

meal (750 g/day). Bulls were naturally stimulated by cows and semen samples were collected with an artificial vagina every 15 days. Then collected semen was evaluated, diluted and frozen in 0.5 mL straws for later thawing. Assessments of sperm motility, hypo osmotic swelling test (HO), heat resistance test (TTR) and staining with Trypan blue were performed to evaluate the quality of thawed semen. The type of supplement did not affect HO (53.7%) and TTR (27.8%) after freezing. Thawed semen of bulls supplemented with CSPUFA had a 22% increasing in sperm motility (37.5 vs. 30.5%;  $P = 0.10$ ), percentage of spermatozoa with normal acrosome (48.0 vs. 39.2%;  $P < 0.05$ ) and number of live spermatozoa (51.5 vs. 42.2%;  $P < 0.05$ ) in relationship to thawed semen of bulls supplemented with cassava meal. Energy supplementation in the form of calcium soaps of polyunsaturated fatty acids may increase the resistance to the processes of sperm cryopreservation and subsequent thawing, increasing the sperm motility, percentage of live spermatozoa and percentage of spermatozoa with normal acrosome

**Key Words:** bypass fat, thawed semen, cassava meal

**W340 Effects of non-protein nitrogen in diets containing 15% wet distillers grains with solubles and steam-flaked corn on feedlot cattle performance and carcass characteristics.** C. H. Ponce<sup>\*1</sup>, M. S. Brown<sup>1</sup>, N. A. Cole<sup>2</sup>, C. L. Maxwell<sup>1</sup>, J. O. Wallace<sup>1</sup>, and B. Coufal<sup>1</sup>, <sup>1</sup>Feedlot Research Group, Department of Agricultural Sciences, West Texas A&M University, Canyon, <sup>2</sup>USDA ARS Conservation and Production Research Laboratory, Bushland, TX.

Our previous data suggest that the non-protein nitrogen (NPN) need in diets with 15% wet distillers grains with solubles (WDGS) for optimum growth performance may be slightly less than in 0% WDGS diets. The objective of the present study was to more clearly define the NPN need in diets with 15% WDGS. Steer calves ( $n = 296$ ; initial BW = 344 kg) previously grown for approximately 75 d were adapted to a common finishing diet, blocked by BW, and assigned to 36 soil-surfaced pens (18 m<sup>2</sup> of pen space and 33 cm of bunk space/animal). Treatments included a control diet without WDGS (contained 3% NPN from urea, and cottonseed meal) and 15% WDGS with either 1.5, 2.25, or 3.0% NPN (0.52, 0.78, and 1.04% urea, respectively). Steers were implanted on d 1 with Revalor-XS and were fed twice daily for 165 d. The WDGS was obtained 3 times/wk from a local plant, and grain composition of WDGS averaged 22% sorghum and 78% corn. Overall DMI was 6.1% higher ( $P = 0.001$ ) for steers receiving WDGS than for the control. Similarly, steers fed WDGS had 8% greater ADG ( $P < 0.008$ ) on either a live or a carcass-adjusted basis than the control. However, overall gain efficiency on either a live or adjusted basis was not different among treatments ( $P > 0.15$ ). Dietary NPN concentration did not influence growth performance ( $P > 0.21$ ). Hot carcass weight was 10.9 kg lighter for the control than for 15% WDGS ( $P = 0.01$ ), whereas dressing percentage tended ( $P = 0.12$ ) to increase in a linear manner as NPN increased in diets with WDGS. Remaining measured carcass characteristics were not altered by treatment ( $P > 0.16$ ). The control group tended to have ( $P < 0.12$ ) fewer average Choice and higher and more low Choice carcasses than those fed WDGS, but the distribution of remaining quality and yield grades did not differ among treatments. Data suggest that growth performance may not be improved by including more than 1.5% added NPN in diets with 15% WDGS derived from a blend of corn and sorghum grains.

**Key Words:** wet corn distillers grains, growth performance, beef cattle

**W341 Effects of nutrient restriction and ruminally undegradable protein supplementation during early to mid-gestation on beef**

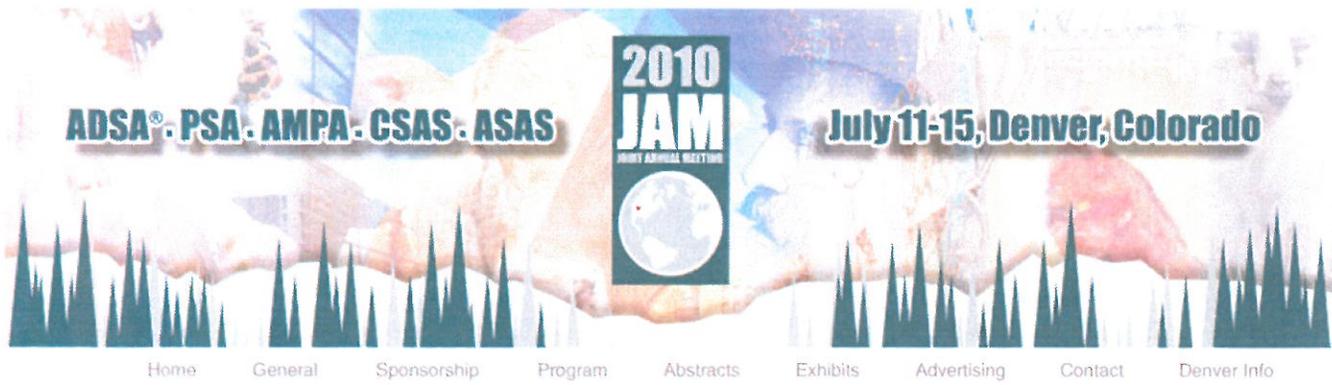
**cow offspring intestinal growth.** A. M. Meyer<sup>\*1</sup>, P. Moriel<sup>2</sup>, W. J. Means<sup>2</sup>, M. Du<sup>2</sup>, B. W. Hess<sup>2</sup>, and J. S. Caton<sup>1</sup>, <sup>1</sup>Center for Nutrition and Pregnancy, Department of Animal Sciences, North Dakota State University, Fargo, <sup>2</sup>Department of Animal Science, University of Wyoming, Laramie.

Thirty-six Angus × Gelbvieh cows were blocked by parity and randomly allocated by BW to 1 of 3 dietary treatments from d 45 to 185 of gestation: a hay-based control (CON) diet formulated to meet NRC requirements for mid-gestation; a nutrient restricted (NR) diet providing 70% of CON NE<sub>m</sub>; or an NR diet fed with a ruminally undegradable protein supplement (NRP) formulated to provide similar essential AA flow to the duodenum as CON. After concluding the dietary treatment period, cows were managed as a single group through calving and weaning. Calves were placed in the feedlot by sex and maternal dietary treatment, and managed similarly during the growing and finishing phases. Steers and heifers were slaughtered at 448 ± 1.0 (mean ± SE) and 466 ± 1.1 d of age, respectively. Detailed necropsies of the small intestine were performed and jejunal samples were collected. Data were analyzed using slaughter group as a block. Slaughter weight (552.4 ± 10.2 kg) did not differ ( $P = 0.76$ ) among maternal treatments. Ileal mass (g) tended to be greater ( $P = 0.12$ ) and proportional mass (g/kg BW) was greater (1.55 vs. 1.26 ± 0.09 g/kg BW;  $P = 0.02$ ) for offspring of CON cows than NR, although liver, duodenal, jejunal, and total small intestinal mass did not differ ( $P \geq 0.38$ ) among treatments. Offspring born to NR cows had greater ( $P < 0.05$ ) jejunal length than CON and NRP, whereas NR had shorter ( $P = 0.03$ ) ileal length compared with CON. Total small intestinal length was greater ( $P = 0.02$ ) for offspring from NR cows than NRP (3,754 vs. 3,448 ± 92 cm). Per unit of BW, ileal length was less ( $P < 0.09$ ) in NR compared with CON and NRP. There were no differences ( $P \geq 0.20$ ) in small intestinal density (g/cm tissue) due to treatment. Additionally, offspring jejunal DNA, RNA, and protein concentration (mg/g tissue) and content (total g) did not differ ( $P \geq 0.74$ ) among maternal treatments. In this study, maternal nutrition of beef cows during early to mid-gestation affected small intestinal length, but not mass, of market-weight offspring.

**Key Words:** developmental programming, intestine, ruminally undegradable protein

**W342 Time of collection affects starch losses in Nellore and crossbred cattle in commercial feedlots.** M. Caetano<sup>\*1</sup>, A. J. C. Nuñez<sup>2</sup>, G. B. Mourão<sup>1</sup>, and D. P. D. Lanna<sup>1</sup>, <sup>1</sup>University of Sao Paulo, ESALQ, Piracicaba, Brazil, <sup>2</sup>University of Sao Paulo, FZEA, Pirassununga, Brazil.

Grain sources, grain processing and different feed formulations have been extensively studied in order to improve the efficiency of starch utilization and animal performance. Starch digestion is closely and directly related to fecal starch content (FS%), however we have observed large variations in FS% through a 24-h period in experimental animals. The objective of this study was to determine the magnitude and variability of starch losses in commercial feedlots, as well as the influence of collection period, diet starch content, grain particle size after grinding, genetic group and starch source (corn or sorghum) on pH and FS%. Samples ( $n=935$ ) were collected on 9 commercial feedlots, with 13 different diets using ground corn or sorghum as starch sources. Diets contained between 40 and 88% concentrate and starch contents between 14.6 and 45.9% in the dry matter (DM). Animals were classified as Nellore or European crossbreds. Morning collections were taken between 0700 and 1200 h and afternoon collections between 1300 and 1800 h. Diets and feces were immediately put on ice and analyzed for DM, ash and starch. Diets were also analyzed for particle size while feces were analyzed for



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