Each of these diets was tube-fed in 25 g quantities as a mixture with NND formulated to provide 5 g of CP from the respective soybean meal source. Except for Cys, true digestibility (TD, %) values of all AA in RSB and DESB-2 were similar ($P > 0.05$). Compared with DESB-1, TD of AA in RSB was only higher ($P < 0.05$) for Ile (98 vs. 92), Leu (97 vs. 94) and Cys (91 vs. 82). Compared with pigs, TD of Ile, Leu, and Phe in RSB, Val, Leu, Lys and Phe in DESB-1, and Leu, Lys, Met and Phe in DESB-2, were higher ($P < 0.05$) in poultry than in pigs. The results suggest that CP and AA digestibility in dry extruded soybean meal are comparable to RSB in pigs and that AA digestibility in soybean meal was different for pigs and poultry.

Key Words: Pigs, Poultry, Extruded Soybean Meal

Physiology and Endocrinology II

T143 Daylength induces changes in leptin and leptin receptors gene expression in adipose tissue of lactating dairy cows. U. Bernabucci*[1], N. Lacetera[1], L. Basiricò[1], F. Rueca[2], D. Pirazzi[1], B. Ronchi[1], E. Seren[3], and A. Nardone[1], [1]*Dipartimento Produzioni Animali*, *Viterbo, Italy*, [2]*Dipartimento Patologia, Diagnostica e Clinica Veterinaria*, *Perugia, Italy*, [3]*Dipartimento Morfofisiologia Veterinaria e Produzioni Animali*, *Bologna, Italy*.

Leptin is mainly secreted by adipocytes and is implicated in the regulation of numerous physiological processes. Effects of daylength on adipose tissue gene expression of leptin in ruminants have been studied mainly on sheep, and no information are available on lactating dairy cows. The aim of the present research was to verify the effect of DL on adipose tissue gene expression of leptin and leptin receptors. Four lactating and pregnant Holstein cows were used. The animals were housed in a climatic chamber. The trial lasted 51 d. The first 30 d were used to adapt animals to the new housing conditions. During that period the DL adopted was 12 h light/12 h dark (12/12). The experimental period lasted 21 d. Phase (Ph) 1: 7 d neutral DL 12/12; Ph2: 7 d long DL (18 h light/6 h dark); Ph3: 7 d short DL (6 h light/18 h dark). During the experimental period milk yield and feed intake were recorded, and blood samples were taken. In addition, at the end of each phase, subcutaneous adipose tissue biopsy was carried out. On plasma samples glucose, NEFA and BHBA were determined. Abundance of leptin mRNA, and ObRa and ObRb leptin receptors were determined by ribonuclease protection assay. Daylength did not affect feed intake. Exposure to short DL reduced significantly milk yield ($P<0.05$). NEFA were slightly reduced by short DL, and glucose and BHBA were not affected by DL. Gene expression of leptin and its receptors were strongly ($P<0.01$) affected by DL. Both leptin and leptin receptors mRNA increased ($P<0.05$) with long DL and declined ($P<0.05$) with short DL. Results of the present study seem to exclude an effect of feed intake and metabolic status on leptin gene expression. A possible direct effect of photoperiod on leptin modulation may be hypothesized in dairy cows.

Acknowledgements: Supported by MIUR-FIRB Project

Key Words: Leptin, Dairy Cow, Photoperiod

T144 Relationship between serum leptin concentration and BW, feed intake, ultrasound traits and carcass merit of hybrid beef cattle. J. D. Nkrumah*[1], C. Hansen[1], D. H. Keisler[2], C. Li[1], B. Irving[1], Z. Wang[1], and S. S. Moore[1], [1]*University of Alberta*, *Edmonton, Alberta, Canada*, [2]*University of Missouri*, *Columbia*.

Leptin is the hormone product of the obese gene synthesized and secreted predominantly by adipocytes. It functions as a lipostatic signal regulating body weight, food intake, energy expenditure, reproduction and certain immune system functions. This study determined the relationship of serum leptin concentration with BW, DMI, ultrasound traits (n = 307) and carcass merit (n = 243) of beef cattle sired by Angus, Charolais or Hybrid bulls at the Kinsella Research Station of the University of Alberta. Serum leptin concentration averaged 13.33 (SD = 6.27) ng/ml and ranged from 2.19 to 39.70 ng/ml. Compared to Charolais-sired steers, Angus sired steers, respectively tended to have a higher serum leptin (14.0 ± 0.6 vs. 11.9 ± 0.9, P = 0.06), higher ultrasound backfat thickness (8.90 ± 0.31 vs. 7.01 ± 0.44, P < 0.01) and marbling score (5.30 ± 0.10 vs. 4.62 ± 0.13, P < 0.01). Serum leptin concentration was correlated (P < 0.05) with DMI (r = 0.20, P < 0.05), residual feed intake (r = 0.15, P < 0.05), mid-point weight (r = 0.26, P < 0.05), final BW (r = 0.25, P < 0.05), ultrasound marbling score (r = 0.32) and backfat thickness (r = 0.45). Serum leptin was unrelated to ADG or FCR (P > 0.20). There were correlations between serum leptin and carcass grade fat (r = 0.37, P < 0.01), carcass marbling score (r = 0.25, P < 0.01), lean meat yield (r = -0.33, P < 0.01) and carcass rib eye area (r = -0.13, P < 0.05). Ultrasound backfat thickness was correlated with ultrasound marbling score (r = 0.49, P < 0.001) but not with rib eye area (r = -0.02). In addition, carcass grade fat and carcass marbling score were correlated with each other (r = 0.52, P < 0.001) and were respectively correlated with lean meat yield (r = -0.90 and -0.55, P < 0.01) and carcass rib eye area (r = -0.29 and -0.21, P < 0.01). These phenotypic associations indicate that serum leptin concentration is related to the body weight, feed intake and body composition of cattle. However, the relationships with body fatness were stronger than those with DMI or BW.

Key Words: Beef Cattle, Carcass Merit, Performance

T145 Failure of short term feed restriction to effect leptin secretion and subcutaneous adipose tissue expression of leptin or long form leptin receptor (Ob-r) in the prepuberal gilt. H. A. Hart*[1], M. J. Azain[1], G. J. Hausman[2], D. E. Reeves[1], and C. R. Barb[1], [1]*University of Georgia*, *Athens*, [2]*USDA-ARS*, *Athens, GA*.

Ovariectomized prepuberal gilts averaging 164 days of age and 79.2 ± 3.8 kg body weight (BW) were either fed to appetite (FA; n = 6) or feed restricted (RST; 40% of FA diet; n = 6) for 7 seven days to determine the effects of feed RST on serum leptin concentrations, metabolism, leptin, Ob-r and transcription factor expression in subcutaneous back fat (BF). On day 8, blood samples were collected every 15 min for 8 h. Serum concentrations of glucose, T3, T4, NEFA, insulin, and leptin were determined. Real-time PCR was performed on mRNA extracted from subcutaneous adipose tissue collected on day 0 (start RST) and day 9. FA gilts gained ($P<.0001$) more BW (8.3 ±.6 kg) than RST (-2.5 ± .6 kg) gilts, however BF thickness did not change. A treatment x time interaction ($P<.009$) was detected for serum glucose concentrations. Serum insulin ($P<.07$), T3 ($P<.08$), and T4 ($P<.04$) concentrations were reduced and NEFA levels ($P<.05$) were greater during h 1, 6, 7 and 8 in RST gilts compared to FA animals demonstrating a metabolic response to RST. Serum leptin concentrations, leptin pulse amplitude, and leptin pulse frequency were not effected by RST. RST failed to effect subcutaneous BF leptin, Ob-r, AFABP (adipocyte fatty acid binding protein), C/EBP-alpha (CCAAT/enhancer binding protein alpha), or PPAR- gamma 2 (peroxisome proliferator activated receptor gamma 2) mRNA expression compared to FA gilts. These results may in part be related to the failure of RST of this duration to influence subcutaneous BF. Thus, the leptin response to RST may require energy levels and (or) BF reduction reaching a putative inhibitory threshold.

Key Words: Pig, Feed Restriction, Leptin

T146 Sequencing, chromosomal mapping and expression of the bovine deiodinase type II (*DIO2*) and deiodinase type III (*DIO3*) genes. E. E. Connor*[1], E. C. Laiakis[1], V. M. Fernandes[1], J. L. Williams[2], and A. V. Capuco[1],

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Thyroid hormones are critical for normal mammalian development and metabolism and their activity is regulated in a highly complex, tissue-specific manner by three isoforms of deiodinases. We determined the full-length bovine type II deiodinase (*DIO2*) and type III deiodinase (*DIO3*) mRNA sequences and characterized expression levels of each of the three deiodinase isoform transcripts in bovine diaphragm, heart, hypothalamus, kidney, liver, lung, mammary gland, pituitary gland and thyroid gland (n = 2 animals/tissue) collected at slaughter. Further, bovine *DIO2* and *DIO3* were positioned on chromosomes 10 and 21, respectively, by radiation hybrid mapping. Sequencing of bovine *DIO2* and *DIO3* cDNAs revealed a high degree of predicted amino acid sequence identity with their orthologs in other mammalian species and demonstrated the conservation of selenocysteine residues within the catalytic domains of both bovine proteins. Expression patterns of the three deiodinase isoforms in bovine tissues were similar for deiodinase type I (*DIO1*) and *DIO2* to those observed in other species. Expression level of *DIO3* transcripts was greatest in bovine mammary gland and kidney, although expression was detected in all tissues sampled. Results of this work will aid in the study of deiodinase gene expression and thyroid hormone regulation in cattle.

Key Words: Deiodinase, Thyroid Hormone, Gene Mapping

T147 Cloning and expression of bovine sodium/glucose cotransporter SGLT2. F.-Q. Zhao*, T. B. McFadden, E. H. Wall, B. Dong, and Y.-C. Zheng, *University of Vermont*, *Burlington*.

The second member of the Na+/glucose cotransporter family, SGLT2, is a low-affinity active glucose transporter. In human, it is predominantly located on the apical membrane of the S1 and S2 segments of renal convoluted proximal tubules, and, thus, may be mainly responsible for the reabsorption of D-glucose from the glomerular filtrate. By BLAST searching GenBank, we found EST sequences of SGLT2 in the cDNA library of bovine mammary tissues, indicating its expression in bovine mammary gland. To facilitate study of the role and mechanism of glucose reabsorption in bovine kidneys to maintain glucose homeostasis of lactating cows and of the potential role of SGLT2 in the mammary gland, we cloned bovine SGLT2 and examined the distribution of its mRNA expression in bovine tissues. The full length mRNA of bSGLT2 is 2275 base pairs and is predicted to encode a protein of 673 amino acids, with a molecular weight of approximately 73 kDa. The deduced amino acid sequence of bovine SGLT2 is 91%, 90%, 91%, and 90% identical to human, rabbit, mouse, and rat SGLT2, and is 58% and 48% identical to bovine SGLT1 and SGLT5, respectively. The sequence of bSGLT2 contains several conserved sodium:solute symporter family signatures that are characteristic of the sodium:solute symporter family. Analysis of current bovine genomic data indicates that the bovine SGLT2 gene may consist of 14 exons. The major in vitro transcription and translation product of bovine SGLT2 cDNA migrated at an apparent molecular weight of 55 kDa. The SGLT2 mRNA was detected predominantly in bovine kidney as a 2.3 kb transcript and at lower levels in all other bovine tissues we examined, including the mammary gland, liver, lung, spleen, intestine and skeletal muscle, as a 3.0 kb transcript. SGLT2 mRNA expression in bovine mammary gland increased more than ten-fold from late pregnancy to early lactation, similar to SGLT1. This indicates that SGLT2 may play a role in milk synthesis in the lactating mammary gland.

Key Words: Glucose Tansporter, Kidney, Mammary Gland

T148 Molecular cloning and expression of bovine leptin receptor isoforms. H. Kawachi*, A. Hamano, S. H. Yang, T. Matsui, and H. Yano, *Kyoto University*, *Kitashirakawa-oiwake, Sakyo-ku, Kyoto, Japan*.

Leptin, the 16 kDa protein product of the *ob* gene, is a hormone that is secreted mainly by adipocytes and regulates feed intake and energy expenditure. Leptin signal is accomplished via a receptor with strong sequence homology to the class I cytokine receptor family. At least five leptin receptor isoforms (Ob-Ra-e) have been cloned from mouse, rat and human, and exhibit widespread distribution among tissues. In bovine, however, there is little information about the sequence and tissue distribution of Ob-R isoforms. To further investigate the characterization of bovine Ob-R isoforms, we have cloned the full length bovine Ob-R isoforms and examined the expression of each isoform mRNA in bovine tissues. Oligonucleotide primers for cloning of bovine Ob-R were designed from the entered several partial fragments of the bovine Ob-R in GenBank. RT-PCR was performed using total RNA from bovine kidney as template. The complete nucleotide sequences of the Ob-R isoforms were determined by cDNA cloning based on 3'-RACE and 5'-RACE. PCR products were subcloned into TA cloning vector and sequenced. To elucidate Ob-R isoforms mRNA expression in cattle, semi-quantitive RT-PCR was carried out using oligonucleotide primer pairs specific for each Ob-R isoform. Each Ob-R isoform gene expression was quantified relative to 18S rRNA. Sequence analysis revealed that we cloned two full length bovine Ob-R isoform cDNAs, the long form (Ob-RL; GenBank accession number AB199589) and the short form (Ob-RS; accession number AB199590). The open reading frame of Ob-RL and Ob-RS gene were 3,498bp and 2,673bp, respectively. Ob-RL and Ob-RS were single transmembrane proteins, and differed in the C-terminal amino acid sequences. These bovine Ob-R isoforms shared significant homology to mouse Ob-Rb and Ob-Ra (73 and 74 % identity at amino acid level, respectively). Moreover, RT-PCR analysis revealed that Ob-R isoform mRNAs were distributed among a wide range of bovine tissues.

Key Words: Leptin Receptor, Bovine, Ob-R

T149 Effect of interval from timed AI to initiation of resynchronization of ovulation using Ovsynch on fertility of lactating dairy cows. R. A. Sterry*[1], M. L. Welle[2], and P. M. Fricke[1], [1]*University of Wisconsin*, *Madison*, [2]*Miltrim Farms, Inc.*, *Athens, WI*.

Nonpregnant lactating Holstein cows (n=695) at various DIM (112.4±2.3; range 50-445) and prior AI services (1.1±0.1; range 0-10) were submitted for timed AI (TAI) using $PGF_{2\alpha}$ (PG, 25 mg) and GnRH (G, 100 µg) in an Ovsynch protocol as follows: (G, d 0; PG, d 7; G+TAI, d 9). Cows were randomly assigned at initial TAI to receive the first G of Ovsynch at 26 d (D26) or 33 d (D33) after TAI to resynchronize cows failing to conceive to initial TAI (Resynch). All D26 cows received G 26 d after TAI and continued Ovsynch only if diagnosed nonpregnant using ultrasonography 33 d after TAI, whereas all D33 cows initiated Ovsynch only if diagnosed nonpregnant 33 d after TAI. Pregnancy status for cows diagnosed pregnant at 33 d was reconfirmed 40 d after initial TAI. Conception rate 33 d after initial TAI was 47% (n=695) and was greater (P<0.01) for cows receiving initial TAI after Presynch/Ovsynch (55%; n=354) than for cows resynchronized using Ovsynch for second and greater TAI (39%; n=341). Treatment did not affect pregnancy loss which was 4.0% (n=326) from 33 to 40 d after TAI. Nonpregnant cows within the D26 and D33 Resynch treatments lacking a CL >10 mm at 33 d (n=51) received a CIDR insert between the first two injections of Resynch. Thus, Resynch conception rates were compared for D26 (n=159) vs. D33 (n=142) cows and for D26+CIDR (G, d 26; G+CIDR in, d 33; PG+CIDR out, d 40; G+TAI, d 42; n=24) vs. D33+CIDR (G+CIDR in, d 33; PG+CIDR out, d 40; G+TAI, d 42; n=27) cows. Conception rate 33 d after Resynch tended to be greater (P=0.09) for D33 (38%) than for D26 (29%) cows but did not differ statistically between D26+CIDR (29%) and D33+CIDR (52%) cows. Pregnancy loss from 33 to 40 d after Resynch was 6.0% (n=99) and did not differ between treatments. Initiation of Ovsynch 26 d after TAI tended to decrease conception rate compared with initiation of Ovsynch 33 d after TAI (9 percentage point difference; 24% decrease) for resynchronizing cows failing to conceive to initial TAI.

Key Words: Resynch, Ovsynch, Pregnancy Loss

T150 Effects of the time of PGF2α in fixed time embryo transfer protocol on synchronization and conception rates in IVF fresh embryo recipients. O. G. SáFilho, J. L. M. Vasconcelos*, R. M. Santos, E. Oba, and G. C. Perez, *FMVZ-UNESP*, *Brazil*.

This trial tested if PGF2α injection on day 7 in relation to on day 9 of a fixed time embryo transfer (FTET) protocol alters reproductive parameters in IVF fresh embryo recipients. Cycling crossbred heifers (n=153), BCS 3.3±0.17, were divided in 4 groups: G1 (n=42), estradiol benzoate (EB, 2mg) + new CIDR on day 0, PGF2α (Lutalyse, 25mg) on day 7, CIDR removed on d 9, EB (0.8mg) on d 10, and FTET on day 18; G2 (n=41) similar to G1, but with already used CIDR for 9 d; G3 (n=35) EB (2mg)+ new CIDR on d 0, CIDR removed on d 9 + PGF2α, EB (0.8mg) on d 10 and FTET; G4 (n=35) similar to G3, but with already used CIDR for 9 d. All cows received fresh IVF embryos (grade 1 or 2) transferred by one trained technician. Ovulatory follicle diameter at time of CIDR removal, CL diameter and serum P4 at FTET were analyzed by GLM; synchronization (presence of CL at FTET), conception and pregnancy rates were analyzed by logistic regression. There was no effect of treatment on ovulatory follicle diameter (10.6±0.56; 11.1±0.63; 11.1±0.58; 10.7±0.56mm), synchronization rate (83.3; 65.9; 82.9; 80.0%), CL diameter (18.9±0.66; 19.7±0.71; 19.2±0.66; 18.9±0.67mm) or serum P4 (2.9±0.33; 2.3±0.33; 2.7±0.34; 2.1±0.35ng/mL) on G1, G2, G3, and G4, respectively. Treatment tended (P=.14) to affect conception (38.2; 30.8; 13.8; 25.0%) and pregnancy rates (31.7; 20.0; 11.4; 20.0%) for G1, G2, G3, and G4, respectively . Recipients receiving PGF2α on d-7 tended to have greater serum P4 concentrations than recipients receiving PGF2α on d-9 (G1+G3: 2.8±0.24; G2+G4: 2.2±0.24ng/mL; P=.06). Independent of treatment, ovulatory follicle diameter affected positively ovulation rate (P<.001) and CL diameter (P<.001). Serum P4 concentrations were affected positively by CL diameter (P<.05) and tended to be affected positively by ovulatory follicle diameter (P=.07). Conception and pregnancy rates were affected positively by serum P4 concentration (P<.01) and CL diameter (P<.01). These data suggest that synchronization protocols to embryo recipients should improve ovulatory follicle diameter due to these could improve synchronization and pregnancy rates.

Key Words: ET, CIDR, PGF2α

T151 Effect of duration of Norgestomet implant during CRESTAR protocol in Nellore cows. G. C. Perez*, R. M. Santos, and J. L. M. Vasconcelos, *FMVZ-UNESP*, *Brazil*.

Perez et al. (2004) showed that cows with lower BCS had smaller follicular diameter at implant removal and lower conception rate. The present trial tested if one more day of norgestomet implant during CRESTAR protocol could improve follicular diameter at implant removal and subsequent synchronization, pregnancy and conception rates. Nellore cows (n=439) with 79±26 DPP, BCS between 2.25 to 3.0 (1-5) were assigned to 4 groups: G1 (n=114) CRESTAR; G2 (n=107) CRESTAR+eCG (Folligon, 400UI) at implant removal+Calf Removal-CR (50h); G3 (n=112) CRESTAR 10 (Norgestomet implant for 10 days) and G4 (n=106) CRESTAR 10+eCG+CR. TAI was performed in the 4 groups 46-50 h after implant removal. Ovarian structures and pregnancy were evaluated by ultrasound. Cyclicity was determined before the beginning of the protocol by 2 ultrasound examinations 7 days apart. Follicular diameter was analyzed by GLM; synchronization, pregnancy and conception were analyzed by logistic regression. Follicular diameter (mm) at implant removal was not affected by duration of implant (9 d-10.97; 10 d-11.03) but it was affected (P<.05) by BCS (2.25-10.6; 2.5-11.0; 2.75-10.9; 3.0-11.6) and DPP (<60d-10.8; 61-80d-10.9; 81-100d-11.3; 101-120d-11.7; >120d-11.0). Synchronization rate (ovulation until 48 h after AI) was affected (P<.01) by DPP (<60d-76.0%; 61-80d-80.7%; 81-100d-96.4%; 101-120d-94.4%; >120d-95.8%) and eCG+CR (G1-72.8%; G2-95.3%; G3-72.3%; G4-94.3%). Pregnancy rate was affected (P<.05) by eCG+CR (G1-40.7%; G2-52.8%; G3-34.2%; G4-47.6%), due to lower synchronization rate in G1 and G3. Conception of effectively synchronized cows (ovulation between AI and 48 h later) was not affected (G1-55.6%; G2-58.1%; G3-48.1%; G4-59.0%) by treatments. Cows that received eCG+CR had ovulation before AI (G2-14.9%; G4-22.0%) with lower conception rate (G2-40%; G4-19.1%) One more day of Norgestomet implant during CRESTAR protocol did not improve follicular diameter or pregnancy. The eCG+CR treatment had a positive effect on synchronization rate but not on pregnancy rate. These data suggest that cows that received eCG+CR should undergo AI before 46h.

Key Words: CRESTAR, TAI, Nellore

T152 Effects of post-insemination CIDR on embryonic loss associated with heat stress in dairy cattle. R. E. Carothers* and C. S. Whisnant, *North Carolina State University*, *Raleigh*.

The objective of this study was to determine the effects of post-insemination progesterone supplementation on heat stressed dairy cows. Previous research had indicated that treatment with GnRH on day 5 post-insemination could increase pregnancy rates in heat stressed dairy cows. This study was conducted in the summer of 2004 in an attempt to improve pregnancy rates of lactating dairy cows. Cows were synchronized with the OvSynch protocol, bred, and randomly assigned to control (CON) or treatment (TR). TR cows received a CIDR five days after breeding, which was removed seven days after insertion. Venous blood samples were collected every other day throughout the study and analyzed for progesterone via RIA. Cows not showing estrus after breeding were pregnancy checked by transrectal ultrasonography approximately thirty days after breeding. Mean Temperature Humidity Index (THI) was 72.5 with average daily maximum THI 79.7 and average daily minimum THI 65.3. These conditions indicate mild heat stress. Serum progesterone concentrations were higher during the time CIDR's were in place in cows treated with CIDR (3.7 ± 0.5 ng/ml) compared to control cows (2.4 ± 0.5 ng/ml) (P<.05). Pregnancy rates did not differ between groups (TR 18.2% versus CON 13.6%). Pregnancy rates were not improved by CIDR treatment of heat stressed dairy cows for seven days post-insemination despite an increase in serum progesterone concentrations.

Key Words: Progesterone, CIDR, Heat Stress

T153 Influence of reducing the interval between GnRH and $PGF_{2\alpha}$ to 5 days on reproductive performance of cows synchronized with GnRH-CIDR- $PGF_{2\alpha}$ programs. G. A. Bridges, C. L . Gasser*, D .E. Grum, M. L. Mussard, L. A. Helser, and M. L. Day, *The Ohio State University*, *Columbus*.

Three experiments were conducted to determine the influence of reducing the length of synchronization programs from 7 to 5 days on reproductive performance in lactating beef cows. In experiment 1, the standard, 7 d Select Synch + CIDR (7d-SS; n = 79) was compared to a 5 d Select Synch + CIDR (5d-SS; n = 77) protocol. Estrus response (87.2%), interval to estrus (57.3 ± 1.0 hr), conception rate (53.7%), and pregnancy rate (PR; 46.8%) did not differ between the programs, and did not vary relative to cycling status (cyclic, anestrous) or cow age (2-yr-old and mature). In experiment 2, the 7 d CO-Synch + CIDR (n = 112) was compared to a 5 d CO-Synch + CIDR (n = 111) protocol. All cows were timed-AI (TAI) concomitantly with GnRH at 60 h following CIDR removal. A significant (P = 0.05) treatment by age interaction was observed for TAI-PR. Timed-AI-PR was 44.4 vs. 60.0% in 2 yr old cows (P<0.05) and 54.3 vs. 53.8% in mature cows for the 7 d and 5 d protocols, respectively. Cycling status was not a significant source of variation in this experiment. In experiment 3, dominant follicle size and systemic estradiol concentrations at 60 hr after CIDR removal were compared between the 7d-SS (n = 16) and 5d-SS (n = 16) protocols. Estrus response was similar (68.8%) between treatments; however interval to estrus was greater (P < 0.05) in the 5 d (80.0 ± 1.7 hr) than 7 d (68.4 ± 3.6 hr) program. Dominant follicle size at 60 hr was nominally larger (P > 0.05) in the 7d-SS (13.3 ± 0.6 mm) than 5d-SS (12.2 ± 0.4 mm) treatment. Estradiol concentrations did not differ at 60 hr between treatments (8.6 ± 0.8 pg/ml). In conclusion, decreasing the duration of the Select Synch + CIDR protocol did not influence breeding performance, while PR was increased in 2 yr-old cows receiving the 5 d CO-SYNCH + CIDR protocol. At 60 hr after $PGF_{2\alpha}$ follicle diameter and estradiol concentrations did not differ between the 5 d and 7 d protocols.

Key Words: Cattle, Synchronization, CIDR

T154 Effects of supplemental progesterone administration on pregnancy rate and resynchronization in lactating dairy cattle during mild heat stress and non-heat stress conditions. A. Denson*, M. Jones, S . Bowers, A. Dos Santos, K. Graves, K. Moulton, and S. Willard, *Mississippi State University*, *Mississippi State*.

Administration of supplemental progesterone (P_4) post-breeding to improve pregnancy rates in cattle have been studied under a variety of production-management systems using various methods of P_4 administration. In the present investigation, studies were conducted to assess the use of the CIDR as a supplemental P_4 source during conditions of mild heat stress and non-heat stress in lactating dairy cows. All cows (n=44 summer; n=64 fall) were synchronized for 7 d using CIDR with administration of $PGF_{2\alpha}$ on d 6. Following CIDR withdrawal cows detected in estrus were bred by AI, with a timed insemination 54 h after $PGF_{2\alpha}$ for all cows not detected in estrus. Cows were balanced for production variables and assigned as Control (CON; no supplemental CIDR) or CIDR+, which received a second CIDR 11 d after the timed-AI. $PGF_{2\alpha}$ was not administered following second CIDR withdrawal. All cows were detected for estrus and bred AI throughout the remainder of the study. Summer study: Holstein (n=33) and Jersey (n=11) cows were managed under mild heat stress conditions (average daily THI=74 and average daily peak THI=80). Ultrasonography (US) at d 42 following the first AI post-CIDR revealed a pregnancy rate (PR) of 27% (6/22) for CIDR+, and 5% (1/22) for CON ($P<0.05$). US at d 65, combining first AI and resynchronized AI, revealed an overall PR of 45% (10/22) for CIDR+, and 18% (4/22) for CON ($P<0.05$). Fall study: Holstein (n=53) and Jersey (n=11) cows were managed under cool season conditions (average daily THI=51 and average daily peak THI=59). US at d 42 following the first AI post-CIDR revealed a PR of 31% (10/32) for CIDR+, 31% (10/32) for CON ($P>0.10$). US at d 65, combining first AI and resynchronized AI, revealed an overall PR of 44% (14/32) for CIDR+ and 41% (13/32) for CON ($P>0.10$). The use of the CIDR as a supplemental source of P_4 post-breeding increased pregnancy rate and accelerated rebreeding under mild heat stress conditions but not during the cool season in lactating dairy cows.

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Key Words: Progesterone, Heat Stress, Dairy Cattle

T155 Leptin gene polymorphisms and selection for milk yield in Holstein cows. S. H. Wu*[1], W. J. Weber[1], Y. Da[1], H. Chester-Jones[1], L. B. Hansen[1], Y. R. Boisclair[2], and B. A. Crooker[1], [1]*University of Minnesota*, *St. Paul*, [2]*Cornell University*, *Ithaca, NY*.

Cows from a breeding project that produced high-merit, contemporary cows (select line, SL) and low-merit cows that represent U.S. Holsteins in 1964 (control line, CL) were used to determine relationships of 2 single nucleotide polymorphisms (SNP) in the leptin gene with genetic merit for milk yield. Both SNP occur within exon 2 and result in amino acid substitutions. The first SNP (Lept1) is an A to T transition that leads to a Tyr7Phe change in the leptin signal peptide. The second SNP (Lept2) is a C to T transition that leads to an Arg25Cys change in the leptin peptide. DNA samples collected previously from 122 CL and 182 SL cows born between 1988 and 1992 (33 CL, 60 SL), 1993 and 1997 (35 CL, 73 SL), and 1998 and 2003 (54 CL, 49 SL) were analyzed. The PTA-milk difference between the lines increased with period (3134 ± 80, 3790 ± 77 and 4328 ± 62 kg, respectively). DNA was amplified with specific primers (Lept1: 5' GATTCCGCCGCACCTCTC 3' and 5' CCTGTGCAAG GCTGCACAGCC 3'; Lept2: 5' ATGCGCTGTGGACCCCTGTATC 3' and 5' TGGTGTCATCCTGGACCTTCC 3'). Amplified products were digested (Cla I for Lept1 and Acc III for Lept2) and digestion products separated by gel electrophoresis. For Lept1, overall AA, AT and TT genotypes represented 84.4, 14.8 and 0.8% for CL and 97.2, 2.8 and 0.0% for SL, respectively. Allelic frequency of T was greater in CL than SL cows during 1993 to 1997, 1998 to 2003, and overall (8.2 vs. 1.4%; χ^2, $P < 0.001$) and tended to decrease in SL cows with time. For Lept2, overall CC, CT and TT genotypes represented 50.8, 39.4 and 9.8% for CL and 37.9, 48.4 and 13.7% for SL, respectively. Overall allelic frequency of T was less in CL than SL cows (29.5 vs. 37.9%, χ^2, $P < 0.05$) but not for any individual time period. PTA-milk values were greater in SL than CL cows for each time period but did not differ among genotype within line for either SNP or their interactions. However, results indicate allelic frequencies for both leptin SNP have been altered by selection for contemporary Holsteins.

Key Words: Leptin, Polymorphisms, Milk Yield

T156 Efficacy and economic value of estrous synchronization. K. Evenson*, J. Johnson, S. Prien, and J. Blanton, *Texas Tech University*, *Lubbock*.

One hundred Angus-based beef cows and heifers were studied to determine the efficacy and economic value of four synchronization methods. Hormones were administered as follows: progesterone controlled internal drug-releasing insert, (CIDR), 1.9 g per animal; GnRH, 100µg i.m.; prostaglandin F2α (PGF2α), 25 mg i.m. HeatWatch estrous detection system was used on d0 until d22 to detect estrus. Artificial insemination was performed 12h after the onset of estrus. Four insemination protocols were utilized and consisted of 1) animals received PGF2α on d5 of the experiment (1-Shot; n=25); 2) animals received a CIDR insert and an injection of GnRH on d0, removal of the CIDR on d6 and were injected with PGF2α on d7 (CIDR; n= 25); 3) animals were injected with GnRH on d0 and PGF2α on d7 (Select Synch; n=25); 4) animals were injected on d0 and d11 with PGF2α (2-Shot; n=25). Animals were equally distributed into four treatment protocols by age, body condition score (BCS), and days postpartum (DPP). After artificial insemination, a clean-up bull was utilized and 100% conception occurred. Estrus response did not differ between treatments ([96%], 1-Shot; [96%], CIDR; [96%], Select Synch; [88%], 2-Shot); ($P > .5569$). Synchrony response of estrus is determined by the number of cows who demonstrated estrus in the predicted time divided by the number of cows who demonstrated estrus within each protocol. The synchrony responses are as follows: [83%], 1-Shot; [92%], CIDR; [96%], Select Synch; [96%], 2-Shot; ($P > .3898$). Protocols were evaluated on an economic basis by cost of semen, hormones, supplies, and fixed costs. Based on protocol cost, the CIDR protocol was the highest cost at $28.77/hd and 1-shot protocol was the lowest cost at $16.62/hd. The 1-shot protocol was the least effective protocol based upon effectiveness and economic value because only 83% were synchronized which resulted in a loss of $66.48 vs. Select Synch which properly synchronized 96% and only lost $19.92. Four synchronization protocols were evaluated with three protocols having a 96% estrous response rate, and one protocol with an 88% response. The CIDR protocol was the most expensive per head and the 1-shot protocol was least expensive per head.

Key Words: Estrus, Synchronization, Reproduction

T157 Effect of estradiol-17β supplementation before the last GnRH of the Ovsynch protocol in high producing dairy cows. A. H. Souza*, A. Gümen, E. P. B. Silva, A. P. Cunha, J. N. Guenther, C. M. Peto, D. Z. Caraviello, and M. C. Wiltbank, *University of Wisconsin*, *Madison*.

The aim of this study was to determine whether increasing circulating estradiol concentrations would increase conception rates (CR) in a TAI protocol for lactating dairy cows. Holstein cows (n=909) were assigned to two groups in a CRD design. Control cows received Ovsynch (GnRH-7d-PGF2α-58h-GnRH-16h-TAI). Treated cows had the same TAI protocol with the addition of 1 mg of estradiol-17β (E2) at 8 h before the second GnRH injection. Ovarian ultrasound and blood samples were taken just before E2 treatment for both groups. In a subset of cows (n=596), a Kamar® was used to assess expression of estrus. Ovulation was confirmed by ultrasound 7 d after TAI. Treatment with E2 increased circulating E2 (18.4±4.6, n=8 vs. 2.94±0.6, n=8; $P<0.01$) and increased expression of estrus (78.5%, n=302 vs. 42.4%, n=290, $P<0.001$). The overall CR did not differ ($P=0.57$) between E2 (45.2%, n=465) and control (43.5%, n=441) cows; however, in cooler seasons (<70F) there was a significant ($P<0.02$) greater CR in cows treated with E2 (50.9%, n=116) than controls (34.6%, n=108). In addition, E2-treated cows that showed estrus not only had better ($P<0.01$) CR (52.7%, n=237) than either E2-treated (21.5%, n=65) or control (37.7%, n=167) cows that did not show estrus, but also tended ($P=0.10$) to have better CR than control cows that showed estrus (45.5%, n=123). Moreover, cows with intermediate-sized ovulatory follicles (15-20 mm with single ovulation, n=416) tended to have an increase in CR ($P=0.06$) due to E2 treatment. In conclusion, any improvements in CR due to E2 treatment appear to depend on expression of estrus, season, cyclicity (data not shown), and size of ovulatory follicle.

Key Words: Estradiol, Estrus, Conception Rate

T158 Effect of GnRH after artificial insemination on conception rates in lactating dairy cows. A. P. Cunha*, A. H. Souza, A. Gümen, E. P. B. Silva, C. M. Peto, J. N. Guenther, D. Z. Caraviello, and M. C. Wiltbank, *University of Wisconsin*, *Madison*.

This study investigated the effect of multiple GnRH injections after timed artificial insemination (TAI) on conception rates (CR) in high producing dairy cows. Lactating Holstein cows (n=821) underwent the Ovsynch protocol (GnRH-7d-PGF2α-58h-GnRH-16h-TAI) and 7 days after TAI cows were assigned to one of two groups in a CRD design 1) treatment: received (i.m.) GnRH (100μg) injection on days 7 and 14 after TAI; 2) control: received no treatment. Ovarian ultrasound evaluations and BCS were performed on days 7, 14 and 20 after TAI for both groups. Cows without a CL on Day 7 were not used in the study. The macro GLIMMIX of SAS was used to evaluate the different models. The overall CR was not different (P>0.10) between GnRH-treated (43%, n=389) and control cows (42%, n=407). A greater (P<0.01) percentage of cows ovulated after GnRH on day 7 (78%, n=352) than after GnRH on day 14 (47%, n=311). Ovulation to the GnRH on day 14 did not have an effect (P>0.10) on CR. However, cows that ovulated after the GnRH on Day 7 had better CR (47%, n=352) than GnRH-treated cows that did not ovulate (27%; P<0.01) or control cows (42%, n=407; P<0.05). Control cows had higher CR than GnRH-treated cows that did not ovulate (P<0.03). The reason for a lack of ovulation in some cows treated with GnRH on Day 7 is unclear. Lack of ovulation was not related (P>0.10) to mastitis rate during the first 20 days after TAI or BCS. There were a greater (P<0.05) percentage of cows with follicles larger than 10mm on Day 7 in the GnRH-treated group that ovulated (99%, n=268) than GnRH-treated cows that did not ovulate (93%, n=72) or control cows (96%, n=397); however, this small difference is unlikely to explain the lack of ovulation in some GnRH-treated cows. In conclusion, ovulation to GnRH on Day 7 may increase CR in lactating dairy cows. An alternative explanation for our results is that lack of ovulation to GnRH on Day 7 has allowed selection of a group of less fertile cows.

Key Words: GnRH, Conception Rate, Dairy Cows

T159 Effect of GnRH between Pre-Synch injections and estradiol 17β during the Ovsynch protocol on conception rates in lactating dairy cows. A. Gümen*, A. H. Souza, A. P. Cunha, E. P. B. Silva, J. N. Guenther, and M. C. Wiltbank, *University of Wisconsin*, *Madison*.

Anovular cows have reduced conception rates (CR) during Ovsynch in spite of satisfactory ovulation rates. In order to improve CR in anovular cows, two modifications were made in a Presynch-Ovsynch protocol. First, cows were treated with Presynch (2 injections of prostaglandin F2α (PGF), 14 d apart, PGF1 initiated at 37-43 d postpartum) and half of the cows received a GnRH treatment at 7 d after PGF1 (PGP) or no treatment (PP). Second, cows that did not show estrus after Presynch were synchronized 11 d later with Ovsynch (GnRH-7d-PGF-58h-GnRH-16h-TAI) and half of the cows received 1 mg estradiol-17β (E2) at 8 h before the second GnRH treatment to increase E2 prior to ovulation. A total of 25% (163 of 654) of cows were anovular with no detectable luteal tissue by ultrasonography between PGF1 and 7 d later. More (P<0.001) anovular cows ovulated in PGP (80%) compared to PP (31% spontaneous ovulation). After the second PGF of Presynch 43% of cows (281/654) were detected in estrus and bred (57.4±0.2 d). Days to estrus were earlier (P<0.03) and less variable in anovular cows in PGP (2.9±0.1 d) compared to PP (3.6±0.3 d). However, there was no difference in ovular cows. In cows showing estrus, CR was numerically but not significantly greater in PGP than PP in anovular (18%; 3/17 vs. 33%; 8/24) but not ovular (36%; 40/110 vs. 38%; 48/128) cows. After Ovsynch, treatment with E2 increased expression of estrus in anovular (77% vs. 39%) and ovular (80% vs. 44%) cows. Interestingly, E2 treatment did not alter CR in ovular cows (45% vs. 45%) but increased (P<0.03) CR in anovular cows (18%; 10/56 vs. 36%; 24/66) regardless of GnRH treatment during Presynch. Thus, GnRH can be added to the Presynch protocol to induce ovulation in anovular cows and this increases synchrony in cows that show estrus. However, the largest increase in CR occurred in anovular cows that received E2 during Ovsynch suggesting that reduced CR to Ovsynch in anovular cows related to insufficient circulating E2.

Key Words: Presynch, Estradiol, CR

Production, Management and the Environment: Nutrition and Management

T160 Electronic identification of young lambs with mini-bolus and effects on intake and digestibility during fattening. J. J. Ghirardi[1], G. Caja*[1], C. Flores[1], and D. Garín[2], [1]*Universitat Autònoma de Barcelona*, *Bellaterra, Spain*, [2]*Universidad de la República*, *Montevideo, Uruguay*.

Three types of cylindrical ceramic mini-boluses (**B**) of different dimensions (o.d. × length; total weight): **B1** (10.5- × 51.0-mm; 13.8 g), **B2** (12.2- × 42.2-mm; 16.2 g), and **B3** (11.2- × 56.4-mm; 20.1 g) were produced. All B had a specific gravity greater than 3 and contained one 32 mm half-duplex ISO transponder. They were orally administrated by a trained operator, as early as possible, to a total of 513 newborn lambs of three sheep breeds used for different purposes: Manchega (dairy, n = 125), Lacaune (dairy, n = 116), and Ripollesa (local meat, n = 272). Lambs sucked from their mothers until wk 5 (dairy) or wk 6 (meat), and were intensively fattened (pelleted concentrate and barley straw ad libitum) thereafter. Growth rate, bolus retention and health status were recorded weekly. Retrieval and forestomachs location of B at slaughter (24 kg BW) were also recorded. Eight male Manchega lambs (45 d of age and 14 kg BW) in metabolic crates were randomly assigned to two experimental groups (**C**, control; and **BA**, mini-bolus applied) to evaluate the effects of B1 on feed intake and digestibility in four periods during fattening. On average, age at administration was lower ($P < 0.01$) in the dairy (B1, 21; B2, 29; and, B3, 20 d) than in the meat lambs (B1, 33; B2, 37; and, B3, 35 d). Body weight at application also differ ($P < 0.05$) between dairy (B1, 9.3; B2, 11.2; and, B3, 9.7 kg) and local meat lambs (B1, 8.9; B2, 11.0; and, B3, 9.1 d). Retention rate varied according to mini-bolus type (B1, 97.7; B2, 98.9%; and, B3, 100%). Lamb growth rate did not vary between B types. Recovery at slaughter was 100%, but three B1 (1.6 %) boluses were recovered from the abomasum. No differences in DM intake, average daily gain, feed conversion rate or nutrient digestibility were found between C and BA. In conclusion, B3 mini-bolus (20.1 g) proved to be an efficient device for the electronic identification of lambs, satisfying the ICAR requirement (>99% in 6 mo) and allowing the traceability of dairy (up to 21 d and 10 kg) and local meat lambs (up to 35 d and 10 kg) from suckling to slaughter.

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Key Words: Electronic Identification, Rumen Bolus, Transponder

T161 Comparison of half- and full-duplex electronic ear tags and intraperitoneally injected transponders in the implementation of traceability under commercial conditions in pigs. C. Santamarina[1], M. Hernández-Jover[2], D. Babot[1,3], and G. Caja*[2], [1]*Universitat de Lleida*, *Lleida, Spain*, [2]*Universitat Autònoma de Barcelona*, *Bellaterra, Spain*, [3]*Centre UdL-IRTA*, *Lleida, Spain*.

A total of 790 Landrace × Large White ×× Pietrain pigs were used to study the traceability from weaning to the end of the slaughter line. Piglets were identified after weaning, reared under intensive conditions and harvested in a commercial slaughterhouse. All piglets were identified in triplicate with: a plastic button ear tag (**C**), in the right ear; an electronic button ear tag (**E**), in the left ear; and, an intraperitoneal (**I**) transponder. Transponders of the two radio frequency technologies complying with ISO 11789 (**H**, half-duplex; **F**, full-duplex B) were used. Treatments were: C (n = 790), EH (n = 369), EF (n = 397), IH (n = 392), and IF (n = 387). Readability of electronic devices was checked on the farm and in the slaughterhouse by using full-ISO handheld transceivers. No losses during the on-farm period and transportation were reported for C. Total of losses and electronic failures during the on-farm period and transportation were lower for IF (1.7%; $P < 0.05$) than EH (4.3%), but results for EF (2.3%)