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SYMPOSIA AND ORAL SESSIONS

Animal Health I

232 Terminal restriction fragment length polymorphism analysis of gastrointestinal bacteria from conventional and segregated early weaned pigs: colonization and succession of putative pathogens and potential direct fed microbials. M. King^{*1}, D. Brown², E. Davis², J. Rehberger¹, J. Spencer³, D. Webel³, C. Maxwell², and T. Rehberger¹, ¹Agtech Products Inc., Waukesha, WI, ²University of Arkansas, Fayetteville, ³United Feeds, Sheridan, IN.

Terminal restriction fragment length polymorphism (T-RFLP) analysis was performed on bacteria colonizing the pars esophagus, duodenum, jejunum, and ileum of conventional (CON) and segregated early weaned (SEW) pigs. This methodology allowed observation of the effects of differing management practices and weaning on community gastrointestinal (GI) flora and monitoring of succession occurrences. Pigs (n=88) were weaned at 19 ± 2 d of age, separated into two groups based on initial BW, and randomly allotted to either the CON or SEW facility. Pigs from each group were divided into four weight groups, allotted into equal subgroups (2-3 pigs/pen) and stratified based on sex and litter. All pigs were fed common diets and managed under similar conditions by separate management personnel for each group. One pig from each weight block was randomly harvested (n=4 per facility), at d 1, 3, 11 and 24 post-weaning. To establish pre-weaning values, pigs (n=4) were also harvested prior to weaning at 7, 14 and 18 d of age for GI section T-RFLP analysis. Data analyses indicate that TRF peaks putatively containing respiratory pathogens such as *Mycoplasma*, *Bordetella*, and those of the *Pasteurellaceae* family (*Actinobacillus*, *Pasteurella*, or *Haemophilus*) or Direct Fed Microbial (DFM) potential Lactic Acid Bacteria (LAB) are often colonizing the pars esophagus ($P \leq 0.05$ or $P \leq 0.10$ depending on organism) during pre-weaning. A variety of pathogens and LAB also appear to be colonizing other GI sections depending on pig age and type of organism. Specific TRFs seem to be key indicators of CON and SEW management practices. The presence of specific pathogen TRFs were positively associated ($P \leq 0.05$) with pigs reared in CON facilities. Certain LAB which were positively associated with pre-weaning colonization ($P \leq 0.05$), persisted in SEW pigs, while negatively correlating to CON reared pigs ($P \leq 0.05$). These data suggest the potential bacterial factors relating to differences between CON and SEW management systems.

Key Words: Swine, Direct Fed Microbial, T-RFLP

233 Herd level risk factors for non-infectious and infectious causes of lameness for Ontario dairy herds. G. Cramer^{*1}, K. Lissemore¹, D. Kelton¹, C. Guard², and K. Leslie¹, ¹University of Guelph, Guelph, ON, Canada, ²Cornell University, Ithaca, NY.

Lameness in dairy cattle is one of the most important issues facing the dairy industry, in terms of both production costs and public perception of animal welfare. The objective of this project was to determine the effect of selected risk factors on the prevalence of infectious and non-infectious lameness lesions on dairy farms. A convenience sample of 5 hoof trimmers were trained and asked to record lesions on a standardized form for all cows they trimmed in a herd. In addition, they completed a risk factor questionnaire for each herd. Complete data was collected on 24 free stall herds and 89 tie stall herds, with an average herd size of 50 cows. Average prevalence of infectious causes and non-infectious

lameness lesions was 22.9% and 17.9% respectively. The impact of specific risk factors was evaluated using separate linear regression models for infectious and non-infectious lesions and for free stall and tie stall herds. For both infectious and non-infectious lesions, herds housing milking cows in free stalls had a significantly increased prevalence compared to herds using tie stalls. For tie stall herds, the use of wood shavings for bedding and routinely spraying cows feet were associated with an increased prevalence of infectious lesions. However, the use of a total mixed ration was associated with decreased infectious lesion prevalence. For non-infectious lameness lesions in tie stall herds, trimming heifers prior to calving decreased prevalence by 4.6%. Furthermore there was a tendency for higher prevalence with increasing herd size. In free stall herds, using less than 2.5 cm of bedding was associated with a 13.3% increase in non-infectious lesion prevalence. From these results, it is clear that the dairy industry continues to struggle with both infectious and non-infectious lameness lesions. They also illustrate that certain risk factors are associated with considerable effects on prevalence levels.

Key Words: Lameness, Risk Factors, Prevalence

234 Lactate Dehydrogenase and N-acetyl-b-D-glucosaminidase activities in bovine milk as measures of clinical mastitis. M. G. G. Chagunda^{*}, T. Larsen, M. Bjerring, and K. L. Ingvarsen, *Danish Institute of Agricultural Sciences, Department of Animal Health, Welfare and Nutrition, Tjele, Denmark.*

The activities of lactate dehydrogenase (LDH) and N-acetyl-b-D-glucosaminidase (NAGase) and their relationship to somatic cell count (SCC) was investigated in normal and mastitic bovine milk. A full dataset, consisting of records from Danish Holstein (11893 records), Danish Red (13359 records) and Jersey cows (9135 records) on one research farm were utilized in the study. In healthy cows all the three parameters, LDH, NAGase, and SCC started at a high level immediately after calving and decreased to low levels as the lactation progressed. Although on average all three parameters had higher levels at the end, than at the beginning of lactation, NAGase had a substantially higher variation (CV = 73.89%) at the end of lactation (vs. 64.26% at the beginning of lactation). In healthy cows, the correlation among the three parameters was moderate at the beginning of lactation ($r = 0.40$ for LDH vs. SCC, $r = 0.44$ for NAGase vs. SCC, and $r = 0.37$ for LDH vs. NAGase) and low at the end of lactation ($r = 0.40$ for LDH vs. SCC, $r = 0.34$ for NAGase vs. SCC, and $r = 0.11$ for LDH vs. NAGase). In mastitic cows, LDH and NAGase activity rose rapidly from about 8 days before a diagnosed mastitis incidence while SCC rose slowly from about 12 days before diagnosis. LDH had the highest increase in the period prior to diagnosis while SCC had the lowest increase. The relationships among the parameters in milk from mastitic cows were higher than in milk from healthy cows ($r = 0.61$ LDH vs. SCC, $r = 0.53$ NAGase vs. SCC, and $r = 0.43$ LDH vs. NAGase). The results indicate that especially LDH and to some extent NAGase activity in milk can be used as an indicator of clinical mastitis. As biosensor assays for LDH are now becoming available this affords the opportunity for improved, automated, real-time, in-line mastitis detection.

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Key Words: Clinical Mastitis, Lactate Dehydrogenase, N-acetyl-b-D-glucosaminidase

235 Acute experimental mastitis perturbs plasma macromineral and α -tocopherol concentrations in early-lactation dairy cows. M. R. Waldron^{*1}, B. J. Nonnecke², R. L. Horst², A. E. Kulick¹, and T. R. Overton¹, ¹Cornell University, Ithaca, NY, ²National Animal Disease Center, USDA-ARS, Ames, IA.

Twenty Holstein cows in early lactation (7 days in milk) were administered 100 μ g of *Escherichia coli* lipopolysaccharide (LPS) dissolved in 10 ml sterile 0.9% NaCl saline (TRT, n = 10) or 10 ml sterile saline absent LPS (CTL, n = 10) into both right mammary quarters. The hypothesis that acute experimental mastitis would have negative impacts on plasma macromineral and vitamin concentrations that might be important toward the development of metabolic disorders was tested. The CTL cows were pair-fed with an individual TRT cow to account for potential differences in feed intake due to TRT. The TRT cows displayed productive, clinical, and physiological signs of moderate to severe inflammation, whereas CTL cows displayed no signs of immune activation. Relative to the CTL cows, the TRT cows displayed marked decreases in plasma calcium (treatment by time effect, $P < 0.01$) and phosphorus (treatment by time effect, $P < 0.01$) and a significant increase in plasma magnesium (treatment by time effect, $P < 0.01$) concentrations over time following intramammary infusion. Interestingly, the decrease in plasma phosphorus occurred despite very low pre-treatment plasma phosphorus concentrations (2.70 ± 0.26 mg/dl). There were no effects of TRT ($P > 0.20$) on plasma 1,25-(OH)₂ vitamin D₃ (87.8 vs. 81.6, SE = 6.5 for TRT and CTL, respectively) or retinol (50.8 vs. 48.0, SE = 1.6 for TRT and CTL, respectively) concentrations; however, plasma α -tocopherol concentration (459 vs. 514, SE = 16 for TRT and CTL, respectively) was decreased by TRT (treatment effect, $P < 0.05$). Acute experimental mastitis altered plasma concentrations of macrominerals and α -tocopherol in this study. These data suggest that immune activation during cases of natural bovine mastitis may be an important factor for metabolic health in early-lactation dairy cows.

Key Words: Mastitis, Minerals, Vitamins

236 Evaluation of the Petrifilm™ Culture System for the identification of mastitis bacteria as compared to standard bacteriological methods. K. Leslie^{*1}, M. Walker², E. Vernooy¹, and A. Bashiri¹, ¹University of Guelph, Guelph, Ontario, Canada, ²Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada.

Mastitis is a very costly disease that impacts both on-farm economics and milk quality. Identification of the causative mastitis pathogen is a fundamental aspect of udder health management programs. There is an on-going demand for the development of on-farm milk culturing methods for early identification of bacteriological species. Petrifilm™ plates are sample-ready selective culture media, which are used for rapid bacteriological isolation and enumeration in the commercial food processing industries. Petrifilm™ products may be useful for on-farm based culture systems that are used to guide treatment decisions, and optimize antibiotic use. The objectives of this project were to determine the test characteristics of Petrifilm™ for the identification of the causative organism in suspected cases of intramammary infection. This study was performed using milk samples from 156 clinical and subclinical mastitis cases in 10 herds in Southern Ontario. Duplicate quarter samples were taken, with one plated immediately, using a single-use plastic pipette, onto each sterile aerobic, coliform, and Staphylococcus Petrifilm plates. The second sample was frozen at -200C and transferred to the Mastitis Research Laboratory, University of Guelph for milk bacteriological culture as the gold standard for calculation of test characteristics.

For each culture result category, the sensitivity, specificity, and predictive values were calculated. Petrifilm™ media had a sensitivity for identification of coliforms and Staphylococcus aureus of 93% and 86% respectively. The specificity for coliforms and S. aureus was 86% and 82%, respectively. It is possible that freezing of the samples used for traditional milk bacteriology may have

increased the isolation of S.aureus, and decreased the recovery of coliforms, reducing the sensitivity and specificity for each organism, respectively. The Petrifilm™ culture system offers considerable potential as an on-farm diagnostic tool for broad classification of the causative organism allowing implementation of appropriate therapy.

Key Words: Bovine, Mastitis, Petrifilm

237 Association between local (udder) clinical signs and important outcomes of clinical mastitis episodes in dairy cattle. J. Wenz^{*}, R. Elia, K. Whitman, and F. Garry, Colorado State University, Ft. Collins.

Clinical mastitis (CM) is the most common infectious disease of dairy cattle and is responsible for significant economic losses. There are many local clinical signs associated with inflammatory changes of the mammary gland during bacterial infection. Treatment and prognosis of CM is often decided based on one or more of these clinical signs; however, there have been no studies evaluating the association of important outcomes associated with CM and the presence of these signs in cows with mild systemic disease. Cows with CM exhibiting mild systemic disease signs (N=240) from a 1500 cow dairy were enrolled in the study. Cows were examined for the presence or absence of firmness and swelling of the affected mammary gland, clots in milk and character of the secretion (thin, thick or serum). Milk culture results and intramammary (IMM) treatment were recorded. Outcomes assessed were need for re-treatment (RTX), recurrent CM episode in the same quarter 15-60 later (RECUR), dried quarter, death or culling and sick pen days (SPD). Data was evaluated using PROC GENMOD and GLM in SAS. RTX occurred in 27% (63/231) and RECUR in 25% (51/206) of CM episodes. Quarter drying and cow culling occurred infrequently, (5% each) and no deaths occurred. RTX was the only outcome associated with local clinical signs evaluated. RTX was 3.64 (1.32-10.2) times more likely in a cow with serum vs. thin secretion. Cows with swelling were 2.82 (1.06-8.14) times more likely to be re-treated while those receiving pirlmycin IMM were 6.66 (1.99-25.7) times more likely to be re-treated than those who initially received no IMM treatment. Secretion was the only clinical sign affecting SPD. Cows with serum had significantly greater SPD (11.6) than those with Thick (6.9) or thin(7.4) secretions ($P < 0.001$). Results suggest serum secretion and swelling of the affected mammary gland was associated with increased re-treatment rate and serum secretion was associated with greater SPD in cows with systemically mild CM.

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Key Words: Mastitis, Clinical signs, Outcomes

238 Plasma paraoxonase could be a good index of liver activity in dairy cows. M. Bionaz^{*}, E. Trevisi, A. Ferrari, and G. Bertoni, Istituto di Zootecnica, Facoltà di Agraria, U.C.S.C., Piacenza, Italy.

Seventy Holstein periparturient dairy cows were used to evaluate the relationship between plasma paraoxonase concentration (PON, an enzyme used to diagnose liver activity in humans), inflammatory conditions and liver activity. Blood samples were collected weekly from cows immediately before feeding from -14 to 42 DIM. Plasma was analyzed to obtain metabolic profiles, inflammatory indices (haptoglobin and ceruloplasmin), low (C-LDL) and high (C-HDL) density lipoprotein cholesterol, vitamin A and PON. Milk yield, body condition score (BSC) and health problems were recorded. Cows were retrospectively grouped into quartiles (UP=upper, INUP and INLO=intermediate upper and lower, LO=lower) based on the plasma PON level during the first 30 DIM.

Cows in the LO had more health problems (94%) than the UP group (12%) during first 30 DIM. LO group exhibited lower ($P < 0.05$) plasma vitamin A, albumin, total cholesterol, C-LDL and C-HDL, and significantly higher ($P < 0.05$) plasma haptoglobin, total bilirubin and globulin than UP group. However, ceruloplasmin, nonesterified fatty acids and betahydroxybutyrate were not differ-

ent. Plasma glucose, urea, Ca, and Mg were lower in the LO than UP group. Cows in the LO group lost more BCS (0.58 vs 0.47 points) and produced less milk (26.4 vs 37.5 kg/d, $P < 0.01$) during the first 30 DIM than the UP group. INUP and INLO groups generally were intermediate in most of the measurements. It appears that PON is negatively correlated with haptoglobin, an inflammatory indicator, and it behaves similarly to the usually synthesized proteins by the liver (albumin, lipoproteins, and retinol binding protein). A reduction of usual liver activity may be diagnosed with PON, based on the results of this study.

Key Words: Paraoxonase, Liver activity, Periparturient dairy cows

239 A model to predict the reproductive status of cattle throughout the reproductive cycle. N. C. Friggens* and M. G. G. Chagunda, *Danish Institute of Agricultural Sciences, Tjele, Denmark.*

Time-series models for detecting estrus from milk traits other than progesterone and decision strategies for interpreting progesterone measures exist but a system combining these aspects to predict not just estrus but reproductive status throughout the reproductive cycle is lacking. The objective of this study was to develop such a model on the basis of automated milk progesterone sampling. A number of additional inputs are incorporated, where available, to make use of other known effectors of reproductive performance. These are: days from calving, breed, parity, signs of behavioural estrus, insemination date, pregnancy determinations, energy status, body fatness, milk urea content and reproductive disorders associated with calving. However, the model is designed to be able to function in the absence of all these additional inputs. Progesterone values are smoothed using an extended Kalman filter before entering the biological component of the model. The model predicts the reproductive status of the cow as one of 3 mutually exclusive states: postpartum anestrus (0), estrus cycling (1), and potentially pregnant (2). The other model outputs are: risk of prolonged postpartum anestrus, risk and type of ovarian cyst, onset of estrus, likelihood of a potential insemination succeeding, and likelihood of being pregnant (following estrus) and days to next sample. The model was tested using only daily progesterone data together with insemination records from 285 lactations gathered over 2 years at one research farm. Independent, external, measures of estrus activity were carried out by visual observation for estrus signs and using activity meters. The model performed significantly better than either the visual or the activity meter based external estrus detection. Approximately 1/3 of model-detected estruses were not detected by external estrus detection. Further, the model accurately predicted pregnancy status 21 days post-insemination in 96% of cases. Reproductive status can be accurately predicted from milk progesterone values using a biological model, this has the potential to provide the basis for a useful reproductive management tool.

Key Words: Reproduction, Progesterone, Estrus

240 The effects of glucosamine and chondroitin sulfate on long term cartilage explants. P. S. Chan and M. W. Orth*, *Michigan State University, East Lansing.*

Osteoarthritis (OA) is a significant cause of lameness in companion animals. The hallmark characteristic of OA is degeneration of articular cartilage. Glucosamine (GLN) and chondroitin sulfate (CS) are nutraceuticals popular for OA treatment. Our objective was to determine the effects of GLN and CS supplementation on bovine cartilage explants stimulated with interleukin-1 (IL-1) over a 14d period. The genes studied include inducible nitric oxide synthase (iNOS), cyclooxygenase-2 (COX-2), microsomal prostaglandin E2 synthase-1 (mPGEs1), matrix metalloproteinase (MMP)-3, 13, aggrecanase (Agg)-1, 2 and tissue inhibitor of metalloproteinase-3 (TIMP-3). Cartilage explants (6mm discs) were biopsied from carpal joints of 4 Holstein steers. After 24h of adaptation, all discs received their respective treatments, which included either a fetal bovine serum control (Ctrl), IL-1 (50ng/ml), GLN (5µg/ml) + CS (20µg/ml) or IL-1 (50ng/ml) + GLN (5µg/ml) + CS (20µg/ml) (combination) treatment. IL-1 was added only on d2 and 10 for the relevant treatments. Media collected and re-

placed every other day were analyzed for nitric oxide (NO) and prostaglandin E2 (PGE2; only d4 and 12) release. Explants collected on d6 and 14 were subjected to relative quantitative PCR (Q-PCR). Statistical analysis for NO and PGE2, and Q-PCR data were performed using Proc MIXED and Friedman test of SAS respectively, with significance at $P < 0.05$. The combination reduced cumulative NO release induced by IL-1 into media by 50% and suppressed IL-1 stimulated PGE2 release by 70% on d4. IL-1 induced COX-2 and iNOS transcripts on d6 and 14 were decreased by the combination while mPGEs1 mRNA expression was repressed on d6. On d6 and 14, up-regulated gene expression of MMP-3, MMP-13, Agg-1 and Agg-2 by IL-1 were reduced by the combination. TIMP-3 mRNA was significantly elevated by the combination relative to IL-1 on d6. The reported anti-inflammatory and chondroprotective properties of GLN and CS may be mediated by down-regulation of genes encoding inflammatory mediators and matrix enzymes.

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Key Words: Glucosamine, Chondroitin, Arthritis

241 Performance and health of group-housed dairy calves fed milk automatically versus manually. R. Engelbrecht Pedersen*¹, F. Skjøth¹, J. Tind Sørensen², and J. Hindhede², ¹*Danish Agricultural Advisory Service, Denmark*, ²*Danish Institute of Agricultural Sciences, Denmark.*

Calf performance and health was studied among group-housed calves (n=2535) in 39 commercial Danish dairy farms. Three group housing systems were identified as follows: manual milk feeding indoors (MI), manual milk feeding outdoors (MO), automatic milk feeding (A).

Live weight gain (LWG) was higher among MI calves (745 g/d; $P < 0.001$) and MO calves (762 g/d; $P < 0.05$) than among A calves (583 g/d). Calves in groups with stocking densities, higher than 0.5 calf/m² had lower LWG than other calves ($P = 0.038$). Damp or wet bedding were contributory to lower LWG ($P = 0.039$).

Diarrhea was diagnosed in about 5 % of all the examined calves (A = 4.3%, MI = 5.2%, MO = 3.9%) and was not significantly different between treatments.

Respiratory disease was prevalent in 15 % of all examined calves (A = 28.1%, MI = 11.8%, MO = 9.3%) and was significantly higher among automatically milk fed calves than calves fed manually ($P < 0.05$). The prevalence of respiratory disease increased, as calves got older ($P < 0.001$). Calves diagnosed with respiratory disease were more prevalently diagnosed with diarrhea ($P = 0.004$).

Typically, larger group size, poor hygiene and continuous introduction of animals into automatic milk feeding systems may be contributable to lower LWG and a higher prevalence of respiratory disease than among manually fed calves.

Within all three systems there were large deviations between individual farms. Present results stress the importance of management in general.

Key Words: Calf performance, Group housing, Automatic milk feeding

242 Impact of subclinical metabolic disease on risk of early lactation culling. T. Duffield*, S. LeBlanc, and K. Leslie, *University of Guelph, Guelph, Ontario, Canada.*

Two datasets (1995, 1999) each involving approximately 1000 cows and 20 to 25 herds, were evaluated retrospectively. Both studies contained data on metabolic parameters for the 1st week postcalving and disease and culling data for early lactation. The 1999 study also contained precalving serum data. Data was screened using 2X2 tables testing the associations between clinical disease and culling risk in early lactation. All diseases that were associated with culling ($P < 0.05$) were placed with parity in a logistic regression model using the GLIMMIX macro to account for herd clustering. Variables at $P > 0.05$ were then removed in a backward elimination process. In the 1995 analysis there was an association between milk fever, mastitis, displaced abomasum and metritis on the risk of culling by 95 days. In the 1999 study milk fever, mastitis, lameness,

and displaced abomasum were associated with early lactation culling risk. Serum associations with culling were treated in a similar manner as clinical disease. Initially a series of 2X2 tables at various serum cutoff values for non-esterified fatty acids (NEFA), calcium and beta-hydroxybutyrate (BHBA) versus risk of culling were created. The most significant cutoff values were then submitted to final modeling with the previously identified culling models. Precalving serum NEFA ≥ 0.4 in the last week precalving was associated with 2.0 X (P=0.002) increased risk of culling in the 1999 study. Both studies identified a cutpoint of 1.8 mmol/L of serum calcium in the first week postcalving being associated with a 3X increased risk (P < 0.05) of culling after removing

all of the clinical milk fever cows. Finally, BHBA ≥ 1400 $\mu\text{mol/L}$ was associated with a two-fold increased risk of early lactation culling in both studies. This suggests that high precalving NEFA and both subclinical hypocalcemia and subclinical ketosis are important predictors for the subsequent risk of early lactation culling.

Monitoring and intervention strategies using this information may be helpful in reducing early lactation culling risk.

Key Words: Subclinical, Disease, Culling

Beef Species: Vertical Coordination in the Beef Industry

243 National Animal Identification: An update. V. E. Ragan*, *USDA APHIS, Washington, DC.*

A key to safeguarding the Nation's livestock herds from both endemic diseases and the drastic effects of diseases such as BSE, Foot and Mouth Disease and other potential emerging diseases, is to have a national plan in place to identify livestock in a way that will provide rapid traceability. As some disease eradication programs, especially brucellosis, are nearing completion, fewer animals are being identified. Current world conditions which include the possibility of intentional or accidental introduction of foreign animal diseases make it essential that potentially exposed animals can quickly be traced. USDA, APHIS has been working closely with State and industry partners to develop a National Animal Identification System (NAIS). Once fully developed and operational, the goal of the national identification system will be to help USDA and our State and industry partners quickly identify any livestock or agricultural premises exposed to a foreign animal disease or disease of concern so that the disease can quickly be contained and eradicated. The goal of the system is to be able to identify an exposed animal, the herd of origin and all contact herds within 48 hours. An update on the premises behind the development of the system and the current status of the system will be provided.

Key Words: Livestock, Disease, Identification

244 Implications of beef system vertical coordination on animal identification and data handling. D. A. Blasi*, *Kansas State University, Manhattan.*

Vertical coordination implies the skillful and effective interaction between the parts of a whole system. Many US Beef value chains were conceived with the initial objective of adding value by differentiating and ultimately creating a branded product. In retrospect, most if not all have encountered numerous challenging issues in pursuit of their quest for the effective interaction between the supply and the demand for their product(s). While integrating the regulatory capacity of animal health is the primary objective of the National Animal Identification System (NAIS), the use of animal identification systems for verifying conformance to a Bovine Export Verification Program set forth by AMS for regaining access to the Asian export market will be the value proposition which will further drive its implementation as a staple process requirement in all segments of US beef cattle production. This accelerated growth of individual animal identification systems will generate significant amounts of data which will need to be synchronized, filtered, analyzed, managed and acted upon in real-time by data mining software and individuals who possess a dual understanding of beef systems production and technology. Ultimately, the resulting information will be used seamlessly throughout a vertically coordinated production system to conduct management and animal health compliance audits, initiate product recall measures and reveal complex biological and economic relationships.

Key Words: Animal Identification, Beef Industry, Information Management

245 Creating systems to produce high quality beef. D. B. Faulkner* and L. L. Berger, *University of Illinois, Urbana.*

Changing calving seasons to match forage resources can dramatically reduce cow feed costs. Making this change often requires weaning calves earlier than the traditional 205 days of age. Early weaning can help producers manage forage and feed supplies when: 1) forage supplies are low, such as during a drought, 2) forage is of low-quality, such as pure fescue pastures in mid-summer, 3) winter feed supplies are limited, or 4) Summer calving is initiated to reduce winter feed cost for the cow. Cow reproductive advantages can also be obtained with early weaning. It makes it easier to get thin cows and/or first or second calf heifers bred and the cows enter the winter in good condition. Cow reproduction can be improved by up to 12% when calves were weaned prior to the breeding season. This would result in savings of \$15 for each cow in the herd. Early weaning also can offer marketing advantages because a producer may market cull cows that have calved on a better spring or summer market and this system can produce lean, tender, high quality beef to meet consumer demand. Creep feeding is an alternative to early weaning. Creep feeding research has demonstrated that source of creep feed, amount of creep feed consumed, and length of time calves consume creep feed all have an influence on carcass quality grade. Nutritional management had 6 times more influence on quality grade than the calf's genetic merit for marbling. However, the effects of high marbling EPDs have been additive with this management system, so both are important. Producers desiring to produce high-quality cattle for the marketplace should consider the breeds they use in their crossbreeding program, the marbling EPD in the bulls, and the management of their calves to get them on a high-energy diet as early as possible. Research shows that carcass fat can be reduced and quality improved by using appropriate management strategies.

Key Words: Systems, Beef

246 Managing a beef production unit as part of a vertically coordinated supply chain. W. L. Mies*, *eMerge Interactive, College Station, TX.*

The obvious benefits to being part of a vertically coordinated system have been demonstrated by the Strategic Alliances Demonstration project in 1993 and the growth of the various alliances that have been created in the beef industry. The structure is designed so that the various production units in the supply chain stop competing with each other for whatever profit is available, but rather share the profit that can be made through producing product better suited to consumer needs. This structure takes some of the hills and valleys out of the profit picture, but makes it a more stable vehicle in order to obtain financing. The decreased risk is thus easier to manage. It is the management of a unit of a vertically coordinated supply chain that is of interest today. When producers enter into a vertical supply chain, they are usually those producers with a vision of the future and they are committed to try to find a better way to be a beef producer. Idealism is very strong during the startup of such an effort and it drives many of the early negotiations. As production starts and decisions are made about how animals are bred, raised and marketed, the idealism melts away and pragmatic business concerns enter the relationships. Vertical supply chains will produce an increasingly larger percentage of the beef in the U.S.