

curve to the standard curve. The resulting P bioavailability estimates for DDGS relative to MSP were 84.3% and 85.3% for fibula breaking load and fibula bone ash, respectively. The basal diet + 500 FTU/kg phytase resulted in greater fibula breaking load (18.7 vs 13.7 kg force) and bone ash (1.049 vs 0.896 g) as compared with the basal diet, resulting in calculated P release of 0.082 and 0.064%, respectively. The 0.225% P DDGS + 500 FTU/kg phytase also resulted in greater fibula breaking load (31.9 vs 24.6 kg force) and bone ash (1.681 vs 1.389 g)

as compared with the 0.225% P DDGS diet. Taking into consideration the response from soybean meal, phytase supplementation resulted in complete P bioavailability from DDGS. These results indicate that the bioavailability of phosphorus in DDGS is approximately 85% with the remaining phosphorus liberated with additional phytase.

**Key Words:** Distiller's Dried Grain, Phosphorus, Pigs

## Physiology and Endocrinology: Strategies for Appointment Breeding of Beef and Dairy Cattle

**414 Comparison of EAZI-BREED CIDR inserts with melengestrol acetate in progestin-based protocols to synchronize estrus in beef cows.** D. J. Schafer\*, J. F. Bader, D. C. Busch, F. N. Kojima, M. R. Ellersieck, M. C. Lucy, M. F. Smith, and D. J. Patterson, *University of Missouri, Columbia*.

Follicular dynamics and timing of estrus and ovulation were compared in 48 nonsuckled, estrous cycling beef cows using EAZI-BREED CIDR inserts (CIDR) or melengestrol acetate (MGA) in progestin-based protocols to synchronize estrus. Cows were assigned equally (n=12) to one of four treatments (T1 to T4) by age and body condition. Cows in T1 were fed MGA (0.5mg·hd<sup>-1</sup>·d<sup>-1</sup>) for 14 d, GnRH (100 µg Cystorelin) was injected on d 26, and PGF<sub>2α</sub> (PG; 25 mg Lutalyse) on d 33. Cows in T2 had CIDRs (1.38g progesterone) inserted for 14 d, GnRH was injected on d 23, and PG on d 30. Cows in T3 were fed MGA for 7 d, injected with PG on d 7, GnRH on d 11, and PG on d 18. Cows in T4 had CIDRs inserted for 7 d, were injected with PG on d 7, GnRH on d 9, and PG on d 16. Transrectal ultrasonography was performed daily to monitor follicular dynamics from GnRH to estrus after PG; and every 4 h from 20 h after the onset of estrus until ovulation was confirmed. Estrus detection was performed with HeatWatch. Emergence of a new follicular wave after GnRH, and estrus after PG did not differ (P>.10) among treatments: T1, 11/12; T2, 9/12; T3, 11/12; T4, 9/12. Mean interval to estrus (h) was shorter (P<.05) for cows in T3 and T4 than cows in T1 and T2 (T1, 62 ± 2.1; T2, 59 ± 2.4; T3, 51 ± 2.1; T4, 52 ± 2.4). Follicle diameter (mm) at GnRH did not differ (P>.10) among treatments; differed at PG (P<.05) between T2 and all other treatments (T1, 12.2 ± .5; T2, 10.7 ± .5; T3, 13.0 ± .5; T4, 12.9 ± .5); and differed (P<.05) 20 h after the onset of estrus between T1 and T2. Progesterone (ng/mL) at PG was greater (P<.001) for cows in T1 and T2 than T3 and T4 (T1, 3.7 ± .4; T2, 3.9 ± .4; T3, 1.8 ± .4; T4, 1.7 ± .4). Interval from estrus to ovulation (h) was shorter (P<.05) for cows in T4 than T3 (T1, 30 ± 1.2; T2, 30 ± 1.4; T3, 31 ± 1.2; T4, 27 ± 1.4). These data demonstrate the flexibility in using MGA or CIDR inserts in progestin-based protocols to synchronize estrus in beef cows. (Supported by USDA-NRI grant 2000-02163).

**Key Words:** Progestin, Beef Cows, Estrus Synchronization

**415 Substituting EAZI-BREED CIDR inserts (CIDR) for melengestrol acetate (MGA) in the MGA Select protocol in beef heifers.** F. N. Kojima\*, J. F. Bader<sup>1</sup>, J. E. Stegner<sup>1</sup>, D. J. Schafer<sup>1</sup>, J. C. Clement<sup>2</sup>, R. L. Eakins<sup>1</sup>, M. F. Smith<sup>1</sup>, and D. J. Patterson<sup>1</sup>, <sup>1</sup>University of Missouri, Columbia, <sup>2</sup>Cow Calf Research and Consulting, Mandan, ND.

This study was designed to compare estrous response, timing of AI and pregnancy rate resulting from AI among beef heifers that were presynchronized with MGA or the CIDR insert prior to GnRH and PGF<sub>2α</sub> (PG). Heifers (n = 353) at three locations (location 1, n = 154; 2, n = 113; and 3, n = 85) were assigned randomly to one of two treatments by age and weight. The MGA Select-treated heifers (MGA; n = 175) were fed MGA (0.5 mg·hd<sup>-1</sup>·d<sup>-1</sup>) for 14 d, GnRH (100 µg i.m. Cystorelin) was injected 12 d after MGA withdrawal, and PG (25 mg i.m. Lutalyse) was administered 7 d after GnRH. CIDRs (CIDR; n = 177) were inserted in heifers for 14 d, GnRH was injected 9 d after CIDR removal, and PG was administered 7 d after GnRH. CIDR-treated heifers received carrier without MGA on days that coincided with MGA feeding. Heifers were monitored for signs of behavioral estrus beginning the day PG was administered. AI was performed 12 h after onset of estrus and recorded as day of AI (Day 0 = PG). Pregnancy rate to AI was determined by ultrasonography 40 d after AI. Quantitative data were analyzed by ANOVA and qualitative data were compared by Chi-square analysis. Distribution of AI was analyzed by ratio of variance (F-test) for mean interval to AI. No interactions between locations and treatments were detected;

therefore, data were pooled for analyses. Estrous response did not differ (P > 0.10) between treatments. Peak AI occurred on Day 3 for heifers in both treatments (CIDR 122/177, 69%; MGA 93/175, 53%), and distribution of AI was more highly synchronized (P < 0.05) among CIDR- than MGA-treated heifers. Pregnancy rate to AI was greater (P < 0.01) in CIDR- (112/177, 63%) than MGA-treated heifers (83/175, 47%), however, final pregnancy rate did not differ (P > 0.10) between treatments. In summary, replacing feeding of MGA with CIDR inserts improved synchrony of estrus and pregnancy rate resulting from AI in replacement beef heifers.

**Key Words:** Beef Heifers, Estrus Synchronization, Progestin

**416 MGA and CIDR based timed AI protocols in postpartum beef cows.** D. Kreider\*, N. Post, R. Rorie, T. Lester, and E. French, *University of Arkansas, Fayetteville*.

An experiment was conducted to compare two timed AI, estrus synchronization protocols in postpartum beef cows. Straight bred Angus cows (n = 125) in herds 1 (n = 54) and 2 (n=71) were sorted by BW and body condition score (BCS); then randomly assigned to treatments. Treatments were: MPGG: MGA (.5mg/hd/d) for 14 d followed by 25mg Lutalyse (PG) 17 d after MGA withdrawal and GnRH (100 µg Fertagyl) 48 h after PG; and CIDR: 100 µg GnRH plus Eazi-Breed CIDR for 7 d, then PG followed in 48 h by GnRH. All cows were inseminated 18 h after GnRH, and then placed with a fertile bull at 10 d after AI. Conception rate (CR) was determined by ultrasound at 30 d post AI and pregnancy rate (PR) was determined by palpation 55 d after bull removal. Serum was collected and analyzed for progesterone (P4) on d -6, 1 and 31 of MGA treatment for MPGG and on d -6, 1 and 7 for CIDR. Cows were assumed to be cycling if P4 was ≥ 1 ng/ml on d -6 or 1 and were considered to have a functional CL if P4 was ≥ 1 ng/ml on d 31 (MPGG) or d 7 (CIDR). BW and BCS, d postpartum at the start of treatment and CR to AI were all different between herds (P < 0.01), but treatments did not differ in initial BW, initial BCS and days postpartum, either within herd (P > 0.14) or for the combined data (P > 0.10). Percent of cows cycling at the start of treatments differed (P = 0.001) between herds (35% vs 92% for herds 1 and 2 respectively), and between MPGG and CIDR in herd 1 (18% vs 54%, respectively; P = 0.006). Conception rate to AI was 25% in MPGG vs 46% in CIDR in herd 1 (P = 0.09) and overall pregnancy rate was 79% in MPGG vs 69% in CIDR (P = 0.86). In herd 2, percent cycling at the start of treatment, and conception rate to AI did not differ between MPGG and CIDR (89% vs 94%, P = 0.35; and 53% vs 65%, P = 0.19; respectively). For the combined data, percent cycling at the start of treatment and conception rate to AI differed between MPGG and CIDR (58% vs 76%, P = 0.03; and 57% vs 41%, respectively, P = 0.04). Under the conditions observed in this study, conception rates to timed AI using an MGA based protocol tend to be lower than those obtained with a CIDR based protocol in postpartum beef cows.

**Key Words:** Timed AI, Estrus Synchronization, Beef Cows

**417 Effect of timing of insemination and estrous synchronization method on AI pregnancy rates in beef heifers.** B. R. Dorsey\*, J. B. Hall, W. D. Whittier, and W. S. Swecker, *Virginia Polytechnic Institute and State University, Blacksburg*.

The objectives of this experiment were to evaluate time of insemination relative to estrus and synchronization with melengestrol acetate with PG (MGA-PG) or an intervaginal progesterone insert with PG (CIDR-PG) on AI pregnancy rate in beef heifers. Crossbred heifers were blocked by weight and assigned to MGA-PG (n = 176) or CIDR (n = 173). The MGA-PG group received MGA (0.5 mg/hd/d for 14 d) followed by PG (25 mg Lutalyse, Pfizer) 19 d after last feeding of MGA. The CIDRs

were inserted for seven days and PG administered 1 d before CIDR removal. Heifers were fitted with HeatWatch (HW) transmitters (n = 200) or heat detection aid (K-mar). Estrus was monitored by HW or thrice daily visual estrous detection. Heifers detected in estrus (n = 270) were randomly bred AI (EAI) once daily beginning at 0900. Heifers not detected in estrus by 96 h after PG (n = 79) were bred by fixed-time AI (TAI) and received GnRH (100 µg Cystorelin, Meriel) at TAI. Pregnancy status was determined via ultrasonography at 60d post AI. Overall AI, EAI and TAI pregnancy rates were analyzed by Chi Square using CAT-MOD procedures of SAS. A majority of heifers (77.4%) were bred AI following estrus. Estrous synchronization method did not (P > 0.5) affect overall, EAI or TAI pregnancy rates. Pregnancy rates for MGA-PG versus CIDR-PG heifers were 53.4% vs. 54.9%; 59.9% vs. 63.3%; 26.5% vs. 31.1% for overall AI, EAI, and TAI, respectively. Data were pooled across estrous synchronization method to determine effect of timing of AI relative to estrus (n = 247). Heifers were grouped by 4 h periods relative to first estrual mount. Time of AI relative to estrus did not (P = 0.30) affect EAI pregnancy rate. Pregnancy rates for heifers bred AI at 0-4, 4-8, 8-12, 12-16, 16-20, 20-24, and > 24 h after estrus were 62.5%, 56.7%, 79.3%, 63.2%, 53.8%, 65.7%, 60.6%, respectively. We conclude that MGA-PG and CIDR-PG are equally effective for synchronizing beef heifers, and that time from estrus to AI, up to 24h, did not affect AI pregnancy rate.

**Key Words:** Heifers, Estrous Synchronization, AI

**418 Factorial analysis of timed AI (TAI) protocols for synchronization of first and second insemination in dairy cattle.** J. P. Meyer\*, R. P. Radcliff, M. L. Rhoads, J. F. Bader, C. N. Murphy, and M. C. Lucy, *University of Missouri, Columbia.*

The PGPG TAI protocol uses a series of prostaglandin F<sub>2α</sub> (PGF) and GnRH injections to synchronize ovulation for TAI. We examined the utility of the first PGF and GnRH injections within PGPG by testing a factorial treatment arrangement within a single study conducted on a large commercial dairy. The PGPG cows were treated with PGF (25 mg Lutalyse), 3 d, GnRH (100 µg Cystorelin), 8 d, PGF, 2 d, GnRH and TAI (n=131). Other treatments were PPG (PGF, 11 d, PGF, 2 d, GnRH and TAI; n=149), GPG (GnRH, 8 d, PGF, 2 d, GnRH and TAI; n=158), PG (PGF, 2 d, GnRH and TAI; n=160) and Ovsynch (GnRH, 7 d, PGF, 2 d, GnRH and TAI; positive control; n=138). The TAI were done within 6 h of the last GnRH. The efficacy of the first PGF injection and the first GnRH injection could be estimated by comparing PGPG/PPG with GPG/PG and by comparing PGPG/GPG with PPG/PG, respectively. Pregnancy was determined by ultrasonography on days 28 and 42 after TAI. The 28 d pregnancy rate (26.0, 31.8, 32.8, 29.3, and 40.3%), 42 d pregnancy rate (22.1, 24.8, 27.2, 23.8, and 32.6%), and embryonic loss rate (28 to 42 d; 15.6, 15.9, 18.8, 18.2, and 20.0%) were similar for PGPG, PPG, GPG, PG, and Ovsynch, respectively. There was no effect of the first PGF or the first GnRH on pregnancy rate. Cows were randomly assigned to receive either GnRH or control (no injection) on d 22 after TAI. Cows diagnosed nonpregnant on d 28 were then treated with PGF on d 29, GnRH on d 31 and TAI. The random pretreatment with GnRH on d 22 enabled a test of two resynchronization TAI protocols [Ovsynch (GnRH, 7 d, PGF, 2 d, GnRH and TAI) versus PG (PGF, 2 d, GnRH and TAI)]. The percentage of cows with corpora lutea on d 28 (pregnancy exam before resynchronization) and the 42 d pregnancy rate following resynchronization were similar for Ovsynch [131/154 (85.1%) and 38/154 [24.6%]] and PG [132/163 (81.0%) and 39/163 (23.9%)]. We conclude that a simple TAI protocol (PGF, 2 d, GnRH and TAI; Rapid synchronization) may be an effective method for TAI in large commercial dairies.

**Key Words:** Dairy, Cow, AI

**419 Effects of CIDR inserts on first service pregnancy rates of lactating dairy cows submitted to a presynch program and on re-synchronization of second service in Mexico.** F. Moreira\*, R. Flores, J. Boucher, and J. Chenault, *Pfizer Animal Health.*

Objectives were to evaluate if EAZI-BREED CIDR Cattle Inserts (CIDR) increase first service pregnancy rate (FSP) of a Presynch program and if CIDR would affect second service estrus detection (EDR) and pregnancy rates (PR). The single-site study was conducted in Central Mexico. Within barns (n=3), parity, and week of enrolment, cows

were assigned to either Presynch or Presynch-CIDR for their first service. Presynch was initiated at 25±3 days postpartum with 25 mg of PGF<sub>2α</sub> (5 mL, i.m.; LUTALYSE Sterile Solution) and a second PGF<sub>2α</sub> 14 days later. At 14 days later, cows received 100 µg of GnRH (2 mL, i.m.; CYSTORELIN), PGF<sub>2α</sub> 7 days later, GnRH 48 hours later, and timed insemination (TI) 12 to 20 hours later. Presynch-CIDR cows also received a CIDR Insert (1.38 g of progesterone) which was administered at first GnRH and removed 7 days later. Presynch and Presynch-CIDR cows were assigned to receive a CIDR insert at 14 days after first service for a 7-day period (Resynch) or no additional treatments (Control). Resynch cows were observed for estrus and inseminated between days 22 and 26 after TI. Control cows were observed for estrus and inseminated between days 4 and 26 after TI. Thus, there were 4 treatments: Presynch/Control (n=415), Presynch/Resynch (n=406), Presynch-CIDR/Control (n=414), and Presynch-CIDR/Resynch (n=403). Cows were palpated for pregnancy 45 to 60 days after insemination. Presynch-CIDR cows had increased PR compared to Presynch (43% and 37%, respectively; P=0.021). EDR did not differ between Resynch and Control (51% and 51%, respectively). In primiparous cows, PR was decreased for Resynch compared to Control (18% and 26%, respectively; P=0.045). In multiparous cows from the Presynch-CIDR group, PR was increased for Resynch compared to Control (21% and 11%, respectively; P=0.034). CIDR increased FSP of lactating cows submitted to Presynch. Resynch had no effect on EDR, negative effects on PR of primiparous cows, but positive effects on PR of multiparous cows.

**Key Words:** CIDR, Presynch, Re-Synchronization

**420 Resynchronization of ovulation in Holsteins after not pregnant diagnosis.** J. S. Stevenson\* and S. M. Tiffany, *Department of Animal Sciences, Kansas State University, Manhattan.*

We compared outcomes of 2 protocols used to resynchronize estrus and ovulation in not pregnant females. Nulliparous heifers and lactating cows in which AI occurred 41 ± 0.7 d (range: 26 to 200 [91% between d 27 and 53]) earlier were presented every 2 to 3 wk for pregnancy diagnosis using ultrasonography. Ovaries were scanned, follicles mapped and sized, presence of corpus luteum noted, and 100 mcg of GnRH injected. Seven days later, 25 mg of PGF was injected and females were assigned randomly to receive a second GnRH injection 48 h (Ovsynch; n = 224) or 1 mg of estradiol cypionate (ECP) 24 h after PGF (Heatsynch; n = 230). Those detected in estrus since diagnosis were inseminated, whereas the remainder received a timed AI (TAI) between 65 and 74 h after PGF. Based on ovarian scans and blood collected before injections for progesterone analysis, 4 groups were classified: anestrus; cystic; cycling, and unknown. Few females (n = 23; 5.1%) were detected in estrus between pregnancy diagnosis and through the day of ECP injection. On the day following ECP injection through the day of TAI, more (P<0.01) ECP- than GnRH-treated females were inseminated based on estrus (33 vs. 13%). Overall, more (P<0.01) Ovsynch than Heatsynch females were TAI (82 vs. 62%). Pregnancy rates were greater (P<0.01) for females inseminated after estrus (34%) than after TAI (24%), but differences were greater between estrus and TAI for Heatsynch (38 vs. 21%) than Ovsynch (33 vs. 27%) females. Pregnancy rates for groups were: anestrus (9%; n = 23); follicular cysts (25%; n = 12); luteal cysts (33%; n = 12); unknown (25%; n = 63); and cycling (28%; n = 344). Pregnancy rates did not differ among parities, but tended (interaction: P = 0.12) to differ between Heatsynch and Ovsynch within parity, respectively: heifers (50% [n = 20] vs. 30% [n = 20]); first lactation (27% [n = 108] vs. 22% [n = 92]), and 2+ lactations (23% [n = 102] vs. 30% [n = 112]). We conclude that little difference occurred in pregnancy outcomes after either the Ovsynch and Heatsynch protocols when applied to dairy females after a not pregnant diagnosis.

**Key Words:** Ovsynch, Heatsynch, Resynchronization

**421 Variations in the Ovsynch protocol after presynchronization of estrous cycles alter pregnancy rates in lactating dairy cows.** M. A. Portaluppi\* and J. S. Stevenson, *Department of Animal Science, Kansas State University, Manhattan.*

Our objectives were to determine pregnancy rates after altering times of the second GnRH injection and AI in the Ovsynch protocol to accommodate AI once daily while cows were locked up at the feed bunk. Cows (n = 654) from 2 dairy herds in northeastern Kansas were studied. Cows ranged from 24 to 44 DIM at the start of the Presynch protocol

consisting of two injections of PGF 14 d apart with the second given 12 d before initiating treatments. Cows were blocked by lactation number and assigned randomly to 3 treatments consisting of variations of the Ovsynch protocol. Cows in Cosynch-48 and Ovsynch received injections of GnRH 7 d before and 48 h after a PGF injection. Fixed-time inseminations (TAI) were made at the time of the second GnRH injection (0 h; Cosynch-48) or 24 h (Ovsynch). Those in Cosynch-72 received the second GnRH injection at 72 h after PGF and were inseminated at the same time. Pregnancy was diagnosed by palpation on d 40 or 41 after TAI. Pregnancy rates in both herds were consistently greater ( $P < 0.05$ ) for Cosynch-72 than for Cosynch-48 and Cosynch-72 vs. Cosynch-48 + Ovsynch. First-lactation cows ( $n = 263$ ) had greater ( $P < 0.05$ ) pregnancy rates (32 vs. 27%) than older cows ( $n = 391$ ). The BCS at TAI ranged from 1.0 to 4.0. Cows having BCS #8805 2.25 ( $n = 469$ ) had greater ( $P < 0.05$ ) pregnancy rates than those having BCS  $< 2.25$  ( $n = 185$ ): 31% vs. 24%, respectively. For each 10-d increase in DIM at the first Presynch PGF injection, pregnancy rates increased ( $P < 0.05$ ) by  $9 \pm 4\%$ . We concluded that pregnancy rates for cows in which estrous cycles were presynchronized before the Cosynch-72 protocol were greater than those treated with the Cosynch-48 and Ovsynch protocols. Table 1. Pregnancy Rates at 40-41 Days after First Insemination

Herd	Cosynch-48	Ovsynch	Cosynch-72	Total
1	17 (78)	19 (78)	25 (72)	20 (228)
2	27 (139)	34 (134)	41 (143)	34* (426)
Total	23 (217)	29 (212)	35** (215)	29 (654)

\* Different ( $P < 0.01$ ) from herd 1.

\*\* Different ( $P < 0.05$ ) from Cosynch-48 and Ovsynch.

**Key Words:** Pregnancy Rates, Presynchronization, Ovsynch

**422 The effect of deep intrauterine placement of semen on conception rate in dairy cows.** M. G. Diskin<sup>\*1</sup>, J. R. Pursley<sup>2</sup>, D. A. Kenny<sup>3</sup>, J. F. Mee<sup>4</sup>, and J. M. Sreenan<sup>1</sup>, <sup>1</sup>*Teagasc, Atheryn, Co. Galway, Ireland*, <sup>2</sup>*Michigan State University, East Lansing, Michigan, USA*, <sup>3</sup>*University College Dublin, Belfield, Dublin, Ireland*, <sup>4</sup>*Teagasc, Fermoy, Co. Cork, Ireland*.

The reported results of the effect of deep intra-uterine horn insemination on conception rate (CR) in cattle is equivocal. Some reports indicate an improvement while others report no improvement in CR. The objective of this study was to determine the effect of bi-lateral uterine horn artificial insemination (AI) on CR in dairy cows. This study was carried out over two years involving 6 commercial inseminators in each year, 4 of which were involved in both years. All inseminators were trained prior to the start of the experiment in each year. Each alternate cow presented for AI in co-operating herds was inseminated by placing all of the inseminate in the body of the uterus (Body) or by placing 50% of the inseminate beyond the curvature in each uterine horn (Horn). Data was collected on a total of 1860 inseminations in 37 herds in 2002 and on 1586 inseminations in 24 herds in 2003. Pregnancy diagnosis was performed using ultrasonography at 28 to 60 days post AI. Data were

analyzed using PROC CATMOD with terms for AI treatment, year, inseminator, and their interactions included in the model. There was no effect ( $>0.05$ ) of AI treatment x inseminator x year, treatment x year or inseminator x year on CR. There was a significant effect ( $P < 0.02$ ) of AI treatment x inseminator on CR, with evidence of either an increase (+11.4%;  $P < 0.05$ ), decrease (-4 to -6%;  $P < 0.05$ ) or no effect ( $P > 0.05$ ) of Horn AI on CR for individual inseminators. A retrospective analysis of the data for all 61 herds showed that the improvement in CR following Horn insemination was most evident in herds with lowest CR following Body AI. This study indicates that the effect of uterine horn AI on CR is not uniform and is inseminator dependent and may be ameliorated by the inherent level of herd fertility. Further studies are required to investigate the technique x inseminator interaction before any general recommendation could be made.

**Key Words:** Semen, Placement, Conception

**423 The association between ultrasound reproductive tract scoring and commonly used veterinary therapeutics with pregnancy rates in spring-calving Holstein-Friesian cows.** F. Buckley<sup>\*</sup>, J. F. Mee, and P. Dillon, *Teagasc, Dairy Production Research Centre, Moorepark, Fermoy, Co. Cork, Ireland*.

The objectives of this study were to investigate if ultrasound reproductive tract scores (URTS) recorded prior to first service reflected subsequent fertility performance, and to discern if commonly used veterinary therapeutic regimes (VTR) administered post ultrasound examination led to improved reproductive efficiency. In total, 6,477 URT scores were analysed from 5,734 Holstein-Friesian cows in 61 spring-calving herds over 2 yr (1999 and 2000). In brief: URTS 1 was assigned to cows with a normal uterus that had recommenced ovulation post partum. A cow with URTS 2 had almost completed involution, had a small volume of mixed echogenic fluid in the uterine lumen, and was ovulatory. Cows with URTS 3 had partially completed involution, had a moderate volume of mixed echogenic fluid in the uterine lumen, and were ovulatory. Cows with URTS 4 were anovulatory, had partially completed involution with a small or moderate volume of mixed echogenic fluid in the uterine lumen. URTS 5 was pyometra. Cows with URTS 6 had completed uterine involution but were anovulatory. A lower pregnancy rate to first service (PREG1) was observed with URTS 2 (51%), 3 (36%), 5 (17%) and 6 (46%) when compared to URTS 1 (57%) ( $P < \text{or} = 0.01$ ). VTR resulted in a lower PREG1 with URTS 1 (-6%,  $P = 0.054$ ) (predominantly a prostaglandin (PG) regime) and URTS 6 (-12%,  $P < 0.05$ ) (predominantly progesterone supplementation), when compared to cows with the same URTS receiving no VTR. Intervention with URTS 2 (predominantly washout (WO) +/- a PG regime) and URTS 4 (predominantly progesterone supplementation and a WO) had no significant effect on PREG1. A positive response to VTR was observed with URTS 3 (+17%,  $P < 0.05$ ) and URTS 5 (+25%,  $P < 0.05$ ), (predominantly a WO +/- PG and an intensive hormonal regime including a WO, respectively). In conclusion, URTS recorded prior to first service did reflect subsequent reproductive performance. However, the level of routine VTR being administered in these herds was unjustified.

**Key Words:** Ultrasound, Score, Fertility

## Production, Management and the Environment: Reproduction and Behavior

**424 Minimum temperature and maximum humidity: Predictors for conception of crossbred Holstein cows in Thailand.** V. Punyapornwithaya<sup>1</sup>, K. Kreausukon<sup>\*1</sup>, S. Theepatimakorn<sup>2</sup>, and W. Suriyasathaporn<sup>1</sup>, <sup>1</sup>*Clinic of Ruminant, Faculty of Veterinary Medicine, Chiangmai University, Chiang Mai Province, Thailand*, <sup>2</sup>*Chiangmai AI Center, Department of Livestock, Chiang Mai Province, Thailand*.

In general, weather influences reproductive performance in dairy cattle. The objective of this study was to determine the effects of temperature and humidity on conception rate in small holder crossbred Holstein dairy herds in the tropics. Data from primiparous and multiparous dairy cows from 513 herds in northern part of Thailand, during January 2001 to November 2002, were used. Monthly average weather data, includ-

ing minimum and maximum of both temperature and humidity, were collected from Thai Meteorological department. Data were analyzed by creating generalized estimating equation (GEE) using PROC GENMOD (SAS version 8). The final data included 8,096 observations from 3,425 cows. For univariate analysis, all weather data except for the maximum temperature factor were negatively related to the risk of conception ( $P < 0.01$ ). The final model included minimum daily temperature ( $P < 0.01$ ) and maximum daily humidity ( $P = 0.09$ ). The increasing of either minimum temperature or maximum humidity caused decreasing conception occurrence. Based on monthly average weather data, we concluded that cows have the lowest conception rate during June to August in Thailand.

**Key Words:** Temperature and Humidity, Conception, Dairy Cows