BQA was considered by participants to be an important consideration for the future (Mean = 1.4, SD = .81). Participants felt that the program helped them increase their understanding of BQA (Mean = 1.6, SD = .78), and provided relevant information to their work (Mean 1.6, SD = .84). A major emphasis of the program was to encourage producers to place all injections in the neck region. When given the choice of indicating where injections should be placed, all respondents indicated the neck, versus the rump or round. Eighty-five percent of respondents correctly indicated that "Extra-label" drug use could only be done with a valid veterinarian-client-patient relationship. However, 33% incorrectly indicated that "Extra-label" drug use in the mixing of drugs in animal feeds is permitted while there is a valid veterinarian-client-patient relationship.

Key Words: Beef, Quality, Assurance

826 Uniformity of mixing and delivery of total mixed rations. A. Predgen* and L. E. Chase, *Cornell University, Ithaca, NY.*

Total mixed rations (TMR's) are being increasingly implemented on dairy farms. One concern is the uniformity of mixing of the TMR on both a within and between day basis. This trial was conducted to evaluate the uniformity of the feed mixing and delivery process on 5 New York dairy herds. Observations were obtained on 3 different days for each farm. Samples were obtained from 5 locations in the feedbunk immediately after the TMR was delivered by the mixer wagon. Samples were analyzed for dry matter, particle size, density, pH, chloride, crude protein (CP) and acid detergent fiber (ADF). The coefficient of variation (CV) was calculated as an index of uniformity. A CV >10% was observed in 14 out of 15 observations for coarse particle distribution. This result indicates the difficulty of incorporating coarse particles uniformly into TMR's. The percent of coarse particles in samples 1 through 5 for 1 day on 1 farm was 24.0, 26.4, 26.5, 21.6 and 28.5%. Analysis of variance was used to examine differences between days or sample location within day. Significant differences ($P<.05$) were found for sample location within day in only 3 comparisons out of the 45 conducted. There were 14 significant differences ($P<.05$) detected for between day observations. These included 4 for particle size, 3 for dry matter, 1 for density, 1 for chloride, 3 for pH and 2 for CP. No significant differences were found for ADF for either within or between day determinations.The results of this study indicate that greater differences in TMR uniformity existed between days than within days on these farms. This variation between days could be related to factors including variations in feeds, operator differences, loading procedure, mixing time or scale errors. The technique of analyzing samples from a number of locations in the feedbunk provides a method to assess the uniformity of TMR mixing and delivery on dairy farms.

Key Words: Total mixed rations, Feedbunk management

827 A heifer development system emphasizing genetics - The Virginia Premium Assured Heifer Program: program development and requirements. J. B. Hall, S. P. Greiner*, B. R. McKinnon, and W. D. Whittier, *Virginia Tech, Blacksburg, VA.*

Several extension sponsored beef heifer development and marketing programs exist in the US, but they give minimum consideration to genetic merit of the heifers. In 1999, the Virginia Premium Assured Heifer (VAPAH) Program was designed as an elite beef replacement heifer program which would emphasize genetic merit of service sires and heifers. The VAPAH Program was designed to produce, for home use or sale, replacement heifers that are healthy, reproductively sound and of known genetic value. Extension professionals and veterinarians provide nutritional, genetic, phenotypic, and health guidelines and recommendations. Physical requirements include maximum age at calving, frame score 4.5 to 6.5, body condition score 5 to 7, proper weight for age and frame and muscling scores of 1 to 2.5 (USDA feeder calf grades). A committee evaluates heifers for structural soundness and freedom from defects (e.g. horns, bad eyes, frozen ears). Health program includes vaccination against bovine respiratory complex, clostridial diseases and leptospirosis as well as calfhood vaccination for brucellosis. Heifers must be treated with an endecticide and certified free of anaplasmosis before sale as VAPAH. Reproductive requirements for open heifers are reproductive tract score of 3 and yearling pelvic area ≥ 150 cm^2, whereas bred heifers must conceive within 50 d of the beginning of the breeding season and have a pelvic area ≥ 180 cm^2 at 18 m of age. Maximum birth weight EPD for service sire (SS) must not exceed the equivalent of the top 40% of Angus breed birth weight EPD. In addition, SS must be breed average for YW EPD. Heifers sired by bulls that meet minimum YW and milk EPD standards are designated as VAPAH Plus. Requirements are updated annually. Approximately, 1700 heifers from 45 farms have been enrolled in the VAPAH program. One thousand eighty-eight heifers have been sold since the start of the program with 57.0 % of the heifers qualifying as VAPAH Plus.

Key Words: Beef, Extension, Replacement heifer

828 A heifer development system emphasizing genetics - The Virginia Premium Assured Heifer Program: marketing. J. B. Hall*, B. R. McKinnon, S. P. Greiner, and W. D. Whittier, *Virginia Tech, Blacksburg, VA.*

The Virginia Premium Assured Heifer (VAPAH) Program is a novel replacement beef heifer development program emphasizing genetics of the heifer and service sire. Heifers meeting VAPAH requirements are identified with a VAPAH eartag to facilitate trace-back, if necessary. Heifers sired by bulls that meet additional genetic standards for growth and milk based on EPDs are designated as VAPAH Plus. Marketing of heifers is facilitated by extension agents and specialists with livestock markets and the Virginia Cattlemen's Association serving as marketing agents. Additionally, VAPAH can be marketed by private treaty. Since 2000, 1088 VAPAH have been marketed. To make comparisons among VAPAH and non-VAPAH, data on 686 heifers marketed from January 2000 to August 2001 were examined. Average price received per heifer was \$980.14, \$947.66 and \$880.93 for bred VAPAH Plus, VAPAH and non-VAPAH, respectively, and \$745.11, \$729.57 and \$665.37 for open VAPAH Plus, VAPAH and non-VAPAH, respectively. These sale results indicate that buyers are willing to pay over \$60/hd more for VAPAH compared to non-VAPAH and an additional \$15 to \$30/hd for VAPAH Plus compared to VAPAH. Thirty-nine farms that purchased a total of 371 heifers responded to a buyer's survey. Satisfaction ratings (1 = very satisfied to 5 = very unsatisfied) were 2.3 and 1.5 for bred and open VAPAH, respectively. Likelihood of buyers purchasing VAPAH again (1 = definitely to 5 = never) was 2.15 (bred) and 2.00 (open). However, when VAPAH and non-VAPAH were offered in the same sale, some buyers indicated considerable confusion in understanding the difference between the designations. To increase marketability of VAPAH outside the region, a web site has been developed that features heifer requirements, upcoming sales, sale summaries and digital images of VAPAH sold or for sale. Based on sale results and buyer surveys, VAPAH and non-VAPAH will not be offered in the same sale. Buyer and producer surveys as well as sale results will be used to refine marketing methods for VAPAH.

Key Words: Beef, Extension, Marketing

Growth and Development

829 Porcine leptin alters fatty acid metabolism by swine adipocytes. T.G. Ramsay*[1], [1]*USDA-ARS.*

The present study examined whether or not recombinant porcine leptin can alter lipid synthesis in porcine adipocytes. The stromal vascular (SV) cell fraction of neonatal subcutaneous adipose tissue was isolated by collagenase digestion, filtration, and subsequent centrifugation. These SV cells were seeded on 25-cm ^{2} tissue culture flasks and proliferated to confluency in 10% fetal bovine serum in DMEM/F12 (50:50). Cultures were differentiated using 2.5% pig serum + 10 nM insulin + 100 nM hydrocortisone. After 7 d of lipid filling, cultures were washed free of this medium, incubated overnight in DMEM/F12 containing 2% pig serum and then used for experiments. Acute experiments assessed 1-^{14}C-palmitate metabolism in cultures exposed to porcine leptin (0 to 1000 ng/mL medium) for 4 h. Chronic experiments used cultures incubated with 0 to 1000 ng porcine leptin/mL medium for 44 h prior to measurements of 1-^{14C}-palmitate oxidation and incorporation into

lipid during a 4 hour incubation. Acute treatment with leptin did not affect palmitate oxidation (P>0.05, n=8) but reduced palmitate incorporation into lipids by up to 45% (P<0.05, n=8). Chronic exposure to leptin increased palmitate oxidation by 36%, although only at the highest concentration of leptin tested: 1000 ng leptin/mL medium (P<0.05, n=8). Chronic leptin exposure reduced palmitate incorporation into total lipids by 40% at 100 ng/mL medium (P<0.05, n=8). Lipoprotein lipase activity was unaffected by leptin (P>0.05, n=4). These data demonstrate leptin functions to promote partitioning of energy away from lipid accretion within porcine adipose tissue by stimulating fatty acid oxidation indirectly and inhibiting lipid synthesis directly.

Key Words: Leptin, Adipocyte, Cell Culture

830 Maternal n-3 Fatty Acid Supplementation to Enhance Brown Fat Thermogenesis in Newborn Lambs. C. Chen*, G. E. Carstens, C. M. Theis, S. L. Archibeque, M. W. Kurz, C. D. Gilbert, L. J. Slay, and S. B. Smith, *Texas A&M University*.

The aim of this study was to determine whether dietary supplementation of n-3 polyunsaturated fatty acid (PUFA) during late gestation would stimulate recruitment of brown adipose tissue (BAT) in utero to improve cold tolerance of newborn lambs. Thirty twin-bearing ewes were allotted to one of six groups (n = 5) beginning 40 15 d prior to lambing. Groups were randomly assigned to treatments in a 2x3 factorial arrangement with factors being: level of rumen-protected fat (2, 4or 8%), and source of rumen-protected fat (high in saturated/monosaturated fatty acid [SMFA; Energy Booster®] or high in n-3 PUFA; formaldehyde-protected soy/linseed lipid). Ewes were individually fed in an open-sided barn. All lambs were separated from ewes and placed in a warm chamber (25 C) within 2 h of age. At 4 h of age, all lambs were placed in a cold chamber (0 C) for 2 h and rectal temperatures (RT) measured at 15-min intervals. One lamb per twin pair was killed at 6 h of age and the other lamb was returned to the warm chamber till 22 h of age. Cold-induced RT responses were again measured for 2 h and the second lamb killed at 24 h of age. Prenatal ADG were greater (P < .01) in ewes fed PUFA vs SMFA diets, but level and source of fat did not affect lamb birth weights. PUFA-fed ewes had higher plasma concentrations of 18:2, 18:3 and EPA, and lower concentrations of 16:0, 16:1, and 18:1 than ewes fed SMFA diets. Plasma SFA:PUFA ratios were lower in PUFA-fed ewes (1.63 vs 2.14 .17). BAT of lambs born to PUFA-fed ewes had higher concentrations of 18:2, EPA and DHA than lambs born to SMFA-fed ewes. The SFA:PUFA ratios in BAT were lower in lambs from PUFA-fed ewes (15.4 vs 20.4 2.4), however, BAT mass, cytochrome c oxidase activity and GDP binding were not affected by level or source of dietary fat. Cold-induced RT responses of lambs were not affected by source of prenatal fat, but increased quadratically as level of prenatal fat increased (39.4, 39.7 and 39.1 .06 C for 2, 4 and 8% fat, respectively). Prenatal n-3 fatty acid supplementation altered the fatty acid profile of BAT, but did not affect BAT thermogenic activity or cold tolerance of newborn lambs.

Key Words: Lamb, Brown Fat, Polyunsaturated Fatty Acid

831 Effects of daidzein supplementation to the diet of pregnant sows on maternal performance and neonatal piglet growth. G. Kuhn[1], M. Ren[2], F. Schneider[1], E. Kanitz[1], M. Tuchscherer[1], K. Nürnberg[1], B. Stabenow[1], K. Ender[1], and C. Rehfeldt*[1], [1]*Research Institute for the Biology of Farm Animals, Dummerstorf, Germany,* [2]*Nanjing Agricultural University, Nanjing, China*.

The objective of this study was to investigate the effects of a daidzein supplement to the diet of pregnant sows on litter and piglet performance, endocrine characteristics, and insulin-like growth factor-1 receptor (IGF-1R) mRNA expression in neonates. Eight sows received a daidzein supplement of 8 mg/kg feed from d 85 of gestation up to parturition and six sows were used as control. Three days before parturition blood samples were taken from sows while colostrum samples were collected at farrowing. Immediately after parturition, two male piglets of average birth weight were selected from each litter for analysis of IGF-1R gene expression in different tissues. Blood samples were collected from the remaining piglets at d 1 of age. The percentage of piglets born alive was higher in the daidzein group than in control (P=0.01) whereas the percentage of runts tended to be lower (P=0.15). Litter weight of live born piglets was higher (P<0.01) in the daidzein treated group. Birth weight of piglets was increased (P=0.02) by daidzein treatment with differences being higher in males (P=0.02) than in females (P=0.12). Concentrations of insulin and IGF-1 in blood of sows were not influenced by daidzein before parturition. Blood IGF-1 concentration of one day old piglets was higher in the daidzein group than in controls (P=0.07). Likewise, IGF-1 concentration in sow colostrum was higher (P=0.07). There was no effect of daidzein on the fatty acid composition of piglet plasma or on the composition of colostrum (protein, lipids, lactose). Compared with the control, muscle IGF-1R mRNA level was significantly higher (P<0.05) in the daidzein group whereas IGF-1R mRNA levels in thymus and liver tended to be higher (P=0.08, P=0.09, respectively). The results suggest that daidzein supplementation during late gestation is capable of affecting maternal performance and fetal growth.

Key Words: Daidzein, Sows, Piglets

832 Effects of exogenous somatotropin during early gestation on postnatal development of muscle fibers in pigs. C. Rehfeldt*, G. Kuhn, and K. Ender, *Research Institute for the Biology of Farm Animals, Dummerstorf, Germany*.

The effects of maternal treatment with porcine somatotropin (pST) during early gestation on postnatal development of muscle fibers were determined. Crossbred gilts received daily injections of either 3 mL of a placebo (n=7) or 6 mg of pST (n=7) from d 10 to 37 of gestation with gradual withdrawal from d 28. Muscle samples were collected at birth (n=41) from low-weight (LW), middle-weight (MW), and heavyweight (HW) littermates, at weaning (d 49, n=35), and at 182 d of age (n=54). Average birth weight and weights of semitendinosus (ST) and psoas major (PM) muscles were unchanged by maternal pST treatment. However, weight group x treatment interactions (P < 0.02) revealed decreases in body weight (BW) and ST weight in HW and increases in LW piglets. Administration of pST increased the number of primary (P < 0.05) and secondary fibers (P < 0.10) in neonatal ST muscle of LW littermates, whereas no changes were observed in the PM muscle. Muscular protein concentration was higher (P < 0.07) after pST treatment. From birth to weaning, total muscle fibre number per muscle cross section (MFN) increased threefold in both ST and PM muscle (P < 0.0001). From weaning to d 182, MFN remained almost unchanged in ST, but increased in PM by a factor of 2.4 (P < 0.001). No significant effects of pST treatment on MFN were found at d 49 and 182 of age, but MFN appeared to be more balanced among originally LW, MW, and HW littermates. At d 49 or 182 of age, there were no differences in BW, carcass weight or weights of ST and PM muscles. Only minimal changes in fiber characteristics were observed in longissimus, ST, and PM muscles due to pST treatment. At d 49, fiber cross sectional area (FCSA) of slow-twitch oxidative (STO) fibers decreased (P = 0.05) in ST. At d 182, STO fiber percentage tended to be higher (P = 0.13) in ST, while the average FCSA tended to be lower (P = 0.14) in PM. The results suggest that maternal pST treatment during early gestation is able to affect neonatal muscle, but scarcely influences postnatal muscle growth.

Key Words: Somatotropin, Muscle, Growth

833 Effect of reconstitution with commensal bacteria on intestinal physiology and performance in the germ-free pig. T.W. Shirkey*, B.G. Goldade, J.K. Marshall, R.H. Siggers, M.D. Drew, B. Laarveld, A. Estrada, and A.G. Van Kessel, *University of Saskatchewan, Saskatoon, SK, Canada*.

To determine the effect of different commensal intestinal bacteria on intestinal physiology and production performance, 16 piglets were aseptically obtained by caesarian section and allocated into 4 gnotobiotic isolators balanced for litter of origin, sex and weight. One isolator was maintained germ-free (GF), and piglets in the remaining isolators were orally inoculated with either *Escherichia coli* K88- (EC), *Lactobacillus fermentum* (LF), or fresh adult porcine feces (PF). Piglets were fed irradiated bovine colostrum (1 d), sow milk replacer (400 mL/kg/d for 15 d) and a commercial weaning diet (*ad libitum* for 10 d). Body weight was recorded every other day and piglets were killed at 26 d of age. Culture of cecal contents indicated colonization of EC and LF groups by *Escherichia spp.* and *Lactobacillus spp.*, respectively. Cecal cultures also indicated 2 spore-forming contaminants (*Clostridium spp.* and *Bacillus spp.*) present in all four isolators. Relative liver and spleen weight (g/kg BW) and small intestinal (SI) length (m/kg BW) was greater in PF versus GF, EC and LF treatment groups. Weight of SI per unit length determined at 25% and 95% of intestinal length was highest in

GF pigs and lowest in either the EC (25%) or PF (95%) group. GF piglets had the highest average daily gain, followed by LF, EC and PF treatments. Commensal intestinal bacteria influence intestinal morphology and may negatively affect performance in pigs.

Item	GF	LF	EC	PF
Liver, g/kg BW	32.54^a	31.70^a	33.20^a	38.73^b
Spleen, g/kg BW	1.74^a	1.76^a	1.87^a	2.89^b
Heart, g/kg BW	6.98	6.65	6.88	6.58
SI length, m/kg BW	1.19^a	1.27^a	1.35^a	2.15^b
SI weight 25%, g/10 cm	3.68^a	3.17^{ab}	2.79^b	3.27^{ab}
SI weight 95%, g/10 cm	5.37^a	4.70^{ab}	4.49^{ab}	3.54^b
Pre-wean ADG, g	178.3^a	168.8^a	121.3^b	51.0^c
Post-wean ADG, g	270.3^a	231.3^a	246.7^a	127.8^b
Total ADG, g	212.3^a	192.0^{ab}	167.7^b	79.5^c

^{a,b,c} Means within the same row without a common superscript letter differ significantly ($P < 0.05$)

Key Words: Intestinal bacteria, Gnotobiotic, Performance

834 Ghrelin induces GH secretion in pigs.

D. H. St-Pierre* and P. Dubreuil, *University of Montreal*.

Ghrelin (G), a linear 28-amino acid peptide octanoylated at Ser^3 was isolated in 1999 from rat stomach and identified as the endogenous ligand of the GHS-R. The potent stimulating effect of G on GH secretion was demonstrated in humans and rats. In our laboratory, the pig has been used during the past several years as an animal model to evaluate the effect of various GH secretagogues. Six crossbred male pigs (51.8±7.2 kg) were used in two 6x6 (6 days) non-balanced latin square design experiments to evaluate GH-releasing potency of G. In both experiments, saline control (SC; 3 mL) and peptides were injected iv and blood samples were collected at 20 minute intervals for 3 hours with additional sampling at 10 and 30 minutes. In exp. 1, native octanoylated (O) free-carboxyl (C) ghrelin (OCG); non-octanoylated ghrelin (nOCG); octanoylated amide ghrelin (ONG); nONG; and a potent analog of GRF, [des-Tyr^1, D-Ala^2, Ala^{15}]-$GRF_{1-29NH2}$ (GRF) were compared at 1.5 nmol/kg. In exp. 2, the effect of ONG was compared at: 0; 0.1; 0.3; 1.0; 3.0; and 9.0 nmol/kg. GH-AUCs for exp. 1 were 639^a: SC; 593^a: nOCG; 667^a: nONG; 1125^b: GRF; 1849^c: OCG; and 2385^d: ONG, SEM: 143 ng.min/mL, ^{a,b,c,d} are significantly different ($p < 0.05$). GH-AUCs for exp. 2 were: 446^a: SC; 666^a: 0.1 nmol/kg; 1223^b: 0.3 nmol/kg; 1372^b: 1.0 nmol/kg; 1768^c: 3.0 nmol/kg; 2027^c: and 9.0 nmol/kg, SEM: 107 ng.min/mL, ^{a,b,c} are significantly different ($p < 0.05$). Results indicate that while OCG and ONG potently stimulate GH release, non-octanoylated ghrelin analogs are inactive. GH secretion depends on dose of ghrelin injected and does not seem to plateau. The experiments suggest that, as in humans and rats, the octanoylated form of ghrelin is required for biological activity in pigs and its potency varies in a dose-dependant manner.

Key Words: Ghrelin, GH secretion

835 The effects of zeranol implantation on pituitary growth hormone-releasing hormone receptor expression in growing beef steers.

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Estrogenic growth promotants increase rate of gain and feed efficiency in beef cattle in part through stimulated synthesis and release of pituitary growth hormone (GH); however, the mechanism of GH stimulation is not well understood. The purpose of the present study was to examine the effects of an estrogenic anabolic compound, zeranol, on ADG, GH response to thyrotropin-releasing hormone + growth hormone-releasing hormone (TRH+GHRH) challenge, and pituitary GHRH receptor mRNA expression in growing beef steers. Sixteen steers averaging 301 ± 6 kg BW were assigned randomly to a control group or to one of two zeranol treatment groups that were implanted (36 mg Ralgro) for a total of 42 d (1 implantation) or 162 d (3 implantations) until slaughter. Five days prior to slaughter, all animals were challenged with TRH+GHRH (1.0 + 0.1 μg/kg, respectively, i.v.) and blood samples were collected at 0, 5, 10, 15, 20, 30, 45, 60, and 120 min relative to challenge for plasma GH determination. The GH response to TRH+GHRH challenge was calculated as the area under the GH response curve (AUC) using trapezoid summation. At slaughter, pituitary glands were collected, weighed, and immediately frozen in liquid nitrogen for subsequent extraction of total RNA. Pituitary GHRH receptor mRNA expression was compared using relative quantitative real-time RT-PCR. Zeranol implantation resulted in increased ADG ($P < 0.01$) and increased AUC in response to TRH+GHRH challenge ($P < 0.05$). The GH responses to TRH+GHRH challenge were significantly lower on d 157 than on d 37 ($P < 0.05$). There was no effect ($P > 0.05$) of time or zeranol implantation on pituitary weight or expression of GHRH receptor mRNA. Our results suggest that increased ADG and GH secretion due to zeranol implantation are not mediated by changes in transcription of the GHRH receptor gene in cattle.

Key Words: Estrogens, Cattle, Growth hormone-releasing hormone

836 Steady-state levels of IGF-I, IGFBP-3, IGFBP-5, myostatin and hepatocyte growth factor mRNA in semimembranosus muscles and /or livers of steroid implanted and non-implanted steers.

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Ribonuclease protection assays (RPA) and real-time RT-PCR were used to measure steady-state semimembranosus muscle and/or hepatic levels of insulin-like growth factor (IGF)-I, insulin-like growth factor binding protein (IGFBP)-3, IGFBP-5, hepatocyte growth factor (HGF) and myostatin mRNAs in steers implanted from 32 to 38 d with Revalor-S®, a combined trenbolone acetate and estradiol implant. IGF-I mRNA levels were 69% higher (P<.01, n=7) in the livers of implanted steers than in the livers of non-implanted steers. Similarly, IGF-I mRNA levels were 37% higher (P<.04, n=7) and 27% higher (P<.01, n=7) in the semimembranosus muscles of implanted steers than in the same muscles from non-implanted steers using real-time RT-PCR and RPA respectively. Hepatic IGFBP-3 mRNA levels were numerically 24% higher (P<.07, n=7) in implanted steers than in non-implanted steers using RPA. Hepatic HGF and IGFBP-5 mRNA levels were not different in implanted and non-implanted steers. Similarly, muscle IGFBP-3, IGFBP-5, and myostatin mRNA levels were not affected by implantation. Muscle HGF mRNA was difficult to detect using RPA and results from this assay indicated that HGF mRNA was not significantly different between implanted and non-implanted animals. However using real-time RT-PCR, muscle HGF was 50% lower (p<.03, n=7) in implanted steers than in non-implanted steers. Previous data from these same steers have shown that circulating IGF-I and IGFBP-3 concentrations were 30 to 40% higher (P<.01, n=7) in implanted steers than in non-implanted, control steers. Additionally, the number of actively proliferating satellite cells that could be isolated from the semimembranosus muscle was 45% higher (P<.01, n=7) for implanted steers than for non-implanted steers. Viewed together these data suggest that elevated muscle IGF-I levels stimulate increased satellite cell proliferation resulting in the increased muscle growth observed in Revalor-S® implanted steers.

Key Words: IGF-I, Muscle, Steroid Implant

837 Effect of Revalor-S® on hepatic and muscle expression of components of the somatotropic axis in Simmental calves and yearling steers.

B. A. Crooker*, L. S. Ma, W. J. Weber, M. E. White, M. R. Hathaway, and W. R. Dayton, *Department of Animal Science, University of Minnesota*.

Steers received Revalor-S® or a sham on day 0 to examine systemic and local effects of steroid implants and age on components of the somatotropic axis. Blood samples and hepatic and longissimus dorsi biopsies were obtained from calves (study A; implant, N=5; control, N=5; 307 ± 9 kg BW) and yearlings (study B; implant, N=5; control, N=5; 411 ± 21 kg BW) on day 0, 3, 7, 14, 21, 28 and 42 (yearlings only). Serum IGF-I was determined by RIA. Hepatic GH receptor (GHR), IGF-I, IGF-BP3 and IGF-BP5 mRNA were determined by ribonuclease protection assay. Muscle IGF-I mRNA in calves was determined by RPA and in yearlings by real-time PCR. The PCR reverse primer for IGF-I spanned the junction of exons 3 and 4 which prevented amplification of genomic DNA. All mRNA results are reported relative to cyclophilin. Data were analyzed as repeated measures using d 0 as a covariate. Results differed when $P < 0.05$. Revalor® did not affect BW of calves (359 ± 3 kg at d 28) but increased BW of yearlings (445, 481 ± 6 kg at d 28). Serum IGF-I was greater in implant yearlings by d 21 (316, 176 ± 23 ng/ml) and the trend ($P = 0.07$) was similar in calves (407, 339 ± 26 ng/ml). Although stable in controls and similar in controls and implants at d 0,

hepatic IGF-I mRNA was greater in implants than controls during d 14 to 28 (A, 80%; B, 87% increase). A similar pattern occurred for muscle IGF-I mRNA in calves (93% increase). In yearlings, muscle IGF-I mRNA in implants was 116% greater than controls at d 28. Hepatic GHR-1A mRNA was not affected by implant in either study. IGFBP-3 mRNA was greater in implants than controls after d 7 (60% increase) in yearlings but unaltered in calves. IGF-BP5 mRNA was not affected by implant in either study. Results suggest Revalor® increased systemic IGF-I (presumably via liver) and local IGF-I in muscle. Either or both may be involved in muscle hypertrophy. These effects were manifested in increased BW gain in yearlings.

Key Words: Liver, Muscle, IGF-I

838 Production, purification and characterization of porcine recombinant insulin-like growth factor binding protein (rpIGFBP)-3 and an anti-rpIGFBP-3 antibody that inhibits IGFBP-3 activity. M. S. Pampusch, E. I. Kamanga-Sollo, M. E. White, M. R. Hathaway, and W. R. Dayton*, *University of Minnesota, St. Paul, MN*.

Insulin-like growth factor binding protein (IGFBP)-3 mediates the biological actions of insulin-like growth factors and may have IGF-I-independent effects on proliferation and apoptosis. IGFBP-3 expression is down-regulated during differentiation of porcine embryonic myogenic (PEM) cells. In order to better assess the role of IGFBP-3 in PEM cell proliferation and differentiation, we have produced and purified recombinant porcine IGFBP-3 (rpIGFBP-3) and an antibody specific for rpIGFBP-3. The N terminal sequence of IGFBP-3 was obtained by 5# RACE PCR using porcine liver RNA as a template. The full open reading frame of IGFBP-3 was amplified from porcine liver RNA and sequenced in both directions by fluorescent automated DNA sequencing. The expressed IGFBP-3 construct contained a 6- histidine tag on the C terminus and a secretion signal. rpIGFBP-3 was produced in a baculovirus expression system under serum-free conditions and purified from conditioned media by nickel affinity chromatography followed by IGF-I-affinity chromatography. Purity of the protein was assessed by silver stained SDS PAGE. rpIGFBP-3 binds IGF-I, as shown by ligand blotting, and cross-reacts with anti human IGFBP-3 antibody. rpIGFBP-3 suppresses IGF-I-stimulated proliferation of cultured PEM cells. A rabbit polyclonal IgG raised against rpIGFBP-3 recognizes rpIGFBP-3 and native IGFBP-3 in serum but does not crossreact with other proteins present in PEM cell lysate or PEM cell conditioned media. The anti-rpIGFBP-3 antibody abolishes the anti-proliferative activity of rpIGFBP-3 in PEM cell cultures. These reagents will provide the tools needed to study the IGF-dependent and IGF-independent effects of IGFBP-3 on proliferation and differentiation of PEM cells.

Key Words: IGFBP-3, Myogenic Cell Culture, Porcine

839 Serum insulin-like growth factor binding protein-3 (IGFBP-3) concentrations parallel antimicrobial-induced increases in serum insulin-like growth factor I (IGF-I) concentrations in pigs. M. R. Hathaway*, M. S. Pampusch, M. E. White, and W. R. Dayton, *University of Minnesota, St. Paul, MN*.

Previously, we have shown that sera obtained from pigs receiving subtherapeutic levels of dietary antimicrobials have increased levels of insulin-like growth factor-I (IGF-I). Since the insulin-like growth factor binding proteins (IGFBP) regulate the bioactivity of the IGFs the present study was designed to determine whether feeding the antimicrobial Aureozol to young pigs also altered IGFBP concentrations. The effect of subtherapeutic antimicrobial supplementation on the sera concentrations of IGFBP-2,-3, and -4 was determined in crossbred weanling pigs. Pigs were allotted to a diet with or without Aureozol for 4 wk. IGFBP-3 and IGF-I analyses were performed on blood samples that were drawn weekly. Four weeks after Aureozol was included in the diet of weanling pigs, circulating levels of IGFBP-3 were increased 45.7% compared to pigs fed the control diet. After an initial drop at weaning, serum IGFBP-3 values increased gradually over time, reaching pre-weaning levels in the Aureozol group on d 21 and in the control group on d 27. The treatment induced difference in serum IGFBP-3 was detected on d 21 ($P < .001$) and d 27 ($P < .001$). In direct contrast, sera IGFBP-2 levels increased with weaning and then decreased gradually over time to pre-weaning levels by d 21. Sera IGFBP-2 levels did not differ between treatment groups at any time ($P < .57$). Sera IGFBP-4 levels did not differ between treatment groups or between time points throughout the study. Aureozol supplementation resulted in a 45.2% increase in serum IGF-I concentrations overall ($P < .03$). The Aureozol fed pigs had a 14.2% increase in body weight gain ($P < .014$) and a 59.6% increase in average daily gain ($P < .012$) compared with pigs fed the control diet. Antimicrobial-induced increases in serum IGFBP-3 and serum IGF-I may be involved in the enhanced growth performance observed with Aureozol supplementation.

Key Words: IGFBP, Pig, Antimicrobial

840 Insulin-like growth factor binding protein (IGFBP)-3 is partially responsible for the proliferation-suppressing activity of transforming growth factor beta (TGF beta) on porcine embryonic myogenic cell cultures. E. I. Kamanga-Sollo, M. S. Pampusch, M. E. White, M. R. Hathaway, and W. R. Dayton*, *University of Minnesota, St. Paul, MN*.

Transforming Growth Factor beta (TGF beta) has been shown to enhance insulin-like growth factor binding protein (IGFBP)-3 production and release in a number of cell types. Similarly, we have shown that treatment of cultured porcine embryonic myogenic (PEM) cells with TGF beta causes a 2 to 3 fold increase ($P < .01$) in IGFPB-3 protein in conditioned media (assessed using IGF-I Western ligand blotting) and a similar increase ($P < .01$) in steady-state mRNA levels (measured using real-time RT-PCR). Additionally, treatment of PEM cells with either TGF beta or recombinant porcine IGFBP-3 (rpIGFBP-3) causes a concentration-dependent suppression of IGF-I-stimulated proliferation (measured by tritiated-thymidine incorporation). We have produced and characterized a polyclonal antibody specific for rpIGFBP-3 and we have shown that this antibody is able to completely inhibit the ability of exogenous IGFBP-3 to suppress proliferation of cultured PEM cells. Utilizing this anti-rpIGFBP-3 antibody, we have shown that inactivation of IGFBP-3 in the medium of TGF beta-treated PEM cells results in loss of 50 to 70 percent of the TGF-beta-induced suppression of PEM cell proliferation. These data show that the TGF beta-induced increase in IGFBP-3 is responsible for part of the suppression of proliferation observed in TGF beta-treated PEM cells. This observation is particularly significant in view of the role of the TGF beta superfamily member myostatin in regulating skeletal muscle mass.

Key Words: IGFBP-3, TGF beta, Porcine Muscle Cells

841 Polyclonal antibodies recognize only the latent peptide of myostatin but not the active form of myostatin in the chicken. Y.S. Kim*, Y.K. Lee, and M.A. Dunn, *University of Hawaii at Manoa, Honolulu, HI*.

Myostatin regulates skeletal muscle growth, but very little is known about the molecular mechanism by which myostatin increases muscle growth. Because anti-myostatin antibodies will be useful in investigating the mechanism of action of myostatin, we designed a project to produce polyclonal anti-myostatin antibodies. A PCR-amplified full sequence and a 369 bp C-terminal fragment containing the active form of chicken myostatin were cloned into an expression vector, and myostatin proteins were expressed in E. coli. Inclusion bodies containing the full sequence and C-terminal fragment were solubilized, then proteins were fractionated by SDS-PAGE. Myostatin bands were cut out and electro-eluted to prepare purified myostatins. Rabbits were immunized against the full sequence and C-terminal chicken myostatin to produce polyclonal anti-myostatin antibodies. IgG was separated from the sera using Protein A affinity chromatography. Antibody binding specificity was examined using Western transfer and immunoblotting. Both IgGs generated against the full sequence and C-terminal myostatin showed strong binding to the recombinant myostatins in a Western blot. When binding specificity was examined in various chicken tissues including liver, heart, skeletal muscle, crop, spleen, kidney and brain, the IgG generated against the full sequence myostatin had a prominent binding to a 37 kD band only in skeletal muscle, but not in any other tissues. Since the molecular wt of the latent peptide of myostatin is close to 37 kD, this result indicates that the polyclonal antibody probably recognizes only the latent peptide of chicken myostatin. In contrast, the IgG generated against the C-terminal recombinant myostatin did not show any skeletal muscle selective binding. Therefore, we conclude that antibodies recognizing the active form of chicken myostatin were not generated by immunization

with the recombinant myostatins probably due to the close homology of the active forms of myostatin across species.

Key Words: Anti-myostatin antibody, Myostatin, Chicken

842 The effect of conjugated linoleic acid on the differentiation of L8 myoblasts. C.S. Chung[1], T.D. Brandebourg*[2], and C.Y. Hu[2], [1]*Department of Animal Science, Chungbuk National University, Republic of Korea,* [2]*Oregon State University, Corvallis.*

Feeding conjugated linoleic acids (CLA) decreases subcutaneous fat and increases lean deposition in growing pigs. However, the underlying mechanisms responsible for these CLA-induced changes in carcass composition are poorly understood. The objective of this study was to examine the effect of CLA on muscle growth by determining how administration of either CLA or specific CLA isomers [cis-9,cis-11 (9c11c), cis-9,trans-11 (9c11t), trans-9,trans-11 (9t11t), trans-10,cis-12 (10t12c)] effects the differentiation of cultured muscle cells. In order to study the effect of CLA on muscle cell differentiation, L8 myoblasts were seeded in low-glucose DME supplemented with 10% fetal bovine serum on d -2 and induced to differentiate in DME supplemented with 2% horse serum on d 0. In separate experiments, CLA, 9c11c, 9c11t, 9t11t, or 10t12c was administered at concentrations of 10, 25, or 50 μM for each of the following intervals: d -1 to d 0, d 0 to d 1 and d 1 to d 4. Differentiation was evaluated by measuring creatine kinase activity on d 5 following treatment at the designated intervals. When administered from d -1 to d 0, the CLA mixture inhibited creatine kinase activity 27% at 25 μM and 42% at 50 μM while creatine kinase activity was decreased by 24%, 71% and 72% versus control as 10t12c concentration increased to 50 μM respectively. All other isomers failed to effect creatine kinase activity when administered for this duration regardless of treatment level. When administered from d 0 to d 1, 10t12c inhibited creatine kinase activity by 44% at 25 μM and 63% at 50 μM while neither the CLA mixture nor the remaining specific isomers had an effect. When administered from d 1 to d 5, the CLA mixture inhibited creatine kinase activity 51%, 66% and 73% as treatment levels increased to 50 μM respectively while the 10t12c isomer maximally inhibited creatine kinase activity 76% at 10 μM. Like the shorter intervals, no other isomer affected creatine kinase activity. These data suggest that the administration of CLA may inhibit muscle cell differentiation and thus fails to explain how feeding CLA to growing pigs results in increased lean gain.

Key Words: CLA, Differentiation, L8 myoblasts

843 Effects of synthetic conjugated linoleic acid (CLA) or bio-formed CLA as high CLA beef on rat growth and adipose tissue development. P.S. Mir*[1], E.K. Okine[2], L. Goonewardene[3], M.L. He[1], and Z. Mir, [1]*Agriculture and Agri-Food Canada, Lethbridge AB,* [2]*University of ALberta, Edmonton AB,* [3]*Alberta Agriculture Food and Rural Development, AB.*

Two experiments were conducted concurrently for 60 days with rats to determine the effects of feeding synthetic CLA containing 53% CLA cis 9, trans 11 and 44% CLA\ trans 10, cis 12\ or bio-formed CLA as high CLA beef from steers fed sunflower oil to increase CLA content by 144% from 3.36 to 8.20 mg/g lipid, on adipose tissue development. In experiment 1, 30 (10/diet) weaned male Wistar rats (51 $\pm$ 0.65 g) were fed, ad libitum, a control diet containing casein and soybean oil, control with supplemental synthetic CLA at 1.1% of diet DM or the control with sunflower oil replacing the soybean oil. In experiment 2, 20 (10/diet) weaned male Wistar rats (52.5 $\pm$ 2.5g) were fed, *ad libitum*, diets where freeze dried beef replaced the casein. The meat in the two diets was derived from either steers raised without dietary oil or from high CLA beef. At the end of the experiment the rats were humanely sacrificed and the organs, muscles and the retro-peritoneal and inguinal fat pads were extracted. In both experiments diets fed to the rats did not affect rate of growth or carcass, muscle and organ (liver, heart and kidney) weights. However, in experiment 1, dietary synthetic CLA reduced ($P<0.01$) weight of the retro-peritoneal fat pad relative to that in rats fed the control diet, but not adipocyte number in either fat depot. Although fat pad weight in rats fed sunflower oil was similar to that of rats fed the control diet, the adipocyte number was increased ($P<0.05$) by 37%. In experiment 2, fat pad weights were similar for the two meat treatments, but adipocyte number in both pads was decreased ($P<0.05$) in rats fed the high CLA beef by 40%. Data suggests that dietary CLA whether synthetic or from high CLA beef can decrease lipid storage potential by decreasing adipocyte numbers and size in fat pads.

Key Words: Rat, adipose development, CLA, high CLA beef

844 Study of carcass, organ, muscle, fat tissue weight, and concentration in rats fed CLA or its precursors by Principal Component Analysis (PCA). L.A. Goonewardene*[1], Z. Wang[1], P.S. Mir[2], E. Okine[3], Z. Mir[2], and M. He[2], [1]*Alberta Agriculture, Food and Rural Development, Edmonton, AB,* [2]*Agriculture and Agri-Food Canada, Lethbridge, AB,* [3]*University of Alberta, Edmonton, AB.*

Carcass, organ and muscle weight, and fat tissue data were obtained from 30 weaned male Wistar rats fed one of three diets, (ten rats/diet) ad libitum for 60 d. The diets were basal containing casein and soybean oil supplemented with conjugated linoleic acid (CLA; 53% cis 9, trans 11 and 44% trans 10, cis 12) at 1.1% diet dry matter, basal where sunflower oil replaced soybean oil, and basal where freeze dried beef derived from steers fed oil to increase CLA replaced casein. The Principal Component Analysis was used to identify linear relationships among variables using a multivariate approach, describe the variables by a few components, and obtain an overview of the pattern of variables relative to the diets. The first principal component extracted carcass weight, organ and muscle weight variables and accounted for 41.3% of the total variation. The second principal component included all of the fat tissue variables and accounted for 20.5% of the total variation. The rats fed the synthetic CLA diet were associated with high carcass, liver, kidney, and heart, gastrocnemius and soleus muscle weights, and low retroperitoneal and inguinal fat weights, and low adipocyte numbers in the fat tissues. In rat models, short periods of synthetic CLA feeding may have a greater impact on decreasing fat accretion in selected fat tissues and feeding either CLA enriched meat or sunflower oil is expected to have little effect, as fat reduction is both CLA intake and isomer dependent.

Key Words: Conjugated Linoleic Acid, feeding, Principal Component Analysis, muscle, fat, organs

845 Measurement of bone mineral content and bone mineral density of pig carcasses by dual energy x-ray absorptiometry. A. D. Mitchell*[1], A. M. Scholz[2], and V. G. Pursel[1], [1]*USDA, Agricultural Research Service, Beltsville, MD,* [2]*Ludwig Maximillians University-Munich, Oberschleissheim, Germany.*

Traditional methods of assessing the bone mineral status of pig carcasses involve dissection, ashing, and/or chemical analysis. By the use of dual energy X-ray absorptiometry (DXA) it is now possible to perform many of these measurements on the intact carcass. The purpose of this study was to quantify the total and regional bone mineral content (BMC, g) and bone mineral density (BMD, g/cm^2) in pig carcasses. A total of 393 half-carcasses (10 - 52 kg, CWT) were scanned by DXA. Regional analysis was available only for CWT >30 kg. Results were analyzed by linear and polynomial regression. Relative to CWT, the BMC for half-carcass, shoulder, ham, loin and side (ribs) were described by 2nd order polynomial regression with R^2) values of 0.98, 0.74, 0.95, and 0.82, respectively. Relative to half-carcass BMC, the BMC of the shoulder, ham, loin and side were described by linear regression with "growth" coefficients (b = slope) of 0.467, 0.327, 239, and 0.011 and R^2) values of 0.91, 0.77, 0.82, and 0.04, respectively. Likewise, the increase in BMD relative to CWT was described by 2nd order polynomial regression with R^2) values of 0.79, 0.56, 0.01, 0.25, and 0.01, for half-carcass, shoulder, ham, loin, and side, respectively. Relative to half-carcass BMD, the BMD of the various regions was described by linear regression with "growth" coefficients (b = slope) of 1.349, 0.777, 0.911, and 0.157 for the shoulder, ham, loin, and side. Thus, during growth from 30 to 52 kg CWT, the largest increase in BMC and BMD was observed in the shoulder while the least amount of increase occurred in the side or ribs.

Key Words: Bone Mineral, Pigs, DXA

846 Predicting growth efficiency in live animals using infrared thermography (IRT). S.L. Scott*[1], A.L. Schaefer[2], A.D. Kennedy[3], R.J. Christopherson[4], A.K.W. Tong[2], and H. Harrison[5], [1]*Agriculture and Agri-Food Canada, Brandon, Manitoba, Canada,* [2]*Agriculture and Agri-Food Canada, Lacombe, Alberta, Canada,* [3]*University of Manitoba, Winnipeg, Manitoba, Canada,* [4]*University of Alberta, Edmonton, Alberta, Canada,* [5]*VitaHealth Inc., Winnipeg, Manitoba, Canada.*

Within populations of beef cattle raised for slaughter, there is a great deal of variability in growth efficiency. This leads to variability in profit per head, because some animals are marketed underfinished while penmates may be marketed overfinished. The objective of this study was to devolop a non-invasive, inexpensive method to predict growth efficiency in live cattle in order to sort them into uniform groups. Since more efficient animals lose less heat to the environment, we used infrared thermography (IRT) to measure heat lost from the animal's body by radiation; this avenue of heat loss accounts for around 60% of total heat loss. The heat loss was then related to growth efficiency to develop a predictive index. Eighteen yearling crossbred heifers averaging 370 kg body weight were randomly allocated to one of two treatments: 1) Cold ad libitum (CAL) in which animals were adapted to -18°C for three weeks in environmental chambers and given a pelleted feed (alfalfa-based; 88.7% dry matter, 0.68 Mcal NE kg^{-1}, 12% crude protein, 0.02% Rumensin® and 0.025% MGA) ad libitum, and 2) Warm ad libitum (WAL) in which the animals were adapted to +18°C for three weeks in environmental chambers and given the same pelleted feed ad libitum. Heat loss was measured by two methods on day 22 of the study in a thermoneutral environment: 1) Measurement of oxygen consumption by indirect calorimetry, and 2) Determination of total radiant heat loss from the body surface using infrared thermography. Body weights and feed intake of the animals were also measured throughout the study. Heat production calculated from oxygen consumption was 0.133 Mcal $kg^{-0.75}$ day^{-1} in the WAL group and 0.155 Mcal $kg^{-0.75}$ day^{-1} in the CAL group ($P<0.05$). A Spearman ranking test showed that feed efficiency significantly ranked with heat loss measured by IRT ($P<0.05$). This means that animals with the highest growth efficiencies displayed the lowest heat loss values based on IRT. Therefore, heat loss as measured by IRT can be used as an index of feed efficiency in cattle.

Key Words: Infrared thermography, Growth efficiency, Beef cattle

847 Application of the Richard's function to characterize growth potential for different biological types of cattle. C. B. Williams*, *U.S. Meat Animal Research Center, Clay Center, NE.*

Different patterns of growth in cattle result mostly from different patterns of nutrient intake and most of the observed variation in nutrient intake is due to diet quality, and physical capacity and nutrient requirements of the animal. Nutrient intake of animals given ad libitum access to a nutrient dense diet is largely controlled by nutrient requirements. To predict growth response for different nutrient intakes, the nutrient requirements for growth should be based on the full growth potential of the animal. On high quality diets, nutrient intake would support potential growth, and on low quality diets, physical capacity would limit nutrient intake, resulting in a lower than potential growth response. The Richard's function was used to characterize the growth potential of 21 biological types of cattle that were evaluated at MARC. Parameters for this function are 1) asymptotic value for empty body weight (**EBW**) at maturity (**A**), 2) scaling parameter (**b**), 3) maturing index (**k**), and 4) inflection parameter (**M**). Standard reference EBW (**SREBW**) was defined as EBW of mature cattle that contained 25% fat, and stage of maturity was defined as EBW/SREBW. The value of M was set to 5.8 for all breeds, so that the mean stage of maturity for steers and females was .5 at the point of inflection. Breed values for A were set at 1.6 and 1.4 times published values of SREBW for steers and cows, respectively. These values were based on data that showed steers and cows on high quality diets attained mature EBW that were 1.6 and 1.4 times SREBW, respectively. Time at birth was set to zero, and breed values for b were calculated from birth weight, A, and M. Breed values for k were estimated by using the first derivative of the Richard's function to predict observed growth with values of k that varied from .002 to .004 in increments of .0001. The k value that minimized the sum of squared deviations between observed and predicted values was selected. Evaluation using independent data sets showed a close agreement between predicted and observed growth curves.

Key Words: Cattle, Growth Curves, Model

Meat Science and Muscle Biology
Meat Quality

848 Effect of days fed on live weight gains and carcass traits in feedlot heifers. G. L. Bishop*, T. E. Lawrence, J. R. Brethour, T. T. Marston, and B. J. Johnson, *Kansas State University, Manhattan.*

A serial harvest trial was conducted to quantify the effects of days on feed (DOF) on feedlot performance and carcass characteristics of feedlot heifers. Moderate framed, crossbred heifers (n=160, BW=362 ± 5.3 kg) were processed, implanted with Synovex® Plus™, and allotted to different feeding groups (92, 113, 134, and 155 d). Heifers were harvested at a commercial packing facility and carcass measurements were collected approximately 24 h postmortem. Feedlot ADG was similar ($P>0.58$) between feeding groups from d0 to d92. Overall ADG was similar ($P>0.07$) for heifers fed 92 (1.21 kg/d), 113 (1.30 kg/d), and 134 d (1.21 kg/d) but decreased ($P<0.01$) for heifers fed 155 d (1.09 kg/d). Final weight increased from d92 to d134 ($P<0.01$). Heifers harvested on d155 had similar ($P>0.39$) final weight as their d134 contemporaries. Incremental increases ($P<0.05$) in hot carcass weight were observed with increasing DOF (92=284.5 kg; 113=300.0 kg; 134=323.2 kg; 154=333.6 kg). Dressing percentage (DP) was lowest ($P<0.07$) at d92 and d113 (59.6% vs. 58.8%, respectively), intermediate ($P<0.01$) at d134 (60.1%) and greatest ($P<0.01$) at d155 (62.1%). Marbling scores were similar ($P>0.54$) between d92 and d113, and increased from d113 to d134 ($P<0.01$). No differences ($P>0.50$) were measured in ribeye area (REA) between d92, d113, and d134 heifers, but REA was greatest ($P<0.01$) in heifers fed 155 d. Backfat increased ($P<0.05$) from d92 to d113, but d113, d134, and d155 were not different. Yield grade increased ($P<0.05$) from d92 to d113, but was similar ($P>0.05$) for groups fed longer than 113 d. Overall carcass maturity did not differ, but tended to increase at d155 ($P<0.06$). Increasing DOF caused heifer carcasses to become fatter and heavier with greater marbling scores, while live weight gain decreased.

Key Words: Heifers, Serial harvest, Carcass

849 The effect of pregnancy status on feedlot performance and carcass quality. G. L. Bishop*, T. E. Lawrence, J. R. Brethour, and T. T. Marston, *Kansas State University, Manhattan.*

Sixty-eight, spring-born yearling heifers were used to determine the effects of pregnancy status on carcass traits and feedlot performance. All heifers were estrus synchronized and artificially inseminated 60 d prior to the finishing phase. Ultrasound and rectal palpation was used to determine if the heifers would be considered open (OPEN) or pregnant (PREG). Heifers were placed in the feeding facility (BW=418 ± 5.3 kg), and after a two wk step-up period, were fed a sorghum grain-based diet (CP=12.9%, NEg=1.50 Mcal/kg) until harvest. Heifers did not receive a growth implant during their lifetime. Ultrasound was used to predict a backfat endpoint of 13 mm at either 105 or 147 days on feed. Cattle were individually weighed within 24 h of slaughter. Fetal age averaged 174 d at harvest. Pregnancy status was visually confirmed at the abattoir and agreed with treatment assignments. After a 24 h chilling period, carcass measurements were collected. Because backfat was similar between harvest dates ($P>0.99$), carcass data were pooled for analysis. Final weight, ADG, and backfat were not different ($P>0.50$) for OPEN vs. PREG heifers (579 ± 6.3 kg, 1.30 kg/d, 13.5 mm; 584 ± 8.2 kg, 1.33 kg/d, 14.2 mm, respectively). The OPEN and PREG heifers had similar ($P<0.35$) hot carcass weights (362 ± 4.5 kg vs. 355 ± 6.0 kg, respectively). Even with these similarities, dressing percentage was greater ($P<0.01$) for OPEN (62.6%) than for PREG (60.4%) heifers. There was a trend ($P=0.16$) for OPEN heifers to have about 3.2