Physiology and Endocrinology: Hormonal Regulation of the Estrous Cycle in Dairy Cattle

W277 Effects of treatments with hCG or GnRH on serum progesterone (P4) and conception rates (CR) in lactating dairy cows submitted to timed artificial insemination (AI) or embryo transfer (ET). P. Justolin*[1], P. Morelli[1], M. Reis[1], O. Sá Filho[1], F. Aragon[2], M. Veras[2], S. Soriano[3], and J. L. Vasconcelos[1], [1]*FMVZ - UNESP*, *Botucatu, SP, Brazil*, [2]*Pioneiros Veterinary Clinic*, *Carambei, PR, Brazil*, [3]*Colorado Dairies*, *Araras, SP, Brazil*.

The effects of treatments with GnRH or hCG 7 d after induced ovulation on P4 and CR in lactating Holstein cows submitted to AI or ET were evaluated. A total of 993 protocols for synchronization of ovulation, performed in 684 lactating Holstein cows (169.8±4.4 DPP; 37.9±0.3 Kg milk/day), were initially used in this study. Synchronization protocols consisted in CIDR insert + GnRH on d −10, CIDR withdrawal + PGF2α on d −3, and estradiol cypionate on d −2. On d −2, cows were assigned to receive either AI on d 0 or ET on d 7. On d 7, ovaries of all cows were evaluated by ultrasonography (US), and only cows with presence of CL remained in the study (834 protocols performed in 661 cows). Within each breeding-technique (BT) group, cows were assigned to receive either (1) no treatments (Control), (2) GnRH on d 7 (GnRH), or (3) hCG (2,500 IU) on d 7 (hCG). Blood samples were collected from a subgroup of 179 cows on d14 for P4 analysis (P4d14). Pregnancy was evaluated by US on d 31 ± 3. The P4d14 was greater in gonadotropin-treated than in Control cows ($P < 0.01$), but did not differ ($P > 0.1$) between GnRH and hCG groups (Control: 4.86±0.36; GnRH: 6.22±0.35; hCG: 6.88±0.36 ng/mL). The CR was greater ($P < 0.05$) in ET than in AI cows (45.2% [168/372] vs. 31.6% [146/462]), in primiparous than in multiparous (42.7% [141/330] vs. 34.3% [173/504]). There was an interaction ($P < 0.05$) between BT and treatment on CR, in manner that treatments affected the CR at ET (Control: 38.1% [48/126]; GnRH: 52.4% [65/124]; hCG: 45.1% [55/122]; $P < 0.05$), but not at AI (Control: 30.1% [47/156]; GnRH: 32.2% [50/155]; hCG: 32.4% [49/151]; $P > 0.1$). Rectal temperature on d 7 negatively affected CR (y = EXP[16.7 - 0.4 • ×] / 1 + EXP[16.7 - 0.4 • ×]; $P < 0.01$). Thus, treatments with GnRH or hCG on d 7 increased P4d14 and improved CR of cows submitted to ET, but not to AI, and rectal temperature on d 7 negatively affected CR regardless of BT or treatment.

Key Words: embryo transfer, lactating cows, conception rate

W278 Effect of the treatment with GnRH seven days after embryo transfer (ET) on reproductive performance in lactating dairy cows. P. Morelli*[1], P. Justolin[1], M. Reis[1], O. Sá Filho[1], F. Aragon[2], M. Veras[2], S. Soriano[3], and J. L. Vasconcelos[1], [1]*FMVZ - UNESP*, *Botucatu, SP, Brazil*, [2]*Pioneiros Veterinary Clinic*, *Carambei, PR, Brazil*, [3]*Colorado Dairies*, *Araras, SP, Brazil*.

The effects of treatments with GnRH 7 d after ET on conception rate (CR) in lactating Holstein cows were evaluated. A total of 350 lactating Holstein cows (192.9 ± 7.6 DPP; 35.1 ± 0.8 Kg milk/day), were initially submitted to a synchronization of ovulation protocol consisting of CIDR insert + GnRH on d −10, CIDR withdrawal + PGF2α on d −3, and estradiol cypionate on d −2. On d 7, ovaries of all cows were evaluated by ultrasonography (US), and those cows with presence of luteal tissue (n = 285) received one fresh embryo into the uterine horn ipsilateral to the CL and an i.m. injection of 100 µg of gonadorelin (GnRH). On d14, cows were randomly assigned to receive (G7+14; n = 147) or not (G7; n = 138) an additional treatment with GnRH. Rectal temperature was measured in all cows immediately after morning milking of d 7 (RTd7) and d 14 (RTd14). Pregnancy was evaluated by US on d 31 ± 3 (US1) and 62 ± 3 (US2). The CR was calculated by dividing the number of pregnant cows by the number of cows receiving an embryo on d 7. The CR-31d was not affected by treatment (G7: 48.5% [67/138]; G7+14: 42.9% [63/147]; $P > 0.1$), but tended to be positively affected by milk production (y = EXP[-0.01 + 0.8 • ×] / 1 + EXP[-0.01 + 0.8 • ×]; $P = 0.06$). The CR-62d was not affected by treatment (G7: 39.8% [55/138]; G7+14: 37.4% [55/147]; $P > 0.1$), but was positively affected by milk production (y = EXP[-1.2 + 0.02 • ×] / 1 + EXP[-1.2 + 0.02 • ×]; $P = 0.04$) and tended to be negatively affected by RTd14 (y = EXP[23.1 - 0.6 •×] / 1 + EXP[23.1 - 0.6 • ×]; $P = 0.05$). In summary, treatment with GnRH 7 d after ET did not improve reproductive performance of dairy cows that received a previous GnRH treatment concurrently with ET.

Key Words: embryo transfer, lactating dairy cows, conception rate

W279 Effect of moment of induced ovulation and progesterone (P4) for resynchronization on fertility of Holstein cows in a 5-d timed AI program. R. S. Bisinotto*, E. S. Ribeiro, L. T. Martins, R. S. Marsola, L. F. Greco, C. A. Risco, W. W. Thatcher, and J. E. P. Santos, *University of Florida*, *Gainesville*.

The effects of the interval from GnRH to insemination (AI) at first AI and supplemental P4 for resynchronization on pregnancy per AI (P/AI) were evaluated. In study 1, cows received 2 injections of prostaglandin (PGF) at 46 and 60 d in milk (DIM). The timed AI protocols began with an injection of GnRH at 72 DIM, and an injection of PGF 5 and 6 d later. Cows were randomly assigned to receive the final GnRH either 56 h after the first PGF of the protocol and AI 16 h later (5d-OVS56, n=634) or GnRH and AI 72 h after the first PGF (5d-COS72, n=593). The proportion of cows in estrus on the day of AI was greater (P=0.003) for the 5d-COS72 than 5d-OVS56 (40.6 vs. 32.4%). P/AI did not differ between treatments on d 32 (5d-OVS56=46.4 vs. 5d-COS72=45.5%) or 60 after AI (5d-OVS56=40.7 vs. 5d-COS72=38.6%). In study 2, nonpregnant cows on d 32 after the first AI received either an intravaginal P4 insert (RCIDR, n=341) or no P4 (RCON, n=334) from the GnRH to the first PGF of the resynchronization (d 0 GnRH, d 5 and 6 PGF, d 7.5 GnRH, 16 h timed AI). Ovaries were scanned (n=340) at the first PGF and final GnRH to detect premature ovulation. Blood was sampled (n=398) at AI and 7 d later for analysis of P4. Synchronization to the protocol was considered when cows had no premature ovulation and when concentrations of P4 at AI and 7 d later were, respectively, <1.0 ng/mL and >2.26 ng/mL. P/AI was greater ($P < 0.05$) for RCIDR than RCON on d 32 (RCON=43.1 vs. RCIDR=51.3%) and d 60 after AI (RCON=37.8 vs. RCIDR=45.5%). Only 5.6% (19/340) of the cows ovulated prematurely, and it tended ($P = 0.09$) to be greater for RCON than RCIDR cows (RCON=7.5 vs. RCIDR=3.6%). Concentrations of P4 on the day of AI and 7 d later (RCON = 0.25 and 2.88; RCIDR = 0.32 and 2.72 ng/mL) did not differ between treatments. Synchronization to treatments did not differ and were 57.8% for RCON and 61.4% for RCIDR. Results indicate that administration of the final GnRH simultaneously with AI does not impair fertility of cows subjected to a 5-d timed AI protocol and that supplementation with P4 during resynchronization improves P/AI.

Key Words: dairy cow, progesterone, timed AI

W280 Evaluation of a mechanistic, dynamic, metabolic model of regulation of reproductive processes in dairy cattle. P. Celi[2], I. Lean[2], H. Raadsma[2], A. Rabiee[2], and J. P. McNamara*[1], [1]*Washington State University*, *Pullman,* [2]*University of Sydney*, *Camden, NSW, Australia*.

The objective was to conduct and initial evaluation of a conceptual research model which describes functional control at the metabolic level, of reproductive processes in dairy cattle; and is suitable for evaluation of data, concepts and hypotheses regarding underlying genetic, nutritional and physiological control of reproduction. This research model used an existing, extensively evaluated model of bovine metabolism (Molly, UC Davis), including glucose, amino acids and fatty acids by muscle, adipose, visceral and mammary tissues. Equations for pulses of LH release, FSH, follicular growth, estrogen and progesterone concentrations in cycling and pregnant animals, ovulation, fetal growth and early embryonic mortality were developed from literature values. The model links glucose with LH release; glucose and IGF1 with follicular growth; and also describes effects of feed intake, metabolic rate and milk production on liver metabolism of estrogen and progesterone. This initial evaluation was a standard evaluation of behavior and sensitivity—did the variables respond in a similar fashion and rate to those in the literature that were not used for the model construction. The statistical standard compared the model output to observed data, and adequacy was decided if the output was within one least significant difference (LSD) based on $P <$ 0.05. Hormonal concentrations during cycling and pregnancy simulated literature values within 1 LSD. Increased metabolic rate (a function of milk production or feed intake) increased degradation of estrogen and progesterone, shortening length of estrus and decreasing progesterone in early pregnancy. The behavior was in the proper direction and magnitude for these variables within 1 LSD ($P < 0.05$) of published values. The model can be useful to frame specific hypotheses on control of reproductive processes by genetic and nutritional mechanisms: and to form a framework of more specific models at cellular and molecular levels of the processes of reproduction in the dairy cow.

Key Words: reproduction, nutrition, research model

W281 Effects of different ovulatory stimulus (GnRH vs. estradiol cypionate) on follicular dynamics of a progesterone-based timed AI protocol in Holstein cows. R. M. Ferreira, H. Ayres*, L. U. Gimenes, and P. S. Baruselli, *Department of Animal Reproduction, University of São Paulo*, *São Paulo, SP, Brazil*.

The aim of this study was to evaluate the effects of estradiol cypionate (EC) at progesterone (P4) device removal, GnRH 56h later or both on follicular dynamics in Holstein cows. At random stages of the estrous cycle (D0), 57 Holstein cows received 2mg estradiol benzoate (Estrogin , Farmavet, Brazil) and one P4 device (CIDR , Pfizer, Brazil). On D8, device was removed and all animals received 25mg dinoprost (Lutalyse, Pfizer, Brazil) plus 400 IU eCG (Folligon , Intervet, Brazil). On the same day (D8), cows were randomly allocated to one of three treatments, as follows: 1) ECP (1 mg; n=18) at P4 device removal; 2) GnRH (0.1mg gonadorelin; n=19) 56h after P4 device removal, and 3) ECP at P4 device removal and GnRH 56h later (n=20). Ultrasound examinations were performed at D0, D8, and every 12 h from P4 removal to disappearance of the ovulatory follicle, or 96 h after P4 withdrawal, whichever occurred first. The diameter of the ovulatory follicles (ØOF), time to ovulation after P4 removal (TOV), ovulation rate (OR) and number of ovulations (Nov) were also evaluated. Statistical analyses were performed with logistic regression by PROC GLIMMIX of SAS. The treatments affected the average TOV (EC=70.8^{a} vs. GnRH=77.3^{b} vs. EC+GnRH=65.3h^{a}; $P < 0.01$) and the ØOF (EC=13.0^{b} vs. GnRH=14.8^{a} vs. EC+GnRH 14.1mm^{ab}; $P = 0.02$). No differences were found on OR [EC=83.3% vs. GnRH=85.0% vs. EC+GnRH=90.0%; $P = 0.71$] and Nov (EC=1.1 vs. GnRH=1.3 vs. ECP+GnRH=1.3, $P = 0.20$). Also, analyses of contrast showed that cows receiving EC had an earlier TOV than cows treated with GnRH ($P < 0.01$). These data suggest that EC+GnRH can be used as an ovulatory stimulus, and its administration at P4 device removal induces ovulation about 70h later. Thus, if TAI is done 56h after P4 device removal, the ovulation will occur around 16–12 h after TAI, an adequate moment to achieve satisfactory pregnancy per AI.
We acknowledge Pfizer and Fazenda Campestre.

Key Words: estradiol cypionate, GnRH, Follicular dynamics

W282 Dose of equine chorionic gonadotropin necessary to cause multiple ovulation and increase in progesterone concentration following a synchronization protocol in lactating dairy cows. A. C. Denicol*[1], F. A. Rivera[1], L. G. D. Mendonca[2], C. D. Narciso[1], G. Lopes Jr.[1], R. G. S. Bruno[1], and R. C. Chebel[1,2], [1]*Veterinary Medicine Teaching and Research Center, University of California*, *Tulare,* [2]*Department of Veterinary Population Medicine, University of Minnesota*, *Saint Paul*.

Objective was to establish a minimum dose of equine chorionic gonadotropin (eCG) capable of inducing multiple ovulation and accessory corpora lutea (CL) and increasing concentrations of progesterone (P4) in lactating dairy cows. Forty-eight lactating Holstein cows were randomly assigned to one of three treatments at the beginning of a timed AI (TAI) protocol: control (n = 10), eCG6 (n = 19) and eCG8 (n = 19). The TAI protocol consisted of GnRH (100 µg i.m.), 7 d later prostaglandin (PG) F2α (25 mg i.m.), and 72 h later GnRH (100 µg i.m.) and TAI. Cows in the eCG6 and eCG8 treatments received 600 and 800 IU of eCG i.m., respectively, 48 h after the first GnRH. Blood was sampled and ovaries were scanned at the time of each injection of the TAI protocol, 48 h after the first GnRH injection, and 7 d after TAI. Concentrations of estradiol on the day of PGF2α injection was not (3.6 0.1 pg/mL; $P = 0.70$) affected by treatment, but the number of follicles > 10 mm on the day of the second GnRH was ($P = 0.03$) greater for eCG8 cows (control = 1.8 ± 0.2, eCG6 = 1.6 ± 0.2, eCG8 = 2.2 ± 0.2). Although the proportion of cows with a CL 7 d after TAI was not ($P = 0.19$) different (control = 100, eCG6 = 73.7, eCG8 = 84.2%), eCG8 cows tended ($P = 0.14$) to be more likely to have an accessory CL (control = 10.0, eCG6 = 15.8, eCG8 = 36.8%). Twelve cows (control = 2, eCG6 = 4, eCG8 = 6) failed to synchronize their estrous cycles and were removed from further analysis. The cumulative CL volume of eCG8 cows was ($P < 0.01$) larger than control and eCG6 cows (control = 7.5 ± 2.0, eCG6 = 5.0 ± 1.2, eCG8 = 10.9 ± 1.5 cm3), and eCG8 cows had ($P < 0.01$) greater P4 concentration 7 d after AI (control = 1.5 ± 0.5, eCG6 = 1.3 ± 0.3, eCG8 = 3.0 ± 0.4 ng/mL). We conclude from this experiment that a dose of 800 IU of eCG is capable of inducing accessory CL and increasing P4 concentration in lactating dairy cows following a TAI protocol.

Key Words: lactating dairy cow, equine chorionic gonadotropin, progesterone

W283 Effect of presynchronization with GnRH or hCG 7 d before resynchronization of ovulation initiated 25 d after a previous timed AI on fertility of lactating dairy cows. J. O. Giordano*, J. N. Guenther, G. Lopes Jr., M. M. Herlihy, A. B. Nascimento, M. C. Wiltbank, and P. M. Fricke, *University of Wisconsin*, *Madison*.

To determine the effect of presynchronization on fertility to resynchronization of ovulation (Resynch), lactating cows on a commercial dairy initiated Resynch 25 d after a prior TAI using GnRH and cloprostenol (PGF) as follows: (d 0, 200 µg GnRH; d 7, 750 µg PGF; 56 h, 100 µg

GnRH; 16 h, TAI). At the prior TAI, cows were randomly assigned to one of three treatments to receive: 2,000 IU hCG (Chorulon) 7 d before initiation of Resynch (HGPG, n=346); 200 µg GnRH 7 d before initiation of Resynch (GGPG, n=361); or no presynchronization (C, n=375). Cows diagnosed not pregnant at 32 d after prior TAI received the PGF injection of the Resynch and continued the protocols. Pregnancy was diagnosed at 32 and 53 d after Resynch TAI to determine pregnancies per AI (P/AI). Based on logistical regression analysis, treatment tended ($P = 0.07$) to affect P/AI 32 d after TAI [HGPG = 33.0% (114/346); GGPG = 30.8% (111/361); C = 25.3% (95/375)]. Based on statistical contrasts, HGPG cows had more ($P = 0.02$) P/AI than C cows, whereas P/AI for GGPG vs. C cows tended ($P = 0.10$) to differ and HGPG vs. GGPG cows did not ($P = 0.53$) differ. Pregnancy loss from 32 to 53 d after Resynch TAI was not affected by parity and did not differ ($P = 0.29$) among treatments [HGPG = 6.3% (7/112); GGPG = 9.9% (11/111); C = 4.3% (4/93)]. Treatment did not affect ($P = 0.13$) P/AI at 53 d after TAI when all treatments were included in the model; however, when analyzed separately, HGPG cows tended to have more ($P = 0.08$) P/AI 53 d after Resynch TAI than C cows [30.5% (105/344) vs. 23.9% (89/373)]. Based on a subset of cows, ovulation to the last GnRH injection of Resynch did not differ among treatments [HGPG = 89.3% (176/197); GGPG = 89.8% (168/187); C = 89.9% (177/197)]. We conclude that presynchronization with hCG or GnRH 7 d before initiation of Resynch did not affect synchronization rate, but that hCG increased fertility whereas GnRH tended to increase fertility compared to Ovsynch initiated 25 d after a prior TAI.
Supported by Hatch project WIS01171

Key Words: hCG, resynchronization, fertility

W284 Milk estradiol and pedometer activity during estrus in dairy cows. N. Kendall, D. Scholey, and G. Mann*, *University of Nottingham*, *School of Biosciences, Division of Animal Sciences, Sutton Bonington Campus, Loughborough, LE12 12RD, UK*.

While it is well established that elevated concentrations of estradiol are responsible for the induction of estrus, the relationship between concentration of estradiol and intensity of estrus is less clear. In this study we have used pedometer activity to quantitatively measure estrous activity at insemination and related this to peak concentrations of milk estradiol during the previous 24h period to determine if estrus intensity is affected by estradiol concentration. The study was carried out in 37 lactating, naturally cycling Holstein Friesian cows maintained under a commercial herd management regimen. Cows were milked by robot and a milk sample taken and pedometer activity data collected at each milking. Cows were inseminated on the basis of observed estrus and/or elevated pedometer activity and daily milk progesterone measurements undertaken to confirm that cows were at the correct stage of the cycle when insemination took place and pedometer and milk estradiol measurements were made. Validated measurements were obtained from a total of 61 estrus periods during which peak pedometer activity was 310 ± 19 steps per hour (range 89 - 776 steps per hour) and peak milk estradiol concentration 4.6 ± 0.2 pg/ml (range 1.8 - 9.1 pg/mL). There was no association between peak concentration of milk estradiol and peak pedometer activity ($P = 0.59$). Furthermore, comparison of successful and unsuccessful inseminations revealed no differences in either milk estradiol (4.3 ± 0.4 vs. 4.8 ± 0.3 pg/mL) or pedometer activity (290 ± 40 vs. 318 ± 22) in cows conceiving or failing to conceive. However, in cows (n = 26) in which measurements were made during successive estrous periods, there were significant ($P < 0.01$) associations in both milk estradiol ($R^2 = 0.28$) and pedometer activity ($R^2 = 0.25$) between previous and subsequent estrous periods. These results demonstrated that while both estradiol concentrations and pedometer activity at estrus appear to exhibit some repeatability within cows, the peak concentration of estradiol in milk was not correlated with estrus intensity.
This work was funded by Defra, the Milk Development Council and Intervet under the Link Sustainable Livestock Programme.

Key Words: cow, estrus, estradiol

W285 Effect of treatment with human chorionic gonadotropin (hCG) and/or intravaginal progesterone (CIDR) on day 5 after AI on fertility in lactating dairy cows. A. B. Nascimento*, J. N. Guenther, F. P. Dalla Costa, M. M. Herlihy, A. Keskin, G. Lopes Jr., and M. C. Wiltbank, *University of Wisconsin*, *Madison*.

Secretion of progesterone (P4) from the corpus luteum (CL) is essential for pregnancy in cattle. Our previous research indicates that lactating dairy cows synchronized with Double-Ovsynch, have much lower P4 after ovulation than heifers (P4 < 50% of heifer, P4 from Day 6 to 13 after AI) in spite of ovulating a similar size follicle. Treatment of these cows on Day 5 after AI with both hCG (to induce an accessory CL) and a CIDR can increase P4 to heifer concentrations. Our primary hypothesis is that supplementation with P4 after AI (hCG and/or CIDR) will increase % of dairy cows pregnant to timed AI. Further, we hypothesized that CIDR treatment until Day 22 after AI would synchronize estrus in non-pregnant cows (~Day 25), produce a more optimal time to begin Ovsynch (Day 7 of new cycle), and increase % pregnant at second timed AI. Lactating Holstein cows (n=794) were synchronized with Double-Ovsynch (First Ovsynch: GnRH-7d-$PGF_2\propto$-3d-GnRH)-7d-(Breeding Ovsynch: GnRH-7d-$PGF_2\propto$-56h-GnRH-16h-AI). On Day 5 after AI cows were randomly assigned to receive no treatment (Control), CIDR, 2,000 IU hCG or CIDR+hCG. The CIDR was removed on Day 22 after AI and pregnancy diagnosis was performed by ultrasound on Day 32 after AI, with resynch initiated on Day 32. A high % of cows were pregnant to first AI (379/794 = 47.7%) with no treatment effects ($P = 0.82$; Control: 98/197 = 49.7%; CIDR: 95/195 = 48.7%; hCG: 95/201 = 47.3%; CIDR+hCG: 91/201 = 45.3%). Non pregnant cows after first AI (n=313) were evaluated for % pregnant to second AI to test the second hypothesis. There were also no differences ($P = 0.66$) on % pregnant to second AI (Control: 26/78 = 33.3%; CIDR: 28/72 = 38.9%; hCG: 24/76 = 31.6%; CIDR+hCG: 26/87 = 29.9%). In conclusion, the results from first AI did not support our primary hypothesis but indicate no impact of P4 supplementation in lactating dairy cows synchronized with Double-Ovsynch in spite of the low circulating P4 in these cows.

Key Words: progesterone, CIDR, hCG

W286 A comparison of conception rates between new and re-used Eazi-Breed CIDRs. R. Giles*[1], G. Seidel[2], C. McConnel[2], and K. McSweeney[1], [1]*Bovine Reproductive Specialists*, *Loveland, CO,* [2]*Colorado State University*, *Fort Collins*.

Intravaginal progesterone (CIDR) inserts can help acyclic dairy cows return to normal cyclicity and successful ovulation for timed AI. However, CIDRs are relatively expensive and the cost per pregnancy would be decreased if CIDRs could be effectively used again. The objective of this study was to determine whether Eazi-Breed CIDRs used within an OvSynch program could be re-used efficaciously in cows diagnosed as acyclic. The study was conducted on 3 dairies (A, B, C) in northern Colorado from January 2009 through January 2010. Enrolled cows were limited to lactations 1-4 and times bred 1-4. Lactating dairy cows (dairies A, N = 631; B, N = 349; and C, N = 378) were scanned ultrasonographically prior to the start of an OvSynch program and diagnosed as being cystic (follicle greater than 25 mm and absence

of corpus luteum (CL)), or without a CL. All cows received 100 μg of GnRH im, and were scanned 7 days later. Cows observed as being persistently cystic or without a CL (acyclic) for two weeks in a row were enrolled into a CIDR sync program. This program involved CIDR (1.38 g progesterone) insertion and im administration of 100 μg GnRH on day 0, CIDR removal and im administration of 25 mg PGF2α on day 7, im administration of 100 μg GnRH 56 h following CIDR removal, and AI 16-18 h later. Cows with odd numbered ear tags received re-used CIDRs and even numbered cows received new CIDRs. Pregnancy status was determined on day 32-39 by ultrasonography. Conception rates (day 32-39) with new CIDRs were slightly higher in both categories (Cystic: new-37/106 (34.9%), re-used-35/114 (30.7%); Acyclic: new-194/559 (34.7%), re-used-184/579 (31.8%)). None of these differences was significant (P>0.1) nor was there a significant difference for all re-used (31.6% pregnant) vs. all new CIDRs (34.7% pregnant; one-tail chi-squared; Fisher-Yates correction). No treatment × dairy effect was noted, although overall pregnancy rates were lower ($P < 0.05$) at dairy C (29.4%) than dairies A (35.0%) or B (37.2%).

Key Words: CIDR, acyclic, OvSynch

W287 Progesterone concentration required for establishment of pregnancy following embryo transfer in lactating Holstein cows. A. G. Kenyon*[1], L. G. D. Mendonca[3], G. Lopes Jr.[1], J. R. Lima[1], J. E. P. Santos[2], and R. C. Chebel[1,3], [1]*Veterinary Medicine Teaching and Research Center, University of California Davis*, *Tulare,* [2]*Department of Animal Sciences, University of Florida*, *Gainesville,* [3]*Department of Veterinary Population Medicine, University of Minnesota*, *Saint Paul*.

Objectives were to determine minimal progesterone (P4) concentration from estrous cycle d 4 to 28 necessary for establishment of pregnancy following embryo transfer (ET) in lactating Holstein cows. Cows at 30 ± 3 DIM were synchronized (d −35 PGF2α, d −28 CIDR, d −21 PGF2α and CIDR removal, d −9 GnRH, d −2 PGF2α, d 0 GnRH) and on d 0 were randomly assigned to the low progesterone (LP4, n = 28) or control (n = 55) treatments. Cows in the LP4 received 2 injections of PGF2α, on d 4 and 5, and a CIDR insert starting on d 5, which was replaced every 7 d until d 28. Blood was sampled on d −9, −2, 0, 4, 7, 14, 21, and 28 and ovaries were examined with ultrasound on d −9, −2, and 7. On d 7, all LP4 cows and control cows bearing a corpus luteum (CL) received ET. Pregnancy was diagnosed on d 28 and 67 d after ET. Proportion of cows ovulating to the GnRH on d −9 (50.6%; P=0.76) and that had luteolysis after PGF2α on d −2 (78.1%; P = 0.99) were not different between treatments. Progesterone concentrations on d −9 (6.10 ± 0.34 ng/mL; P=0.52), d −2 (0.47 ± 0.05 ng/mL; $P = 0.87$), and d 0 (1.54 ± 0.14 ng/mL; $P = 0.97$) were not different between treatments. Total CL volume on d 7 was ($P < 0.01$) smaller for LP4 cows (1.9 ± 0.6 vs. 6.1 ± 0.4 cm3). Proportions of cows pregnant at 28 (27.3 vs. 0%; $P < 0.01$) and 67 (13.0 vs. 0%; $P = 0.05$) d after ET were greater for control cows. Average P4 from d 4 to 28 was greater for control cows (3.7 ± 0.2 vs. 1.7 ± 0.3 ng/mL; $P < 0.01$), but there was ($P > 0.01$) an interaction between treatment and day as in d 4 (1.6 ± 0.2 ng/mL; $P = 0.40$) and 7 (2.4 ± 0.1 ng/mL; $P = 0.17$) there were no differences, but on day 14 (5.5 ± 0.4 vs. 2.0 ± 0.5 ng/mL; $P < 0.01$), 21 (3.5 ± 0.6 vs. 1.8 ± 0.7 ng/mL; $P = 0.06$), and 28 (5.4 ± 0.6 vs. 1.6 ± 0.8 ng/mL; $P < 0.01$) control cows had greater P4. Average P4 < 1.8 ng/mL from d 4 to 28 and P4 concentration < 2.5 ng/mL on d 14 were not conducive to establishment of pregnancy.

Key Words: progesterone, Holstein cow, embryo survival

W288 A comparison between sexed and conventional semen and some reproduction items in Iranian Holstein dairy herds. A. A. Naserian*[1], F. Karavan[2], and A. Razavi[3], [1]*Ferdowsi University of Mashhad*, *Mashhad, Iran*, [2]*Nemoneh dairy farm*, *Gorgan, Iran*, [3]*Karaj Islamic Azad University*, *Karaj, Iran*.

The aim of this study was a comparison between sexed and conventional semen and some reproduction items in Iranian Holstein dairy farms in northeast of Iran. Data were collected from computerized management software of every herd from January 2006 through December 2008. All herds, 5–10 percentage of heifers were bred with sexed semen. The female calves were bred at age 14–15 mo with 126–130 Cm height. The diets were balanced to meet or exceed the minimum nutritional requirements of heifers for a gain 0.75–0.8 Kg/d (NRC 2001). The data were analyzed with ANOVA by using the general linear model of SAS 2003. The means were comparison by the Tukey method. The results have been shown in the Table 1.Therefore, sexed semen in a new tool for producing more female calves in commercial dairy herds.

Table 1. Reproduction items amongst sexed and conventional semen heifers

Item	sexed	conventional	SEM	P-value
Age of breeding (month)	14.97	15.23	0.138	0.543
Times of AI	1.61	1.41	0.021	0.283
Birth difficulty (score)	1a	1.94b	0.016	0.001
Heifer height at breeding (cm)	125.12	126.33	1.718	0.261
Female calves (%)	85.81a	48.12b	0.981	0.001
Pregnancy length (month)	8.88	9.16	0.134	0.110

Key Words: sexed semen, conventional semen, reproduction items

W289 Dose reduction of fluorogestone acetate through partition of sponges in a program of estrus synchronization. J. L. Cordero[1], T. Sánchez[1], P. Molina[1], R. Nieto[1], J. Peralta[2], M. Cárdenas[3], O. Mejía[4], J. Nuñez[4], E. García*[5], and J. L. Figueroa[1], [1]*Programa de Ganadería, Colegio de Postgraduados*, *Texcoco, México*, [2]*ICAP, Medicina Veterinaria y Zootecnia*, *UAEH, Hidalgo, México*, [3]*INNSZ*, *México City*, [4]*CEIEPO UNAM*, *Tres Marías, México*, [5]*CUCSUR, UADG*, *Autlán Jalisco, México*.

The objective of the experiment was to determine the effect of dose reduction in sponges impregnated with fluorogestone acetate (FGA) through the partition of the same, in the main reproductive variables of Dorset ewes. Forty-four ewes were randomly assigned in four groups: Complete sponge control group, 40 mg of FGA (n=11); half sponge group, theoretically with 20 mg of FGA (n=11); one-quarter sponge group theoretically with 10 mg of FGA (n=11), and one-eighth sponge group theoretically with 5 mg FGA (n=11). Sponges remained inserted for 12 days, and 10 days after insertion all groups received a dose of 15 mg of prostaglandin (PGF2α). There was a 100% of estrous onset for groups with 40, 20 and 10 mg of FGA, but not for the 5 mg group with 81% ($P \leq 0.05$). There were no differences ($P \geq 0.05$) among treatments for gestation rate (40 and 10 mg of FGA= 100%, 20 mg of FGA= 82%, and 5 mg of FGA= 60%). Concerning to LH secretion, differences existed only in amplitude among 5 mg of FGA group (65 ± 6.40 ng mL^{-1}), compared with 40, 20 and 10 mg of FGA groups (41± 9.21; 38 ±7.94, and 23 ± 4.68 ng mL^{-1}, respectively). Under the present experimental conditions we conclude that doses of 40, 20 and 10 mg of FGA can effectively synchronize estrus in the breeding season however, 5 mg of FGA resulted in alterations in LH secretion.

Key Words: progesterone, luteinizing hormone, Dorset ewes.