the median intercept was identified using the pooled slopes and compared to all other ST intercepts. Seven ST were not different (P>.05) from the median intercept with an average geometric intercept (GI) of 0.20 (AZ, CA, KA, MN, OR, PA, WA). Three ST had a higher average GI of 1.00 (UT, ID, NE), two ST had a lower GI of 0.95 (IL, NY) and two ST had the lowest GI of 3.08. Average GI weighted for the observations in each group was -.19. The slope of ADF versus NDF appears constant throughout the US and variation in intercepts is more likely related to laboratory differences rather than to regional differences in alfalfa. In conclusion, it is possible to identify a geometric relationship between ADF and NDF that can be used to develop uniform alfalfa hay quality guidelines for the US: ADF = -.19 + .80*NDF; n=605, R^2=.90, and RMSE=1.7.

Key Words: Fiber, Forage Quality, Alfalfa

569 Effects of purified fiber energy supplementation on digestion and ruminal parameters of steers fed cool season grass hay. H. M. Blalock* and C. J. Richards, *The University of Tennessee, Knoxville*.

Six ruminally and duodenally cannulated steers were arranged in a replicated 3 x 3 Latin square. Steers had free choice access to cool season grass hay and were supplemented with 0 (NO), 0.25 (LO) or 0.50% (HI) BW of purified fiber (60% solka floc, 40% oat fiber) prior to AM hay feeding. Periods were 18 d. On d 7 to 17, steers were intra-ruminally dosed with Cr_2O_3 followed by total fecal collection from d 12 to 17 and duodenal digesta sampling at 10 hr intervals on d 13 to 17. On d 17, Co-EDTA was ruminally dosed and rumen fluid collected at 0, 3, 6, 9, 12 and 24 hr post-dosing. On d 18, ruminal contents were evacuated, weighed and subsamples retained for bacterial separation. Forage intake and total N intake were not affected by supplementation. Total intake of DM, NDF, ADF and OM were increased ($P < 0.05$) with increased supplementation. Quantities and percentages of total tract DM, NDF, ADF and OM digestion were increased ($P < 0.05$) by supplementation. Ruminal and total tract nitrogen digestion were not affected by supplementation. Ruminal acetate and propionate concentrations were not affected ($P > 0.10$) while butyrate concentrations increased ($P < 0.01$) with supplementation. Isobutyrate, valerate and isovalerate concentrations decreased ($P < 0.01$) with supplementation. However, isobutyrate was not different between HI and LO. Ruminal pH was greatest ($P < 0.01$) for HI. Ruminal NH_3-N concentrations were decreased ($P < 0.01$) by supplementation. A TRT x Time interaction existed ($P < 0.01$) for NH_3-N due to the concentration of NO remaining relatively constant throughout the 24 hr period. Total N flow at the duodenum was not affected by supplementation. This data indicates that supplementing steers consuming cool season grass hay with fibrous energy can increase ruminal and total tract fiber digestion without affecting forage intake.

Key Words: Fiber, Digestion, Ruminant

Nonruminant Nutrition: Amino Acids

570 The optimal true ileal digestible lysine and total sulfur amino acid requirement for nursery pigs between 10 and 20 kg. J. D. Schneider*, M. D. Tokach, S. S. Dritz, R. D. Goodband, J. L. Nelssen, J. M. DeRouchey, C. W. Hastad, N. A. Lenehan, N. Z. Frantz, B. W. James, K. R. Lawrence, C. N. Groesbeck, R. O. Gottlob, and M. G. Young, *Kansas State University, Manhattan*.

An experiment involving 360 pigs (avg BW = 10.3 kg) was conducted to determine the appropriate true ileal digestible (TID) lysine and total sulfur amino acid (TSAA) requirement of nursery pigs, and consequently to determine the optimal TSAA:lysine ratio. This trial was organized as a combination of two separate experiments with one set of diets consisting of five treatments with increasing TID lysine (0.9, 1.0, 1.1, 1.2, and 1.3%) and the second set of diets consisting of five treatments with increasing TID TSAA (0.56, 0.62, 0.68, 0.74, and 0.81%). The highest level of both lysine and TSAA (1.3 and 0.81%, respectively) served as a positive control and this diet was combined as one treatment to give a total of nine treatments. Pigs were randomly allotted to 8 replications with 5 pigs per pen based on BW. Average daily gain increased (linear, P < 0.01), while ADFI decreased (linear, P < 0.06) to 1.3% TID lysine. Increasing TID lysine from 0.9 to 1.3% also improved (linear, P < 0.01; and quadratic P < 0.05, respectively) gain:feed. Increasing TID TSAA from 0.56 to 0.81% increased (linear, P < 0.02) ADG and improved (linear, P < 0.01) gain:feed. Regression analysis of the response surface resulted in an estimated TID TSAA to lysine ratio ranging from 55 to 61% for ADG and 57 to 61% for gain/feed.

	TID	Lysine, %					
Item	0.9	1.0	1.1	1.2	1.3	SED	Linear	Quadratic
ADG, g	494	524	525	519	549	17.306	0.01	0.51
ADFI, g	901	881	872	842	865	36.733	0.06	0.34
Gain/ Feed	0.55	0.59	0.61	0.62	0.63	0.012	0.01	0.05

		TID	TSAA, %					
Item	0.56	0.62	0.68	0.74	0.81	SED	Linear	Quadratic
ADG, g	514	528	545	540	549	17.306	0.02	0.40
ADFI, g	878	868	881	867	865	36.733	0.66	0.88
Gain/ Feed	0.59	0.61	0.62	0.62	0.63	0.012	0.01	0.34

Key Words: Total Sulfur Amino Acids, Lysine, Nursery Pigs

571 The optimal true ileal digestible lysine and threonine requirement for nursery pigs between 10 and 20 kg. N. A. Lenehan[1], M. D. Tokach[1], S. S. Dritz[1], R. D. Goodband[1], J. L. Nelssen[1], J. L. Usry[2], J. M. DeRouchey[1], and N. Z. Frantz*[1], [1]*Kansas State University, Manhattan,* [2]*Ajinomoto Heartland LLC, Chicago, IL*.

A total of 360 pigs (Genetiporc; initially 10.7 kg and 34 d of age) were used in a 17-d growth assay. This trial was conducted as a combination of two separate trials in order to simultaneously examine both the true ileal digestible (TID) lysine and threonine requirements, and determine the appropriate threonine to lysine ratio. The first part of the trial consisted of five treatments with increasing TID lysine (0.9 1.0, 1.1, 1.2, and 1.3%). The second part consisted of five treatments with increasing TID threonine (0.60, 0.66, 0.73, 0.79, and 0.85%). The highest level of both lysine and threonine (1.3 and 0.85%, respectively) served as a positive control and this diet was combined as one treatment to give a total of nine treatments. There were 8 replications with 5 pigs per pen. Both ADG and gain/feed (G/F) increased (quadratic, P < 0.02) to 1.2% TID lysine. For threonine, ADG (linear, P < 0.03) and G/F (quadratic, P < 0.04) increased to 0.79% TID threonine. Using 0.79% TID threonine and 1.2% TID lysine as the requirements yields a TID threonine to lysine ratio of 66% for both ADG and G/F. In summary, these results suggest a TID threonine to lysine ratio of approximately 66% for 10 to 20 kg pigs.

		TID	Lysine,	%				
Item	0.9	1.0	1.1	1.2	1.3	SED	Linear	Quadratic
ADG, g	532	541	587	599	582	19	< 0.01	0.02
ADFI, g	918	870	917	923	896	35	0.81	1.00
Gain/ feed	0.58	0.62	0.64	0.65	0.65	0.01	< 0.01	< 0.01

		TID	Threonine,	%				
Item	0.60	0.66	0.73	0.79	0.85	SED	Linear	Quadratic
ADG, g	563	573	577	603	582	19	0.03	0.26
ADFI, g	924	900	897	923	896	35	0.45	0.64
Gain/ feed	0.61	0.64	0.64	0.65	0.65	0.01	< 0.01	0.04

Key Words: Threonine, Lysine, Nursery Pigs