

As Fed Basis					
Dependent	Independent	Coefficient	SEM	P-value	r ²
Feed intake	Min. Temp.	-0.07	0.03	0.03	0.18
Coarse+Med.	Max. Temp.	0.57	0.28	0.05	0.44
	DMI	-3.43	1.06	0.004	
Med.	DMI	-2.96	0.71	0.0003	0.49
	Med.	0.77	0.31	0.01	
Milk Yield	Med.	-0.66	0.21	0.005	0.25
Chew. Rate	Eating	1.05	0.21	0.0002	0.44
Dry Matter Basis					
Dependent	Independent	Coefficient	SEM	P-value	r ²
DMI	Min. Temp.	-0.06	0.03	0.04	0.18
Coarse+Med.	Max. Temp.	0.54	0.29	0.08	0.39
	DMI	-3.32	1.12	0.007	
Med.	DMI	-3.13	0.77	0.0004	0.41
	Med.	0.79	0.35	0.03	
Milk Yield	Med.	-0.64	0.22	0.0079	0.23
Chew. Rate	Eating	1.07	0.22	0.0001	0.43

Key Words: Particle size, Chewing, Dairy cows

Forages & Pastures: Grazing, cultivars, forage management

W229 Nutritional quality of twenty alfalfa (*Medicago sativa* L) cultivars from Embrapa's Brazil germplasm bank. H. Carneiro*¹, M. de A. Botrel¹, F. de S. Sobrinho¹, and M. Villaquiran², ¹EMBRAPA, CNPGL, Minas Gerais, Brazil, ²E (Kika) de la Garza American Institute for Goat Research, Langston University, Langston, OK..

Alfalfa is one of the most important forages in the world for dairy cattle production because of its high nutritional value. Although there are many studies on cultivated alfalfa in temperate regions, studies on the nutritional quality of alfalfa under tropical conditions are scarce. Recently, Embrapa, Brazil's national agriculture research service, has initiated alfalfa breeding studies and developed several cultivars. The objective of this research was to evaluate the production and nutritional quality of the Embrapa alfalfa germplasm bank under tropical conditions, specifically in the Zona da Mata region of Minas Gerais state in Brazil. Twenty alfalfa cultivars were evaluated over a 2-yr period in a randomized block experimental design with three replications and five different harvest intervals for nutritional quality and 18 harvest intervals for production determinations. Data were analyzed statistically for the effects of cultivars, harvest interval and the interaction. There were significant differences among cultivars for forage production ($P < 0.04$), CP content ($P < 0.02$), NDF ($P < 0.05$), and in vitro and in situ digestibility ($P < 0.05$), but not differences were found in lignin ($P > 0.05$). These results indicate that Crioula CNPGL1, P 58N58, and F 686, were superior for dry matter production, crude protein and neutral detergent fiber. The Embrapa alfalfa cultivar Crioula CNPGL1 was 14% more productive than P58N58 ($P < 0.05$) and 20% more productive than for F686 ($P < 0.05$). The superior production and quality of the Crioula CNPGL1 alfalfa cultivar reflect good adaptability to soil and environmental conditions of the Zona da Mata area. Therefore, it is evident that potential exists for immediate utilization of these cultivars in this area; however, further studies are needed for different soils types as well as field-testing by producers.

Key Words: Alfalfa, Nutrition Quality, Tropics

W228 Behaviors of transition dairy cows and heifers. K. J. Daniels*, J. R. Townsend, S. S. Donkin, E. A. Pajor, A. G. Fahey, and M. M. Schutz, Purdue University, West Lafayette, IN.

Management strategies are critical for a successful transition period and may differ for cows and first calf heifers. The objective of this study was to compare behaviors between transition cows and heifers, emphasizing feeding behaviors and the relationship of these behaviors with DMI and milk yield. Five multiparous Holstein cows (C) and five Holstein heifers approaching first calving (H), were housed in tiestalls from 28d prior to expected calving and provided feed *ad libitum*. The C and H were videotaped 24 h/d, using time-lapse video recording, beginning 15d prior to expected calving until 14d after calving. On d-6, d-2, d2 and d8 relative to actual calving the durations of the following behaviors were measured: standing (S), lying (L), resting (Re), feeding (F), ruminating (R) and ruminating while lying (RL). Daily DMI and postpartum milk yield were recorded. The model selected for analyses included effects of parity group (C and H), day and interactions. There were no significant differences between C and H in L, F or RL. For both parity groups, L ($P < .01$) differed across d and there were d by parity group interactions for F ($P < .05$) and RL ($P < .01$). For all animals, L decreased through d2 and then increased on d8. For C, F decreased through d2 and then increased on d8; while for H, F increased until d-2, decreased at d2 and then increased on d8. Through d2, RL decreased for C and then increased on d8; but for H, RL did not decrease until d2 and then increased on d8. As expected, C had greater milk yield ($P < .05$) and DMI ($P < .01$) than H. Milk yield on d8 was significantly affected by Re on d-6 ($P < .01$). The DMI on d8 was significantly affected by F on d2 ($P < .01$). Behaviors, DMI and milk yield differed for transition C and H, indicating that managing them differently during the transition period may be beneficial.

Key Words: Dairy cattle, Transition, Behavior

W230 Forage production and quality of triticale cultivars in north Alabama. M. Lema*, E. Cebert, and V. Sapra, Alabama A & M University.

Because of its cold tolerance and double-cropping potential, triticale can play an important role in bridging the feed shortage gap in late fall and winter in north Alabama when other cool season grasses become dormant. Field trials were conducted in 2001 and 2002 at Winfred Thomas Agricultural Research Station (WTARS) and Sand Mountain Agricultural Substation (SMAS) in north Alabama to evaluate the forage yield and quality of six triticale (*X Triticosecale Wittmack*) cultivars (TCL105, TCL111, TX98D955, TX96VT5019, Tritical 498 and Tritical 2700). The cultivars were planted in four replicated 6-row plots 6.1 m long with rows 1.22 m apart in a randomized complete block design. At both locations, TX98D955, TX96VT5019 and Tritical 2700 produced higher ($P < 0.05$) forage DM than the other cultivars (2-yr average of 4,134; 3,851 and 4,063 kg/ha for TX98D955, TX96VT5019 and Tritical 2700, respectively versus 2,744; 3,070 and 3,077 kg/ha for TCL105, TCL111 and Tritical 498, respectively at WTARS and 6,326; 5,974 and 5,938 kg/ha for TX98D955, TX96VT5019 and Tritical 2700, respectively versus 4,531; 3,784 and 4,060 kg/ha for TCL105, TCL111 and Tritical 498, respectively at SMAS). Crude protein, ether extract and gross energy contents were lower ($P < 0.05$) for TCL111 and TCL105. Acid-detergent fiber content was higher ($P < 0.05$) and IVDMD lower ($P < 0.05$) for TCL 105. The cultivars TX96VT5019 and TX98D955 had higher ($P < 0.05$) P content and the cultivars TCL105, TCL111, TX96VT5019 and TX98D955 higher ($P < 0.05$) Ca content than the rest. The cultivars TCL105 and TCL111 were higher ($P < 0.05$) in Mg and lower ($P < 0.05$) in K than the other cultivars. Sulfur was higher ($P < 0.05$) for Tritical 498 and Zn higher ($P < 0.05$) for TCL498, TX96VT5019 and TX98D955. Iron content was lower ($P < 0.05$) for TX96VT5019 and TX98D955 than for the other cultivars.

Key Words: Triticale cultivars, Forage production, Forage quality

W231 Grazing and supplementation effects of lablab (*Lablab purpureus*) on weight gains of St. Croix White hair sheep lambs during the dry season. E. Valencia*, R. W. Godfrey, and S. Weiss, *University of the Virgin Islands, Agricultural Experiment Station.*

Scarcity of guineagrass (*Panicum maximum* Jacq.), particularly during the dry season, is a major limitation to growing small ruminants in the eastern Caribbean islands. Lablab (*Lablab purpureus*) is a fast growing and high yielding semi-annual forage legume, but its potential as an animal feed for grazing or supplementation has not been documented. The feeding value effect of lablab on ADG of weaned lambs (15 kg BW) during June-August 2002 (dry season) was investigated. Treatments were unrestricted grazing of guineagrass supplemented with lablab (SL; 0.5% animal liveweight on a dry matter basis), unrestricted grazing of both guineagrass and lablab (GL), and unrestricted grazing of guineagrass (control) in a randomized complete block with two replicates. Lambs (n = 4) grazed pastures (.14 ha) and were supplemented for a 96-d period, after a preliminary adjustment feeding period of 14-d. Lambs were weighed weekly throughout the trial. Herbage mass (HM) was estimated in five .25m² areas in each paddock every 21-d. Data were analyzed using GLM procedures of SAS and mean separation when significant was conducted with LSMEANS. There were significant differences (P < 0.05) among treatments ADG. There was a four-fold increase in ADG for GL (72.8 ± 6.2 g/d) compared to the control (18.5 ± 6.9 g/d). Average daily gain of lambs on GL was also much higher than SL (36.4 ± 6.4 g/d). There were differences among treatments for HM (P < 0.05). At season end, HM on offer for GL (3.64 ± 0.3 Mg/ha) was two-fold higher than SL (1.9 ± 0.3 Mg/ha) and control (1.3 ± 0.3 Mg/ha). These results indicate that weight gains of St. Croix White lambs can be increased with summer grazing or supplementation of lablab. The increased weight gains observed with unrestricted grazing of lablab justify its establishment as a special purpose pasture for use with weaned lambs during the dry season.

Key Words: Grazing, Supplementation, Sheep

W232 Horse preference for alfalfa-grass hay harvested in afternoon or morning. L. C. MacKay*¹, H. F. Mayland², and W. P. MacKay³, ¹(H.S. Student) *Los Altos, El Paso, Texas*, ²USDA-ARS, *Kimberly, Idaho*, ³University of Texas, *El Paso, Texas*.

Cattle, sheep, and goats, prefer forage cut in the afternoon to that cut in the morning, presumably because of the greater sugar concentration. However, no quantitative studies have been reported for horses. We tested horses' preference for PM- vs. AM-cut alfalfa-grass hay grown in southeastern Montana. Hay consisted of 70% Grimm alfalfa at 15% bloom and 30% Fairway crested wheatgrass. The hay was cut on July 5, 2002 at 1900 hr and again the next morning at 0700 hr using a swather equipped with a conditioner. Hay was air-dried for 24 h and baled into 300 kg round bales, stored on pallettes, tarped, and placed under a metal hay shed. Five kg of each hay were offered ad libitum to each of five American Quarter horses for 10 minutes. Feeding was replicated twice a day for four days and was performed with random sequencing of horses and positioning of the hay buckets placed on the ground. Dry matter intake was determined by weighing before and after feeding. Four samples of each bale were dried in a convection oven at 60°C for two weeks, then ground into a fine powder. Each 1-g sample was combined with 9 ml distilled water, boiled for 5 min., and vacuum filtered through Whatman #1 qualitative paper. Sugars in the filtrate were determined using a Bausch and Lomb 400SD refractometer having range of 0 - 60%. Data were tested with analysis of variance. Horses preferred the PM-cut hay (P = 0.001) which had a significantly higher concentration of sucrose (P = 0.038). Horses were able to identify the forage having the greater concentration of sugar and ate larger quantities of that hay.

Key Words: Horse, Hay, Preference

W233 Rabbit preference, intake and digestibility of afternoon- or morning-cut alfalfa hay fed ad libitum as pellets. H. F. Mayland*¹, J. C. Burns², and B. E. Mackey³, ¹USDA-ARS, *Kimberly, ID*, ²USDA-ARS, *Raleigh, NC*, ³USDA-ARS, *Albany, CA*.

Ruminants show a preference for afternoon- versus morning-cut forage, which is likely a response to accumulated sugars during daylight. We

determined rabbit (*Cuniculus oryctolagus*) preference, intake and digestibility of pelleted alfalfa (*Medicago sativa*) hay that was cut either in the afternoon (PM) or in the morning (AM). Preference was determined by *ad libitum* feeding of both hays for 21 days. Dry matter intake of each hay, when fed alone, was determined in a cross over design for two consecutive 2-week periods followed by a one-week period. Apparent dry matter digestibility was determined by daily fecal collections for three consecutive days. Animals had free access to trace mineral salt and fresh water. Feed allocations were replaced daily and subsamples of forage and refusals were composited by group and week for analyses. Rabbits strongly preferred the PM pellets, which formed 95, 97, and 98% of their diet during weeks 1, 2, and 3 respectively. When not given a choice, rabbits ate the same amount of each feed (p=0.54). Rabbits, during the final week, had a dry matter intake of 6.7% of body weight. The apparent dry matter digestibility, as measured by the rabbits, was 640 g kg⁻¹. Like ruminants, rabbits could sense the difference between the afternoon- and morning-cut hays, but contrary to ruminants, rabbits ate the same amount of each hay when not given a choice.

Key Words: Rabbits, Hay pellets, Preference

W234 Effect of previous exposure of sheep to monoterpane odors on intake of alfalfa pellets treated with camphor or α -pinene. R. E. Estell*¹, E. L. Fredrickson¹, D. M. Anderson¹, K. M. Havstad¹, and M. D. Remmenga², ¹USDA, *ARS, Jornada Experimental Range, Las Cruces, NM*, ²New Mexico State University, *Las Cruces, NM*.

Lambs were exposed to aromas of two monoterpenes that had previously been found to decrease intake to determine if exposure during feeding modified effects of these terpenes on subsequent intake. Two experiments were conducted using a split plot design. Thirty-six ewe lambs (mean BW = 23.1 and 42.2 kg in Exp. 1 and 2, respectively) were grouped alfalfa pellets (4% of BW, DM basis) in enclosed portable buildings (3.0 x 3.7 m) for 2 h each morning for 56 d. Nine lambs were randomly assigned to each of four buildings, and the appropriate chemical (25 g of camphor in Exp. 1 or 50 ml of α -pinene in Exp. 2) was placed in a mesh-covered container in the center of the feeder in two buildings immediately before feeding (two buildings served as controls). After the 8-wk exposure period, lambs were individually fed alfalfa pellets (640 g, DM basis) for 20 min each morning for 10 d (5-d adaptation, 5-d intake measurement) in a metabolism building. Treatments were sprayed on alfalfa pellets at levels representing the concentration of that chemical in *Flourensia cernua* or at 10-fold that concentration. Controls received ethanol carrier only. Lambs were fed in three groups (n = 12), stratified such that one lamb from each building was placed on each treatment in each group. Lambs were housed as one group and fed alfalfa pellets at 5% of BW (DM basis) except during the 20-min tests. No day effect was detected for intake with either chemical (P > 0.05); therefore, data for collection periods were pooled across day. Exposure to the volatile aroma for 8 wk had no effect on intake during the 10-d interval for either monoterpene (P > 0.05). Moreover, intake during the 10-d interval was not affected by treatment concentration (P > 0.05). Neither concentration of the terpene applied to feed nor previous exposure to the volatile aroma from camphor or α -pinene altered feed intake under the conditions of this study.

Key Words: Intake, Sheep, Terpene

W235 Effects of polyethylene glycol and feed blocks on carbohydrate fermentation of woody species. A. Boubaker¹, C. Kayouli¹, and A. Buldgen², ¹Institut National Agronomique Tunis, ²Faculté des Sciences Agronomiques Gembloux Belgique.

In vitro gas production and organic matter (OM) fermentation were investigated using a closed fermenter containing rumen contents from four goats receiving 70 % of oat hay and 30 % of concentrate. Six shrub species were incubated separately (*Erica arborea*, *Phillyrea angustifolia*, *Pistacia lentiscus*, *Myrtus communis*, *Quercus suber* and *Viburnum tinus*). Vetch oat hay was used as a reference for tannin-free forage. The effects of polyethylene glycol (PEG 4000) and feed block supply were investigated on the mixture of these shrubs. Feed blocks contained (crude weight basis) wheat bran (38%), wheat flour (10 %), molasses (10%), salt (10%), urea (10%), quicklime (15%), dicalcium phosphate (5%), mineral and vitamin supplement (2%). All studied species were

relatively low in crude protein (59-91 g/kg dry matter) and high in fibre (ADF: 266-407 g/kg dry matter). There were differences in volume of gas produced after 72 h with *Viburnum tinus* producing the highest volume (77.8 ml/g OM) and *Quercus suber* (27.4 ml/g OM) producing the lowest. However, all shrubs species showed less fermentation activity than hay (96 ml/g OM). Volume of gas production, rate of fermentation, volatile fatty acid production and organic matter fermentation were increased ($P < 0.05$) by the addition of PEG. The rate of such increase was relatively low with feed block addition. However, both PEG and blocks addition had greater effects on VFA and OM fermented than on gas production.

Key Words: Shrubs, Gas production, Feed blocks

W236 Effects of windrowed or baled forage on forage quality and beef cattle production during the winter. V. Nayigihugu^{*1}, A. D. Schleicher¹, B. W. Hess¹, D. W. Koch², and J. W. Flake², ¹Department of Animal Science, ²Department of Plant Science, University of Wyoming.

The objectives of this study were to determine the effects of previous windrow grazing on forage production, forage quality of hay left in windrows or harvested as bales, and BW change of cows offered each forage type during a winter feeding period. Windrow grazing occurred on two meadows (16.2 and 10.1 ha) during the winter of 2000. Samples were collected every 1.22 m perpendicular to the center of the previously grazed windrow in the spring and the summer of 2000, after which the meadows were harvested. Windrows were combined together to double windrow size. On one half of each meadow, all bales were removed, while on the other half, alternate windrows were baled and removed. Forage samples were then collected once monthly until January 2001. Beginning in November, 54 pregnant cows (BW = 551 ± 16.9 kg) were assigned to windrowed or baled forage for 42 d (16.2-ha meadow = 13 cows/treatment and 10.1-ha meadow = 14 cows/treatment). Forage DM production in the spring was greater ($P < 0.0001$) at 2.44 and 4.88 m compared to where the windrow was grazed the previous year, but this effect was not observed ($P = 0.39$) in the summer. Acid detergent fiber of forage left in windrows was greater ($P = 0.05$) than baled forage from September through January. Estimated DMD was greatest ($P = 0.05$) at harvest and declined more progressively for windrowed forage than baled forage. Forage NDF ($P = 0.09$) and CP ($P = 0.08$) tended to be greater for forage left in windrows compared to forage harvested as bales. Cattle offered windrows lost BW while cattle fed baled hay gained BW, resulting in lower ($P < 0.0001$) ADG for cattle grazing windrows compared to cattle fed baled forage. The reduction in forage nutrient content observed for forage left in windrows appeared to result in reduced production by cows grazing windrowed forage.

Key Words: Cattle, Forage, Grazing

W237 Performance comparison of three hay rake designs. W. A. Greene^{*}, D. A. Munn, and G. L. Sautter, *The Ohio State University, Wooster USA.*

The main objective was to compare the drying efficiency and nutritional value of baled hay resulting from three types of hay rake (bar, rotary, wheel). Dry matter (DM), crude protein (CP), and neutral detergent fiber (NDF), determined by wet chemistry methods, were used for these comparisons. First and second cuttings were harvested from a twenty acre mixed (orchardgrass/alfalfa) and a twenty acre alfalfa field. Hay was mowed with a 12 ft. disc-mower conditioner. The six outside swaths of each field were not included in the trial. Alternate swaths of the hay used in the trial were assigned to each of the three rakes. Representative pre-raking samples were obtained for chemical analyses from the first cuttings. Hay was baled into large round bales with a fixed chamber baler. Within 24 h after baling, representative samples were taken from each bale for chemical analysis (DM, CP, NDF). Although there were no significant differences ($P > .05$) for pre-raking and post-baling chemical analyses, there tended to be a loss in nutritional value during the raking and baling processes for the alfalfa hay (5.0% lower CP, 6.4% higher NDF). In general, type of rake had little effect on dry matter, crude protein, and NDF of either the mixed or the alfalfa baled hay.

Rake	n	1st cutting mixed hay			2nd cutting mixed hay			
		%DM	%CP	%NDF	n	%DM	%CP	%NDF
Bar	4	83.4	9.0	61.9	1	79.4	16.2	40.3
Rotary	4	82.9	9.6	63.9	1	80.9	16.3	40.3
Wheel	4	82.8	8.9	67.7	2	80.5	16.3	38.8
P		.26	.08	.28				

Rake	n	1st cutting alfalfa hay			2nd cutting alfalfa hay			
		%DM	%CP	%NDF	n	%DM	%CP	%NDF
Bar	2	83.2	16.2	49.2	6	75.2	16.1	36.6
Rotary	5	81.5	15.4	48.3	6	74.8	15.6	38.7
Wheel	3	82.5	14.5	50.6	6	74.4	15.6	38.0
P		.20	.43	.41		.57	.07	.03

W238 Effect of weaning date and pasture rotation frequency on performance by fall calving cows grazing tall fescue pastures - 2-year summary. K. P. Coffey^{*}, W. K. Coblenz, T. F. Smith, D. A. Scarbrough, D. S. Hubbell, III, B. C. McGinley, J. E. Turner, and C. F. Rosenkrans, Jr., *University of Arkansas, Fayetteville, AR.*

Many management-oriented recommendations are available presently to reduce the impacts of grazing *Neotyphodium coenophialum* - infected tall fescue pastures (IF). Our objective was to evaluate the impact of pasture rotation frequency (twice monthly = 2X vs. twice weekly = 8X) and weaning date (early April = EARLY vs. late May = LATE) on performance by fall-calving cow-calf pairs grazing IF mixed with crabgrass. Sixty cows (495 ± 9.6kg initial BW) were allocated randomly by BW and age to one of eleven IF pastures initially. Pasture groups were allocated randomly to either 2X or 8X and half of each rotation frequency were allocated randomly to EARLY or LATE weaning dates in a 2 x 2 factorial treatment arrangement. Open cows were replaced at the start of the breeding season with first-calf heifers with calves. Cow weights, milk production, and quantity of hay offered did not differ ($P > 0.10$) between weaning dates or rotation. Cow BCS at calving did not differ ($P > 0.10$) across treatments, but were higher ($P < 0.05$) from 2X vs. 8X at breeding. On the date EARLY calves were weaned, EARLY managed in a 2X rotation were heavier ($P < 0.05$) than LATE from a 2X rotation or EARLY from an 8X rotation. As expected, however, actual weaning weight was lower ($P < 0.05$) from EARLY vs. LATE, but was not impacted ($P > 0.10$) by rotation frequency. On the late-May weaning date, LATE were still 40 kg heavier ($P < 0.05$) than EARLY, although EARLY had approximately 56 d to recover from weaning. Adjusted 205-d weaning weights did not differ ($P < 0.10$) across treatments. Therefore, at the end of the second calf cycle, rotational grazing management has had no impact on forage species composition and cow or calf performance. Calves weaned in April weighed substantially less, even in late May, when later-weaned calves were weaned, implying a high level of stress in response to the April weaning.

Key Words: Tall fescue, Cattle, Forage management

W239 Effect of weaning date and pasture rotation frequency on post-weaning performance by fall-born calves grazing tall fescue pastures - 2-year summary. K. P. Coffey^{*}, W. K. Coblenz, T. F. Smith, D. A. Scarbrough, D. S. Hubbell, III, B. C. McGinley, J. E. Turner, and C. F. Rosenkrans, Jr., *University of Arkansas, Fayetteville, AR.*

Weaning fall-born calves grazing *Neotyphodium coenophialum* - infected tall fescue pastures (IF) in April (EARLY) rather than late May (LATE) has had serious negative effects on calf weight, even when measured 56 d later. The objective of this study was to evaluate long-term implications of weaning calves from IF pastures managed using a twice monthly (2X) vs. twice weekly (8X) rotation schedule in April vs. waiting until late May or early June. A total of 113 Gelbvieh-sired calves were vaccinated against 7 *Clostridial* strains, IBR, BVD, PI₃, and BRSV 28 d prior to weaning and received a booster vaccination 14 d later. At weaning, calves were gathered at approximately 0800h from their respective pastures, weighed, commingled, and transported directly to a local auction facility. Calves were weighed at the auction facility at approximately 1700, returned to the research station the following morning, and placed in drylots and fed alfalfa hay and 0.9 kg/hd daily of ground corn for 21 d. At the end of the receiving period, calves were grazed as a group on

common bermudagrass pastures. Total BW loss to the auction barn was greater ($P < 0.05$), ADG during the subsequent 21-d receiving period was lower ($P < 0.05$), and time required to recover weight loss was longer ($P < 0.05$) from LATE vs. EARLY, but percentage shrink did not differ ($P > 0.10$) among weaning or rotation treatments. Heifer BW was 58 kg greater ($P < 0.05$) at breeding from LATE calves. Steers previously managed in a 8X rotation schedule and weaned LATE were heavier ($P < 0.05$) at the time they were shipped to a feedlot than EARLY steers. Steers weaned EARLY from a 8X rotation weighed less ($P < 0.05$) than the other treatment groups. Therefore, rotation frequency had little impact on post-weaning calf performance, but weaning fall-born calves in mid-April proved to have serious negative impacts on long-term animal growth performance.

Key Words: Tall fescue, Cattle, Weaning

W240 Performance of cow/calf pairs grazing common crabgrass. D. W. Sanson^{*1}, E. K. Twidwell², and B. C. Venuto³, ¹LSU Ag. Center, Rosepine Research Station, Rosepine, ²LSU Ag. Center, Agronomy Department, Baton Rouge, ³LSU Ag. Center, Southeast Research Station, Franklinton.

Performance of cows and calves grazing crabgrass was evaluated in each of two summers in Southwest Louisiana. Crabgrass was established in mid May each year by planting 3.36 kg of seed plus 52 kg of 8-24-24 fertilizer per ha. When the crabgrass was approximately 7.5 cm high, 67 kg of N was applied per ha. Control pastures also received the same amount of N at this time. Control pastures in Year 1 were bahiagrass and were combinations of common bermudagrass and bahiagrass in Year 2. Cow/calf pairs were stratified by weight and randomly assigned to either crabgrass or control pastures. Cows and calves were weighed on two consecutive days at the start and the end of each experiment. Cows were scored for condition at the time they were weighed. In Year 1, 120 cow/calf pairs were used, with six 10-cow groups on each treatment. In Year 2, 140 cow/calf pairs were used, with seven 10-cow groups on each treatment. In both years, the stocking rate was 2.5 cow/calf pairs per ha. Cow/calf pairs were placed on crabgrass on June 13 during Year 1 and were grazed for 78 days. In Year 2, grazing did not begin until July 2. This delay was due to a lack of moisture needed for germination and growth of the crabgrass and resulted in a 58-day grazing period. Both trials were terminated at the end of August so the ground could be prepared for ryegrass planting. Cows grazing crabgrass gained 10 ± 4 kg during Trial 1, while the cows grazing bahiagrass lost 21 ± 4 kg ($P < .05$). Calves that grazed crabgrass in Trial 1 had higher weight gains than those grazing bahiagrass ($P < .05$). The weight gain of calves grazing crabgrass was 76 ± 2 kg during the 78-d period while the calves grazing bahiagrass gained 52 ± 2 kg. In Trial 2, cows grazing crabgrass had higher ($P < .05$) weight gains and body condition scores than cows grazing bahiagrass pastures. Calves grazing pastures planted to crabgrass also had higher gains ($P < .05$) than calves grazing the control pastures.

Key Words: Beef cattle, Crabgrass, Bermudagrass

W241 Effects of corn or soybean hulls supplementation to bermudagrass hay on ruminal *in situ* disappearance of DM, NDF, ADF and CP of hay, corn and soybean hulls. V. T. Nguyen^{*}, I. A. Orr, B. J. Rude, and D. G. St. Louis, Mississippi State University, MS.

Six ruminally fistulated crossbred steers (181 ± 23.9 kg) were randomly assigned in a 3X3 Latin square design with replication to compare the effects of corn or soybean hulls supplementation on ruminal *in situ* disappearance of bermudagrass hay, corn or soybean hulls. Steers were fed either low quality bermudagrass hay (BG), hay and corn at 0.445 % body weight (BGC) or hay and soybean hulls at 1.16 % bodyweight (BGH). Hay, corn or soybean hull samples were ruminally incubated for 2, 4, 6, 8, 16 and 24 hours. At time 2 and 4, hay DM disappearance for BG was less ($P < .05$; 17.63 and 18.69 %, respectively) than for BGC (18.26 and 19.33 %, respectively) or for BGH (18.43 and 19.81 %, respectively). At time 8, hay DM disappearance for BGH was 24.11 %, greater ($P < .05$) than BG (22.52 %) and BGH (22.63 %). Both DM disappearance values for corn (34.8, 36.10, 40.84, 47.49, 54.42 and 64.01 %) and for soybean hulls (22.79, 26.79, 29.77, 37.42, 46.61 and 56.12 %) for time 2, 4, 6, 8, 16 and 24, respectively, were greater than hay at all times ($P < .05$). Hay NDF disappearance at time 2, 4, 6, 8, 16 and 24 for BG was 3.93, 4.81, 6.55, 10.27, 18.90 and 22.05 %, whereas it was 4.15, 5.47,

7.69, 9.25, 17.10 and 24.81 % for BGC and 4.10, 6.33, 7.88, 11.68, 17.58 and 25.48 %, respectively, for BGH, with differences ($P < .05$) among treatments found only at time 2 and 4. Compared to hay NDF, soybean hull NDF disappeared at a faster rate ($P < .05$; 8.60, 12.84, 15.81, 18.31, 30.02 and 42.31 % at time 2, 4, 6, 8, 16 and 24, respectively). There were no differences ($P > .05$) in hay ADF disappearance between BG and BGC. However, it was enhanced ($P < .05$) for BGH at time 6, 8 and 16. Hay CP disappearance was the same ($P > .05$) among treatments. When hulls were supplemented, ruminal *in situ* disappearance of DM, NDF and ADF of hay was improved. Based on these results, low quality forage utilization may be enhanced when soybean hulls are supplemented.

Key Words: *In situ* disappearance, Low quality bermudagrass hay, Soybean hulls supplement

W242 Effect of wintering period growth rate on finishing growth rate, final weight and carcass parameters from forage or high concentrate finished cattle. J. P. S. Neel^{*1}, J. P. Fontenot², W. M. Clapham¹, and S. K. Duckett³, ¹USDA-ARS, AFSRC, Beaver, WV, ²Virginia Tech, Blacksburg, ³The University of Georgia, Athens.

Seventy two English-type crossbred steer calves were used to compare growth rate, final weight and carcass parameters from cattle finished on forage (FOR) or high concentrate (CON), after being wintered at low (LOW, ADG = 0.36 kg), medium (MED, ADG = 0.55) or high (HIGH, ADG = 0.82) growth rates. Steers were harvested on the same dates, across treatments, at a commercial meat plant. Data were analyzed as a 3 x 2 factorial design with winter treatment, finishing treatment and two-way interaction in the model. Steer ADG during finishing was greater ($P < .01$) for LOW than HIGH and tended to be greater ($P < 0.10$) for MED than HIGH wintering treatments. Animals had greater ($P < 0.001$) ADG for CON than FOR. Final weight (FW) was greater ($P < 0.05$) for MED and HIGH than LOW wintering treatments and greater ($P < 0.001$) for CON than FOR. Carcass weight (CW) was greater ($P < 0.05$) for MED and HIGH than LOW and tended to be greater ($P < 0.10$) for HIGH than MED. Animals finished on CON had greater ($P < 0.001$) CW than FOR. Wintering treatment did not influence ($P > 0.10$) dressing percentage (DP), yield grade (YG), rib fat (RF), ribeye area (REA) or percent kidney, pelvic and heart fat (% KPH), however quality grade (QG) was greater ($P < 0.01$) for HIGH than LOW and tended to be greater ($P < 0.12$) for HIGH than MED. Animals finished on CON had greater ($P < 0.001$) ADG, FW, CW, DP, YG, QG, RF, REA and % KPH. Wintering steers on the LOW treatment resulted in greater ADG during the finishing period, and lower CW and QG than HIGH but did not influence other carcass characteristics. Finishing cattle on CON resulted in greater ADG, FW, CW, DP, YG, QG, RF, REA and % KPH.

Key Words: finishing, forage, wintering

W243 Comparative performance of yearling crossbred beef heifers grazing three cool-season grass species under irrigation in northern Utah using management intensive grazing practices. C. A. Fitzgerald, R. D. Wiedmeier^{*}, P. R. Schmidt, B. A. Kent, and J. L. Walters, Utah State University, Logan, Utah.

The carrying capacity of irrigated pastures established with monocultures of three cool-season grass species was determined using yearling crossbred beef heifers. Six adjacent 0.5-ha paddocks were established with three grass species, two paddocks/species: orchard grass (OG) (*Dactylis glomerata*, "Ambassador"), tall fescue (TF) (*Festuca arundinacea*, "Fawn") and perennial ryegrass (PRG) (*Lolium perenne*, "Moyie"). Sixty yearling, crossbred beef heifers (360 kg) were stratified into six groups of 10 heifers each. One group was randomly assigned to each of the six paddocks. Grazing commenced in late May and concluded in late September. Flood irrigation and fertilization of paddocks occurred between five grazing periods during the grazing season. The number of heifers assigned to each paddock was adjusted at the beginning of each grazing period depending on forage availability. Management intensive grazing was used allowing the heifers a fresh pasture allotment each 24 hours. Pasture allotment size was adjusted daily to allow heifer ad-libitum intake with an 8 cm post-grazing stubble height.

Clip plots were taken daily to determine DM availability of each paddock allotment. Heifers were weighed before and after each 24 d (approximately) grazing period. Heifers consuming PRG consumed slightly more DM than those consuming TF (9.7 vs 9.5 kg/h/d, $P = 0.005$). Intake of OG was intermediate, 9.6 kg/h/d. No difference in ADG resulting from grass species could be detected ($P > 0.05$). All heifers were gaining BW at an acceptable rate (1.2 kg/d). The carrying capacity of OG and PRG did not differ (194 vs 129 grazing d/ha, respectively, $P > 0.05$). The TF exhibited increased carrying capacity compared to OG (264 vs 194 grazing d/ha, respectively, $P > 0.05$) and PRG (264 vs 129 grazing d/ha, respectively, $P < 0.05$). Based on the results of this study, TF is superior to either OG or PRG for irrigated pasture in northern Utah for development of yearling beef heifers.

Key Words: Grazing, Heifers, Carrying capacity

W244 Influence of turning cows out to pasture on fatty acid profile of milk. R. C. Khanal*, T. R. Dhiman, and R. L. Boman, *Department of Animal, Dairy and Veterinary Sciences, Utah State University.*

Five late lactation Holstein cows milking an average of 25.4 ± 6.4 kg/d were used to study the influence of turning cows out to pasture on fatty acid profile of milk. The 45-d experiment was divided into 3 phases. During first 2 d (Phase 1) of the experiment cows were fed TMR containing 50% forage and 50% grain mix, from 3-31 d (Phase 2) cows were grazed on a predominantly ryegrass pasture with no grain supplementation, and from 32-45 d (Phase 3) cows were fed a diet similar to phase 1. Milk yield was recorded daily. Daily milk fat content and fatty acid profile was determined for samples collected from both a.m. and p.m. milkings. Spline regression was performed to determine the changes in fatty acid profile during different phases. Cows produced an average of 25.2 ± 6.1 , 14.0 ± 4.8 , and 11.2 ± 5.6 kg/d of milk with 3.4, 4.0, and 3.6% fat in phase 1, 2, and 3, respectively. The CLA content was 4.54 mg/g of fat in phase 1 and reached a maximum of 25.3 mg/g of fat on d 25 of the experiment. No significant change ($P > 0.05$) occurred thereafter in phase 2. The $C_{18:1t-11}$ content was 28.9 mg/g of fat in phase 1 and reached a maximum of 79.5 mg/g of fat on d 24 of the experiment with no significant change thereafter ($P > 0.05$) in phase 2. The $C_{18:2}$ fatty acid declined gradually with no further decrease observed after d 24 ($P > 0.05$) of the experiment while $C_{18:3}$ increased significantly ($P < 0.05$) with no further increase after d 9 ($P > 0.05$) of the experiment in phase 2. The CLA content in milk fat reached the value similar to phase 1 within d 5 once cows were taken off the pasture with no change thereafter ($P > 0.05$). There was no significant change ($P > 0.05$) in other fatty acids after d 7 once the cows were moved to phase 3. In the present study it took 23 days to establish the highest level of CLA in milk fat after cows were turned out to pasture for grazing with no grain supplementation. Other fatty acids were also stabilized near d 23 after turn out of cows to pasture.

Key Words: CLA, Pasture, Cows

W245 Consumer acceptability characteristics of conjugated linoleic acid (CLA) enriched milk and cheese. R. C. Khanal*¹, T. R. Dhiman¹, C. Brennand¹, R. L. Boman¹, and D. J. McMahon¹, ¹Utah State University.

Consumer acceptability characteristics of CLA enriched milk and cheese was studied in two experiments. Experiment 1: 15 cows were randomly assigned either to a diet containing 51:49 forage to concentrate ratio (TMR), grazed on pasture (PS) or PS with 3.2 kg/d of a grain mix containing 75, 10, and 5% of full-fat extruded soybeans, beet pulp,

ground corn, and molasses on DM basis, respectively (ES). Experimental duration was 6 wk with final 3 wk for measurement. Average CLA contents in milk fat were 5.2^b, 16.2^a, and 16.9^a mg/g of fat for TMR, PS, and ES diets, respectively. Milk from wk 4 to 6 was used for consumer acceptability characteristics. Experiment 2: 18 cows were randomly assigned either to a TMR, PS, or PS with 3.2 kg/d of full-fat extruded soybeans (ES) diet. Cheese was manufactured from the milk collected during wk 4 to 6 of the experiment. Cheese had 4.7^b, 15.7^a, and 14.6^a mg of CLA/g of fat for TMR, PS or ES diet, respectively. An open panel of consumers (n=75) evaluated CLA enriched milk (mouth-fill, color, flavor, and overall quality) and cheese (color, flavor, texture, and overall quality) from experiment 1 and 2, respectively on a hedonic scale of 1-9. A trained panel evaluated the milk (n=8) and cheese (n=7) for evenness of color, flavor, and overall quality in a scale of 1-10. There were no significant differences ($P > 0.05$) among treatments for any of the parameters studied for milk and cheese by both open and trained panels except for oxidized flavor in cheese. Trained panel scored significantly lower ($P = 0.04$) for oxidized flavor in cheese from ES treatment (2.6) compared to either of the cheese from TMR (2.9) or PS (3.0) treatments. In conclusion, CLA enriched milk and cheese were similar in color, flavor, and consumer acceptability characteristics except for oxidized flavor in cheese made from the milk of cows fed full-fat extruded soybeans while on pasture.

Key Words: CLA, Milk and cheese, Consumer acceptability

W246 Influence of genotype, heading date and cutting date on fatty acid composition of ryegrass. V. R. Loyola*^{1,3}, J. J. Murphy², M. O'Donovan², N. Gowen², M. D. S. Oliveira³, and C. Stanton¹, ¹Teagasc, Dairy Products Research Centre, Moorepark, Fermoy, Ireland, ²Teagasc, Dairy Production Research Centre, Moorepark, Fermoy, Ireland, ³Universidade Estadual Paulista, UNESP, Jaboticabal, Brasil, supported by FAPESP.

Ruminant products are the only significant source of conjugated linoleic acid (CLA) and they are an alternative as a source of omega-3 fatty acids, which may be beneficial components in the human diet. Linoleic and α -linolenic acids in feed are the precursors of these fatty acids in milk and meat. Animals grazing fresh grass have higher levels of omega-3 and CLA in their meat and milk, when compared with those consuming conserved forages. Therefore, it is important to quantify the variation in the precursors of these fatty acids in grasses. Our objective was to evaluate the effects of genotype, heading date and cutting date on the concentration of fatty acids (FA) in perennial ryegrass (*Lolium perenne* L.) cultivars. Ryegrass samples were taken at four cutting dates (22/05, 12/06, 03/07 and 28/08/2000) from a 2x2 factorial experiment in a split-plot design with three replications. The four ryegrass cultivars used were: Millenium, Portstewart, Napoleon and Spelga. Forage samples were freeze-dried and grounded. Fatty acids were methylated using a one-step methylation, and analyzed by gas chromatography. The genotype effect was significant ($P < 0.05$), with tetraploid cultivars resulting in higher total FA concentrations (19.03 g/kg DM), in comparison to diploid cultivars (16.73 g/kg DM). Intermediate heading cultivars presented higher ($P < 0.05$) total FA levels (19.38 g/kg DM), compared to late heading (16.38 g/kg DM). There was also a significant effect of cutting date ($P < 0.01$) on total FA concentrations, with the highest levels 18.52 and 19.97 g/kg DM, found in May and August, respectively. The June and July total FA concentrations, 16.59 and 16.45 g/kg DM, respectively, differed only from August ($P < 0.05$). This work demonstrates the viability of manipulation of ruminant products through management and breeding of grasses, aiming alter its FA levels.

Key Words: Ryegrass, Growth stage, Fatty acids

Extension Education

W247 Consumer response to beef quality assurance certification of producers. J. W. Comerford*¹, J. P. Slayton², and L. Zerby², ¹Penn State University, University Park, PA USA, ²Pennsylvania Beef Council, Middletown, PA USA.

A study was conducted to evaluate the response of consumers to information about beef quality assurance certification training of producers. Two methods were used. First, six focus groups were interviewed after observing three separate informational posters about beef quality assurance training at a mock retail meat case. Secondly, 168 consumers were

interviewed while shopping at the meat case at one of nine retail food stores in central and eastern Pennsylvania. Group interviews revealed that consumers were receptive to information about beef products; implications of "advertisement" and the use of the terms "animal welfare" and "training of producers" were highly negative, while "safety" and "quality" were neutral; some form of validation of the program was positive and desirable; and information should be located on the meat package or within the meat case. Store interviews revealed 74% of consumers thought quality assurance labeling had "some importance" to