

include: 1) follicular development; 2) endocrinology associated with follicular development; 3) corpus luteum development and regression; 4) endocrinology associated with corpus luteum function; and 5) a summary of the estrous cycle. This review will also include an overview of prostaglandin F_{2α}, GnRH, estradiol cypionate (ECP), and progestins in terms of their applications in estrus and/or ovulation synchronization protocols. A better understanding of physiology and endocrinology of the estrous cycle will improve reproductive management of dairy cattle and facilitate the successful application of AI, including fixed-time AI protocols.

Key Words: Estrous Cycle, Dairy Cattle

64 Utility of CIDRs in improving reproductive performance and management of dairy cows. D.J. Kesler* and T.L. Steckler, *University of Illinois*.

The CIDR, an intravaginal progesterone insert (IPI), was approved by the FDA in 2002. Although FDA approved the use of the CIDR for synchronization of estrus in dairy and beef heifers and beef cows, advancement of the first pubertal estrus in beef heifers, and advancement of the first postpartum estrus in beef cows, it has several additional applications including estrus synchronization of dairy cows. The approved protocol includes the injection of PGF six days after CIDR insertion and CIDR removal the next day; however, this may not be the protocol with maximal efficacy. Other applications evaluated include: 1) inclusion with Ovsynch for synchronization of heifers and cows, 2) inclusion with Ovsynch for preparing ET recipient cows, 3) inclusion with Ovsynch for treatment of cystic ovarian disease, 4) treatment after insemination to enhance the establishment of that pregnancy, and 5) treatment for synchronization of the return estrus of cows not conceiving to the first synchronization protocol. When the IPI was included with Ovsynch, inserted at the first GnRH injection and removed at the PGF injection seven days later, it has been demonstrated to improve pregnancy rates in anestrous dairy cows (20 more pregnancies per 100) and all cows combined (15 more pregnancies per 100). The IPI improved pregnancy rates in ET recipient cows when it was included with Ovsynch. There were 10 more pregnancies per 100 cows treated with the Ovsynch protocol that included the IPI. Overall, 94% of the cows starting the protocol received embryos and 64% became pregnant. When the IPI was used with the Ovsynch protocol 100% of the cystic cows ovulated and 44% became pregnant at the timed AI subsequent to treatments. When the IPI was administered on day 7 post-breeding through day 14 it either improved (one study had 12 more pregnancies per 100) or have no effect (other studies) on pregnancy rate to the previous breeding. Studies have demonstrated that nonpregnant cows administered the CIDR about 14

to 21 days after breeding express a shorter period of return estrus than untreated cows. In summary, the CIDR/IPI has many applications to improve pregnancy rates in dairy cows and facilitate reproductive management.

Key Words: CIDR, Synchronization, Embryo Transfer

65 Monitoring reproductive performance: Tools and rules. R. L. Wallace*, *University of Illinois*.

The reproductive management of dairy herds has a sizeable impact on the productivity and profitability of those operations. Reproductive inefficiency results in excessively long lactations where milk production progressively declines or prolonged non-productive periods (long dry periods). Both results are costly to the dairy producer, but a long-term effect may be inadequate numbers of replacement heifers to maintain stable herd size. Purchased replacements increase the risk that new diseases will be introduced on the dairy operation, which may have even greater and more long-lasting impact on the productivity and profitability.

Reproductive failure accounts for 20-25% of the reason dairy cows are marketed for beef. Abortions may contribute to this figure, yet on average, less than 3% of cows abort each year (NAHMS Dairy 96). Infertility precludes the option of removing animals from the herd because they are inefficient milk producers. Not all reproductive cull cows are sold because they are infertile. Often cows have not been offered an adequate opportunity to express their ability to reproduce. Successful reproduction is a combination of the assigned length of the voluntary waiting period (VWP), the proportion of cows bred due to detected heat or timed insemination (service rate), and the proportion of cows that conceive and carry a calf to term (conception rate). The pregnancy rate can then be defined as the proportion of cows presented for breeding that conceive (service rate times the conception rate). The 21-day pregnancy rate evaluates this parameter over selected 21 day intervals.

Monitoring dairy herd reproductive programs involves analysis of herd-average parameters such as days in milk, days to first breeding, days open, length of the dry period, calving interval and age at first calving. Consultants to dairy operations can use benchmarks for each of these parameters, but the affects of statistical bias and data momentum must be considered. Newer software programs can provide more contemporary reproductive analysis using 21-day pregnancy rates and statistical process control. These analyses can provide information so producers can make decisions to affect positive change instead of reacting to past problems from historical data.

Key Words: Reproduction, Monitoring, Pregnancy Rate

Graduate Student Competitive Research Papers - Ph.D. Division

69 Influence of prepubertal dietary protein level and age at first calving on early-weaned replacement beef heifer performance. W. J. Sexten*, D. B. Faulkner, and F. A. Ireland, *University of Illinois at Urbana-Champaign*.

Simmental x Angus heifer calves (n=310) were utilized in a 2 x 2 factorial arrangement to evaluate prepubertal dietary protein level and age at first calving on performance, reproductive and maternal traits. Heifer calves were weaned early at 67 ± 19.9 days of age and fed either a 19% or 23% CP diet and bred to calve at 18 (18M) or 24 (24M) months of age. Diets were isocaloric, calculated to provide 2.32 Mcal NE_m/kg DM and 1.42 Mcal NE_g/kg DM. Eighteen-month heifers were offered feed *ad libitum* from weaning to breeding while 24M heifers were limit fed at 1.8% of BW. Data were analyzed using the MIXED and GENMOD procedures of SAS. Diet did not significantly (P > 0.05) influence pre-breeding ADG, breeding weight, hip height, pelvic area, or fat thickness. Prebreeding ADG was greater (P < 0.05) for 18M (1.1 kg) than 24M (0.67 kg). Eighteen-month heifers were lighter, (305.1 kg) shorter (116 cm) and fatter (0.64 cm) at breeding than 24M heifers (319.0 kg, 122.6 cm, and 0.39 cm) (P < 0.05). The 18M heifers remained lighter and shorter (P < 0.05) through weaning of their first calf yet BCS was not influenced (P = 0.16). Prepubertal dietary protein did not influence (P > 0.05) pregnancy, calving or weaning percentages. Pregnancy, calving and weaning percentages tended (P < 0.10) lower for 18M heifers (51%, 45.8% and 39.7%) compared to 24M (66.7%, 62.5% and 53.5%). Birth weight and calving ease were not influenced (P > 0.05) by prepubertal dietary protein level or age at first calving. Milk production, calf wean-

ing weight and calf birth to weaning ADG were not influenced (P > 0.05) by prepubertal dietary protein treatments. Milk production, calf weaning weight and calf birth to weaning ADG were reduced in 18M (3.8 kg, 69.2 kg and 0.53 kg/d) compared to 24M (5.1 kg, 82.0 kg and 0.68 kg/d) (P < 0.05). Prepubertal dietary protein level did not influence performance, reproductive or maternal traits. Eighteen-month calving heifers entered the herd earlier however reproduction and maternal performance was reduced.

Key Words: Heifer Development, Dietary Protein, Age at First Calving

70 Effect of corn distiller's dried grains with solubles (DDGS) and/or antimicrobial regimen on the ability of growing pigs to resist a Lawsonia intracellularis challenge. M. H. Whitney*, G. C. Shurson, R. M. Guedes, C. J. Gebhart, and N. L. Winkleman, *University of Minnesota, St. Paul, MN*, ²*Swine Services Unlimited, Inc., Morris, MN*.

Two experiments were conducted to determine if including DDGS in the diet reduces the incidence and/or severity of infection in growing pigs after a *L. intracellularis* challenge. In Experiment 1, eighty 17-d old weaned pigs were blocked by sex and weight and randomly allotted to one of four treatment groups: negative control (NC) - unchallenged, corn-soy diet; positive control (PC) - challenged, corn-soy diet; 10% DDGS diet (10D) - challenged; and 20% DDGS diet (20D) - challenged. Challenged pigs were orally inoculated with 1.5 x 10⁹ *L. intracellularis*

after a 4-wk pre-challenge period. On d 21 post-challenge, pigs were euthanized, lesions of intestinal mucosa was evaluated, and ileal tissue samples were analyzed by immunohistochemistry to determine presence and proliferation of *L. intracellularis*. Feeding DDGS did not beneficially affect lesion length, prevalence, proliferation of *L. intracellularis*, or severity of lesions ($P > .10$). In Experiment 2, 100 pigs were managed similarly to pigs in Experiment 1, except that the dosage of *L. intracellularis* was reduced to 8.0×10^8 . Treatments consisted of NC and 4 challenged groups: PC, 10D, PC + AR (antimicrobial regimen), and 10D + AR. For AR treatments, diets contained 30 g/ton BMD[®] continuously, with Aureomycin[®] pulsed at 500 g/ton from d 3 pre-challenge to d 11 post-challenge. Feeding DDGS reduced ileum and colon lesion length and prevalence ($P < .05$), and reduced severity of lesions in the ileum ($P < .05$) and colon ($P < .10$) compared to other challenged pigs. Pigs fed AR had a lower prevalence and severity of lesions in the jejunum ($P < .05$), and tended to have reduced total tract lesion length ($P = .11$). No differences in length, severity, or prevalence of lesions were observed in 10D + AR pigs ($P > .15$), but fecal shedding of *L. intracellularis* was reduced on d 14 post-challenge ($P < .05$). No dietary effects on fecal shedding were observed by d 20 post-challenge ($P < .10$). Proportion of cells infected with *L. intracellularis* was reduced when DDGS ($P = .05$) or antimicrobials ($P = .10$) were fed. Dietary inclusion of DDGS may provide some benefit to growing pigs subjected to a moderate ileitis challenge, similar to a currently approved antimicrobial regimen, but not under conditions of a severe *L. intracellularis* challenge.

Key Words: Pig, Ileitis, Distiller's Dried Grains with Solubles

71 Selection for placental efficiency in swine: Genetic parameters and trends. H Mesa*, T.J Safranski, K.M Cammack, and W.R Lamberson, *University of Missouri-Columbia*.

Direct and maternal genetic parameters and trends were estimated using data from two lines divergently selected for three generations on an index that included litter size (LS), birth weight (BW), and placental weight (PW). The index was designed to modify LS through changes in placental efficiency (PE), defined as the ratio of BW: PW. Animal model and MTDFREML procedures were used to estimate direct and maternal genetic effects and their correlations and to compute estimated breeding values (EBV) for BW (n=1788), PW (n=1442), PE (n=1442), and LS (n=125). The model included the fixed effects of generation and line, with the addition of parity number for LS and of sex for the other traits. Contemporary group was fitted as an uncorrelated random effect for all traits. Quadratic regression on LS was used as a covariate for BW, PW, and PE. Direct heritability estimates from single-trait models were .02, .21, .09, and .08 for BW, PW, PE, and LS, respectively. Maternal heritability estimates were .39, .38, .29, and .03 for BW, PW, PE, and LS, respectively. Genetic correlations between direct and maternal effects were -.51 and -.20 for PW and PE, respectively, and were outside the parameter space for BW and LS. Direct genetic correlations from two-trait models were .77 for BW and PW, -.27 for BW and PE, -.69 for PW and PE, -.19 for LS and BW, -.78 for LS and PW, and .37 for LS and PE. The GLM procedure of SAS was used to compare EBV lsmeans; the model included generation, line, and replicate within line. Divergence trend in direct EBV was 2.13 1.11 g, 17.12 2.34 g, .12 .02, and .00 piglets per generation for BW, PW, PE, and LS, respectively. At generation three, direct EBV tended to be higher in the upward (H) than the downward (L) selected line for BW (.81 2.05 g vs. -6.19 2.21 g, respectively; $P = .10$), tended to be lower in H than L for PW (-1.48 11.02 g vs. 34.62 11.85 g, respectively; $P = .07$), and were not different for PE ($P = .14$). These results indicate that BW, PW, and PE are susceptible to change by genetic selection, but the magnitude of the divergence observed did not result in detectable differences in LS.

Key Words: Genetic Parameters, Placental Efficiency, Pigs

72 Improvement of pregnancy rate to fixed-time artificial insemination with progesterone treatment in anestrus post-partum cows. C.L. Gasser*, E.J. Behlke, C.R. Burke, D.E. Grum, M.L. Mussard, and M.L. Day, *The Ohio State University*.

Potential for pregnancy in anestrus cows requires elevation of progesterone concentration (P4) before ovulation. Utilization of an intra-vaginal progesterone-releasing insert (IPI) ensures that elevated P4 occurs in all anestrus cows. The objective of this study was to determine if treating anestrus cows with an IPI prior to synchronized ovulation

would increase the pregnancy rate to fixed-time AI (TAI). Blood samples collected from post-partum beef cows (n = 419) on d -18 and d -9 (TAI = d 0) were analyzed for progesterone concentration; ovarian ultrasonography was performed on d -9; and cows were categorized accordingly as either estrous-cycling (CYC, n = 235) or anestrus (ANES, n = 184). All cows in the study received GnRH (100 µg) on d -9. ANES cows either were not treated (CONT, n = 111) or received an IPI (CIDR, n = 73) on d -9. All cows in the study were given prostaglandin F_{2α} on d -2, at which time the IPI was removed from ANES, CIDR-treated cows. In cows that exhibited estrus at least 24 h before d 0, AI was performed within 12 h (Early AI). In all other cows, TAI was performed on d 0, and those that were not detected in estrus 12 h previously received GnRH at TAI. None of the ANES, CIDR-treated cows exhibited estrus more than 12 h before TAI, whereas Early AI was performed in 11 and 3% of ANES, CONT-treated and CYC cows, respectively ($P < 0.05$). Conception rate at TAI was greater ($P < 0.05$) in ANES, CIDR-treated (55%) than ANES, CONT-treated cows (39%) and not different than the CYC group (54%). Consequently, pregnancy rate to TAI also was greater in ANES, CIDR-treated (55%) than ANES, CONT-treated cows (35%) and not different than the CYC group (53%). In conclusion, pregnancy rate to TAI was increased with progesterone treatment in anestrus cows through preventing premature estrus and increasing conception rate.

Key Words: Anestrus, CIDR, Synchronization

73 Increasing weaning age improves pig growth performance and profitability in a three-site production system. R.G. Main*, S.S. Dritz, M.D. Tokach, R.D. Goodband, and J.L. Nelsen, *Kansas State University, Manhattan*.

Two trials were conducted to determine the effects of weaning age on growing pig biologic and economic performance in a three-site production system. Trial 2 also evaluated the effects of modifying nursery feed budgets according to weaning age. In trial 1 (2,272 pigs), treatments included weaning litters at 12, 15, 18, or 21 d of age. In trial 2 (3,456 pigs), litters were weaned at 15, 16, 18, 19, 20, or 21 d of age and categorized into three treatments (15.5, 18.5, or 21.5 d of age). In trial 2, pigs in each age group were fed a nursery feed budget classified as more or less complex. Since feed budget did not affect ($P > 0.27$) performance, only weaning age effects are presented. Each trial was conducted as a randomized complete block design with four blocks of linked nursery and finishing sites (6 and 10 reps/block in trials 1 and 2, respectively). All wean age treatments were weaned from a 7,300-head sow farm on the same day into the same nursery. Each block remained intact as pigs moved from nursery to finishing site. Costs and revenue were measured for each pen. Increasing weaning age (12, 15, 18, or 21; and 15.5, 18.5, or 21.5 in trials 1 and 2, respectively) improved (linear, $P < 0.03$) wean-to-finish ADG (580, 616, 637, 687 8 g/d; 676, 697, 722 6 g/d), mortality rate (9.4, 7.9, 6.8, 3.6 0.95 %; 3.9, 3.4, 2.5 0.5 %), weight sold per pig weaned (94.1, 100.5, 104.4, 113.1 1.3 kg, 107.6, 111.6, 116.2 1.1 kg), income over costs (\$2.00, 5.11, 7.12, 11.19 0.52/pig; \$7.99, 10.04, 12.46 0.46/pig), and cost per hundred kg sold (\$86.19, 83.24, 81.49, 78.36 0.46; \$80.80, 79.25, 77.50 0.32). The improvements in growth and mortality largely occurred in the initial 42 d after weaning, with smaller growth improvements in finishing. These studies indicate that increasing weaning age up to 21.5 d predictably improves grow-finish throughput (1.80 0.12 kg sold/pig/d of age) and profitability (\$0.89 0.05/pig/d of age) within this three-site production system.

Key Words: Weaning Age, Pigs, Economics

74 Predicting bacterial crude protein production from urinary allantoin in spot samples. R.A. McDonald*, T.J. Klopfenstein, G.E. Erickson, and T.W. Loy, *University of Nebraska-Lincoln, Lincoln, NE*.

A metabolism trial was conducted to determine if allantoin in spot urine samples could be a predictor of bacterial CP (BCP) production in finishing heifers. Three diets, formulated to produce differences in BCP production, were fed to six ruminally fistulated heifers (BW=596±47 kg) in a 3 x 6 latin rectangle design. The high-moisture corn (HMC) diet was 88.3% HMC, 6.7% cottonseed hulls, and 5.0% dry supplement (DM basis). In the BRAN diet, 20% corn bran replaced HMC. Urea was included at 0.9% of DM in these two diets. In the third diet, urea was removed from the BRAN diet, and soybean meal (SBM) replaced HMC at 7.8% of DM. Periods consisted of 9 d for adaptation and 5 d

for collection. Spot urine and fecal grab samples were collected daily (0800, 1100, 1400, and 1700 h), and rumen pH and intake data were monitored continuously. BCP (g/d) production from allantoin excretion (BCP-A) was lower for HMC (750) versus BRAN (962; $P=0.02$) or SBM (909; $P=0.07$). Bacterial efficiency ($P=0.15$) and average pH ($P=0.13$) tended to be lower for HMC (8.8 and 5.44) than BRAN (10.3 and 5.78) and SBM (10.8 and 5.88). Dry matter digestibility ($P=0.08$) was higher for HMC (85.0) than BRAN (81.6) and SBM (80.0) with no difference in digestible DMI ($P=0.45$). Regression analyses suggest that efficiency increased with increasing pH and decreased as time below pH of 5.6 increased. Increasing digestible DMI increased BCP-A with an ef-

iciency of 13.1%. BCP-A followed NRC estimates (BCP-NRC) of BCP. These relationships suggest allantoin excretion is an effective marker of BCP production.

Dependent Variable	Independent Variable	Intercept	Slope	R ²
Efficiency	Average pH	-4.87	2.59	34.8
Efficiency	Time below 5.6	11.9	-0.003	51.7
BCP-A	Digestible DMI	-259	13.1	56.7
BCP-NRC	BCP-A	198	0.853	55.0

Key Words: Allantoin, Bacterial Crude Protein, Cattle

Graduate Student Competitive Research Papers - M.S. Division

76 The effects of dietary okara on performance of nursery pigs. J.R. Hermann* and M.S. Honeyman, *Iowa State University*.

Okara is the residue left from ground soybeans after the production of soymilk and tofu. Interest in okara exists because there is a need for a reliable source of high quality protein for organic pig production. Organic soymilk and tofu production is well established. The objective was to determine the effectiveness of dietary okara on performance of nursery pigs. Four replicate trials involving a total of 48 pigs (13.17 kg 0.32) were conducted at the Iowa State University Swine Nutrition Farm. The pigs and feeders were initially weighed and at 7 d intervals until the completion of each 18 d trial. Average daily gain (ADG), average daily feed intake (ADFI), and gain:feed (G:F) ratio were recorded for each pen. During each trial, three dietary treatments were fed: 1) okara 25% (25% of total diet), 2) okara 50% (50% of total diet), and control diet (composed of corn, soybean meal, oats, and essential vitamins and minerals). All diets contained 10% oats. Okara (ground pellets) was added to the diets at 25 and 50% levels by weight. Diets were isocaloric based on calculated analysis. Pigs were initially allotted by weight to one of three treatments. There were four pigs per pen for a treatment in each replication. Among pigs receiving dietary okara there were no differences in ADG, ADFI, and G:F ratio compared to pigs receiving the control diet. Pigs fed okara 25% had a higher ADG when compared to 50% okara ($P < 0.06$). Total G:F ratio was increased when diets supplemented with 25% were fed compared with 50% ($P < 0.04$). Dietary okara is a potential alternative to soybean meal in nursery pig diets. More research is needed to determine the levels at which okara can be substituted in the diet. The 50% okara rate was comparable to a conventional nursery pig diet. The 25% okara rate was equal and may be superior to a conventional nursery pig diet in growth and feed efficiency.

Key Words: Okara, Nursery Pigs, Soybean Meal

78 Anti-diabetic potentials of *Momordica charanta* and *Andrographis paniculata* and their effects on estrous cyclicity of Alloxan-induced diabetic rats. B. Reyes¹, N. Bautista^{*1}, N. Tanquilut¹, R. Anunciado², A. Leung¹, G. Sanchez¹, R. Magtoto³, S. Sajapitak⁴, H. Tsukamura⁴, and K.-I. Maeda⁴, ¹Pampanga Agricultural College, Magalang, Philippines, ²University of the Philippines, Los Banos, Laguna, Philippines, ³Iowa State University, Ames, Iowa, ⁴Nagoya University, Nagoya, Japan.

Momordica charanta and *Andrographis paniculata* are commonly used herbs by the diabetic folks in Pampanga, Philippines. While the anti-diabetic potential of *M. charanta* is well established, it is not known whether *A. paniculata* possesses anti-diabetic property. Moreover, the effects of these herbs on estrous cyclicity of diabetic rats are not known. Thus, in this experiment, we determined the anti-diabetic potentials of *M. charanta* and *A. paniculata* and their abilities to restore estrous cycle in Alloxan-induced diabetic rats. Extract and decoction of *M. charanta* and *A. paniculata*, respectively, were administered orally to Alloxan-induced diabetic rats from the day they showed diabetes through the blood and urinary glucose levels until the last day of the experiment. There were two groups of rats that served as positive (untreated Alloxan-induced diabetes) and negative controls. Rats treated with *M. charanta* and *A. paniculata* had higher body weight (BW) and lower feed and water intake compared with positive control starting from day 16 (D16) to D26 ($P < 0.05$), though lower BW and higher feed and water intake compared with negative controls ($P < 0.05$). Urinary glucose could not be detected in the *M. charanta*- and *A. paniculata*-treated rats from

D11 to D26. The blood glucose levels in *M. charanta*- and *A. paniculata*-treated rats were significantly reduced from D11 to D26 compared with positive controls ($P < 0.05$) and comparable with negative controls ($P < 0.05$). *M. charanta* and *A. paniculata* demonstrated potentials in the restoration of estrous cyclicity at about 8.4 days from the day it was disrupted. The reduction of blood glucose levels and restoration of estrous cycle in Alloxan-induced diabetic rats treated with *M. charanta*- and *A. paniculata* indicate that the herbs possess anti-diabetic potentials that could restore impaired estrous cycle.

Key Words: Diabetes, Estrous Cycle, Herbs

79 Effect of flax supplementation and a combined trenbolone acetate and estradiol implant on circulating IGF-1 and muscle IGF-1 mRNA levels in finishing cattle. J. D. Dunn*, J. P. Kayser, A. T. Waylan, E. K. Sissom, J. S. Drouillard, and B. J. Johnson, *Kansas State University, Manhattan*.

Combined trenbolone acetate (TBA) and estradiol (E₂) growth promotants have been reported to increase circulating IGF-1 and muscle IGF-1 mRNA levels in finishing cattle. The purpose of this experiment was to evaluate the effects of a 5% ground flaxseed (FLAX) supplement and a combined TBA/E₂ growth promotant, Revalor-S, (IMP) on both circulating IGF-1 and local muscle IGF-1 mRNA concentrations. Sixteen crossbred steers (initial BW = 397 kg) were randomly assigned to one of four treatments: 1) FLAX/IMP, 2) No FLAX/IMP, 3) FLAX/No IMP, 4) No FLAX/No IMP. Data were analyzed as a 2x2 factorial in a split-plot design (4 steers/treatment). Steers were allowed ad libitum access to a 93% concentrate diet for the entire study. Serum was harvested from blood collected via jugular venipuncture on d 0 (before implantation or FLAX addition), 14 and 28, and stored for subsequent use in analysis of circulating IGF-1 levels. Muscle biopsy samples (3.5 g) were obtained from the longissimus muscle on d 0, 14, and 28. Total RNA was isolated from the muscle samples and real-time quantitative-PCR was used to evaluate relative differences in gene expression. FLAX supplementation had no effect ($P > 0.10$) on circulating IGF-1 levels. No FLAX cattle had increased levels of muscle IGF-1 mRNA as compared to FLAX cattle on d 28 (4.4-fold, $P < 0.01$). Following implantation, sera from IMP steers had 52 and 84% greater ($P < 0.05$) IGF-1 levels as compared to sera from No IMP steers on d 14 and 28, respectively. On d 28, local muscle IGF-1 mRNA levels were increased 2.4-fold ($P < 0.01$) in biopsy samples obtained from IMP as compared to No IMP steers. These data support that the administration of a combined TBA/E₂ growth promotant increases circulating IGF-1 and local muscle IGF-1 mRNA concentrations in finishing cattle. However, this increase in muscle IGF-1 mRNA appears to be attenuated by the addition of a FLAX supplement.

Key Words: Beef Cattle, IGF-1, Trenbolone Acetate

80 Influence of weaning age, creep feeding and type of creep on steer performance and carcass traits. D. W. Shike*¹, D. B. Faulkner¹, D. F. Parrett¹, F. A. Ireland¹, and M. J. Cecava², ¹University of Illinois at Urbana-Champaign, ²Consolidated Nutrition, Fort Wayne, IN.

Angus x Simmental steers (n=168) were assigned to four treatments: Early Wean/High Concentrate (EW), Normal Wean/Creep (C), Normal Wean/Fiber Creep (FC) and Normal Wean/No Creep (NC) to determine the effects of weaning age, creep feeding and type of creep on calf performance and carcass traits. Steers were weaned at 63 ± 16.3 or 189