

## Ruminant Nutrition: Beef: Forages and Grazing

**1040 Effects of self-fed byproducts on animal performance, carcass traits and fatty acid profiles of pasture reared finishing cattle.** D. D. Kiesling\*, D. G. Morrical, D. R. Strohbehn, M. S. Honeyman, D. W. Busby, D. Maxwell, and J. S. Sellers, *Iowa State University, Ames.*

The objective of this study was to evaluate self-fed byproducts on pasture reared finishing cattle. Major effects studied were animal performance, carcass traits and fatty acid (FA) profile with specific emphasis on conjugated linoleic acid (cis-9, trans-11–18:2; CLA). Eighty-two crossbred yearling steers were utilized in a 2 × 2 factorial design with implanted and non-implanted cattle fed either Diet 1: corn/dried distillers grain with solubles (DDGS) or Diet 2: soyhulls/DDGS. Self-feeders were available to cattle that continually grazed cool-season grasses at 5.6 animals/ha. Ribeye facings were extracted for lipid content and esterified for FA analysis by gas chromatography. Data presented is from the first year of this 2 year trial, which second year data has yet to be analyzed. Average daily gains (ADG) over the entire trial of cattle fed Diet 1 were greater (1.59 kg/d vs. 1.52 kg/d,  $P = 0.09$ ) compared with cattle fed Diet 2. Diets did not affect dressing percentage, yield grade or quality grade. As expected, implanted cattle gained faster (1.66 kg/d vs. 1.46 kg/d,  $P < 0.0001$ ) than non-implanted cattle. No differences were observed among implant treatments relative to marbling scores (1031.0 vs. 1016.0, non-implanted vs. implanted, respectively,  $P = 0.29$ ). However, percentage of cattle grading low choice or better was higher in non-implanted cattle (77.5% vs. 47.6%,  $P = 0.005$ ). Cattle fed Diet 2 did have greater CLA levels (0.66 g/100g FA vs. 0.44 g/100g FA,  $P < 0.0001$ ). However, supplementation of byproducts does lead to reduced levels of CLA when compared with grass-finished cattle. Neither diet nor implant treatments had an effect on total lipid, total saturated fatty acid (SFA), polyunsaturated fatty acid (PUFA) or monounsaturated fatty acid (MUFA). In conclusion, pasture reared cattle perform comparably to feedlot cattle in the yard and on the rail when supplemented with byproducts. As well, greater CLA levels can be achieved especially when fed a low starch diet such as soyhulls.

**Key Words:** beef cattle, by-products, fatty acid profile

**1041 Diets containing thirty percent wheat straw or orchard grass hay fed at either ad libitum or restricted intake prepartum have modest effects on postpartum performance.** N. B. Litherland\*, M. L. Raeth-Knight, and J. G. Linn, *University of Minnesota, St Paul.*

The objectives of this study were to investigate the effects of forage type (wheat straw vs. orchard grass hay) and DM amount fed (ad libitum vs. 30% DMI restriction) prepartum on postpartum performance. A 2 × 2 factorial design with 10 cows per treatment was used to determine the effects of forage type in a TMR (wheat straw (WS) vs. orchardgrass hay (GH)) and amount fed (ad libitum (A) vs. 30% intake restriction (R)) in DM based on NRC, 2001. Treatments included WS TMR A (WSA); GH TMR A (GHA); WS TMR R (WSR); GH TMR R (GHR). The WS TMR (DM basis) contained 30% WS, 21% corn silage, 10% alfalfa hay, 18% ground corn, 17% soybean meal, and 4% molasses (14.8% CP, 1.5 NE<sub>L</sub> Mcal/kg, 37% NDF). The GH TMR contained 30% GH, 46% corn silage, 10% alfalfa hay, 10% soybean meal, and 4% molasses (15% CP, 1.5 NE<sub>L</sub> Mcal/kg, 40% NDF). Cows received one lactation diet after calving (CP 17.8%, NE<sub>L</sub> 1.6 Mcal/kg, NDF 26%). Cows were housed in a tie-stall barn, fed once daily prepartum and fed and milked twice daily postpartum. Thirty 6 cows were used in the final analysis using the Mixed procedure in SAS. As designed, dry matter intake as a percent of body weight was higher ( $P < 0.05$ ) in WSA and GHA vs. WSR and

GHR prepartum, but there was no difference postpartum. Fat corrected milk yield tended to be higher ( $P = 0.10$ ) from GHR cows. Postpartum energy balance was less negative ( $P = 0.04$ ) for GHA for wk 1 to 4. Milk fat production tended ( $P < 0.08$ ) to be higher for GHR cows. Liver total lipids, body weight, body condition score, milk fat:protein, and fecal dry matter, did not differ among treatments. Feeding behavior was observed by 24 h video surveillance and 10 min video scans for 5 d pre- and postpartum. Cows fed WSA or WSR tended ( $P < 0.06$ ) to have more eating bouts on d 2 and 4 postpartum than cows fed GHA or GHR. Results indicate that forage type and amount of DM fed have modest effects on performance and behavior of cows in tie stall barns if diets are formulated to meet NRC, 2001 requirements.

**Key Words:** restricted intake, ad libitum intake, transition cow

**1042 In situ digestibility of grass hay after heifer diets were abruptly switched from 35 or 70% concentrate to 100% forage.** L. A. Voigt\*<sup>1</sup>, R. L. Endecott<sup>1</sup>, R. C. Waterman<sup>2</sup>, and J. A. Paterson<sup>1</sup>, <sup>1</sup>Montana State University, Bozeman, <sup>2</sup>USDA-ARS, Miles City, MT.

Twelve ruminally-cannulated Hereford-cross heifers (non-pregnant, 2-yr-old, 508 ± 2 kg) were randomly assigned to 3 individually-fed, pre-experiment diets (4 heifers/diet). Diets were: 1) all forage, (CONTROL); 2) 35% concentrate, (35%), and 3) 70% concentrate (70%). Heifers were fed the diets for ~100 d before the start of the trial. Pre-experiment diets consisted of grass-alfalfa hay (11.8% CP) and corn (9.8% CP), with soybean meal-urea supplement added to make the diets isonitrogenous at 13% CP. On d 0, diets were abruptly switched to grass hay (6.2% CP, fed at 2% BW). In situ digestibility runs were conducted starting on d -8 and ran continuously (d 1, 4, 7, 10, 13, 16, 19, 22) after the diet switch. Duplicate sample bags filled with 5 g of grass hay and a blank bag were incubated for 0, 24, 48, and 96 h. Pre-experiment diet × in situ run interactions occurred ( $P \leq 0.04$ ) for OM and NDF digestibility. Organic matter digestibility of grass hay before the diet switch (d -8) was lower ( $P \leq 0.10$ ) for 70% than for 35% or CONTROL; 48-h: 68.5, 66.7, and 53.0 ± 2.3%; 96-h: 76.3, 75.2, and 61.6 ± 1.0% for CONTROL, 35%, and 70%, respectively. A comparable pattern was observed for NDF digestibility; 48-h: 67.7, 65.6, and 48.8 ± 2.8%; 96-h: 77.0, 75.9, and 58.9 ± 1.1% for CONTROL, 35%, and 70%, respectively. In contrast, after the diet switch (d 1), OM digestibility of grass hay was higher for 70% than for 35% or CONTROL ( $P \leq 0.10$ ; 48-h: 66.5, 66.0, and 69.0 ± 1.7%; 96-h: 75.9, 76.1, and 77.6 ± 0.7% for CONTROL, 35%, and 70%, respectively). Digestibility of NDF was likewise higher for 70% than 35% or CONTROL; 48-h: 65.5, 64.4, and 67.8 ± 2.2%; 96-h: 76.2, 76.3, and 78.1 ± 0.8% for CONTROL, 35%, and 70%, respectively. Organic matter and NDF digestibilities in subsequent in situ runs were similar ( $P > 0.10$ ), regardless of pre-experiment diet. Rate of digestion was not influenced by pre-experiment diet ( $P = 0.74$ ; avg 4.3 ± 0.002%/h). Forage digestibility was depressed when heifers were fed a high-concentrate diet; however, this effect disappeared within 48 h of feeding an all-forage diet.

**Key Words:** forage digestibility, diet switch, beef cattle

**1043 Evaluation of annual ryegrass (*Lolium multiflorum*) in two fall grazing systems on forage quality and beef heifer performance.** J. M. Kelzer\*<sup>1</sup>, R. S. Walker<sup>2</sup>, S. L. Bird<sup>3</sup>, and R. D. Mathison<sup>3</sup>, <sup>1</sup>University of Minnesota, St. Paul, <sup>2</sup>Extension Regional Center, University of

Minnesota, Andover, <sup>3</sup>North Central Research and Outreach Center, University of Minnesota, Grand Rapids.

Effects of fall grazing stockpiled and windrowed annual ryegrass on forage quality and beef heifer performance were evaluated. One renovated, 2-ha pasture was seeded with annual ryegrass (*Lolium multiflorum*) in late June and treated with herbicide in August for weed control. In late September, stockpiled forage from one-half of the pasture was cut into single windrows while the other half was left standing. Weaned Angus beef heifers (n = 48) averaging  $186 \pm 7$  kg initial BW were randomly assigned to 1 of 2 grazing treatments (3 replications per treatment; 8 heifers per replication): 1) stockpiled annual ryegrass (STO), and 2) windrowed annual ryegrass (WIN). Forage samples were collected to determine change in forage quality over time and weekly DM loss following grazing. Heifers were weighed at trial initiation, weekly, and at trial completion to measure animal performance. Percent forage DM at trial completion was  $41.8 \pm 2.8$  and  $38.4 \pm 7.5\%$  for STO and WIN, respectively. Final concentration of CP was greater ( $P < 0.01$ ) for STO compared with WIN ( $13.6$  vs.  $11.4 \pm 0.5\%$ ). Final concentrations of NDF ( $56.0$  vs.  $66.5 \pm 0.5\%$ ) and ADF ( $36.5$  vs.  $42.3 \pm 0.5\%$ ) were lower ( $P < 0.01$ ), while TDN ( $60.4$  vs.  $55.9 \pm 0.5\%$ ) and relative feed value ( $100.7$  vs.  $78.4 \pm 1.3$ ) remained greater ( $P < 0.01$ ) for STO compared with WIN over time. Forage DM loss was estimated at  $6.3 \pm 4.0\%$  and  $2.5 \pm 1.0\%$  for STO and WIN. Heifers on STO grazed 5 d longer ( $P < 0.01$ ) than WIN (45 vs. 40 d). Although final BW ( $206$  vs.  $201 \pm 8$  kg) and ADG ( $0.43$  vs.  $0.37 \pm 0.04$  kg) were similar for STO and WIN, overall BW gain was greater ( $P < 0.05$ ) for STO ( $19.2$  vs.  $14.9 \pm 1.5$  kg). Results suggest grazing stockpiled and windrowed annual ryegrass may be viable systems to extend fall grazing; however, forage maturity can reduce forage quality to levels that may limit beef heifer performance.

**Key Words:** beef cattle, grazing system, annual ryegrass

**1044 Effects of pen cleaning frequency and feeding high distillers grains and wheat straw on nutrient mass balance and performance of feedlot steers.** A. R. Rich\*, G. E. Erickson, T. J. Klopfenstein, M. K. Luebbe, and W. A. Griffin, *University of Nebraska, Lincoln*.

A summer experiment compared feeding wet distillers grains plus solubles (WDGS) with wheat straw to corn on steer performance, manure N, and N loss. Crossbred steer calves ( $365 \pm 5$  kg) were stratified by BW, and assigned randomly to 16 pens (8 steers/pen) and fed for 145 d from May to October. Four treatments were tested as a  $2 \times 2$  factorial with factors being diet and pen cleaning frequency (monthly or at the end of the feeding period). Diets consisted of 85% corn, 5% molasses, and 5% wheat straw (CON) or 70% WDGS and 25% wheat straw (BYP). Both diets contained 5% supplement. Nitrogen excretion was determined by difference between N intake and N retention. Total N lost was calculated by subtracting manure and runoff N from excreted N. Runoff was drained, quantified, and analyzed from retention ponds when rainfall occurred. No interactions ( $P > 0.25$ ) between diet and cleaning frequency were observed for performance. Steers fed CON had greater DMI, ADG, HCW, marbling, and fat depth ( $P < 0.02$ ) compared with BYP. Due to decreased ADG, steers fed BYP were fed an additional 14 d for performance, but mass balance data are for 145 d only. Cleaning frequency had no impact ( $P > 0.35$ ) on cattle performance. Feeding BYP increased ( $P < 0.01$ ) N intake and N excretion compared with CON due to differences in CP between diets ( $23.5$  vs  $11.6\%$ ), and was not impacted by cleaning frequency. Runoff N was not impacted ( $P > 0.10$ ) by diet or pen cleaning treatments. Amount of DM, OM, and N removed in manure was almost doubled ( $P < 0.01$ ) by feeding BYP compared with CON. Likewise, cleaning pens monthly almost doubled

( $P < 0.01$ ) DM, OM, and N removed in manure. Despite increases in manure N, N losses were greater ( $P < 0.01$ ) for BYP compared with CON. However, cleaning pens monthly decreased ( $P < 0.01$ ) N losses by 8.4 kg and % N lost from 72.5 to 49.4% compared with cleaning once at the end. Feeding 70% WDGS with 25% wheat straw decreases ADG and G:F and increased N losses.

**Key Words:** cleaning frequency, nitrogen, wet distillers grains plus solubles

**1045 Restricting intake of replacement heifers by limiting hay access time.** W. J. Sexten\* and D. K. Davis, *University of Missouri, Columbia*.

Spring-born replacement beef heifers are often developed using hay offered ad libitum with limited supplementation from weaning until breeding. The objective of this experiment was to evaluate restricted hay access time on replacement heifer performance and hay intake. Spring-born Red Angus crossbred heifers were randomly assigned to 8 h (8H) or 24 h (24H) access to hay in year 1 (YR1) (n = 52) and year 2 (YR2) (n = 64). Three pens per treatment were used in YR1 with a 107 d development period beginning 19 December 2007. During YR2 4 pens per treatment were used during the 93 d development period initiated 7 January 2009. Development periods concluded 4 April 2008 and 10 April 2009. Each pen was offered one large round bale of hay in a bale feeder. As hay was consumed another bale was offered in a second feeder. As the second bale was consumed the first feeder was moved and a third bale added. This rotational system was used throughout development. Hay not consumed was considered wasted. 8H access was restricted using polywire around hay feeding area. Heifers were fed 2.0 kg/animal per d of supplemental DM consisting of 93.7% distillers dried grains with solubles, 4.1% limestone and 2.2% mineral. Hay was 10.4% CP, 39.3% ADF and 60.3% NDF in YR1 and 10.4% CP, 41.3% ADF and 60.6% NDF in YR2. Data were analyzed as a randomized complete block design using the mixed procedure of SAS. Initial and final heifer weight was greater ( $P < 0.02$ ) in YR1 than YR2 with no differences due to access time. Access time and year tended ( $P = 0.09$ ) to interact for development ADG. In YR1 24H had greater ( $P < 0.05$ ) ADG than 8H while in YR2 no differences ( $P > 0.10$ ) were observed due to access time. Yearling pelvic area and reproductive tract score were not different ( $P > 0.10$ ) due to access time or year. Total hay DMI was greater ( $P < 0.01$ ) in YR1. Total hay DMI and daily hay DMI were reduced ( $P < 0.01$ ) by 10.9% due to 8H. Prebreeding weight, yearling pelvic area and reproductive tract score were not influenced by restricting hay access time however development ADG was reduced in YR1. Restricting hay access time can reduce hay DMI of developing replacement heifers.

**Key Words:** beef heifer, hay, restricted intake

**1046 Effect of stocking rate on nutrient quality of cornstalk residue.** J. A. Gigax\*, C. D. Buckner, L. A. Stalker, T. J. Klopfenstein, and S. J. van Donk, *University of Nebraska, Lincoln*.

A grazing trial compared the effect of stocking rate on corn residue removal and nutrient quality over a 65 d period. Treatments included no removal (control), light grazing (0.4 animal unit months/ha), and heavy grazing (0.8 animal unit months/ha), that were applied to 6 6.6 ha paddocks (2 replications) on a 53 ha center pivot irrigated field of corn residue from mid-December to mid-February. Residue samples were collected before and after grazing at 10 locations within each paddock using a  $1/2$  m<sup>2</sup> quadrat. After collection samples were sorted by plant part (leaf, stem, husk, cob, and grain), and analyzed for DM, OM, CP, and in vitro organic matter disappearance (IVOMD). No 3 or 2-way

interactions were observed for amount of residue OM (kg/ha;  $P \geq 0.61$ ), but amount of residue was affected by plant part and time collected ( $P \leq 0.02$ ). Of residue remaining before grazing, stems make up the greatest proportion (42.1%) followed by leaves (33.8%), cobs (14.1%), and husks (9.9%). Little removal of stems (2% of original amount) was observed. Cobs and leaves were moderately removed from the light stocking rate (40.1% and 34.4%, respectively) and heavy stocking rate (28.5% and 20.7%, respectively) compared with control (19.2% and 0.1%, respectively). Proportionally, most husks were removed from the heavy stocking rate treatment (87.8%), moderately for light stocking rate treatment (53.1%), and least for control treatment (32.2%). Husks (57.9%) and leaves (53.7%) had greater IVOMD than cobs (48.2%) and stems (49.0%;  $P < 0.01$ ) and IVOMD decreased over collection time ( $P = 0.03$ ). Leaves (5.4%) and husks (4.2%) had the greatest CP content compared with cobs (3.9%) and stems (3.0%;  $P < 0.01$ ). Cattle grazing corn residue removed primarily husk, leaf, and to a lesser extent, cobs. Husk and leaf have greater IVOMD and CP than cob or stem.

**Key Words:** corn residue, grazing, cattle

**1047 Ruminant pressure and pH dynamics of bloated steers grazing winter wheat forage.** W. E. Pinchak<sup>\*1</sup>, D. W. Pitta<sup>1</sup>, D. P. Malinowski<sup>1</sup>, J. D. Fulford<sup>1</sup>, T. A. Wickersham<sup>2</sup>, and J. Coverdale<sup>2</sup>, <sup>1</sup>Texas AgriLife Research, Vernon, <sup>2</sup>Texas A&M University, College Station.

We undertook an experiment to quantify ruminal pressure (mbar), pH and temperature to phenotypic timing and duration of frothy bloat in rumen cannulated steers grazing wheat pasture during the bloat prone period in North Texas through use of an inter-reticulo/rumen biotelemetry bolus system (Kahne Ltd, N. Z.). Environmental conditions (temperature, UV radiation, solar radiation, humidity, dew point wind speed and direction and precipitation) were measured via a recording weather station (WatchDog 2770, Spectrum Technologies, Inc., Plainville, IL, USA) to determine their relationships to timing, frequency, severity and duration of bloat. Bloat (bloat score 1) was observed in 3 of 12 cannulated Angus cross steers (mean BWT 235 kg) of common ancestry and provenance by 7 February 2010. Analyses of ruminal biotelemetry data quantified cumulative increases in intraruminal pressure from about 1200 h on 8 Feb through most of 9 Feb. Pre-bloat intraruminal pressures of the 3 bloat prone steers on 4 Feb exhibited rapid cyclicality at 5 min sampling intervals throughout the 24 h period. In contrast, from 7 through 9 Feb, the cyclicality decreased, distinct plateaus at peak pressures up to 120 min and decreased amplitude among 5 min sampling periods were found. Peak sustain pressure occurred from evening of 8 Feb throughout 8 Feb. Unlike reports for frothy/foamy bloat in feedlot cattle there was not a concomitant decrease in ruminal pH. The opposite was observed where pH increased during the peak bloat on 9 Feb in all 3 steers. This bloat event was preceded by 3 d of cloudy conditions, high humidity (>60%) and temperatures above freezing. Peak bloat on 9 Feb was accompanied by a cold front, below freezing temperatures and frost. We suggest these preliminary results reinforce our frothy bloat research model where rapid changes in environmental conditions are primary catalysts to bloat onset and duration. Interestingly, finding an increase in pH with increasing ruminal pressure would suggest possible accumulation of ruminal ammonia and reinforces the long suggested role of soluble proteins in wheat pasture frothy bloat.

**Key Words:** ruminal pressure, pH, biotelemetry, environment

**1048 Rumen bacterial diversity dynamics associated with changing from bermudagrass hay to grazed winter wheat diets.** D. W. Pitta<sup>\*1</sup>, W. E. Pinchak<sup>1</sup>, S. E. Dowd<sup>2,4</sup>, J. Osterstock<sup>3</sup>, V. Gontcharova<sup>2</sup>,

E. Youn<sup>4,5</sup>, K. Dorton<sup>6</sup>, I. Yoon<sup>6</sup>, B. R. Min<sup>1</sup>, J. D. Fulford<sup>1</sup>, T. A. Wickersham<sup>7</sup>, and D. P. Malinowski<sup>1</sup>, <sup>1</sup>Texas AgriLife Research, Vernon, <sup>2</sup>Research and Testing Laboratory, Lubbock, TX, <sup>3</sup>Texas AgriLife Research, Amarillo, <sup>4</sup>Medical Biofilm Research Institute, Lubbock, TX, <sup>5</sup>Texas Tech University, Lubbock, <sup>6</sup>Diamond V Mills, Cedar Rapids, IA, <sup>7</sup>Texas A&M University, College Station.

Bacterial populations in the rumen adapt to a wide range of changing dietary composition, nutrient density, and environmental conditions. The objective of this study was to explore the distinct bacterial niches associated with the fiber and liquid fractions of rumen contents in animals transitioned from bermudagrass hay diet to a grazed wheat diet. Briefly the experiment involved sampling of fiber and liquid rumen fractions and whole rumen contents of 14 (Angus × Hereford) ruminally cannulated steers sequentially fed bermudagrass hay (*Cynodon dactylon*; 34 d) and grazing wheat forage (28 d) to characterize and elucidate changes in bacterial diversity utilizing 16S bTEFAP pyrosequencing technique. Bermudagrass hay was a conserved C4 perennial grass with a lower protein (11%) and higher fiber (67%) content when compared with grazed winter wheat (*Triticum aestivum*), a C3 annual grass with higher protein (20%) and a large (66%) soluble fraction. Significant differences in the OTU estimates (Chao1, Ace, and Rarefaction) were detected between fractions of both diets, with bermudagrass hay supporting greater diversity than wheat forage. Sequences were compared with a 16S database using BLASTn and assigned sequences to respective genera and genera-like units based on the similarity value to known sequences in the database. Predominant genera were *Prevotella* (up to 33%) and *Rikenella-like* (up to 28%) genera on the bermudagrass diet and *Prevotella* (up to 56%) genus on the wheat diet irrespective of the fractions. Principle component analyses accounted for over 95% of variation in 16S estimated bacterial community composition in all 3 fractions and clearly differentiated communities associated with each diet. In summary, bermudagrass hay diets clustered more clearly and were more diversified than wheat diets.

**Key Words:** bermudagrass hay, wheat, bTEFAP pyrosequencing

**1049 Fermentable fiber levels in diets for natural beef cattle markets.** M. J. Baker<sup>\*</sup>, D. E. Hogue, M. L. Thonney, and D. J. Ketchen, Cornell University, Ithaca, NY.

Eligibility requirements for “natural” beef often state that antibiotics, including ionophores, cannot be fed. To reduce the incidence of acidosis in diets without an ionophore, feeders often increase the NDF concentration, which lowers intake of digestible nutrients with a resulting increase in cost of gain. However, if the NDF has high potential fermentability (pfNDF), then feed intake may increase and compensate for the lack of an ionophore. The purpose of this experiment was to evaluate the interaction between monensin and levels of pfNDF on growth and feed efficiency of yearling steers. Crossbred steers (n = 32, BW = 485 kg) were blocked by weight with 2 large and 2 small steers assigned to each of 2 slatted floor pens per diet (Table 1) and fed for 87 d. Diets contained 70% whole shelled corn, 0 or 10% soy hulls, and a high NDF pellet formulated to meet protein, mineral and vitamin requirements. One steer died of causes unrelated to the experiment and carcass data for 2 others were not obtained. There were no significant interactions or main effects for growth or feed intake responses (Table 1). Cattle fed the 20% pfNDF diet had a higher ( $P < 0.10$ , 5.8, 5.2 ± 0.185) quality grades than cattle fed the 15% pfNDF. There was an interaction between monensin and pfNDF in carcass fat deposition ( $P < 0.05$ ). Adding monensin to 15% pfNDF diets increased backfat, worsened yield grade, and tended ( $P = 0.13$ ) to increase marbling, with little effect of monensin for 20% pfNDF diets. Diets with 20% pfNDF without monensin supported growth and



carcass characteristics similar to higher energy diets with monensin. This provides an opportunity to sell to “natural” cattle markets while avoiding the typical reductions in performance that occur when no ionophore is included in the diet.

**Table 1.** Effect of pfNDF and ionophore on growth and carcass traits of steers

Monensin:	0	0	+	+	
pfNDF:	15%	20%	15%	20%	SE
n (steers)	8	8	7	8	
Initial wt., kg	483	489	481	488	17
Final wt., kg	590	604	605	607	19
ADG, kg	1.22	1.32	1.41	1.36	0.11
HCW, kg	363	359	371	370	13
n (pens)	2	2	2	2	
gain/DMI	0.123	0.128	0.141	0.139	0.011
n (carcasses) <sup>1</sup>	8	7	7	7	
Marbling (500 = low Choice)	562	619	631	617	21
Quality grade (5 = low Choice)	5.1	5.8	5.5	5.7	0.3
Back fat, cm	1.2	1.7	1.3	1.2	0.1
REA, cm <sup>2</sup>	85	85	85	98	2
Yield grade	3.1	3.7	3.4	3.0	0.2

<sup>1</sup>Adjusted to average carcass weight of 366 kg.

**Key Words:** beef, fermentable NDF, Natural diets

**1050 Chemical composition and in situ digestion kinetics of fodder tree leaves.** J. I. Sultan\*<sup>1</sup>, U. B. Cheema<sup>1</sup>, A. Javaid<sup>1</sup>, and M. Yaqoob<sup>2</sup>, <sup>1</sup>*Institute of Animal Nutrition and Feed Technology, University of Agriculture, Faisalabad, Pakistan,* <sup>2</sup>*Department of Livestock Management, University of Agriculture, Faisalabad, Pakistan.*

This study evaluated the nutritional status of *Morus alba*, *Acacia nilotica*, *Syzygium cumuni* and *Ziziphus jujuba* tree leaves for use as supplement in ruminant animal feed. Chemical analyses revealed that DM ranged from 25% to 47% in *Morus alba* and *Syzygium cumunii*, organic matter was higher (94%) in *Syzygium cumuni* and *Ziziphus jujuba*. *Morus alba* had higher (23%) CP, whereas, NDF was greater in *Ziziphus jujuba* (32%). The ADF was higher in *Syzygium cumuni* (23%), while, acid detergent lignin was greater (7%) in *Morus alba* and *Syzygium cumuni*. Hemicellulose (15%) and ash content (10%) were higher in *Ziziphus jujuba* and *Morus alba*, respectively. Metabolizable energy was higher (10.5 MJ/kg) in *Morus alba* than the other species. Among minerals Ca and K was highest in *Acacia nilotica*, P in *Morus alba*, and Mg and Na in *Ziziphus jujuba*. In situ DM digestibility was higher (90.2%) for *Morus alba*, DM lag time was shorter (0.63 h) for *Acacia nilotica*, and rate of DM disappearance was lowest (5.34% per h) for *Syzygium cumuni*. Extent of DM digestion (98.26%) and NDF digestibility (84.10%) were higher for *Morus alba*. Shorter NDF lag time (0.71 h) and higher rate of NDF disappearance were evident for *Acacia nilotica*, but extent of NDF digestion was higher (96.80%) for *Morus alba*. Based on chemical composition and in situ digestion kinetics, *Morus alba* leaves proved the best supplement followed by *Acacia nilotica*, *Ziziphus jujuba* and *Syzygium cumuni* for the feed and optimum production of ruminants.

**Key Words:** Tree species; chemical composition, digestion, digestibility kinetics