

Another major limitation to the inclusion rate of alternative ingredients is variability in the concentration and digestibility of the nutrients in the ingredient. This concern limits the inclusion rate of many ingredients in group 3) and 4), and the ingredients in these groups are usually only attractive if some guarantees for consistency can be obtained from the supplier of the ingredients.

Key Words: alternative ingredients, anti-nutritional compounds, pigs

237 Phytase and NSP-degrading enzymes for alternative feed ingredients. R. T. Zijlstra^{*1}, E. Beltranena^{1,2}, C. M. Nyachoti³, and S. W. Kim⁴, ¹University of Alberta, Edmonton, AB, Canada, ²Alberta Agriculture and Rural Development, Edmonton, AB, Canada, ³University of Manitoba, Winnipeg, MB, Canada, ⁴North Carolina State University, Raleigh.

Co-products from cereal and oilseed crops processed for food, biofuel, or bio-industrial purposes are attractive feed ingredients to manage feed costs per unit of gain in swine. These alternative feed ingredients may contain more phytate and non-starch polysaccharide (NSP) than traditionally measured in cereal grains that may limit nutrient digestibility or feed intake. Supplemental feed enzymes combined with feed processing technologies and advanced feed quality evaluation

techniques are important components of a strategy to mitigate risks of high dietary inclusion of co-products. Supplemental enzymes have been studied for decades in combination with cereal grains; however, more recently, specific efforts have started to apply enzyme technology to co-products. Some important considerations are: a) the substrate for the enzyme must be the main limitation for digestibility of the nutrient of interest, b) effects of enzyme must be clarified for the co-product vs. the rest of the diet, and c) processing technology may affect the content and functional characteristics of phytate and NSP in the co-product. Thus, analysis of phytate and NSP content should be part of feed quality evaluation. Generally, phytase improves P digestibility and its effects on energy and AA digestibility are variable depending on trial conditions. Generally, NSP-degrading enzymes improve energy digestibility and their effects on AA and P digestibility are variable depending on trial conditions. Due to the altered nutrient flow through the intestinal tract, supplemental enzymes may also alter nutrient availability to intestinal microbes, and hence alter microbial populations. Application of enzyme technology combined with modern feed processing and feed quality evaluation technologies may provide the pig with additional energy, AA, and P resulting in cost-effective, predictable growth performance and carcass quality.

Key Words: alternative feedstuff, enzyme, pig

Physiology and Endocrinology: Dairy Cattle Reproduction

238 Effect of PRID administered 5-12 days post-insemination on progesterone levels and pregnancy risk in previously inseminated dairy cows. S. J. Scott*, K. E. Leslie, R. B. Walsh, J. S. Walton, and S. J. LeBlanc, *University of Guelph, Guelph, ON, Canada.*

Progesterone (P₄) concentration in the days following AI is one important factor in maintenance of the developing conceptus. The effects of a Progesterone-Releasing Intravaginal Device (PRID) inserted between 5 – 12 d after AI and removed 7 d later on serum P₄ concentrations and risk of pregnancy were studied in 671 lactating dairy cattle on 8 farms in Ontario. Cows were visited weekly and randomly assigned to receive PRID or PID (Placebo Intravaginal Device). Serum P₄ was measured at insertion and removal of the device. At insertion P₄ levels were similar between treatment groups (2.9 ± 1.7 ng/ml). The probability of pregnancy to the AI immediately before device insertion was not significantly different in PRID (36%) and PID (38%) treated cows, or between cows enrolled 5 - 8 and 9 - 12 days post-AI (P=0.8). Cows that received PRID had higher serum P₄ at device removal than controls (4.8 vs. 4.3 ng/ml, P=0.04, accounting for P₄ at insertion). Yet, change in P₄ concentration was only significant in cows that received PRID 9 - 12 days post-AI (3.7 versus 3.1 ng/ml in PRID and controls, respectively, P=0.05). Use of Ovsynch had confounding effects. Cows bred off natural heat detection (HD; n = 427) were 1.5 times more likely to become pregnant to that breeding than cows bred with Ovsynch (n = 234) (P=0.03). Cows bred on Ovsynch had 0.52 ng/ml less P₄ upon device removal (P=0.03), compared to cows bred on HD. BCS recorded at the time of enrolment was not significantly different between treatment groups (2.75 ± 0.3). There was no association of BCS with probability of pregnancy or P₄ at device removal, and no interaction of BCS with the effect of PRID. Average milk yield (41.2 ± 7 kgs) was positively associated with the probability of pregnancy (P=0.05). There was no interaction of milk yield with the effect of PRID. Under the conditions of this study administration of a P₄ device post-insemination increased circulating P₄ but was not associated with pregnancy to the preceding AI.

Key Words: PRID, progesterone, pregnancy

239 Plasma hormones and energy metabolites in postpartum lactating (L) and nonlactating (NL) Holstein cows that either conceived or failed to conceive at first insemination. A. N. Brauch^{*1}, J. C. Green¹, J. P. Meyer¹, A. M. Williams¹, C. S. Okamura¹, P. Taube², L. Goetze², and M. C. Lucy¹, ¹University of Missouri-Columbia, Columbia, ²Pfizer Animal Health, New York, NY.

Lactation affects circulating concentrations of metabolic hormones involved in nutrient partitioning for milk synthesis. The objective was to examine hormones and energy metabolites in dairy cows that were either L or NL and either conceived [pregnant (P)] or failed to conceive [not pregnant (NP)] at first insemination. Primiparous Holstein cows were assigned to one of two treatments after calving [L (n=23) or NL (n=20), dried off immediately]. Blood was collected thrice weekly for 60 d postpartum. Cows were treated with Presynch-Ovsynch and inseminated with frozen semen from a single ejaculate. The interval to first insemination (61 ± 1 d) was similar for L and NL cows that were either P (n=16 L; n=11 NL) or NP (n=7 L; n=9 NL) at first insemination. The L cows averaged 30.4 ± 0.8 kg milk/d at 60 d postpartum. There was an effect of lactation on plasma growth hormone (GH) concentrations (P<0.01) because L cows had greater GH when compared with NL cows (14.9 ± 1.8 vs. 6.8 ± 1.8 ng/mL, respectively). Insulin-like growth factor 1 (IGF1) concentrations were affected by both lactation (P<0.001) and status (P<0.02). L cows had lesser IGF1 than NL cows and, regardless of treatment, NP cows had lesser IGF1 than P cows (L cows: 104.7 ± 12.3 and 125.2 ± 7.8 ng/mL for NP and P; NL cows: 167.4 ± 10.2 and 195.9 ± 9.3 ng/mL for NP and P). There was an effect of lactation (P<0.001) and a status by day interaction (P<0.01) for plasma glucose. L cows had lesser glucose compared with NL cows (65.7 ± 0.9 and 77.4 ± 0.8 mg/dL for L and NL, respectively). Plasma glucose was greater in P cows than NP cows during d 0 to 30 (72.6 ± 0.4 and 68.9 ± 0.5 mg/dL for P and NP cows) but was similar thereafter (d 31 to 60; 72.5 ± 0.3 and 72.2 ± 0.4 mg/dL for P and NP cows). L cows had greater (P<0.01) plasma non-esterified fatty acid (NEFA) than NL cows (436.6

± 32.3 vs. 188.6 ± 30.7 $\mu\text{Eq/L}$, respectively). Plasma NEFA were similar ($P > 0.10$) for P and NP cows. Overall, lactation affected hormone and metabolite concentrations that were associated with pregnancy at first insemination in both L and NL cows.

Key Words: lactation, hormone, metabolite

240 Effect of lactation on plasma progesterone concentrations and early embryonic development in Holstein cows. J. C. Green^{*1}, J. P. Meyer¹, A. M. Williams¹, A. N. Brauch¹, C. S. Okamura¹, P. Taube², L. Goetze², and M. C. Lucy¹, ¹University of Missouri, Columbia, ²Pfizer Animal Health, New York, NY.

Progesterone is stimulatory to embryonic development and its blood concentrations may be decreased by greater metabolic activity in lactating cows. The objective was to determine if the physiological state of lactation affects plasma progesterone concentrations and embryonic growth from d 28 to 42 of pregnancy in Holstein dairy cows. Primiparous cows were assigned to one of two treatments immediately after calving [lactating (L; $n=22$) and non-lactating (NL; dried off immediately after calving; $n=19$)]. Blood was collected thrice weekly. Cows were treated with Presynch-Ovsynch and artificially inseminated with semen from a single ejaculate. Cows that did not conceive to first insemination were re-inseminated until they became pregnant. Pregnant cows were slaughtered on 28 ($n = 6$ L and 7 NL), 35 ($n = 8$ L and 6 NL), or 42 ($n = 8$ L and 6 NL) d after insemination and tissues were collected and weighed. The interval to first insemination, services per conception, and days open were similar for L and NL cows. There was no effect ($P > 0.10$) of treatment (i.e., lactation) on blood progesterone concentrations during the first, second, or third (after insemination) postpartum luteal phases. Weight of the CL increased with successive d of pregnancy (6.0 ± 0.7 , 7.6 ± 0.7 , and 8.4 ± 0.6 g; 28, 35, and 42 d, respectively; $P < 0.05$) but there was no effect of treatment on CL weight ($P > 0.10$). There was an effect of treatment ($P < 0.06$) and d of pregnancy ($P < 0.001$) on fetal weight because fetuses grew during pregnancy and NL cows had heavier fetuses than L cows (0.1 ± 0.1 , 0.8 ± 0.1 , and 2.0 ± 0.1 g vs. 0.1 ± 0.1 , 0.6 ± 0.1 and 1.6 ± 0.1 g for NL vs. L on d 28, 35, and 42, respectively). Likewise, there was an effect of treatment ($P < 0.01$) and d of pregnancy ($P < 0.001$) on placental weight because placenta were heavier on successive d of pregnancy and NL cows had heavier placenta than L cows (1.2 ± 1.6 , 13.2 ± 2.2 , 25.0 ± 1.6 g vs. 1.1 ± 2.2 , 8.1 ± 1.7 , 16.8 ± 1.5 g for NL vs. L on d 28, 35, and 42, respectively). The conclusions were that there was no effect of lactation on plasma progesterone but lactation reduced the weights of the fetus and placenta.

Key Words: lactation, progesterone, embryo

241 Effects of resynchronization programs on fertility, progesterone and PAGs after insemination. I. M. Thompson^{*1}, R. L. A. Cerri¹, I. H. Kim², J. A. Green³, J. E. P. Santos¹, and W. W. Thatcher¹, ¹University of Florida, Gainesville, ²Chungbuk National University, South Korea, ³University of Missouri, Columbia.

Objectives were to develop a Timed (T) AI resynchronization platform to improve pregnancy (P) rate and to evaluate responses of progesterone (P₄) and P associated glycoproteins (PAGs) in lactating cows. Cows ($n=1578$) were presynchronized with 2 injections of PGF_{2 α} given 14 d apart at 42 ± 3 d postpartum followed by Ovsynch (GnRH, 7 d PGF_{2 α} , 56 h GnRH, 16 h TAI [d 0]). The Treatment (TRT) group received a CIDR from d 18 to 25, GnRH at d 25, d 32 ultrasound P diagnosis and

non-pregnant (NP) cows received PGF_{2 α} , GnRH 56h after and TAI 16 h later (d 35). The Control (CON) group was diagnosed for P at d 32 and NP cows received GnRH, d 39 PGF_{2 α} , GnRH 56 h after, and TAI 16 h later (d 42). P was re-confirmed at d 60. Blood for analyses of P₄ and PAGs was taken every 2 d from d 18-30 in 100 cows and continued weekly to d 60 of P ($n=43$). P rates at d 32 (45.8%, $n=814$; 45.9%; $n=764$) and P losses at d 60 (6.7% and 4.0%) did not differ for TRT and CON, respectively. Second service P rates (36%, $n=441$ and 39.5% $n=412$) and P losses (6.3% and 6.7%) did not differ for TRT and CON. Days non-pregnant for pregnant and NP cows for 2 TAI were less for TRT ($120.7 < 124.9$ d $P < 0.01$). Plasma P₄ was greater ($P < 0.01$) for pregnant TRT cows (18-60 d; $6.6 > 5.3$ ng/ml), and P₄ at d18 was greater ($P < 0.03$) for pregnant than NP cows ($5.3 > 4.3$ ng/ml). Plasma PAGs in P were lower ($P < 0.01$) for TRT on d 39 ($2.8 < 4.1$ ng/ml) and 46 ($1.34 < 3$ ng/ml). Cows pregnant at d 32 that had P loss by d 60 ($n=7$) had lower ($P < 0.05$) PAGs at d 30 than pregnant cows ($n=36$) until d 60 ($2.9 < 5$ ng/ml). PAGs at d 30 (> 0.33 ng/ml) were predictive of d 32 P diagnosis (Sensitivity 100%, Specificity 90.6%). In conclusion, TRT and CON protocols had comparable P rates for first and second TAI services, but P occurred 4 d earlier in TRT. CIDR and/or GnRH increased P₄ during pregnancy. Dynamics of PAGs were indicative of pregnancy status and pregnancy loss.

Key Words: resynchronization, progesterone, PAGs

242 Fertility after timed artificial insemination in lactating dairy cows resynchronized using Double-Ovsynch or standard Ovsynch. J. O. Giordano^{*1}, M. C. Wiltbank¹, S. Bas¹, A. P. Cunha¹, R. A. Pawlisch², J. N. Guenther¹, and P. M. Fricke¹, ¹Department of Dairy Science, University of Wisconsin, Madison, ²Brodhead Veterinary Clinic, Brodhead, WI.

Our objective was to assess if using Double-Ovsynch (DO, Pre-Resynch, GnRH-7d-PGF_{2 α} -3d-GnRH, 7d later Breeding-Resynch, GnRH-7d-PGF_{2 α} -56h-GnRH-16h-TAI) to resynchronize ovulation for second and subsequent TAI may increase pregnancies per AI (P/AI) compared to Standard Ovsynch (OV, GnRH-7d-PGF_{2 α} -56h-GnRH-16h-TAI). Cows at various DIM and prior services were blocked by parity and were randomly assigned to either DO or OV for resynchronization of ovulation and TAI. All DO cows received the 1st GnRH injection of Pre-Resynch 22 d after TAI, and cows ($n=962$) diagnosed not pregnant using transrectal ultrasonography 29 d after TAI continued the protocol. All OV cows received GnRH 32 d after TAI, and cows ($n=956$) diagnosed not pregnant using transrectal palpation 39 d after TAI continued the protocol. In a subgroup of cows from each treatment, the proportion of cows with a corpus luteum (CL) at the 1st GnRH injection of Breeding-Resynch and OV and ovulation to the last GnRH injection before TAI was assessed using transrectal ultrasonography. Pregnancy diagnosis was performed for all cows in both treatment groups by ultrasonography at 29 d and transrectal palpation at 74 d after TAI. Overall, P/AI 29 d after TAI was not affected by parity ($P=0.58$) and was greater for DO compared to OV cows [38.5% (370/962) vs. 30.0% (287/956), $P < 0.0001$]. Pregnancy loss from 29 to 74 d after TAI was not affected by parity ($P=0.55$) and did not differ ($P=0.22$) between treatments [DO, 13.9% (50/359) vs. OV, 17.5% (49/280)]. Proportion of cows with a CL at the 1st GnRH injection of Breeding-Resynch and OV was greater for DO than OV cows [85.4% (373/437) vs. 68.9% (314/456); $P < 0.0001$]. Ovulation to the GnRH injection before TAI was similar between treatments [DO, 90.0% (251/279) vs. OV, 87.5% (238/272); $P=0.36$]. We conclude that Double-Ovsynch increased fertility of lactating cows compared to a Standard

Ovsynch protocol when used for resynchronization of ovulation. Supported by Hatch project WIS01171

Key Words: Double–Ovsynch, resynchronization

243 Effect of parity on pedometer activity at estrus in dairy cows.

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The increase in walking activity seen around estrus in cows has led to the use of pedometers as an estrous detection aid. While the increase in activity is clearly established, results on the effect of age or parity are less clear with studies reporting both increases and decreases in activity with increasing age or parity. The aim of this study was to determine the effect of parity on pedometer activity in Holstein Friesian cows in an automatic milking system and housed throughout lactation. All animals were maintained within the University of Nottingham commercial dairy unit in a free stall system with free access to robotic milking machines. Cows were fed an ad lib total mixed ration with additional concentrates supplied at milking according to yield. Each cow was fitted with a pedometer and activity data downloaded at each milking. Data was analyzed over a four year period from a total of 59 cows in which data was available three successive lactations for each cow (lactation 1 - 3, n=25; lactation 2 - 4, n=18; lactation 3 - 5, n=16). For each cow, a mean value for peak pedometer activity at all estruses was determined over each successive lactation. Peak pedometer activity (steps per hour) at estrus was highest during 1st lactation (331±20) and declined during 2nd (273±16; P<0.05) and 3rd (233±10; P<0.01) lactations. No further decline was seen during 4th (215±13) or 5th (211±32) lactation. There was no significant effect of year of study on pedometer activity (P>0.4). These results indicate a decrease in pedometer activity at estrus over earlier lactations that stabilizes in older cows. The magnitude of this decline is of importance in determining the level of activity that constitutes an estrous episode in cows of different ages.

Key Words: cow, estrus, pedometer

244 Effect of body condition score on milk yield, milk composition and reproductive competence during the service period of Holstein-Friesian dairy cattle.

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The aim of this experiment was to compare the effect of body condition score and body condition change on milk yield, milk composition, postpartum interval to insemination, ovarian activity and conception rate. This experiment was completed using 90 multiparous Holstein-Friesian cows in the same management system over the serving period at Butland Farm, Dorset, UK. There was no significant effect of body condition change at 50 pp on mean condition score (1 to 5), L 2.46, S 2.36, G 2.47 (sem 0.078), milk yield at first service (kg/d), L 40.9, S 44.1, G 42.9 (sem 1.02), milk fat yield at first service (kg/d), L 2.01, S 2.16, G 2.04 (sem 0.077), or third service (kg/d), L 1.37, S 1.66, G 1.60 (sem 0.082), milk protein yield at first service (kg/d), L 1.23, S 1.26, G 1.31 (sem 0.027) or second service (kg/d), L 1.10, S 1.26, G 1.20 (sem 0.026). Milk yield at second service was significantly different between body condition change groups (kg/d), L 34.5, S 41.3, G 39.3 (sem 0.96), P<0.05, and third service (kg/d), L 27.7, S 39.5, G 37.5 (sem 1.55) P<0.05, milk fat at second service (kg/d), L 1.53, S 1.88, G 1.92

(sem 0.053) P<0.05 and milk protein at third service (kg/d), L 1.37, S 1.70, G 1.60 (sem 0.082) P<0.05. Body condition change groups were not significantly different in PP interval to first service (d), L 66.9, S 59.6, G 58.9, (sem 2.13), PP interval to second service (d), L 106.0, S 88.2, G 85.4, (sem 3.06), PP interval to third service (d), L 120.3, S 116.2, G 116.5 (sem 4.31), all inter-service intervals (d), L 36.1, S 36.1, G 27.5 (sem 1.93), PP interval to conception (d), L 85.2, S 76.3, G 84.0 (sem 4.43) and services per conception (no.), L 1.73, S 1.25, G 2.00 (sem 0.127). Body condition score per se had no significant effect on milk production, milk composition and reproduction. Body condition loss at 50 d pp had a negative effect on milk yield, milk composition and reproduction.

Key Words: reproduction, body condition, milk production

245 Effects of nutrient restriction on ghrelin secretion and cyclicality in dairy heifers.

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Circulating ghrelin (GHR) concentrations are affected by plane of nutrition and may be involved in signaling metabolic status to the reproductive tract. Objectives were to measure daily and peri-prandial plasma GHR concentrations during chronic undernutrition and correlate these changes with dynamic changes in ovarian structures and steroid hormone concentrations. Following an acclimation period (3 wk), Holstein heifers (n=12; 338.0 ± 7.8 kg) were fed ad libitum (WF; n=6) or restricted to 50% of ad libitum intake (UF; n=6) for 7 wk. Body condition scores (BCS) were recorded during wk 1 and 10 and weekly measurements were obtained for: ovarian follicular and luteal development, body weights, plasma GHR and plasma progesterone. Plasma GHR concentrations were also measured during a peri-prandial sampling window (every 15 min between 0500 and 0900, feed was given at 0700) in wk 10 of the experiment. Weekly GHR concentrations were greater in UF than WF heifers (264.9 ± 34.3 vs. 108.3 ± 31.4 pg/ml, respectively; P < 0.05). During the sampling window, plasma GHR concentrations fluctuated over time (P < 0.01) suggesting an effect of feeding. During the sampling window GHR concentrations tended to be greater in UF than WF heifers (119.9 ± 21.5 vs. 64.8 ± 19.6 pg/ml, respectively; P < 0.09). Plasma GHR concentrations and change in BCS were negatively correlated (R²=0.39; P < 0.01) in that heifers that lost the most BCS had the highest concentrations of circulating GHR. Two of the UF heifers (33% of the group) became anestrus by wk 6 of the experiment. Plasma GHR concentrations, however, were not correlated with plasma progesterone or ovarian measurements. In summary, circulating GHR concentrations increased in Holstein heifers during chronic negative energy balance induced by underfeeding. One third of the heifers with elevated plasma GHR concentrations became anestrus although no direct correlations between circulating GHR concentrations and reproductive parameters were detected.

Key Words: ghrelin, dairy

246 The effect of GnRH and an opioid antagonist on pregnancy rate of repeat breeding Holstein dairy cows.

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The objective of this study was to observe the effect of GnRH and naloxone in repeat breeder Holstein dairy cows. In a double blind study 45 repeat breeder Holstein cows were selected from a large dairy

cooperative farm of the highlands of the occident of Mexico. All cows presented a history of repeat breeding, and further more, during palpation the presence of an ovarian cyst was detected. Divided at random in three groups of 15 cows. Group one was treated with 100 µg GnRH im on the oestrus day of insemination. Group 2 was treated with naloxone, 5 mg im at 12 hour intervals for three consecutive days, treatment commenced since one day before insemination. Group 3 was used as a control injected with 5 ml im of saline solution at 12 hour intervals for three consecutive days, injections commenced since one day before estrual insemination. Cows were inseminated twice (12 h apart) according to the AM-PM rule and pregnancy was confirmed by rectal palpation between 12 and 18 weeks after the last insemination. Pregnancy rates in GnRH treated repeat breeder cows was 56%, while pregnancy rate in naloxone treated cows was 89% ($p < 0.01$) and control cows showed a 20% pregnancy rate. There was a significant correlation between progesterone levels and pregnancy rate in all groups. It was concluded that opioids participate significantly in the expression of estrous behaviour and ovulation in repeat breeder Holstein cows.

Key Words: GnRH, naloxone, dairy

247 Use of OVSYNCH and alternative protocols to synchronize estrus and ovulation in dairy cows managed in a seasonal grass-based system. M. M. Herlihy^{*1,2}, M. A. Crowe², M. G. Diskin³, and S. T. Butler¹, ¹*Teagasc Moorepark DPRC, Fermoy, Co. Cork, Ireland*, ²*SAFVM, University College Dublin, Ireland*, ³*Teagasc, APRC, Athenry, Co. Galway, Ireland*.

Lactating dairy cows ($n=1,623$) were enrolled in a study to evaluate estrus/ovulation synchronization protocols. Cows in each herd ($n=8$)

were divided into 3 groups based on days in milk (DIM) at mating start date (MSD): Group 1, 2 and 3 animals were ≥ 42 , 21-41 and 0-20 DIM at MSD. At 10 d before MSD Group 1 animals were sorted by parity and calving date and randomly assigned to: 1) d -10 GnRH (10 µg i.m. Buserelin) and CIDR insert (1.38 g P4); d -3 PGF_{2α} (25 mg i.m. dinoprost); d -2 CIDR out and AI at observed estrus (CIDR_OBS); 2) same as CIDR_OBS, but GnRH 36 h after CIDR out and TAI (timed AI) 18 h later (CIDR_TAI); 3) same as CIDR_TAI, but no CIDR (OVSYNCH) or 4) Untreated Controls (CTL). The efficiency of each protocol was assessed by measuring plasma P4 on d 0 and 11 ($< 1\text{ng/mL}$ = low; $\geq 1\text{ng/mL}$ = high). The numbers of visible corpora lutea and follicles per cow were counted by ultrasound before assignment to treatment. Treatment facilitated estrus/TAI on day 0 (MSD), day 21 and day 42 for Group 1, 2 and 3. The proportion of cows with low P4 on d 0 was similar (0.99, 0.99, and 0.97 for CIDR_OBS, CIDR_TAI and OVSYNCH). The proportion of cows with elevated P4 on d 11 was highest ($P < 0.001$) for CIDR_TAI (0.88, 0.97, and 0.89 for CIDR_OBS, CIDR_TAI and OVSYNCH). Treatment affected ($P < 0.05$) conception rate to first service (CRFS) (53.7, 49.4, 42.6 and 49.3% for CIDR_OBS, CIDR_TAI, OVSYNCH and CTL). CRFS was greater ($P < 0.001$) for cows with a CL at the time of treatment than for those that did not (53 vs. 44%). Calving to service interval was shorter ($P < 0.001$) for CIDR_TAI and OVSYNCH compared with CIDR_OBS and CTL. Calving to conception interval was 8 days shorter ($P < 0.01$) for CIDR_TAI compared with CTL (76 vs. 84 days). Estrus and ovulation synchronization protocols were effective at achieving earlier first service and conception in grass-based seasonal calving dairy herds.

Key Words: estrus synchronization, TAI, dairy cow

Ruminant Nutrition: Feedlot, Byproduct Feeds

248 Effects of ruminally degradable N in diets containing wet corn distillers grains and steam-flaked corn on feedlot cattle performance and carcass characteristics. C. H. Ponce^{*1}, M. S. Brown¹, N. A. Cole², C. L. Maxwell¹, and J. C. Silva¹, ¹*Feedlot Research Group, West Texas A&M University, Canyon*, ²*USDA ARS Conservation and Production Research Laboratory, Bushland, TX*.

Assessment of degradable N needs in diets containing wet corn distillers grains with solubles (WCDGS) is needed to aid the cattle industry in managing feed costs. Yearling steers ($n = 525$; initial weight = 373 +/- 13 kg) were housed in 54 pens (9 to 10 steers/pen) and received treatments in a 2 x 3 + 1 factorial. Factors included WCDGS (15 or 30% of DM) and non-protein N (NPN; 0, 1.5, or 3.0% of DM) from urea. The control diet without WCDGS contained 3.0% NPN (1.06% urea) and cottonseed meal. Steers were fed twice daily for 129 d and WCDGS was obtained three times/week from a local plant. Final shrunk BW was less ($P < 0.02$) for 30% WCDGS than for the control or 15% WCDGS. Overall DMI was not different ($P > 0.31$) between the control diet and 15 or 30% WCDGS, but overall DMI increased linearly ($P = 0.04$) as NPN increased. Overall ADG and gain efficiency were affected by both WCDGS and NPN (interaction, $P < 0.12$). Overall ADG for steers fed 15% WCDGS was greater for 1.5 and 3.0% NPN than for 0% NPN ($P < 0.07$, quadratic); however, ADG was not influenced by NPN for 30% WCDGS. Overall ADG was not different between the control and 15% WCDGS, but ADG was lower ($P < 0.02$) for 30% than for 15% WCDGS. Overall gain efficiency among steers fed 15% WCDGS was greatest for 1.5% NPN and least for those fed 0% ($P < 0.07$, quadratic),

whereas gain efficiency decreased linearly ($P < 0.09$) as NPN increased in 30% WCDGS diets. No interactions between WCDGS and NPN were evident for carcass traits. Dressing percent was greater ($P < 0.01$) for the control diet than for 15% or 30% WCDGS (65.1, 64.2, and 63.9% for control, 15% WCDGS, and 30% WCDGS, respectively). Hot carcass weight was not different between the control and 15% WCDGS ($P = 0.44$), whereas carcass weight was less for 30% WCDGS than for 15% WCDGS ($P < 0.01$). Other carcass measurements were not different among treatments. Data suggest that optimum performance occurs between 1.5 and 3.0% NPN when diets contain 15% WCDGS, and with 1.5% NPN or less when diets contain 30% WCDGS.

Key Words: protein, beef cattle, byproduct feeds

249 Evaluation of lighter density fraction from dried distillers grains with solubles as a feedstuff for ruminants. J.M. Greene^{*1}, R. Srinivasan², and B.J. Rude¹, ¹*Animal and Dairy Sciences, Mississippi State University, Starkville*, ²*Agricultural and Biological Engineering, Mississippi State University, Starkville*.

A novel combination of sieving and air classification has been developed to separate dried distillers grains with solubles (DDGS) into different fractions based upon density and size. The lighter fractions have greater fiber than the original DDGS. The objective of this trial was to evaluate the lighter fraction of DDGS as a possible feedstuff for cattle diets. Angus and Hereford ($n = 12$; 238 ± 5.74 kg) steers were randomly