1024 Evaluations for final score at different ages. L. Klei*[1], S. Tsuruta[2], I. Misztal[2], and T. J. Lawlor[1], [1]*Holstein Association USA, Inc., Brattleboro, VT,* [2]*Unversity of Georgia, Athens, GA.*

The objective of this study was to investigate genetic evaluations for final score (PTAT) at different ages. Breeding values were predicted with a random regression model (RRM) and with the current national genetic evaluation model (NE), a repeatability model. RRM included fixed effects for management group and stage of lactation; fixed regressions on age at classification; additive genetic and permanent environmental effects with random regressions on age; and random residual effects. Correlations between PTATs from RRM at various ages and NE ranged from 0.89 to 0.99. PTAT genetic trends for sires and registered cows from RRM at 24 and 60 months of age were similar to those obtained from NE. Trend for grade cows from RRM was lower at 60 month of age than NE trend. The correlation between PTAT of sires and the average age of daughters tended to be positive indicating that daughters of high type bulls are scored more often. Bulls whose genetic evaluation improves as the age of daughters increases tend to have higher genetic evaluations for traits associated with increased longevity. For example, sires with the largest positive difference between PTAT at 60 and 24 months of age had an udder composite evaluation that was 2.7 points higher than those with the largest negative difference in PTAT at the two ages. Proportion of registered cows in the data set decreased from over 80% for cows born in 1981 to 55% for cows born in 1997. Registered cows have mostly two or more scores while grade cows tend to have only a single score at an early age. Declining numbers of scores at later ages may result in selection of sires whose daughters are superior at an early age but age poorly. Evaluation for final score by the random regression model allows identifying bulls whose daughters# are superior at an early age and mature gracefully.

Key Words: Holstein, Final Score, Random Regression

1025 Genetic correlations of pathogen-specific clinical mastitis with milk yield and somatic cell score. Y. de Haas*[1], H.W. Barkema[2], and R.F. Veerkamp[1], [1]*Institute for Animal Science and Health, ID-Lelystad, The Netherlands,* [2]*Animal Health Service, Drachten, The Netherlands.*

Several pathogens play a crucial role in the type of clinical mastitis (CM), and since the etiology of each mastitis-causing pathogen is different the question can be raised whether selection for yields affects all pathogens equally, and if selection for lower somatic cell counts improves resistance to all pathogens equally. Therefore, the objective of this study was to quantify genetic variation for overall and pathogen-specific CM and to estimate genetic correlations with milk yield and somatic cell score. Data from 274 Dutch herds recording clinical mastitis over an 18-months period were used. Analyzed pathogens were *Staphylococcus aureus*, coagulase negative staphylococci, *Escherichia coli*, *Streptococcus dysgalactiae*, *Streptococcus uberis* and other streptococci. The data set contained 47,563 lactations of 28,695 cows of different parities. Cases of overall and pathogen-specific CM were treated as binary traits in AS-REML. In total, 5,950 lactations with at least one case of CM were included, and in 5,780 cases the mastitis-causing pathogen was classified. Variance components for the sire, maternal grandsire, and permanent environmental effect were estimated using generalized linear mixed models with a logit-link function. Heritabilities ranged from 0.02 to 0.10 for pathogen-specific CM. Genetic correlations of overall CM with milk yield and somatic cell score at 150 days were 0.69 and 0.63, respectively. However, these genetic correlations differed per mastitis-causing pathogen. For instance, the incidence rate of clinical *E. coli* mastitis was slightly unfavorably correlated with 150d milk yield (0.13), but stronger with 150d SCS (0.74). Whereas the genetic correlations with clinical *Str. dysgalactiae* mastitis were 0.70 and 0.16, respectively. Therefore, current selection practices (using milk yield and somatic cell count) will have different effects on the incidence rates of each pathogen.

Key Words: Genetic correlations, Clinical mastitis, Pathogens

1026 Genetic evaluation of episodes of short and long duration of elevated somatic cell scores. X. Li, M. M. Schutz*, A. P. Schinckel, and D. L. Lofgren, *Purdue University.*

Long or short episodes of elevated somatic cell scores (SCS) may indicate different causes of mastitis and may be under different levels of genetic control. The objectives of this study were to estimate genetic and phenotypic parameters of short and long episodes of elevated SCS, and to compare preliminary Predicted Transmitting Abilities (PTA) of sires for lactation means of SCS and short and long episodes. Two random subsets of Holstein Dairy Herd Improvement Association test-day records represented 70,369 lactations of 51,433 cows and 79,890 lactations of 57,357 cows, respectively. Occurrence of short and long episodes of elevated SCS within a lactation were binomial traits defined by two methods. Method 1 defined short episodes (S1) as test-day SCS increasing by 2 or more units to above 5 and then declining by 2 or more units to below 5 on consecutive test days. Long episodes (L1) were defined when no decrease of 2 occurred for the subsequent test day. Method 2 defined short (S2) and long episodes (L2) similarly, but used the within-herd residual standard deviation of a lactation curve for 30 stage of lactation classes in place of the constant threshold of 5. Genetic components of variation for lactation means of SCS and the incidence of short and long episodes were analyzed using single- and multiple-trait animal models. Heritabilities of lactation SCS (LSCS) and adjusted lactation SCS after removing episodes of short duration (ALSCS) were around 0.10. Heritability estimates were near 0 for S1 and S2, and near 0.04 for L1 and L2. Genetic correlation of LSCS with S1 and S2 averaged 0.902 and 0.945, respectively. Phenotypic correlations were low, about 0.197 and 0.239 for S1 and S2, respectively. Current selection for decreased SCS appears to be consistent with genetic improvement for lower incidence of short episodes of elevated SCS. Low heritability of short episodes may preclude genetic progress from direct selection. The PTA for LSCS and ALSCS were similar giving further evidence that episodes of short duration may be under little genetic control.

Key Words: Mastitis, Somatic Cell Scores, Genetics

ASAS/ADSA Physiology: Estrous Synchronization

1027 Use of ECP in a presynchronized timed artificial insemination protocol for lactating dairy cows. E. R. Jordan*[1], S. M. Pancarci[2], M. J. Schouten[3], and W. W. Thatcher[2], [1]*Texas A and M University,* [2]*University of Florida,* [3]*Schouten Dairy, Hico, TX.*

To test whether ECP could replace the final GnRH in a timed artificial insemination (TAI) protocol, lactating dairy cows were grouped by week of calving and assigned to treatments on alternating weeks. All cows were presynchronized using two $PGF_2\alpha$ (Lutalyse®; Pharmacia Corp., Kalamazoo, MI; 25 mg, im) treatments 14d apart (35±3 and 49±3d postpartum). Cows in both groups received a treatment of GnRH (Cystorelin®; Merial Ltd., Iselin, NJ; 100μg, im) on d0 (63±3d postpartum). Seven days later (70±3d postpartum) $PGF_2\alpha$ was administered. Cows assigned to TAI (n=157) received a second GnRH at experimental d9 (72±3d postpartum) and were artificially inseminated 24 hr later (73±3d postpartum). Cows in the ECPsynch group (n=164) received ECP (ECP®; Pharmacia Corp., Kalamazoo, MI; 1 mg, im) on experimental d8 (71±3d postpartum) and were artificially inseminated 48 hr later (73±3d postpartum). Pregnancy was verified 37-44d after insemination by rectal palpation. Health records of cows were recorded and included in the data analysis. Stage of the estrous cycle at initiation of the treatment protocol and prior cyclicity was determined based on previous observed estrus. Statistical analyses included stepwise logistic regression analysis to determine significant variables and the general linear model of SAS. The treatment by estrus interaction was significant (P<.01). The pregnancy rate for the cows in estrus was 32.8±8.2% (n=28) for TAI and 40.4±4.1% (n=107) for ECPsynch, but 26.8±3.8% (n=129) and 6.6±5.7% (n=57), respectively for cows not observed in estrus. Fewer cows on TAI than ECPsynch expressed visual signs of estrus (P<.01). The pregnancy rate for cows initiating the synchronized regime between d5 and 12 of the estrous cycle was higher than for cows at other stages of the cycle or at an unknown stage (P<.02). Based on these results, pregnancy rates at first synchronized insemination after the voluntary waiting period will be similar for cows receiving either ECP or GnRH as the ovulatory hormone for timed insemination.

Key Words: Timed artificial insemination, ECP, ECPsynch

1028 Presynchronization of estrous cycles in lactating dairy cows with Ovsynch + CIDR and resynchronization of repeat estrus using the CIDR. S.Z. El-Zarkouny*, J.A. Cartmill, A.M. Richardson, M.A. Medina-Britos, B.A. Hensley, and J.S. Stevenson, *Kansas State University, Manhattan*.

Our objectives were to determine if presynchronized estrous cycles and the addition of progesterone (P4) to the Ovsynch (OVS) protocol would improve pregnancy rates (PR) on d 29 and whether a repeat estrus could be resynchronized with P4 after timed AI (TAI). A total of 630 cows in two cooperating herds were assigned to eight treatments (A, B, C, D, E, F, G, and H). All cows received the OVS protocol: 100 μg of GnRH on d -10 and d -1; 25 mg of $PGF_{2\alpha}$ on d -7; and TAI on d 0. Estrus in cows was presynchronized with two injections of $PGF_{2\alpha}$ 14 d apart (Presynch; A, B, C, and D) with the second injection given 12 d before the OVS protocol, whereas cows in E, F, G, and H received no $PGF_{2\alpha}$ before OVS. Cows in C, D, G, and H received (d -7) a P4-releasing intravaginal insert (CIDR) for 7 d (d -10 to -3). Repeat estrus in cows was resynchronized (Resynch; B, D, F, and H) with a used CIDR for 7 d starting on d 13 after TAI, whereas cows in A, C, E, and G were controls. Blood samples were collected before each hormonal injection for determination of P4 (d -36, -22, -10, -3, -1, +13, and +20). On d 29 and 57, PR was diagnosed by ultrasonography after TAI and embryo survival (ES) was calculated. A three-way interaction occurred (P=0.07), indicating that Presynch increased PR (46 vs. 37%), but without Presynch, the CIDR + Resynch reduced and no CIDR + Resynch increased PR. Because of a Presynch × CIDR interaction (P<0.05), AI submission rate for 2^{nd} AI (AISR; first eligible estrus 20-25 d after TAI) was greater (P<0.05) for Presynch cows treated with vs. without the CIDR (38 vs. 18%), whereas in no Presynch cows, the CIDR had no effect (23 vs. 27%). Resynch decreased (P=0.08) 2^{nd} CR (first eligible estrus 20-25 d after TAI) compared to controls (18 vs. 33%). An interaction (P=0.07) of Presynch × CIDR decreased 2^{nd} CR for Presynch cows with vs. without CIDR (15 vs. 29%), but increased 2^{nd} CR for no Presynch cows with vs. without CIDR (38 vs. 20%). We concluded that Presynch + OVS increased PR above OVS alone. Resynch did not increase AISR, decreased 2^{nd} CR, and tended to increase ES.

									Pre-		Re-
Trait	A	B	C	D	E	F	G	H	synch	CIDR	synch
Cows, no.	81	79	78	80	89	69	82	72	-	P values	-
PR, %	49	47	42	47	37	51	35	27	0.05	0.05	0.56
AISR, %	14	21	37	39	21	26	24	29	0.46	0.01	0.29
2^{nd} CR, %	34	24	25	5	29	10	44	31	0.44	0.80	0.08
ES, %	60	59	43	60	49	61	55	68	0.68	0.94	0.12

Key Words: Ovulation synchronization, Progesterone, Dairy cows

1029 Characteristics of estrus before and after insemination and fertility after estrus. synchronization with GnRH, $PGF_{2\alpha}$, and progesterone in dairy heifers. A.M. Richardson*, B.A. Hensley, and J.S. Stevenson, *Kansas State University, Manhattan*.

Our objectives were to determine whether estrus activity was diminished after AI and possible pregnancy initiation compared to before AI and whether conception was reduced when a progestin treatment was used without turning over the dominant follicle at the time of progestin initiation. Pubertal Holstein heifers were assigned randomly to three treatments: 1) 100 μg of GnRH given 6 d before 25 mg of $PGF_{2\alpha}$ (d -1) plus a used intravaginal progesterone-releasing (CIDR-B, InterAg) insert (d -7 to 0; CIDR+GnRH); 2) same as CIDR+GnRH without GnRH (CIDR); and 3) same as CIDR+GnRH without used CIDR (GnRH). All heifers were fitted with HeatWatch® patches and characteristics of estrus examined before and after AI included duration of estrus (DUR), number of standing events (STD), and total duration of standing events (DURSTD). Heifers were inseminated 10-12 h after the onset of estrus. Blood samples were collected on d -7, -1, and 0 for determination of progesterone. Pregnancy was diagnosed by ultrasonography 28-30 d after AI. Estrus-detection rates (EDR) and pregnancy rates (PR) tended (P<0.10) to be less for heifers treated with GnRH. Heifers in their luteal phase (d 5-18; n=102) on d -7 had greater (P<0.05) EDR (86 vs. 59%) and greater (P<0.05) PR (50 vs. 29%) than heifers in their follicular phase (d 19-21; n=17). Luteal-phase heifers had shorter (P<0.05) DUR (11.5 ± 0.5 vs. 14 ± 1 h), fewer (P<0.05) STD (34 ± 3 vs. 51 ± 6), and shorter (P<0.05) DURSTD (89 ± 9 vs. 137 ± 17 s) than those in metestrus (d 1-4; n=35). Heifers (59/69; 87%) not conceiving after the synchronized estrus were detected in estrus 18 to 26 d later. Comparing characteristics of estrus before and after the synchronized estrus in these 59 heifers, STD (36 ± 3 vs. 23 ± 3) and DURSTD (94 ± 7 vs. 60 ± 7 s) were greater (P<0.01) before than after AI, whereas DUR (11.8 ± 0.6 vs. 10.6 ± 0.6 h) and individual DURSTD (2.6 ± 0.1 vs. 2.7 ± 0.1 s) were not different. Conception at this first eligible repeat estrus was 46% (27/59). We concluded that conception rates were not reduced after estrus synchronization with CIDR + $PGF_{2\alpha}$ and estrus activity (STD and DURSTD) was reduced after once inseminated.

Trait	CIDR+GnRH	CIDR	GnRH
Heifers, no.	67	66	68
EDR, %	78.5	87.7	76.7
CR, %	60.4	65.9	55.3
PR, %	44.2	57.4	40.6
$PGF_{2\alpha}$ to estrus, h	68 ± 4^a	67 ± 5^a	45 ± 4^b
% in estrus (49-72 h)	78^c	67^c	44^d

^{a,b}P<0.01. ^{c,d}P<0.05.

Key Words: Estrus, Conception, Progestin

1030 Time of ovulation and follicular development in estrous synchronized Brahman females. S.R. Tatman[1], D.A. Neuendorff*[1], A.W. Lewis[1], T.W. Wilson[1], C.R. Looney[2], and R.D. Randel[1], [1]*Texas A&M Research Center, Overton, TX,* [2]*Ovagenix, LP, Bryan, TX*.

Dry, multiparous, Brahman cows were used to determine the effect of PG (25 mg Lutalyse®, Upjohn) injection or an intravaginal progesterone releasing device (CIDR) combined with PG on follicular development from estrus to ovulation and ovulation time. Based on 2 mo of daily estrus detection, cows with normal estrus cycles were selected for the trial. Three treatments (control [CO], PG, CIDR + PG (CP), n=12 per treatment) were used. PG cows received PG on d 14 of an induced cycle. CIDRs were inserted in CP cows and removed after 7 d when PG was injected. Estrus was detected using 4 sterile bulls and constant estrus detection. The dominant follicle was measured by ultrasonagraphy at 2-hr intervals from estrus to ovulation. Follicle size at estrus did not differ among treatments (CO: 17.3±1 mm; PG: 16.6±.9 mm; CP: 18.2±1 mm). Follicle diameter at ovulation was similar (P > 0.10) in CP (18.8±.9 mm) and CO (18.3±.7 mm), but both were greater (P < 0.05) than PG (16.2±.7 mm). No differences were detected (P > 0.10) for change in follicle diameter or change in follicular size/hr from estrus to ovulation (CP:.59±1.3 mm and .019±.04 mm/hr; CO: .94±1.1 mm and .04±.04 mm/hr; and PG: -.43±1 mm and -.011±.03 mm/hr; respectively). Interval from estrus to ovulation was similar (P > 0.10) for CP (27.7±2 hr), CO (27.1±2 hr), and PG (27.4±2 hr). Neither interval from PG injection to ovulation nor PG injection to estrus was different (P > 0.10) between CP (101±9 hr, 74±10 hr; respectively) and PG (118±7 hr, 92±7 hr; respectively). Follicle sizes at CIDR insertion and removal were similar (P > 0.10) in synchronized vs. non-synchronized cows. A lower proportion of CP cows (50%) showed normal estrus compared to PG (83%). In this protocol, the CIDR may have been detrimental for estrous synchronization of Brahman cows.

Key Words: Brahman female, Synchronization, Ovulation

1031 Ovulation synchronization using progestins, GnRH, and $PGF_{2\alpha}$ before timed AI (TAI) and resetting follicular waves for resynchronization of repeat inseminations of suckled beef cattle. M.A. Medina-Britos*[1], A.M. Richardson[1], G.C. Lamb[2], C.R. Dahlen[2], S.K. Johnson[1], S.Z. El-Zarkouny[1], B.A. Hensley[1], and J.S. Stevenson[1], [1]*Kansas State University,* [2]*University of Minnesota*.

We determined if there was an advantage to providing progestin before or concurrent with ovulation synchronization prior to TAI. Secondly, we determined whether resynchronization of follicular waves would synchronize repeat estrus after TAI and increase return rates to estrus and 23-d pregnancy rates (23-d PR). Suckled beef cows (n=609) were used at four locations in KS and MN. Cows were assigned to a 2 × 3 factorial experiment with five treatments. Two prebreeding treatments: 1) CIDR: 100 μg of GnRH on d -9 and a progesterone (P4)-releasing intravaginal insert (CIDR, InterAg) for 7 d; 25 mg of $PGF_{2\alpha}$ on d -2;

100 μg of GnRH and TAI on d 0 and 2) MGA: same protocol without CIDR but cows were fed 0.5 mg of MGA for 14 d beginning 26 d before the first GnRH injection. Three postbreeding treatments were: 1) control; 2) 1 mg of estradiol benzoate (EB) + CIDR; or 3) 1 mg of estradiol cypionate (ECP) + CIDR. Estrogen injections were given on d 13 and 20 and a used CIDR was inserted between d 13 and 20 after TAI. Upon removal of CIDR, cows were reinseminated after twice daily detection of estrus until d 23. Blood samples were collected on d -35, -21, -9, -2, 0, +13, and +20 for later measurement of P4 and cycling status. Body condition was assessed on d -2. Pregnancy was diagnosed by ultrasonography at 28-33 and 56-61 d after TAI. Variables were calculated: pregnancy rate after TAI (PR); % returned to estrus 20-23 d after TAI (% RET); average interval to estrus after TAI (INT); conception rate after second AI (CR); and embryo survival (ES) from d 28-33 to 56-61. We concluded that a concurrent source of P4 with ovulation synchronization increased PR compared to using MGA. Use of estrogen + CIDR increased return rate to estrus without affecting conception at the previous TAI and increased the 23-d PR.

Trait	MGA	CIDR	Control	EB	ECP
Cows, no.	315	294	307	154	148
PR, %	45.7^a	55.1^b	52.4	44.1	50.6
RET, %	48.0	50.0	27.4^a	73.3^b	63.1^b
INT, d	21.0±0.1	21.1±0.2	$21.0\pm0.2^{a,b}$	20.8 ± 0.1^a	21.4 ± 0.1^b
CR, %	60.0^a	47.9^b	56.5	46.9	63.0
23-d					
PR, %	58.0	63.3	55.8^c	61.7	68.9
ES, %	88.1	90.4	84.6	92.0	96.4

^{a,b}P<0.05. ^{c}Control vs. EB+ECP (P<0.05).

Key Words: Ovulation synchronization, Progestin, Estrogen

1032 Addition of GnRH to a melengestrol acetate (MGA)-prostaglandin $F_{2\alpha}$ (PG) estrus synchronization protocol in postpartum beef cows. D. J. Patterson*, J. F. Bader, K. K. Graham, F. N. Kojima, G. A. Perry, M. S. Kerley, and M. F. Smith, *University of Missouri, Columbia, MO.*

This experiment was conducted to determine whether addition of GnRH to a MGA-PG protocol would improve synchrony of estrus and maintain high fertility in postpartum beef cows. Primi- and multiparous crossbred cows were assigned by age, body condition score (BCS) and days postpartum (dpp) to one of two treatments. Cows were fed MGA (.5mg·hd^{-1}·d^{-1}) for 14 d followed by an injection of PG (25 mg Lutalyse) 19 d after MGA withdrawal. GnRH (100 μg Cystorelin) was administered to 103 of the cows 12 d after MGA withdrawal and 7 d before PG. Control cows (n=106) received only MGA-PG. Average BCS and dpp for GnRH-treated and control cows were 5.0 and 5.0; 44 and 46 d, respectively. Blood samples were collected from all cows 10 d before and on the first day of MGA, and 7 d before and on the day PG was administered. Progesterone in serum was elevated (> 1 ng/ml) in 40 % of GnRH-treated and 33 % of control cows prior to treatment, respectively (P > .1). Cows were observed for signs of behavioral estrus for 7 d after PG and AI was performed 12 h after observed estrus. Estrus response did not differ (P > .1) between treatments (GnRH: 83 %, 86/103; control: 80 %, 85/106). The mean interval to estrus after PG was 72.0 and 74.7 h for GnRH-treated and control cows, respectively (P > .1). The peak synchronized period for both treatments occurred between 72 and 96 h after PG and did not differ (P > .1) between treatments. Estrus response after PG ranged from 36 to132 h for GnRH-treated, and from 36 to120 h for control cows. Synchronized conception (SCR) and pregnancy rate (SPR) did not differ (P > .1) between treatments [SCR: 78 % (67/86), 85 % (72/85); SPR: 65 % (67/103), 68 % (72/106) for GnRH-treated and control cows, respectively]. This study demonstrates similarities in response to a 14-19 d MGA-PG estrus synchronization protocol in postpartum beef cows with or without the addition of GnRH. (Supported by grants from Select Sires, Inc., and USDA-NRI 2000-02163)

Key Words: Estrus synchronization, Progestin, Beef cows

1033 Comparison of melengestrol acetate (MGA)-based estrus synchronization protocols in yearling beef heifers. F. N. Kojima*, J. F. Bader, J. E. Stegner, B. E. Salfen, S. L. Wood, M. F. Smith, and D. J. Patterson, *University of Missouri, Columbia, MO.*

The objective of this study was to identify estrus synchronization protocols that offer potential for use in fixed-time AI programs for replacement beef heifers. Three MGA-based protocols were compared in yearling Angus heifers (n = 345: n = 115/treatment). Heifers were assigned to one of three treatments by reproductive tract score (RTS) and BW 2 wk prior to the initiation of treatments. Treatments were: 1) MGA (.5mg·hd^{-1}·d^{-1}) for 14 d followed by prostaglandin $F_{2\alpha}$ (PG: 25 mg Lutalyse®) 19 d after MGA withdrawal (MGA-PG); 2) addition of GnRH (100 μg Cystorelin®) on d 26 of the MGA-PG protocol (MGA-GnRH-PG); and 3) MGA for 7 d, PG on the last day of MGA, GnRH 4 d after PG, and a second injection of PG 11 d after the last day of MGA (7-11 Synch). Heifers were monitored for signs of behavioral estrus for 7 d beginning on the day PG was administered. AI was performed 12 h after onset of estrus. Estrus response (ER), synchronized conception rate (SCR), and synchronized pregnancy rate (SPR) were analyzed by Chi-square analysis. Synchrony of estrus was analyzed by ratio of variance (F-test) for mean time interval to onset of estrus. ER did not differ (P > .10) among treatments. Estrus synchrony was greater (P < .05) for 7-11 Synch treated heifers (331.9) than for MGA-PG (667.1) or MGA-GnRH-PG treated heifers (539.3). SCR and SPR were greater (P < .05) for MGA-PG (63 % and 54 %) than MGA-GnRH-PG (45 % and 39 %) or 7-11 Synch (47 % and 37 %) treated heifers. There was an effect of reproductive maturity/cycling status of heifers, indicated by RTS, on ER, SCR, and SPR regardless of treatment. ER (93 % and 81 %), SCR (66 % and 46 %), and SPR (62 % and 37 %) were all greater (P < .01) in cycling compared to non-cycling heifers. Reproductive maturity/cycling status significantly influenced response to synchronization treatment and subsequent conception and pregnancy rate in yearling beef heifers. (Supported by USDA-NRI grant 2000-02163)

Key Words: Estrus synchronization, Artificial insemination, Yearling beef heifers

1034 Effects of a progestin on ovulation, accessory CL formation and follicular development during GnRH and $PGF_{2\alpha}$ treatment in beef cattle. M.L. Mussard*, C.R. Burke, D.E. Grum, and M.L. Day, *Ohio State University, Columbus, OH/USA.*

The improvements in pregnancy rates expected to result from addition of a progestin during a GnRH-$PGF_{2\alpha}$ synchrony system have not been consistently realized in recent field studies. The objectives of this experiment were to determine the effects of a progestin on follicular dynamics and accessory CL formation following treatment with GnRH-$PGF_{2\alpha}$. Randomly cycling, postpartum beef cows (n=67) received 100 g GnRH on d 0 and 25 mg $PGF_{2\alpha}$ on d 7. Daily transrectal ultrasonography was used to monitor ovarian structures from d -4 to 12. Cows received either melengestrol acetate (.5 mg/hd) daily from d 0 to 6 (MGA; n=33) or the grain carrier for MGA (non-MGA; n=34). Blood samples were collected on d -2, 0, 4, 6, 7, and 9 for progesterone analysis. On d 9, a second injection of GnRH (100 g) was administered to approximately 50% of the animals in the MGA (n=15) and non-MGA (n =16) treatments. Animals that did not receive the second GnRH injection were observed for estrus every 8 h from d 5 to 12. The incidence of ovulation in response to GnRH on d 0, accessory CL formation, diameter of the dominant ovarian follicle on d 7 and 9, and time of ovulation following $PGF_{2\alpha}$ were compared. On d 7, animals in the MGA treatment tended (P < 0.10) to have dominant follicles of greater diameter (12.7 ± .40 mm) and fewer accessory CL (36%) than in the non-MGA treatment (11.8 ± .35 mm and 59%, respectively). Regardless of whether a second GnRH injection was given on d 9, the interval to ovulation following $PGF_{2\alpha}$ was later (P < 0.05) in the MGA than non-MGA treatment (4.2 ± .17 d vs. 3.7 ± .15 d, respectively). In conclusion, treatment with MGA tended to decrease the incidence of accessory CL formation following GnRH, disrupt follicular growth and delay timing of ovulation following $PGF_{2\alpha}$. Results from this study suggest that inclusion of MGA in a GnRH-$PGF_{2\alpha}$ based synchrony system may alter typical ovarian responses observed in cyclic cows.

Key Words: Beef cattle, Progestin, Follicle

1035 Estradiol Enhances Synchrony and Fertility to Artificial Insemination (AI) or Embryo Transfer (ET) in Brangus Females. J.A. Meyer*[1], C.R. Looney[2], C.R. Long[2], J.A. Thompson[1], M.L. Day[3], H.D. Hafs[4], and D.W. Forrest[1], [1] *Texas A&M University, College Station, TX* , [2] *Ovagenix, Bryan, TX* , [3] *The Ohio State University, Columbus, OH,* [4] *Rutgers University, New Brunswick, NJ.*

Two trials were conducted to quantify effects of estradiol benzoate (EB) administration on fertility after removal of a controlled internal drug release (CIDR)® insert. Lactating, primi- and multiparous Brangus females were administered a CIDR (1.38g Progesterone) for 7 or 8 d with prostaglandin $F_{2\alpha}$ (25 mg, im) administered upon removal of the CIDR (control group). Females allotted to the treatment group were administered estradiol benzoate (EB, 1 mg,im) at 24 h post-CIDR removal. Females were observed twice daily for signs of estrus behavior for 5 d after CIDR removal. In Trial 1, females were inseminated 12 h post-onset of estrus. The synchrony rate (SR; 93.9%) in EB treated (n = 82) females was higher ($P < 0.01$) than the SR (80.0%) in the control group (n = 230). First service conception rate (FSCR) was not affected ($P > 0.1$) by EB treatment (50.6 and 46.4% for treatment and control groups, respectively). However, females in the treatment group had a higher ($P = 0.08$) first service pregnancy rate (FSPR) than females in the control group (47.6 vs. 36.7%, respectively). In Trial 2, recipient cows received a single embryo 6.5 to 7.5 d post-onset of estrus. SR was higher ($P < 0.01$) in EB treated (n = 886) females compared to control (n = 457) females (93.0 and 73.5%, respectively). FSCR did not differ ($P > 0.1$) between control and treatment groups (54.4 and 55.7%, respectively). FSPR was higher ($P < 0.01$) in EB females (46.1%) compared to females in the control group (38.1%). In conclusion, the addition of an injection of 1 mg EB administered 24 h after a conventional CIDR synchronization treatment regimen increased both SR and FSPR following either AI or ET, in Brangus females.

Key Words: Progesterone, Estradiol, Synchronization

ASAS/ADSA Production, Management, and Environment: Waste Management for Beef and Swine; Reproductive Practices and Measures

1036 Decreasing nitrogen losses from open-dirt feedlot pens by manipulation of organic matter excretion. G. E. Erickson*, T. J. Klopfenstein, and C. T. Milton, [1] *University of Nebraska-Lincoln.*

Three experiments with yearling steers (404 ± 15 kg) evaluated adding either 15 (15bran) or 30% (30bran) corn bran to a 15% corn silage, corn based diet (0bran). Experiments were conducted from October to February (128 d), February to June (105 d), and June to September (110 d) in eastern Nebraska. Performance and mass-balance of nitrogen were assessed for each pen (8 steers/pen; 4 pens/treatment) in each experiment. No experiment by treatment interactions were detected ($P > .10$), so performance data were pooled. Increasing dietary corn bran from 0 to 30% increased ($P < .01$) DM intake and decreased ($P < .05$) ADG, leading to depressed ($P < .01$) feed efficiency. Compared to the 0bran diet, feed efficiency was depressed by 7.8 and 10.4% for 15bran and 30bran, respectively, suggesting that organic matter (OM) excretion was increased. For the winter/spring months, increasing dietary corn bran increased manure N and decreased N losses (primarily volatilization) expressed as either kg/steer or percentage of N excretion. During the summer experiment, increasing dietary corn bran did not significantly influence either manure N or N losses. Increasing OM excretion of feedlot cattle may increase manure N thereby decreasing volatilization losses but will also depress feed efficiency.

Item	0bran	15bran	30bran	SE	Linear	Quadratic
ADG, kg/d	1.82	1.81	1.74	.03	.05	.58
ADG/DM intake	.154	.142	.138	.002	.01	.09
Winter/spring, kg/steer						
N manure	12.6	21.1	25.0	1.6	.01	.29
N losses	36.9	31.6	29.3	1.8	.02	.51
%N lost[a]	74.5	59.9	53.9	3.2	.01	.32
Summer, kg/steer						
N manure	6.5	6.2	7.1	1.3	.76	.70
N losses	16.0	17.3	16.6	1.5	.78	.60
%N lost[a]	70.9	73.6	69.6	5.9	.88	.66

[a] Percentage of N excreted.

Key Words: Nitrogen, Nutrient management, Manure

1037 Validation of the nitrogen balance in a whole system feedlot model. H. Fairweather, K. A. Beauchemin, and K. M. Koenig, *Agriculture and Agri-Food Canada, Research Centre, Lethbridge, AB, Canada.*

FeedNuts is a stochastic daily time step simulation of a feedlot system model and predicts the nutrient flow (N, P) from feed inputs to the manure and effluent storage systems. Inputs (CP, P, UIP, DM and TDN, % dietary DM) into the FeedNuts model are stochastic and the mass balance is calculated initially for a single animal, which is then aggregated to the whole system. Data from Bierman et al. (1999; J. Anim. Sci. 77:1295-1305), which evaluated the N balance in a feedlot, were used to verify the model calculations and validate the N balance predicted by the FeedNuts model. The N balance experiments consisted of a digestibility trial and a feedlot trial (87 d) in which cattle were fed one of three corn grain based diets. The diets were: wet corn gluten feed (WCGF, 41.5% of DM), 10% forage (10F) and all concentrate (CONC). Total tract N digestibility of the diets was 65.2, 74.7 and 76.9% for the WCGF, 10F and CONC diets, respectively. The FeedNuts model predicts the total N excreted as the difference between N intake and N retained (calculated using the net protein gain equation, NRC (1996)). A rumen sub-model that accounts for microbial protein synthesis and the degradability of feed protein sources is used to determine N output in urine and feces. Using a daily time step to predict N retention predicted a higher amount of N retained (approximately 0.5 kg over the 87 d) compared with the estimated retention in the feedlot study. However, that calculation used only the final weight. The N digestibility and predicted fecal and urinary N, as a percentage of N intake, were within 10% of the measured values for each diet. Furthermore the predicted relative ranking of diets in terms of fecal and urinary N agreed with the observed. This verification and validation exercise demonstrates the capability of the FeedNuts model for predicting the N balance in the feedlot system at any point in time as a function of ration inputs.

Key Words: Nitrogen balance, System model, Validation and verification

1038 Digestibility of several known dietary manipulations used in combination to reduce nutrient excretion in pigs. S.L. Hankins*, D.C. Kendall, B.E. Hill, and B.T. Richert, *Purdue University, West Lafayette, IN.*

Twelve crossbred barrows (Initial BW=96kg) were blocked by weight and randomly assigned to one of three diets. All diets were formulated to provide 0.48% digestible Lys and were: 1) Standard 13.1% CP corn-soy diet, 0.23% available P (0.50% total P) (STD), 2) 11.5% CP corn-soy diet, 0.15% Lys-HCl, 0.26% available P (0.50% total P) (RCP), and 3) 8.25% CP diet with 5% soybean hulls, high-available P corn, 0.05% phytase and reduced mineral sulfates, 0.40% Lys-HCl, 0.16% available P (0.26% total P) (HRP) to evaluate the effect of several known dietary manipulations in combination on nutrient excretion compared to standard diets. Pigs were adapted to metabolism stalls and dietary treatments for 7 d followed by a 3 d total feces and urine collection. Feces and acidified urine were collected twice daily and frozen until analysis. Pigs were fed at 3X maintenance levels (NRC, 1988) with ad-libitum access to water. Feces and urine were analyzed for DM, nitrogen (N), ammonium N (AMM) and total P (TP). DM digestibility was 88.8%, 88.3% and 87.9% for the STD, RCP and HRP diets, respectively. N and P digestibility were 82.8%, 81.4%, 75.2% and 45.9%, 48.3%, 56.1% for the STD, RCP and HRP diets, respectively. Urine N was 41% and 66% lower ($P<.05$) from pigs fed the RCP and HRP diets, respectively, compared to the STD diet. Total N excretion was reduced ($P<.05$) 37% and 55% when the RCP (20.3 g/d) and HRP (14.6 g/d) diets were fed respectively when compared to the STD (32.2 g/d) diet. N retention as a percent of total N absorbed was 30% higher ($P<.05$) for pigs on