T86 Survey response of beef exhibitors to radio frequency identification device. J. W. Lehmkuhler*[1] and T. Quam[2], [1]*University of Wisconsin, Madison*, [2]*Wisconsin Cattlemen's Association, Sun Prairie, WI.*

The Wisconsin Cattlemen's Association (WCA) was awarded funds to investigate the use of radio frequency identification device (RFID) technology for beef steers exhibited at the State and five county fairs. The University of Wisconsin Extension Livestock team assisted WCA in implementing the project. In total 1,142 steers were identified with RFID tags. Exhibitors were required to register their premises through the state's system. A brief one page, ten question survey was conducted by county Extension. The survey questions were either yes/no or scalar from 1 to 5. A total of 112 surveys were returned which was approximately a 50% return rate. Respondents indicated that the project tended to increase their knowledge of the electronic animal identification system. Responses regarding the premise registration form as being simple to understand and ease of registering their premise were between "Undecided" and "Agree". Exhibitor responses indicated the process did not appear to slow the check-in process. The majority of the participants felt the tags did not negatively impact the appearance of their show animal either. Based upon the survey responses only, a total of 14 steers had lost the RFID device. The total number lost is unknown as not all steers that were identified at the check-ins were exhibited. Additionally, nine steers were reported by the survey respondents to have developed an infection around the site of administration. It is uncertain as to the cause and warrants further investigation. This project reports responses from neutral to acceptable regarding the device as an acceptable form of animal identification by the respondents. The project was reported by survey respondents to be important for the livestock show industry as a National Animal Identification System is developed. The use of RFID technology appears to be a plausible method for identifying cattle going to exhibitions but is not faultless. As the industry continues to make advances to the development of a national animal identification system, Extension will need to provide increased education to exhibitors regarding the system.

Key Words: Cattle, Electronic identification, Youth

Food Safety: Foodborne Pathogens in Beef and Dairy Cattle

T87 Effect of plant extract supplementation on digestive tract microbiota and carcass contamination in young Holstein bulls receiving a high-concentrate diet. M. Devant*[1], C. Adelantado[2], A. Anglada[1], A. Bach[1,3], and M. A. Calvo[2], [1]*IRTA-Unitat de Remugants, Barcelona, Spain*, [2]*UAB-Departament de Sanitati d'Anatomia Animals, Barcelona, Spain*, [3]*ICREA, Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain*.

Ninety male Holstein bulls were used in a completely randomized design experiment to study the effect of a blend of plant extracts (PE: cynarin, gingsen and fenugreek) supplementation on digestive tract microbiota, and carcass contamination. Three treatments: control (CTR), monensin (MON, 32 mg/kg DM), and PE (2.8 g/kg DM) were tested. Bulls had ad libitum access to straw and concentrate during 108 d until slaughter weight (460 ± 30 kg). After sacrifice, samples from skin and carcasses before chilling at the brisket were collected to determine *Escherichia coli* O157:H7 and *Salmonella enterica typhimurium* presence. Also rumen, jejunum, cecum, and rectum grab-samples were collected to investigate *E. coli* O157:H7 and *S. enterica typhimurium* presence, and to count *E. coli*, lactic acid bacteria (LAB), aerobic mesophile bacteria (AMB), and fungi. Treatments did not affect rumen, jejunum, and rectum microbiota counts, and pathogenic bacteria studied. In the cecum, the percentage of LAB counts below 5 log cfu/mL was greater ($P < 0.01$) in MON (68.1%) than in CTR (34.6%) and PE (28.0%) treatments, the percentage of fungi counts below 3.5 log cfu/mL tended ($P = 0.09$) to be lower in CTR (26.7%) than in MON (66.7%) and PE (60.0%) treatments, and the percentage of the AMB counts below 8 log cfu/mL was greater ($P < 0.01$) in PE (46.7%) than in CTR (16.7%) and MON (16.7%) treatments. The prevalence of *E. coli* O157:H7 in the cecum tended ($P = 0.11$) to be lower in the MON (18.2%) than in the CTR (55.6%) and PE (57.2%) treatments. Skin and carcass contamination were not affected by treatment. Supplementation of bulls fed high-concentrate diets with monensin or plant extracts affected cecum microbiota; however, no differences in carcass contamination were detected.

Key Words: Beef, Plant extract, Carcass contamination

T88 Reduction adhesion of *E. coli* O157:H7 on CACO-2 cell by phage displayed peptides. C. J. Fu*, F. J. Schmidt, and M. S. Kerley, *University of Missouri, Columbia*.

Eighty phage clones, selected against pathogen *E. coli* O157:H7 by phage display technology, were tested to identify peptides adhesion to monolayers of CACO-2 cells. PEG/NaCl purified phages (10^{12}) and 10^5 bacteria from an overnight culture were inoculated into microtiter plate wells. Control experiments tested bacterial binding in the presence of phage clones from the unselected library or in the absence of phage. Inoculants (triplicate) were incubated in the same culture medium as CACO-2 cell for 45 minutes. Nonbinding bacteria were washed off (PBS), and the binding bacteria were dislodged with 2% tween-20 in DMEM medium for 10 minutes. Bacteria were serially diluted and plated on LB agar. Seven phage clones (PC23, PC41, PC43, PC61, PC62, PC77, and PC79) were found to reduce adhesion two-fold ($P < 0.10$) compared to both control incubations. This result suggests that specific peptides could influence adhesion affinity of gut bacteria, and thereby interfere with the establishment of chronic infection and subsequent shedding of pathogens such as *E. coli* O157:H7.

Key Words: Adhesion, CACO-2, *E. coli* O157:H7

T89 Effects of potassium lactate, sodium metasilicate, peroxyacetic acid and acidified sodium chlorite on physical properties of ground beef. S. A. Quilo*, F. W. Pohlman, A. H. Brown, P. G. Crandall, P. N. Dias-Morse, R. T. Baublits, and C. Bokina, *University of Arkansas, Fayetteville*.

Beef trimmings (90/10) that were left untreated (CON), or were treated with either 3% potassium lactate (KL), 4% sodium metasilicate (NMS), 200 ppm of peroxyacetic acid (PAA) or 1000 ppm acidified sodium chlorite (ASC) prior to grinding were utilized to evaluate antimicrobial chemical compound impact on bulk ground beef instrumental and sensory characteristics. After antimicrobial application, the trimmings were ground, weighed, packaged and evaluated during simulated retail

display. Bulk ground beef from the PAA treatment was lighter (L*; $P < 0.05$) than CON while KL and ASC were similar ($P > 0.05$) to CON. The NMS, PAA and KL ground beef were similar in redness values (a*; $P > 0.05$) to CON and more red ($P < 0.05$) than ASC. The KL and PAA treatments presented similar (b*; $P > 0.05$) yellow color to CON. In contrast, the NMS and ASC treatments were less ($P < 0.05$) yellow than CON. The NMS treatment had higher estimations of oxymyoglobin proportions (630 nm/580 nm; $P < 0.05$) when compared to CON, whereas KL and PAA were similar ($P > 0.05$) to CON for this attribute. The NMS treatment also had a lower hue angle (tan-1(b*/a*); $P < 0.05$) than CON, whereas all other treatments were similar to CON. Sensory attributes were measured by panelists on bulk ground beef, and indicated that KL, NMS and PAA were similar ($P > 0.05$) to CON for overall color, worst point color, and percent discoloration on day 0 of display. On day 7 of display panelists detected greater ($P < 0.05$) overall red color for the NMS and KL treatments when compared to the CON, whereas PAA and ASC treatments were similar ($P > 0.05$) to the CON for this attribute. These results suggest that application of NMS, KL, PAA or ASC antimicrobials to beef trimmings prior to grinding can generally allow for similar or improved ground beef color characteristics during retail display.

Key Words: Ground beef, Antimicrobials, Instrumental color

T90 A long-term, sub-clinical, outbreak of *Salmonella enterica* subsp. *enterica* Cerro in a Pennsylvania dairy herd. J. S. Van Kessel*[1], J. S. Karns[1], D. R. Wolfgang[2], E. Hovingh[2], and Y. H. Schukken[3], [1]*USDA-ARS*, *Beltsville, MD*, [2]*Pennsylvania State University*, *University Park*, [3]*Cornell University*, *Ithaca, NY*.

Salmonella is a prominent foodborne pathogen in the US and dairy cattle have frequently been identified as reservoirs for this organism. Here we describe a long-term outbreak of *Salmonella enterica* subsp. *enterica* Cerro that was detected in a Pennsylvania dairy herd during routine monitoring as part of a longitudinal study of several dairy herds. An initial analysis of individual fecal grab samples from the milking herd indicated a very low prevalence of *Salmonella* (1/102) and *Salmonella* was not detected in 10 environmental samples. In a subsequent sampling 6 mo later, *Salmonella* was isolated from 43.5% (47/108) of the cows and 40% of collected environmental samples (10/25). The *Salmonella* isolated in the first sampling was serovar Typhimurium var. Copenhagen, however isolates from the second herd sampling were serovars Cerro (91.5%) and Kentucky (8.5%). Sporadic environmental sampling between these initial complete milking herd samplings yielded serotypes Kentucky, Typhimurium var. Copenhagen, and Cerro and clinical salmonellosis was observed in several cows shedding Typhimurium var. Copenhagen. The herd was sampled nine additional times over the next 14 mo and fecal prevalence of *Salmonella* ranged from 8.4% to 89%. Prevalence remained high (58 to 69%) over the following 8 mo, showed evidence of decline over the next 3 mo, and then increased again to 89%. Cerro was the only serotype isolated during this period. Bulk milk was cultured weekly during this 22-mo period and *Salmonella* was isolated from 5.3% (5/94) of milk samples. For the last 14 mo of the study, milk filters were also cultured for *Salmonella* on a weekly basis and 65% (37/57) of the filters tested positive. There were no significant health or production concerns in the herd during this outbreak. Based on these observations we conclude that sub-clinical *Salmonella enterica* subsp. *enterica* Cerro infection can be persistent in a milking herd.

Key Words: *Salmonella*, Dairy, Cerro

T91 Prevalence of Shiga toxin-producing *Escherichia coli* in beef cattle grazing irrigated pastures or rangeland forages during winter and spring. L. M. Bollinger*[1], H. S. Hussein[1], M. R. Hall[1], and E. R. Atwill[2], [1]*University of Nevada*, *Reno*, [2]*University of California-Davis*, *Tulare*.

Since the first outbreak of Shiga toxin-producing *Escherichia coli* (STEC), the role of beef in human infection has been emphasized. In the US, *E. coli* O157:H7 has been the STEC commonly associated with human illnesses ranging from diarrhea to the life-threatening hemolytic uremic syndrome (HUS). Worldwide, a large number of STEC serotypes have caused similar illnesses. The objective was to assess STEC prevalence in four cow/calf operations on pasture (ranging from 38 to 1,300 cows) and five on the range (ranging from 65 to 225 cows) in California during winter and spring. Fecal samples were collected from 319 cattle on pasture and 365 on the range. Prevalence rate of STEC was not affected ($P > 0.05$) by season for cattle on pasture (averaging 3.8%) but was higher ($P < 0.05$) in winter than in spring for those on the range (13.6 vs 0.6%). Across operations and seasons, calves had a higher ($P < 0.05$) STEC prevalence rate than cows (12.4 vs 2.3%). Cattle on pasture had a lower ($P < 0.05$) STEC prevalence rate than those on the range (3.8 vs 7.7%). The STEC isolates belonged to 16 serotypes (*E. coli* O26:HUT [an untypeable H antigen], O86:H2, O111:H16, O125:H2, O125:H16, O125:H19, O125:H$^-$ [a nonmotile isolate], O127:H2, O127:H19, O128:H16, O146:H21, O166:H2, OUT [an untypeable O antigen]:H2, OUT:H16, OUT:H$^-$, and OUT:HUT). Of these serotypes, five (*E. coli* O26:HUT, O125:H$^-$, O146:H21, OUT:H2, and OUT:H$^-$) are known to cause HUS and two (*E. coli* OUT:H16 and OUT:HUT) are known to cause other human illnesses. Eight of the serotypes (*E. coli* O86:H2, O125:H2, O125:H16, O125:H19, O127:H2, O127:H19, O128:H16, and O166:H2) detected in this study have not been reported in cattle. Interestingly, *E. coli* O157:H7 isolates were not found in the cattle tested. The results of this study illustrate grazing beef cattle as a reservoir of a wide range of STEC of which several serotypes are pathogenic to humans. Thus, it is critically important to develop and implement control measures to decrease carriage and fecal shedding of these foodborne pathogens by beef cattle.

Key Words: Food safety, Beef cattle, *Escherichia coli*

T92 Prevalence of Shiga toxin-producing *Escherichia coli* in dairy cattle during winter and spring. H. S. Hussein*[1], L. M. Bollinger[1], M. R. Hall[1], and E. R. Atwill[2], [1]*University of Nevada*, *Reno*, [2]*University of California-Davis*, *Tulare*.

The role of dairy cattle in human infections with Shiga toxin-producing *Escherichia coli* (STEC) has emerged in the past two decades. A large number of outbreaks and sporadic cases of human illnesses resulted from visiting dairy farms or consumption of raw milk, dairy products, or ground beef from culled dairy cows. The illnesses included mild or bloody diarrhea, vomiting, abdominal pain, hemorrhagic colitis, and the life-threatening hemolytic uremic syndrome (HUS). The objective was to determine STEC prevalence in four dairy farms (averaging 713 Holstein cows and heifers) in California during winter and spring. Fresh fecal samples were collected from 532 cows and 73 heifers. Over the two seasons, STEC were recovered in all farms with prevalence rates ranging from 0.6 to 4.1%. Prevalence of STEC was not altered ($P > 0.05$) by season, parity, or days in milk (1 to 60, 61 to 150, or $\geq$ 151 d). The corresponding prevalence rates averaged 2.0, 1.5, and 1.3%, respectively. Heifers tended to have a higher ($P = 0.17$) prevalence rate of STEC than cows (5.5 vs 1.5%). The STEC isolates belonged to five

serotypes (*E. coli* O15:H$^-$ [a nonmotile isolate], O127:H19, O136:HUT [an untypeable H antigen], OUT [an untypeable O antigen]:H$^-$, and OUT:HUT). Of these STEC serotypes, one (*E. coli* OUT:H$^-$) is known to cause HUS and two (*E. coli* O15:H$^-$ and OUT:HUT) are known to cause other human illnesses. The *E. coli* O127:H19 serotype detected in this study has not been reported in cattle. Interestingly, *E. coli* O157:H7 isolates were not found in the cattle tested. The results of this study emphasize the importance of testing dairy cattle for STEC, in general, and suggest the need for developing pre-harvest control methods to decrease carriage and fecal shedding of these foodborne pathogens.

Key Words: Food safety, Dairy cattle, *Escherichia coli*

Forages and Pastures: Silages and Dairy

T93 Dynamics of early fermentation of *Albizia lebbeck* silage. T. Clavero* and R. Razz, *Centro de Transferencia de Tecnologia en Pastos y Forrejes. Facultad de Agronomia. Universidad del Zulia*, *Maracaibo, Zulia, Venezuela*.

The dynamics of fermentation were studied with *Albizia lebbeck* ensiled in the western part of Venezuela. Chopped fresh plant materials were ensiled into a laboratory silo, with a relationship 1:2 (w:v) of legumes:molasses, and stored at 25°C, and then were opened on 0.5, 1, 3, 5, 7, 14 and 30 days after ensiling, respectively. The samples were taken from three silos at each sampling time and the fermentation qualities and nitrogenous components were analyzed.The fermentation dynamics showed a fast pH reduction (P<0.05) within the initial three days of ensiling, decrease to 4.11 at day 5 and then remained almost constant until the end of ensiling (30 day). LA content showed a significant (P<0.05) increase after the first day of ensiling, reaching the peak (8.19 g/kg) on day 7, followed by an insignificant decrease (P>0.05). AA content increased significantly (P<0.05) after 3 days of ensiling and reached a highest concentration (1.63 g/kg) on day 7. PA and BA were detected in no or only small amount over the ensiling period. This was attributed to a fast reduction in pH because of the rapid production of LA which restricted growth of clostridia. TN an PN showed a slight decrease within the initial 3 days of ensiling, followed by an insignificant decrease (P>0.05). SN increased gradually and reached the highest value on day 3 (P<0.05) and then tended to decrease. AN was not detected over the ensiling period. Some of the changes in nitrogenous components could be attributed to the action of plant enzymes within initial days of ensiling. This study showed that the silage made from *Albizia lebbeck* with molasses addition had good fermentation characteristics where active LA fermentation took place in the initial stage of ensilage, resulting in a decrease pH with early stabilization of the medium.

Key Words: *Albizia lebbeck*, Silage, Fermentation quality

T94 Effect of storage time on ruminal starch degradability in corn silage. J. R. Newbold*[1], E. A. Lewis[1], J. Lavrijssen[1], H. J. Brand[1], H. Vedder[2], and J. Bakker[2], [1]*Provimi Research and Technology Centre*, *Brussels, Belgium*, [2]*BLGG*, *Oosterbeek, The Netherlands*.

Fifteen corn silages, covering a wide range in dry matter (DM) and starch content, were stored in bunker silos on commercial farms in the Netherlands. Each silo, filled with one harvest of one cultivar, was sampled at two-monthly intervals from approximately two to ten months after ensiling. Samples were frozen until evaluation of ruminal degradability. Three lactating Holstein cows were used to determine degradability of DM, starch and crude protein (CP) by *in sacco* incubation for 0, 3 and 24h, followed by machine washing. At ensiling, mean DM was 332g/kg (SD=55.0, range=171-476) and mean starch was 312g/kg DM (SD=59.7, range=126-426). Data were analysed by analysis of variance with repeated measures within each subject (silo) and cultivar as covariate. The proportion of starch degraded after 3h incubation increased with storage time (mean = 0.532, 0.535, 0.589, 0.639, 0.690 when stored for 2, 4, 6, 8 and 10 months, respectively, SE=0.014, P<0.001). Similar effects, of smaller magnitude, were observed for degradability of starch after 0h and 24h. Although the proportion of CP degraded also varied with time of storage (for example, 3h degradability = 0.392, 0.361, 0.335, 0.429 and 0.470 for 2, 4, 6, 8 and 10 month storage, respectively, P<0.001), degradabilities of starch and CP were not correlated (P>0.1). There was an interaction between effect of storage time and DM concentration at ensiling (P<0.001): the increase in 3h starch degradability between 2 and 10 months of ensiling was 0.007 for silages <300g DM/kg at ensiling and 0.251 for silages >375g DM/kg at ensiling. The rate of increase in 3h starch degradability during storage was correlated positively with DM at ensiling (r=0.77, P=0.006) but not with starch concentration at ensiling (r=0.26, P=0.35). The effect of time since ensiling on starch degradability should be considered when formulating ruminant rations containing corn silage.

Key Words: Degradability, Starch, Corn silage

T95 Corn hybrid forage quality differences as influenced by ensiling. D. J. R. Cherney*, J. H. Cherney, and W. J. Cox, *Cornell University*, *Ithaca, NY*.

Hybrid selection is one of the most important management practices that affect the feeding quality of corn silage. Our objective was to determine the impact of ensiling on forage quality of 54 corn hybrids. Four field replicates of each hybrid were planted at each of two locations in NY in 2003 (Groveland Station, NY and Aurora, NY). Five plants from each hybrid were harvested, chopped through a chipper shredder, mixed and sub-sampled for fresh and ensiled samples. Silage samples were vacuum bagged within one hour of chopping. There were differences among hybrids in pH (P < 0.01) at both sites. pH of ensiled samples was positively correlated with silage dry matter (DM; r=0.82) and increased 0.016 pH units for each 10 g/kg increase in DM. All samples were well ensiled, with an average pH of 3.6, and an individual sample total range of 3.43 to 3.91. Dry matter of fresh and ensiled samples were highly correlated (r=0.98), with ensiled samples averaging 10 g/kg lower than their fresh counterpart. Crude protein (CP) of ensiled samples was highly correlated (r=0.95) with CP of fresh samples. The slope of ensiled sample CP to fresh CP was not different from unity, but there was a 4.1 g/kg bias in CP in favor of the ensiled samples, due to loss of dry matter from oven drying of silage. Sugar of fresh samples averaged 99 g/kg while that of corresponding ensiled samples averaged 36 g/kg. Ranking of hybrids for sugar changed from fresh to ensiled, but was not consistent between sites. Non fibrous carbohydrate of ensiled samples was 52 g/kg lower than fresh samples. There were hybrid x ensiling/fresh interactions for neutral detergent fiber (NDF) and in vitro true digestibility