

($P = 0.10$) for AR rams to have greater mounting frequency compared with A rams (20.9 2.8 mounts/20 min and 14.5 2.8 mounts/20 min for AR and A rams, respectively). The frequency of raising the fat tail of females, however, was greater ($P = 0.06$) in A than AR rams. Neither A nor AR rams managed to service the ewes. Significant correlation existed ($P < 0.05$) between bouts of leg kicking and mounting frequency

($r = 0.42$) and between mounting frequency and tail-raising ($r = 0.62$). Results indicate that A and AR rams have similar sexual performance. Awassi rams managed to raise the fat tail of females more frequently thus predicting a greater advantage in natural mating over AR rams.

Key Words: Sheep, Libido, Behavior

Animal Health Mastitis and Management

334 Infrared thermography to evaluate milking induced alterations in teat tissue fluid circulation. C. O. Paulrud*¹, S. Clausen², P. E. Andersen², M. Bjerring³, and M.D Rasmussen³, ¹Danish Dairy Board, ²Risoe National Laboratory, ³Danish Institute of Agricultural Sciences.

Machine milking may influence the defense mechanisms of the teat by altering teat tissue fluid-dynamics. The skin temperature reflects the underlying circulation and tissue metabolism. Use of thermography can focus, collect and transform the infrared range of the electromagnetic spectrum that is emitted from any body in a heat dependant fashion. Thermography images a pictorial summary of the heat gradients generated and can thereby visualize the thermal patterns of the skin resulting in useful mapping of the underlying circulation. Two healthy cows and one heifer with moderate teat oedema were milked with a conventional liner and a very soft experimental liner in a split udder design mode. Thermographic pictures were taken before teat preparation with a wet cloth, immediately after preparation, and successively after milking for 10 min. Skin temperatures were measured approximately 5 mm from the teat apex, at the mid, and at the base of the teat. The thermographic patterns were visually different between teats milked with different liners. During preparation, teat apex-, mid teat- and teat base-temperature fell 3.61.4, 3.41.6 and 1.70.9 C respectively. The decrease at mid teat and teat base temperature were however less distinct among teats with moderate oedema. Immediately after milking, all teats milked with the soft liner were colder at the teat apex (mean 2.10.4C) and slightly warmer at the middle (1.10.6C). During milking, temperature at the teat base decreased of teats without oedema and milked with the conventional liner but did however rise among teats milked with the soft liner and among teats with moderate oedema. Present findings may be explained by the soft liner having a relatively low ability to massage the teat apex combined with a relatively good capacity to massage the teat sinus and maintain fluid circulation at the teat base. We conclude that thermography is useful for study and evaluating the effects of different milking techniques on teat fluid dynamics.

Key Words: Milking, Teat, Thermography

335 Bedding amendments for environmental mastitis control in dairy cattle. E. K. Kupprion, J. D. Toth*, Z. Dou, H. W. Aceto, and J. D. Ferguson, University of Pennsylvania, Kennett Square, PA/USA.

Coliform bacteria are environmental mastitis pathogens that thrive in manure and bedding and are often responsible for transient peracute and acute mastitis. The purpose of this experiment was to investigate if acid and alkaline amendments added to dairy cow bedding are effective in controlling mastitis-causing bacteria populations. Alum, fluidized bed combustion coal flyash (FBC), flue gas desulfurization flyash (FGD), or hydrated lime were added to kiln-dried sawdust bedding material (1:10 amendment:bedding, DM basis) overlying mattresses in dairy tie-stalls with no-amendment control included for comparison. Each treatment was replicated three times. Bacteria counts were made by plating samples of bedding, mattress swab, and teat end swab, collected on day 1, 2, 3; colonies were identified as total Gram-negative bacteria, *E. coli*, and *Klebsiella* spp. pH was also determined on bedding samples. All amendments but FGD exhibited antibacterial effect. Flyash FBC appeared to be most effective on day 1; the hydrated lime treatment suppressed bacteria growth on day 1 and 2 with the antibacterial effect diminished on day 3. Alum was able to suppress bacteria populations throughout the 3-day sampling period. The antibacterial effect of the amendments was apparently related to pH alteration of the bedding material. Hydrated lime raised pH by about 5 units during day 1 and 2, FBC by nearly 5

units on day 1, whereas alum reduced pH by about 3 units throughout the 3-day period. Bedding pH was not changed by the FGD treatment.

Key Words: Environmental Mastitis, Mastitis Control, Bedding Amendments

336 Impact of two coliform mastitis vaccination schedules on milk yield, dry matter feed intake and intramammary infections of dairy cattle. C.S. Petersson*¹, K.E. Leslie¹, D.F. Kelton¹, and B.A. Mallard², ¹Department of Population Medicine, ²Department of Pathobiology, University of Guelph, Ontario, Canada.

Late lactation cows and springing heifers from two research herds were enrolled two weeks prior to drying off and randomly assigned to one of two vaccination protocols. Group A involved vaccination at dry-off, three weeks before expected calving, and 2 to 9 days in milk (DIM). Group B cows were vaccinated two weeks before dry-off, at dry-off, and at three weeks before expected calving. Daily milk weights were recorded from enrolment until the day of drying off, as well as for the first 30 days of the next lactation. Quarter milk samples were aseptically collected once from day 2 to 9 DIM for bacteriological culture. After calving, dry matter intakes (DMI) were recorded for all cows during the period from the day before to the two days after the Group A vaccination date. Descriptive data from the first 141 cows that have completed the trial are summarized. The mean decline in milk production over the two-week period prior to drying off was -11.8 kg and -13.6 kg for Group A and Group B cows, respectively. This difference was not statistically significant. Milk production on the day prior to dry-off in Groups A and B was 12.0 kg and 12.2 kg, respectively. After calving, the average milk production at 30 DIM was 37.5 kg and 37.8 kg cows in Groups A and B, respectively. On the day of vaccination for Group A after calving, DMI values were 11.8 kg and 13.0 kg for group A and B, respectively ($P=0.07$). Daily milk production on this date was found to be 26.5 kg and 27.5 kg for Groups A and B, respectively. Results of milk bacteriology from 656 quarter samples have isolated major pathogens from 29 and 14 quarters in groups A and B respectively. *E. coli*, *Klebsiella* and environmental *Streptococci* were found in 12, 3, and 10 versus 3, 1 and 5 of the quarters from animals in Groups A versus B, respectively. Preliminary results favor coliform mastitis vaccination at two weeks before, at dry-off and at transition.

Key Words: Vaccination, Mastitis, Coliform

337 Multiple boosters of J5 vaccine elicit strong lactational antibody responses in dairy cows. R.A. Darch*¹, L. Nielsen¹, P. Saama¹, R.J. Erskine², A.P. Belschner³, and J.L. Burton¹, ¹Animal Science, Michigan State University, ²Large Animal Clinical Sciences, Michigan State University, ³Pharmacia Animal Health.

J5 *E. coli* vaccines have done well to protect cows from coliform mastitis in early lactation. However, data from our group show that peak rates of coliform mastitis occur between 3 and 5 months of lactation, even in J5 vaccinated herds, suggesting that protective antibody responses wear off quickly after the final dose of vaccine is administered. The objective of this study was to determine if multiple boosters of J5 vaccine maintain strong anti-coliform antibody responses throughout lactation. Commercial J5 bacterin was used to immunize two groups of cows ($n = 4$ multiparous, 2 primiparous per group); control cows received the recommended 3 doses of J5 vaccine (at dry off, 30 days dry, and 14 days postpartum) while treated cows received 12 doses (the recommended 3 doses plus 9 additional doses at 30-day intervals). Weekly blood samples were collected from all cows throughout the trial for ELISA assay of serum anti-J5 *E. coli* IgM, IgG1, and IgG2 antibody responses. ELISA test data were normalized against negative control values and resulting

data analyzed by repeated measures (SAS). Results showed that all cows mounted clear IgM, IgG1, and IgG2 antibody responses when administered 3 doses of vaccine. However, treatment influenced ($P < 0.0001$) the shape of each antibody response profile. Control cow responses declined once vaccinations were terminated while treated cow responses increased steadily throughout lactation. Differences between treatment groups were particularly striking for the IgG1 and IgG2 response profiles. Results show that multiple boosters of J5 bacterin sustains strong serum antibody responses in lactating cows.

Key Words: Coliform Mastitis, Vaccines, Antibody Response

338 An evaluation of the ColiMast test for detection of coliform mastitis in dairy cattle. S.K. Gawrylash^{*1}, K.E. Leslie¹, M. Archambault², and A. Bashiri¹, ¹University of Guelph, Department of Population Medicine, ²University of Guelph, Animal Health Laboratory.

A rapid and accurate method to determine the type of pathogen causing clinical mastitis would be useful. The ColiMast test is an enriched growth media in a vial. After incubation, a color change indicates the presence of coliforms. This project has evaluated the test characteristics of the ColiMast test for detecting coliforms in clinical mastitis milk samples. Samples were obtained from submissions to the University of Guelph laboratory. A ColiMast vial was inoculated with 2 ml of milk and incubated at 37°C. Color change was evaluated at 12 and 24 hours. The original milk samples underwent standard culture. In addition, four farms inoculated a ColiMast test with milk from each case of clinical mastitis. The producer checked the ColiMast test at the next two milkings to observe and record any color change. The original milk sample was frozen and sent to the University of Guelph. A second ColiMast test was done on the same sample after thawing, and sent for bacteriological culture. Sensitivity and specificity of ColiMast were calculated. In addition, reasons for false positive and false negatives were identified. A Kappa Value for the agreement between the ColiMast tests done on-farm and in the lab was calculated. Complete results were obtained from 505 samples. A total of 172 samples were positive for coliforms. After 24 hours of incubation, 128 of these lab-positive samples were also positive on ColiMast (sensitivity = 0.74). Of the 333 samples that were negative for coliforms on culture, 261 were ColiMast negative (specificity = 0.78). This means that there were 72 ColiMast tests that gave a false positive result. It is noteworthy that the ColiMast test uses 2 ml of milk in an enriched liquid growth medium as compared to a 0.01 loop inoculum in milk culture. Of the 72 false positive tests, 26 had no significant growth on culture. The larger volume of milk may allow for relatively small numbers of coliforms to grow and cause a color change. The Kappa Value was 0.85 when the test was read at 12 hours suggesting excellent agreement between ColiMast tests done on the farm and in the lab. The agreement was substantially less at 24 hours ($K=0.48$). In conclusion, the ColiMast test offers great promise for use in a treatment decision-making protocol.

Key Words: Mastitis, Clinical, Diagnosis

339 Characteristics of milk samples submitted for culture in Wisconsin from 1994 - 2001. J. A. Makovec^{*} and P. L. Ruegg, University of Wisconsin, Madison.

Bovine mastitis is an extremely costly disease of dairy cattle because of its frequent occurrence and impact on milk production. Microbiologic examination of milk samples from mastitic cows is useful in determining the cause of the infection and deciding on appropriate preventative and therapeutic strategies. The objective of this study was to examine the characteristics of milk samples submitted for culture in Wisconsin from 1994 to 2001. Clinical case records from milk samples submitted to the Wisconsin Veterinary Diagnostic Laboratory from January 1994 until June 2001 were retrieved, and the test results were copied from original paper records into a computer spreadsheet for analysis. Test results ($n=83,650$) were recorded as no growth, contaminated or identified as specific bacterial pathogens. Multiple bacteria were isolated from some milk samples. The proportion of samples identified as contaminated by the laboratory varied by year ($P < 0.0001$) and ranged from a high of 20.6% in 1997 to a low of 9.5% in 2001. The proportion of samples coded as no growth increased from 22.6% in 1994 to 49.7% in 2001. The proportion of *Staph aureus* and *Strep ag.* isolated from milk samples was associated with year ($P < 0.0001$). Isolation of *Staph aureus* decreased from 17.7% in 1994 to 9.7% in 2001 while isolation of

Strep ag. decreased from 8.1% in 1994 to 3.0% in 2001. Coagulase negative *Staphylococcus* were isolated from 12.7% to 17.5% of all samples and environmental *Streptococcus* were isolated from 11.6% to 20.1% of all samples. *E. coli* were isolated from 3.1% to 6.7% of all submissions. Number of tests requested was associated with year ($P < 0.0001$) ranging from 16,505 in 1999 to 6,301 in 1995. Number of tests requested was associated with month ($P < 0.0001$) ranging from 8,932 in April to 3,948 in December. Antimicrobial susceptibility tests were run on 10.65% of all samples. Microbial examination shows a decrease in the proportion of contagious bacteria in comparison to the proportion of environmental pathogens.

Key Words: Mastitis, Milk samples, Milk quality

340 Evaluation of *Mycoplasma species* shedding patterns in milk of lactating dairy cows with intramammary infections. M. Biddle^{*} and L. Fox, Washington State University, Pullman.

This study was conducted to evaluate the shedding patterns of ten lactating dairy cows with mycoplasma intramammary infections. Milk samples were collected daily for 28 days using aseptic techniques. Mycoplasma isolation in milk samples was initiated by directly plating a fresh milk sample onto a mycoplasma agar plate. Isolation was also attempted by inoculating mycoplasma enrichment broth, to increase the likelihood of isolation for 4 days and then transferring broth to an agar plate. Agar plates from direct culture and enrichment broth were incubated at 37°C, 10% CO₂, for 10 days before examination. Agar plates were examined for growth of mycoplasma colonies and the numbers of colony forming units (CFU) were recorded. Mycoplasma was isolated from milk samples of 8 cows by direct plate inoculation, with and without enrichment. In samples from 2 cows mycoplasma was only detected from agar plating of broth culture. Contrasting isolation frequencies of direct plate versus broth culturing resulted in isolation of mycoplasma species 68% of the time from both direct plate and broth culturing methods. Mycoplasma species were isolated in 23% of the broth cultures alone and 9% of the time through direct plate only. A bimodal frequency distribution of mycoplasma shed in mammary composite and quarter milk samples was observed. In composite milk samples, mycoplasma was never recovered in 35% of the samples, while 54% of the samples had more than 6 million colonies recovered. In 43% of the quarter milk samples mycoplasma was never recovered while in 39% of the samples there were greater than 6 million colonies. The use of enrichment broth has the potential to improve detection of cows with mycoplasma intramammary infections. Data indicated that periods of latency might exist when cows with mycoplasma mastitis may not be shedding this pathogen in milk. These latent periods can affect diagnosis of this disease

341 Impact of intramammary treatment of CMT positive early postpartum dairy cows. J.A. Wallace^{*1}, K. Stipetic², K.E. Leslie¹, R.T. Dingwell¹, Y.H. Schukken², and P. Baillargeon³, ¹University of Guelph, Department of Population Medicine, ²Cornell University, ³Clinique de St-Louis/Embryobec.

1781 quarters of 489 cows from dairy herds in Quebec ($n=14$), Ontario ($n=2$), and New York ($n=7$) were enrolled. All quarters from each cow were tested by the dairy producer using the California Mastitis Test (CMT) between calving and day 3 in milk, and sampled aseptically for milk bacteriology. A CMT score >0 was considered positive. Cows with a positive CMT were randomly assigned to receive either the label dose of intramammary cephapirin sodium (Cefa-Lak) or no treatment. All CMT positive cows were sampled for bacteriological culture on two more occasions (10-16 DIM, and 17-23 DIM) to determine cure of infections. Outcomes evaluated included the effect of treatment on cure for major pathogens, and the effects of treatment on linear score (LS) and milk production for the first three DHI tests post calving. The sensitivity (56%) and specificity (86%) of CMT for detecting cows infected with major pathogen infections was relatively good, although the test characteristics varied among farms; particularly in relation to the rate of IMI in fresh cows. There was a significant difference in cure rates for major pathogens ($p < 0.01$), especially for the environmental streptococci ($p < 0.0001$) between the 135 treated quarters and the 186 controls. The impact of CMT score, treatment group, and cure were assessed by measuring changes in LS and milk production using a mixed model procedure, controlling for herd, breed, and lactation. Overall, cows with a CMT 3 had a higher LS ($p < 0.05$). Treated cows were 3.6 times more likely to cure a major pathogen infection ($p < 0.02$). Cows that cured a

major pathogen had a lower LS on test date 3 ($p=0.08$). As LS increased milk production decreased. There was a trend in the data that indicated that untreated cows with high CMT score at calving (score 2 and 3) had a lower milk production on the first test days, whereas this effect was not present in treated cows with a high CMT score. In conclusion, early antibiotic treatment of CMT positive quarters had a significantly greater cure rates than controls, particularly with the environmental pathogens.

Key Words: Mastitis, Postpartum, Therapy

342 Reported antimicrobial usage on organic and conventional dairy farms in the Midwest and Northeast. A.M. Geiger^{*1}, P.L. Ruegg¹, L.D. Warnick², J.B. Kaneene³, S.J. Wells⁴, C. Fossler⁴, and L. Halbert³, ¹University of Wisconsin, Madison, WI, ²Cornell University, Ithaca, NY, ³Michigan State University, East Lansing, MI, ⁴University of Minnesota, St. Paul, MN.

A longitudinal study is evaluating risk factors for antimicrobial resistance on dairy farms. The objective of this part of the project was to compare antimicrobial usage on conventional (CON) versus organic (ORG) dairy farms. A questionnaire ($n=131$) was administered at an initial visit by trained personnel. Data were entered into a central database and analyzed using SAS. Conventional dairies used significantly more ionophores and coccidiostats in weaned calves ($p<.0038$.) More milk from cows treated with antibiotics ($p=1.401*10^{-5}$), and more milk replacers containing antibiotics ($p=.004$) were used to feed calves on CON farms. Significantly more CON dairies used antibiotics ($p=.0003$) to treat respiratory disease in cows. There was no significant difference in the use of antibiotics to treat respiratory diseases or scours in calves. The use of Tetracycline ($p=.002$.) and Trimethoprim-Sulfa ($p=.0049$) to treat calf problems was higher in CON dairies. No ORG dairies but 40.4% of CON dairies reported the use antibiotics to treat mastitis ($p=1.307*10^{-6}$.) The most common antibiotics used to treat mastitis on CON dairies were: Penicillin (42.42%), Ampicillin (26.26%), Amoxicillin (15.15%), and Oxytet (18.18%). Comprehensive dry cow therapy was used by 97.98% of CON versus 3.13% of ORG. Significantly more conventional dairies used antibiotics to treat metritis or retained placenta ($p<.0001$.) Significantly more conventional dairies used antibiotics to treat foot problems in adult cows ($p<.0001$.) Although there was no significant difference in the use of antibiotics in footbaths, significantly more CON dairies used tetracycline in the footbath ($p=.0214$.) No ORG herds but 17.17% of CON used antibiotics in the water or feed of weaned calves and heifers ($p=.0122$.) Of the organic dairies, 50% reported the use of antibiotics in their dairy cattle. After antibiotics had been used, 10% of ORG herds reported using animals for organic milk production after a withdrawal has passed. No ORG herds used animals for organic meat production after administering antibiotics. As expected, this study found that the use of antimicrobials is significantly higher on CON farms as compared to ORG farms.

Key Words: Antimicrobial, Organic, Drugs

343 Influence of environmental stressors and prophylactic antibiotic on serum antioxidant concentrations and incidence of bovine respiratory disease of feeder steers. N. K. Chirase^{*1,3}, C. W. Purdy², R. W. Loan³, R. Briggs², G. Duff⁴, J. Avampato¹, and D. Murray⁵, ¹Texas Agricultural Experiment Station, Amarillo and West Texas A&M University, Canyon, ²USDA/ARS, Bushland, TX and Ames, IA, ³Texas A&M University, College Station, ⁴Arizona State University, Tucson, Arizona, ⁵OXIS International, Portland, OR.

Feeder cattle often encounter many environmental stressors and pathogens associated with the marketing process and translocation to the feedyard. Exposure to stressors could compromise the antioxidant and immune defense systems, resulting in morbidity and mortality of these calves. An experiment was conducted to determine the effects of prophylactic antibiotic treatment and posttransit commingling of feeder calves obtained from two sources (New Mexico and Tennessee), to measure red blood cell (RBC) lysate concentrations of cellular glutathione peroxidase (cGPx), reduced glutathione (GSH) and superoxide dismutase (SOD) and assess the incidence of bovine respiratory disease (BRD). One hundred twenty one (121) crossbred steers (average BW 190 kg) were purchased in TN and eighty four (84) crossbred steers of similar size and age were obtained in NM, vaccinated, weighed, and blood obtained for RBC. Steers were randomly allotted into 3 commingling treatment groups (3 replicates per group): 1) New Mexico (NM), 2) Tennessee

(TN) and 3) Commingled (Mixed). One-half of the steers in each treatment group received pretransit prophylactic Nuflor (1 mL/15 kg of BW, s.c.). Upon arrival at the feedyard in Clayton, NM, all steers were managed using commercial feedyard management protocols. Steers were also scored daily for BRD and blood was obtained upon arrival (d 0) and on morbid steers on various days. All the oxidative stress biomarkers were standardized using HB content of the cell. The data were subjected to the analysis of variance using the General Linear Models procedure of SAS. Pretransit HB (mg/dL), cGPx (mU) and GSSG (nmol) were lower ($P<0.05$) in TN steers than NM steers. On the contrary, the GSH concentrations of the NM steers were lower than the TN steers. Pretransit cGPx values for TN calves correlated ($r=0.27$; $P<0.01$) with episodes of BRD at the feedyard. As incidence of BRD increased from 0 to 4, cGPx concentrations decreased from 95.3 to 20.3 mU, respectively. Superoxide dismutase and GSH responses were inconsistent among all treatments. These results suggest that oxidative stress biomarkers could be used as biomarkers of BRD susceptibility. Furthermore, antioxidant supplementation may be required to restore the antioxidant defense system

Key Words: Feeder Steers, Oxidative Stress, Bovine Respiratory Disease

344 Effect of environmental stressors and prophylactic antibiotic on serum antioxidant concentrations and incidence of bovine respiratory disease of feeder steers. N. K. Chirase^{*1,3}, C. W. Purdy², R. W. Loan³, R. Briggs⁴, G. Duff⁵, and J. M. Avampato¹, ¹Texas Agricultural Experiment Station, Amarillo and West Texas A&M University, Canyon, ²USDA/ARS, Bushland, TX, ³Texas A&M University, College Station, TX, ⁴USDA/ARS, Ames, IA, ⁵Arizona State University, Tucson, Az.

Feeder cattle often encounter many environmental stressors and pathogens associated with the marketing process and translocation to the feedyard. Exposure to stressors could compromise the antioxidant and immune defense systems, resulting in morbidity and mortality of these calves. An experiment was conducted to determine the effects of prophylactic antibiotic treatment and posttransit commingling of feeder calves obtained from two sources (New Mexico and Tennessee), to measure serum antioxidants (retinol, α - and γ -tocopherol) concentrations and assess the rate of bovine respiratory disease (BRD). One hundred twenty one (121) crossbred feeder steers (average BW 190 kg) were purchased in TN and eighty four (84) crossbred steers of similar size and age were purchased in NM and calves were vaccinated, weighed, and blood obtained via jugular venipuncture. The calves were randomly allotted into 3 commingling treatment groups (3 replicates per group): 1) New Mexico (NM), 2) Tennessee (TN) and 3) Commingled (Mixed). One-half of the steers in each treatment group received pretransit prophylactic Nuflor (1 mL/15 kg of BW, s.c.). Upon arrival at the research feedyard in NM, all steers were managed similar to commercial feedyard management protocols. Steers were also scored daily for BRD and blood was obtained via jugular venipuncture upon arrival (d 0), 7, and 28 d posttransit. The data were subjected to the analysis of variance using the General Linear Models procedure of SAS. There was no antibiotic treatment by commingling interaction ($P > 0.05$) for serum free retinol, α - and γ -tocopherol concentrations and incidence of BRD. Regardless of commingled group, transit stress decreased ($P<0.01$) serum free retinol and α -tocopherol concentrations of feeder steers on d 7 and 28 posttransit. By d-28, serum α -tocopherol concentrations decreased from 6.3 ug/mL to 1.65 ug/mL, far below the critical levels for cattle. Prophylactic antibiotic treatment did sustain ($P>0.05$) serum antioxidant concentrations of steers. Although, γ -tocopherol also decreased regardless of commingled or antibiotic treatment, they increased three-fold by d-28. These results suggest that transit stress reduced serum antioxidant concentrations to critical levels at the feedyard and supplementation may be required to restore them.

Key Words: Feeder Steers, Oxidative Stress, Bovine Respiratory Disease

345 Development and validation of a pruritic index to assess the impact of chorioptic mange infestation in dairy cows. K. Day^{*1}, K. Leslie¹, T. Duffield¹, D. Kelton¹, J. Jansen², and W. Sears¹, ¹University of Guelph, Guelph, ON, ²Ontario Ministry of Agriculture, Food, and Rural Affairs, Fergus, ON.

Recent studies have reported a significant association between presence of mange lesions and reduced production in early lactation. In addition, there was a significant positive production response to moxidectin therapy in the transition period. However, the biological reasons for these

effects were not described. It is suspected that mange infestation results in intense pruritus and decreased DMI. The objective of this study was to develop and validate a semi-quantitative scoring system to categorize the degree of pruritus in mange infested cattle. In addition, the association between Pruritic Index Score, Mange Lesion Score, presence of Chorioptes mites, measures of productivity, and response to endectocide treatment in Ontario dairy cattle were evaluated. Subjective measures of mange lesion and pruritus were developed and evaluated. Study herds were solicited from veterinarians based on observed mange lesions. All lactating cows were scored for pruritic index and mange lesions at enrollment and six weeks post treatment. In a subset of 135 cows in three herds, each cow was scored by six different individuals to develop an inter-reader assessment of these subjective scoring systems using a statistical permutation test. Mange positive cows were matched with mange negative herd mates for parity and stage of lactation. All cows were randomly assigned to receive moxidectin pour-on endectocide or a placebo pour-on solution. The study population consisted of 1179 cows in 21 herds. The overall prevalence of mange lesions was 47.8% and of pruritus was 56.5%. Herd level prevalence of mange lesions ranged from 19 to 72%. Inter-reader comparison of pruritic index and mange lesions showed a small but significant variation among readers. Pairwise comparison showed overall differences between mean scores for lesion and itch between readers, as well as significant differences between some readers for both lesion and itch scores. More differences were observed for inter-reader lesion scores than for itch scores. Pruritic index and mange lesion scores were significantly associated. When DIM, parity, and random herd effects were controlled, positive pruritic index score was significantly associated with higher milk production on the DHI test closest to enrollment.

Key Words: Mange, Pruritus

346 Cow characteristics and management factors on locomotion in Holsteins. T. E. van Dorp¹, L. R. Schaeffer¹, P. Boettcher², D. Kelton¹, and M.M. Shoukri³, ¹University of Guelph, Guelph, ON, Canada, ²IDVGA-LITA, Segrate (MI), Italy, ³University of Western Ontario, ON, Canada.

Risk factors related to locomotion of Holstein dairy cows were separated into the characteristics of the cow (locomotion score, parity, days in milk, body condition score, and 150-day kg milk production) and management factors (flooring, hoof trimming, footbath, and feeding around parturition). The objective was to relate the risk factors to the change in locomotion scores from first to second visit (49 to 59 days apart). Milking cows of 26 free stall herds were scored for locomotion (from 1 Excellent to 5 Lame) and body condition (BCS)(from 1 Skinny to 5 Obese). Data consisted of 5774 observations on 3298 cows (2478 cows had 2 observations). Locomotion score was analyzed with a linear mixed model. Herd was included as a random effect. Results indicated that herd explained almost 3 percent of the variability, whereas the unexplained variability, the residual, accounted for 97 percent. Cows with more parities and more days in milk were associated with reduced locomotion. Cows with more body condition and higher 150-day milk production were associated with improved locomotion. Management practices indicated that not using a footbath, using a footbath twice per month, not using formaldehyde, not trimming the hoofs, and changing the diet twice after calving were associated with improved locomotion. These results should be interpreted with caution, because the number of herds was relatively small, and significant management factors were usually found when the number of herds in a category was small. The large residual variance suggested that other more possibly important factors (disease) were not recorded during this study.

Key Words: Locomotion, Dairy cows

347 Effect of environmental stressors and prophylactic antibiotic on performance, fever status and incidence of bovine respiratory disease of feeder steers. N. K. Chirase^{1,3}, C. W. Purdy², R. W. Loan³, R. Briggs⁴, G. Duff⁵, and J. M. Avampato¹, ¹Texas Agricultural Experiment Station, Amarillo and West Texas A&M University, Canyon, ²USDA/ARS, Bushland, TX, ³Texas A&M University, College Station, TX, ⁴USDA/ARS, Ames, IA, ⁵Arizona State University, Tucson, Az.

Feeder cattle often encounter many environmental stressors and pathogens associated with the marketing process and translocation to

the feedyard. Exposure to stressors could compromise the antioxidant and immune defense systems, resulting in morbidity and mortality in these calves. An experiment was conducted to determine the effects of prophylactic antibiotic treatment and posttransit commingling of feeder calves obtained from two sources (New Mexico and Tennessee), to determine performance and rate of bovine respiratory disease (BRD). One hundred twenty one (121) crossbred feeder steers (average BW 190 kg) were purchased in TN and eighty four (84) crossbred steers of similar size were obtained in NM and calves were vaccinated, weighed, rectal temperature (RT) measured, and randomly allotted into 3 commingling treatment groups (3 replicates per group): 1) New Mexico (NM), 2) Tennessee (TN) and 3) Commingled (Mixed). One-half of the steers in each treatment group received pretransit prophylactic Nuflog (1 mL/15 kg of BW, s.c.). Upon arrival at the Clayton Livestock Research Center, Clayton, NM, all steers were housed by groups and managed similar to commercial feedyard management protocols. Steers were also scored daily for BRD, weighed and rectal temperatures measured upon arrival (d 0), 7, 14, 21 and 28 d posttransit. The data were subjected to the analysis of variance using the General Linear Models procedure of SAS. There was no antibiotic treatment by commingling interaction ($P > 0.05$) for ADG, RT or BRD rates. Bovine respiratory disease rate was higher in the TN and Mixed groups than the NM group (2.22 and 1.72 vs 0.92, respectively). However, on d 7, 14, 21 and 28 of the study, the NM calves gained less ($P < 0.01$) and also had higher RT on d 28 than the TN and Mixed calves. Prophylactic antibiotic had no effect ($P > 0.05$) on RT or ADG of calves of all treatment groups but lowered ($P < 0.05$) BRD rates (1.33 vs 1.91). As the BRD rates or episodes of sickness increased, the ADG of calves decreased. These results suggest that more studies are required to understand the role of environmental stressors on feeder cattle performance and health.

Key Words: Feeder Steers, Performance, Bovine Respiratory Disease

348 A comparison of the effect of *Neospora caninum* on milk production in two populations of Ontario dairy herds. Jamie Hobson¹, Todd Duffield¹, Dave Kelton¹, Bev McEwen², Sharon Hietala³, Kerry Lissemore¹, Ken Leslie¹, Gerard Cramer¹, and Andrew Peregrine¹, ¹Ontario Veterinary College, University of Guelph, Guelph, Ontario, Canada, ²Animal Health Laboratory, University of Guelph, Guelph, Ontario, Canada, ³California Animal Health and Food Safety Laboratory System, Davis, University of California, U.S.A.

Studies on *Neospora caninum* infection in dairy cattle and its effect on milk production have yielded conflicting results, possibly due to differences in study methodology or to an as yet undetermined biological effect. The objective of this work was to compare these effects and propose a theory explaining the association between *N. caninum* serostatus and milk production. Group A consisted of cows from 28 case herds of a large study into *N. caninum* in Ontario dairy herds conducted in 1999. These herds had experienced at least one *N. caninum* abortion based on fetal histopathology in 1998/99; subsequent whole herd serology was completed in 1999. Group B comprised 57 herds that were sampled in the 1998 Ontario Sentinel Herd Project and were considered representative of Ontario herds. Cow-level completed 305-day milk production records were obtained for all cattle from the Ontario Dairy Herd Improvement program from the parity corresponding to the time of serum collection. Cow-level serostatus was determined with a kinetic-ELISA, using a sample-to-positive control ratio cutoff of ≥ 0.45 . Data were analysed using a linear regression model with the GENMOD procedure in SAS ver.8 controlling for parity, days in milk at test date, and the random effect of herd clustering. Seropositive cows in Group A produced 276 kg less 305-day milk than seronegative cows ($n=1196$, $p < 0.05$). In contrast, Group B seropositive cows produced 151 kg more 305-day milk ($n=3162$, $p=0.10$) than seronegative cows. Therefore, if *N. caninum* caused abortion problems in a herd, milk production was negatively affected in seropositive cows, but when *N. caninum* did not cause an abortion problem, milk production was enhanced in seropositive cows. The authors theorize that the effect of *N. caninum* infection on cow-level milk production is dependent on the immunological ability of cattle to control *N. caninum* infection.

Key Words: *Neospora caninum*, Milk production, Abortion