.259, .258, .254, and .254, respectively; P< .08) with increasing tryptophan level, characterized by an improvement in performance from the basal diet to the .145 Trp:Lys diet and a plateau thereafter. The pigs fed the positive control diet had similar ADG (P> .10), but tended to be more efficient (.286 vs. .253; P< .07), have less accretion of BF (1.17 vs. 4.09 mm; P< .02), and greater accretion of LEA (5.15 vs. 2.36 cm^2; P< .06) than pigs fed the corn-synthetic amino acid diet at .290 Trp:Lys. This experiment demonstrates that the TID tryptophan:lysine ratio for pigs from 90 to 115 kg may be as low as .145 Trp:Lys, and that very low protein diets with high levels of synthetic amino acids may compromise feed efficiency and carcass characteristics in late finishing barrows.

Key Words: Pigs, Tryptophan, Late finishing

531 Effect of dietary protein content and phase feeding on performance and plasma urea nitrogen patterns of growing pigs. N.T. Rodgers*[1,2] and R.T. Zijlstra[1], [1]*Prairie Swine Centre Inc.*, [2]*University of Saskatchewan, Saskatoon, Canada*.

Successful N management is important for sustainable pork production. Plasma urea nitrogen (PUN) concentration is related to excess dietary AA and urinary N excretion. Either a reduction in dietary protein or phase feeding (more diets with gradually reduced AA content fed within a period) should reduce PUN, indicating reduced urinary N excretion. Two levels of dietary protein (high, avg. 19%; low, avg. 17%; 3,400 kcal DE/kg; ideal AA profile) and 3 separate phase feeding programs (2 diets each 3 wk, 3.0 and 2.2 g dig. Lys/Mcal DE; 3 diets each 2 wk, 3.0, 2.6, 2.2 g dig. Lys/Mcal DE; 6 diets each 1 wk, 3.0 down to 2.0 g dig. Lys/Mcal DE) were used as 6 treatments in a 2 x 3 factorial arrangement in 6-wk studies with 25-kg barrows. In the performance study, 180 pigs were housed 5 pigs/pen with free access to feed, for 6 pens per treatment. In the metabolism study, 36 pigs were housed in individual pens pair-fed to performance pigs, for 6 pigs per treatment. Once per wk, pig weight and feed intake were measured, blood was collected from pigs in both studies, and PUN was analyzed. Overall ADG ranged from 905 to 957 g/d in the performance study and from 790 to 889 g/d in the metabolism study, without treatment differences (P > 0.10). Overall ADFI ranged from 1.89 to 1.96 kg/d in the performance study (P > 0.10), and was 1.88 for high and 1.86 kg/d for low protein in the metabolism study (P < 0.10). Overall, PUN differed between dietary protein levels (P < 0.01) but not among phase feeding programs (P > 0.10) for both studies. Specifically, for the performance study for high versus low protein, PUN was 19% higher in wk 1 and 12% in wk 2 (P < 0.01), not different in wk 3 and 4, and 11% higher in wk 5 and 6 (P < 0.10), with similar trends for the metabolism study. In summary, dietary protein content or phase feeding did not alter performance. Results indicate that PUN may predict expected reductions in urinary N excretion for reduced dietary protein, but not for phase feeding.

Key Words: Plasma urea nitrogen, Dietary protein, Pig

532 N-acetylcysteine is a highly bioavailable precursor of cysteine for protein accretion in piglets. A. K. Shoveller*[1], J. A. Brunton[1], P. B. Pencharz[1,2], and R. O. Ball[1,2], [1]*Department of Agricultural, Food and Nutritional Science, University of Alberta, Canada*, [2]*Departments of Nutritional Science and Paediatrics, University of Toronto, Canada*.

During the neonatal period, cysteine may be an indispensable amino acid for protein accretion. In addition to its role in protein synthesis, cysteine is also a precursor for the de novo synthesized antioxidant, glutathione. Antioxidant supplementation in grower-finisher pigs has been shown to improve the physical appearance of meat. However, cysteine is relatively unstable; therefore, there are advantages to supplying alternative forms. N-acetylcysteine (NAC) may be an effective means of supplying cysteine. NAC has been shown to increase the synthesis of glutathione. The bioavailability of cysteine from N-acetylcysteine was determined in intravenously fed piglets randomized to one of four diet treatments with equal intakes of methionine (0.3 g/kg/day) and 0.2 cysteine (CON), 0 NAC (zeroNAC), 0.13 NAC (lowNAC) or 0.27 g/kg/d NAC (highNAC). Piglets (2-4 days old; 1.8 kg, n= 16) were surgically implanted with femoral venous catheters for blood sampling and jugular catheters for diet and isotope infusion. All piglets recovered on complete diets for 2 days. On day 3, the test diets were initiated and continued until day 8. Blood was sampled 6h before test diet initiation and at time 0, 6, 12, 18, 24, 36, 48, 60, 72, 84, 96, 108, and 120 h. Urine was collected on ice in 24-h periods. On day 8, 3H-phenylalanine (1 mCi/kg) and a flooding dose of cold phenylalanine (150 mmol/L, 9mL/kg) were used to measure the fractional rate of protein synthesis. Total mean weight gain was highest in highNAC and CON, lower in lowNAC and lowest in the zeroNAC group; however, these differences did not reach significance. NAC retention was not different between lowNAC and highNAC, and was 85.2% and 80.3%, respectively (pooled SD=2.19, n=8). Preliminary data indicate that the zeroNAC group had significantly lower nitrogen retention (%) than the highNAC and CON groups, and the lowNAC groups were not different from either zeroNAC or highNAC and CON. Further analysis will confirm the availability of cysteine from NAC for protein synthesis. These data suggest that NAC is a highly available precursor for cysteine when used in an intravenous solution and administered to neonatal piglets.

Key Words: N-acetylcysteine, Protein synthesis, Piglet

533 The effect of dietary protein to energy ratio on carcass composition and fillet yields of rainbow trout and Atlantic salmon. P.A. Azevedo*, S. Leeson, and D.P. Bureau, *University of Guelph, Guelph, Ontario*.

Salmonid fish species have different protein and lipid deposition patterns between various body compartments. Yield of marketable products may be different for different species and these may respond differently to changes in diet composition. This study examined the effect of dietary digestible protein to digestible energy ratio (DP/DE) on dressed carcass and fillet yield and composition of market size Atlantic salmon and rainbow trout. Four isoenergetic diets (DE = 20 MJ/kg), with different DP/DE (18, 20, 22 and 24 g/MJ) were hand-fed to near-satiety to triplicate groups of 55 rainbow trout (initial body weight, IBW = 270 g/fish) and 55 Atlantic salmon (IBW = 460 g) reared at 8.5^{o}C over 24 weeks. Dressed carcass and fillet yields were determined and samples were collected for proximate analysis. Dressed carcass yield (DCY) was significantly higher (P < 0.0001) for salmon compared to trout. Diet had no effect on DCY of trout (mean 87%), but DCY of salmon showed a linear decrease (from 91 to 88 %) with decreasing DP/DE (P < 0.05). Fillet yield (%) was not affected by species or diet and averaged 62% of carcass weight. Moisture and crude protein (CP) contents of dressed carcass were significantly higher and lipid content was lower (P < 0.05) in salmon compared to trout, but this was not affected by diet. Fillet moisture and lipid contents were significantly affected by species and diet (P < 0.05). Salmon fillets had significant higher moisture and lower lipid contents than those of trout and both contents were affected by diet (P < 0.05). There was a linear decrease (P < 0.05) of water in salmon fillet and a linear increase of lipid content (P < 0.05) in trout fillet with decreasing DP/DE ratios. CP was not affected by diet but it was higher in salmon fillet than in trout fillet (P < 0.05). The results show that isoenergetic diets with different protein contents have significant effects on carcass yield of salmon and on chemical composition of salmon and trout carcasses.

Key Words: Salmonids, Carcass composition, Diet

Physiology
Estrus Synchronization II

534 Administration of gonadotropin-releasing hormone (GnRH) on d 5 or 6 of the estrous cycle alters follicle dynamics and increases pregnancy rates in beef cattle. A. M. Arnett*, J. D. Rhinehart, J. D. Bailey, R. B. Hightshoe, and L. H. Anderson, *University of Kentucky*.

Follicle ablation prior to maternal recognition of pregnancy (d 16 - 17) can improve pregnancy rates. Two experiments were conducted to determine if administration of GnRH on d 5 or d 6 (d 0 = first observed estrus) would alter follicular growth in heifers and improve pregnancy rates. The objective of the first experiment was to characterize ovarian follicular dynamics of heifers after administration of GnRH on d 5 or d 6 of the estrous cycle. Mature crossbred heifers (n = 15) were administered

a single injection of prostaglandin $F_2\alpha$ (i.m.; 25 mg; Prostamate) and were observed for estrous behavior. Heifers were administered GnRH (i.m.; 100 μg; Cystorelin) on either d 5 (n = 4) or d 6 (n = 5). Transrectal ultrasonography was used on alternating days from d 6 - 18 to determine the diameter (mm) of follicles and to map follicle growth and regression. Treatment with GnRH on d 5 and d 6 induced ovulation of first-wave follicles and formation of accessory corpra lutea in all heifers. Atresia and subsequent recruitment of the third follicle wave by d 17 occurred in all four and in three of five heifers administered GnRH on d 5 or d 6, respectively. Experiment two was designed to determine if pregnancy rate could be altered by administration of GnRH on d 5 or d 6 with embryo transfer on d 7. Recipient females (n = 58) from two locations were randomly allocated to either receive GnRH (n = 30; 100 μg) or to serve as untreated controls (n = 28). Recipient females were administered GnRH on d 5 (n = 8) at one location and d 6 (n = 22) at another location. Frozen embryos were transplanted on d 7 by experienced technicians. Pregnancy rate was determined on d 30 by transrectal ultrasound. A higher proportion ($P < 0.01$) of females administered GnRH on d 5 (75 %) or d 6 (77 %) became pregnant than females that received no treatment (29 %). This study concludes that administration of GnRH on d 5 or 6 alters follicular dynamics and may increase pregnancy rates in embryo transfer.

Key Words: GnRH, Follicle waves, Embryos

535 Synchronizing ovarian follicular development with melengestrol acetate (MGA) and a CIDR in beef cattle.

M.L. Mussard*[1], C.R. Burke[1], C.L. Gasser[1], and M.L. Day[1], [1] *The Ohio State University*.

Artificial breeding programs in beef cattle that involve timed AI require the presence of a healthy and responsive dominant follicle (DF) on the ovaries at the time of AI. This study evaluated the potential of feeding MGA to promote a persistent DF followed by a short period of progesterone (P4) treatment to induce development of a new DF. Each of 34 heifers and 25 postpartum cows was fed MGA (.5 mg/hd per d) for 14 d, followed by an intravaginal P4 insert (CIDR) for 4 d (d 0 = CIDR insertion). Ovarian structures were monitored by transrectal ultrasonography from d -17 until ovulation. Blood samples were collected on d 0 and 1 for analysis of P4 concentration. At the time of CIDR insertion, animals were classified as having a persistent DF (PF) or not (NPF), with persistence being defined by the presence of a DF that developed during MGA feeding and was present for > 4 d in the absence of 1 ng/ml P4 on d 0. Persistent follicles developed in 13/34 heifers and 11/25 cows. In both heifers and cows, size of the DF at CIDR insertion was greater in the PF than NPF groups ($P < .01$). Emergence of a new DF occurred after CIDR insertion in 12/13 heifers and 10/11 cows in the PF groups compared to 10/21 heifers and 7/15 cows in the NPF groups. In heifers, emergence of the ovulatory DF occurred on d 1.9 ± .9 in the PF and d .4 ± .6 in the NPF group and in cows, on d 1.7 ± 1.7 in the PF and d -3.1 ± 1.2 in the NPF group ($P < .05$). Size of the DF on d 7 did not differ between heifer groups (12.2 ± .3 mm), but in cows, the NPF group had a larger ($P < .05$) DF on d 7 than the PF group (16.3 ± .9 and 12.6 ± 1.0 mm, respectively). The d of ovulation did not differ between the PF and NPF groups in either heifers (8.8 ± .3 d) or cows (8.9 ± .2 d). Turnover of persistent follicles was induced in 92% of females with a CIDR. In females without persistent follicles on d 0, the treatment evaluated in this experiment appeared to allow normal follicular dynamics in heifers, but cows developed ovulatory follicles of extended lifespan.

Key Words: Persistent follicle, Beef cattle, Ovaries

536 Follicular development and reproductive maturation are precociously activated in heifers by early weaning and feeding a high concentrate diet.

C. L. Gasser*, C. R. Burke, M. L. Mussard, E. J. Behlke, D. E. Grum, J. E. Kinder, and M. L. Day, *The Ohio State University, Columbus, OH*.

Wave-like patterns of follicular growth begin early in the life of heifers and dynamic maturational changes occur between 3 and 6 mo of age. Precocious puberty can be induced in >85% of heifers weaned at 2.5 mo of age and fed a high concentrate diet. We hypothesized that this precocious induction of puberty was the result of an acceleration of ovarian maturation in heifers. Crossbred Angus heifer calves were weaned at 104 ± 1.5 (n = 19; early weaned, EW) or 208 ± 2.5 d of age (n = 10; normal, NW). The EW heifers were fed a high concentrate (60% corn; EWH, n = 10) or control diet (30% corn; EWC, n = 9). The NW heifers were fed the C diet after weaning. Heifers were weighed every two weeks after weaning. Daily trans-rectal ultrasonography was performed to determine number and size of follicles present through one complete follicular wave beginning at 18, 23, 28, 32, 36, and 44 (EW) or 32, 36, and 44 (NW) wk of age or until puberty. Blood samples were collected weekly starting at 22 (EW) or 31 (NW) wk of age. Heifers in the EWH treatment were heavier ($P < 0.01$) than EWC from 175 d of age through the end of the study (trt x age; $P < 0.05$). Body weights did not differ between EWC and NW. Maximum diameter of the dominant follicle (MaxDF) was affected by treatment ($P < 0.01$). At 28 wk of age, MaxDF was greater ($P < 0.01$) in EWH (12.9 ± 0.5 mm) than EWC (10.8 ± 0.4 mm). This difference continued through 32 wk of age. At 32 wk of age, MaxDF was greater ($P < 0.05$) in EWC than NW, but similar by 36 wk of age. All EWH, 5 of 9 EWC, and 5 of 10 NW attained puberty at less than 300 d of age. Mean age at puberty for EWH heifers was 252 ± 9.6 d. Heifers attaining puberty during the experiment continued with subsequent luteal phases as evidenced by cyclic patterns of progesterone concentrations. Ovarian maturation was accelerated in heifers that were weaned early and fed a high concentrate diet, resulting in precocious onset of puberty.

Key Words: Puberty, Follicle, Heifer

537 Effects of varying intervals from dominant follicle emergence to progestin removal on follicular dynamics and estrus synchronization.

M.D. Utt*, F.D. Jousan, and W.E. Beal, *Virginia Polytechnic Institute and State University*.

The objective of the experiment was to determine if varying the interval from emergence of a new follicle to the end of an estrus synchronization treatment affected the synchrony of estrus. On Day 6 to 8 of the estrous cycle non-lactating beef cows were fitted with a progesterone-releasing intravaginal device (CIDR; n=49). At CIDR insertion each cow received an i.m. injection containing either 1 mg estradiol-17β and 100 mg progesterone (EP) or 100 μg of GnRH. CIDRs remained in place for 7 or 9 d. In addition, one half of the animals in each subgroup were treated with 37.5 mg PG at CIDR insertion to regress the corpus luteum (CL). All cows received 25 mg PG 24 h prior to CIDR removal. HeatWatch was used to monitor estrus. Ovarian follicular development was monitored by ultrasonography. Data was analyzed as a 2x2x2 factorial with: EP or GnRH; 7- or 9-d CIDR; and CL regressesed or present as main effects. Interval from follicle emergence to CIDR removal was greater following GnRH treatment or in animals fitted with a CIDR for 9 d. Longer interval from follicle emergence to CIDR removal increased dominant follicle (DF) size at CIDR removal. Cows with larger DF at CIDR removal tended to exhibit estrus earlier, but no difference in the synchrony of estrus was detected. Cows with the CL regressed at CIDR insertion had a larger DF at CIDR removal and exhibited estrus earlier, however, synchrony of estrus was not affected. Treatments altered the interval from follicle emergence to progestin withdrawl and affected follicular dynamics, but did not improve the synchrony of estrus.

	EP	GnRH	CIDR 7	CIDR 9	CL present	CL regress	SE
Emergence to CIDR removal (d)	4.7^a	6.6^b	4.8^a	6.5^b	5.5	5.8	0.2
DF at CIDR removal (mm)	11.3^a	13.4^b	11.8^a	13.0^b	11.5^a	13.2^b	0.4
CIDR removal to estrus (h)	55.3	49.8	56.4	48.8	58.3^a	46.8^b	3.4

Least-square means within each row and main effect with uncommon superscripts differ (P<0.07).

Key Words: Estrus synchronization, Follicle emergence, Progestin

538 Comparison of the efficiency of estradiol 17β, estradiol benzoate, and estradiol cypionate in stimulating atresia of dominant follicles in beef heifers. J. D. Rhinehart*, A. M. Arnett, R. B. Hightshoe, and L. H. Anderson, *University of Kentucky*.

The objective of this experiment was to compare the efficacy of estradiol 17β, estradiol benzoate and estradiol cypionate to induce regression of the dominant follicle and stimulate new wave recruitment in beef heifers. Fifteen crossbred heifers (BW = 431 kg, Age = 14.3 months), at random stages of the estrous cycle, were randomly assigned to one of three treatment groups. Heifers received a 1 mg i.m. injection of either estradiol 17β (E17), estradiol benzoate (EB) or estradiol cypionate (ECP, Pharmacia & Upjohn, Kalamazoo, MI) on D 0. Follicle diameter was assessed via transrectal ultrasonography on D -3, D -1, D 3, D 4, and D 5. Pretreatment ultrasonography (D -3 and D -1) was used to determine the status of the dominant follicle at treatment. Dominant follicles were classified as growing, regressing or static. No difference ($p > .10$) was observed in the proportion of heifers in which regression of the dominant follicle was induced by E17 (80%), EB (100%) or ECP (60%) on D 3. Size of the dominant follicle tended to be smaller in the E17 (10.2 mm .82) and EB (10.2 mm .46) groups than in the ECP (12 mm .78) group at time of treatment (D 0; $p = 0.11$). The frequency of follicles classified as regressing tended ($p = 0.14$) to be greater in the ECP (3/5) treated group than in the E17 (1/5) or EB (1/5) groups. The number of days to new wave emergence (day at which multiple 5 mm follicles were observed) tended ($p = 0.13$) to be earlier in heifers treated with E17 (3.2 .22 days) and EB (3.2 .2 days) than that for heifers treated with ECP (4.0 days). Among treatment groups, the size of the dominant follicle on D5 was similar ($p = 0.434$) and averaged 9.27 1.7 mm (range = 3 - 18mm). We conclude that estradiol 17β, estradiol benzoate and estradiol cypionate are equally effective in stimulating follicular atresia but that the recruitment of a new follicle wave after regression may be delayed in beef heifers administered estradiol cypionate.

Key Words: Estradiol, Follicle development

539 Effects of abomasal casein or essential amino acid infusions on splanchnic hormone metabolism in lactating dairy cows. C. K. Reynolds*[1], J. A. Benson[1], and A. Faulkner[2], [1] *The University of Reading, Reading, UK,* [2] *The Hannah Research Institute, Ayr, UK*.

The objective was to determine the effects of increased postruminal supply of amino acids (AA) and the form of AA delivery on splanchnic metabolism of insulin and glucose-dependent insulinotrophic polypeptide (GIP) in 6 multiparous, catheterized, rumen cannulated, early-lactation Holstein X Friesian cows (653 kg BW) fed alfalfa, grass silage and concentrates (33, 17 and 50 % of DM, respectively) hourly at 97 % of ad libitum DMI. Treatments were 4-d abomasal infusions (18 L/d) of water followed by either casein (CAA) or free essential AA (EAA) equal to 800 g milk protein/d for 6 d in a single-reversal experiment with a 5 wk interval. Plasma concentration (pg/ml) and splanchnic (portal-drained viscera [PDV] and liver) net hormone flux (μg/h) was measured hourly on the last day of infusions. Daily DMI and milk yield averaged 23.3 and 36.8 kg, respectively. There were no interactions ($P > 0.10$) between AA infusion and the form of delivery (CAA vs. EAA). Treatment infusions increased ($P < 0.01$) net PDV release (234 vs. 302) and liver removal (-97 vs. -155) of insulin, such that total splanchnic release (136 vs. 147) and arterial concentration (464 vs. 489) were not affected. Infusions had no effect ($P > 0.10$) on arterial concentration (406 $\pm$ 12) or net PDV release (36 $\pm$ 36), liver removal (-35 $\pm$ 16), or total splanchnic release (2 $\pm$ 36) of GIP. In conclusion, chronic increases in abomasal CAA or EAA supply did not increase net PDV release or arterial concentration of GIP in lactating dairy cows. This suggests that increased net PDV insulin release in response to abomasal AA infusion is not attributable to measurable changes in GIP metabolism.

Key Words: Splanchnic, Insulin, GIP

540 Efficacy of synthetic GnRH analogs for estrous synchronization. M. A. Cline*, J. B. Hall, and W. D. Whittier, *Virginia Polytechnic Institute and State University, Blacksburg, VA*.

Commercial analogs of GnRH appear equally effective for estrous synchronization; however, few studies have compared analogs. To test the hypothesis that there is no difference among GnRH analogs, two experiments were conducted to determine the effect of GnRH analogs, Cystorelin® (CYS, gonadorelin diacetate tytrahydrate, Merial Ltd, Iselin, NJ) and Factrel® (FAC, gonadorelin hydrochloride, Fort Dodge, Fort Dodge, IA), on pregnancy rate to synchronized AI, LH surge characteristics and ovarian follicular dynamics. In Experiment one, 496 beef cows from 7 herds, blocked by body condition and d postpartum, were randomly assigned to CYS or FAC treatment as part of the Ovsynch protocol (100 μg GnRH d 0, 25 mg Lutalyse d 7, 100 μg GnRH d 9). There was a tendency ($P = .09$) for more FAC cows to be pregnant at d 45 compared to CYS cows. However, only in one herd ($n = 32$) did FAC cows have greater pregnancy rate at d 45 than CYS cows. In Experiment two, 18 cycling luteal phase beef cows were assigned to receive either CYS or FAC as part of the Ovsynch protocol. On d 0 and 9, blood samples were collected every 15 min from -30 to 525 min post GnRH injection to characterize the LH surge. Ultrasound examination of ovarian structures was conducted daily from d -1 to d 11. Follicular phase CYS cows had a shorter time to maximum LH concentration than did FAC or luteal phase CYS cows (treatment X phase interaction, $P = .03$). The duration of the LH surge was shorter for follicular and luteal phase CYS cows than follicular or luteal phase FAC cows (treatment X phase interaction $P = .02$). Maximum LH concentration and area beneath the LH curve did not differ ($P > .05$) between treatments. Cows treated with CYS had more ($P = .02$) non-dominant follicles. GnRH analog did not affect ($P > .05$) the day of new follicular wave emergence, rate of dominant follicle growth, peak follicle size or dominate follicle size at second GnRH injection. We conclude that either product may be used in beef cows as part of timed AI protocols without compromising fertility.

Key Words: Beef Cattle, GnRH, Synchronization

541 Time of ovulation, serum LH and progesterone concentrations in estrous synchronized Brahman cows. S.R. Tatman[1], D.A. Neuendorff[1], A.W. Lewis[1], T.W. Wilson[1], C.R. Looney[2], G.L. Williams[3], and R.D. Randel*[1], [1] *Texas Agricultural Experiment Station, Overton, TX,* [2] *Ovagenix, LP, Bryan, TX,* [3] *Texas Agricultural Experiment Station, Beeville, TX*.

The effect of $PGF_2\alpha$ (PG; 25 mg Lutalyse®, Upjohn) injection or an intravaginal progesterone releasing device (CIDR) combined with PG on ovulation time and hormone secretion was studied in dry, nonlactating, multiparous, Brahman cows. Normal estrous cycling cows were assigned to control (CO; n=9), PG (n=11), or CIDR + PG (CP; n=11). PG cows received PG on d 14 of the estrous cycle. CIDRs were removed after 7 d and PG was injected. Estrus (E) was detected using sterile bulls and continuous observation. Ovulation time was determined using ultrasonography at 2-hr intervals from E through ovulation, and serum samples were collected at the same times. One CO and PG cow had silent E, while six CP cows failed to respond to treatment ($P \leq 0.05$). Interval from E to ovulation (26.02 $\pm$ 1.75 hrs, 25.78 $\pm$ 2.35 hrs, and 27.45 $\pm$ 1.66 hrs for CON, CP, and PG treatments respectively) and LH concentrations from hr 0 (E) to hr 22 were similar ($P \geq 0.30$). Although there was a time effect for LH ($P \leq 0.001$), there was no time by treatment interaction ($P \geq 0.70$). Cows that had an LH surge following E (4 of 9 CO, 1 of 5 CP, 5 of 10 PG cows; $P \geq 0.10$) were evaluated for intervals from peak LH to ovulation, E to ovulation, and E to peak LH, and data were pooled as no differences ($P \geq 0.10$) were detected among treatments for these parameters (26.15 $\pm$ 3.14 hr, 30.99 $\pm$ 2.71 hr, 4.80 $\pm$ 1.88 hr) nor for peak LH (28.74 $\pm$ 9.07 ng/ml; respectively). Progesterone on days 6, 7, 8, 12, 13, and 14 differed ($P \leq 0.001$) by day but there was no treatment or day by treatment interaction ($P \geq 0.10$). Synchronization treatment did not appear to alter LH and progesterone profiles in Brahman cows that showed E during the synchronization period. The CP treatment resulted in fewer cows showing E within the 120 hr period. Neither time of ovulation relative to E or the LH peak, nor interval from E to LH peak appeared to be affected by treatment.

Key Words: Brahman female, ovulation, LH

542 In vitro fertilization of cumulus-intact and cumulus-free bovine oocytes in medium supplemented with heparin and different concentrations of calf serum. Parviz Tajik*[1], [1]*Faculty of Veterinary Medicine, University of Tehran.*

Bovine follicular oocytes were isolated from ovaries recovered from a local slaughter house within 2h. Oocyte-cumulus complexes were washed 4 times with TCM-199 (with Earle's salts) and supplemented with 10% (v/v) heat inactivated fetal calf serum (FCS), 100 IU/ml penicillin G and 0.1 mg/ml streptomycin. Every ten oocytes with compact cumulus cells were transferred into a 0.1-ml drop of the culture medium. Covered with paraffin oil which had been previously kept about 2h in a CO_2 incubator before the oocytes were added. After culture of oocytes for 22-24h, they were randomly divided into 2 groups. One left intact and the other freed from cumulus and corona cells by treatment with PBS containing 0.1% hyaluronidase for 10-20min and by repeat passage through a fine pipette. Oocytes were then washed twice with BO (Brackett and Oliphant, 1975) medium containing heparin and different concentrations of calf serum (CS) into a 50-μl drop of the same medium. The transferred oocyte dishes were kept in a CO_2 incubator for about 30min until the spermatozoa were added for fertilization. Semen preparations and insemination were according to Tajik et al, 1993. Table shows the effect of different concentrations of CS on penetration in vitro of cumulus-intact and cumulus-free bovine oocytes in a medium containing heparin.

Cumulus	CS concentrations	No oocytes examined	oocytes) penetrated (%)
+	0	31	15(48)
+	5%	31	23(74)
+	10%	31	23(74)
+	20%	30	13(43)
-	0	40	0
-	5%	41	41(100)
-	10%	43	36(83)
-	20%	46	10(22)

In the present situation it can be concluded that, there is no penetration of cumulus-free oocytes in the BO medium lacking protein supplement (in the present study CS). However, 48% of cumulus-intact oocytes were penetrated. High concentration (20%) of CS is not recommended for in vitro fertilization of bovine oocytes.

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Key Words: In vitro fertilization, Bovine oocytes, Calf serum

543 The effect of small doses of Naloxone on the onset and duration of the first oestrus after weaning in the sow. V. Fuentes*, R. Orozco, and A. Hernández, [1]*Centro Universitario de los Altos Universidad de Guadalajara, México.*

This work was carried out with the objective of observing the effect of small doses of naloxone on the onset and duration of the first Oestrus post weaning in the sow. For this purpose 32 multiparous sows were chosen and allocated at random in two groups of 16 animals each. Group 1 was treated with 2 mg of naloxone im administered every 12 hrs. Treatment was initiated since 3 days before the day of weaning and continued for three days after. Group 2 received similar treatment as group 2, and injected with 2 ml of saline solution. It was observed that in sows treated with naloxone oestrus was evident at 85.8 5.2 hr after weaning. In the control group treated with saline injections oestrus was detected at 108.37 5.2 hr after weaning (P<0,05). Further more it was also observed that the duration of oestrus was of 89.6 3.9 hr, and 49.6 hr for naloxone and saline treated sows respectively(P<0.05) It was concluded that naloxone treatment gives further support to endogenouos opioids as modulators of reproduction.

Key Words: naloxone, sow, oestrus

544 Evaluating the benefit of melengestrol acetate (MGA) in synchronizing dairy heifers. R. L. Saltman*[1], A. P. Belschner[1], J. F. Boucher[1], C. E. Gardner[2], and A. J. Wormuth[2], [1]*Pharmacia Animal Health, Kalamazoo, MI,* [2]*Agway Feed & Nutrition, Shippensburg, PA.*

The purpose of this study was to evaluate the effect of melengestrol acetate (MGA) on heat detection and conception rate in breeding age dairy heifers. The study was a generalized block design with blocking based on week of assignment. Heifers were randomly assigned to either the control group or the MGA group. On the day of assignment, the MGA treatment group began receiving 0.5 mg MGA/head/day in their feed which continued for 14 consecutive days. The control group did not receive MGA. Nineteen days after withdrawing the MGA, all heifers (both MGA and controls) received a 5 mL injection of LUTALYSE® Sterile Solution (prostaglandin F2α). All heifers were observed for estrus for the 7 days following the Lutalyse injection. All heifers seen in estrus during this period were inseminated. All heifers not seen in estrus in the 7 days following the Lutalyse injection received a second Lutalyse injection 14 days after the first injection. All heifers were observed for estrus for the 7 days following the second Lutalyse injection. All heifers seen in estrus during this period were inseminated. After the seven day period following the second injection, heifers not seen in estrus or returning to estrus were maintained on study and were bred at signs of estrus. Pregnancy was determined by rectal palpation at least 40 days post-insemination. Significant differences were seen in percent of heifers inseminated after first Lutalyse injection (71.6 in controls vs. 91.8 in the MGA treatment group), pregnancy rate of all heifers 15 days after the first Lutalyse injection (52.7 vs. 71.2), days from the first Lutalyse injection to first breeding (8.8 vs. 5.0), variance in days from the first Lutalyse injection to first breeding for heifers in heat after the first Lutalyse injection (0.9487 vs. 0.5096), and days from the first Lutalyse injection to 90% pregnancy in the treatment group (23.0 vs. 13.5).

Key Words: Reproduction, Dairy heifers, Melengestrol acetate

545 Effects of progesterone (P4) with an estradiol-17beta ($E_2\beta$) 7day controlled internal drug releasing (CIDR) insert on fertility to timed insemination in beef females. J.A. Meyer*[1], C.R. Looney[2], R.S. Walker[1], C.R. Long[2], M.L. Day[3], and D.W. Forrest[1], [1]*Texas A&M University, College Station, TX,* [2]*Ovagenix LLC, College Station, TX,* [3]*The Ohio State University, Columbus, Ohio.*

This study compared pregnancy rates (PR) to Timed AI (TAI) between cows that did or did not receive P4 (50 mg, IM) in a CIDR-based TAI program. Cows in the control group (n = 379) received $E_2\beta$ (2.5 mg, IM) upon CIDR insertion (d 0), prostaglandin F2α (25 mg, IM) at CIDR removal (d 7) and $E_2\beta$ (1 mg, IM) 24 h post-CIDR removal (d 8). The treatment group (n = 383) received the same protocol with the addition of P4 (50 mg, IM) upon CIDR insertion. All cows were TAI 30 h post-final $E_2\beta$ injection. Females were located in 5 breeding herds of multiparous Angus or Charolais in Texas and were TAI by the same technician (tech) in two herds, by a different tech in one herd and by two or more techs in two herds. Tech code was not recorded by TAI of each female. TAI-PR was defined as cows (n) pregnant to TAI divided by cows (n) in each treatment group. Bulls were joined with cows for 60 d after the TAI for determination of final PR. Logistical regression analyses identified affect of breed (P< 0.3), parity (P< 0.6) and age (P< 0.4) on TAI-PR. TAI-PR was 43.7±0.24% for control and 41.5±0.34% for P4-treated cows (P< 0.5). Location of trial affected (P< 0.01) TAI-PR. TAI-PR was greater (P< 0.03) for Herds 2, 3, and 4, when compared to Herd 1. Herd 5 had the lowest (P< 0.01) TAI-PR when compared to contemporary herds. Final PR were 82.8±0.13% for control and 79.4±0.12% for P4-treated cows (P< 0.22). It was concluded that an injection of P4 at time of CIDR insertion did not influence pregnancy rates to TAI.

Trait	Herd 1	Herd 2	Herd 3	Herd 4	Herd 5
n	34	20	191	45	472
TAI-PR	52.9 $\pm 0.34^{bc}$	64.9 $\pm 0.46^{ac}$	57.5 $\pm 0.14^{ac}$	60.0 $\pm 0.30^{ac}$	33.1 $\pm 0.09^{d}$
Final PR	97.1 $\pm 0.16^{c}$	90.0 $\pm 0.74^{d}$	71.7 $\pm 0.16^{f}$	97.7 $\pm 0.13^{c}$	81.8 $\pm 0.12^{e}$

^{a,b} P < 0.03. ^{c,d,e,f} P < 0.01.

Key Words: CIDR, Estradiol, Timed AI