T152 Eating behavior and the decline in feed intake of Holstein cows during the transition period. P. D. French*, M. A. DeGroot, and J. L. Chamberlain, *Oregon State University*, *Corvallis*.

The objective of this study was to determine if eating behavior differs by magnitude of feed intake depression during the transition period. Data were pooled from three experiments involving 73 multiparous Holstein cows that were group housed and fed individually via Calan gates for the three weeks before and after parturition. Within each experiment, cows were ranked by decline in prepartum dry matter intake (DMI) and approximately one-half of the cows were assigned low intake depression (LID) and the remaining cows were assigned to high intake depression (HID). Decline in DMI was calculated as the change in DMI from 3 wk prepartum (average daily DMI from 21 to 15 d prepartum) to 1 wk prepartum (average daily DMI from 7 to 1 d prepartum). Prepartum and postpartum data were analyzed separately. Average decline in prepartum DMI was 5.3 and 31.6% for LID and HID, respectively. Daily DMI was similar for LID and HID until the wk prior to calving when DMI declined more for HID (intake depression x day; $P < 0.01$). Feed intake was associated ($R^2 = 0.45$) with time spent at the feedbunk, which decreased more for HID (50%) compared to LID (25%) over the prepartum period (intake depression x day; $P < 0.01$). Number of visits to the feedbunk did not differ, but LID cows spent more time at the feedbunk per visit (11.4 vs 13.5 min/visit for HID and LID, respectively; $P < 0.01$). Prepartum eating rate was greater for HID (109 vs 94 g DM/min for HID and LID, respectively; $P < 0.01$). During the postpartum period, DMI (16.2 vs 18.2 kg DM/d for HID and LID, respectively; $P < 0.01$), eating time (149 vs 174 min/d for HID and LID, respectively; $P < 0.01$) and feedbunk visits (12.5 vs 13.4 visits/d for HID and LID, respectively; $P < 0.01$) were greater for LID. Results show that the depression in DMI that occurs around the time of parturition coincides with a decrease in eating time per feedbunk visit and therefore daily eating time. This data provides a critical link for the further study of depressed periparturient feed intake.

Key Words: Feed intake, Eating behavior, Periparturient

T153 The simulated economic return of using Ovsynch in dairy herds. P. D. French*, *Oregon State University*, *Corvallis*.

Systematic breeding programs, such as Ovsynch have been developed to improve reproductive performance. Although Ovsynch has been shown to improve pregnancy rates in some studies, the economic viability of this systematic breeding program is often ignored. Therefore, the purpose of this study was to determine the financial impact of Ovsynch at different levels of reproductive performance and milk yield. A computer simulation generated weekly production, reproduction, and cull events for individual cows in a typical herd. Data for 10 herds of 125 cows in milk were generated over 5 years for one of 16 scenarios in a 2 x 2 x 3 factorial arrangement of treatments. Main effects were days open (145 or 160; DO), first service synchronization (Ovsynch or none), and peak milk yield (36, 42 or 49 kg). Pregnancy rates for herds not using Ovsynch were 18.5 and 15.2% for 145 and 160 DO, respectively. Annual income was calculated as the difference between revenue (milk, calf, and cull) and expenses (feed, replacements, interest, and other). Using Ovsynch at first service increased income (+$72.12/cow/yr) for herds at 160 DO, but did not affect income of herds with 145 DO (synch x DO interaction; $P < 0.01$). This increase in income by using Ovsynch at first service in herds with 160 DO was due mainly to an increase in revenue. Response to Ovsynch was similar across level of milk production. The return of using Ovsynch at first service in herds with 160 DO was 6.5:1. Sensitivity analysis was conducted to determine if profit margin would affect the feasibility of Ovsynch. Profit margin did not affect the economic return of Ovsynch. Based on average economic conditions in the US, dairy herds with DO of 160 would benefit from using Ovsynch at first service, whereas herds with DO of 145 will not benefit economically.

Key Words: Days open, Ovsynch, Reproductive losses

T154 Effect of yeast (saccharomyces cervisiae) on prepartum and postpartum dry matter intake and performance of Holstein dairy cows. F. Kafilzadeh* and Y. Ghorbani, *Razi University*, *Kermanshah, Kermanshah, Iran*.

To study the effect of Saccharomyces Cervisiae (SC) on prepartum and postpartum dry matter intake(DMI) and their performance during the early lactation period, sixteen dairy cows (from a herd of 850 lactating cows) in their second parity were used in a completely randomized design (n=8) with two treatments (with and without yeast). Cows were allocated to each treatment randomly based on their milk yield and were fed individually during the experimental period. The experiment started from 3 weeks prepartum and continued until 30 days postpartum. Addition of Sc had no effect (P>0.05) on DMI prepartum while it significantly (P<0.05) increased postpartum DMI. Daily milk yield was significantly (P<0.05) higher in cows fed yeast (30.64 vs. 28.39 Kg/d). Addition of Sc did not have a significant (P>0.05) effect on milk fat or milk lactose while it resulted in an increase (P<0.05)in daily milk fat yield (1.23 vs. 1.04kg/d). Protein percentage (3.59 vs. 3.16) and protein yield were also higher (P<0.05) in Sc fed group. Feed to milk ratio was not significantly (p>0.05) affected by feeding yeast.

Key Words: Saccharomyces Cervisiae, Dairy cow, Postpartum

T155 Effect of extending the voluntary waiting period on lactation performance of Holstein cows. J. A. Rodrigues*[1], R. C. Chebel[1], and J. E. P. Santos[2], [1]*University of Idaho*, *Caldwell*, [2]*University of California*, *Tulare*.

The objective of the present study was to evaluate the effect of extending the voluntary waiting period (VWP) on lactation performance of Holstein cows. Lactating cows were assigned to one of three reproductive protocols during study lactation 1 (VWP treatment applied), being that in two of them the VWP was 49±7 DIM (SV) and in the other it was 73±7 (LV). Only cows conceiving to the first postpartum AI were used in the present study. Therefore, in the present study there were 58 cows in the SV group and 69 cows in the LV group. Cows were milked three times daily and milk yields were recorded for individual cows once monthly, and milk samples were analyzed for somatic cell count (SCC), fat and true protein concentrations. Occurrence of postparturient diseases and mastitis during the first 60 d of lactation 2 were recorded. Data was analyzed using the GLM and CHISQ procedures of SAS. Cows from the SV group had shorter ($P < 0.001$) interval from calving to conception (SV = 55.9 ± 0.5 vs. LV = 73.9 ± 0.5 d), lactation length (SV = 282.9 ± 1.2 vs. LV = 301.4 ± 1.1 d), and calving interval (SV = 11.1 ± 0.03 vs. LV = 11.8 ± 0.03 mo) during lactation 1. Length of the VWP did not affect average daily

milk production (P = 0.29), average fat (P = 0.82) and protein (P = 0.35) concentrations, and average somatic cell count (P = 0.84) during lactation 1. Total milk production during lactation 1 was not affected (P = 0.25) by the length of the VWP period. Average milk yield (P = 0.92), average fat (P = 0.83) and protein (P = 0.66) concentrations, and average somatic cell count (P = 0.33) during the first 3 months of lactation 2 were not affected by the length of the VWP on lactation 1. There was no difference (P = 0.97) in the incidence of mastitis during the first 60 d of lactation 2 between SV and LV cows, but smaller proportion of cows from the LV group tended (P = 0.09) to experience retained fetal membranes during lactation 2 (SV = 8.62% vs. LV = 1.45%). The present study, although with limited number of experimental units, indicates that extending the VWP in approximately 24 d does not affect production of lactating dairy cows.

Key Words: Voluntary waiting period, Lactation performance

T156 Estimating the potential contribution of groups of cows within herds to the total herd milk volume. R. Goodling, K. Griswold*, and T. Beck, *Penn State Cooperative Extenstion*, *University Park*.

The potential contribution of groups of cows within a herd to the total herd milk volume was investigated with DHIA data from 269 Pennsylvania dairy herds comprised of 24,000 Holstein cows. Milk and milk component data were collected for all December 2005 test dates. Data were analyzed using the UNIVARIATE and MIXED procedures of SAS version 9.1. The contribution potential of a cow group to the total herd milk volume was estimated as the difference between the % of the total herd milk volume produced by a defined group of cows and the % of the total number of lactating cows represented by that group of cows. For example, if cows from 41 to 100 DIM represented 25% of the lactating cows and produced 30% of the total herd milk volume, then their contribution potential would be + 5%. The statistical model included the fixed effects of DIM group, herd size group, and average daily milk yield group. DIM groupings were 1 to 40, 41 to 100, 101 to 200, 201 to 300, and 300+. Herd size groupings were < 50 cows, 51 to 100 cows, and > 100 cows. Average daily milk yield groupings were < 23.2, 23.2 – 27.3, 27.3 – 31.8, 31.8 – 36.4, >36.4 kg per cow per day. Contribution potential was affected (P<0.0001) by DIM group with 2.5, 5.7, 3.8, -1.8, and -7.6% for 1 to 40, 41 to 100, 101 to 200, 201 to 300, and 300+ DIM, respectively. A significant (P<0.0001) average daily milk yield group by DIM group interaction was observed with contribution potential decreasing from 2.9 to 1.1% for cows 1 to 40 DIM and increasing from -7.6 to -5.4% for cows 300+ DIM as average daily milk yield increased from < 23.2 to > 36.4 kg per cow per day. There was a trend (P=0.0969) for a herd size group by DIM group interaction with contribution potential for cows < 100 DIM decreasing while contribution potential for cows >100 DIM increased as herd size increased. These results suggest that larger herds and high producing herds are more effective at maintaining the contribution potential of cow groups in later lactation compared to smaller herds and low producing herds.

Key Words: Daily milk production, Herd size, DIM

T157 Effect of feeding method and forage type on herd mean milk urea nitrogen (MUN) levels. K. Griswold*[1], R. Goodling[1], C. Brown[2], T. Nauman[3], N. Kohut[4], L. Yoder[5], and J. Mylin[6], [1]*Penn State Cooperative Extension*, *University Park*, [2]*F. M. Browns Sons, Inc.*, *Birdsboro, PA*, [3]*Hoober Feeds, Inc.*, *Gordonville, PA*, [4]*Purina Mills, Inc.*, *Douglassville, PA*, [5]*Homestead Nutrition, Inc.*, *New Holland, PA*, [6]*Lancaster DHIA*, *Manheim, PA*.

The effect of feeding method and forage type on herd mean milk urea nitrogen (MUN) levels was evaluated using Dairy Herd Improvement Association (DHIA) data from 202 herds in Pennsylvania. All herds using Lancaster DHIA services and having MUN analysis performed on milk samples collected from October 1 to October 31, 2005 were asked to participate in the study. If the herd owner agreed to participate, they then completed a simple survey which indicated their herd size, their feeding method as either total mixed ration (TMR) or, component-fed ration (CFR), and use of different forages including corn silage (CS), haycrop silage (HCS), baleage (BH), and dry hay (DH). Herds ranged in size from 24 to 870 cows, and 122 of the herds used TMR while 80 herds used CFR. Data from 12,718 individual cow records containing test date (TD) MUN, milk, fat%, protein %, SCC, and days in milk (DIM) were analyzed using PROC MIXED within SAS. The model included the fixed effects of TMR, CS, HCS, BS, and DH, and the random effects of herd size and milk production level. Herd mean MUN was greater (P<0.001) for TMR herds compared to CFR herds (14.34 vs 13.55, respectively). Herds feeding CS had a lower (P<0.0119) MUN level compared to herds not feeding CS (13.78 vs 14.11, respectively), and in contrast, herds feeding BH had a greater (P<0.001) MUN level than herds not feeding BH (16.11 vs 15.22, respectively). The results would indicate that herd mean MUN levels may be affected by feeding method and the choice of forages used in the herd ration.

Key Words: MUN, Feeding method, Forage

T158 Effect of synchronization protocols on reproductive performance of Holstein heifers. J. L. Stevenson*[1], R. C. Chebel[1], J. C. Dalton[1], and J. E. P Santos[2], [1]*University of Idaho*, *Caldwell*, [2]*University of California*, *Tulare*.

The objective of the present study was to evaluate different synchronization protocols for Holstein heifers. Holstein heifers (n = 236), between 13±1 mo of age, were assigned to one of four synchronization protocols. Heifers in the CON group received no treatment and were AI upon detection of estrus; heifers in the PGF group received one injection of PGF2a on study d 0 and were AI upon detection of estrus, and those not inseminated by study d 14 received a second injection of PGF2a; heifers in the CIDR group received a CIDR insert on study d 0 for 7 d and an injection of PGF2a at CIDR removal and were AI upon detection of estrus from study d 7 to 10, and those not inseminated by 72 h after PGF received an injection of GnRH and were AI at fixed time; heifers in the TAI group received one injection of GnRH on study d -6, a CIDR insert, and an injection of GnRH and PGF2a on d 0, on study d 7 CIDR was removed and heifers received an injection of PGF2a, and 48 h later heifers received an injection of GnRH and were AI at fixed time. Heifers from CON and PGF groups not inseminated by study d 28 were right censored. Pregnancy was diagnosed at 29±3 and 62±3 d after AI. Data were analyzed using the LOGISTIC, LIFETEST, and GLM procedures of SAS. Treatment affected the interval from enrollment to AI (CON = 13.6±0.9, PGF = 9.6±1.1, CIDR = 10.3±0.1, TAI = 15.0±0.0 days; P = 0.007) and the proportion of heifers not inseminated by study d 28 (CON = 12.7, PGF = 15.9,

CIDR = 0.0, TAI = 0.0%; P = 0.001), and tended to affect the interval from enrollment to conception (CON = 16.4±0.9, PGF = 14.5±1.2, CIDR = 10.6±0.7, TAI = 15.0±0.0 days; P = 0.06). Treatment tended to affect conception rate (CON = 66.1, PGF = 69.8, CIDR = 56.2, TAI = 44.8%; P = 0.10), but did not affect pregnancy rate after a 28 d breeding period (P = 0.63). Heifers from the CIDR group tended to become pregnant at a faster rate.

Key Words: Heifers, Synchronization

T159 Daily variation in somatic cell counts as a measure of management intensity. J. M. Lukas*, L. A. Espejo, M. I. Endres, and J. K. Reneau, *University of Minnesota*, *St Paul*.

Statistical process control measures quality improvement by reduction of variation in process output. Milk somatic cell counts (SCC) are a measure of milk quality that reflects the management intensity on the farm. The purpose of this study was to relate variation in bulk tank SCC with the intensity of feeding and manure management and lameness prevention on the farm. Thirty nine randomly chosen freestall dairies located in Minnesota were visited once during the summer of 2004. Information on management practices implemented on the farm was obtained through observation and a questionnaire answered by the herd manager during the farm visit. Collected data included information on alley and stall maintenance, footbath and foot trimming protocol, linear water and bunk space per cow, pushing up of feed, and time spent away from the barn. The number of cows in the milking herd was also recorded. Bulk tank SCC was determined at every milk pick up for the three months preceding the farm visit and the results were plotted on a statistical process control individual measurement chart for each farm. Resulting mean and sigma for each of the farms was recorded. For each mean SCC a high, low and medium variation was determined based on variation in bulk tank SCC observed in the Upper Midwest. Using recorded mean and sigma in SCC, each farm was classified as being characterized by low, medium or high SCC variation. Analysis of variance was performed to identify significant differences in management practices between farms characterized by different SCC variation levels. Farms with low variation in SCC were characterized by a significantly higher frequency of alley scraping and footbath treatment and tended to push up feed more frequently. Low SCC variation farms had also a significantly larger milking herd and had cows spending significantly more time away from the barn.

Key Words: BTSCC, Statistical process control, Variation

T160 Ability of consistency index to predict SCC standard violations in the next 7 or 30 days. J. M. Lukas*[1], M. L. Kinsel[2], and J. K. Reneau[1], [1]*University of Minnesota*, *St. Paul*, [2]*Agricultural Information Management Inc.*, *Ellensburg, WA*.

Statistical process control charts and indices are used to evaluate process performance. Charts distinguish between a process that is in or out of control. Indices assess process prospects of meeting desired standards. The following study examines the ability of a consistency index to predict violations of the somatic cell count (SCC) standards depending on the status of the milk production process (in or out of control) and the length of time in which the violation is said to occur or not occur (7 days or 30 days). Bulk tank SCC data from every milk pick up were collected for 12 months of 2004 from 1501 dairy herds of the Upper Midwest. A consistency index was developed that calculates the maximum allowable variation to meet the SCC standard at a given mean SCC. Indices for each herd were calculated from the last 30 bulk tank SCC results according to the following formula: Consistency index= (standard - mean)/3 where mean is the average SCC calculated from individual values of bulk tank SCC. Five different standards were used to calculate five different indices (from 200,000 cells/mL to 600,000 cells/mL, step of 100,000). Each index was compared with the actual variation in SCC during the same 30 days and used to predict future violations. Logistic regression was used to estimate the detection probability of violators and nonviolators and certainty associated with a positive or negative result. Effect of herd status (in or out of control) and length of prediction time (7 vs 30 days) were also entered into the model. Shortening the length of the prediction time and performing the capability index test in herds that are in control improves the detection probability of all violators and increases the certainty associated with a negative result. With detection probability of all violators and certainty associated with a negative result always above 80% for all 5 SCC standards the capability index proves to be a reliable tool to predict standard violations within the next 7 days.

Key Words: Statistical process control, SCC, Standard violation

T161 The relationship between bodyweight change and disease incidence in early lactation. E. M. Marion*[1], C. D. Dechow[1], J. A. D. R. M. Appuhamy[2], and B. G. Cassell[2], [1]*The Pennsylvania State University*, *University Park*, [2]*Virginia Polytechnic University*, *Blacksburg*.

The objectives of this study were to investigate the relationship between body weight change between calving and 30 days in milk and occurrence of dairy cattle disease. Daily body weight was available from 515 cows, of which 346 Holstein cows were from the Penn State herd, and 120 Holstein and 49 Jersey cows were from the Virginia Tech herd. Daily body weights were recorded twice daily by AfiFarm upon a cow exiting the milking parlor. The average of at least five weights during the first week of lactation and at least five weights between 27 and 33 days in milk were calculated for each cow. Body weight change was defined as average BW during the first week of lactation minus average body weight during the fourth week of lactation. Diseases were recorded by herd managers at the respective universities; disease categories (1 = diseased, 0 = not diseased) included displaced abomassum, ketosis, all metabolic disease, uterine disease, mastitis, and all diseases. The total disease frequency was 48% in the Penn State herd and 31% in the Virginia Tech herd. The LOGISTIC procedure of SAS was used to analyze disease from the Penn State herd with fixed lactation number, age, year-season, and body weight change effects. The average body weight change during the first 30 days of lactation was -44 kg. The effect of body weight change was significant for displaced abomasum, ketosis, metabolic disease, uterine disease, and all diseases. Odds ratios were calculated for weight change at the 75th percentile (-69 kg) to weight change at the 25th percentile (-20 kg). Cows losing more weight had higher odds of developing a displaced abomasum (1.41:1), ketosis (2.24:1), metabolic disease (1.62:1), and all diseases (1.43:1). Cows with uterine diseases (0.80:1) lost less weight. Change in body weight was significantly associated with disease, and electronically recorded body weight could be used as an indicator of a cow's health status.

Key Words: Body weight change, Disease

T162 Effects of environmental factors during rearing on milk yield after first calving. J. Broucek*[1], S. Mihina[1], C. W. Arave[2], P. Kisac[1], M. Uhrincat[1], P. Flak[1], and A. Hanus[1], [1]*Research Institute of Animal Production*, *Nitra, Slovakia*, [2]*Utah State University*, *Logan*.

The objective was to find whether milk yield of primiparous cows is affected by their rearing to weaning, the sire line and the season of birth and calving. At the seventh d of life 32 heifers were randomly divided to individual hutches (H,n=9), group pen with automatic feeding station (A,n=10) or to a nursing cows pen (N,n=13). Heifers A and H received mothers milk in free choice three times a d from a bucket with nipple to seventh day. Heifers of the group N sucked a mother's udder three times per d. Mother was milked. Group A received 6 kg of milk replacer (MR) per d divided into 4 portions in 6 h intervals, group H 6 kg of MR per d from a bucket with nipple divided into 2 portions in 12 h intervals. Amount of MR was increased from the 28th d on 8 kg per d. The number of calves per one nursing cow was determined according to milk yield (6 kg milk per calf). All animals were weaned at the age of 8 wks and kept in group pens, equal conditions of nutrition were ensured in all groups. After calving, the heifers were in free-stall housing, fed a total mixed ration. Trial cows originated from four sires were divided also according to the season of birth and calving. The four-factorial ANOVA was used, only sire lineage and season of birth had significant effects. The N group tended to the highest production of milk and FCM (6894.1; 6541.9 kg), the A group the lowest (5757.5; 5820.9 kg; P=0.06) for 305-d lactation. Effects of the sire were significant for contents of fat, protein and TS (P<0.05). Cows born in March-May had the highest % of protein and cows born in June-August the lowest (3.21 vs. 3.06 %). Dairy cows born and calving in December-February had the highest production of milk, protein and TS, and dairy cows born in June-August the lowest. Results demonstrate that system of heifers rearing is an important determinant of milk production during the first lactation. Dairy cows should not be stressed by heat temperatures.

Key Words: Dairy cow, Rearing, Season

T163 Temperature influences upon vascular dynamics as measured by doppler ultrasonography. B. H. Kirch*[1], G. E. Aiken[1], and D. E. Spiers[2], [1]*USDA-ARS, Forage-Animal Production Research Unit*, *Lexington, KY*, [2]*University of Missouri*, *Columbia*.

Two preliminary studies were performed using doppler-image ultrasound to document the vascular changes of cattle under hot and cold conditions. Three calves per study (320 ± 38 kg) were acclimated to thermoneutrality in the Brody Environmental Center at the University of Missouri. A minimum of three ultrasound measurements were taken of the median caudal artery at the 4th coccygeal vertebrae (Cd4) using a 13 mhz probe. The animals were then stressed by either raising air temperature to 32°C or reducing it to 8°C. The animals were housed under these conditions for 24 h and then returned to thermoneutral temperatures. Ultrasound scans were repeated at -2 (2 h prior to temperature change), 5, 23, 24 and 28 h (4 h after returning to thermoneutrality) after being put under climatic changes. Blood flow rates of heat stressed cattle significantly increased from 39.12 (-2 h) to 59.87 mm/min at 23 h of exposure (P ≤ 0.05). The vessel area tended to increase (0.047 to 0.063 cm^2) with the onset of the stress but was not statistically significant. Heart rate (82 beats/min) was unchanged throughout the study, but respiration rate did increase from 82 (-2 h) to 120 breaths/min (23 h). Cattle placed under cold stress showed lower flow rates to the caudal artery after 23 h of exposure (P ≤ 0.10) (30.73 at -2 h to 18.44 mm/min at 23 h). Blood flow rates of the cold stressed cattle initially increased after the challenge. At 5 h post temperature reduction, flow rates were 53.9 mm/min, increasing over the baseline of 30.7 mm/min (P ≤ 0.07). Under cold conditions heart rate was unchanged and averaged 79 beats/min across all five time periods while respiration rate decreased from 62 (-2) to 36 breaths/min (23 h). Arterial area increased from 0.057 to 0.072 cm^2 at 5 h (P ≤ 0.07) then decreased to 0.043 cm^2 at 23 h. The doppler-image ultrasound detected vascular changes due to environmental variation and lends itself to future studies assessing environmental stress effects on hemodynamics.

Key Words: Doppler-flow ultrasound, Cattle, Cold and heat stress

T164 The use of digital infrared thermography for monitoring environmental physiology in dairy cattle. M. B. White, M. Jones, S. Schmidt, A. Chromiak, and S. T. Willard*, *Mississippi State University*, *Mississippi State*.

The objective of this study was to monitor the thermal environment and assess its impact on body surface temperatures in lactating dairy cattle of various breeds and coat color using digital infrared thermal imaging (DITI). Three dairy breeds were housed within freestall barns: white Holstein (n=5), black Holstein (n=5), Jersey (n=5) and Gir x Holstein (GxH; n=5). The study was conducted from May 25 (d 0) to June 15 (d 21) with ambient environment (e.g., temperature-humidity index; THI) recorded throughout the day. Cows had access to sprinklers and fans which were turned off 1 hr prior to imaging to normalize surface temperature measures. Right lateral images were obtained three times daily (0600, 1200, 1800 h) using a Thermacam S60 camera (FLIR). Intravaginal temperature loggers were inserted into all cows on d 0, with vaginal temperatures (VT) acquired every 5 min. Data was analyzed in relation to breed (coat color), day, time of day, and ambient conditions, and the warmest (d 19; maximum THI: 84.1; heat stress) and coolest (d 3; maximum THI: 71.4; no heat stress) days selected for comparative analysis of study main effects. Within breed, DITI maximum (MAX) surface body temperatures differed (P<0.05) between d 3 and 19 among all time of day measures. Among breeds, Jersey cows had higher (P<0.05) DITI MAX temperatures on d 3 at 0600 and 1800 than the other breeds, while all other breed comparisons on this day did not differ (P>0.10). DITI MAX temperatures did not differ (P>0.10) on either the coolest (d 3) or warmest (d 19) days between white and black Holstein cows. On d 19, GxH cows (38.0 ± 0.1 °C) had higher (P<0.05) DITI MAX temperatures than Holstein cows (36.9 ± 0.3 °C), yet GxH VT were lower (38.6 ± 0.1 °C; P<0.05) than Holstein cows (39.2 ± 0.1 °C). In summary, cow body surface temperatures were influenced by environmental conditions which DITI could detect, including differences in responsiveness among breeds. These data establish relationships between cow body surface thermal signatures within production environments from which further studies can assess the use of DITI for environmental monitoring of dairy cattle.

Key Words: Thermography, Dairy, Temperature

T165 Physiological responses of Holstein cows (white or black hair coat) under different solar loads: An environmental chamber study. C. N. Lee*[1], P. Hillman[2], R. Collier[3], and K. Gebremedhin[2], [1]*University of Hawaii-Manoa*, *Honolulu*, [2]*Cornell University*, *Ithaca, NY*, [3]*University of Arizona*, *Tucson*.

Recent studies suggest the importance of hair coat in cattle adaptation to heat stress environments. The objective of this study was to quantify

the physiological responses of Holstein cows to two different loads of solar radiation (lo-550W/m^2 and hi-880W/m^2). These solar loads represent the am (1000-1200) and pm (1300-1600) periods in Arizona summers. Cows (dry and pregnant) of two hair coats: a) black (n=4, >90% black) and b) white (n=3, >90% white; n=1, 60% white) were used in a switched back design in an environmental chamber study with or without solar radiation. Each exposure to solar radiation consisted of 3 days with 2 white and 2 black cows. Daytime THI for the chambers were set at 84 (38.9°C, 25% RH) and nite time THI were set at 70 (23.3°C, 56% RH). Physiological responses measured were: a) respiration rates, b) dorsal skin temperations, c) rectal temperatures and d) sweating rates. Black hair coat absorbed 91% of the solar load while white hair coat absorbed 57%. Dorsal temperatures for black or white coat at lo solar were 39.5°C and 34.5°C and at hi solar were 41.7°C and 34.9°C, respectively. Respiration rates were not different for the coat colors; lo solar 86 breaths/min. and hi solar 99 breaths/min. Rectal temperatures at lo solar were 38.9°C for black and 38.7°C for white and at hi solar were 39.4°C for black and 39.0°C for white. Cows with black hair coat had 1.5x higher sweating rates than cows with white hair coat at both solar loads. Variations in the ability to thermal regulate by sweating within a hair coat color were observed. The study suggested that cows with black coat absorbed higher solar load and this was compensated by higher sweating rates facilitated by higher dorsal skin temperatures thus allowing for greater evaporative cooling.

Key Words: Solar load, Hair coat, Physiological responses

T166 Frequency and potential production losses from low and inverted fat-protein ratios (FPR) for Pennsylvania dairy herds. R. Goodling*, K. Griswold, and T. Beck, *Penn State Cooperative Extension*, *University Park*.

The frequency of low and inverted fat-protein ratios (FPR) were investigated with DHIA data from 269 Pennsylvania dairy herds comprised of 24,000 Holstein cows. Milk and milk component data were collected for all December 2005 test dates. Due to the small number of observations for herds < 30 cows and individual cows < 41 days in milk (DIM), these data were excluded from analysis. Data were statistically analyzed using the UNIVARIATE, CORR, and FREQ procedures of SAS version 9.1. A low FPR was defined as 0.9 to 1.0 and an inverted FPR was defined as < 0.9. The average FPR for all cows in the study was 1.19. However, one fifth of all cows had a low or inverted FPR with 12.7% of all cows being inverted. Within individual herds, 17(± 10 SD) % of cows had low or inverted FPR and 8 (± 10 SD) % of cows had inverted FPR. The largest percentage (21%) of inverted FPR records occurred between DIM 41 to 100, whereas the percentage of low FPR records was greatest for 300+ DIM (38%). There was a substantial negative correlation between low FPR and total milk kg (-0.49) and total fat kg (-0.53). In contrast, modest positive correlations existed between inverted FPR and total milk kg (0.19) and total fat kg (0.33). For the examined test dates, the average herd lost 3.41 kg of fat per day from inverted FPR and 1.15 kg of fat per day from low FPR. Based on the butterfat price in Federal Order 1 for December, these depressions in fat production cost the average herd $11.27 and $3.78 per day for inverted FPR and low FPR, respectively. The results suggest that the direct economic cost of lost fat production from inverted and low FPR cows within Pennsylvania dairy herds is relatively minor.

Key Words: Fat-protein ratio, Fat production, Economic cost

T167 Effect of dry period length on health and production of Holstein cows during the subsequent lactation. R. D. Watters*[1], J. N. Guenther[1], A. E. Kulick[1], P. W. Clark[2], and R. R. Grummer[1], [1]*University of Wisconsin*, *Madison*, [2]*University of Wisconsin*, *River Falls*.

Recent experiments to examine the effects of dry period length on subsequent lactation have employed insufficient cows to determine effects on health disorders. This study was conducted on a large commercial dairy herd to evaluate the effect of dry period length on milk production, milk components, colostrum quality, and incidences of mastitis and metabolic disorders. Dry cows (n=772) were randomly assigned to receive a dry period of 55 (C; n=382) or 34 d (S; n=390). Dry cows on C were fed a low-energy diet until 34 d prior to expected calving and then all cows were fed a moderate-energy transition diet. Milk yield was recorded every 15 d through 150 DIM and milk was sampled every 30 d through 100 DIM to analyze milk components. Cows on C produced more milk than cows on S ($P < 0.0001$; 43.8 vs. 41.8 kg/d). Cows in their 3rd or greater lactation produced more milk than cows in their 2nd lactation ($P < 0.0001$; 41.5 vs. 44.1 kg/d). There was no treatment by time or treatment by parity interaction for milk yield. Fat percent was affected by treatment ($P < 0.05$; C = 3.35 vs. S = 3.48) and parity ($P < 0.05$; 3.36 vs. 3.47 for 2nd and 3rd and greater lactation, respectively). Fat yield was not affected by treatment, but there was a parity effect ($P < 0.0001$; 1.40 vs. 1.53 kg/d for 2nd and 3rd and greater lactation, respectively). Protein percent was affected by treatment ($P < 0.0001$; C= 2.69 vs. S = 2.82) and parity ($P < 0.0001$; 2.82 vs. 2.70 for 2nd and 3rd and greater lactation, respectively). Protein yield was not different for treatment, but was for parity ($P < 0.05$; 1.17 vs. 1.20 kg/d for 2nd and 3rd and greater lactation, respectively). IgG concentration in colostrum was not affected by treatment. The incidences of mastitis, displaced abomasum, ketosis, metritis and retained placenta did not differ between treatments. There appears to be no effect of shortening the dry period from 55 to 34 d on health.

Key Words: Dry period length, Health, Milk yield

T168 Conception rate and pregnancy loss rate in lactating Holstein cows of a single herd following timed insemination or insemination at detected estrus. D. J. Ambrose*[1,2], T. Govindarajan[2], and L. A. Goonewardene[1,2], [1]*Alberta Agriculture Food and Rural Development*, *Edmonton, Alberta, Canada*, [2]*University of Alberta*, *Edmonton, Alberta, Canada*.

The objective of the study was to determine, retrospectively, the factors affecting conception rates and pregnancy loss rates in lactating dairy cattle. Breeding records (n=1544) for five years were obtained from one dairy herd. The effect of timed-insemination (n=1324) versus insemination at detected estrus (n= 220), and the influence of parity, stage of lactation, milk production, milk composition, body condition, body weight, year, season, and number of inseminations, on conception rate and pregnancy loss rate were determined. Conception rates were lower (P<0.03) in cows that were time inseminated (29.4%) compared to cows that were inseminated at detected estrus (37.4%). Season had a significant effect on conception rate (P<0.01), with lower conception rates (23.2%) in summer compared to the average of other seasons (33.0%). Interaction between season and type of insemination was significant (P<0.05). During winter, insemination at detected estrus resulted in higher conception rate than timed insemination (P<0.01). Overall incidence of twinning was 4.0%. Pregnancy loss was affected by type of insemination (P<0.01) and body condition (P<0.01). Cows that were time-inseminated had a higher rate of early embryonic loss (2.8%), abortion (2.3%), and still-births (4.5%), compared

to 0, 0 and 1.8 %, respectively, for cows that were inseminated at detected estrus.

Key Words: Timed insemination, Conception rate, Pregnancy loss

T169 Factors affecting reproductive performance of Holstein heifers. F. A. Braga*, R. C. Chebel, and J. C. Dalton, *University of Idaho*, *Caldwell*.

The objective of the present study was to evaluate factors affecting reproductive performance of dairy heifers. Holstein heifers (6,389) were housed in a feed lot located in Parma, ID. Weekly heifers weighing > 309 kg were initiated in the reproductive program that consisted of one injection of PGF2a and AI upon detection of estrus. Heifers not inseminated by 11 d after the first PGF2a injection received a second injection of PGF2a. Pregnancy was diagnosed at 40±3 d after AI. Environmental conditions were recorded from study d -15 to 15 (study d 0 = day of initiation of the breeding program or day of AI). Average minimum daily temperature (MDT), average temperature humidity index (THI), and average rain fall (RF) were calculated for the following periods: P1, d -15 to 0; P2, d 0 to 3; P3, d 0 to 15; and P4, d -15 to 15 (P4). Exposure to environmental conditions was classified as: no heat stress (NHS = THI < 72) and heat stress (HS = THI > 71); no cold stress (NCS = MDT > -1 ºC) and cold stress (CS = MDT < 0 ºC); and no RF (NRF = 0 ml/d), low RF (LRF = RF < 1.05 ml/d) and high RF (HRF = RF > 1.04 ml/d). Heifers were also classified according to body weight at initiation of the breeding program as thin (TH < 340 kg); good (G = 340 - 365 kg); and heavy (HY > 365 kg). Data was analyzed by LOGISTIC procedure of SAS. Proportion of heifers inseminated during the first 22 d of the breeding program was affected by body weight (TH = 95.4, G = 98.1, HY = 98.9%; P = 0.02) and exposure to cold stress during P1 (NCS = 99.1, CS = 97.8%; P < 0.001). Pregnancy rate 22 d after the initiation of the breeding program tended to be affected by cold stress during P3 (NCS = 68.9, CS = 66.4%; P = 0.06). Conception rate was affected by AI number (1st = 67.8, 2nd = 56.3, 3rd = 47.7, 4th = 37.2%; P < 0.001), AI technician (A = 65.5, B = 60.3%; P < 0.001), and cold stress during P3 (NCS = 63.5, CS = 59.2%; P = 0.001) and tended to be affected by exposure to high precipitation during P1 (NRF = 61.7, LRF = 62.7, HRF = 59.8%; P = 0.08). From this study it was established a correlation between exposure to cold stress and reduced reproductive performance of dairy heifers.

Key Words: Heifers, Reproduction, Environment

T170 The effects of month of insemination and temperature-humidity index on non-return rate in Pennsylvania Holsteins. C. D. Dechow[1], M. L. O'Connor*[1], A. L. Mosholder[1], G. J. Killian[1], and S. Schnell[2], [1]*The Pennsylvania State University*, *University Park*, [2]*Genex Cooperative, Inc.*, *Shawano, WI*.

A total of 1,257,333 insemination records from January of 2000 through December of 2004 were provided by Genex Cooperative, Inc. Insemination date, herd number, and cow identification number were used to determine if cows were re-inseminated within 90 days (NR90) of insemination. First and second services by Holstein sires in herd-years that had at least 300 recorded services and herd-months with at least 8 services were retained. A minimum of 10 services per sire, 50 services per technician, and a herd non-return rate between 10% and 80% were required for inclusion in the dataset. The final dataset included 60,718 records from 152 herds. Daily maximum temperature-humidity index (THI) from weather stations representing six regions in Pennsylvania was merged with insemination data. Maximum THI on the day of insemination, 1 day after insemination, and average maximum THI for the week of insemination were analyzed. Statistical analyses were performed in ASReml with NR90 treated as a binary response variable. Fixed effects included herd-year, service number, technician and THI. Random effects were cow, bull and error. Month of insemination was included as a fixed effect for one analysis. Average NR90 was 50%, which represents the percentage of cows that were not re-inseminated within 90 days. The odds of not returning to service were highest for services in March and lowest in August, and the odds ratio for March to August non-return was 1.36 to 1. Temperature-humidity index effects were strongest when the average maximum THI for the week of insemination was considered. The odds ratio of NR90 when THI was in the 75th percentile (23°C) to NR90 at median THI (15°C) was 0.92:1.00. The odds ratios of NR90 at the 95th percentile THI (28°C) to the median THI was 0.81:1.00. Results indicated that heat stress can have severe impacts on conception rates in Pennsylvania.

Key Words: Heat stress, Temperature, Non-return

T171 Effects of management techniques and farm status on bacterial contamination of colostrum. S. I. Kehoe*, B. M. Jayarao, B. A. Straley, and A. J. Heinrichs, *The Pennsylvania State University*, *University Park*.

Good colostrum quality requires high immunoglobulin content; however, bacterial counts in colostrum are a problem often overlooked. A study was conducted to: 1) determine bacteriological quality of colostrum and 2) identify management factors that influenced the bacteriological quality of colostrum. Colostrum samples (~250 ml) from representative dairy herds in Pennsylvania (n=55) were analyzed for bacteriological counts. Information on farm management practices were collected through an administered questionnaire survey. Samples were analyzed for standard plate count (SPC), preliminary incubation count (PIC), laboratory pasteurization count (LPC), staphylococcus aureus (SA), streptococcus agalactiae (SAG), coagulase negative staphylococci (CNS), streptococci (SS), coliforms (CC) and non-coliforms (NC). Bacterial counts were log transformed and general linear model was used to identify management techniques that influenced bacterial results (P < 0.1). Mean bacterial counts for SPC, PIC, LPC, SA, SAG, CNS, SS, CC, NC in colostrum were observed to be 997,625; 12,040,946; 616; 306; 10,994; 164,883; 257,114; 323,390 and 111,544, cfu/ml, respectively. The findings of the study suggest that high counts of CNS in colostrum were associated with herds that had > 100 cows and SCC > 200,000. Refrigerated colostrum had higher PIC and CC than frozen colostrum or colostrum that was used for immediate feeding. Farms that did not feed calves with colostrum from their own dam had higher counts of SPC, PIC and CC. The findings of the study show that many colostrum samples have high bacterial counts. It is recommended that educational programs be developed that address hygiene practices to be followed during collection, processing and storage of colostrum.

Key Words: Colostrum, Bacterial counts, Management