554 Impact of genetic drift on developing access and benefit sharing guidelines under the Nagoya Protocol: The case of Meishan pigs imported into the United States. H. D. Blackburn*[1], Y. Plante[2], E. W. Welch[3], G. A. Rohrer[4], and S. R. Paiva[5], [1]*National Animal Germplasm Program ARS-USDA, Ft. Collins, CO,* [2]*Agriculture and Agri-Food Canada, Saskatoon, Saskatchewan, CA,* [3]*University of Illinois, Chicago, Chicago,* [4]*US Meat Animal Research Center ARS-USDA, Clay Center, NE,* [5]*EMBRAPA Secretariat International Affairs, Brasilia, Brazil.*

The Convention on Biological Diversity developed the Nagoya Protocol (NP) on access and benefit sharing (ABS) for international exchange of genetic resources. Concerns are NP will impose new costs for exchanging livestock genetic resources and interfere with private treaty contracts which dominate the sector. NP was developed without evaluating sectoral exchange practices or genetic change among imported populations. This study evaluated how allele frequencies of an imported population changed over time and how those results may affect ABS formulation under the NP. Thirty-five microsatellites were used to evaluate the effect of genetic drift (GD) on Meishan pigs. Samples included Meishan from: China (M-China, 22 hd; samples originally imported in the 1989) and US (M-US, 42 hd). The M-US was subdivided by herd of origin; US Meat Animal Research Center (M-MARC, 18 hd) and Iowa State University (M-ISU, 24 hd). Both herds were maintained for ~8 generations as randomly bred controls. Meishan-US, M-MARC and M-ISU were compared with M-China throughout the analysis. Measures of genetic diversity and GD were computed with GENALEX and TempoFs genetic software. Across markers TempoFs analysis showed a mean shift in allele frequency of 0.11(se = 0.019) due to GD for M-US vs M-China. Evaluating M-MARC and M-ISU the mean and standard error allele frequency shifts due to GD were 0.169 (0.034) and 0.214 (0.036), respectively. Principal coordinate analysis confirmed separation of M-US, M-MARC, M-ISU from M-China. The results show that among M-US substantial changes in allele frequency due to GD occurred in a relatively short time frame. If GD is coupled with directional selection differences between founder animals and subsequent generations would increase at a faster rate. The dynamics of genetic change over time plus dispersed ownership of resulting progeny of livestock suggest that current genetic exchange practices of the livestock sector (private contracts) be the basis for livestock genetic resource exchange and any ABS arrangement be considered at the time of purchase.

Key Words: Nagoya Protocol, genetic drift, Meishan

555 Vermont dairy farmer perceptions regarding farm access control. J. M. Smith*, R. Standish, M. Quaassdorff, M. Mills, L. Powell, and L. Weglarz, *University of Vermont, Burlington.*

Movements across the farm gate were important for the spread of foot-and-mouth disease in the United Kingdom in 2001; thus farm access may be an important control point. To better understand the perceptions of Vermont dairy farmers regarding control of farm access, a series of interviews was conducted. Twenty-six farmers, recruited by snowball sampling in one county, were interviewed in 2011. An additional 4 interviews were conducted in 2012. Several key themes emerged. Although many stated that knowing who comes onto the property is very important to protecting the health of the animals, keeping a record was not viewed as necessary. Service providers, such as the veterinarian or AI technician, who have regular contact with animals were trusted to practice effective sanitation of boots and equipment between farms. Farmers generally trusted that no one would go out of their way to intentionally harm the animals, and believed there was not much they could do to prevent an intentional biological attack. Another farmer noted that humans are not the only vectors for disease, and, since keeping birds and rodents away is nearly impossible, if neighboring farms became infected with a highly contagious disease, it would be hard to avoid even if stringent biosecurity measures were followed. Many farming operations have a fairly lax visitor policy because they want to be open to visitors. Many farmers seemed to think that if a visitor policy involving booties, boot washing, and little contact with animals was put in place and enforced, then recording visitors would not be necessary. Recording visitors by hand seemed unnecessary for small farmers who knew most of the visitors that came to the farm personally and impractical for larger farms with deliveries and visitors around the clock. Video surveillance as an option was generally well-received if the cost was not borne by the farmer. Themes identified in these qualitative interviews can form the basis of quantitative surveys to more accurately evaluate the extent to which various perceptions are held by dairy farmers. Such data can assist the development of a social marketing strategy to promote access control on dairy farms.

Key Words: dairy, biosecurity, access control

556 Profit in practice: Understanding the role of human resource management in dairy farm efficiency. J. E. Johnson*, N. Popp, and G. J. Lascano, *California Polytechnic State University, San Luis Obispo.*

The effect of employee selection, assessment, training, rewards and retention is not well understood on California dairy farms (F). A qualitative approach was utilized to address 3 objectives: (1) determine the frequency of Human Resource Management (HRM) policies and practices, (2) identify and categorize effective managerial behaviors, and (3) suggest strategies for finding and educating current and future dairy managers. Eight F were selected based on size (>1000 milking cows) and accessibility (willing to be interviewed) to participate in semi-structured interviews. Dairy owners discussed the history, structure, HRM practices, and perceived effectiveness of HRM practices on their dairies. Participating dairies had 1000–4350 milking cows and 10–90 full time employees. Qualitative codes were identified and defined to allow for analysis of the 3 objectives. Frequency and effectiveness varied considerably. Although all F utilized employment applications, only 25% considered them effective. Alternatively, employee referrals were perceived as highly effective. Employee training was also undertaken in all F, but only 50% considered this practice effective. Although farm-level productivity was evaluated in all cases, individual employee performance was evaluated in only 25%. Extrinsic motivation (pay, bonuses) was used twice as often as intrinsic motivation (empowering employees, offering praise) despite the greater financial cost. Implementation of exemplary HRM strategies included a hiring and 90 d orientation process; regular training offered to all employees to understand dairy SOPs; and a bonus incentive program for individual performance. Key managerial characteristics identified were bilingualism (100%), combining agricultural skills with education (100%), taking initiative (75%), and interpersonal skills (63%). Finally, suggestions for meeting personnel needs on F going forward included offering managerial, technology and language training to students in agricultural programs, utilizing practical examples to

facilitate transfer of training, and offering related extension seminars for those already working on farms.

Key Words: dairy farm, human resources, management

557 Tools to exploit sequence data to find new markers and disease loci in dairy cattle. D. M. Bickhart*[1], H. A. Lewin[2,3], and G. E. Liu[4], [1]*United States Department of Agriculture, Agricultural Research Service, Animal Improvement Programs Laboratory, Beltville, MD,* [2]*Department of Evolutoin and Ecology, University of California, Davis,* [3]*Institute for Genomic Biology, University of Illinois at Urbana-Champaign, Urbana,* [4]*United States Department of Agriculture, Agricultural Research Service, Bovine Functional Genomics Laboratory, Beltsville, MD.*

The decrease in cost of next-generation sequencing has brought the technology into the realm of practical applications in livestock genomics. Recently, the 1000 Bulls Project has heralded the possibility of using full sequence data to improve imputation and detect disease loci within select founder bulls. Sadly, informatics tools designed to utilize such data have not yet reached maturity, as many currently available programs are hard-coded to call variants only in human subjects or take an inordinate amount of time for analysis. With these challenges and prospects in mind, we have developed a comprehensive variant detection pipeline that uses a variety of information derived from sequence data to call SNP, INDEL and structural variants within the genomes of individuals. The pipeline is designed to be fully automated, is capable of being restarted in the case of errors and can be run on different computing architectures. We have run our pipeline on sequence data derived from a famous Holstein bull. Despite having 87 gigabases (30× coverage of the genome) of sequence for this bull, our pipeline took only 48 h to fully analyze the data using 20 processor cores and less than 32 gigabytes of ram. Initial filtering of this data has revealed one million candidate SNP and 759 copy number variants (CNV). An annotation program incorporated into the pipeline has also revealed putative functional effects of these variants and has identified more than 17,000 non-synonymous SNP that could alter protein function in this individual. The pipeline provides an efficient and freely available tool for researchers to process cattle genomic sequence data to detect genetic variants for use in the dairy industry.

Key Words: SNP, sequencing, genomics

558 In situ evaluation of NDF digestion in a large-scale biogas power plant. A. Palmonari*, M. Fustini, G. Canestrari, N. Panciroli, and A. Formigoni, *DSMVET, University of Bologna, Bologna, Italy.*

Optimization of renewable sources is a key point for the modern energy production systems. One of these energy sources, are biogas power plants (BPP). Inside the reactors, cellulosic substrates are fermented by bacteria and fungi to produce methane, which is then burned and converted to electric energy. Since the main BPP methanogenic bacterial species were identified, substrates characterization takes place in small – scale laboratory fermenters, not completely representative of the whole BPP system. An accurate substrate analysis is extremely required to estimate the amount of methane that can be produced. Objective of this study, was to set up and test a potentially useful system to evaluate the fiber (NDF) digestion dynamics directly inside the BPP. Adapting the procedure of ruminal in situ fermentations, 48 samples (8 corn silages, 8 alfalfa hay, 8 grass hay, 8 sorghum, 4 straw, 4 corn stover, 4 soybean hulls and 4 triticale) were placed inside the BPP and collected after several digestion time points (5, 10 and 20 d). Using acid insoluble ashes as internal markers, NDF digestibility was evaluated. We observed an extremely slow process: in 5 d, NDF digestibility was 32.8 ± 3.1% in corn silage, 31.6 ± 2.5% for alfalfa hay, 22.4 ± 1.2% straw, 20.5 ± 0.8% corn stover, 33.3 ± 5.8% soybean hulls, 31.2 ± 4.6% sorghum, 24.3 ± 1.2% triticale. After 20 d NDF digestibility reached higher values: 64.7 ± 4.2%, 57.9 ± 3.6%, 54.7 ± 3.8%, 47.2 ± 2.7%, 49.7 ± 1.7%, 82.8 ± 4.1%, 63.8 ± 3.8%, 59.1 ± 5.3% for corn silage, alfalfa hay, grass hay, straw, corn stover, soybean hulls, sorghum and triticale, respectively. In conclusion, BPP, due to their microflora, are able to digest cellulose to produce substrates required for methane synthesis; however, this process is particularly slow. These data suggest that the novel system is useful to nutritionally characterize several feeds, and moreover, that further analysis could be done to investigate the BPP major digestion dynamics.

Key Words: biogas power plant, biogas fistula, NDF digestibility

559 Dairy cow handling facilities and the perception of beef quality assurance on Colorado dairies. A. E. Adams*, I. N. Roman-Muniz, T. Grandin, D. R. Woerner, and F. J. Olea-Popelka, *Colorado State University, Fort Collins.*

A survey was conducted on Colorado dairies to assess attitudes and practices regarding dairy beef quality assurance (BQA). The objectives were (1) to assess the need for a new handling facility that would allow all injections to be administered via dairy BQA standards; (2) to establish if Colorado dairy producers are concerned with dairy BQA; and (3) to assess the differences in responses between dairy owners and herds-personnel. Of the 95 dairies contacted, 20 (21%) agreed to participate, with a median herd size of 1178. When asked to rank in order of importance 7 traits when designing a new handling facility (efficiency, animal safety, human safety, ease of animal handling, ease of operation, inject per BQA, and cost), 70% ranked human safety as first or second in priority (35% each) and 55% ranked animal safety as first or second (20 and 35% respectively), while being able to administer injections per BQA standards ranked second-to-last or last for 75% of producers (35 and 40% respectively). Respondents estimated the average annual income from the sale of cull cows to be 4.6% of all dairy income, with 50% receiving at least one carcass discount or condemnation in the past 12 mo Ninety-five percent of owners and 93% of herds-personnel stated the preferred location for SC injections was the neck region, with 53 and 50% respectively stating that all SC injections were always administered in that location. Similarly, 79% of owners and 73% of herds-personnel stated the preferred location of all IM injections was the neck region, with 20 and 25% respectively stating that the neck region was used for all IM injections. Results suggest the need for a handling facility that allows for the safe and efficient administration of all drugs according to dairy BQA guidelines. In addition to improved handling facilities, the need for educational opportunities that highlight the impact of improved dairy BQA on profitability and consumer confidence exist. Just as dairy producers are committed to producing safe and nutritious milk, they should be committed to producing the best quality meat as well.

Key Words: dairy beef quality assurance, dairy cow, dairy handling facilities