T240 Effect of insemination timing on conception rates of dairy cows having high activity as identified by the Select Detect activity monitor. R. L. Nebel*[1], J. M. DeJarnette[1], and E. Harty[2], *[1]Select Sires Inc., Plain City, OH, [2]Dairymaster, Causeway, Co. Kerry, Ireland.*

The primary objective of this field trial was to determine the effects of interval to AI on conception rates of dairy cows identified as high activity using the Select Detect activity system. The Select Detect system uses neck-mounted sensors to scrutinize acceleration and intensity of movement with continuous 24-h surveillance of estrous related activity. Farm personnel inseminated cows at random intervals after onset of HA according to standard procedures, which in most herds was a once daily AI program. The hour activity exceeded the HA threshold was used to determine interval from onset to AI. Conception rates from 4,126 services were recovered from 19 herds located in 8 states. The mean duration of HA was 10.5 ± 0.1 h with a median of 10.0 h indicating a slightly skewed distribution. The distribution of duration of HA was as follows: ≤4 h, 15.8%; 5 to 8 h, 17.2%; 9 to 16 h, 46.2% and ≥16 h, 21.3%. The parity by AI interval interaction significantly influenced conception rates. Among primiparous cows, a curvilinear relationship was apparent with optimum conception occurring at AI intervals of 13 to 16 h after HA and trended lower for both earlier and later AI intervals. Among multiparous cows, conception rates at intervals ≤12 h were different that those >16 h with 13 to 16 h being intermediate. Specifically, conception rates for primiparous and multiparous cows respectively were 36 and 32.4% (0 to 4 h), 37.5 and 32.2% (5 to 8 h), 41.2 and 32.9% (9 to 12 h), 45 and 28.9% (13 to 16 h), and 37.7 to 23.3% (17 to 26 h). In conclusion, these results are consistent with similar studies based on observed mounting activity wherein optimum conception rates are obtained at AI intervals proximal to 12 h after detected estrus (HA) with shorter intervals appearing to be less compromising to conception rates that are longer intervals. The Select Detect system allows conception rates to be optimized because of 24-h surveillance and precision of determining activity related to estrus.

Key words: timing of AI, Select Detect, MooMonitor

T241 Reproductive performance in Mexican Holstein dairies by geographic region. H. Lopez*, F. Cavazos, A. Gonzalez, L. Ruiz, and C. Vergara, *ABS Global Inc.*

Our objectives were to compare reproductive indicators from Holstein dairies in 5 regions of Mexico and establish benchmarks for the 20% most efficient herds. Data from 119,097 cows and 377,025 inseminations were evaluated from January to December 2010 form 54 dairies in Region 1 (R1[BCN, BCS; n = 10 herds]), Region 2 (R2[CHH; n = 5 herds]), Region 3 (R3[AGU, JAL; n = 14]), Region 4 (R4[QUE; n = 6]), and Region 5 (R5[COA, DUR; n = 19]). Analyses were conducted with the MIXED procedure using herd as the experimental unit. Mean herd size was greater ($P < 0.05$) for R2 (4,178 ± 3,702) and R5 (3,308 ± 2,573) than R1 (735 ± 225), R3 (1,484 ± 866), and R4 (1,202 ± 735). Days for waiting period (R1 = 51 ± 4; R2 = 51 ± 2; R3 = 50 ± 4; R4 = 53 ± 9; R5 = 47 ± 6), pregnancy diagnosis (R1 = 41 ± 4; R2 = 37 ± 1; R3 = 40 ± 4; R4 = 42 ± 4; R5 = 40 ± 1), and reconfirmation (R1 = 120 ± 42; R2 = 94 ± 21; R3 = 114 ± 37; R4 = 105 ± 35; R5 = 91 ± 6) did not differ among regions. Insemination risk was greater ($P < 0.05$) for R2 (62%) and R5 (65%) than R1 (58%), and R3 and R4 (56%). Percentage of cows bred at estrus was greater ($P < 0.05$) for R3 (83%) and R4 (85%), intermediate for R2 (79%) and R5 (77%), and lower for R1 (71%). Conception rate for cows bred at estrus was greater ($P < 0.05$) for R1 and R2 (36%), intermediate for R3 and R4 (33%), and lower for R5 (29%). The % of cows bred after synchronization was greater ($P < 0.05$) for R1 (29%), intermediate for R2 (21%) and R5 (23%), and lower for R3 (17%) and R4 (15%). Conception rate for TAI cows was greater ($P < 0.05$) for R1 (34%), intermediate for R2 and R3 (29%), and R4 (31%), and lower for R5 (26%). Pregnancy rate was greater ($P < 0.05$) for R1 (20%) and R2 (22%) than R3 and R4 (18%), and R5 (17%). Percentage of cows pregnant by 100 DIM was greater ($P < 0.05$) for R1 (52%) and R2 (55%) than R3 and R4 (48%), and R5 (44%). The 20% most efficient operations had mean pregnancy rate of 23%, waiting period of 54 ± 3 d, insemination risk of 63%, conception rates to estrus of 38%, TAI of 35%, and percentage of cows pregnant by 100 DIM of 58%. Regional differences existed in reproductive parameters in Mexican dairies, which may be attributed to program compliance and differences in herd size.

Key words: fertility, reproduction, estrus

T242 Effects of 2.1 and 10 x 10^6 dosages of sex-sorted or conventionally processed sperm on conception rates of Holstein heifers. J. M. DeJarnette*[1], M. A. Leach[1], R. L. Nebel[1], C. E. Marshall[1], C. R. McCleary[2], and J. F. Moreno[3], *[1]Select Sires Inc., Plain City, OH, [2]Sexing Technologies Inc., Plain City, OH, [3]Sexing Technologies Inc., Navasota, TX.*

The conception rates of Holstein heifers after AI with 2.1 or 10 × 10^6 sperm dosages of sex-sorted or conventionally processed sperm were compared. Ejaculates collected by artificial vagina from 8 Holstein sires were cryopreserved at either 2.1 or 10 × 10^6 sperm per dose with or without sorting to 90% purity for X-chromosome bearing spermatozoa using flow cytometry. All treatments were processed in an egg-yolk (20%), TRIS, glycerol (7%) extender and packaged in color-coded 0.25-mL French straws. Straws (n = 350 straws/treatment per sire) were packaged and distributed in aliquots of 12 (3 straws of each treatment) to 51 herds of Holstein heifers. Straw color was recorded in the on-farm record keeping system at the time of AI and retrieved by electronic download. A total of 9,172 services were recovered providing a mean sample size of 287 ± 3.5 services/sperm dose per semen type within sire (range: 248 to 318). Conception rates (LSM) were influenced (Tukey test) by the main effects of herd, sire, semen type, sperm dosage, and service number. The herd by sperm dosage interaction was significant and implied some herds (technicians) are more proficient than others at maintaining high levels of conception with reduced sperm dosages. Across herds and sires, the conception rates of each semen type by sperm dosage combinations were as follows: 2.1 × 10^6 sex-sorted, 38%, n = 2,319; 10 × 10^6 sex-sorted, 44%, n = 2,279; 2.1 × 10^6 conventional, 55%, n = 2,282; 10 × 10^6 conventional, 60%, n = 2,292. The observation that conception rates of sex-sorted semen were improved by the 10 × 10^6 sperm dosage is encouraging toward the prospectus of development of a commercially available sex-sorted product with improved conception potential over existing technology. However, the failure of the 10 × 10^6 sex-sorted sperm dosage to achieve conception rates comparable to either dosage of conventional semen is somewhat discouraging toward the plausibility of comparable conception rates to conventional semen in the absence of major technological advances in efficiency of sperm sorting or cryopreservation.

Key words: sex-sorted semen, sperm dosage, flow cytometry

T243 IGF-I increases in vitro embryo production and protects against deleterious effects of heat stress in Nelore (*Bos indicus*) and Holstein (*Bos taurus*) breeds. R. A. Satrapa, E. M. Razza, C. F. Silva, T. Nabhan, R. A. L. Simoes, and C. M. Barros*, *Department of Pharmacology - IBB, University of São Paulo State, Botucatu, Sao Paulo, Brazil.*

In the present study the beneficial effect of IGF-I during in vitro culture of embryos was tested comparatively between a more tolerant (Nelore = N) versus a less thermo tolerant breed (Holstein = H). Oocytes, obtained in a local abattoir, from N and H females were matured and fertilized with semen from N (n = 6) and H (n = 6) sires, respectively. Embryos cultured was performed at 39°C, 90% N_2, 5% CO_2, and 5% O_2 in SOFaaci medium. In experiment 1 and 2, embryos from both breeds with ≥16 cells were randomly allocated in 4 groups: Control (maintained at 39°C all the time) HS (96 h after fertilization the embryos were subject to heat shock of 41°C for 9h and then returned to a temperature of 39°C), IGF (cultured in the presence of IGF, 100 ng/ml), and IGF-HS (IGF and HS). In experiment 1 cleavage, morula, and blastocyst rates were evaluated; whereas in experiment 2 apoptosis was determined by TUNEL, in both breeds simultaneously. The results were analyzed by logistic regression using the Proc GENMOD (SAS). In experiment 1, HS significantly decreased blastocyst rates in N (29.6 vs. 24.1%, control vs. HS, respectively) and H (20.1 vs. 15.5%). Adding IGF-I to the culture medium increased significantly blastocyst rates in both breeds N (23.3% vs. 29.9%, -IGF vs. +IGF, respectively) and H (15.7 vs. 21.4%). In experiment 2, HS increased ($P < 0.05$) apoptosis rates both in N (3.3 ± 0.2 vs. 4.1 ± 0.3) and H (4.8 ± 0.3 vs. 6.0 ± 0.4). It is concluded that adding IGF to the culture medium of embryos of both breeds increases blastocyst rate and decreases apoptosis. Additionally, Holstein were more sensitive to the deleterious effects of HS than Nelore embryos, since there was a higher decrease in blastocyst rate of heat stressed embryos from Holstein than from N cows, as well as a higher incidence of apoptosis in H embryos.

Key words: heat stress, IGF, embryo

T244 Cytological endometritis incidence in crossbred dairy cows. R. M. Santos*, L. C. Carneiro, J. P. E. Saut, A. F. Ferreira, M. F. S. Padua, and N. Bortoletto, *FAMEV-UFU, Uberlândia, Minas Gerais, Brazil.*

The objective was to evaluate the incidence and risk factors for cytological endometritis in crossbred dairy cows (Holstein/Gyr) maintained in a hot climate in Southwestern Brazil. The cytological endometritis diagnostic was performed in primiparous (n = 26) and multiparous (n = 100) cows, from a herd with 480 lactating cows maintained in pasture during the rainy season and at loose housing in the dry season. Average milk production was 18.75 kg/day. At 48.18 ± 9.10 DIM the cows had their body condition scored using a 5-point system and were examined by ultrasound to determine CL and uterine fluids. The vaginal discharge was evaluated by the gloved hand method. The cytological samples were collected only in cows with clear or translucent vaginal mucus and no uterine fluids. Cytological sample of the endometrium were collected using a cytobrush adapted for use in cattle. Slides for cytological examination were prepared on farm by rolling the cytobrush on a glass microscope slide and air-dried. The cytology slides were stained with modified Wright Giemsa stain. Each slide was examined at 400× magnification to perform the differential cell count of 200 cells (polymorphonuclear neutrophils and endometrial cells) by 2 observers. Cytological endometritis was defined when the proportion of neutrophils were ≥5% (Gilbert et al., 2005). The incidence of cytological endometritis was analyzed by the binary logistic regression including in the model calving season, BCS, presence of CL, parity and DIM. The cytological endometritis incidence in crossbred dairy cows was 25.40%. Cows calving at spring/summer season had tendency (34.04 vs. 20.25%; $P = 0.057$) to have higher cytological endometritis incidence than cows calving at autumn/winter. Cows with BCS ≤2.5 had higher (31.25 vs. 15.22%; $P = 0.04$) cytological endometritis incidence than cows with BCS ≥2.75. The effects of the CL, parity, and DIM were not different. In conclusion, cytological endometritis was related to BCS but not other production factors. Supported by FAPEMIG.

Key words: uterine disease, endometritis, dairy cows

T245 Effect of simultaneous thawing of multiple semen straws and sequence of insemination on pregnancy rate for timed-AI in suckled multiparous Nelore cows. L. Z. Oliveira*[1], V. F. M. Hossepian de Lima[1], R. M. Santos[2], T. Martins[3], R. F. G. Peres[4], H. B. Graff[4], E. R. Carvalho[4], A. F. C. de Andrade[5], and R. P. Arruda[5], *[1]FCAV-UNESP, Jaboticabal, SP, Brazil, [2]FAMEV-UFU, Uberlândia, MG, Brazil, [3]FMVZ-UNESP, Botucatu, SP, Brazil, [4]Agropecuária Fazenda Brasil, Nova Xavantina, MT, Brazil, [5]FMVZ-USP, Pirassununga, SP, Brazil.*

Because of large breeding herds and the frequent use of fixed-time artificial insemination (TAI) in Brazil, multiple cows are often bred simultaneously. This results in the routinely practice of thawing simultaneously more than one straw of semen. The objective of this study was to determine the effect of simultaneous thawing of multiple 0.5-mL semen straws and sequence of insemination on pregnancy rate (PR) at TAI in suckled multiparous Nelore cows. All cows (n = 479) received 2 mg of estradiol benzoate and an intravaginal progesterone releasing device on d 0. On d 8 the device was removed and the animals were treated with 500 µg of PGF2α, 300 UI of eCG and 0.5 mg of estradiol cipionate. At 48 h after device removal the cows were TAI. Ten 0.5-mL frozen straws were thawed simultaneously in an electric water-bath (36°C) for a minimum of 30s. Semen doses from 3 Angus bulls were utilized. The sires and the straw sequence were equally distributed across 2 AI technicians. The records also included sequence of insemination (first, second, third, until tenth) and time of seminal deposition. The cows were divided into different groups: cows inseminated with 1st, 2nd and 3rd semen straws (G1); cows inseminated with 4th, 5th and 6th semen straws (G2); cows inseminated with 7th, 8th, 9th and 10th semen straws (G3). Ultrasound pregnancy diagnosis was performed 40 d after TAI. The PR at TAI was analyzed using PROC LOGISTIC of SAS, including model effects of bull, inseminator and group. The mean time (±SD) of straws remaining in the thawing bath were 01:30 ± 00:51 (G1), 03:36 ± 01:10 (G2) and 06:13 ± 01:44 min (G3). The PR was affected ($P = 0.009$) by sequence of insemination (G1: 52.78%; G2: 53.85%; G3: 39.06%). An important point when considering simultaneous thawing of straw groups is the thawing bath would serve as an incubating environment for the semen, and could have influenced the sperm viability and the fertility of the spermatozoa.

Key words: Nelore, pregnancy rate, simultaneous thawing

T246 An individual cow-based model to aid in decision making about reproductive management of dairy cows. P. Federico*[1], A. De Vries[2], G. M. Schuenemann[3], and K. N. Galvão[2], *[1]Capital University, Columbus, [2]University of Florida, Gainesville, [3]The Ohio State University, Columbus.*

Many factors influence the reproductive and productive performance of dairy herds, consequently, profitability. Choosing the most effective reproductive protocol for a given herd is a critical managerial decision. To assess the effectiveness and profitability of different AI protocols, we developed an individual-based model to simulate a dairy herd. The reproductive status and milk production of each individual cow is tracked over time accounting for the stochastic nature of events such as estrus, conception, abortion, and mortality. Novel components of this model include: 1) implementation of various reproductive strategies [estrus detection (ED) only, Ovsynch, Presynch-Ovsynch, and Presynch-Ovsynch with ED]; 2) effectiveness of protocol implementation (e.g., accuracy of ED, compliance with administration of injections); 3) daily dynamic tracking of all events (e.g., milk, pregnancy, replacements, birth) that occur based on probability distributions; and 4) user-friendly interface to set up strategies, parameter values, and to visualize daily outcomes of the model. Components 1 and 2 provide quantitative information on best AI programs according to the effectiveness of protocol implementation (e.g., ED only is better than Ovsynch with poor compliance). Component 3 allows decision makers to estimate the timing to reach the new level of pregnancy and milk yield after a reproductive change is implemented at the farm level. Moreover, component 4 facilitates the understanding of the magnitude and the time to attain the expected true benefits. This is a key tool for outreach programs to motivate the adoption of best strategies for a particular farm. Additionally, the stochastic nature of the model helps the decision makers to be aware of the variability of the outcomes (e.g., percent pregnant) due to herd size and pure chance. Sensitivity analysis quantifies the influence of some of the factors affecting the reproductive performance. Through a mechanistic and bottom-up approach we obtained herd level parameters comparable to real on-farm values (e.g., percent pregnant, milking, or culled).

Key words: dynamic model, dairy cow, reproduction

T247 Efficacy of embryo transfer in lactating dairy cows during summer using fresh or vitrified embryos produced in vitro with sex-sorted semen. II. Calving data. T. R. Bilby*[1], J. Block[2], B. M. Stewart[1], P. Morelli[1], L. Bonilla[3], and P. J. Hansen[3], *[1]Texas AgriLife Research and Extension, Texas A&M System, Stephenville, [2]OvaTech LLC, Gainesville, FL, [3]Department of Animal Sciences, University of Florida, Gainesville.*

Objective of the study was to determine whether transfer of fresh or vitrified embryos produced in vitro with sex-sorted semen could improve calving rates and percentage of heifers born during summer in lactating dairy cows versus artificial insemination (AI). Lactating dairy cows (n = 722) were enrolled during summer at 2 commercial dairies in Texas. Cows were randomly assigned to one of 3 treatments: AI (n = 227), embryo transfer-vitrified (ET-V; n = 279) or embryo transfer-fresh (ET-F; n = 216). Embryos were produced in vitro using sex-sorted semen and cultured in BBH7 culture medium until d 7 after insemination. For vitrification, grade 1 expanded blastocysts were vitrified using the open-pulled straw method. Fresh embryos were grade 1 blastocysts and expanded blastocysts. Cows were submitted to an estrous synchronization protocol and either time-AI or AI following detected estrus (day of estrus = d 0). On d 7, cows were examined by ultrasound for presence of a corpus luteum (CL). An embryo was transferred to cows with CL in ET-V and ET-F groups. Cows were synchronized if progesterone was <1 ng/mL on d 0 and presence of CL on d 7. There were no treatment by farm interactions. The percentage of cows with live births was significantly increased for ET-F than for ET-V and AI among all cows (27.5 vs. 17.1 and 14.6%) and synchronized cows (29.9 vs. 18.5 and 20.0%). The percentage of cows giving birth to a live heifer was significantly increased for ET-F and ET-V compared with AI among all cows (79.1 and 72.5 vs. 50.0%) and synchronized cows (79.1 and 72.5 vs. 50.0%). There was no difference between ET-F and ET-V for percent live heifer births but both were greater than for AI. There was no effect of treatment on embryo loss. The transfer of fresh embryos produced in vitro using sex-sorted semen to lactating dairy cows during summer can effectively increase the percentage of cows that calve and also the percentage of cows that give birth to a live heifer compared with AI with conventional semen.

Key words: embryo, heat stress, dairy

T248 Economic evaluation of embryo transfer in dairy cows during the summer using linear programming. A. De Vries*[1], T. R. Bilby[2], J. Block[3], and P. J. Hansen[1], *[1]University of Florida, Gainesville, [2]Texas AgriLife Research and Extension, Texas A&M System, Stephenville, [3]OvaTech LLC, Gainesville, FL.*

The objective of this study was to estimate the economic value of the transfer of sexed female embryos (ET) to dairy cows in the summer compared with the use of conventional AI year round. Summer heat stress reduces fertility of dairy cows, but transfer of fresh sexed embryos in the summer may double the chance of pregnancy per transfer and result in more heifer calves. However, ET is more expensive than conventional AI, and the greater generation of pregnancies in the summer changes the calving pattern and seasonal cash flows. An economic analysis was carried out using a Markov chain dairy herd simulation model combined with linear programming. The model simulated cows from first calving up to the end of the ninth parity, used weekly steps, and assumed a 50% service rate. Seasonality was modeled as 52 periods per year. Heat stress was assumed to affect milk yield production, fat yield production, fertility, involuntary culling, and death risk. Decision variables were the number of purchased heifers per period. Embryo transfer was assumed to cost $60 per transfer compared with $20 per AI. Herd constraints were a maximum of 1300 cows (dry and lactating) or 1000 lactating cows during each week of the year. Results showed that the use of ET in the summer increased profit/cow per yr by $22 for the total cow constraint. Revenues were not changed, but the use of ET resulted in $39 less replacement cost per yr, as well as $20 greater total breeding costs and $3 greater feed cost. The use of ET reduced the maximum percentage of milking cows in the spring from 94% to 91% and reduced the number of dry cows. When the number of milking cows was the herd constraint, profit/milking cow per yr was increased by $42 when ET was used in the summer. Total costs were reduced by $4 per milking cow per yr and total revenues increased by $39, mostly due to increased milk sales and heifer calf sales. In conclusion, embryo transfer during the summer in heat stressed dairy cows is profitable, especially when the number of milking cows is the main constraint.

Key words: embryo transfer, heat stress, economics

T249 Economic comparison of two resynchronization protocols initiated at different intervals after insemination on fertility in lactating dairy cows. J. G. N. Moraes*[1], R. G. S. Bruno[2,3], P. R. B. Silva[1], A. L. A. Scanavez[1], L. G. D. Mendonça[1], J. A. Hernandez-Rivera[2], K. J. Lager[2,3], T. R. Bilby[2], J. Fetrow[1], and R. C. Chebel[1], *[1]Department of Veterinary Population Medicine, University of Minnesota, St. Paul, [2]Texas AgriLife Research and Extension Service, Texas A&M System, Stephenville, [3]Department of Agricultural Science, West Texas A&M University, Canyon.*

Objectives were to evaluate the effect resynchronization protocol on rate of re-insemination and economic outcomes. Cows from 2 dairies (MN = 3,069 and TX = 2,149) at 17 ± 3 d after pre-enrollment AI (PreEAI) were enrolled in the study. Cows were examined for pregnancy 31 ± 3 d after PreEAI. Cows in the early presynchronized resynchronization (EG) and early resynchronization (EOV) treatments started the resynchronization protocol (Ovsynch56) at 24 ± 3 d after PreEAI and EG cows received a GnRH at 17 ± 3 d after PreEAI. Cows in the late presynchronized resynchronization (LG) and late resynchronization (LOV) treatments started the resynchronization protocol at 31 ± 3 d after PreEAI and LG cows received a GnRH at 24 ± 3 d after PreEAI. Cows were re-inseminated when observed in estrus throughout the study. Cost of GnRH and PGF were $1.92/dose, value of pregnancies $275, value of pregnant cow $1,000, value of non-pregnant cow $600, and cost of a day open $3. Pregnancy to PreEAI was not (P = 0.54) different among treatments (44.2%). Smallest (P < 0.01) percentage of EG cows were re-inseminated before pregnancy diagnosis (EG = 28.8, EOV = 44.1, LG = 42.6, LOV = 47.6%), re-insemination rate was smallest (P < 0.01) for EG cows, and more EG cows were re-inseminated at timed AI (EG = 65.9, EOV = 49.6, LG = 42.4, LOV = 38.7%). Interval between AI was smallest (P < 0.01) for EOV cows (EG = 31.2 ± 0.3, EOV = 29.0 ± 0.3, LG = 32.7 ± 0.3, LOV = 32.0 ± 0.3d). Treatment did not affect pregnancy per AI of cows diagnosed non-pregnant to PreEAI (29.2%;P = 0.24) and the percentage of cows pregnant to PreEAI and resynchronized AI (55.4%; P = 0.78). Cost of resynchronization was greatest for EG treatment (EG = 9.1 ± 0.1, EOV = 5.0 ± 0.1, LG = 5.6 ± 0.1, LOV = 2.8 ± 0.1), but return per resynchronized cow was not affected by treatment (EG = 778.8 ± 11.6, EOV = 766.6 ± 11.6, LG = 786.3 ± 10.9, LOV = 790.3 ± 10.2). Because the EG treatment suppressed estrus signs, the difference in interval between AI among treatments was very small and because treatment did not affect percentage of cows pregnant to re-insemination there were no differences in economic return per cow non-pregnant to PreEAI.

Key words: economics, dairy cow, resynchronization

T250 The effects of probiotic, prebiotic, and plant extract on egg quality in layer hens. V. Kalderon[1] and V. Akay*[2], [1]*Cakabey High School, Izmir, Turkey,* [2]*Global Nutritech Biyoteknoloji Ltd., Kocaeli, Turkey.*

Researchers have been looking for alternative solutions to antibiotics for several reasons including the ability of microorganisms to develop resistance against antibiotics, the detrimental effects of antibiotics on the environment, and the high cost. This study was conducted to determine the effects of probiotic, prebiotic and plant extract on hen weight, various egg parameters, and egg bacterial growth in layer hens. Fifty 16-wk-old Bovans Brown layer hens were purchased from a local company and at 24 wks of age were randomly assigned to 5 treatments and kept in cages (70 × 93 × 114 cm). Treatments were: 1) Control; 2) Probiotic [1 kg BENESACC (*Saccharomyces cerevisiae* NCYC R618, 4 billion cfu/gr)/ton feed, Global Nutritech Ltd., Turkey]; 3) Prebiotic [1 kg EXCELMOS (mannanoligisaccharides)/ton feed, Global Nutritech Ltd., Turkey]; 4) Probiotic+Prebiotic (1 kg BENESACC and 1 kg EXCELMOS/ton feed); and 5) Oregano extract (2 lt ROPADIAR/ton water, Ropa Pharm Inc., The Netherlands). Feed and water were provided ad libitum; feeding was done manually several times a day. Hens were weighed weekly. Egg yields and egg weights were recorded daily and eggs were kept at 4°C for later analysis of protein content and bacterial growth. The trial continued 6 wks, and data were reported on a weekly basis. There were no differences for hen weights among treatment groups. Egg weights increased during trial for only the Probiotic, Prebiotic and Oregano groups compared with the Control and Probiotic+Prebiotic groups. Egg size increased for only the Probiotic and Prebiotic groups compared with the Control, Probiotic+Prebiotic and Oregano groups. There were no differences among groups for egg protein content. No bacterial growth was observed for the Probiotic+Prebiotic group, while bacterial growth was recorded for other groups. In conclusion, probiotic, prebiotic and oregano extract, or a combination of probiotic and prebiotic, can be used in layer hens to improve egg quality. However, a combination of probiotic and prebiotic provided the best results against bacterial growth in eggs.

Key words: probiotics, prebiotics, layer hen

T251 The in vitro antibacterial activity of extracts by different extraction of Chinese pulsatilla root, purslane herb, dyers woad leaf, and ash barks—traditional Chinese medicine. F. Rejun*[1], W. Xiangrong[1], H. Jianghua[1], Y. Yulong[2], and C. Caihui[1], [1]*Department of Animal Science and Technology, Hunan Agricultural University, Changsha, Hunan, P. R. China,* [2]*Institute of Subtropical Agriculture, Chinese Academy of Sciences, Changsha, Hunan, P. R. China.*

Conventional drugs usually provide effective antibiotic therapy for bacterial infections but there is an increasing problem of antibiotic resistance and a continuing need for new solutions. The aim of present study is to develop novel antibacterials replacer to overcome effectively bacterial resistance. Aqueous extracts and ethanolic extracts from Chinese pulsatilla root, purslane herb, dyers woad leaf and ash barks, were screened against *E. coli* C 84008 and *Salmonella pullorum* C (79–13) by using the disk diffusion test technique. The minimum inhibitory concentrations (MIC) were determined by micro-dilution method. As a result of this finding, The ethanolic extract of dyers woad leaf was not inhibitory to *E. coli*. Chinese pulsatilla root, purslane herb, dyers woad leaf (water) extracts were active against all the bacteria tested. The aqueous extracts of Chinese pulsatilla root and dyers woad leaf and the ethanolic extracts of ash barks had the lowest MIC against Salmonella pullorum (0.025 g/mL); the ethanolic extracts of ash barks had the lowest MIC against *E. coli* (0.025 g/mL).

Key words: traditional Chinese medicine, aqueous extracts, ethanolic extract

T252 Effect of season on four categories of fresh and current new mastitis infections in Minnesota. R. F. Leuer* and J. K. Reneau, *University of Minnesota, Saint Paul.*

New infection rates are a leading indicator of a dairy's udder health. Seasonal climate changes make it challenging to produce milk at a consistent quality level. Identifying problem months is important to focus effort on preventing spikes of high new infections. The objective of this study was to identify and quantify the months where herds have the highest percent of fresh cows with new infections (FNI) and percent of current lactating cows with new infections (CNI). Minnesota DHIA monthly average herd somatic cell count (SCC) records were collected from January 2007 to November 2010. Monthly herd tests without SCC information were removed and only herds with an average of 10 tests per year over the collection period were included. Herds were divided into 4 categories based on average herd SCC over the collection period. Low herds (L) with less than 200,000 SCC (n = 325), medium low (ML) herds between 200,000 and 300,000 SCC (n = 547), medium high herds (MH) herds between 300,000 and 400,000 SCC (n = 470), and high herds (H) above 400,000 SCC (n = 438). Monthly records (n = 66,296) were analyzed using PROC GLM with

significant differences determined at $P < 0.05$ using Tukey's multiple comparisons test. FNI was different in all categories except for MH and H (L = 11.8, ML = 14.1, MH = 15.6, H = 15.7). The statistically highest month for FNI was June (L = 12.7, ML = 15.1, MH = 17.2, H = 17.6) for all categories, with FNI similar for MH and H. The 4 categories were all significantly different in overall average CNI (L = 8.1, ML = 10.5, MH = 12.5, H = 14.2). High months of CNI for L herds were July and August (9.1, 9.3), ML high months were July, August, and September (11.6, 11.9, 11.2), MH high months were July, August, and September (13.6, 13.6, 13.1), and H high months were January, February, July, and August (15.1, 14.4, 15.3, 14.9). The greatest challenge for FNI appeared to be spring when cows may be exposed to the dampest environments. The summer months were the worst for CNI, with the addition of the deep winter months for the poorest milk quality herds.

Key words: SCC, DHIA, new infections

T253 Effect of somatic cells counting on milk composition of Holstein cows. J. A. De Freitas*[1], A. F. Garcez Neto[1], J. C. De Souza[2], J. Da Silva[1], V. L. De Souza[1], and T. M. Dos Santos[1], *[1]Federal University of Parana, Palotina, Parana, Brazil, [2]Federal University of South Mato Grosso, Aquidauana, Mato Grosso do Sul, Brazil.*

The subclinical mastitis is among the main diseases causing changes in milk composition and reducing their quality. Therefore, the somatic cell counting has been widely used as a tool for monitoring milk quality, which is an important factor to the milk industry and the health of the mammary gland. The objective of this study was to evaluate the correlation between somatic cells counting (SCC) and the contents of fat, protein, lactose, total solids, urea and milk production in Holstein cows of a Brazilian herd. It were used 3544 data of milk yield and composition from 467 cows of a commercial heard with an average milk production of 27.46 L / day during the year of 2006. Animals were kept in free stall system receiving a ration presented 17% of crude protein and 75% of total digestible nutrients (TDN) in dry matter (DM). The roughage:concentrate ratio used was 50% in DM . The roughage was based in corn silage and the concentrate feed was composed by soybean meal, cottonseed meal, vitamin and mineral premix. Individual milk samples were made monthly and from each sample were analyzed the percentage of protein, fat, lactose, total solids, urea and SCC. Data of production and milk composition were compared using ANOVA and correlation. There was no significant effect ($P > 0.05$) between SCC and fat content although there was found inverse correlation between SCC and % of milk fat (Table 1). There were significant negative correlations ($P < 0.05$) between SCC and lactose, total solids, urea and milk production, and positive and significant correlation ($P < 0.05$) between SCC and protein content. It can be concluded that the increase in SCC affect negatively the milk quality.

Table 1. Coefficients of correlation between somatic cell counting (SCC) and the levels of fat, protein, lactose, total solids, urea and milk production in dairy cows

Component	Coefficients of correlation	Level of significance
% Fat	−0.02098	0.2117
% Protein	0.13497	0.0001
% Lactose	−0.36840	0.0001
% Total solids	−0.10684	0.0001
% Urea	−0.11734	0.0001
Daily milk production (kg/d)	−0.20438	0.0001

Key words: lactation, mastitis, milk quality

T254 Immunoglobulin G1 concentration and bacterial contamination of colostrum fed to newborn Holstein heifers in Central California dairies. I. Z. Zhelev*[1], N. D. Spiro[1], J. D. Robison[1], J. Quigley[2], and A. Lago[2], *[1]California State University, Fresno, [2]APC Inc., Ankeny, IA.*

Objectives of this study were to evaluate the current status of immunoglobulin G1 (IgG1) concentration and bacterial contamination of first feeding colostrum under existing management practices of 7 Central California dairies ranging in herd size from 800 to 4000 adult cows. Colostrum samples (n = 546) were collected before first colostrum administration to newborn Holstein heifers. Three of the 7 dairies added supplement to colostrum (n = 312). On these dairies, 2 colostrum samples were obtained, one before adding supplement and one after supplementation. Colostrum collection began July 2009 and continued monthly through June 2010. Samples were analyzed for IgG1 using ELISA and bacteriology assessed through Standard Plate Count (SPC). Mean (SD) IgG1 concentration of colostrum fed was 35.96 (±16.13) mg/ml with a range of 0.45 to 114.94 mg/ml. Within dairy mean IgG1 concentrations varied from 21.20 to 47.21 mg/ml. Within the 3 dairies supplementing colostrum, mean IgG1 concentrations before and after supplementation was 45.39 and 47.21 mg/ml, 32.13 and 35.39 mg/ml, 27.20 and 37.07 mg/ml, respectively. Colostrum fed contained SPC ranging from 13,420 to 2,171,835 cfu/ml. A total of 41 (17.52%) of the pure colostrum fed (n = 234) were contaminated (>100,000 cfu/ml). Supplemented colostrum fed (n = 312) was contaminated in 179 (57.37%) of the cases. Thus, 220 (40.29%) of the total 546 calves were fed contaminated colostrum. A dramatic increase in SPC (52,817 to 2,171,835 cfu/ml) in supplemented compared with unsupplemented colostrum was observed in one dairy. The range of colostral IgG1 and SPC concentrations between herds suggests the potential exists to produce quality colostrum. However, this same data also suggests major flaws in the consistency of colostrogenesis and management of colostrum being fed to calves. Colostrum supplementation may lead to increases in colostrum IgG1 concentrations. Colostrum management practices markedly influence SPC concentrations.

Key words: colostrum, immunoglobulin, standard plate count

T255 Use of a blood glucose meter compared with laboratory analysis in dairy calves . M. R. Stafne* and S. I. Kehoe, *University of Wisconsin-River Falls, River Falls.*

Measuring glucose levels in calves is a key component in many research studies. However, testing the glucose levels at a laboratory can prove to be expensive and can delay progression of a project if the data are needed immediately. As an alternative to laboratory testing, it was hypothesized that a hand-held glucose meter would provide the same accurate results but faster. Therefore, the objective of the study was to determine the accuracy of a glucose meter when used on dairy calves compared with results from a laboratory test. Sixty-eight samples were collected from 34 calves with a 2-wk interval between the 2 sampling periods. Testing and housing of the calves was performed at Merrick's Research Facility (Union Center, WI). The calves used were fed a standard 20/20 milk replacer at 10 oz. DM per day which included various supplements due to an ongoing nutrition trial. Calves were housed in plastic hutches and were fed water and grain (18% CP; Prince, Marshfield, WI) ad libitum. Blood was collected using a blood collection vacutainer containing sodium fluoride (BD Diagnostic Systems, Franklin Lakes, NJ). Samples were first tested on whole blood

using a glucose meter and then centrifuged. Plasma was extracted using a pipette and frozen for later analysis at Marshfield Laboratories (Marshfield, WI). Measurements were statistically analyzed using the Proc Ttest in SAS 9.2 and were determined significant at $P < 0.05$. Least squares means for the laboratory glucose test and glucose meter were 93.97 ± 17.79 mg/dL and 121.66 ± 25.84 mg/dL, respectively ($P < 0.001$). It was concluded that the 2 testing methods did not produce comparable results. The variation in glucose concentration may have been due to the type of blood sample needed to run each test. Additional research containing more samples and other various tests would be recommended.

Key words: glucose, calves, glucose meter

T256 Study on the metabolic mechanism of melamine in dairy cattle. X. Jin, Y. Zhang, S. Li*, H. Zhang, Q. Zhang, and Z. Cao, *State Key Laboratory of Animal Nutrition, College of Animal Science and Technology, China Agricultural University, Beijing, China.*

This trial was to study the effects of dietary supplementation of melamine byproducts on residual concentration of melamine in rumen fluid, blood, urine, feces and milk of dairy cows. The further object was to reveal the metabolic mechanism of action of melamine in dairy cows by single factor experiment. The experiment was divided into 3 phases with 10 d in each phase (7 d for pre-feeding and 3 d for sampling). Five cannulated multiparous cows with similar milk yield and body weight were assigned to the experiments. There were 3 levels set in the melamine byproducts experiment, using 0.516%, 0.860%, 1.204% melamine byproducts to replace 3%, 5%, 7% soybean meal relatively. Feeding the dairy cows with the same concentration of pure melamine or melamine byproducts in each part of the experiments, the supplementing level was from low to high, and fed melamine byproducts to the cows with concentration in the morning. Data were analyzed as a completely randomized single factor design by ANOVA using the general linear model procedure in SPSS. The results showed that residual concentration of melamine in each kind of samples was durative increasing. When the melamine byproducts level rose to 0.860% in the concentration, the residual concentration of melamine in samples of milk was significantly different from that of 0.516% ($P = 0.02$), while the residual concentration in other samples were not significantly different; when the melamine byproducts level rose to 1.204%, the residual concentration in ruminal fluid and urine were very significantly different from that of 0.516 ($P \leq 0.01$), the residual concentration in blood, raw milk were significantly different from that of 0.516 ($P = 0.02$). The residual concentration in feces was not significantly different from that of 0.516% and 0.860% ($P = 0.27$), though the concentration of melamine was durative increasing; The concentration of melamine in the raw milk, feces and urine from the phase with the highest supplemental level were 1.31, 3.30 and 107.75mg/kg, respectively. It is concluded that renal excretion is the primary metabolic pathway of melamine while defecation and lactation are only auxiliary pathways. It was consistent with the report that melamine had negative effect on kidney.

Key words: dairy cattle, melamine, metabolic mechanism

T257 Association between milk urea nitrogen and fertility of Brazilian dairy cows. M. C. Doska[1], J. A. Horst[2], A. A. Valloto[2], and R. Almeida*[1], *[1]Universidade Federal do Paraná, Curitiba, PR, Brazil, [2]Associação Paranaense de Criadores de Bovinos da Raça Holandesa, Curitiba, PR, Brazil.*

The objective of this study was to associate milk urea nitrogen (MUN) values with reproductive performance of dairy cows from Paraná State, south of Brazil. With this purpose, 16,569 test-days from 2,145 dairy cows belonging to 3 large Holstein herds were analyzed. Monthly MUN concentrations measured using infrared test method before conception in these 3,926 lactations obtained from official milk recording program were used in this analysis. Generalized linear model methodology was adopted to determine the relationship between days open and the included fixed effects and the covariable peak milk yield, assuming gamma distribution. Animals were categorized into quartiles based on MUN values. General means in this data set were 154.4 ± 77.6 for days open, 48.6 ± 9.7 kg for peak milk yield, and 44.9 ± 21.2 mo of age. First, average, and maximum MUN values before conception were 13.85 ± 3.83, 15.36 ± 2.78, and 18.10 ± 3.57 mg/dL, respectively. Correlations between days open and the first MUN test after parturition (r = 0.03) and between days open and average MUN before conception (r = 0.07) were weak, but the association between days open and maximum MUN test before conception was higher (r = 0.30). Correlation between days open and peak milk yield also was positive (r = 0.16), which means that higher producing cows showed a trend for lower fertility. Days open from dairy cows calving in the fall were lower ($P < 0.01$) than in the remaining seasons; 135.5 ± 1.0 versus 152.6 ± 1.0, 155.4 ± 1.0, and 171.2 ± 1.0, respectively for summer, winter, and spring calving seasons. Primiparous cows showed lower ($P < 0.01$) days open than older cows; 144.9 ± 1.0 for first-lactation cows, 152.5 ± 1.0 for second-lactation cows, and 162.6 ± 1.0 for 3 or more lactation cows. Maximum MUN test before conception is more closely associated with increased days open than average MUN before conception or the first MUN test after calving. Maximum MUN values before conception greater than 15.5 mg/dL were associated with decreased fertility in Brazilian lactating dairy cows.

Key words: reproduction, protein, days open

T258 Metabolic profiles and immune status of periparturient dairy cows transitioning from conventional to organic management system. J. F. Odhiambo*, Q. Zebeli, S. Iqbal, D. A. Mansmann, U. Farooq, S. Sharma, S. M. Dunn, and B. N. Ametaj, *University of Alberta, Edmonton, AB, Canada.*

Metabolic profiles and plasma haptoglobin (Hp) in dairy cows transitioning from conventional to organic management system were compared with those of dairy cows managed conventionally. Blood samples were collected from Holstein and Jersey dairy cows during the dry period (DP), 0–30, 30–60, and 60–90 d in milk (DIM, n = 7 cows for each lactation stage). Concentrations of NEFA, BHBA, cholesterol, lactate and Hp in the serum were measured by ELISA. Data were analyzed by the mixed procedures of SAS. Results showed that concentrations of NEFA and BHBA were highest ($P < 0.001$) at 0–30, intermediate at 30–60 and 60–90 DIM, and lower during the DP. Interestingly, BHBA was greater ($P < 0.001$), at all stages of lactation, in conventional cows (e.g., 1289.4 ± 88.6 vs. 883.6 ± 47.5μmol/L at 0–30 DIM). Serum concentrations of cholesterol increased with increasing DIM and returned to nadir levels during DP and was higher ($P < 0.001$) in conventional than organic cows. Low glucose concentrations were observed 0–30 DIM, levels were intermediate at 30–60 and 60–90 DIM, and peaked during the DP ($P < 0.001$). Glucose concentrations did not differ ($P = 0.54$) between conventional and organic cows. Lactate did not ($P = 0.24$) vary with DIM or day × farm type but was higher ($P < 0.001$) in organic cows than in conventional ones. Serum concentrations of Hp were elevated during the DP; reached peak levels 0–30 DIM, and decreased gradually with increasing days postpartum

and were much higher ($P < 0.001$) at all periods in conventional than organic cows. Overall, concentrations of Hp were 528.1 ± 45.2 μg/mL in conventional cows vs. 261.1 ± 16.9 μg/mL in organic cows ($P < 0.001$). Taken together, data indicated that metabolic changes associated with initiation of lactation are preceded by an acute phase response in dairy cows, and that cows in organic systems seem to be healthier than cows under conventional systems. These differences might be due to differences in nutritional management and milk production expectations in the 2 systems.

Key words: organic dairy cows, metabolic profile, immunity

T259 Season and stage of lactation affected metabolic profiles and innate immunity of periparturient dairy cows. J. F. Odhiambo*, Q. Zebeli, S. Iqbal, D. A. Mansmann, U. Farooq, S. Sharma, S. M. Dunn, and B. N. Ametaj, *University of Alberta, Edmonton, AB, Canada.*

Blood metabolic profiles and innate immunity were evaluated in 4 dairy herds during their periparturient period. Blood samples were obtained during dry period (DP), 0–30, 30–60, and 60–90 DIM from dairy cows (n = 7 for each lactation group) by tail venipuncture during summer and winter of 2009 and 2010, respectively. Concentrations of NEFA, BHBA, glucose, cholesterol lactate and haptoglobin (Hp) in serum were analyzed by ELISA. Data were evaluated by the mixed procedures of SAS. Interactions between season and stage of lactation affected blood NEFA ($P < 0.001$) and Hp ($P < 0.02$) but tended ($P < 0.10$) to affect cholesterol and glucose. No effects were observed for BHBA and lactate. Concentrations of NEFA in cows during summer were greater 0–30 DIM, intermediate 30–60 DIM and DP, and lower between 60 and 90 DIM. The pattern was similar in winter except for greater values at 60–90 DIM compared with summer values (301.9 ± 29.3 vs. 174.2 ± 28.6 μEq/L, respectively). Concentrations of Hp in serum were elevated during the DP, peaked between 0 and 30 DIM and gradually declined to nadir levels between 60 and 90 DIM. At 0–30 DIM concentrations of Hp were higher in summer than in winter (495.9 ± 47.9 vs. 334.3 42.9 μg/mL, respectively). Cholesterol was lower ($P < 0.01$) during the DP and 0–30 DIM but higher ($P < 0.01$) 30–60 and 60–90 DIM in both seasons. In the latter periods, winter concentrations of cholesterol were numerically greater than those of summer (202.2 ± 8.7 vs. 187.7 ± 9.3, and 227 ± 9.2 vs. 207.6 ± 10.9 mmol/L, for 30–60 and 60–90 d, respectively). Glucose was higher during the dry period, lower immediately post calving, and gradually increased thereafter in both seasons. However, the concentrations during 0–30 and 30–60 DIM tended to be higher in the winter than during summer (46.6 ± 1.9 vs. 56.5 ± 1.7, and 52.9 ± 2.1 vs. 58.1 ± 1.8 mg/dL, respectively). In conclusion, differences in nutrition regimens and likely in milk yields for summer and winter seasons exacerbated cow responses to negative energy balance variably and the effects were more pronounced in summer than in winter.

Key words: dairy cows, season, metabolic profile

T260 Management factors affecting microbial contamination of bovine colostrum. E. Conrad*[1], K. Morrill[1], J. Quigley[2], and H. Tyler[1], *[1]Iowa State University, Ames, [2]APC Inc., Ankeny, IA.*

Our objective was to determine management practices that affect the level of bacterial contamination of maternal colostrum (MC) on US dairy farms. Samples of MC (n = 892) were collected from 65 farms in 12 states. Samples of MC were obtained from Holstein (n = 629), Jersey (n = 191), and unidentified (n = 102) breeds of cattle. Total plate count (TPC) and coliform count (CC) were determined for each sample (DHI, Dubuque, IA). An investigator completed a management survey assessing 53 factors associated with management practices on each farm. The average TPC for the MC was 5.50×10^5 cfu•ml^{-1}, well above the recommended industry standard of $<1.0 \times 10^5$ cfu•ml^{-1}. MC with TPC counts greater than $1.0x10^5$, $5.0x10^5$, and 10.0×10^5 accounted for 45.9, 27.2, and 16.6% of samples, respectively, indicating that bacterial contamination of colostrum is a significant problem. Industry standards recommend that MC CC be $<1.0 \times 10^4$ cfu•ml^{-1}. The average CC of MC was 115.16 cfu•ml^{-1}, 77.0% of the samples were <50.0 cfu•ml^{-1}, indicating that the industry standard of $<1.0 \times 10^4$ cfu•ml^{-1} may not be a good indicator of MC coliform contamination. Based on survey responses (n = 804) MC was transferred to an average of 2.48 containers before feeding. 42.29% and 8.96% of MC was transferred to >3 and >4 containers respectively. The average time from MC collection to the feeding or storage was 48 min, with 54.3% of the samples being fed or stored >60 min after collection. Colostrum was allowed to sit at room temperature for an average of 33 min after being removed from storage before feeding, with 20.1% of samples sitting out for >60 min before being fed. These survey results indicate that MC management practices may be responsible for the high levels of bacterial contamination observed in this data set.

T261 Effect of short-term treatment with bovine somatotropin on milk yield of Brazilian dairy cows. R. Almeida*[1] and S. L. Viechnieski[2], *[1]Universidade Federal do Paraná, Curitiba, PR, Brazil, [2]StarMilk Farm, Céu Azul, PR, Brazil.*

The objective of this trial was to evaluate short-term milk yield response of 2 commercial sources of bovine somatotropin (bST) administered every 14 d in a high-producing dairy herd. One hundred sixty Holstein cows from the StarMilk Farm, Paraná State, south of Brazil, averaging 53.9 ± 13.5 mo of age, 217 ± 148 DIM, 43.5 ± 11.7 kg/d of milk, 680 ± 65 kg of BW, and 2.90 ± 0.21 BCS were assigned to one of 2 treatments in a randomized block design using milk production during the 7-d pretreatment period as the blocking criterion. Treatments were 4 consecutive subcutaneous injections of 500 mg of bST (Boostin, Intervet Schering-Plough Saúde Animal, Brazil) or 500 mg of bST (Lactotropin, Elanco Saúde Animal, Brazil), both given at 14-d intervals. All cows were milked 3x a day and received the same TMR fed 5x daily, consisting of corn silage, ryegrass silage, corn grain ground, soybean meal, whole cottonseed, soybean hulls, urea, minerals, and vitamins. The DM, CP, and NDF contents of the offered diets were similar between treatments, as well as cow's BCS and reproductive status. The estimated nutritional levels of this diet were 53.7% DM, 1.64 Mcal/kg NE_{lac}, 17.0% CP, 33.3% NDF, 19.5% ADF, 19.0% $_{pe}$NDF, 38.0% NFC, and 4.2% EE. Each group of cows was housed in a side of a free stall and no cow entrance was allowed during the trial. Data was analyzed with the mixed procedure of SAS with a model containing the continuous effect of the covariate and the fixed effects of block, treatment, day, and the interaction between treatment and day. The mean square of cow nested within treatment was used as the error term to test the treatment effect. Boostin-treated cows yielded 1.6 kg/d more milk ($P = 0.02$) than Lactotropin treated cows; 38.8 ± 0.5 versus 37.2 ± 0.5 kg/d, respectively. Treatment and day interaction also was an important source of variation ($P < 0.01$), and milk yield differences between the 2 bST sources were observed mainly in the first half of each 14-d cycle of bST administration. In this short-term trial it was observed differences in the milk yield response between the 2 commercial sources of bST.

Key words: dairy cow, growth hormone

T262 Chop length, dry matter and density of corn and wheat silage structures in California dairies. N. Silva-del-Río*[1] and C. Heiman[2], *[1]University of California Cooperative Extension, Tulare, [2]Alltech, Lexington, KY.*

The aim of this study was to describe chop length, dry matter and density of corn (n = 25) and wheat (n = 16) silage structures in California dairies. Corn silage was stored in conventional piles (n = 22), drive over piles (n = 2), and bunkers (n = 1), that averaged 24 ft in height (range: 14–30 ft). Wheat silage structures were either conventional piles (n = 15) or bunkers (n = 1) and averaged 20 ft in height (range = 10–30 ft). Corn silage chop length was 1.3 cm (n = 6), 1.6 cm (n = 1), 1.9 cm (n = 14) and 2.2 cm (n = 4). Wheat silage chop length was 1.3 cm (n = 6), 1.9 cm (n = 9) and 2.2 cm (n = 1). Three density samples were taken at 6 ft from the bottom (B), and 2 samples at 6 ft from the top (T). The average of all the density samples collected was expressed as dry matter (DM) and as fed (AF). As fed density indicates porosity (resistance to air penetration) and may be a better indicator of silage preservation than DM density. Densities were compared with paired *t*-test (T and B) and chi-squared test (DM and AF). Average silage DM was 35.7% (range: 27.0–42.0%) for corn and 32.9% (range: 26.3–38.2%) for wheat. Silage DM was 35.4% (B) and 37.0% (T) for corn, and 35.5% (B) and 35.3% (T) for wheat. A greater ($P < 0.001$) proportion of corn silage structures met the desired density benchmark when expressed as DM (88.0%; 15 lb DM/ft3than AF (44.0%; 44 lb AF/ft3). Corn silage structures (88.0%) had at least one density sample below 44 lb AF/ft3, and 60.0% below 35 lb AF/ft3. Density of corn silage structures was higher at B than at T (47.6 vs. 36.6 lb AF/ft3; $P < 0.001$). There were no differences in the proportion of wheat silage structures meeting the desired density benchmark as AF (18.7%; 40 lb AF/ft3) or as DM (31.2%; 14 lb DM/ft3). Wheat silage structures (87.5%) had at least one density sample below 40 lb AF/ft3, and 68.7% below 30 lb AF/ft3. Density of wheat silage structures was higher at B than at T (40.0 vs. 29.1 lb AF/ft3; $P < 0.001$). The units (DM or AF) and sample location (B and T) need to be accounted for when interpreting silage density results. There are opportunities to improve silage packing density in California dairies.

Key words: corn silage, wheat silage, density

T263 Molecular aspect of laying hens feed cottonseed meal supplemented with lysine and enzyme. K. Pournia*, H. Kermanshahi, and A. Golian, *Ferdowsi University of Mashhad, Mashhad, Iran.*

The objective of this study was to evaluate the effect of cottonseed meal supplemented with lysine and NSP-depredating enzyme on jejunum cell efficiency and magnum protein synthesis as measured RNA:DNA and Protein:RNA ratio, respectively. Eighty White Leghorn hens (80 weeks old) were used in this experiment for 12 weeks. Hens were randomly divided into 4 treatments of 5 replicates with 4 birds in each. The experiment was conducted in 2 × 2 factorial experiment in completely random design (CRD). The hens were fed by mash basal diet supplemented with 1% lysine + 0% enzyme (Treatment 1), 1% lysine+0.025% enzyme (Treatment 2), 2% lysine+0% enzyme (Treatment 3), 2% lysine+0.025% enzyme (Treatment 4). Feed and water were provided ad libitum. The result indicated that protein content in magnum was not significantly affected by different levels of lysine and enzyme. Although magnum Protein: RNA ratio increased as lysine level increased ($P < 0.05$). However, results have shown that jejunum DNA concentration was not significantly affected by lysine ($P > 0.05$). Moreover, jejunum RNA: DNA ratio increased with 2% of lysine ($P < 0.50$). It was concluded cottonseed meal supplemented with lysine and enzyme had improved jejunum cell efficiency (RNA: DNA), and magnum protein synthesis (Protein: RNA) ratio in laying hens.

Key words: cottonseed meal, cell efficiency, protein synthesis

T264 Performance evaluation of Santa Ines ewes and lambs weaned at 60 days of lactation. M. M. Stradiotto*[1], A. D. Rodrigues[2], and J. A. Negrão[1], *[1]University of Sao Paulo – USP; Faculty of Animal Science and Feed Engineering – FZEA, Pirassununga, SP, Brazil, [2]University of Sao Paulo State – UNESP; Faculty of Agronomy and Veterinary Sciences – FCAV, Jaboticabal, SP, Brazil.*

The objective of this work was to verify how the maternal stress influenced lambs performance during suckling and after weaning. For that, milk production of 50 ewes was measured during 90 d of lactation. Before weaning, milk production was measured twice a month by the system weigh-suckle-weigh of lambs. Weaning occurred abruptly, at 60 d of lambs life, and after that, milk production was daily measured for 30 d. During lactation, animals were submitted to stressful stimulus called ACTH, where ewes received 1 mL/10kg BW of ACTH (adrenocorticotropic hormone) with saline solution 0.9%, which corresponded to the administration of 0.6 UI of the hormone by intravenous injection (jugular). Blood samples were collected by jugular vein puncture in 5 times: −20 min (20 min before the stressful stimulus ACTH), 0 min (soon after the stimulus) and 60, 120, and 300 min after the stimulus. The variables were analyzed in subdivided parcels, which means as repeated measures in time through MIXED procedure. Means were compared by Tukey test with a significance level of 0.05 and, when necessary it was performed the Pearson correlation analysis through statistical program SAS (2000). Mean milk production before weaning was influenced by cortisol levels at 60 min after ACTH administration, with linear correlation of 0.36 ($P < 0.01$). However, mean milk production after weaning and weight of lambs were not influence by imposed stress to the animals. Milk production was greater at 90 d, as in the fourth week after weaning, mean production was 195.2 mL (±17.74), showing that the breed has satisfactory mean milk production.

Key words: milk, sheep, weigh-suckle-weigh

T265 Comparison of pork characteristics of antibiotic free Yorkshire crossbreds raised in the hoop barn. S.-H. Oh*[1], D. Bautista[2], D. Hanson[2], M. Morrow[2], and T. See[2], *[1]North Carolina A&T State University, Greensboro, [2]North Carolina State University, Raleigh.*

The objective of this study is to compare pork characteristics for antibiotic free Yorkshire crossbreds to be raised in the hoop barn. The experiments have been accomplished in North Carolina Agricultural and Technical State University Farm and The Center for Environmental Farming Systems (CEFS) in Goldsboro, NC, where have been raising antibiotic free Yorkshire sows. Twenty 4 sows were impregnated in each research farm with the semen of Berkshire, Large Black, Tamworth and Yorkshire as a control group. Litters were weaned, and reared within deep-bedded hoop houses. The deep bedding, generally straw, corn stalks, or hay, was spread approximately 14–18 inches thick and provided a comfortable environment for the animals, which allows rooting and other natural behaviors. One hundred four pigs were used to compare pork characteristics which include pH, color score, L*, a*, b*, marbling score, drip loss, hot carcass weight, backfat thickness (BF), loin muscle area (LMA), and shear force. The data was analyzed with GLM in SAS 9.01 including research farm, season, breeding

group and sex as fixed effects. Backfat thickness, LMA, and drip loss were significantly different among breeding groups ($P < 0.05$). Large Black breeding group showed significantly higher backfat thickness followed by Berkshire, Yorkshire and Tamworth groups. However, Tamworth breeding group had significantly higher drip loss (4.50 g) than other groups; 3.77 g, 3.26 g, and 2.62 g in Yorkshire, Berkshire, and Large Black groups, respectively. This information helps the small farmers who raise rare breeds to choose better breed combinations for outdoor environments.

Key words: antibiotic-free Yorkshire, crossbred, pork characteristics

T266 Comparison of body weights in Berkshire and Large Black crossbreds produced by the use of antibiotic-free Yorkshire sows. S.-H. Oh*[1], M. Morrow[2], and T. See[2], *[1]North Carolina A&T State University, Greensboro, [2]North Carolina State University, Raleigh.*

The objective of this study was to compare body weights of Berkshire and Large Black crossbreds produced by the use of antibiotic free Yorkshire sows raised in a hoop facility. Pigs were reared within deep-bedded hoop houses at finishing phase. The swine unit at North Carolina A&T State University has a 48 × 96 ft hoop facility that is different from standard confinement facilities. The deep bedding, generally straw, corn stalks, or hay, is spread approximately 35–45 cm thick and provides a comfortable environment for the animals which allows rooting and other natural behaviors. It is relatively difficult to measure feed intake and growth rates for pigs raised in outdoor systems compared with confinement systems. Eight Feed Intake Recording Equipment (FIRE, Osborne Industries Inc. Osborne, Kansas) stations were used to collect body weight, feed intake, feeding time, feeding rate, number of feedings per day, and feed conversion. This abstract was limited to comparison of body weights among 3 breeding groups that were 23 finishing pigs (5 Berkshire × Yorkshire; 10 Large Black × Yorkshire; 8 Yorkshire × Yorkshire) in total. Before analysis, each individual′s feed intake records were evaluated for outliers by plotting feed intake by day and testing each feed intake observation with the Cook′s D test statistic and studentized residuals. After removal of outliers, 5 time points at 64, 125, 162, 176, 197, and 229 d of age, were selected to analyze the data with the repeated measurement method, which included 138 observations (30 records in Berkshire × Yorkshire; 60 records in Large Black × Yorkshire; 48 records in Yorkshire × Yorkshire). As a result, Berkshire breeding group (Berkshire × Yorkshire) showed significantly higher weights than Yorkshire purebred ($P < 0.05$), however, there was not significantly different between Berkshire and Large Black breeding groups as well as between Large Black and Yorkshire groups. This information helps the small farmers who raise rare breeds to choose better breed combinations for outdoor environments.

Key words: antibiotic free, Yorkshire, crossbred

T267 Evidence that maternal conjugated linoleic acid alters secondary metabolites in plasma of late-stage chick embryos that may lead to increased embryonic mortality. V. A. Leone*[1], D. Haughey[2], E. A. Bobeck[2], M. E. Cook[2], and F. M. Assadi-Porter[2], *[1]University of Chicago, Chicago, IL, [2]University of Wisconsin-Madison, Madison.*

Previous work in our lab shows that hens fed 0.5% conjugated linoleic acid (CLA) in a low-fat diet results in nearly 90% embryonic mortality in non-cooled, fertile eggs. Mortality appeared to be a result of decreased yolk lipid utilization by the developing embryo during the last week of development. Since the chick embryo relies on lipid for nearly 90% of its energy needs via β-oxidation during incubation, we hypothesized that if embryos from CLA-fed hens were lipid "starved," changes in blood secondary metabolites (metabolome) may be altered when compared with embryos from hens fed 0.5% canola oil. Single Comb White Leghorns (8 per treatment) were individually housed and fed standard layer mash with 0.5% canola oil or 0.5% CLA. After one month on diet, hens were artificially inseminated and eggs were incubated. On d 20 of incubation, 3 to 6 viable eggs from each treatment that had not pipped were removed from incubation and plasma was collected aseptically and immediately placed on ice. Plasma metabolites were analyzed via nuclear magnetic resonance (NMR) using a Varian 600 MHz instrument and integrated using MetaboAnalyst software. A 2-tailed *t*-test with unequal variance was conducted to determine significant differences ($P < 0.1$) using SAS. Embryos from hens fed CLA showed decreased plasma leucine ($P = 0.01$), alanine ($P = 0.03$), methionine ($P = 0.03$), glutamine ($P = 0.06$), tyrosine ($P = 0.03$), phenylalanine ($P = 0.07$), formate ($P = 0.06$), and glucose ($P = 0.01$). The significant decreases in plasma amino acids in embryos from CLA-fed hens suggest they are undergoing starvation, hence embryos from hens fed dietary CLA could be in a state of metabolic acidosis and undergoing protein catabolism to counterbalance these effects. This is further supported by the significant decrease in plasma glucose. These results provide preliminary data to show that embryos from CLA-fed hens exhibit a different pattern of metabolism than their control counterparts that may be associated with CLA's negative effects on embryonic mortality.

Key words: CLA, embryonic mortality, metabolomics

T268 Suitability of visual ear tags, electronic boluses and retinal images for tracing and auditing lamb traceability. M. A. Rojas-Olivares, G. Caja, S. Carné, A. Costa-Castro, A. K. K. Salama, A. Ait-Saidi, and M. Rovai*, *G2R, Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain.*

Lamb traceability using different identification (ID) devices was studied under farm and slaughterhouse conditions. Lambs were intensive fattened and slaughtered as Spanish Recental lamb (23 to 25 kg BW). Lamb primary ID was done at birth with temporary official visual ear tags (V1; polyurethane rectangular flags, 2.8 g, 40 × 15 mm; n = 241) in the left ear. Lamb secondary ID was done at weaning with permanent official visual ear tags (V2; polyurethane triangular flags, 5.2 g, 38 × 39 mm; n = 104) inserted in the right ear and with electronic mini-boluses (MB; ceramic capsules, 19 g, 56 × 12 mm) applied orally. Moreover, 81 lambs were ID with glass encapsulated transponders s.c. injected (IT) in the left armpit for tracing carcasses through the slaughtering line. Electronic ID by MB and IT used 32-mm half-duplex transponders. Retinal images of live lambs (n = 98) were taken at 80 d of age (both eyes) for auditing lamb ID. Head position was compared (normal, n = 67; reversed, n = 31) after harvesting. On-farm traceability did not vary according to ID device ranging from 98.6 to 100%; $P > 0.05$). The V1 and V2 were removed at beheading, and MB at evisceration, enabling carcass ID that was assumed to be the same as the slaughtering order. Although only 78.8% IT were retained after slaughter, they proved that carcass order was altered at weighing, reducing the carcass traceability in the slaughterhouse to 68.3%. All retinal images matched in live lambs, but live vs. slaughtered image matching markedly decreased in the normal vs. reversed head position (56.4 vs. 75.0%; $P < 0.05$). In conclusion, V1, V2, MB and IT were efficient devices for individually tracing live lambs but all of them failed for tracing carcasses efficiently. Individual tracing from farm to

carcass using radiofrequency ID devices would be possible if carcass order is maintained in the slaughterhouse. Retinal images efficiently audited live lambs and most of carcasses. We do not recommend the use of injects for lamb ID, agreeing with previous research, but they may be a useful tool for tracing carcasses when their order is compromised.

Key words: traceability, electronic identification, retinal image

T269 Retrospective analysis of the effects of feeding pelleted versus meal diets on growth performance of 12- to 30-kg nursery pigs over a 5-year period. E. D. Frugé*[1], E. L. Hansen[1], S. A. Hansen[1], K. A. Frerichs[1], and C. W. Hastad[2], *[1]Hubbard Feeds, Mankato, MN, [2]New Fashion Pork, Jackson, MN.*

A retrospective analysis was conducted on 5 trials (TRL) over 5 years (2006–2010) to determine the effects of feeding pigs pelleted (P) vs. meal (M) diets on growth performance. The TRL were combined and analyzed as a randomized complete block design with TRL and BW as blocking factors. Treatment (TRT) replication for each TRL were 12, 6, 12, 5 and 5, for TRL 1 to 5, respectively for a total of 40 replicates, with 25 to 28 pigs per pen (n = 2,129; 12.3 ± 1.05 kg initial BW). Trials were conducted using the same research barn and similar genetics (FAST/PIC dam × TR4 sire). The TRT were; 1) meal diet; and 2) as 1 pelleted. All diets were corn-soybean meal-DDGS based and contained 15, 15, 30, 23.5, and 30% DDGS, in TRL 1 to 5, respectively. Diets were formulated to be adequate in all nutrients and contained 1.20% TID Lys in all TRL except TRL 2 at 1.10% TID Lys. The average TRL length was 26.6 d, ranging from 24 to 29 d between TRL. Consistent improvements in performance for pigs fed pelleted diets were noted in each TRL (Table 1). Overall ADG, GF, and final BW were improved ($P < 0.01$) in pigs fed pelleted diets. Pigs fed pelleted diets had increased ADG by 5.4% and improved GF by 5.9%. These data provide the ability to determine economic benefits of feeding pelleted vs. meal diets in nursery pigs.

Table 1.

TRL[1]	ADG, g	SEM	GF	SEM	ADFI, g	SEM	ENDWT, kg	SEM
1M	618	4.45	0.60	0.002	1024	6.22	30.3	0.170
1P	645*		0.64*		1009		31.0*	
2M	631	9.28	0.66	0.002	950	14.00	28.8	0.379
2P	688*		0.71*		972		30.3**	
3M	615	7.08	0.67	0.005	918	9.21	27.0	0.211
3P	645*		0.72*		900		27.8**	
4M	641	14.0	0.64	0.004	995	25.00	29.9	0.509
4P	666		0.67*		987		30.6	
5M	623	8.64	0.63	0.007	986	13.49	29.0	0.324
5P	665**		0.67**		987		30.2***	
Cum. M	627	4.02	0.64	0.002	978	6.02	29.1	0.139
Cum. P	663*		0.68*		974		30.1*	

[1]TRT × TRL; $P > 0.35$; *$P < 0.01$; **$P < 0.05$; ***$P < 0.10$.

Key words: growth, nursery pigs, pellet

T270 Comparative assessment of boar spermatozoa having different cryopreservation potential. J. M. Feugang*[1], M. M. Ferraz[2,1], J. C. Rodriguez-Munõz[1], B. S. Grillis[1], S. T. Willard[3], and P. L. Ryan[1,4], *[1]Department of Animal and Dairy Sciences, Mississippi State University, Mississippi State, [2]Faculdade de Medicina Veterinariae Zootecnia, Universidade de Sao Paulo, Brasil, [3]Department of Biochemistry and Molecular Biology, Mississippi State University, Mississippi State, [4]Department of Pathobiology and Population Medicine, Mississippi State University, Mississippi State.*

Introduction of semen cryopreservation is still limited in swine industries due to their poor freezability. Indeed, a subset of boars, known as "bad freezers" induces low pregnancy and farrowing rates compared with "good freezers" when using same amounts of spermatozoa per insemination. Numerous studies have been conducted to improve the cryosurvival of boar semen, but there are still no clear indicators of freezability potential of boar semen. To this end, the present study was conducted to evaluate the motility and viability of boar spermatozoa with known cryotolerance status. Commercial proven fertile boars were selected upon conception rates after artificial inseminations (AI) using fresh semen. Semen of 3 independent ejaculations were collected from 4 "good" and 4 "bad" freezers as indicated by their differential conception rates after AI using frozen-thawed semen. Collected-semen were diluted and either stored in cooling solution or frozen in 5-mL plastic straws. Both semen types were centrifuged through a discontinuous percoll gradient to remove all contaminants. Motile spermatozoa were washed in PBS-PVP or extender for motility (CASA) and viability analyses. The proportions of motile, progressive, rapid, and viable spermatozoa were evaluated. Data were analyzed using a Student′s *t*-test, and $P \leq 0.05$ was fixed as threshold of significance. Sperm motility of cool-diluted semen was similar between "good" and "bad" freezers (82 ± 20% and 78 ± 16%). After freezing-thawing, the proportions of motile (24 ± 8% vs. 22 ± 10%), progressive and rapid spermatozoa were comparable between both boar groups. The proportions of (viable) spermatozoa with intact plasma membrane (94 ± 7% vs. 95 ± 4%), acrosome (29 ± 11% vs. 23 ± 6%) and mitochondria (87 ± 11% vs. 87 ± 10%) membranes were not significantly different between "good" and "bad" freezers. Our data confirm the inability of routine criteria of sperm evaluation to identify the freezability status of boars, suggesting the existence of induced-molecular cryodamages that may characterize "bad" freezer boars′ semen. Work supported by USDA-ARS Biophotonics Initiative #58-6402-3-0120.

Key words: spermatozoa, cryopreservation, motility