783   Impacts on growth of beef cattle due to long-term copper deficiency are further exacerbated in the presence of high dietary manganese. S. L. Hansen*, L. R. Legleiter, R. S. Fry, K. E. Lloyd, and J. W. Spears, *North Carolina State University*, *Raleigh*.

A study was conducted to evaluate the effects of long-term copper (Cu) deficiency, either alone or in the presence of high manganese (Mn), on the performance of beef calves. Twenty-one Angus calves were born to cows that had been on one of the following treatments for at least 410 days by calving: 1)10 mg Cu/kg DM from tribasic copper chloride in addition to the basal diet (analyzed 7 mg Cu/kg DM; +Cu), 2) no supplemental Cu and 2 mg molybdenum (Mo)/kg DM (-Cu), and 3) no supplemental Cu, 2 mg Mo/kg DM and 500 mg Mn/kg DM from manganese sulfate (-Cu+Mn). After weaning, calves remained on the same treatments as their dams and were group fed by treatment for a period of 33 days before being individually fed via Calan gate feeders through a 136 day growing phase. The average calf age at weaning was 180 days. Liver biopsies taken when calves were approximately 160 days of age indicated that calves fed low-Cu diets were below the threshold for Cu deficiency (7 and 4 mg Cu/kg DM for -Cu and -Cu+Mn, respectively). Copper adequate calves were heavier (237 kg; $P < 0.05$) at weaning than those fed -Cu (199 kg) or -Cu+Mn (186 kg) diets. Daily gains from birth to weaning were greater ($P < 0.01$) for +Cu calves (1.09 kg) than for -Cu (0.88 kg) and -Cu+Mn (0.82 kg) calves. During the growing phase, ADG was not different between +Cu (1.08 kg) and -Cu (1.05 kg) calves, but was lower (0.86 kg; $P < 0.05$) in -Cu+Mn calves. Dry matter intake during the growing phase did not differ among +Cu (7.36 kg) and -Cu (7.08 kg) calves. However, DMI was lower ($P < 0.01$) in -Cu+Mn calves (5.39 kg) when compared to -Cu calves. Feed efficiency during the growing phase did not differ among treatments. Findings from this study indicate that a low-Cu diet fed to calves prior to weaning adversely affects performance. In addition, the presence of high Mn in diets of Cu-deficient calves further exacerbates the effects of low Cu on growth.

Key Words: Cattle, Copper, Manganese

784   Effects of high B-vitamin supplementation on measures of health and performance of veal calves. D. Wood*[1], J. Sowinski[1], and N. Keith[2], [1]*Animix*, *Juneau, WI*, [2]*Keith Associates*, *Springfield, MO*.

An experiment was conducted to determine effects of enhanced B-vitamin fortification on calf health and performance. Auction sourced Holstein bull calves (n = 110; initial BW = 46 kg; ~1 wk of age) were transferred to the facility, and randomly placed into individual raised, slatted veal stalls. All calves were provided starter formula (22% CP and 16% fat) composed of liquid fat, whey, skim milk, & spray dried plasma, and transitioned to a veal finisher (19.5% CP and 17% fat) at ~40 days. Formulas were fortified with a typical B-vitamin containing, dispersible premix. Calves were randomly assigned to receive one of two treatments, 1) Increased B-vitamin fortification: 9 × B1, B2 and B6; 8 X pant. acid, 6X B12, 7× biotin, 3× folic acid, 2× choline and 4× niacin (B-vit; n = 55), 2) no added supplement, only basal formula (Control; n = 55). Individual calf BW was determined on d 11 and d 62 and individual hanging carcass weights were determined at slaughter. Calf ADG from day 11 − 62 did not differ (P = 0.50) among treatments (0.95 and 0.97 kg/d for Control and B-vit.-Fortified, respectively). Calf ADG from day 11 − 143 (market) did not differ (P=0.75). Individual antibiotic treatments day 11 − 63 were reduced from 1.52 / calf in control to 0.63 / calf in B-vit. (P = 0.101). Incidence of feed refusals day 11 − 63 reduced 23% (P = 0.35) and percentage of calves treated was reduced from 41.8% in control to 25.5% in B-vit (P=0.07). Incidence of re-treatment day 11 − 63 was reduced from 29% in control to 12.7% in B-vit (P=0.035). Mortality and culls to 9 weeks was 1.8% B-vit and 5.3% Control. Weeks 10 − 23 reported no diff. in ADG (1.49 and 1.50 kg/d for Control and B-vit, respectively, P=0.93) or feed refusals (P=0.91). 4 calves (7.2%) died of disease in both treatments during week 10 - 23. Individual antibiotic treatments week 10 − 23 were reduced from 1.79 / calf in B-vit to 1.22 in control (P=0.254). No difference was noted in carcass color or confirmation (P=0.36). Under the conditions reported in this study, additional B-vitamin supplementation improved measures of calf health to week 9 but did not improve health parameters week 10 − 23.

Key Words: Calf, B Vitamin, Vitamin

Ruminant Nutrition: Protein and Fiber Digestion

785   Protein requirements of Nellore bulls, steers and heifers in Brazil. P. V. R. Paulino*[1], S. de C. Valadares Filho[1], M. A. Fonseca[1], K. A. Magalhães[1], M. I. Marcondes[1], M A. de Souza[1], E. Detmann[1], R. F. D. Valadares[1], and R. D. Sainz[2], [1]*Universidade Federal de Viçosa*, *Viçosa, MG, Brazil*, [2]*University of California*, *Davis*.

The objective in this trial was to determine the protein requirements of Nellore bulls, steers and heifers, reared under the same experimental conditions. Forty–seven animals were used (16 bulls, 15 steers and 16 heifers), being fed in individual pens for 112 days, and slaughtered at the end of this period. Eleven animals (4 bulls, 3 steers and 4 heifers) were slaughtered at the beginning of the trial, composing the reference group, which was used to estimate the initial body composition of the animals. The remaining animals were randomly assigned to 6 treatments, in a factorial design, 3 × 2 (3 sexual classes and 2 concentrate allowance levels), with four replicates per treatment. Four animals of each sexual class were designated to the maintenance group. The concentrate allowance levels used corresponded to the allowance of 0.6 or 1.2% of the body weight. The diets were formulated to be isoproteic, with corn silage as the source of roughage. The protein content retained in the body was estimated by a regression equation of the logarithm of the body content of protein on the logarithm of the empty body weight (EBW). The net requirements of protein for 1 kg of empty body gain (EBG) were estimated as the derivative of the regression equation described above. The net protein requirements of EBG decreased as the live weighted increased, being greater for the bulls, intermediate for the steers and lower for the heifers. The retained protein (RP) can be estimated by the equations: RP = 14,78 + 175,86 * EBG − 2,95 * RE (bulls), RP = 25,62 + 139,81 * EBG − 7,43 * RE (steers); RP = 18,13 + 177,27 * EBG − 16,57 * RE (heifers). Bulls had higher net requirements of protein for empty body gain in relation to the steers and heifers, being lower for the heifers in relation to the steers, reflecting the differences observed in the body composition among the three sexual classes. The estimated total requirements of crude protein, for finishing of Nellore cattle, were 12.92; 11.14 and 10.08% of the total dry matter of the diet, for bulls, steers and heifers, respectively.

Key Words: Beef Cattle, Zebu, Protein

786   Digestibility of cottonseed with Tifton 85 hay fed free-choice to beef steers. G. M. Hill*[1], M. H. Poore[2], and B. G. Mullinix, Jr.[1], [1]*University of Georgia, Tifton*, [2]*North Carolina State University, Raleigh*.

Whole cottonseed (WCS) is a supplement for wintering beef cows, but few reports indicate effects of free-choice feeding of WCS. Large beef steers (n=28; 417.2 ± 36.1 kg initial BW) were ranked by BW, randomly assigned to four treatments (7 steers each), and individually-fed diets for 17 d. Dietary treatments included free-choice hay (Tifton 85 bermudagrass; 12.4% CP, 42.6% ADF, 76.8% NDF) and minerals. Dietary treatments included hay with Control supplement [C; 75% ground corn, 25% cottonseed meal (19.9% CP, 14.2% NDF), fed at 2.5 kg/steer daily], or WCS (DM basis: 22.4% CP, 39.2% ADF, 54.7 % NDF, 18.0% crude fat) fed at three levels (LCS, WCS at 0.25 % initial BW; MCS, WCS at 0.5 % initial BW; and FCS, WCS fed free-choice). Chromic oxide (10 g/steer daily; d 8 to d 17) was fed as an indigestible marker, mixed with C supplement, or fed in a carrier (corn=0.25 kg/steer daily) for CS treatments. Fecal samples (11/steer, d 13 to d 17) were analyzed to determine apparent digestion of dietary nutrients. Dietary CP and crude fat (% of DM) based on DMI for C, LCS, MCS and FCS, respectively, were: 14.4, 2.1; 13.6, 3.7; 14.8, 5.7; and 14.5, 5.2. Breed type (BT) of steers [BT1, Angus (n=7) and Angus crossbred (n=8); BT2, Angus x Hereford (n=8); BT3, Hereford steers (n=5)] was used as a covariate ($P > 0.20$; Table). Hay DMI (Table) was reduced for MCS and FCS, and dietary DMI was similar for LCS and FCS, both lower than C or MCS. Inconsistent WCS intake by FCS steers resulted in lower WCS intake and dietary DMI than for MCS. Digestibility of OM was lowest for FCS, intermediate for LCS and MCS; and, ADF and NDF digestibility declined with increasing dietary WCS. The short duration of the trial contributed to DMI adjustment to WCS in MCS and FCS diets.

Table 1.

Item	Control	LCS	MCS	FCS	SE	$P <$
Hay DMI, kg	6.61[a]	6.49[a]	5.89[ab]	5.47[b]	0.29	0.04
Supplemental DMI, kg	2.45[a]	1.20[c]	2.17[ab]	1.91[bc]	0.18	0.01
Dietary DMI, kg	9.09[a]	7.71[b]	8.10[ab]	7.41[b]	0.42	0.05
OM digestibility, %	79.08[a]	76.50[ab]	75.10[bc]	71.70[c]	1.32	0.01
CP digestibility, %	77.17	77.48	77.84	74.30	1.46	0.32
ADF digestibility, %	65.06[a]	65.82[a]	66.07[ab]	57.46[b]	2.04	0.03
NDF digestibility, %	74.04[a]	75.02[a]	71.41[ab]	68.61[b]	1.50	0.03

Key Words: Cottonseed, Steer, Digestion

787   Performance of beef heifers and digestibility of steers fed whole cotton seed, corn gluten feed and pigeon peas. V. A. Corriher*, G. M. Hill, S.C. Phatak, and B.G. Mullinix, Jr., *University of Georgia, Tifton*.

Exp.1: Yearling beef heifers were fed supplements including whole cotton seed [WCS; 1.36 kg/d; 92.6% DM, 22.5% CP, 18.1% crude fat], corn gluten feed [CGF; 1.59 kg/d; 88.2% DM, 22.1% CP], pigeon peas [PP; 1.59 kg/d; 88.9% DM, 21.5% CP], corn/soybean meal as a control [(70% corn, 30% SBM) C/SBM; 1.59 kg/d; 89.9% DM, 30.8% CP], and free-choice corn silage [28.6% DM, 8.3% CP, 39.1% NDF] in feedlot. Supplements contained Rumensin® (200 mg/animal daily) in both experiments. Heifers (n=56) were of Breed Type 1 (BT1, Angus=19, Angus × P. Hereford= 8) or Breed Type 2 (BT2, Brangus=13, Braford= 16). Heifers were ranked by BW (initial BW=249.27 ± 23.72 kg) within BT, and randomly assigned to dietary treatments for 57d. Initial and final BW were means of consecutive daily unshrunk BW. The ADG for heifers tended to be higher for pigeon peas (Table). However, DMI/gain tended to be higher for corn gluten feed compared with other supplements.

Exp.2: Yearling beef steers were fed the same supplements (C/SBM: 2.00 kg/d; WCS: 2.30 kg/d; CGF: 2.30 kg/d; PP: 2.00 kg/d) as in experiment 1, and free-choice bermudagrass hay [92.5% DM, 12.4% CP, 76.8% NDF]. Steers (n=28) were of Breed Type 1 (BT1, Angus=7, Angus X=8), Breed Type 2 (BT2, Angus × P. Hereford= 7, Simmental X=1) or Breed Type 3 (BT3, P. Hereford= 4, Hereford X=1). Steers were ranked by BW (initial BW=450.55 ± 28.21kg) within BT, and randomly assigned to dietary treatments for 14d. Initial and final BW were means of consecutive daily unshrunk BW. Chromic oxide (10g/steer daily, d 5 to d 14) was fed as an indigestible marker and mixed with supplement. Total DMI was higher for whole cottonseed. Crude protein, ADF and OM digestibility were higher for corn gluten feed. Higher digestibility, suggests greater nutrient availability of corn gluten feed for cattle.

Table 1.

Exp. 1	C/SBM	WCS	CGF	PP	SE	$P <$
57-d DMI, kg	5.24[bc]	4.76[c]	5.98[a]	5.67[ab]	0.16	0.03
57-d ADG, kg	0.93	0.79	0.89	1.01	0.10	0.53
DMI/gain	5.90	6.31	6.68	5.61	0.89	0.84
Exp. 2						
Total DMI, kg	6.86[b]	7.44[a]	6.90[b]	7.03[b]	0.12	0.01
Digest. OM, %	76.0[b]	73.7[a]	79.3[a]	74.7[bc]	0.77	0.01
Digest. CP, %	77.7[b]	78.1[b]	81.7[a]	77.2[b]	0.67	0.01
Digest. ADF, %	58.2[bc]	60.1[b]	65.3[a]	55.7[c]	1.46	0.01

Key Words: Steer, Pigeon Peas, Digestibility

788   The rumen passage rate of forage NDF is highly associated only to the level of intake of dietary NDF. A. Cannas*[1], F. Boe[1], V. Giovanetti[2], E. Zerbini[3], and G. Molle[2], [1]*Dipartimento di Scienze Zootecniche, University of Sassari, Sassari, Sardinia, Italy*, [2]*Istituto Zootecnico e Caseario della Sardegna, Olmedo, Sardinia, Italy*, [3]*Cargill Animal Nutrition, Spessa, Italy*.

Cannas and Van Soest (2000) published a prediction equation in which the level of intake of dietary NDF was used to predict the rumen passage rate (Kp) of forages. The two variables were associated curvilinearly. Their prediction model included a second variable (dietary CP concentration) to account for the negative effect of rumen N shortage on Kp. However, in the literature many other independent variables have been used to predict Kp of dietary forages in ruminants. Thus, to elucidate which dietary and animal variables affects the rumen passage rate of forages, 40 dairy ewes (BW 46.8 kg ± 2.9 kg of s.d.) in mid-lactation (5 per treatment kept in metabolic cages) were fed ad libitum 8 different pelleted diets with a large range of variation in NDF concentration (23.9%-45.8%, DM basis). CP concentration was sufficiently high (on average 18.4 % DM) to rule out rumen shortages of nitrogen. Four of the 8 diets (range of NDF= 28.5%-45.8%, DM basis) were also given in rationed amounts (1.19% of BW, DM basis) to dry ewes. Rumen Kp passage rate was estimated supplying a single dose of dehydrated alfalfa, the common and only forage ingredient of all diets, marked with Yb.

Overall, DMI ranged from 489 to 2634 g/d (1.09%-5.77% of BW) and NDF intake from 117 to 1367 g/d (0.29%-2.87% of BW). The best predictor of rumen passage rate of forage NDF was the level of intake of dietary NDF. This predictor was both linearly and curvilinearly associated to forage NDF Kp with equally good statistics: Kp (%/h) = $1.82 \times$ NDFI (% of BW) +2.27; $r^2 = 0.76$, P< 0.001; or Kp (%/h) = 4.23 $NDFI^{0.50}$ (% of BW), $r^2 = 0.76$, P< 0.001. The distribution of the residuals and the regressions based on the treatment means (Kp = 1.84 NDFI + 2.27, $r^2 = 0.93$, P< 0.001; or Kp = 4.29 $NDFI^{0.49}$, $r^2 = 0.95$, P< 0.001) seemed to slightly favour the curvilinear model. No other dietary or animal variables seemed to affect rumen Kp.

Key Words: Passage Rate, Prediction, Sheep

789   Meta analysis of rumen fill of cattle in relation to NDF intake and digestibility. D. J. Sauvant*[1] and D. R. Mertens[2], [1]*AgroParisTech, Paris, France*, [2]*US Dairy Forage Research Center, Madison, WI*.

Rumen fill is related to intake and ruminal digestion. Our objective was to explore if NDF relationships could be used to establish a rumen fill unit system. A database was compiled from 41 published experiments (n=164 treatments) where weights of dry matter (DMru) and NDF (NDFru) in the rumen were measured on various types of cattle. On a live weight (LW) basis, DMru averaged 1.76±0.30%LW and NDFru 0.99±0.22%LW. Dietary NDF averaged 36.0±9.7% of DM and NDF intake (NDFI) averaged 1.10±0.25%LW. As several experimental objectives were included in the database, only global regressions were evaluated. NDFru was related to the ruminal weight of total contents (TWru = 7.68 + 3.44 NDFru, n=156, rmse=1.51 %LW) or DM (DMru = 0.843 + 0.918 NDFru, n=164, rmse=0.22). The major variable related to NDFru was NDFI (NDFru = 0.461 + 0.484 NDFI, n=164, rmse=0.18). The residual variations of this equation (RESNDFru) were compared to variables other than NDFI, which might influence rumen fill. The ratio NDFru/NDFI, which is sometimes used as an index of rumen fill, was closely related with RESNDFru (RESNDFru = -0.76 + 0.83 NDFru/NDFI, n=159, rmse=0.08). There were no relationships between RESNDFru and DM intake; milk yield or composition; dietary NDF, CP, or starch; percentage of concentrate; mean particle size; chewing time or index; rumen fermentations; or fractional outflow rates of particles and liquid. In contrast, NDF digestibility (NDFD = 0.53±0.12) in the whole gut was negatively related with RESNDFru (RESNDFru = 0.988 NDFD - 1.67 NDFD2, n=121, rmse=0.16). Organic matter digestibility, which is correlated to NDFD, was also negatively linked with RESNDFru. For 43 treatments, in situ degradation of NDF of the forage was measured (NDFDis = 0.71±0.21). For these data a curvilinear regression was observed between RESNDFru and NDFDis (RESNDFru = - 1.08 + 4.90 NDFDis - 4.44 NDFDis2, n=43, rmse=0.13), the maximum value being achieved for NDFDis = 0.55. In conclusion, rumen fill is related primarily to NDF intake and secondly to its digestibility.

Key Words: NDF, Digestibility, Rumen Fill

790   Predicting ruminal passage rates of fiber fractions and starch in dairy cattle. J. A. Voelker Linton* and M. S. Allen, *Michigan State University, East Lansing*.

Passage rates of fiber fractions and starch are important factors determining ruminal nutrient digestion, microbial protein production, efficiency, and flow to the duodenum, and physical and metabolic satiety effects of a diet. Data obtained in our laboratory from 11 experiments utilizing the pool and flux method for estimating passage rates of digesta fractions were used to develop new regression equations predicting passage rates of indigestible NDF (iNDF), potentially digestible NDF (pdNDF), and starch. The data set included 254 animal-periods from multiparous lactating cows, 29 animal-periods from primiparous lactating cows, and 32 animal-periods from pregnant heifers. For passage rates, 95% confidence intervals were 1.23 to 5.31 h^{-1} for iNDF, 0.19 to 4.26 h^{-1} for pdNDF, and 3.44 to 33.9 h^{-1} for starch. Data were divided into two sets by randomly selecting 2/3 of the animal-periods from each study (210 records) for a database used to develop potential models, then assigning the remaining 1/3 of the animal-periods from each study (105 records) to a database used to validate potential models. Equations were developed using predictor variables that are available on farms. Predictors used in the regression equations included dietary concentrations of NDF, forage NDF (forNDF), and starch; 30-h in vitro NDF digestibility of forages; DIM and BW; intake of DM, NDF, and starch; and MY, milk fat concentration, and 3.5% fat-corrected MY (FCMY). The best predictions explained 68% (RMSE = 0.69), 53% (RMSE = 0.71), and 42% (RMSE = 5.87) of variation in passage rates of iNDF, pdNDF, and starch, respectively. Equations developed indicate that important predictors of passage rate include proportions of starch, NDF, and forNDF in the diet, intake of DM and starch, forage NDF digestibility, and MY or FCMY. Improving accuracy of predictions of passage rates will increase our ability to optimize ruminal fermentation, which can aid in optimizing DMI and nutrient utilization, thus reducing nutrient waste and increasing efficiency of milk production.

Key Words: Passage Rate, Fiber Fractions, Starch

791   Evaluation of counts of ruminal fibrolytic bacteria and enzyme activities in response to corn silage particle size in high-yielding dairy cows. Q. Zebeli*[1], V. Ölschläger[1], M. Tafaj[1], W. Vahjen[2], B. Junck[1], O. Simon[2], and W. Drochner[1], [1]*University of Hohenheim, Stuttgart, Germany*, [2]*Free University of Berlin, Berlin, Germany*.

This study examined the effects of particle size (PS) of corn silage (CS) on counts of selected fibrolytic bacteria and related enzyme activities in particulate or fluid ruminal digesta as well as on ruminal or total digestive tract fiber degradation in dairy cows fed TMR (40% CS, 10% hay and 50% cereal-based concentrate; DM basis) ad libitum. Four early-lactating (67 ± 8 DIM), rumen-fistulated Holstein cows were randomly assigned to incomplete block switch-back design in four 23-d periods to 1 of 3 diets (in average: 6.9 MJ NEL/kg of DM, 15% CP and 35% NDF in DM) differing in PS of CS: 14, 8.1 and 5.5mm (n=5/treatment). After a 12-d diet adaptation, digesta samples were collected from dorsal (particulate) and ventral (fluid) rumen sac, 1h before and 3h after morning feeding, and analyzed for pH, VFA, fibrolytic enzyme activities (by an agar-diffusion assay) and counts of fibrolytic bacteria using 16S rDNA quantification by real-time PCR. In general, the counts of total eubacterial cells, R. albus and R. flavefaciens were not affected by dietary PS (P>0.10), but the activities of CMCase, Glucanase, Galactanase and Xylanase quadratically increased with reducing PS (P<0.05). This was reflected in quadratically increased ruminal (in situ; P=0.07) or total tract (P<0.05) fiber degradation. Decreasing dietary PS did not affect ruminal pH (P>0.10), but increased ruminal C2/C3 ratio and C4 proportion (P<0.05).

Compared to fluids, the particulate digesta showed higher counts of fibrolytic bacteria and enzyme activities (P<0.05), whereas the latter were stronger enhanced by reducing dietary PS (P<0.05). Results of this study indicate that reducing PS of CS in a TMR has the capacity to increase fiber degradation in the rumen of dairy cows, particularly by stimulating the activities of fibrolytic enzymes rather than increasing the total count of fibrolytic bacteria.

Key Words: Ruminal Fermentation, Fibrolytic Bacteria, Dairy Cow

792   Nutrient digestibility and utilization in non-lactating fistulated cows fed diets containing ratios of untreated corn silage and Silo-King®treated alfalfa haylage. G. A. Ayangbile*, D. Spangler, D. Jones, and K. Thompson, *Agri-King, Inc.*, *Fulton, IL.*

It is a common practice in most dairy operations to feed diets consisting of two or more types of forages. On some farms, choices are made to ensile corn silage (CS) with or without any additive. However, it is of greater risk to ensile alfalfa without any additive. This study evaluates nutrient digestibility and utilization in non-lactating fistulated cows fed a TMR containing varing ratios of untreated CS and Silo-King® treated alfalfa haylage. Cows were arranged in a 4 × 4 latin square design. Diets consisted of a) 80% untreated CS and 20%, treated alfalfa haylage (80:20, CS/Hlg), b) 60:40, CS/Hlg, c) 40:60, CS/Hlg, and d) 20:80, CS/Hlg. Each period consisted of 16 d adaptation to diets, and 5-d collection. Total fecal collection was obtained per cow, and random spot urine samples were collected before (0 h) and after (4 h) feeding. Rumen fluid and blood samples were collected at 0 h and 4 h. The amino acids composition expressed as percentage of insoluble crude protein were higher for the TMR containing lowest inclusion of haylage. DMI ranged from 31.2 lb DM to 33.5 lb DM. Total DM fecal output (14.5 lb) was highest (P<.05) for 80:20, CS/Hlg and lowest (11.1 lb) for the 20:80, CS/Hlg. Digestibilities for DM, NDF, ADF, and starch were greater (P<.05) for 40:60 and 20:80, CS/Hlg TMR. Blood glucose (P<.05), ammonia, rumen valeric and isoacids were increased (P<.05) with higher haylage ratios in TMR. Results indicate the benefits of replacing portion of a diet containing an untreated corn silage with a higher level of treated alfalfa haylage. There were greater digestibility and utilization of organic and inorganic nutrients.

Key Words: Treated Forages, Fecal Output, Digestibility

Swine Species

793   Effects of a ground raw soybean diet on reproductive performance in gilts. D. Sykes*, K. Necaise, W. Brookshire, P. Gerard, F. Cunningham, M. Crenshaw, and P. Ryan, *Mississippi State University*, *Mississippi State.*

Raw soybeans contain high levels of phytoestrogens (i.e., genistein), which are bioactive compounds known to enhance ovarian function in sows, but little is known about the use of raw soybean diets on reproductive performance in gilts. Thus, the objective of this study was to examine the effects of a raw soybean diet on pregnancy outcome and weaning performance of gilts. To this end, prepubertal Yorkshire x Landrace gilts (n=20; BW 73.6 ± 1.1 kg; age 140 d) were assigned to balanced isonitrogenous (CP 14%) and isocaloric diets using either soybean meal (SBM; n=10) or ground raw soybean (RSB; n=10) as the protein (100%) supplement source. Gilts were housed in covered outdoor pens with ad libitum access to feed and water and monitored daily (from 160 d of age) for estrus using a teaser boar then bred by AI on the third standing estrus using the AM/PM rule. After breeding, gilts were penned individually indoors and restricted to their respective diets (2.23 kg/day) through to d 111 of gestation when they were placed in farrowing crates and maintained on a lactation diet until weaning. There was no difference (P > 0.10) with respect to diets on age of gilts at time of first estrus (RSB 193.2 d ± 6.86; SBM 188.4 d ± 5.97) or breeding (RSB 235.6 d ± 7.51; SBM 230.1 d ± 6.82). All but three gilts in the RSB group conceived on first AI. There was no difference in the average number of pigs born to gilts (RSB, 13.2 ± 1.29; SBM, 13.8 ± 0.59 pigs) or on the number of mummified fetuses and stillborns. Mean litter birth weights (RSB, 1.34 ± 0.08; SBM, 1.41 ± 0.05 kg) and placenta weights (RSB, 3.35 ± 0.41; SBM, 3.75 ± 0.22 kg) were not different. While there was a difference (P < 0.05) in the mean number of pigs weaned per litter (RSB, 8.90 ± .80; SBM, 11.80 ± 0.59 pigs) there were no differences in the average weaning weight of pigs (RSB, 7.90 ± 0.45; SBM, 7.50 kg ± 0.31 kg). There was an observed but not significant difference in time to return to estrus post-weaning of sows (RSB, 18.0 ± 4.59; SBM, 13.9 ± 4.79 d). These studies indicate that feeding raw soybeans as a protein dietary supplement source is not detrimental to reproductive performance in gilts.

Key Words: Raw Soybeans, Gilts, Reproduction

794   Effect of feeding Luctarom "S" 55972Z® on sow reproductive performance. D. Towey[1], J. Sonderman[2], D. Reese*[1], D. Travnicek[1], and K. Eskridge[1], [1]*University of Nebraska, Lincoln*, *Lincoln, NE*, [2]*Danbred North America, Columbus, NE.*

The objective of this study was to determine the effects of feeding Luctarom "S" 55972Z® (Lucta S.A., Barcelona, Spain) and maternal line on sow reproductive performance. Luctarom is a product with a milky flavor and strong cured cheese and vanilla bottom notes. Treatments were arranged as a 2 x 2 factorial with diet and maternal line as factors. Diets were corn-soybean meal based containing 1.2% total lysine, 3,260 kcal of ME/kg and 3% added fat, with or without Luctarom. Parity two to nine line 241 and 482 Danbred N.A. females (n=176) were used at a parity-segregated commercial farm. Control or Luctarom feed (containing 0.075% Luctarom) was introduced to sows when they were moved into the farrowing quarters 4d before farrowing. Sows remained on their respective dietary treatment until weaning (average 16.8 d of lactation). Prior to farrowing, sows were limit-fed, but after farrowing they were allowed ad libitum access to feed until weaning. Each sow's allotment of feed was weighed prior to dispersal. Feed disappearance was calculated the next morning by weighing any feed that remained in the feeder. All data were analyzed using analysis of covariance with parity as a covariate. In addition, day was treated as a repeated measure for the feed disappearance data. Feed disappearance before (2.36 vs. 2.52 kg/d; P = 0.222) and following farrowing (6.79 vs. 6.79 kg/d; P = 0.989) was similar for control and Luctarom fed sows, respectively. During the prefarrowing