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POSTER PRESENTATIONS

Animal Behavior and Well-Being: Methodology

TH1 Functional test of the hypothalamic-pituitary-adrenal axis of sows which perform various abnormal behaviors. D. C. Lay Jr.*, *Livestock Behavior Research Unit, Agricultural Research Service - USDA, West Lafayette IN.*

The objective of this study was to assess the function of the hypothalamic-pituitary-adrenal (HPA) axis of sows which perform differing abnormal behaviors to determine if regulation of their HPA axis had been altered. When dexamethasone is injected i.v., in normal individuals plasma cortisol is suppressed. Individuals with an altered regulation of their HPA are resistant to this suppression. Sows (n = 27) were housed in traditional gestation stalls and fed once daily in the morning. Behavioral data were collected weekly on 3 separate days (-7, 0, 7 d): 7 d prior to treatment, on the day of treatment, and 7 d after treatment. At 0830, 1 h after sows were fed, behavioral assessments were conducted to determine the incidence and type of stereotypic behavior that each sow performed. On d 0, a 10 mL blood sample was collected from all sows at approximately 2000 h. Immediately following blood collection, all sows received 2 mg of dexamethasone administered i.v. The following morning, 12 h later, a second blood sample was collected from each sow. Dexamethasone suppressed plasma cortisol in 23 sows who exhibited base concentrations of 38.8 ± 3.2 ng/mL which were decreased to 9.0 ± 0.9 ng/mL by 12 h later. Four sows proved to be resistant to the dexamethasone. These sows exhibited base concentrations of 40.7 ± 11.1 ng/mL which increased to 53.7 ± 9.5 ng/mL by 12 h later. Fourteen sows performed oral stereotypic behaviors during more than 50 % of the observations. These sows tended to ($P < 0.08$) have greater base cortisol concentrations and they also had greater ($P < 0.04$) post-dexamethasone plasma cortisol than sows performing stereotypic behavior during less than 50 % of the observations. These data indicate that sows which perform oral stereotypic behavior may have altered regulation of their hypothalamic-pituitary-adrenal axis.

Key Words: Stress, Swine, Hypothalamic-Pituitary-Adrenal Axis

TH2 Validation of a water HOBO and the Noldus Observer for drinking behavior in the nursery pig. A. M. Meiszberg*¹, A. K. Johnson¹, J. W. Dailey², J. A. Carroll², L. J. Sadler¹, J. R. Garvey¹, and N. Krebs³, ¹*Animal Science, Iowa State University, Ames*, ²*USDA-ARS, Livestock Issues Research Unit, Lubbock, TX*, ³*Pork Industry Institute, Texas Tech University, Lubbock.*

Collecting accurate behavioral events for extended periods can be time consuming. If a device could accurately record duration and frequency for a behavioral event, this would provide a useful research tool. The objectives of this study were to determine the accuracy of an automatic water meter compared to a human observer for drinking duration (s) and the frequency of visits to the waterer by nursery pigs. Eleven PIC USA gilts (22 ± 2 d of age; 6.5 ± 1.4 kg BW) were used to compare 2 methods; Observer software (OBS) and water meter Hobos (WMHOB) affixed to the water line. For our study, the WMHOB was defined as the control for drinking duration and visits. All gilts were housed individually in stainless steel pens and had ad libitum access to a corn-based diet and one water nipple. Drinking behavior was collected on d 0, 7, and 14 of the trial using one color camera positioned over 4 attached pens that recorded onto a RECO-204 DVR for 24 h at 1 fps. Drinking was defined as head over the water nipple. Behavioral measures were collected continuously from DVD by 2 experienced observers. Data were transformed prior to statistical analysis, and the duration and frequency were analyzed using the general linear model (GLM) and regression procedures in SAS. The GLM model included the method of observation and pig nested within method for the error term. The method of observation affected ($P = 0.001$) the duration (13.88 ± 1.43 s for WMHOB vs. 22.58 ± 1.46 s for OBS) and visits ($P = 0.005$) for drinking behavior (4.94 ± 0.33 visits for WMHOB vs. 3.48 ± 0.33 visits for OBS). For duration and frequency of visits to the drinker, R^2 was 0.563 and 0.687 respectively. In conclusion, the relationship between methods was weak. Also, OBS method underestimated the number of visits and overestimated the total duration of drinking for the nursery pig compared to the WMHOB.

Key Words: Drinking, Pig, Water

TH3 Temporary glycosuria alters molasses consumption in Holstein calves. C. S. Wilcox^{*1}, M. M. Schutz¹, S. S. Donkin¹, and S. D. Eicher², ¹*Purdue University, West Lafayette, IN*, ²*USDA- ARS, West Lafayette, IN*.

Cognitive activities and stress increase hippocampal glucose demand. Elevated circulating cortisol improves glucose conservation and neogenesis. Chronic activation of the adrenal cortex causes adrenal fatigue and lowers cortisol production causing hypoglycemia. In chronic stress rat models, sucrose intake is altered. This study was conducted, as a preliminary study of stress in dairy calves, to determine the effect of phlorizin-induced glucose demand on molasses consumption. Phlorizin temporarily blocks renal absorption of glucose from the urine causing glycosuria. This increases the demand for glucose in order to maintain normal physiologic blood glucose concentrations. To ensure preruminant status, all calves were maintained on milk replacer (fed at 10% of body weight) and given free access to water. In a completely randomized design with 2 treatments, 3-wk-old calves ($n = 6/\text{treatment}$) received 0.365g of phlorizin by s.c. injection (3 ml) or 3 ml of s.c. of saline. During a 7-d adjustment period and 24 h after treatment, all calves were allowed free access to molasses. Hourly urinary output, urinary glucose concentration, and molasses consumption were measured. Data were analyzed using GLM procedure in SAS. Mean molasses consumption for 24 h after treatment was 0.72g (± 0.07) for the control group and 1.42g (± 0.01) for the phlorizin-treated group ($P = 0.02$). Urinary output for the 8-h test period was 1.13 kg (± 0.06) for the control group and 1.67 kg (± 0.08) for the phlorizin-treated calves ($P = 0.026$). Mean urinary glucose peaked at 60 mg/dL 4 h after treatment for calves given phlorizin while the concentration for the control group fluctuated between 0 and 5 mg/dL ($P = 0.001$). Phlorizin treatment significantly increased urinary excretion, urinary glucose concentration and molasses consumption in 3-wk-old Holstein calves. Results of our study showed that alterations in glucose metabolism, specifically increased urinary glucose losses, and increased voluntary sucrose intake. Additional investigations are needed to confirm the relationship of stress with voluntary sucrose intake and to extend the utility of this feeding behavior response as an experimental model.

Key Words: Dairy Calf, Glucose, Phlorizin

TH4 Effect of alternative models for increasing stocking density on the lying behavior, hygiene, and short-term productivity of lactating Holstein dairy cattle. P. D. Krawczel^{*1,2}, C. S. Mooney¹, H. M. Dann¹, M. P. Carter¹, R. E. Butzler¹, C. S. Ballard¹, and R. J. Grant¹, ¹*William H. Miner Agricultural Research Institute, Chazy, NY*, ²*Department of Animal Science, The University of Vermont, Burlington*.

Spatial requirements of dairy cows may be assessed using several experimental models that attempt to simulate on-farm conditions. The objective of this study was to determine the differences in lying behavior, hygiene, and milk production of Holstein dairy cows when housed at a stocking density of 100 (1 cow per stall and headlock) or 142% imposed by either 1) the denial of access to freestalls and headlocks, 2) the denial of freestalls, headlocks, and 26.6 m² of alley space to simulate adding cows to the pen, or 3) adding 14 cows to increase group size. Cows ($n = 136$) were assigned to 1 of 4 pens in a 4-row freestall barn and treatments were allocated using a 4 \times 4 Latin square with 14-d periods. Lying time (h) and number of bouts per d for 12 focal cows per pen were determined using dataloggers recording at 1-min intervals during the final 5 d of each period. Hygiene of focal cows was assessed from the difference in the scores observed after the legs and udder were cleaned on d 2 of each period and those observed on d 14. Milk yield and dry matter intake were established from the pen mean over the final 4 d of each period. Milk composition was evaluated from samples collected during all milkings on d 12 of each period. Data were analyzed using MIXED procedure of SAS. Lying time was greater (13.0 h/d; $P < 0.002$) for 100% stocking density than 142% stocking density treatments, which did not differ (11.8 h/d; $P > 0.10$). Lying bouts (12.3 per d) did not differ among treatments ($P > 0.10$). The changes in udder (0.6) and leg (1.3) hygiene score per period were not affected by treatment ($P > 0.10$). Milk fat (3.6%), true protein (3.19), somatic cell score (4.5), milk yield (43.8 kg/d), and dry matter intake (24.6 kg/d) did not differ ($P > 0.10$) by treatment. The three stocking density models evaluated in this short-term study appear to be equally valid based on the lack of response in lying behavior and lactation performance. Additionally, all 3 models resulted in 1.2 h/d less lying time than the 100% stocking density control.

Key Words: Dairy Cattle, Stocking Density, Behavior