

## Animal Behavior and Well-Being: Dairy, Sheep, and Beef

**903 Behavioral changes of dairy cows during drying-off using abrupt cessation of milking.** K. A. Painter, K. E. Leslie\*, and E. H. Tatone, *University of Guelph, Guelph, ON, Canada.*

The dry period between successive lactations is crucial for regeneration of productive function of mammary tissue, preparation for high production, and to prevent new intramammary infections (IMI). With continually increasing production levels over time, the stress of abrupt drying-off could be a welfare concern, as well as an increased risk period for new IMI. The objectives of this study were to document standing and lying behaviors through the process of drying-off, and to evaluate the associations between parity (lactation 1 relative to lactation 2 and above) and production level ( $>27$  kg/d compared with  $<22$  kg/d) and changes in these activities. From June to October 2009, a total of 76 cows in a commercial free-stall herd, milking 3 times per day, were enrolled onto this study. Each cow was fitted with a HOBO data logger (HOBO Pendant G Data Logger, Onset, Pocasset, MA) on the outside of the right hind leg, parallel to the floor (longitudinally). The HOBOS were programmed to start data collection at 7am, 2 d before drying-off (d-2), and to continue for 6 d following drying-off (d6). Cows received their last milk-out at the second daily milking (d0, noon). The HOBO recorded time-stamped standing and lying behavior (including lying side) at one minute intervals, allowing for the calculation of total lying time per day. Simple univariable analysis by 2-sample *t*-tests was used to compare production level and parity against total lying time. Upon completion of the full data set, multivariable analysis will be performed. Cows drying-off at high production had significantly lower lying times compared with cows at lower production levels on d1 ( $P < 0.05$ ;  $634.71 \pm 211.04$  vs.  $747.04 \pm 166.86$  min) and d3 ( $P < 0.005$ ;  $724.58 \pm 138.81$  vs.  $836.15 \pm 116.03$  min). Lactation 1 cows also showed significantly ( $P < 0.001$ ) lower lying times of almost 3 h compared with multiparous cows on d1 ( $572 \pm 195.04$  vs.  $751.61 \pm 170.66$  min). In conclusion, these data suggest that abrupt cessation of milking at drying-off is associated with changes in standing and lying behaviors, indicative of increased discomfort. These behavioral changes appear to be influenced by production level at the time of drying-off and by parity. Management interventions in the process of drying-off may be warranted.

**Key Words:** drying-off, behaviour, lying and standing time

**904 Short-term overcrowding affects the lying and social behavior of lactating Holstein dairy cows.** P. D. Krawczel\*<sup>1,2</sup>, L. B. Klaiber<sup>1</sup>, R. E. Butzler<sup>1</sup>, L. M. Klaiber<sup>1</sup>, H. M. Dann<sup>1</sup>, C. S. Mooney<sup>1</sup>, and R. J. Grant<sup>1</sup>, <sup>1</sup>*William H. Miner Agricultural Research Institute, Chazy, NY*, <sup>2</sup>*The University of Vermont, Department of Animal Science, Burlington.*

Reduced access of resources, due to overcrowding, may affect lactating dairy cows' daily time budgets detrimentally. The objective of this study was to determine the differences in feeding, ruminating, lying, and social behaviors of Holstein dairy cows housed at stocking densities of 100 (1 cow per freestall and headlock), 113, 131, and 142%. Multiparous cows ( $n = 96$ ) and primiparous cows ( $n = 40$ ) were assigned to 4 pens in a 4-row barn. Pens were balanced for parity, milk production, days in milk, and somatic cell count. Treatments were imposed by reducing resting and feeding space for 14 d using a  $4 \times 4$  Latin square design. Time spent feeding and ruminating were quantified by 24 h of direct observation beginning at 0800 on d 11. Dataloggers recorded lying behavior (time and bouts) of 12 focal cows per pen at 1-min intervals during the final 5 d of each period. Social aggression was defined as

the number of successful displacements from the feed bunk during the 2 h after cows returned to the pen after milking. Displacements were recorded after 9 milkings over the last 4 d of each period. Pen means ( $n = 16$ ) were analyzed using MIXED procedure of SAS. Feeding ( $3.7 \pm 0.2$  h/d) and ruminating ( $7.2 \pm 0.2$  h/d) did not differ among stocking densities ( $P > 0.5$ ). Overcrowding did change the location of rumination; a greater percentage ( $95.1 \pm 2.4$ ) of the total rumination ( $P < 0.01$ ) occurred within a freestall at 100% compared with 131% ( $89.6 \pm 2.4$ ) or 142% ( $87.3 \pm 2.4$ ). Lying time was reduced by 0.8 h at 131% and 0.7 h at 142% ( $P < 0.02$ ) compared with 100 or 113%. Lying bouts ( $11.3 \pm 0.6$  per d) were not affected by stocking density ( $P = 0.57$ ). Relative to 100% ( $13.2 \pm 2.5$  per 2 h), social aggression was greater at 142% ( $20.4 \pm 1.8$  per 2 h;  $P = 0.03$ ) and tended to be greater at 131% ( $15.8 \pm 3.5$  per 2 h;  $P = 0.10$ ). Decreased lying time and increased aggression at the feed bunk during short-term overcrowding suggests increased stocking densities may alter the time budgets of lactating dairy cows. The long-term ramifications of these changes are unknown and should be addressed to ensure management practices ensure the welfare of lactating dairy cows.

**Key Words:** dairy cow, stocking density, behavior

**905 Early detection of lameness through pedometric activity and lying behaviour of dairy cattle.** J. H. Higginson\*<sup>1</sup>, S. T. Millman<sup>2</sup>, G. Cramer<sup>1,3</sup>, K. E. Leslie<sup>1</sup>, A. M. B. de Passille<sup>4</sup>, T. F. Duffield<sup>1</sup>, and D. F. Kelton<sup>1</sup>, <sup>1</sup>*University of Guelph, Guelph, ON, Canada*, <sup>2</sup>*Iowa State University, Ames*, <sup>3</sup>*Cramer Mobile Bovine Veterinary Services, Stratford, ON, Canada*, <sup>4</sup>*Agriculture and Agri-Food Canada, Agassiz, BC, Canada.*

The objective of this pilot study was to examine changes in dairy cow activity around lameness events, a component of a larger ongoing investigation to determine the efficacy of pedometric activity for early lameness detection. The commercial Pedometer Plus system (SAE Afkim, Israel) provides information regarding the number of steps taken, the duration of lying time, and the number of lying bouts. The device was affixed to the hind limbs of 130 lactating cows and data was collected twice daily during milking. Hooves were examined for lesion identification every 3 mo and trimmed every 6 mo. In addition, Between these, lameness cases identified by the producer were evaluated by a veterinarian, treated, and causal factors recorded. To date, 5 cows with new cases of digital dermatitis were identified. Activity and lying behavior were analyzed during 2 time periods - 7 d before lameness identification and exam, and 7 d following exam, with exam day excluded. A paired *t*-test demonstrated a difference in activity between time periods ( $P = 0.03$ ). On average ( $\pm$ sd), cows performed 65.1 ( $\pm 4.1$ ) steps/hour before lesion identification and 76.2 ( $\pm 5.6$ ) following identification. The mean number of lying bouts between time periods was not different ( $P = 0.79$ ), with mean lying of 10.0 ( $\pm 0.7$ ) bouts/day before the lameness exam and 9.9 ( $\pm 0.6$ ) following the lameness exam. Lying duration also did not differ ( $P = 0.54$ ), with 693.1 ( $\pm 28.0$ ) minutes/day before the lameness exam and 675.1 ( $\pm 34.5$ ) minutes/day following the exam. Our preliminary results suggest that during the 7 d before identification of digital dermatitis, cows are less active. Continued enrolment will determine if other hoof lesions show similar changes. Further evaluation of activity around lameness events will determine if early detection through the use of pedometry is possible.

**Key Words:** lameness, pedometry, activity

**906 Behavioral responses to feeding regimens, housing and heat stress in dairy calves.** A. L. Adams\*, T. H. Friend, G. A. Holub, S. M. Garey, and C. L. Terrill, *Texas A&M University, College Station.*

There is concern that accelerated feeding programs may adversely influence calves during periods of environmental heat stress. The objective of this study was to determine the effects of housing, feeding regimens, and heat stress on activity and utilization of shade by dairy calves. Fifty-five Holstein bull calves 1–3 d of age were randomly assigned to 1.85 m<sup>2</sup> individual pens that were either indoors in a climate-controlled environment (n = 28) or outdoors in a covered barn (n = 27) for 7 wk. Within each of the 2 housing treatments, calves were assigned to one of 3 feeding regimens: milk replacer increased by 0.1% of BW weekly, n = 17; consistent amount of milk replacer at 1.1% of BW, n = 18; or milk replacer decreased by 0.1% of BW weekly, n = 20. Calves were fitted with pedometers and released into a 15.24 m × 9.14 m partially shaded (9.14 m × 3.05 m) outdoor open-field test pen for 1 h every 7 d in the early afternoon in July and August. Behavior was classified as active, standing, lying or in-shade at 5-min intervals. Recorded steps, shade use (0 = in-shade, 1 = not in-shade), and mean activity scores (0 = lying, 1 = standing, 2 = active) were analyzed as repeated measures in an autoregressive covariance mixed model. Feed regimen did not affect the number of steps taken, shade use, or activity of the calves. An increase in steps occurred over time with 454 ± 25.35 steps for wk 1 and 717 ± 24.49 steps for wk 7 ( $P < 0.0001$ ). Calves housed outdoors took more steps (618 ± 17.88) than calves housed indoors (559 ± 17.39;  $P = 0.0039$ ). Calves averaged significantly ( $P < 0.0001$ ) fewer steps (465 ± 13.84) during field tests with high ( $\geq 83$ ) temperature-humidity index (THI) values than during field tests with low ( $< 80$ ) THI (718 ± 40.14 steps). Calves spent less time in the shade as they aged ( $P < 0.0001$ ), when the THI was low ( $P < 0.0001$ ), and if they were housed outdoors ( $P = 0.0011$ ). Calves housed indoors tended to be more active than calves housed outdoors ( $P = 0.094$ ). These results suggest that accelerated feeding programs do not impose additional thermal stress on calves.

**Key Words:** calves, behavior, heat stress

**907 Behavior of two cow genotypes (Holstein vs. Jersey) in two milk production systems (grazing vs. confinement).** A. I. Roca-Fernández\*, C. P. Ferris<sup>2</sup>, E. R. Vance<sup>2</sup>, and A. González-Rodríguez<sup>1</sup>, <sup>1</sup>*Agrarian Research Centre of Mabegondo, La Coruña, Galicia, Spain,* <sup>2</sup>*Agri-Food and Biosciences Institute, Hillsborough, Co. Down, UK.*

Diverse milk production systems exist in Europe, ranging from low input grazing systems to high input confinement systems. The impact of these systems on dairy cow behavior has not been extensively examined. The aim of this study was to compare the behavioral activities of 2 cow genotypes (Holstein-Friesian, H-F vs. Jersey × Holstein-Friesian crossbred, Jx) when managed within 2 contrasting milk production systems (grazing, G vs. confinement, C). One hundred 20 spring calving cows (H-F, n = 60 and Jx, n = 60) were balanced on calving date and milk yield and randomly assigned to one of 2 milk production systems (G, n = 60 and C, n = 60) in a block design with a 2 × 2 factorial arrangement of treatments. Cows were scanned on 3 occasions in a 6 week period (P1, end July; P2, middle August; P3, end August) and the behavioral activities of cows were registered at 20-min intervals, between 16.00 and 22.00 h and 7.00–14.00 h. The behavior of each cow was recorded, according to the following activities: lying, eating, standing and ruminating. There were differences ( $P < 0.001$ ) between periods for time spent lying, eating and ruminating in relation to daylight, while time spent standing did not show any difference. Cows on the grazing system spent more time lying and ruminating in P3 (272 and 165 min., respectively) than in P1

(152 and 122 min., respectively) and time spent eating was lower in P3 (485 min.) than in P1 (553 min.). Breed had no effect on any of the behaviors recorded. Nevertheless, a tendency to spend more time eating and ruminating was observed in Jx (354 and 195 min., respectively) than in H-F (343 and 184 min., respectively). System showed an effect ( $P < 0.001$ ) on dairy cow behavior. Cows on the grazing system spent more time grazing (522 min.) than those on the housing system spent eating (175 min.). Cows on the confinement system spent more time lying (405 vs. 212 min., respectively), standing (301 vs. 87 min.) and ruminating (246 vs. 134 min., respectively) than did those in the grazing system. Greater synchrony of dairy cows behavior was observed at pasture than in the confinement system.

**Key Words:** milk production systems, cow genotypes, feeding behavior

**908 Diet palatability influences the feeding behavior of sheep.** I. R. Ipharraguerre\*<sup>1</sup> and J. J. Villalba<sup>2</sup>, <sup>1</sup>*Lucta SA, Barcelona, Spain,* <sup>2</sup>*Utah State University, Logan.*

The aim of this study was to assess whether the feeding pattern displayed by sheep exposed to a monotonous ration is modified when the same ration is presented in a diversity of flavors. Thirty-five 2-mo old lambs were randomly assigned to 5 groups (7 lambs/group). One group of lambs [Diversity (D)] was fed simultaneously an unflavored ration of alfalfa and barley (75:25) and the same ration mixed (0.2%) with one of 3 flavors: 1) sweet, 2) umami, and 3) bitter. The other 4 groups (Monotony) received just one of the 4 rations [i.e., unflavored control (C); sweet (S); umami (U); and bitter (B)]. All animals were fed their respective rations ad libitum from 0800 to 1600 for 60 d. Feed consumption was measured throughout the study. Data were analyzed as a split-plot design with repeated measures using a mixed-effect model with animal (random) nested within group. On d 55, intake was estimated every 30 min for 8 h. On d 56, scan samples were taken at 5-min intervals to assess the incidence of offered feeds on feeding events. On average, lambs in D consumed 4 to 8% more feed than lambs in the other groups ( $P < 0.008$ ). Lambs in D showed lower intakes than the other groups during the 2 peaks of food consumption: 30 min ( $P < 0.008$ ) and 270 min ( $P < 0.007$ ) after offering the rations. In contrast, lambs in D consumed more feed than lambs exposed to monotonous flavors at 60 ( $P < 0.05$ ), 90 ( $P < 0.07$ ), 120 ( $P < 0.10$ ), and 180 min ( $P < 0.05$ ) post-feeding. No differences among groups, however, were detected in the proportion of scans recorded during the feeding cycle. Thus, differences in total feed consumption were likely supported by changes in the rate, but not the frequency, of feeding events. Within group D, diet preferences were umami > sweet > bitter (33 > 28 > 26 g/kg of metabolic BW;  $P < 0.01$ ) and plain > bitter (31 vs. 26 g/kg of metabolic BW;  $P < 0.01$ ). Exposure to diverse flavors in the same ration has the potential to increase feed intake and foster an even utilization of feed across time by reducing peaks and nadirs of feed consumption compared with exposure to monotonous rations.

**Key Words:** behavior, flavor, intake

**909 Early experience to flavor diversity influences food selection and intake by sheep.** J. J. Villalba\*<sup>1</sup> and I. R. Ipharraguerre<sup>2</sup>, <sup>1</sup>*Utah State University, Logan,* <sup>2</sup>*Lucta SA, Barcelona, Spain.*

The objective of this study was to determine whether early experiences to flavor diversity or monotony influence intake and preferences for novel feeds by sheep. Thirty-five 2-mo old lambs were randomly assigned to 5 groups (7 lambs/group). One group of lambs [Diversity (D)] was fed

simultaneously an unflavored ration of alfalfa and barley (75:25) and the same ration mixed (0.2%) with one of 3 flavors: 1) sweet, 2) umami, and 3) bitter. The other 4 groups (Monotony) received one of the 4 rations [i.e., unflavored control (C); sweet (S); umami (U); and bitter (B)]. All animals were fed ad libitum from 0800 to 1600 for 60 d. Afterward, all groups received alfalfa hay for 46 d. Following, preference tests were conducted over 5 d by offering simultaneously novel feeds of either (1) high energy content (beet pulp, corn, milo, oats), (2) high protein content (wheat gluten meal, rabbit pellets, soybean meal, Calmanna), or (3) beet pulp mixed with secondary compounds [condensed quebracho tannins (10%), quillaja bark saponins (2%), and sagebrush terpenes (3%)]. Data were analyzed as repeated measures using a mixed-effect model with animal (random) nested within group. On average, lambs in D consumed more feed ( $P < 0.01$ ) than lambs in the other groups (118, 113, 109, and 109 g/kg of metabolic BW for lambs in D, B, U, C and S, respectively). No differences in ADG were detected among groups for the first 33 d of exposure, but from d 34 to 60 lambs in D grew faster ( $P < 0.04$ ) than lambs in the other groups (0.30, 0.20, 0.22, 0.19, and 0.20 kg/d for lambs in D, B, U, C and S, respectively). Lambs in C preferred beet pulp compared with lambs in U and B ( $P < 0.04$ ); lambs in B preferred oats compared with lambs in D, C, and S; lambs in S preferred corn compared with lambs in B ( $P < 0.05$ ); and lambs in D preferred milo compared with lambs in N and S ( $P < 0.06$ ). Thus, exposure to diverse flavors in the same ration may influence intake and selectivity and contribute to modify initial acceptability and preference for novel feeds by lambs.

**Key Words:** early experience, flavor, intake

**910 Preference in cattle offered a ground switchgrass and alfalfa hay blend flavored with sucrose or citric acid.** S. J. Chavez\*, S. Freeman, and G. B. Huntington, *North Carolina State University, Raleigh.*

Intake of feed can be influenced positively or negatively by flavor. The objective was to evaluate preference for sucrose or citric acid addition to a ground hay blend (switchgrass:alfalfa = 3:1, as fed). Flavors were dissolved in 50 mL deionized water for blending. Sucrose hay (SU) had 100g sucrose added per kg hay. Citric acid hay (CA) had 50 g citric acid added per kg hay. Control hay (CON) had 50 mL deionized water added per kg hay. Hays were mixed 3 d before the experimental period and stored at room temperature. Eleven Angus-cross steers and 1 heifer (initial BW =  $283 \pm 25$  kg) were housed under a roof on expanded metal flooring with access to 6 feed slots designated I through VI, west to east. Cattle were offered 1 kg of supplement (47.5% each, soybean hulls and corn with 5% trace mineralized salt, as fed) at 0800 daily. Orts were removed and weighed at 0800. Cattle were offered 0.6% BW treatment hay at each feed slot and treatments (SU, CA, and CON) were randomly assigned to 2 of the 6 locations at 0830 daily. Cattle were given a 14-d adaptation to CON followed by a 7-d preference trial. Preference was determined by disappearance where greater disappearance was taken to mean animal preference. Cattle preferred SU ( $3.42 \pm 0.04$  kg/d) over CON ( $2.8 \pm 0.04$  kg/d,  $P < 0.01$ ) and CA ( $0.32 \pm 0.04$  kg/d,  $P < 0.01$ ) and preferred CON over CA ( $P < 0.01$ ). Feeding location I was preferred more than III ( $P < 0.03$ ). This difference was seen since CA was randomly assigned 4 out of the 7 d from position III. Cattle searched for SU and consumed SU in entirety in both locations before consuming CON or CA. Cattle consumed SU over CON and CA independent of location. Cattle searched for the SU and consumed SU immediately after SU was presented in both locations. Cattle may search for food that stimulates taste receptor cells for sweetness over other flavors. Adding

sweet flavors to cattle feeds would increase intake of forages with lower nutritional values such as switchgrass.

**Key Words:** cattle, preference, flavor

**911 Characterization of feeding behavior traits and associations with feed efficiency in beef heifers fed a high-grain diet.** E. Mendes\*, G. Carstens, and L. Tedeschi, *Texas A&M University, College Station.*

Few studies have characterized meal criterion in beef cattle, which is an estimate of the longest nonfeeding interval that is considered to be part of a meal. Objectives of this study were to quantify meal criteria, and to examine within-animal repeatability of feeding behavior traits and their associations with residual feed intake (RFI) in beef heifers fed high-grain diets. An electronic feed intake system (GrowSafe; DAQ4000E version 9.25) was used to record individual bunk visit frequency (BVF) and duration (BVD) for 62 heifers (initial BW = 286) fed a high grain diet (3.1 Mcal ME/kg DM) for 81 d. A mixture 2-pool distribution model (R mixdist package 0.5–2) was fitted to log<sub>10</sub>-transformed interval lengths between BVF. The intersection of the 2 distributions, which The intersection of the 2 distributions, which represents intervals within and between meals, was computed as the meal criteria and used to calculate meal frequency (MF) and duration (MD). RFI was calculated as the difference between actual and expected DMI from linear regression of DMI on ADG and mid-test BW<sup>0.75</sup>. The overall means ( $\pm$ SD) for BVF and MF were  $50 \pm 8.9$  and  $8 \pm 1.5$  events/d, respectively;  $61 \pm 17.3$  and  $129 \pm 26.6$  min/d for BVD and MD; respectively, and  $6 \pm 1.1$  for number of bunk visits per meal (BVM). The pooled meal criteria calculated on the 62 animals in this study was 12.5 min. RFI was positively correlated ( $P < 0.05$ ) to BVF (0.42), BVD (0.41), MD (0.32), and BVM (0.44), but not with MF (0.03). Feed behavior traits for period 1 (d 1 to 40) were regressed on feed behavior traits on period 2 (d 41 to 81) to access within-animal repeatability of these traits. The  $r^2$  of the regression equations for BVF, BVD, MF, MD were 0.63, 0.76, 0.73, 0.77, respectively, and for number of bunk visits per meal was 0.55. These results suggest that within animal repeatability of feed behavior traits are high and that they may be useful indicator traits for RFI in beef cattle.

**Key Words:** feed behavior, residual feed intake

**912 Approaches for assessing temperament in calves post-weaning.** K. L. Barkley\*<sup>1</sup>, L. D. Pullen<sup>1</sup>, A. M. Kopanko<sup>1</sup>, A. E. Tanner<sup>1</sup>, S. R. Blevins<sup>1</sup>, M. L. Wahlberg<sup>1</sup>, C. W. Swecker Jr<sup>1</sup>, J. P. S. Neel<sup>2</sup>, W. M. Clapham<sup>2</sup>, and R. M. Lewis<sup>1</sup>, <sup>1</sup>Virginia Tech, Blacksburg, <sup>2</sup>USDA-ARS, Beaver, WV.

Cattle under routine management express behaviors that may represent stress or anxiety. Our objectives were to develop reliable measures of calf behavior, and to determine whether these measures change under repeated handling. A factorial design of 2 measurement protocols [regular (R), irregular (I)], and 3 recording periods, each 1 mo apart, was used. The R measurements were collected over 3 consecutive d; I measurements were collected on d 1 within each period. Twenty Angus-cross heifer calves, 2 wk post-weaning, were randomly assigned to each protocol. Calves were weighed, calmly moved into a squeeze chute, and their heads caught. Behavior was scored from 1 (docile) to 5 (aggressive) by 3 observers. Heart rate (HR), and blood and fecal samples, were then collected. Exit velocity (EV) was obtained on release from the chute over 2 m. Calves were penned individually with the same human presence, and again scored. Plasma cortisol concentrations were determined by EIA. Data were analyzed with ANOVA. Protocol, period, and their interaction, were compared on d 1. Period, day, and

their interaction were fitted within R. Both scores were included as covariates to assess cortisol. Chute ( $0.33 \pm 0.16$ ;  $P = 0.04$ ) and pen ( $0.52 \pm 0.12$ ;  $P < 0.001$ ) scores and HR ( $20 \pm 5$  beat/min;  $P < 0.001$ ) were less and EV slower ( $0.43 \pm 0.09$  s;  $P < 0.001$ ) in R than I. Chute score decreased across periods in R but increased in I ( $P = 0.03$ ). In R in a period, chute score declined with d ( $0.34 \pm 0.14$ ;  $P = 0.05$ ), with little change in pen score, EV or HR ( $P > 0.17$ ). Chute and pen score were highly correlated in R ( $0.56$ ;  $P < 0.001$ ); less so in I ( $0.31$ ;  $P = 0.04$ ). Plasma cortisol was 39% higher at period 1 than 3 ( $P < 0.001$ ). It increased with chute and pen score ( $P = 0.01$ ). Plasma cortisol in R was 22% higher at d 1 than 3. It increased with chute score ( $P = 0.01$ ). Repeated handling reduced ill temperament and signs of stress. Chute score is quickly assessed, indicative of anxiety, and could be used to monitor husbandry practices.

**Key Words:** temperament, cortisol, calves

**913 Relationship of temperament at calving and distribution of beef cows grazing foothill rangeland.** D. W. Bailey\*<sup>1</sup>, H. C. Van-Wagoner<sup>2</sup>, D. Jensen<sup>2</sup>, D. L. Boss<sup>2</sup>, and M. G. Thomas<sup>1</sup>, <sup>1</sup>New Mexico State University, Las Cruces, <sup>2</sup>Montana State University, Havre.

The objective of this study was to determine if docility score measured at calving was related to measures of cattle grazing distribution in foothill rangeland of northern Montana. We hypothesized that cows with aggressive temperaments would travel farther horizontally and

vertically from water and use steeper slopes than docile cows. A herd of Hereford and Tarentaise crossed cows ( $n = 186$ ) and a herd of Angus, Charolais, Hereford, Piedmontese, Salers, and Tarentaise crossed cows ( $n = 191$ ) were observed at calving and assigned a temperament score (1 = calm and 6 = dangerous and extremely aggressive) for 5 years. Both herds were also visually observed during grazing, and their locations were recorded in multiple pastures with rugged topography for 5 years. Only cows that had 2 or more calves in their lifetime were included in the analyses. Mean temperament, number of calves and breed were used to explain differences in the average recorded terrain use with a mixed model analysis. Temperament at calving was not related to horizontal or vertical distance traveled to water and slope use in either herd. For the Hereford and Tarentaise crossed cows, breed and number of calves affected both horizontal and vertical distance traveled to water ( $P < 0.05$ ). Cows with more Tarentaise breeding traveled farther than cows with predominantly Hereford breeding. Tarentaise cows traveled  $58 \pm 2$  m vertically from water while Hereford cows traveled  $50 \pm 2$  m. Cows with 3 or more calves during their lifetime ( $56 \pm 2$  m) traveled farther ( $P < 0.01$ ) vertically from water than cows with only 2 calves ( $48 \pm 2$  m). For the other herd, vertical distance traveled to water was affected by the number calves ( $P = 0.01$ ) with cows with 4 or more calves traveling farther than cows with 2 or 3 calves. We rejected our hypothesis and concluded that docility at calving was not related to terrain use during grazing.

**Key Words:** docility, behavior, breed