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

Table 1. Pregnancy Rates at 40-41 Days after First Insemination

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

* Different ($P < 0.01$) from herd 1.
** Different ($P < 0.05$) from Cosynch-48 and Ovsynch.

Key Words: Pregnancy Rates, Presynchronization, Ovsynch

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

The reported results of the effect of deep intra-uterine horn insemination on conception rate (CR) in cattle is equivocal. Some reports indicate an improvement while others report no improvement in CR. The objective of this study was to determine the effect of bi-lateral uterine horn artificial insemination (AI) on CR in dairy cows. This study was carried out over two years involving 6 commercial inseminators in each year, 4 of which were involved in both years. All inseminators were trained prior to the start of the experiment in each year. Each alternate cow presented for AI in co-operating herds was inseminated by placing all of the inseminate in the body of the uterus (Body) or by placing 50% of the inseminate beyond the curvature in each uterine horn (Horn). Data was collected on a total of 1860 inseminations in 37 herds in 2002 and on 1586 inseminations in 24 herds in 2003. Pregnancy diagnosis was performed using ultrasonography at 28 to 60 days post AI. Data were analyzed using PROC CATMOD with terms for AI treatment, year, inseminator, and their interactions included in the model. There was no effect (>0.05) of AI treatment x inseminator x year, treatment x year or inseminator x year on CR. There was a significant effect (P<0.02) of AI treatment x inseminator on CR, with evidence of either an increase (+11.4%; P<0.05), decrease (-4 to -6%; P<0.05) or no effect (P>0.05) of Horn AI on CR for individual inseminators. A retrospective analysis of the data for all 61 herds showed that the improvement in CR following Horn insemination was most evident in herds with lowest CR following Body AI. This study indicates that the effect of uterine horn AI on CR is not uniform and is inseminator dependent and may be ameliorated by the inherent level of herd fertility. Further studies are required to investigate the technique x inseminator interaction before any general recommendation could be made.

Key Words: Semen, Placement, Conception

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

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

Key Words: Ultrasound, Score, Fertility

Production, Management and the Environment: Reproduction and Behavior

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

In general, weather influences reproductive performance in dairy cattle. The objective of this study was to determine the effects of temperature and humidity on conception rate in small holder crossbred Holstein dairy herds in the tropics. Data from primiparous and multiparous dairy cows from 513 herds in northern part of Thailand, during January 2001 to November 2002, were used. Monthly average weather data, including minimum and maximum of both temperature and humidity, were collected from Thai Meteorological department. Data were analyzed by creating generalized estimating equation (GEE) using PROC GENMOD (SAS version 8). The final data included 8,096 observations from 3,425 cows. For univariate analysis, all weather data except for the maximum temperature factor were negatively related to the risk of conception ($P < 0.01$). The final model included minimum daily temperature (P<0.01) and maximum daily humidity (P=0.09). The increasing of either minimum temperature or maximum humidity caused decreasing conception occurrence. Based on monthly average weather data, we concluded that cows have the lowest conception rate during June to August in Thailand.

Key Words: Temperature and Humidity, Conception, Dairy Cows

425 Diameter of head of tail as a negative energy balance indicator in relation to reproductive performance in dairy cows. K. Kreausukon*, V. Punyapornwithaya, W. Posuya, and W. Suriyasathaporn, *Clinic of Ruminant, Faculty of Veterinary Medicine, Chiang Mai University, Chaing Mai Province, Thailand.*

Body Condition Scoring has been used as a management tool for evaluating negative energy balance in dairy cows. However, the efficiency of the scoring is based on each practitioner. The objective of this study was to determine the use of diameter of head of tail (DHT) parameter in relation to body weight (BW), body condition score (BCS), and reproductive performance in dairy cows. Data from sixty -five crossbred Holstein-Friesian cows calving during July to November 2003 from 31 farms in Mae-On sub-district, Chiangmai province were used. The DHT were measured at the 1st coccygeal by using vernier calipers. Data of DHT, BW, and BCS were collected before and after parturition, and data on calving date and first insemination date were recorded for calculated day to first service. The maximum losses of DHT, BCS, and BW, were found at 6 weeks after parturition. Subsequently the data at 6 weeks was used and analyzed by Pearson Correlation Coefficients. Results showed that loss of DHT was positively related to loss of BCS, loss of BW, and day to first service ($P < 0.01$). In conclusion, measuring DHT before and after parturition can be used as a management tool in dairy farms.

Key Words: Diameter of Head of Tail, Day to First Service, Dairy Cows

426 Can acceptable pregnancy rates be achieved using exclusive timed artificial insemination for first service? M. B. Capel*[1], D. V. Nydam[2], and R. Saltman[3], [1]*Perry Veterinary Clinic,* [2]*NYS College of Veterinary Medicine,* [3]*Pfizer Animal Health.*

The goal of this study was to determine if acceptable pregnancy rates can be achieved using exclusive timed artificial insemination for first service. The study was conducted on a commercial dairy milking 1,900 cows. Rolling herd average, heat detection rate, and pregnancy rate (defined as the proportion of cows open and eligible for breeding that become pregnant per 21-day period) were 11,200 kg, 67%, and 20% for the previous year, respectively. The breeding program for the past two years was a prostaglandin (PGF2α) injection at 30-36 days in milk (DIM) and 14 days later (Pre-Synch). All cows not bred by natural heat detection after a 46 day voluntary waiting period (vwp) were given GnRH at 57-63 DIM, PGF2 α 7 days later, GnRH 2 days later, and bred 12-16 hours later (Ov-Synch). This program served as the control group for the trial. The treatment program was a Pre-Synch, Ov-Synch program with no natural heat detection on first service that started at 9-15 DIM. The treatment group also had a 46 day vwp, and 100% of the treatment group cows were bred by 52 DIM. All cows present on the farm at 9-15 DIM were enrolled in the study. Cows in both groups found open at pregnancy examination were placed on Ov-Synch either the same day if a corpus luteum was detected by rectal palpation, or in one week if one was not detected. The sample size for the study was 1049 cows. Pregnancy rates for both groups presented in the following table indicate that it is biologically possible to achieve high pregnancy rates using exlusive timed artificial insemination for first service beginning at 46 DIM.

DIM	Treatment Group Pregnancy Rate	95% Confidence Interval	Control Group Pregnancy Rate	95% Confidence Interval
46-66	30	25.9-34.5	20	16.7-23.1
67-87	18	14.1-21.5	28	24.2-32.3
88-108	25	20.6-30.2	21	16.4-25.5
109-129	21	15.5-27.4	23	17.6-29.5
Total	25	22.1-27.2	23	20.5-25.4

Key Words: OvSynch, Pregnancy Rate, Breeding

427 System for in vitro production with sexed sperm in commercial dairy herds. R. D. Wilson*[1], K. A. Weigel[1], P. M. Fricke[1], M. L. Leibfried-Rutledge[2], D. L. Matthews[1], V. R. Schutzkus[1], and J. J. Rutledge[1,2], [1]*University of Wisconsin, Madison,* [2]*BOMED Inc., Madison, WI.*

Our objective was to research a system exploiting the synergy among ovulation (estrus) control, sexed sperm and in vitro production for replacement heifers production on commercial farms. Holstein cull cows (n=104) were selected by herd owners for use as donors, and ovaries were collected via colpotomy or at slaughter. Oocytes (n=4542) were aspirated from the ovaries and used to produce embryos in vitro using sex-sorted sperm from 3 Holstein sires. Seven Wisconsin herds participated and 365 embryos were produced (3.5 $\pm$ 0.4 transferable embryos per donor) although only 272 embryos were transferred (fresh) due to limited availability of recipients. Embryos were transferred into recipients 6, 7, or 8 d after recipients either expressed estrus or ovulation occurred (i.e. Ovsynch synchronization). Recipients cows that showed standing estrus had a conception rate of 16.3 %, while those resulting from a synchronization program had a mean conception rate of 20.0%. Recipient heifers (all in standing estrus) had conception rate of 34.2%. Conception rates for female in vitro produced embryos were lower ($P<0.005$) than timed artificial insemination in cows and heifers (24.3% and 36.1% respectively). For the last 124 embryo transfers, GnRH (100μg, IM) was randomly administered recipients immediately after embryo transfer. Farm, GnRH, embryo sire, and season had significant effects on conception rate. To date 28 full term calves have been born; 89% were female. Mean lifetime net merit of donor cows was \$122 $\pm$ 17, while that of recipients was \$130 $\pm$ 13. Therefore, additional replacement heifers can be produced using selected cull cows as donors, with little or no adverse effect on genetic merit of the herd. These results suggest that in vitro production has promise as an early system for utilizing sexed semen in dairy cattle breeding programs. However models of implemetation should continually be investigated, a working model will be beneficial to the dairy industry.

Key Words: Sex-Sorted Sperm, In Vitro Production, Holstein Cattle

428 Effect of clinical mastitis and other diseases on reproductive performance of Holstein cows. F. Frago[1], A. Ahmadzadeh*[1], B. Shafii[1], J. C. Dalton[2], M. A. McGuire[1], and W. J. Price[1], [1]*University of Idaho, Moscow,* [2]*University of Idaho, Caldwell Research & Extension Center, Caldwell.*

This study investigated the effect of clinical mastitis and its interaction with other diseases on reproductive performance of lactating Holstein cattle. Data were collected from cows that calved between June 2001 and October 2003. Retrospectively, cows (n=963) were divided into four groups: clinical mastitis with other diseases (group 1), clinical mastitis only (group 2), other diseases only (group 3), and healthy cows (group 4). Days in milk at first service (DIMFS), services per conception (S/C), days open (DO), and proportion of cows that remained open by 220 DIM were analyzed. Groups 1 and 2 had higher ($P < 0.05$) S/C compared to group 4 (2.8 $\pm$ 0.4 and 2.1 $\pm$ 0.1 vs. 1.6 $\pm$ 0.1, respectively). Moreover, groups 1 and 2 had higher ($P < 0.05$) DO compared to group 4 (155 $\pm$ 15 and 107 $\pm$ 5 vs. 88 $\pm$ 2, respectively). Based on non-linear exponential decay model, the rate by which animals became pregnant over time was lower ($P < 0.05$) for groups 1, 2, and 3 compared to group 4. Moreover, the proportion of cows that remained open by 220 DIM was higher ($P < 0.05$) in groups 1, 2, and 3 compared to group 4. There was no difference in DIMFS among groups possibly due to programmed breeding. Mastitis affected ($P < 0.05$) S/C and DO only when clinical mastitis occurred after 105 DIM. Time of mastitis occurrence had no effect on DIMFS. Results suggest that reproductive efficiency was decreased by the presence of clinical mastitis in that a greater proportion of cows with mastitis remained non-pregnant over time. Furthermore, the negative effects were exacerbated when cows experienced both clinical mastitis and other diseases.

Key Words: Clinical Mastitis and Other Diseases, Reproductive Performance, Dairy Cow

429 Use of audible Doppler and B Mode ultrasonography to monitor fetal heart rate of hair sheep in the tropics. R. W. Godfrey*[1], L. Larsen[1], A. J. Weis[1], and S. T. Willard[2], [1]*University of the Virgin Islands, Agricultural Experiment Station, Kingshill, VI,* [2]*Department of Animal and Dairy Sciences, Mississippi State University, Mississippi State.*

There is little information available on the fetal development of hair sheep in a tropical environment. The objective of this study was to compare measurements of crown-rump length (CRL) and fetal heart rate (FHR) throughout gestation using B-mode and Doppler ultrasonography in hair sheep. St Croix White, Barbados Blackbelly and Dorper X St. Croix White ewes (n = 54) were bred to St Croix White, Dorper, Barbados Blackbelly and Dorper X St. Croix White rams. Fetal measurements were collected weekly starting 28 d after a successful mating. Linear array B-mode ultrasonography (5 and 7.5 mHz) was used to measure CRL and visual FHR and Doppler ultrasonography was used to measure audio FHR. Due to the size of the fetus CRL was not measurable after 42 d of gestation and visual FHR was not measurable after 70 d. Audio FHR was not consistently measurable before 35 d but could be measured through 140 d of gestation. There was no effect ($P > 0.10$) of breed of dam or sire on CRL or FHR. Single lambs had higher CRL ($P < 0.01$) than twin or triplet lambs at d 35 and 42 of gestation. There was no difference ($P > 0.10$) in visual or audio FHR between single, twin and triplet lambs. Visual FHR was higher ($P < 0.09$) than audio FHR at 28, 42 and 49 d of gestation. Audio FHR and days of gestation of singles, twins and triplets had a linear relationship ($y = 255.44 - 0.392(x)$, $r^2 = 0.15$). Crown-rump length and days of gestation of singles, twins and triplets had a linear relationship ($y = -3.43 + 0.17(x)$, $r^2 = 0.59$). The relationship between days of gestation and visual FHR of single, twin and triplet lambs was best described by a cubic equation ($y = -531.19 + 39.56(x) - 0.62(x^2) + 0.002(x^3)$, $r^2 = 0.37$). These results indicate that FHR can be monitored using Doppler ultrasonography for a longer period of time during gestation in hair sheep than either visual FHR or CRL measured by B-mode ultrasonography.

Key Words: Sheep, Ultrasound, Fetus

430 Effect of time of feed delivery on the feeding and lying behavior of lactating dairy cows. T. J. DeVries* and M. A. G. von Keyserlingk, *The University of British Columbia, Vancouver, BC, Canada.*

Feeding activity of group-housed dairy cows is highest during the day, with peak feeding times occurring in the morning and late afternoon immediately after milking and delivery of fresh feed. What is unclear is whether it is the return from milking or delivery of fresh feed that has the greatest effect on stimulating cows to feed. The objectives of this experiment were to determine: 1) which of these management practices has the greater ability to stimulate dairy cattle to go to the feed alley, and 2) the effect of moving the time of feed delivery away from milking on the feeding and lying behavior of dairy cows. These objectives were tested by separating feeding and milking times, and monitoring the changes in feeding and lying behavior of free stall housed cows. Forty-eight lactating Holstein cows were subjected to each of two treatments in a 2 x 2 cross-over design replicated over time. The treatments were: 1) milking and feeding time coinciding, and 2) feeding 6 h post milking. Cows were milked twice daily at 0500 h and 1700 h. Time-lapse video was used to quantify the lying time of the cows and an electronic feed alley monitoring system was used to monitor the feeding behavior of the cows. When animals were fed 6 h post milking, they increased ($P = 0.02$) their daily feeding time by 12.5%. This change was predominantly driven by a 26% decrease ($P = 0.006$) in the feeding time during the first hour post-milking and a 82% increase ($P = 0.007$) in feeding time during the 60 min following the delivery of fresh feed. Feeding 6 h post milking did not change the daily lying time of the cows ($P = 0.9$), however, cows that did not have fresh feed upon return from milking lay down 20 min sooner ($P < 0.001$) after the return from milking. These results indicate that the delivery of fresh feed has a greater impact on stimulating cows to go to the feed alley than does the return from milking. Additionally, these results indicate that feeding and lying behavior of dairy cows are affected by changes in feeding management.

Key Words: Feeding Time, Feeding Behavior, Dairy Cows

431 Impacts of grouping and space during gestation on body-condition and lesion scores and performance of sows. J. L. Salak-Johnson*, S. R. Neikamp, S. E. Curtis, and S. L. Rodriguez-Zas, *Department of Animal Sciences, University of Illinois, Urbana.*

Knowledge of impacts of grouping and floor space treatment during gestation on sow state-of-being and performance is limited. Objectives were to determine effects of individual (crate) vs group (pen) housing and optimal space allowance for grouped dry sows based on state-of-being and performance. At d27 of gestation, 5 sows per treatment were allocated to crate or group pen. Space in 3 pen treatments was 15, 25, or 35 ft^2/sow, respectively. Sows in 6 replicates over 2 parities (n=120) were evaluated. Body condition (BCS) and lesions (LS) scores, health/injury, and lameness were assessed every 3 d the first 3 wk then weekly, thereafter. Productive performance was based on BW gain, backfat (BF) and farrowing data. Many significant treatment, day, parity, and interaction effects on performance occurred, but only treatment effects and linear and quadratic contrasts are reported. Overall, treatment affected BCS and LS ($P<0.0001$); BCS was highest ($P<0.0001$) in crated sows. Crated sows also had lower ($P<0.0001$) LS regardless of body location. In grouped sows, there were many significant linear and quadratic contrasts. Grouped sows at 15 ft^2/sow had higher ($P<0.001$) LS at ears, head, neck, shoulder, back, rear, perineum-vulva, side than sows grouped at 25 or 35 ft^2/sow that typically did not differ. Sows grouped at 35 ft^2/sow had higher ($P<0.001$) BCS than those at 15ft^2/sow. Overall, treatment affected BW and BF ($P<0.0001$); grouped sows at 25 and 35 ft^2/sow were heavier and had deeper BF than other sows. Crated sows weaned fewer ($P<0.02$) pigs than did grouped sows at 35 ft^2/sow. There were no overall treatment effects on total pigs born and born alive, or various litter performance measures, but there were quadratic trends among pen treatments ($P=0.05$). Sows at 25 ft^2/sow had smaller litters, pigs of lower birth wt and fewer weaned than those at 35 ft^2/sow. So, both grouping sows and space allowance during gestation influenced numerous measures of sow and litter performance.

Key Words: Sow, Gestation, Housing

432 Relationships between measures of temperament and carcass traits in feedlot steers. R. C. Vann*[1], J. C. Paschal[2], and R. D. Randel[3], [1]*MAFES-Brown Loam Experiment Station, Raymond, MS,* [2]*TAMU-Cooperative Extension Service, Corpus Christi, TX,* [3]*TAMU-Texas Agricultural Research and Extension Center, Overton, TX.*

The objectives of this study were to evaluate effects of exit velocity (EV, m/s), chute temperament score (CS; 1=calm, no movement to 5=jumping and rearing; highly agitated) and pen temperament score (PS; 1=non-aggressive, not excited by humans to 5=aggressive, runs into fences and at humans if approached) and measure relationships between EV, CS and PS taken at two times near weaning (T1=21 d after weaning and T2=90 d later) with carcass traits and warner-bratzler shear force (WBS) values in feedlot steers. Crossbred steers (n=58) were assigned a PS, calves were weighed and assigned a CS, restrained in a cattle restraint chute then released and time recorded to travel 1.83 m. Sire consisted of one Brangus and several Angus sires. Least square means were obtained from PROC Mixed with main effects of sire breed, harvest date and age of dam. Sire breed was not a significant source of variation for EV, PS, CS, or carcass traits of longissimus muscle area (LMA), and back fat (BF); however, Brangus-sired steers had greater intramuscular fat (IMF; $P < 0.06$) at weaning and greater carcass longissimus muscle area per hundred weight (LMACWT; $P = 0.03$) and a higher USDA Yield grade ($P < 0.05$). The r between EV and PS at T2 was 0.61 ($P < 0.001$). The r between EV at T1 and WBS was 0.28 ($P < 0.03$) and EV at T2 and WBS was 0.34 ($P < 0.0095$). The r between EV and CS at T2 was 0.43 ($P < 0.008$). The r between PS at T1 and WBS was 0.24 ($P < 0.07$) and at T2 was 0.35 ($P < 0.008$). The regression coefficients between EV and WBS at T1 was 0.37 ($P < 0.04$) and at T2 was 0.57 ($P < 0.0095$) and PS and WBS at T1 was 0.39 ($P < 0.07$) and at T2 was 0.47 ($P < 0.008$). In conclusion, sire breed was not a significant source of variation in exit velocity. As exit velocity and pen score increased WBS values also increased.

Key Words: Feedlot Steers, Temperament, Carcass

433 Temperament alters adrenal response to exogenous ACTH in Brahman heifers. K. O. Curley, Jr.*[1,2], D. A. Neuendorff[2], A. W. Lewis[2], J. J. Cleere[2], T. H. Welsh, Jr.[1], and R. D. Randel[2], [1] *Texas Agricultural Experiment Station, College Station,* [2] *Texas Agricultural Experiment Station, Overton.*

The objective of this study was to compare adrenal responsiveness to stimulation with exogenous ACTH, in calm and temperamental heifers. Two-year old, spring born Brahman heifers comprised the two temperament groups that were selected using exit velocity (EV). The calm (C) and temperamental (T) groups consisted of the 6 slowest (EV=1.05±.05 m/sec) and 6 fastest (EV=3.14±0.22 m/sec) two-year old heifers within the herd. Blood samples were collected via indwelling jugular cannula for 6h pre- and 6h post- administration of ACTH (0.1 IU/kg BW). Sampling intervals were 15min throughout the 12h except for the final 180min; when the sampling intervals were 30min. Serum cortisol (CS) concentrations were determined via RIA. Pearson correlation coefficients and ANOVA were used for statistical comparisons. Basal CS, determined as the mean concentration (ng/mL) within the 1h period prior to ACTH challenge, was correlated to EV (r=.87; P<.001) and differed (P<.001) between temperament groups (C=4.5±.7 and T=18.7±2.9). Following ACTH challenge, both peak CS and time to reach peak CS did not differ between temperament groups. Temperament influenced (P<.001) the increase, induced by the ACTH challenge, from basal CS (C=1375±215 and T=310±94%). A negative correlation was found between EV and % increase in CS (r=-.83; P<.001) increase. Time to return to basal CS was also influenced (P<.001) by temperament group as C took longer than T heifers (C=268±10 and T=154±18min). The area under the curve following the return to basal CS was not influenced by temperament (C=7548±644 and T=8464±428ng*min/mL), indicating that the CS concentrations in the temperamental heifers continued to decrease below basal concentrations. As poor temperament relates to increased basal adrenal activity and muted responsiveness to pharmacological stimulus, temperament does affect stress mechanisms. Exit velocity can be used as an indicator of temperament and predictor of adrenal response to ACTH.

Key Words: Temperament, ACTH Challenge, Exit Velocity

PSA - Environment and Management: Layer Management

434 The impact of layer dietary threonine levels on egg component yield, composition, and functionality. P. R. Niemeyer*, C. D. Coufal, and J. B. Carey, *Texas A&M University, College Station.*

Over 20 weeks, one hundred 35 week old Single Comb White Leghorn laying hens were housed individually in an open sided laying facility with groups of 5 hens sharing access to a common feed trough. A typical layer diet (diet A) containing 0.56% threonine was fed to control hens. Four experimental diets containing additional levels of threonine were fed for 18 weeks. Diets B, C, D, E, contained threonine at levels of 0.66%, 0.76%, 0.86%, and 0.96% respectively. Egg samples were analyzed for egg weight, shell strength, and yolk and albumen yield, protein content, solids, and functionality. Albumen and yolk were kept separate and pooled by nutritional treatment, homogenized and analyzed for protein content and solids. Eggs were sampled at weeks 3, 10, and 16 for angel and sponge cake. Yolk and albumen were separated and pooled by nutritional treatment to make three replicates each of sponge and angel food cakes. Results were recorded by rapeseed displacement. Cake samples were cored, five cores per cake and subjected to double compression on the Instron Universal Testing machine. Cakes were measured for hardness, cohesiveness, springiness, gumminess, and chewiness. Yolk protein content was found to be significantly higher in diets C, D, and E, when compared to diets A and B. Yolk solids showed no significant differences over the dietary treatments. Sponge cake rapeseed displacement yielded no differences among diets. Albumen protein content was found to be significant higher in diets C and E when compared to the other diets. Diet E was found to have significantly higher albumen solids and angel cake rapeseed displacement when compared to the other dietary treatments. These data clearly indicate a potentially important impact of threonine nutrition of laying hens on LE yield, composition, and functionality.

Key Words: Threonine, Liquid Eggs, Egg Composition

435 Single and combined effects of yeast cell wall residue and Sel-Plex® on production and egg quality of laying hens. V. G. Stanley*[1], W. F. Krueger[2], and A. E. Sefton[3], [1] *Prairie View A&M University, Prairie View,* [2] *Texas A&M University, College Station,* [3] *Alltech, Guelph, ON, Canada.*

The objectives of the study were to examine the effects of yeast cell wall residue (Bio-Mos) and Sel-Plex, single and combined on egg production and egg quality from 37-wk-old White Leghorn hens for 4 wk in a completely randomized designed experiment. Hens were reared in cages, 2 hens per cage, and fed the same corn-soybean based layer diet, supplemented with either Bio-Mos (2 kg/ton) or Sel-Plex (1 lb/kg) and combined with 16% CP , 2,800 kcal ME/kg, 3.5% Ca and .6% P. Hen-day egg production from the Sel-Plex-fed hens was significantly higher (P<.05) than the control (88 vs 81%) and Bio-Mos (83.2%). Egg production of the Bio-Mos plus Sel-Plex-fed hens was also significantly higher (90%) than the control (81.4%). Eggs from the Sel-Plex-fed hens weighed significantly more (68.13 g), had heavier yolks (31.9 g) and albumen (59.8 g), compared to the control [63.20%, 18.12 g (28.7%), and 35.03 g (55.4%), respectively]. Sel-Plex plus Bio-Mos-fed hens produced yolk (20.68 g) and albumen (39.02 g) significantly heavier than control (18.12% and 35.51%, respectively). Eggs from the Bio-Mos-fed hens were significantly heavier than the control (65.41g vs 63.21g). However, yolk and albumen weights from the Bio-Mos-fed hens [19.42g (29.7%) and 35.91g(54.9%), respectively] did not differ significantly from the control [18.12g (28.7%) and 35.51g (56.2%), respectively]. Hens fed Bio-Mos supplemented-feed had significantly larger eggs (65.41g), yolk [19.38 g (29.6%)] and albumen weight [35.93g (54.93%)] compared to the control [63.14g, 18.07g (28.62%), 35.47g (56.18%), respectively]. Cholesterol concentration per gram of whole egg was significantly lower for the Sel-Plex-fed hens (193.2 mg/dL) compared to the control (236.1 mg/dL). Egg cholesterol concentration from the Bio-Mos plus Sel-Plex-fed hens was also significantly lower (211.2 mg/dL) than the control (236.1 mg/dL). The results suggested that Sel-Plex had beneficial effects on egg production, egg size, and egg cholesterol concentration and there appears to be a synergistic effect of Bio-Mos and Sel-Plex on egg production.

Key Words: Sel-Plex, Bio-Mos, Laying hens

436 Beak trimming of Leghorn pullets 2: Healing and beak re-growth. C. B. Annett*, K. Schwean-Lardner, and H. L. Classen, *Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, SK, Canada.*

Beak trimming of White Leghorn pullets is performed in an attempt to reduce cannibalism and improve performance in the flock. This procedure, when optimally performed, removes the rostral portion of the beak, including the epidermis, innervated and vascularized dermis and bone of the maxilla and mandible. The objective of this study was to observe histological healing and neuroma formation and measure regrowth of beaks from two strains of pullets that had been beak trimmed at the hatchery, or trimmed on farm at 10d or 35d of age. Six beaks (2 trimmed of each strain and 1 each of untrimmed) were collected at 1d, 10d, 30d and 210d post trim and placed in 10% buffered formalin. Following fixation, beaks were trimmed saggitally and the medial aspect trimmed to 3-5 mm, mounted and stained with haematoxylin & eosin for histological examination. Healing was rated on a graded scale of 1 (no healing) to 7 (no lesions). At 2d, 86d and 43 wk of age, Vernier calipers were used to measure beak length from the rostral nares to the beak tip in 40 birds per treatment per strain. Data were analyzed as a 2 X 4 factorial analysis, with Duncans Multiple Range Test separating means when ANOVA was significant. No healing was seen in any of the treatment groups at 1d post trim. At 10d post-trim, beaks of pullets trimmed at the hatchery had a significantly improved healing score (4.25) compared to pullets that had been beak trimmed at 10d (1.25) and 35d (1.00) of age, however, by 30d post-trim healing between groups was not different (5.75, 5.50 and 5.00, respectively). Beaks were considered healed at 210d post-trim (6.00, 6.00, 6.00). Neuromas were not identified in any of the beaks examined. There were significant differences in beak length between all groups (untrimmed: 17.7 mm; 0d: 13.5 mm; 10d: 11.7; and 35d: 16.1mm) when measured at 43 wk of