BTA4. The reelin gene (RELN) has been shown to control neuronal migration in the developing brain in mice; and mutations in the gene have shown similar symptoms to PDME. It maps to the long arm of human chromosome 7, which is homologous to BTA4. Primers developed from human studies were used to amplify a 159-bp fragment, which encompasses positions 1136-1295 of the human RELN sequence. After initial sequencing of direct PCR product, the fragment had a 90.06% homology score with human RELN. Sixteen animals representing nine breeds: Guernsey, Angus, Holstein, Jersey, Brown Swiss, Hereford, Gelbvieh, Limousin and Simmental, were PCR amplified and direct sequenced. Single nucleotide polymorphisms (SNP's) at positions 54 and 69 were identified. Using this information, we will develop either PCR restriction fragment polymorphisms (PCR-RFLP) or single strand conformational polymorphisms (SSCP) to map the gene by linkage analysis in the ARS Cattle Genome Mapping Project.

Key Words: Gene mapping, Dairy cattle, Genetic diseases

331 Genetic analysis of Bovine Progressive Degenerative Myeloencephalopathy (PDME) or Weaver Syndrome in Brown Swiss Cattle. S.K. DeNise*[1] and E. Oberg[1], *University of Arizona, Tucson AZ USA*.

Eight bovine microsatellite markers have been used to develop haplotypes for carriers of PDME within the Brown Swiss Breed. These markers include TGLA116 (the original marker for PDME), BMS2172, BMS885, DIK8, BM1224, BM6437, BMS495 and INRA072, that encompass a 12.7 cM region of bovine chromosome 4. Haplotypes have been developed for all progeny-tested carrier sires, resulting in a high probability of determining carrier status of progeny from these sires. Using the haplotype test, we have identified a recombinant bull that is a known PDME heterozygote. This bull places the PDME locus telomeric of BM1224. Physical mapping of the region using bacterial artificial chromosome clones (BAC) has identified two human expressed sequence tags (ESTs) near BMS495. These sequences map to human chromosome 7 (Gene Map 98 (NCBI): D7S484-528, 55.6-58.9) and place these ESTs between GHRHR (7p14; 40.1-55.6) and IGFBP3 (7p13-12; 69.4-74.3). If the BAC clone is not chimeric, then these ESTs map centromeric to GHRHR in cattle with the linkage order as BMS495: 69.6; GHRHR: 74.8 and IGFBP3: 82.2 (ARS Cattle Genome Mapping Project). Thus, there may have been rearrangements between the bovine and human genomes in this region.

Key Words: Gene mapping, Dairy cattle

332 The effects of storage and preservative on genomic DNA extraction from bovine milk somatic cells. G. Robitaille*[1], M. Britten[2], and D. Petitclerc[1], [1]*Dairy and Swine Research and Development Centre, Agriculture and Agri-Food Canada,* [2]*Food Research and Development Centre, Agriculture and Agri-Food Canada*.

Molecular approach of genotyping a huge amount of cow is complicated by the need of cells for genomic DNA extraction. An alternative approach to blood sampling is the use of milk somatic cells. The objective of the study was to define milk storage conditions for an efficient DNA isolation. Individual milk from 3 cows, having different somatic cell count, were processed immediately for DNA isolation or stored at -20, 4, 20, and 37^{o}C for up to 15 days, with or without bronopol or potassium dichromate as preservatives. DNA was extracted using InstaGene Matrix (BIORAD). Briefly, milk was diluted in a phosphate buffered saline and spun. Supernatant and excess of fat were removed, cells were resuspended in 20 μl of water and mixed to 200 μl of InstaGene Matrix (BIORAD). The suspension was incubated for 30 min at 56^{o}C and 100^{o}C for 8 min and kept frozen. PCR amplification (40 cycles : 94 ^{o}C - 30 sec, 55^{o}C - 30 sec, and 72^{o}C - 30 sec using Taq polymerase) was carried out on 10 μl of the supernatant in a reaction volume of 25 μl. Two sets of primers were tested on each sample, one that amplifies the bovine kappa-casein gene exon IV to discriminate genetic variants A and B (453 bp), and the other that amplifies the microsatellite region within intro III (246 bp). Results clearly demonstrated that, although fresh sample were more efficient as starting material, it is possible to isolate PCR-grade genomic DNA from milk that were stored up to 15 days at temperatures as high as 37^{o}C. This is particularly true when bronopol was added to milk. SSCP and RFLP of PCR fragments to genotype cows were carried out without problems. In conclusion, isolation of genomic DNA using InstaGene Matrix has proven to be effective with milk stored at various temperatures for up to 15 days. This means that individual milk samples, collected and forwarded to central testing laboratories within 15 days for milk composition analysis, can also be tested for gene polymorphism.

Key Words: Genotyping, DNA extraction, Somatic cells

CONTEMPORARY AND EMERGING ISSUES

333 Proposed new regional project on animal ethics. S. L. Davis*[1], J. R. Males[1], J. C. Swanson[2], and K. K. Schillo[3], [1]*Oregon State University, Corvallis,* [2]*Kansas State University, Manhattan,* [3]*University of Kentucky, Lexington*.

Writing about Science, Lubchenco (1998. Science 279:491-497) wrote "Part of our collective responsibility to society must include a scientific community-wide re-examination of our goals and alteration of our course, if appropriate." The same is true for animal sciences of course, and with the increasing number of contentious social issues related to animal sciences it is becoming even more important that we conduct such a re-examination. This is basically what Thompson (1998. J. Animal Sci. 77:372-377) suggested in his presentation to ASAS at their 1997 meeting. Thompson (1998) also suggested that one approach to accomplish that re-examination would be to develop a new professional ethic, and one way to accomplish that would be the formation of a new Hatch regional project on Animal Bioethics. As a result, a group of 26 scientists have prepared a proposal to establish such a regional Hatch project titled Animal Bioethics. The objectives of this proposal are:

1. Create a forum in which animal scientists and non-animal scientists (philosophers, social scientists, etc.) may work together to examine and discuss contentious social issues.

2. Provide a means of encouraging the development and coordinating the activities of research projects dealing with bioethics of the animal sciences.

3. Develop mechanisms of outreach that would allow animal scientists to respond directly to consumers and our critics who may question our science and/or production methods.

4. Provide the means for ongoing critical analysis of the animal science professions in the context of their ability to address moral and sociopolitical issues.

Accomplishment of these objectives will require the participation and collaboration of animal scientists as well as philosophers and social scientists.

Key Words: Regional project, Animal ethics

334 The development and evaluation of Pennsylvania's Humane Society Police Officer Training Course: Animal Husbandry. B.L. Coe*, E.P. Yoder, and D.E. Evans, *Pennsylvania State University, University Park*.

Recent Pennsylvania legislation (Act 1994-135) requires Humane Society Police Officers investigating animal abuse cases to receive training from a land-grant university regarding animal agriculture. A committee of Penn State specialists, humane society reps, farm organization reps, and PA Dept. of Ag. officials developed a relevant educational program. The program provides instruction in animal husbandry practices, animal behavior, handling, transportation, production systems, and investigation/evaluation of animal cruelty complaints. This project used an Instructional Systems Design framework for development and evaluation of the PA Humane Society Police Officer Training Program: Animal Husbandry. Data were collected from program participants, stakeholders, and a comparison group via detailed surveys. The program was conducted in PA from 1996-99 and 147 people completed the program. This study examined whether the new curriculum to train humane officers prepared them to adequately and reasonably enforce the

Anti-Cruelty Law in PA with relation to agricultural animals. Evaluation results indicate the educational program provided officers a good base of information and experience, along with excellent written and personal contact resources. Participants were also more prepared to visit sites in response to reports of farm animal abuse. Participant attitudes towards animal agriculture did not change substantially, however, officer on-the-job knowledge and confidence did increase considerably. Networking among stakeholders did not increase significantly. Due to the relatively low number of livestock investigations, it was difficult to determine if there was a change in their success subsequent to training. Course materials were determined to be appropriate and participant feedback provided valuable suggestions for future continuing education. Response to the program was positive and even participants who did not typically deal with agricultural animals felt it was educational and worthwhile.

Key Words: Animal husbandry, Teaching, Animal abuse investigation

335 ADDS, a modern program for delivery of knowledge to agriculture. J.M. Mattison*[1], R.M Kattnig[2], B.R. Eastwood[3], M.J. Joyce[4], and M.B. Oppermant[1], [1]*ADDS Center,* [2]*University of Arizona,* [3]*USDA-CSREES,* [4]*Wisconsin Milk Marketing Board.*

ADDS (Agricultural Databases for Decision Support) is a program that takes a fresh and original approach to addressing the needs of modern agriculture for dependable, research-based information, educational programming and decision support tools. The program consists of a growing number of national perpetual projects oriented toward a commodity (or species), major issue, discipline, or clientele. Projects are comprehensive in scope and bring many of the users needs into one accessible resource. The major concept woven into the fabric of ADDS is open and inclusive national cooperation. This embraces cooperation between the public and private sectors, across states, institutions, departments, disciplines, functions, organizations and groups. Other important concepts of the program include user oversight; peer review and expert selection of materials; and sharing of information resources among projects. ADDS is product oriented, with each component under the leadership, control and ownership of the initiating database group.
Policy for ADDS is set by the public and private sector members of the board of directors of ADDS, Inc., a non-profit educational corporation. This board is composed of up to three directors from each of the database groups. Infrastructure, management and technical support for these projects are provided by the ADDS Center located in Verona, Wisconsin. The center operates under the authority of the ADDS, Inc. board.
ADDS products are electronically published on CD and the web. Participation in the projects is open to all having an interest and expertise to share. New projects are encouraged as a critical mass of individuals to carry out the development is identified. Funding support is sought as a project moves forward. The iterative process of development, distribution to users, user feedback, and further development is expected to keep these products on the leading edge of useful technologies and management systems for agriculture.

Key Words: InfoBases, Decision Support, Extension

336 Behavior of the Holstein dairy farming system in Brazil between 1980 and 1992. B. A. Waltrick*[1], C. N. Costa[2], and W. J. Koops*[1], [1]*Wageningen University Research Center, The Netherlands and* [2]*EMBRAPA Dairy Cattle, Juiz de Fora-MG, Brazil..*

The Holstein breed has been successfully used for milk production in many countries, because of its genetic potential for milk production. In Brazil, the Holstein breed performs well under good management practices. This study aimed at giving an overview of the development of the Holstein dairy system in Brazil by evaluating its structure and properties in terms of trends in milk yield from 1980 and 1992. This evaluation shows the persistence of the system in maintaining production over the long term, concerning routine fluctuations in response to disturbances. This research is a partial study on the sustainability of the Holstein dairy system in Brazil.
Data provided by the National Dairy Database consist of lactation records from Holstein cows registered by milk recording services of the Brazilian Holstein Breeders Association from 1980 to 1992. There were 154,053 lactation records available. The most representative system was selected: cows milked twice a day, from the South and Southeast regions which included 118,802 records from the states of Minas Gerais, Sao Paulo, Parana, Santa Catarina and Rio Grande do Sul. The analyses included the distribution of number of records, level and range of production. Milk yields were adjusted to 305 days.
The development of the milk recording system is reflected by the increasing number of lactation records in the course of the period, independent of lactation number. However, in 1990 the system was evidently disturbed. Its resilience was shown by the capacity to recover in number of records as well as in production level, thus maintaining system stability. The results of the distribution analysis showed an increasing variation in the range of production values. The median showed little variation across years.

Key Words: Holstein cattle, dairy system, milk production

337 Dairy farm modernization in Wisconsin. J. Bewley*, R.W. Palmer, D.B. Jackson-Smith, and D.E. Hemken, *University of Wisconsin, Madison.*

A survey was sent to 694 Wisconsin dairy farms that had increased herd size by at least 40% between 1994 and 1998. Responses from 302 farms were used to (1) determine specific modernization strategies employed, (2) examine impacts of these strategies on herd performance, (3) assess levels of satisfaction with recent changes, and (4) provide information for producers considering future expansion. Herds were categorized for analysis by herd size and type of expansion. DHI information was used to evaluate milk production, days open, and linear somatic cell scores. Mean herd size for surveyed herds was 102 cows in 1994 and 252 cows in 1998 with a long-term goal of 453 cows. Modernization issues examined in this study include strategies for changing milking systems, changing housing, handling animals, handling manure, managing employees, sourcing of animals, and obtaining additional feed. Farms that had built all new facilities had higher milk production, greater labor efficiency, and higher satisfaction with economic performance than those who modified existing facilities or combined older with new buildings. Increased herd size was generally associated with higher milk production, increased labor efficiency, and greater satisfaction with quality of life satisfaction measures. Sixty percent of respondents were using a pit parlor in 1998. These herds had higher production, lower somatic cell scores, greater labor efficiency, and higher satisfaction with their milking systems when compared to those using flat parlors or stall barns with pipelines. Reasons for modernization included: to increase profitability (89%), to improve labor efficiency (73%), to improve working conditions (69%), to get time away from the farm (61%), and to allow a family member to join the operation (34%). All but 6% of the producers responded positively to the question Knowing what you know now, would you do it again? Nearly one-third (29%) of respondents indicated they would expand at a faster rate, and 23% indicated they would expand to a larger size.

Key Words: survey, expansion, user satisfaction

338 Hydrogen Sulfide concentrations downwind from agitated swine manure pits. C. L. Tengman* and R. N. Goodwin, *National Pork Producers Council, Ames, IA.*

Six swine farms of varying size in IA, IL, and MN were selected for the monitoring of ambient air hydrogen sulfide(H_2S) concentrations during the deep pit manure storage agitation and removal activity. Specialized monitoring equipment was used called the MDA Scientific Chemcassette® Single Point Monitor (SPM). The SPM's were located at 15.2m and 30.4m intervals downwind from the farm. The primary objective was to gain information on the increase and decrease of hydrogen sulfide levels before, during and after agitation. Monitoring stations included two SPM's, one with a 1-90ppb range and a second with 50-1500ppb. Weather data, temperature, relative humidity, wind speed and wind direction, were also collected on most of the farms where monitoring took place. Results show that the agitation and removal activity significantly increase the H_2S concentrations downwind from the swine barns. Results also tell us the weather conditions measured play a significant role in the transport of H_2S downwind from the swine barns. On average, most H_2S concentrations dropped significantly or were below 30ppb at 30.4m and beyond. The drop of H_2S concentrations below 30ppb occurred prior to the end of agitation and up to five hours post agitation. Peak H_2S concentrations at 15.2m were measured an average

of 3.2 h after the start of agitation and ranged from 0-8 h. The maximum total number of 30-min average measurements greater than 30ppb for all sites was an average 5 times and ranged from 3 to 9 times.

Key Words: hydrogen sulfide, swine, manure

339 N- vs. P-based manure nutrient management: A field study of leaching losses of N and P. J.D. Toth*, Z. Dou, J.D. Ferguson, D.T. Galligan, and C.F. Ramberg, *University of Pennsylvania, Kennett Square*.

Manure applications to croplands have traditionally been made to meet plant requirements for N, which often leads to overapplication of P and elevated P runoff loss. A P-based manure application criterion has been proposed to address this concern. We initiated a field experiment in 1998 to examine leaching losses and soil accumulation of N and P with corn, alfalfa, and orchardgrass receiving N- vs. P-based dairy manure; the crops also received two additional treatments: control (no N or P added) and fertilizer (N applied at rates meeting crop requirements). Passive capillary wick lysimeters were installed underneath the replicated crop strips to collect leachate moving below the crop root zones. Leachate water samples were analyzed for nitrate and P. In the initial year of this long-term study (April 1998-March 1999), flow-weighted annual leachate nitrate-N concentrations from corn and orchardgrass were highest for the fertilizer treatment (23 and 13 mg/L, respectively) and lower for the manured treatments and the control, although these differences were not statistically significant at the 5% level. Mass of nitrate-N lost in leachate was 123 and 57 kg/ha for the fertilizer treatments to corn and orchardgrass, respectively, averaged 88 and 40 kg/ha for the manured treatments of the two crops, and 66 kg/ha for manured alfalfa. Leachate P concentrations from alfalfa were significantly higher for the N-based manure treatment (0.09 mg/L) than for P-based (0.04 mg/L). From April 1999 through January 2000 in the second year of the study, nitrate-N concentrations in leachate below the N- and P-based manure treatments were 19 and 22 mg/L for corn; and 22 and 28 mg/L for alfalfa, respectively. Nitrate-N concentrations from grass did not exceed 8 mg/L. Leachate concentrations and mass in leachate of nitrate and total P from corn and orchardgrass generally have not differed as a result of basing manure application rates on crop N vs. P needs.

Key Words: Nutrient Management, Nitrate Leaching, Phosphorus

340 A new tool to help with sire selection. A. Perkins*[2], V. LaVoie[1], and J. Stellflug[1], [1]*USDA ARS US Sheep Experiment Station, Dubois ID,* [2]*Carroll College, Helena MT*.

Variation in sexual performance of male mammals can be costly to producers if poor sexual performance sires are selected. Our goal was to develop a drug test that could distinguish between high and low sexual performance males before their use in production. Testosterone is necessary for male sexual behavior, but baseline concentrations are not predictive of libido. Our hypothesis was that when a ram is given an injection of naloxone his testosterone (T) and LH response to the injection can predict his sexual performance. Three experiments were conducted. Variables included dosage of naloxone, season of year, and repeatability within individual rams. Rams previously identified by behavior tests (sexually inactive[asexual; n = 26]and sexually active[n = 26]rams) were treated with naloxone(0.5, 0.75, and 1.5 mg/kg body weight)in November, June, and December. Changes in T and LH were calculated by subtracting prenaloxone average values from postnaloxone values for each ram. The largest difference was considered an individual's response to treatment. Responses to naloxone were compared between ram groups (asexual and sexually active rams) over seasons, years, and dosages using PROC GLM and PROC MIX for repeated measure. The T response to naloxone was greater ($P < 0.05$) in sexually active than in asexual rams, and LH response tended ($P < 0.07$)to differ between sexually active and asexual rams. All dosages were equally effective during the breeding season. In general, greatest values for LH and T were at 15 and 60 min after naloxone, respectively. The same rams were tested over two breeding seasons. Year affected responses ($P < 0.05$) but ram class x year was not significant. Accuracy of predicting asexual rams was 73% and accuracy of predicting sexually active rams was 81%. This test is most effective during the breeding season. We suggest that a refinement of this patent pending protocol be developed for veterinarians and producers to use during routine examination of potential sires.

Key Words: Sexual, Breeding, Naloxone

DAIRY FOODS

341 Rheological properties of high fat creams containing added whey proteins and homogenized at different pressures. S. Adapa and K. Schmidt*, *Kansas State University, Manhattan*.

Dairy creams with milk fat levels of 50% and 55%, were compared to study the effect of added whey proteins and homogenization pressures on the rheological behavior. The study was done in two steps. In the first study, whey protein concentrate was added to the creams (50 & 55% fat) at the rate of 0 (control), 1, 2, and 3% (w/w), UHT treated, stored at 4°C and 25°C, and evaluated over a period of 43 days. In the second study, whey protein concentrate was added to the creams (50 & 55% fat) at 2% (w/w) level, UHT treated, homogenized at 0 (control), 500, 1000, and 1500 psi, and evaluated over a period of 43 days. All creams were tested for viscoelastic properties by dynamic testing involving sinusoidal oscillatory tests at frequencies ranging from 1-10 Hz and a strain of 0.7%, using a parallel plate geometry. In both the studies, storage modulus (G′) and loss modulus (G″) of all treatments were slightly dependent on frequency, exhibiting higher values at higher frequencies. In all treatments, G′ was significantly higher than the G″ throughout the frequency range tested without any crossover. G′ and G″ increased significantly over time and also exhibited higher values at lower temperatures (4°C). Tan δ values (G″/G′) did not change over time. In the first study, level of fat resulted in differences in G′ and G″ rather than the level of added protein. In the second study, homogenization pressures resulted in differences in G′ and G″ values with samples homogenized at higher pressures having higher G′ and G″ values but lower tan δ values.

Key Words: Creams, UHT, Viscoelastic

342 The concentration of FFA and free amino groups in raw milk from cows fed high or low amounts of concentrate. H. Alkanhal*, M. Alshaikh, M. Salah, and H. Mogawer, [1]*King Saud University, Riyadh, Saudi Arabia*.

Milk lipase activity, initial concentration of FFA and free amino groups and subsequent lipolysis and proteolysis were measured in raw milk from cows fed either high (70%) or low (40%) amounts of concentrate. Lipase activity (2.36 μeq of FFA/ml/h) and initial FFA concentration (0.26 meq/100 g of fat) were higher in raw milk from cows fed high amounts of concentrate than those in raw milk from cows fed low amounts of concentrate (2.04 μeq of FFA/ml/h and 0.14 meq/100 g of fat, respectively). Spontaneous lipolysis at 24 and 48 h was also higher in raw milk from cows fed high amounts of concentrate than in raw milk from cows fed low amounts of concentrate. Initial content of free amino groups (2.12 mmol/100 g of protein) and subsequent proteolysis at 48 h (2.28 mmol/100 g of protein) were higher in raw milk from cows fed a high concentrate ration than those in raw milk from cows fed a low concentrate ration (1.99 and 2.14 mmol/100 g of protein, respectively). Some differences in lipolysis and proteolysis in raw milk were observed between weeks of treatment. Increased lipolysis and proteolysis products in raw milk from cows fed a diet high in concentrate may increase the rate of off-flavor appearance in milk and dairy products.

Key Words: Lipolysis, Proteolysis, Concentrate