterial primers HDA1-GC and HDA2. The 16S rDNA fragments in the PCR products were separated by DGGE to generate a profile of the bacterial community in the gut samples. DNA fragments of interest were cut from the DGGE gel and sequenced to permit bacterial identification. There was hatch-to-hatch variation in the crop, ileal, and cecal microbiota profiles. One fragment was observed to be common to most chicks in all hatches. The bacterial community was dominated by *Lactobacillus* species, but distinctive ileal and cecal profiles were obtained for each hatch. These data show that the microbiota of broiler chicks entering sheds will be different for each production cycle.

Key Words: Gut microbiota, Polymerase chain reaction, Broiler

Ruminant Nutrition: Fat Feeding, Metabolism, and Composition

M164 Influence of short-term feed restriction on milk production traits of Sarda dairy ewes. G. Pulina*, A. Mazzette, G. Battacone, and A. Nudda, *Dipartimento di Scienze Zootechniche, University of Sassari, Sassari, Italy.*

The effects of short-term feed restriction on milk yield and milk composition of Sarda dairy ewes were studied in a 17-d experiment. Twenty sheep were housed in individual pens and divided in two isoproductive groups. Ten ewes (feed restricted group, FRG) were fed a total mixed ration pelleted diet (TMR-PD) *ad libitum* (average intake of 2.5 kg/head per day) for 7 days (preliminary period), followed by 3 days of feed restriction of 50% of their previous intake (1.25 kg/head per day of TMR-PD) and 7 days of recovery. The other ten ewes (control, C group) were fed TMR-PD *ad libitum* during all the experimental period (average intake of 2.5 kg/head per day). There were no differences in milk yield between the two groups during the preliminary period (1485 and 1493 g/d for FRG and C group, respectively). Milk yield for the FRG decreased during the feed restriction period and averaged 72% of the values of the C group (1009 vs 1389 g/d, $P \leq 0.001$). Milk yield of the FRG was not completely restored during the 7-d recovery period, remaining lower than that of the C group (1278 vs 1451 g/d, $P = 0.12$). Fat percentage tended to increase in FRG during the feed restriction period (5.87% vs 5.27%, $P = 0.08$), and remained higher than that of the C group during recovery (6.04% vs 5.20%, $P \leq 0.01$). No effects of feed restriction on protein percentage (5.52% vs 5.53% for FRG and C group, respectively) were observed. SCC was lower in the FRG than in the C group during the

preliminary period (Ln SSC 4.51 vs 4.71, $P = 0.06$), increased by more than 4 fold during the feed restriction period (Ln SSC 5.34 vs 4.76, $P = 0.02$) and remained higher during the recovery period (Ln SSC 5.4 vs 4.8, $P = 0.10$). Short-term feed restriction caused a permanent drop in milk production and an increase in SCC on dairy ewes.

Funded by the PRIN-MIUR, Intellatle project

Key Words: Feed restriction, Milk, Dairy ewes

M165 Influence of short-term feed restriction on milk fatty acid profile in dairy ewes fed complete pelleted diet. A. Nudda, S. Fancellu, A. Mazzette, G. Battacone, and G. Pulina*, *Università di Sassari, Sassari, Italia.*

During feed restriction, changes in metabolism occur and often result in the mobilization of energy from the adipose tissue. The objective of this work was to evaluate changes in the fatty acid (FA) profile of milk fat during short-term feed restriction in dairy ewes. Six ewes (3 at low-body condition score and 3 at high-BCS) were fed a complete pelleted diet (CPD) *ad libitum* (average intake of 2.5 kg/head per d) for 7 days, followed by 3 days of feed restriction of 50% of their previous intake (feed restriction group, FRG). Other 6 ewes (control, C group), divided into 3 low-BCS and 3 high-BCS sheep, were always fed CPD *ad libitum* (average intake of 2.5 kg/head per d). The CPD composition was (on a DM basis) 38.3% NDF, 16.0% CP and 4.5% EE (of which 2% of palm oil). The data of the 3-d treatment were analysed by a