ANIMAL BEHAVIOR & WELL-BEING I

0791 (M005) Free range pork production system on savanna pasture in Brazil. *L. S. Murata*, F. L. da Silva, L. R. Roos, L. S. Fonseca, I. Fontana, C. A. da Silva Júnior, F. N. Gomes da Costa, C. G. D. Q. Roriz, L. H. N. Ribeiro, A. P. Santana, and S. L. S. Cabral Filho, University of Brasilia, Brazil.*

An alternative pork breeding system to traditional confined pork breeding has been implemented in the Midwest of Brazil on native savanna pasture mainly concerning welfare and product quality to small family farmers. A free-range pork production, separated by solar electric fences, was implemented in a 4.5-ha area on the University of Brasilia's farm in Brasilia, Federal District. The pregnancy and farrowing sectors are run in a cycle system, divided into 25 and 20 paddocks, respectively, both with a management central area. Native pasture is basically composed by *Trachypogon* spp., *Schyzachririum scoparium*, *Paspalum eriantum,* and *Echinolaena inflexa*. Monthly rotation grazing is used, providing a 4-mo pasture recovery period. The maximum density range in pregnancy and farrowing paddocks is 5 and 1 sows, and the available area/paddock is aproximately 1000 m^2 and 280 m^2, respectively. Boars paddocks are composed by eight individual paddocks with 200 m^2 separated by solar electrical and wire-framed fences. The nursering sector has four paddocks with 160 m^2 each and the growing sector has eight paddocks with 80 m^2. T gestation paddock has a collective metallic shelter covered with a straw and plastic roof as well as shade-providing shelters. The farrowing area has an individual shelter similar to the one used for gestation. It contains farrowing sow restraint bars, and females can make a nest with the available provided straw. There is also a shade-providing structure. The livestock is composed of 21 sows and 3 boars in a monthly pork production system, with five groups of females. Artificial insemination is used for reproduction, and the boar's ejaculate is processed at the farm. The semen is collected with the gloved-hand method weekly, and, when needed, later diluted with the commercial BTS diluent. Sows are inseminated three times each heat with 100 mL of diluted semen with $3x10^9$ sperm cells. Ten days before farrow, the pregnant sows are moved to the farrowing paddock. Weaning of piglets occurs after 30 d of lactation. The piglets are slaughtered weighing approximately 23 kg each.

Key Words: behavior, outdoor pork porduction, welfare

0792 (M006) Behavioral laterality, facial hair whorls, and heart rate variability in horses. C. B. Shivley*, T. Grandin, and M. Deesing, *Colorado State University, Fort Collins.*

The objective of this study was to test for an association between facial hair whorl characteristics and behavioral responses to a fear-inducing stimulus as well as heart rate variability in horses. This was a pilot study in which a small sample size was used. Nineteen well-trained riding horses (7 to 30 yr old) were categorized based on their facial hair whorl height (high, medium, or low), lateral location (right or left of midline), and rotation (clockwise or counterclockwise). Each horse was subjected to a novel object test where an umbrella was suddenly opened as a person approached the horse from the front. The turning response (right or left) was recorded. A Polar RS800CX heart rate monitor was used to continuously measure heart rate and heart rate variability. The standard deviation of the inter-beat interval (SDNN) was used for analysis of heart rate variability. Two horses had double facial hair whorls, and analysis was done both including them in the category of the dominant hair whorl and excluding them. Facial hair whorl rotation showed a correlation with turning response to the fear-inducing stimulus with $P = 0.04$ including the double hair whorls and $P = 0.11$ excluding the double hair whorls. Clockwise hair whorls were associated with turning to the right and counterclockwise hair whorls were associated with turning to the left. There were no significant correlations between facial hair whorl lateral location or height and direction turned ($P > 0.05$). All horses showed a decrease in the SDNN after the presentation of the fear-inducing stimulus ($P = 0.0024$). Horses with high facial hair whorls showed a tendency for a greater decrease in SDNN compared to horses with medium/low facial hair whorls ($P = 0.06$). There was no significant correlation between rotation of facial hair whorl or lateral location and heart rate variability ($P > 0.05$). In conclusion, facial hair whorls are associated with turning response and heart rate variability in horses. Facial hair whorls may be used as a noninvasive method to predict how a horse will respond when frightened and how stressful the event will be. Further studies are needed to develop this method for use by horse owners and trainers.

Key Words: facial hair whorls, behavioral laterality, heart rate variability

0793 (M007) Effects of rearing system and stocking density on growth performance, carcass quality, and welfare of male Arbor Acres broilers. W. Chang*, J. Tang, G. Liu, and H. Cai, *Feed Research Institute, Chinese Academy of Agricultural Sciences, Beijing, China.*

This trial was to investigate effects of rearing system and stocking density on growth performance, carcass quality, and welfare of broilers. A total of 936 1-d-old male Arbor Acres

Table 0793.

Items		0~21d				22~42d			
RS	SD	ADFI(g/d)	ADG(g/d)	FGR	BW(g)	ADFI(g/d)	ADG(g/d)	FGR	BW(g)
WFR	LSD	64.07 ± 1.32ab	44.79 ± 1.60b	1.43 ± 0.03b	947 ± 16.66^{b}	109.80 ± 1.93^{b}	67.43 ± 1.35^{b}	1.63 ± 0.01^{b}	2829 ± 22.51^{b}
	HSD	57.69 ± 1.86a	42.70 ± 1.22a	1.35 ± 0.04a	897 ± 14.67^{a}	120.90 ± 3.33^{c}	64.87 ± 1.64^{a}	1.87 ± 0.02^{c}	2721 ± 39.40^{a}
LFR	LSD	69.83 ± 1.52b	47.21 ± 1.51c	1.48 ± 0.03b	992 ± 18.71^{c}	103.20 ± 3.53^{a}	65.20 ± 1.75^{a}	1.58 ± 0.01^{a}	2802 ± 27.24^{ab}
	HSD	62.56 ± 1.94ab	46.13 ± 1.70bc	1.35 ± 0.03a	969 ± 13.50^{b}	119.20 ± 2.53^{c}	64.48 ± 1.38^{a}	1.85 ± 0.01^{c}	2779 ± 21.00^{ab}
Main effects									
SD	LSD	66.95 ± 1.78a	46.00 ± 1.37a	1.45 ± 0.05b	969 ± 12.20 ^{b}	106.50 ± 2.83^{a}	66.3 ± 1.50 ^{b}	1.61 ± 0.05^{a}	2815 ± 26.80^{a}
	HSD	60.13 ± 1.83b	44.42 ± 1.47b	1.35 ± 0.07a	932 ± 11.71 ^{a}	120.10 ± 3.13^{b}	64.67 ± 1.38 ^{a}	1.86 ± 0.07^{b}	2750 ± 22.13^{b}
RS	WFR	60.88 ± 1.73a	43.74 ± 1.51a	1.39 ± 0.04a	921 ± 12.16 ^{a}	115.30 ± 3.03^{b}	66.15 ± 1.52 ^{b}	1.75 ± 0.14^{b}	2775 ± 24.22
	LFR	66.20 ± 1.71b	46.67 ± 1.56b	1.42 ± 0.03b	980 ± 12.52 ^{b}	111.20 ± 3.22^{a}	64.83 ± 1.41 ^{a}	1.72 ± 0.15^{a}	2790 ± 21.55
P-value									
SD		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.019	< 0.001	0.042
RS		< 0.001	0.005	0.147	< 0.001	0.007	0.045	0.002	0.574
SD*RS		0.543	0.260	0.254	0.082	0.066	0.136	0.050	0.160

broilers were randomly allocated to four treatments with six replicates by a 2 × 2 factorial design, including two rearing types (wire floor rearing and litter floor rearing) and two stocking densities (low stocking density of 8 birds/m^2 and high stocking density of 18 birds/m^2). The results showed that during 0~3 wk, high stocking density (HSD) significantly decreased average daily gain (ADG), average daily feed intake (ADFI), and feed/gain (F/G) of broilers than low stocking density(LSD); wire floor rearing (WFR) significantly improved ADG and ADFI than litter floor rearing(LFR). During 4~6 wk, LFR significantly decreased ADG ($P < 0.05$), ADFI ($P < 0.01$) and F/G ($P < 0.01$) of broilers than WFR; HSD lowered ADG ($P < 0.05$), increased ADFI and F/G ($P < 0.01$) than LSD. There was no obvious interaction on growth performance of broilers between stocking density (SD) and rearing system (RS) ($P > 0.05$). HSD significantly decreased eviscerated weight ($P < 0.01$), breast muscle ($P < 0.01$), and thigh muscle weights ($P < 0.05$) of broilers than LSD. There was interrelationship for meat yield between SD and RS ($P > 0.05$), with an exception of eviscerated weight and thigh muscle weight ($P < 0.05$). WFR and LSD groups had higher score of feather damage, pododermatitis, and hockburn; lower foot felt temperature (litter or net) and mortality; and higher uniformity than LFR and HSD groups, respectively. In conclusion, LSD-WFR was the most superior in growth performance, carcass quality and welfare of broilers; oppositely HSD-LFR was the most inferior.

Key Words: broiler, rearing system, stocking density

0794 (M008) Comparison of three acute stressors in horses. A. J. Bachman, A. Berzas, and C. E. Ferguson*, *McNeese State University, Lake Charles, LA.*

Stress in horses can be caused by any number of things: a new pasture mate, trailer ride, unexpected loud noise, or even strenuous exercise. The objective of this study was to test three stressors (air horn, firecracker, and exercise), to determine their effect on heart rate (HR) and time from elevated heart rate to return to baseline heart rate. A total of six horses were used in this study: three mares, two fillies, and one gelding. The horses were used in a crossover design over a 2-m period where each horse received each stressor every 7 d. The horses remained in a stall while the Pre-Stress HR was measured every 30 sec for 5 min to determine baseline. Once baseline was established, the horse was brought to a round pen and exposed to a specific stressor. The exercise stressor required the horse to trot or canter for 10 minutes: 5 min clockwise and 5 min counterclockwise. The air horn and firecracker stressors lasted between 5 and 10 sec during each exposure. Immediately following being exposed to the stressor, the Stressed HR was recorded every 30 sec for 90 sec. The horse was then returned to original stall, and the Post-Stress HR was recorded every 30 sec for 15 min. Statistical differences in treatments were determined using the Proc GLM in SAS. There were no differences between the mean Pre-Stress HR of each of the stressors. The mean Stressed HR for the air horn (89 ± 14) was significantly higher ($P < 0.06$) than firecracker (58 ± 5) but not different from exercise (72 ± 4). There was no significant difference among the stressors' Post-Stress HR means. At the immediate Stressed HR measure, the one with the greatest effect ($P < 0.03$) on HR was the air horn (109 ± 19) compared with exercise (77 ± 4) and the firecracker treatment (66 ± 5). At the second immediate Stressed HR measure (60 sec following end of stimulus) the HR was not different between the air horn (86 ± 14) and exercise (71 ± 4), but both were greater ($P < 0.07$) than firecracker (57 ± 5). There were no differences in the mean Post-stressed HR between treatments. These results indicated that the short-term use of an air horn will elevate a horse's HR greater than 10 min of exercise but only for a short duration. Also, the use of a firecracker to induce short-term stress is not effective.

Key Words: horse, stress, heart rate, air horn, stressors

0795 (M009) Effect of social housing on pre- and post-weaning intake and performance of dairy calves.

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This study investigated how pre-weaning housing environment affects intake and performance of dairy calves during the milk-feeding stage and once group-housed after weaning. Twenty Holstein bull calves were housed either individually (IH; n = 10) or paired and housed in pens (PH; n = 5) from birth until 49 d of age. Calves were offered grain concentrate (23% CP) and milk replacer (26% CP, 16% fat, 150 g DM/L) ad libitum and weaned by incrementally diluting the milk replacer from 39 to 49 d of age. Post-weaning, IH calves were paired within treatment, and all calves were offered a complete pelleted diet (21% CP) ad libitum and followed until 84 d of age. Feed intake was recorded daily and calves were weighed 2x/wk. Data were summarized by week and analyzed in a repeated measures general liner mixed model. Intake of milk replacer was similar between treatments (9.84 L/calf/d, SE = 0.82, P = 0.9). Pre-weaning concentrate intake was subject to a treatment × wk interaction (P = 0.014), with PH calves increasing solid feed intake to a greater extent over time (in wk 5–6, 0.17 vs. 0.051 kg/d, SE = 0.031). During the 10 d of weaning, PH calves had greater concentrate intake than IH calves (0.69 vs. 0.30 kg, SE = 0.11, P = 0.039). Growth was similar between treatments before weaning (1.05 kg/d, SE = 0.10, P = 0.5), but PH calves had greater ADG during the 10 d of weaning (0.67 vs. 0.41 kg/d, SE = 0.07, P = 0.02). Once all calves were pair-housed after weaning, there was no effect of pre-weaning housing environment on intake (3.3 kg/d, SE = 0.15, P = 0.9) or ADG (1.21 kg/d, SE = 0.07, P = 0.2). These results indicate that social housing for dairy calves encourages solid feed intake during the milk-feeding stage, resulting in improved intake and weight gain during the weaning period.

Key Words: dairy calf, social housing, feed intake

0796 (M010) Associations of stall design, behavior, and hygiene of lactating dairy cows.

M. A. Overvest* and T. J. DeVries, *University of Guelph, Kemptville, ON, Canada.*

Free stall standing behavior is typically indexed to improve cow and stall hygiene using stall designs that are often restrictive to the cow. The objective of this observational study was to determine the association of stall design, cow hygiene, and lying behavior in lactating Holstein dairy cows (n = 23; parity = 3.0 ± 1.3; mean ± SD). Cows were part of a group of 40 ± 3 cows, housed in a free-stall barn with 52 free stalls (head-to-head), and designed for free cow traffic to an automated milking system. Each stall was 1.93 m long (from rear of curb to brisket board), 1.22 m wide, and the stationary neck rail was 1.26 m above the stall bedding surface (water mattress bedded with wood shavings), and 1.91 m from the rear curb. Cows were observed for four 2-wk periods. During periods 1 and 3, a swinging PVC neck guard (located 0.92 m from the base of the stall and 2.22 m from the curb) was installed in the free stalls. Cows were hygiene scored (flank, udder, and lower leg; scale of 1 = very clean to 4 = very dirty) on the last 7 d of each period. Stalls were hygiene scored using a grid system (# contaminated 0.15 × 0.15 m squares in a 1.20 × 1.60 m grid). Electronic data loggers were used monitor lying behavior. Data were analyzed in multivariable mixed-effect regression models. Lying duration tended (P = 0.1) to decrease when cows were kept with the neck guard (-0.6 h/d; SE = 0.4), and was decreased (P < 0.05) in primiparous cows (-1.2 h/d; SE = 0.5), with higher production (-0.07 × kg/d; SE = 0.03), and when stalls were dirtier (−9.4 × stall hygiene score; SE = 4.5). Flank hygiene was worse when cows were kept with the neck guard (P = 0.001), in multiparous cows (P = 0.04), when stalls were dirtier (P = 0.002), and tended to be worse when cows spend less time lying down (P = 0.1). Udder hygiene was worse in multiparous cows (P = 0.03), when cows spend less time lying down (P = 0.002), and tended to be worse when stalls were dirtier (P = 0.06). Lower leg hygiene was worse in multiparous cows (P = 0.006), when cows spend less time lying down (P = 0.04), and tended to be worse in earlier lactation cows (P = 0.07). In summary, these results show that cow lying duration may be negatively impacted when free-stall design imposes restrictions on usage and when stalls are dirty. Further, cow hygiene is affected by lying behavior patterns of cows and by the cleanliness of the cow's environment.

Key Words: hygiene, behavior, stall design

0797 (M011) Time budget and rumen development of dairy calves around the time of weaning.

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The objective of this study was to develop tools to aid in the evaluation of the success of weaning programs for dairy calves, including physiological and behavioral measures and daily time budgets for calves at this stage of life. The study followed 10 ad libitum milk-fed Holstein calves for 24 d: pre-weaning (d 33 to 39 of age), during weaning (d 40 to 49 of age), and post-weaning (d 50 to 56 of age). During weaning, milk replacer was incrementally diluted on d 40, d 43, d 46, and d 49 by 25, 50, 75, and 100%, respectively. Calves were individually housed until weaning was complete (d 49), at which time each calf was paired. Feed intakes were recorded daily. Calves were weighed 2x/wk. Rumination time was observed by live 60-sec scans between 1200 and 1300 h on alternate days beginning on d 34 and ending on d 56. Blood β-hydroxybutyrate (BHBA) concentration was recorded daily, using a

calf-side test, on the same schedule. Electronic data loggers continuously recorded standing and lying behavior for the duration of the trial. A mixed effect regression model provided insight on changes from pre- to post-weaning. Starter DMI increased from pre-weaning to post-weaning (51.7 to 3984.5 g DM/calf/d, SE = 160.0; $P < 0.001$). BHBA increased from pre-weaning to post-weaning (0.003 to 0.133mmol/L, SE = 0.01; $P < 0.001$) as consumption of concentrate increased. Rumination time decreased from pre-weaning to post-weaning (7.9 vs. 2.9 min/h, SE = 1.4; $P < 0.043$). Standing time increased (5.95 to 8.03h/d; SE = 0.16), while both lying time (18.1 to 17.2 to 16.0h/d; SE = 0.16) and lying bouts (21.7 to 18.1 to 16.9 bouts/d; SE = 0.46) decreased from pre-weaning to weaning and again from weaning to post-weaning ($P < 0.001$). The results indicate that these physiological and behavioral measures accurately assess rumen capabilities, daily time budgets, and calf comfort around the time of weaning. Further, BHBA measurements show promise in indicating rumen development in dairy calves.

Key Words: dairy calf, weaning, time budget

0798 (M012) Use of peripartum period cud chewing and activity data for diagnosis of health disorders.

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Objectives of the current experiment were to develop strategies to use peripartum cud chewing and activity for diagnosis of peripartum disorders within 72 h after calving. Holstein animals (nulliparous = 77, parous = 219) were fitted with cud chewing/activity monitors from -17 to 17 d relative to calving. Blood sampled weekly from 0 to 20 d relative to calving were used for determination of β-hydroxybutyrate (BHB) concentration and incidence of ketosis (BHB > 1400 mmol/L). Blood sampled on d 0, 1, and 2 relative to calving were used for determination of total Ca concentration and incidence of sub-clinical hypocalcemia (Ca < 8.5 mg/dl). Cows were examined for retained placenta (RP) and metritis by study personnel. After analyzing cud chewing and activity data according to occurrence of peripartum diseases, cud chewing data from individual cows was used to diagnose disease using the receiver operator characteristics. Formulas involving cud chewing to diagnose disease are not disclosed because of intellectual property considerations. Prevalence of stillbirth, RP, sub-clinical hypocalcemia, metritis, and ketosis were 6.1%, 13.2%, 37.8%, 21.2%, and 7.6%, respectively. The criterion used for diagnosis of stillbirth resulted in sensitivity and specificity of 50 and 79.7%, respectively. There were no criteria that could be used for diagnosis of RP before the day of calving. Two criteria could be used for diagnosis of sub-clinical hypocalcemia on the day of calving. One of the criterion resulted in 66.7 and 61.3% sensitivity and specificity, respectively. The second criterion resulted in sensitivity and specificity of 82.7 and 49.6%, respectively. Metritis could be diagnosed 72 h after calving with a sensitivity and specificity of 75 and 93.1%, respectively. Among cows that were diagnosed with RP within 24 h after calving, the cud chewing criterion resulted in sensitivity and specificity of 70.8 and 75%, respectively. Cud chewing could not be used for diagnosis of ketosis. Activity data was not useful in the diagnosis of any of the health disorders evaluated in this experiment. We conclude that cud chewing data may be used for diagnosis of stillbirth, sub-clinical hypocalcemia, and metritis.

Key Words: transition cow, health disorder, diagnosis

0799 (M013) Effect of stall size, tie-rail position, and chain length on cow injuries and cleanliness in Eastern Canadian tie-stall farms.

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Lying stall configuration affects cow comfort. Lack of space for the cow may result from old facilities (stall size) and from efforts to keep the cow cleaner (tie-rail position). To evaluate effects of not following recommendations for stall configuration on cow comfort, 40 lactating Holstein cows from each of 100 tie-stall dairy farms (Quebec, $n = 60$; Ontario, $n = 40$) were measured (hip height and hook bone width) and evaluated for neck, knee, and hock injuries, and udder, flank, and leg cleanliness. Data collected about stall configuration included bed length, stall width, tie-rail height and position, tie-chain length, and manger wall height, and these were compared with Canadian recommendations. Data were analyzed using Proc GLIMMIX of SAS with a binomial distribution. Only 21.1% of cows had a tie-chain long enough to meet recommendations. A standard tie-rail forward position ($\geq$ 35 cm compared to the bed length) was observed for 16.8% of cows. Each 10-cm increase of stall width closer to the recommendation decreased odds of neck injury by 11.6% ($P = 0.008$) but increased odds of flank and leg dirtiness by 35.6% ($P = 0.0006$) and 16% ($P = 0.0006$), respectively. Each 10-cm increase in bed length tended to decrease odds of knee injuries by 10.4% ($P = 0.08$) but increased odds of udder dirtiness by 35.6% ($P = 0.02$). Increasing tie-rail height by 10-cm closer to the recommendation increased odds of neck injuries by 22% ($P = 0.008$). Each 10-cm move forward of the tie-rail decreased odds of neck and knee injuries by 41.8% ($P = < 0.0001$) and 17.2% ($P = 0.0001$), respectively, but increased by 20.2% ($P = 0.03$) odds of udder dirtiness. Each 10-cm lengthening of the tie-chain decreased odds of neck (8.3%, $P = 0.02$), knee (9.9%, $P = 0.002$), and hock (8.3%, $P = 0.003$) injuries. A higher than recommended manger wall was not

related to cow injuries ($P > 0.1$) but increased by 3.7% ($P = 0.02$) odds of udder dirtiness. Although recommendations for tie-rail height need further testing, these results suggest that, even if associated with decrease in cleanliness, simple modifications by dairy producers to stall configuration (forward tie-rail position and increased tie-chain length) to meet current recommendations would result in a decrease in neck, knee and hock injuries and increasing cow welfare.

Key Words: tie-stall, injuries, cleanliness

0800 (M014) Evaluation of cow cleanliness and fly avoidance behaviors among cows with docked, switch-trimmed, and switch-intact tails.

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Tail docking has become a contentious issue in the dairy industry because of concerns related to pain and inhibition of natural fly avoidance behaviors. The TailWell Power Tail Trimmer (Shoof International LTD, Cambridge, New Zealand) is a cordless drill attachment with circular blades to trim a cows' switch quickly and easily. The objective of this study was to evaluate cow cleanliness and fly avoidance behaviors between 64 cows trimmed with the Tailwell Power Tail Trimmer (T), 89 previously docked cows (D), and 53 cows with intact switches (S). Cow cleanliness was evaluated bi-weekly with separate scores recorded for the flank, leg, and udder using a scoring system ranging from light (L) to very heavy (VH). Individual teat scores were recorded using a scoring system ranging from 0 (no dirt) to 4 (filthy). Fly avoidance behaviors were monitored for 2 min/cow at each sampling. The PROC MIXED of SAS (SAS Institute Inc., Cary, NC) was used to evaluate the effects of tail status, scoring period, herd, and interactions on udder, flank, leg, and teat cleanliness. Stepwise backward elimination was used to remove nonsignificant interactions ($P \geq 0.05$). No significant differences were observed among tail status for flank, udder, or leg scores ($P \geq 0.05$); however, significant differences were observed for scoring period, herd, and the interaction of scoring period × herd ($P < 0.05$). Herd was a significant predictor of teat scores ($P \geq 0.05$), however tail status was not ($P \geq 0.05$). The GENMOD procedure of SAS was used to evaluate fly avoidance behaviors. Cows with docked tails were 2.01 and 2.21 times more likely to have a higher tail swing score than cows with switch-trimmed and intact-switch tails, respectively ($P < 0.01$). The lack of differences among cleanliness supports existing literature suggesting that docking tails does not improve cow hygiene. The observed increase in fly avoidance behavior among docked cows suggests behavioral deprivation for these cows. The Tailwell Power Trimmer provides a way to relieve dairy worker concerns related to intact switches without the perception aspects of tail docking.

Key Words: tail trimming, fly avoidance, cow hygiene

0801 (M015) Effect of reduced hair coat on performance of feedlot steers during summer heat stress.

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Heat stress in cattle reduces well-being and performance. The challenge is to develop effective procedures for heat stress mediation over the entire summer period. This necessitates the identification and development of reliable predictors of heat strain in the animal. A 94-d study, using crossbred Angus steers ($n = 36$; average body weight = 284 ± 29kg) was conducted during summer 2013. Animals were stratified by weight, housed in groups of nine among four different pens with ~ 50% shade coverage, and hair scored (1 to 4 scale; with higher values indicating a shorter coat). Hair coat was carefully removed using the standard "torched" procedure from half of the steers, with those remaining being unaltered (average hair score: 1.9). Ambient temperature (T_a) and relative humidity were recorded using Hobo H8 Pro data loggers (Onset Computer, Bourne MA) in sun and shade. Range of T_a was 12.2 to 36.6°C, and calculated temperature humidity index was 54.4 to 85.3. Steers were provided a corn-based feedlot diet and water ad libitum, and core temperature (T_{core}) measured hourly using intraruminal telemetric boluses (Smartstock, Pawnee, OK). Electronic ID tags (Allflex US Inc., Dallas-Fort Worth, TX) connected to a GrowSafe FI system (GrowSafe Systems Ltd., Airdrie, AB, Canada) provided feed intake (FI) data. Respiration rates (RR) were measured at 0800 and 1700 h on select days throughout the study, with measurement frequency increasing with heat events. Data analysis was conducted using ANOVA, (JMP Statistical Software; SAS Institute; Cary, NC) to determine the effect of a reduced hair coat on FI, feed efficiency (FI/ADG), RR, and T_{core}. Analysis revealed no effect of torching on daily FI ($P = 0.85$), but an increase in feed efficiency in non torched versus torched ($P < 0.01$). Analysis of mean daily T_{core} over the entire period by animal and hour of day showed a 0.21°C lower T_{core} value for torched versus non-torched animals ($P < 0.01$). Likewise, maximum daily T_{core} was 0.25°C lower in torched versus non-torched animals, with no difference ($P > 0.10$) in daily minimum T_{core}. Torching appeared to have no significant effect on average daily respiration rates ($P = 0.89$). These results indicate that reducing the hair coat of steers during summer months may offer a cosmetic benefit along a reduction in core temperature due to an increase in cutaneous heat loss. However, overall feed efficiency was slightly reduced as a result of this procedure. Additional studies are needed to determine the reason for this reduction.

Key Words: heat, stress, steers