treatments were not different during the lactation. The numbers of days return to estrus of sows among the treatments were not different. This study indicates that the use of fermented soybean meal with Aspergillus Orizae in lactation diet improved the performance of primiparous sows by decreasing body weight loss during lactation whereas the use of probiotics was not beneficial.

Key Words: Lactating sows, Probiotics, Fermented soybean meal

Physiology: Estrous synchronization

200 A comparison of the MGA® Select and 7-11 Synch protocols to synchronize estrus in postpartum beef cows. J. E. Stegner*, F. N. Kojima, M. R. Ellersieck, M. F. Smith, and D. J. Patterson, *University of Missouri*.

This experiment compared progestin-GnRH-$PGF_{2\alpha}$(PG) based protocols for estrus synchronization in postpartum beef cows. Cows were assigned by age, body condition score (BCS), and days postpartum (dpp) to one of two treatments. The MGA® Select treated cows (T1; n=109) were fed melengestrol acetate (MGA; 0.5mg·hd^{-1}·d^{-1}) for 14 d, injected with GnRH (100 μg i.m. Cystorelin) 12 d after MGA withdrawal, and PG (25 mg i.m. Lutalyse) 7 d after GnRH. The 7-11 Synch treated cows (T2; n=111) received MGA for 7 d, PG on day 7 of MGA, GnRH 4 d after PG, and PG 7 d after GnRH. Mean BCS (4.7 ± 0.1, T1; 4.7 ± 0.1, T2) and dpp (41 ± 1, T1; 41 ± 1, T2) did not differ ($P > 0.1$) between treatments. Blood samples were collected 8 d and 1 d prior to MGA to determine pretreatment cyclicity [progesterone, P_4 > 1ng/mL; 10/109 (9%), T1; 12/111 (11%), T2; $P > 0.1$] and again on the day of PG to predict treatment response [81/109 (74%), T1; 84/111 (76%), T2; $P > 0.1$]. Serum concentrations of P_4 at PG differed ($P < 0.01$) between treatments [3.3 (T1) vs. 1.7 (T2) ng/mL]. Heat Watch® was utilized for 7 d after PG to detect estrus and AI was performed 12 h after the onset of estrus. Estrous response was similar ($P > 0.1$) between treatments [100/109 (92%), T1; 101/111 (91%), T2]. The mean interval to estrus (65 ± 2 h, T1; 52 ± 2 h, T2) and synchrony of estrus (analyzed by ratio of variance, F-test) differed ($P < 0.01$) between treatments. Synchronized conception and pregnancy rates [61/100 (61%), 61/109 (56%), T1; 71/101 (70%), 71/111 (64%), T2] and final pregnancy rate [97/109 (89%), T1; 98/111 (88%), T2] did not differ ($P > 0.2$) between treatments. This study demonstrates that estrous response and fertility are similar among cows assigned to the MGA® Select or 7-11 Synch protocols. Synchrony of estrus, however, may be improved following treatment with the 7-11 Synch protocol. These data will be used to facilitate methods of fixed-time AI in beef cattle. (Supported by grants from Select Sires, Inc., and USDA-NRI 2000-02163.)

Key Words: Estrus synchronization, Progestin, GnRH

201 A comparison of two fixed-time AI programs for postpartum beef cows. F. N. Kojima*, J. E. Stegner, J. F. Bader, D.J. Schafer, R. L. Eakins, M. F. Smith, and D. J. Patterson, *University of Missouri*.

The objective of this study was to compare two fixed-time AI protocols for postpartum beef cows. Cows at two locations (location 1, n = 113; location 2, n = 95) were stratified by age, days postpartum (dpp), and body condition score (BCS), and randomly assigned to one of two fixed-time AI protocols. The two treatments included: 1) 7-11 Synch (n = 103: cows were fed melengestrol acetate [MGA; 0.5mg·hd^{-1}·d^{-1}] for 7 d followed by prostaglandin $F_{2\alpha}$ [PG: 25 mg i.m. Lutalyse] on d 7 of MGA, GnRH [100 μg i.m. Cystorelin] on d 11, and PG on d 18, with fixed-time AI 60 h after the last PG and GnRH at AI); and 2) CO-Synch plus EAZI-BREED™ CIDR (CIDR: n = 105: GnRH was administered at the time of CIDR insertion [CIDR was in place for 7 d], PG was administered at the time of CIDR removal, with fixed-time AI 48 h after PG and GnRH at AI). One AI sire was used for all inseminations. Pregnancy rate to fixed-time AI was determined by ultrasonography between 50 and 60 d after AI. Quantitative data were analyzed by ANOVA and qualitative data were compared by Chi-square and logistic regression analyses. There were no differences attributed to location for any of the variables considered in the analyses. Results were, therefore, pooled for the respective treatments. Mean age (5.8 ± 0.2 vs. 5.8 ± 0.2), dpp (50.3 ± 1.7 vs. 51.5 ± 1.7), and BCS (5.6 ± 0.1 vs. 5.6 ± 0.1) were not different ($P > 0.10$) between the 7-11 Synch and CO-Synch plus CIDR groups. Pregnancy rate to fixed-time AI did not differ ($P > 0.10$) between the 7-11 Synch (65/103, 63 %) and CO-Synch plus CIDR (58/105, 55 %) groups. These data indicate that the 7-11 Synch and CO-Synch plus CIDR protocols provide significant opportunity to AI cows at a fixed time with resulting high fertility, eliminating the need to detect estrus. Duration of treatment and cost of these protocols provide flexibility for beef producers in choosing the protocol that matches a specific management scenario. (Supported by USDA-NRI 2000-02163)

Key Words: Beef Cows, Estrus Synchronization, Fixed-time AI

202 Effects of CIDR in the Ovsynch protocol on AI pregnancy rate in crossbred beef cows. H. K. Baitis*[1], A. Garcia[1], W. D. Whittier[1], and J. M. DeJarnette[2], [1]*Virginia Polytechnic Institute and State University, Blacksburg, VA/United States,* [2]*Select Sires, Inc., Plain City, OH/United States*.

Failure of the follicle to respond to the first GnRH injection in a synchronization protocol results in premature estrus (PE) in 8-10% of treated animals. The objective of this experiment was to determine if the addition of an intravaginal progesterone-releasing insert (CIDR) to the Ovsynch protocol would alter AI reproductive performance in postpartum beef cattle. Crossbred beef cows were subjected to synchronization of estrus and ovulation. Cows were managed in a typical commercial cow/calf operation at three locations in Virginia. A total of 379 mature beef cows were randomly allotted to receive either 50μg GnRH (Cystorelin, Abbott Laboratories) on d 0, PGF2α on d 7 (25 mg dinoprost), 100μg GnRH on d 9 (OV; n=188) or 50μg GnRH and CIDR on d 0, PGF2α on d 7 with CIDR removal, 100μg GnRH on d 9 (CIDR; n=190). Estrous activity was monitored with both Kamar (Kamar, Inc., Steamboat Springs, CO) and visual detection methods. Cows that exhibited PE were bred 12-16 h after estrus. All cows not detected in estrus were bred AI at 12-16 h after PGF2α. Pregnancy was diagnosed via trans-rectal ultrasonography 35-40 d post insemination. Data were analyzed using the Proc GLM (SAS) procedures. A higher pregnancy rate ($P<0.05$) was obtained in cows receiving a CIDR device (66%) compared with OV treatment alone (52%). Pregnancy rate to AI was not affected ($P>0.05$) by location, inseminator, or sire. In conclusion, addition of a CIDR to the Ovsynch protocol results in increased AI pregnancy rates in crossbred, mature beef cattle.

Key Words: Estrous synchronization, CIDR, Postpartum

203 Single versus a split dose of $PGF_{2\alpha}$ administered 18 or 19 d after a 14 d melengestrol acetate (MGA) treatment to synchronize estrus in *Bos taurus* x *Bos indicus* heifers. G. A. Bridges*, G. P. Portillo, M. K. Shaw, J. W. de Araujo, and J. V. Yelich, *University of Florida, Gainesville*.

Melengestrol acetate (MGA® Premix) and $PGF_{2\alpha}$ (LUTALYSE® Sterile Solution) were used to synchronize estrus in *Bos taurus* x *Bos indicus* heifers in 3 replications. Replications 1 (n = 139) and 2 (n = 146) were conducted at the same location in consecutive years, while replication 3 (n = 410) was conducted at a separate location. All heifers were administered MGA for 14 d at a rate of 0.5 mg $head^{-1}d^{-1}$. In replications 1 and 2 heifers were randomly distributed to receive either 25 mg $PGF_{2\alpha}$ i.m. 19 d following MGA or 12.5 mg $PGF_{2\alpha}$ i.m. on d 19 and 20 following MGA. In replication 3, heifers received the same $PGF_{2\alpha}$ treatments and were randomly divided into two groups with $PGF_{2\alpha}$ treatments initiated either 18 or 19 d following MGA. Visual detection of estrus was conducted in the AM and PM for 72 h after $PGF_{2\alpha}$ and heifers were AI 8 to 12 h after exhibiting estrus. Heifers not observed in estrus by 72 h following $PGF_{2\alpha}$ were timed-AI and received GnRH (100 μg i.m.; FERTAGYL®) at such time. Pregnancy was diagnosed by ultrasonagraphy 50 to 60 d following the synchronized breeding within each replication. Within replication 3, duration from MGA withdraw to $PGF_{2\alpha}$ administration did not effect any treatment variables analyzed, so data were combined. There were no significant treatment x replication effects for any variable analyzed so data were pooled. Heifers receiving a split dose of $PGF_{2\alpha}$ (50.1%; n = 341) had a greater ($P < 0.05$) three-day estrous response compared to the single dose (43.2%; n = 354) heifers. Modifying the dosage of $PGF_{2\alpha}$ from a single to a split dose also increased ($P < 0.05$) timed-AI pregnancy rates (23.9 vs 33.5%), and overall AI pregnancy rates (34.5 vs 42.5%), respectively. In

conclusion modifying the dosage of $PGF_{2\alpha}$ from a single to two consecutive half-doses 18 or 19 days following MGA increased three-day estrous response, timed-AI, and overall AI pregnancy rates in *Bos taurus* x *Bos indicus* heifers.

Key Words: *Bos indicus*, Progestin, Synchronization

204 Fixed-time artificial insemination of postpartum beef cows at 72 or 80 hours after treatment with the MGA® Select protocol. J. E. Stegner*, J. F. Bader, F. N. Kojima, M. R. Ellersieck, M. F. Smith, and D. J. Patterson, *University of Missouri*.

This study was conducted to determine the appropriate timing of fixed-time AI following administration of the MGA® Select protocol. Cows at two locations (location 1, n= 114; location 2, n = 97) were assigned to fixed-time AI at 72 or 80 h by age, body condition score (BCS), days postpartum (dpp), AI technician, and sire. All cows were estrus synchronized with the MGA® Select protocol [melengestrol acetate, MGA ($0.5mg{\cdot}hd^{-1}{\cdot}d^{-1}$) for 14 d, GnRH (100 μg i.m. Cystorelin; day 26) 12 d after MGA withdrawal, followed in 7 d with $PGF_{2\alpha}$ (PG; 25 mg i.m. Lutalyse; day 33)]. Cows were inseminated at 72 h (n = 108) or 80 h (n = 103) after PG with a second injection of GnRH at AI. There were no differences attributed to location for any of the variables considered in the analyses. The results are, therefore, pooled for the respective treatments. Mean BCS (5.2 ± 0.1,72 h; 5.3 ± 0.1, 80 h) and dpp (34 ± 2, 72 h; 35 ± 2, 80 h) did not differ (P > 0.1) between treatments. Blood samples were collected 7 d and 1 d prior to MGA to determine pretreatment cyclicity, and again on the day of PG to determine treatment response [progesterone > 1 ng/mL; (33/108, 31%, 72 h vs. 32/103, 31%, 80 h; P > 0.8, pretreatment); (74/108, 69%, 72 h vs. 69/103, 67 %, 80 h; P > 0.9, at PG)]. Pregnancy rates were higher (P < 0.05) among cows inseminated at 72 h (69/108, 64%) versus 80 h (52/103, 50%) following administration of the MGA® Select protocol. Pregnancy rates at the end of the breeding season did not differ (P > 0.2) between treatments [98/108 (91%), 72 h; 88/103 (85%), 80 h]. These data indicate that pregnancy rates resulting from fixed-time AI are improved when postpartum beef cows are inseminated at 72 versus 80 h following administration of the MGA® Select protocol. (Supported by grants from Select Sires, Inc., and USDA-NRI 2000-02163.)

Key Words: Fixed-time AI, Beef Cows, Progestin

205 A fixed-time AI program for postpartum beef cows with 7-11 Synch. F. N. Kojima*, J. E. Stegner, J. F. Bader, M. F. Smith, and D. J. Patterson, *University of Missouri*.

The 7-11 Synch protocol for synchronization of estrus in beef cows results in a tightly synchronized estrous response that generally peaks at 54 h following treatment. The objective of this study was to determine the optimum timing of fixed-time AI using the 7-11 Synch protocol. Cows were stratified by age, days postpartum (dpp), and body condition score (BCS), and randomly assigned to fixed-time AI at 48 or 60 h following the 7-11 Synch protocol. All cows were synchronized with the 7-11 Synch protocol and fed melengestrol acetate (MGA; $0.5mg{\cdot}hd^{-1}{\cdot}d^{-1}$) for 7 d followed by prostaglandin $F_{2\alpha}$ (PG: 25 mg i.m. Lutalyse) on d 7 of MGA, GnRH (100 μg i.m. Cystorelin) on d 11, and PG on d 18. Fixed-time AI was performed either at 48 (n = 123) or 60 h (n = 122) after the last PG injection, and GnRH was administered at AI. One AI sire was used for all inseminations. Pregnancy rate to fixed-time AI was determined by ultrasonography 50 d after AI. Quantitative data were analyzed by ANOVA and qualitative data were compared by Chi-square and logistic regression analyses. Mean age (5.5 ± 0.3 vs. 5.4 ± 0.3), dpp (46.8 ± 1.5 vs. 47.5 ± 1.5), and BCS (5.3 ± 0.1 vs. 5.3 ± 0.1) were not different (P > 0.10) between 48 and 60 h fixed-time AI groups. Pregnancy rate to fixed-time AI did not differ (P > 0.10) between cows that were inseminated at 48 (64/123, 52 %) or 60 h (72/122, 59 %) following the 7-11 Synch protocol. These data indicate that the 7-11 Synch protocol provides flexibility to AI cows at fixed times between 48 and 60 h following administration, resulting in high fertility and eliminating the need to detect estrus. Further research is needed to confirm results from this study and more precisely determine the most effective timing of AI following administration of the 7-11 Synch protocol. (Supported by grants from Select Sires Inc., and USDA-NRI 2000-02163)

Key Words: Beef Cows, Estrus Synchronization, Fixed-time AI

206 Timing of insemination and GnRH on pregnancy rates in beef cows in a modified CO-Synch estrous synchronization system. J. B. Hall*[1], J. M. DeJarnette[2], J. C. Whittier[3], and T. W. Geary[4], [1]*Virginia Tech, Blacksburg, VA,* [2]*Select Sires Inc., Plain City, OH,* [3]*Colorado State University, Fort Collins, CO,* [4]*USDA-ARS Miles City, MT*.

The objective of this study was to examine the effect of timing of fixed time AI (TAI) in the CO-Synch protocol on pregnancy rates in cows not displaying estrus by 48 h after prostaglandin. Postpartum beef cows (n = 825) from four herds were synchronized with an injection of GnRH (100 μg, Cystorelin®) on d 0 followed by PGF (25 mg, Lutalyse®) on d 7. Estrus detection was performed twice daily from d 6 to d 9. Cows detected in estrus (HD) were bred by AI 12 h after estrus. At 48 h after PGF, all cows not detected in estrus were randomly assigned by parity and days postpartum (74.5 0.5 d) to TAI at 48 h (TAI48) or 64 h (TAI64). All TAI48 and TAI64 cows received an injection of GnRH (100 μg) at AI. Body condition score (BCS; 5.2 0.02) was recorded at initiation of synchronization. Pregnancy was determined by ultrasonography between d 45 and d 60 post AI. Pregnancy rates to TAI were different across herds (herd x TAI, P < 0.05). In three herds, pregnancy rates were similar (P > 0.3) between TAI48 and TAI64 cows; whereas, in one herd pregnancy rate was greater (P < 0.002) in TAI64 than TAI48 cows. Across all herds, pregnancy rates were greater (P < 0.001) in cows bred after HD (66.8 %; 129/193) compared to cows bred TAI48 (40.7 %;129/317) or TAI64 (41.3 %; 130/315). Overall pregnancy rate for all AI times was 47.0 % (388/825). The percentage of cows bred after HD was influenced by herd (P < 0.01) with a range of 5.3 to 26.6 %. Pregnancy rate to timing of AI was not affected (P > 0.10) by BCS or days postpartum. We conclude that, in the CO-Synch protocol, TAI with GnRH at 48 h or 64 h after PGF results in acceptable AI pregnancy rates for cows not detected in estrus. Because TAI at 64 h would allow more cows to be inseminated following a detected estrus, heat detection + TAI64 may improve overall AI pregnancy rates.

Key Words: Estrous synchronization, Timed insemination, Beef cows

207 A timed insemination program for first service based on the use of estradiol cypionate (ECP) in lactating dairy cows. S. M. Pancarci, A. Arteche, F. Silvestre, S. Kamimura, and W. W. Thatcher*, *University of Florida, Gainesville, FL, USA*.

Objective was to determine if ECP may replace the first GnRH injection of a HeatSynch protocol based upon a measurement of pregnancy rate in lactating dairy cows. Primiparous (n=182) and multiparous (n=237) Holstein cows were assigned randomly to either a Heatsynch protocol or a Double-ECPsynch protocol following a pre-synchronization program in which $PGF_{2\alpha}$ (25 mg, i.m.) was given at 35 ± 3 and 49 ± 3 dpp. Cows assigned to the Heatsynch protocol (n=212) received an injection of GnRH (100 μg, i.m.) at 14 d after the second $PGF_{2\alpha}$ injection of the pre-synchronization sequence (63 ± 3 dpp). Seven days later (70 ± 3 dpp) $PGF_{2\alpha}$ was administered followed 24 h later (71 ± 3 dpp) with an injection of ECP (1 mg, i.m.) and a timed AI at 48 h after ECP (73 ± 3 dpp). Cows in the Double-ECPsynch protocol (n= 207) received an injection of ECP (2 mg, i.m.) at 7 d after the second $PGF_{2\alpha}$ injection of the pre-synchronization sequence (i.e., 56 ± 3 dpp). Ten days later (66 ± 3 dpp) $PGF_{2\alpha}$ was injected followed 24 h later (67 ± 3 dpp) with an injection of ECP (1 mg, i.m.) and a timed AI at 48 h after ECP (69 ± 3 dpp). In both treatment groups, cows that were detected in heat at 24 h after ECP (1 mg, i.m) injection were inseminated at that time. Pregnancy rates at 28 ± 1 and 63 ± 3 days following insemination did not differ between Heatsynch (44.8%, 37.3%) and Double-ECPsynch (39.1%, 28.0%) protocols. Risk of losing pregnancy between days 28 ± 1 and 63 ± 3 after the first service tended (P< 0.06) to be lower for the Heatsynch protocol (16.8%) than the DoubleECPsynch protocol (28.4%). Among cows that were not pregnant to the first service (n=230), 139 (60.4%) were re-inseminated following visual signs of estrus prior to pregnancy examination at day 28 ± 1. In conclusion, comparable pregnancy rates were achieved between DoubleECPsynch and Heatsynch programs in

lactating dairy cows. However, further studies are needed to reduce pregnancy losses.

Key Words: Estradiol cypionate, Timed insemination, Pregnancy rate

208 Increased dose of GnRH in a synchronized ovulation program for lactating dairy cattle.

K. E. Leslie, S. J. LeBlanc*, and C. H. Leslie, *University of Guelph, Ontario, Canada*.

Synchronization of ovulation and timed insemination with the Ovsynch protocol is a widely adopted reproductive management program in lactating dairy cattle. The probability of pregnancy is increased if a follicle is ovulated following the first injection of GnRH. In other contexts, there are some data to suggest possible positive dose response effects of GnRH. Our objective was to measure the effect of higher than usual doses of GnRH in the Ovsynch program on first insemination pregnancy risk in dairy cows. In 6 commercial herds over 1 yr, 537 Holstein and Jersey cattle received timed first insemination between 54 and 114 DIM (median 74 DIM) following the Ovsynch protocol. All cows received GnRH, PGF2α (500 μg cloprostenol) 7 d later, followed by GnRH 48 h later and AI the next day. At each injection of GnRH, cows were randomly and blindly assigned to receive either 100 or 200 μg gonadorelin acetate i.m., resulting in 4 treatment groups denoted by dose of GnRH: 100/100, 100/200, 200/100, and 200/200. Pregnancy was diagnosed by rectal palpation $>$ 35 d after AI. The probability of pregnancy following treatment was modelled with multivariable logistic regression, accounting for the correlation of cows within herd. Overall, there was no difference in pregnancy risk among groups (overall mean 32%). However, there was a treatment by DIM interaction. Parity and calving season covariates were not significant. Among cows bred before 75 DIM, pregnancy risks were: 100/100, 16%; 100/200, 28%; 200/100, 40%; 200/200, 24%, P = 0.01). Cows that received 200 μg GnRH at the first injection were more than 3 times more likely to be diagnosed pregnant than control cows (odds ratio = 3.4; 95% confidence interval, 1.5 - 7.5; P = 0.03); other groups did not differ from the 100/100 group. Among cows bred $\geq$ 75 DIM, there were no significant differences in pregnancy risk between treatment groups. We speculate that among cows bred earlier, the higher first dose of GnRH may have resulted in more cows ovulating in response to the injection, favouring the success of the Ovsynch program.

Key Words: Ovsynch, Gonadotropin releasing hormone, Postpartum

209 Resynchronization of ovulation using Ovsynch to induce second timed artificial insemination service in lactating dairy cows. .

P. M. Fricke*[1] and M. L. Welle[2], [1] *University of Wisconsin-Madison,* [2] *Miltrim Dairy, Athens, Wisconsin*.

Lactating Holstein cows (n=711) received a modified Presynch protocol to initiate first postpartum (pp) timed artificial insemination (TAI) service as follows: 25 mg $PGF_{2\alpha}$ (d 183; d 323; d 463 pp); 50 μg GnRH (d 603 pp); 25 mg $PGF_{2\alpha}$ (d 673 pp) and 50 μg GnRH+TAI (d 693 pp). At first TAI service, cows were randomly assigned to initiate the first GnRH injection of Ovsynch (50 μg GnRH, d 0; 25 mg $PGF_{2\alpha}$, d 7; 50 μg GnRH+TAI, d 9) at 19 d (D19), 26 d (D26), or 33 d (D33) post-TAI to induce second TAI service (Resynch) for cows failing to conceive to Presynch. All D19 cows received a GnRH injection at 19 d post TAI and continued the Ovsynch protocol only if diagnosed nonpregnant using ultrasound at 26 d post TAI. Cows in the D26 and D33 groups initiated Ovsynch only if diagnosed nonpregnant using ultrasound at 26 d or 33 d post-TAI, respectively. Overall conception rate to Presynch was 40.2% (286/711) and was greater (p<0.01) for D19 (46.0%, 108/235) and D26 (42.1%, 101/240) cows than for D33 cows (32.6%, 77/236). Overall conception rate to Resynch was 32.0% (123/384) and was greater (p<0.01) for D26 (33.9%, 41/121) and D33 (37.8%, 54/143) cows than for D19 cows (23.3%, 28/120). Resynch conception rate was greater (p<0.05) for D19 cows with (27.5%, 25/91) than for cows without (10.3%, 3/29) a CL at the $PGF_{2\alpha}$ injection of Ovsynch, whereas Resynch conception rate tended to be greater (p=0.09) for D26 + D33 cows with (38.7%, 75/194) than for cows without (28.6%, 20/70) a CL at the first GnRH injection of Ovsynch. For cows diagnosed pregnant to Presynch, overall pregnancy loss to d 68 of gestation was 23.4% (67/286) and was greater (p>0.01) for D19 (27.8%, 30/108) and D26 (27.7%, 28/101) cows than for D33 cows (11.7%, 9/77). Although administration of GnRH to pregnant cows 19 d after first TAI service did not appear to induce iatrogenic embryonic loss, initiation of Ovsynch 19 d after first TAI service resulted in a lower conception rate compared with initiation of Ovsynch 26 or 33 d after first TAI service.

Key Words: Resynch, Ovsynch, Presynch

210 Reproductive responses following postpartum suppression of follicular development with a Deslorelin implant during summer heat stress.

F. T. Silvestre*, S. Kamimura, J. A. Bartolome, A.C.M. Arteche, S. M. Pancarci, and W. W. Thatcher, *University of Florida, Gainesville, FL, USA*.

Holstein cows received a non-degradable GnRH-agonist implant (Deslorelin, 5mg) within 1 to 4d postpartum (n=120), between June 25 to Aug. 8, for comparison to control cows (n=127). Enrollment consisted of normal cows with a BCS $\geq$ 2.75. Cows were assigned weekly and injected with $PGF_{2\alpha}$ 7 d later. Implants were removed on Aug. 28 and Sept. 4 with implant exposure ranging from 28 to 67d. Ultrasonography (US) monitored numbers of ovarian follicles and CL at 7, 28, 35, 45, 56 and 66d of treatment or days postpartum in sub-samples of cows. At 31d after implant removal, cows enter a Pre-synch/Ovsynch protocol: GnRH on d0, $PGF_{2\alpha}$ on d7, GnRH on d17, $PGF_{2\alpha}$ on d24, GnRH on d26 and TAI 16h later. Cows were re-inseminated at estrus within 26d after TAI. Pregnancy rate (PR) was evaluated at 28d (US) after TAI. Blood samples were collected at: $PGF_{2\alpha}$ of pre-synch, subsequent GnRH, at TAI and 8d after TAI. The implant increased number of Class 1 (3-5 mm) follicles (21.03 $\pm$ 0.66 $>$ 11.27 $\pm$ 0.58; P$<$ 0.01) and decreased numbers of Class 2 (6-9 mm; 0.08 $\pm$ 0.17 $<$ 1.93 $\pm$ 0.15 P$<$0.01), Class 3 ($>$ 10 mm) follicles (0.01 $\pm$ 0.10 $<$ 1.81 $\pm$ 0.09; P$<$0.01), and CL (0.09 $\pm$ 0.06 $<$ 0.7 $\pm$ 0.05; P $<$0.01). Follicular development was arrested at $<$ 4 mm in the implant group during the postpartum-heat stress period. Percent cows cycling was less for the implant group at the beginning of the Ovsynch protocol (49%, n=114 $<$ 94%, n=117; P$<$0.01). The implant lowered PR: overall TAI PR (27 %, n=120 $<$ 53.5 %, n=127 %; P$<$ 0.09), TAI PR in cycling cows (33.9 %, n=56 $<$ 55.4%, n=110; P$<$ 0.06), and TAI PR in cycling cows that ovulated after TAI (39.5%, n=48 $<$ 60.9%, n=87; P$<$0.06). Accumulated PR (TAI + 26d AI) did not differ (40.8%, n=120 implant vs 59.8%, n=127 control; P$<$0.16). The implant induced delay in turnover of postpartum-heat stress damaged follicles compared to control may have contributed to lower PR. Rate of depletion of heat stressed damaged follicles may affect PR.

Key Words: Deslorelin implant, Heat stress, Fertility

211 Effect of ovulatory follicle size at time of GnRH injection or standing estrus on pregnancy rates and embryonic/fetal mortality in beef cattle.

G. A. Perry*[1,2], M. F. Smith[1], M. C. Lucy[1], A. J. Roberts[2], M. D. MacNeil[2], and T. W. Geary[2], [1] *University of Missouri, Columbia, MO,* [2] *USDA-ARS, Fort Keogh LARRL, Miles City, MT*.

Use of GnRH in AI protocols results in ovulation of a wide range of follicle sizes. Our objective was to determine the effect of ovulatory follicle size at GnRH-induced ovulation or standing estrus on pregnancy rates and embryonic/fetal mortality. Lactating beef cows (n = 273) received the CO-Synch protocol (100 μg GnRH, i.m. on d -9; 25 mg PG, i.m. on d -2; and 100 μg GnRH, i.m. on d 0 with timed AI) or were inseminated following detection of estrus using Heatwatch (electronic mount detectors). Ovulatory follicle size was determined by transrectal ultrasonography on d 0 (timed AI) or 12 h after detection in estrus. Pregnancy rates and fetal viability were determined by transrectal ultrasonography on d 27, 41, 55, and 68 after timed-insemination. On d 27 following GnRH-induced ovulation, there was a tendency ($P = 0.07$) for follicle size to effect pregnancy rates [13/45 (29%), 13/22 (59%), 18/39 (46%), 11/28 (39%), 13/20 (65%), and 7/19 (37%) for $\leq$ 11, 11.5 to 12, 12.5 to 13, 13.5 to 14, 14.5 to 15, and $\geq$ 15.5 mm follicles; respectively]; however, by d 68 embryonic loss in cows that were induced to ovulate $\leq$ 11 mm follicles resulted in lower ($P < 0.01$) pregnancy rates (8/45; 18%) than cows in each of the other groups, which were unchanged from d 27. When ovulation occurred following standing estrus (37 d AI breeding season) there was no effect of follicle size ($P = 0.18$) on pregnancy rates at d 25 to 39 after insemination [11/14 (79%), 14/20 (70%), 28/35 (80%), 26/41 (63%), 21/25 (84%), and 25/38 (66%) for $\leq$ 11, 11.5 to 12, 12.5 to 13, 13.5 to 14, 14.5 to 15, and $\geq$ 15.5 mm; respectively], nor were embryonic/fetal mortalities affected by ovulatory follicle diameter

($P = 0.66$). In summary, embryonic/fetal survival was decreased following GnRH-induced but not spontaneous ovulation of small ($\leq$ 11 mm) ovulatory follicles in beef cows.

Key Words: Fixed-time AI, Follicle Size, Embryonic Mortality

212 Effect of hCG administration approximately 5 d after artificial insemination on progesterone concentrations and AI conception rates in beef heifers. R. N. Funston*[1], J. L. Olson[2], R. J. Lipsey[3], T. W. Geary[4], and A. J. Roberts[4], [1]*University of Nebraska, Lincoln,* [2]*Montana State University, Bozeman,* [3]*American Simmental Association, Bozeman, MT,* [4]*USDA-ARS, Miles City, MT.*

Objectives of this study were to determine if administration of hCG approximately 5 d after AI would increase plasma progesterone (P4) concentrations and conception rates in beef heifers. Heifers from two locations (Location 1, n = 347; BW = 367 ± 1.72 kg; Location 2, n = 246; BW = 408 ± 2.35 kg) received MGA (0.5mghd^{-1}d^{-1}) for 14 d and an injection of PGF (Lutalyse®; 25 mg; i.m.) 19 d later. Heifers were observed for estrus continuously during daylight from 0 to 4.5 d after PGF and inseminated by AI approximately 12 h after onset of estrus. Pregnancy status was determined by ultrasound approximately 50 d after AI. One-half of the heifers inseminated at Location 1 were randomly assigned to receive an injection of hCG (Chorulon®, 3333 IU i.m.) 8 d after PGF and a blood sample was collected from all heifers 14 d after PGF for P4 analysis. One-half of the heifers inseminated at Location 2 were administered hCG on d 9 after PGF and a blood sample was collected from all heifers 17 d after PGF. Heifers at Location 1 had a 93% synchronization rate, exhibited estrus 2.46 ± .03 d after PGF and received hCG 5.05 ± .03 d after AI. Heifers at Location 2 had an 85% synchronization rate, exhibited estrus 2.69 ± .03 d after PGF and received hCG 5.8 ± .03 d after AI. Progesterone concentrations were greater ($P < 0.01$) for hCG treated heifers at both locations, 8.6 vs 4.6 ng/ml for treatment and control at Location 1 and 11.2 vs 5.6 ng/ml for treatment and control at Location 2. Conception rates (65 vs 70% for treatment and control, respectively) were not different ($P = 0.36$) at Location 1. Conception rates tended ($P = 0.11$) to be increased with hCG treatment at Location 2, 61 and 50% for treatment and control, respectively. In summary, hCG administration approximately 5 d after AI increased progesterone concentrations in beef heifers and tended to improve AI conception rates at one location.

Key Words: Heifers, Progesterone, hCG

213 Inclusion of a CIDR after initial artificial insemination concentrations of progesterone and corpus luteum volume in suckled beef cows. R. C. Wasson*, J. E Larson, D. R. Brown, and G. C. Lamb, *North Central Research and Outreach Center, University of Minnesota, Grand Rapids, MN 55744.*

The objectives of this study were to evaluate progesterone (P4), corpus luteum (CL) and follicular response in cows after insertion of a CIDR between d 5 and 21 of the estrous cycle. Seventeen Angus cows (75 to 110 days postpartum) were estrous synchronized with the Select-Synch (a 100 μg injection of GnRH followed by a 25 mg injection $PGF_{2\alpha}$ 7 d later). At artificial insemination (AI) all cows were body condition scored and randomly assigned to one of four treatments: 1) untreated controls (n = 5); 2) administration of a CIDR on days 5 to 14 after AI (n = 4); 3) administration of a CIDR on days 14 to 21 after AI (n = 4); and 4) administration of a CIDR on days 5 to 21 after AI (on d 14 after AI the first CIDR was removed and replaced with a new CIDR; n = 4). On d ?9, and -2 to 26 relative to AI, blood was collected and serum harvested daily for determination of P4 concentration, plus transrectal ultrasound of the ovaries was performed to determine follicle and CL diameters. Cows were examined for pregnancy via transrectal ultrasound on d 28 and 56. One cow in each treatment was pregnant after initial AI. Six cows were observed in estrus and inseminated by AI between d 21 and 26 (3, 1, 2, 0 for treatments 1, 2, 3, and 4, respectively). On d 56, the number of pregnancies per treatment were 3, 2, 3, 1 for treatments 1, 2, 3, and 4, respectively. Between d 5 and 21 average CL volume was greater ($P < 0.01$) for treatments 2 (3.8 0.2 cm^3), 3 (3.5 0.3 cm^3), and 4 (3.6 0.3 cm^3) than 1 (2.6 0.2 cm^3) and average concentrations of P4 were greater ($P < 0.01$) for treatment 2 (3.2 0.2 ng/mL) and 4 (3.4 0.2 ng/mL) than 1 (2.6 0.2 ng/mL),whereas 3 (2.9 0.2 ng/mL) was intermediate. Regardless of treatment CL volume and concentrations of P4 correlated ($r = 0.504$; $P < 0.001$). During d 5 to 21 the average concentration of P4 was greater ($P < 0.01$) in cows with a CIDR (3.8 0.2 ng/mL) than those without a CIDR (3.0 0.2 ng/mL). In addition, daily concentrations of P4 tended ($P = 0.11$) to be greater in cows with a CIDR than those without. We conclude that inclusion of a CIDR during after AI increased concentrations of P4 and enhanced CL volume during diestrus. Inclusion of a CIDR did not appear inhibit embryonic survival.

Key Words: Beef Cows, Progesterone, Estrous synchronization

Production, Management, & the Environment

214 Application of the Cornell Nutrient Management Planning System. T. P. Tylutki*[1], D. G. Fox[1], and M. McMahon[2], [1]*Cornell University, Ithaca NY USA,* [2]*McMahons EZ Acres, Homer NY USA.*

The Cornell Nutrient Management Planning System (CuNMPS) is a collection of software tools that have been developed to implement integrated nutrient management planning on dairy farms. The CuNMPS consists of the Cornell Net Carbohydrate and Protein System (for evaluating rations), and Cornell CropWare (a crop nutrient management tool). A five-year project was conducted with a case-study dairy farm to determine if applying these tools have the desired impact on nutrient management. The case-study farm (625 mature Holsteins) is located over a sole-source aquifer that supplies the drinking water for approximately 55,000 people. The farm has a tillable land base of 450 ha with a mix of well drained valley land (corn:alfalfa rotation) with a high leaching potential and shallow, acidic clay hill land (continuous grass) with a high run-off potential. In 1997 (year 1), lactating cows were averaging 30.9 kg milk per day, 44% cull rate, and 42.9% of the whole herd diet being home-raised (forages only). Numerous changes occurred during the next four years driven by the adoption of quality management principles. Changes included: animal grouping strategies, feed storage, crop rotation, crop harvesting, crop type, personnel training, herd management, feeding management, and overall business management. The integration of these changes has resulted in a 38% increase in the proportion of the diet that is home grown (currently 59%), 37% reduction in the feed nitrogen purchased, 40% reduction in feed phosphorus purchases, 47% reduction in cull rate (currently below 30%), 26% increase in herd size (due primarily to reduced cull rate), 9% higher milk per cow, and 45% more milk sold per day. Additionally, purchased feed costs for the entire herd (assuming 2002 feed prices in 1997) have been reduced 48% per 45.4 kg milk. This level of impact exceeded expectations; however, it highlights the need for precision feeding, improved integration of herd, soils and crops management and intensive model training for CNCPS and CropWare, a higher farm management level, and the adoption of continuous improvement and quality management by the farm and their advisors.

Key Words: Nutrient management, Quality control, Models

215 Nutrient management practices on U.S. dairy operations: Results from the NAHMS Dairy 2002 Study. B. J. McCluskey[2], J. E. Lombard*[1], and S. Ott[2], [1]*Integrated Livestock Management, Colorado State University, Fort Collins, CO,* [2]*USDA:APHIS:VS, CEAH, Center for Animal Health Monitoring, Fort Collins, CO.*

Sound nutrient management practices are essential to maximize the economic benefits of manure while simultaneously reducing the risk of adverse environmental consequences. New and existing regulations have been promulgated to find the balance between normal dairy operation practices and environmental protection. The National Animal Health Monitoring Systems Dairy 2002 study surveyed dairy operations in 21 states representing 82.8% of U.S. dairy operations and 85.5% of U.S. dairy cows. One specific objective of this study was to assess nutrient management practices used on U.S. dairy operations. Approximately 55% (S.E. 2.9) of operations reported using either a gutter scraper or