

## Small Ruminant: Sheep Production

**891 Use of n-alkanes to estimate intake and digestibility of vegetative crops by young sheep.** H. Dove\* and W. M. Kelman, *CSIRO Plant Industry, Canberra, ACT, Australia.*

The development of longer-season wheat cultivars in Australia has allowed increasing use of wheat as a grazing resource in winter, replacing either pasture or forage oats. There are few data for diet composition, intake or forage digestibility in young sheep grazing wheat forage, especially in comparison with oats or pasture. Over 2 years, we used the n-alkane method to estimate diet composition (year 2), OM intake, fecal output and diet digestibility in 30 kg Merino sheep. In July of year 1, sheep grazed wheat, oats or a phalaris-based pasture for 22d at 33 animals/ha. In year 2, they grazed wheat for 34d at 33 animals/ha, within a larger fertilizer-response study. In each year, data were analyzed as replicated randomized blocks using plot mean data. There were no fertilizer effects on intake variables in year 2, so overall means are reported. In year 1, OM intakes did not differ significantly between sheep grazing oats (1162 g/d), wheat (1403 g/d) or pasture (1510 g/d). However, fecal OM excretion was significantly greater ( $P = 0.01$ ) in animals grazing pasture (362.1 g OM/d) than crop (mean 146.2 g OM/d). OM digestibility of the pasture was thus significantly less (0.758;  $P < 0.05$ ) than for either oats (0.861) or wheat (0.901), which did not differ. Digestible OM intakes (mean 1140 g OM/d), liveweight gains (mean 254 g/d) and liveweight gains/kg OM intake (mean 189 g/kg OMI) did not differ between treatments. Crop growth in year 2 was reduced by drought and by the end of the grazing period, crop biomass was < 400 kg DM/ha and constrained intake. The crop also contained more weeds. Nevertheless, alkane-based estimates of diet composition showed that 89% of forage intake was from wheat. Herbage intake (862 g OM/d), whole-diet digestibility (0.762) and liveweight gain (162 g/d) were all less than in year 1. Liveweight gains/kg of OM intake were very similar (190 g/kg OMI) to year 1, suggesting that reduced liveweight gains were due to lower intakes. The results also indicate that in year 1, the digestibility of crop forage was greater than pasture, but OM and DOM intakes by young sheep were similar across forages.

**Key Words:** alkanes, intake, wheat forage

**892 Effect of level of intake on digestibility of NDF of soybean hull diets in sheep.** D. C. Hein, M. L. Thonney\*, D. A. Ross, and D. E. Hogue, *Cornell University, Ithaca, NY.*

Including soybean hulls in ruminant diets increases feed intake and production. This is likely due to the high fraction of digestible NDF (dNDF) in soybean hulls, which may optimize VFA production for rumen health. High feed intakes, however, decrease digestibility. Therefore, the objective of this project was to quantify the effect of level of feed intake on digestibility of NDF in soybean hull diets. Diets were fed at intake levels of 2, 3, or 4% of BW (%BW). Each intake level was fed to 8 pens of 2 weaned, 17-kg ram lambs (24 pens) and to 8 pens of 1 mature, 66-kg, non-lactating ewe (24 pens). On an as-fed basis, the lamb diet included 71.7% soybean hulls, 21.5% soybean meal, 4.5% molasses, 1% vitamin-mineral premix, 0.5% calcium carbonate, 0.5% chromic oxide, 0.25% vitamin E premix, and 0.025% Deccox, while the ewe diet contained 72% soybean hulls, 20% corn, 2% soybean meal, 4.5% molasses, 1% mineral-vitamin premix, and 0.5% chromic oxide. After a 10-d adaptation period, feces were collected for 2 d. Uneaten feed was recorded to determine actual feed intake. The fecal samples and 2 feed samples from each experiment were dried and ground for determination of NDF, dry matter, and chromic oxide concentrations. Apparent dry

matter digestibility (DMD) and dNDF were quantified using chromic oxide as a marker. In ram lambs, with actual intakes ranging from 1.7 to 4.1%BW, regression analyses showed a linear effect with apparent DMD decreasing ( $P < 0.001$ ) by  $8.1 \pm 1.16$  percentage units and dNDF decreasing ( $P < 0.001$ ) by  $12.1 \pm 1.57$  percentage units for each percentage unit increase in DMI as %BW. In mature ewes, with actual intakes ranging from 1.6 to 3.9%BW, digestibility values at low intakes were not as high as in lambs and the depression in digestibility was less pronounced, with DMD decreasing ( $P = 0.034$ ) by  $2.9 \pm 1.28$  percentage units and dNDF decreasing ( $P = 0.009$ ) by  $4.5 \pm 2.00$  percentage units for each percentage unit increase in DMI as %BW. These experiments demonstrated a linear decrease in digestibility of NDF with increasing intake that accounted for 75 to 85% of the associated depression in apparent DM digestibility.

**Key Words:** digestion, NDF, sheep

**893 Evaluation of feeding value of corn distillers dried grains with solubles for sheep.** G. Abdelrahim\*<sup>1</sup>, J. Khatiwada<sup>1</sup>, N. Gurung<sup>1</sup>, J. Vizcarra<sup>1</sup>, and C. Kerth<sup>1</sup>, <sup>1</sup>Alabama A & M University, Normal, AL, <sup>2</sup>Tuskegee University, Tuskegee, AL, <sup>3</sup>Auburn University, Auburn, AL.

Corn distillers dried grains with solubles (DDGS) which have become very popular over the past 15 yr due to their energy value in relation to corn, price, flexibility in feeding, and reduction in incidence and duration in acidosis, are a by-product of the fuel ethanol industry. The objectives of this study were to evaluate the effects of varying levels of dietary DDGS inclusion on: dry matter intake, average daily gains, and carcass composition of sheep. Twenty-four lambs ( $40.1 \pm 48.6$  kg initial BW, and 8 to 9 mo of age) were obtained and used in a randomized complete-block design ( $n = 2$  replications per treatment). Diets, on a dry matter basis, were: control, 10% DDGS, and 20% DDGS. All diets contained 50% fescue/bermudagrass mix hay, and 50% of the respective concentrate mixes. The concentrate mixes containing DDGS were formulated to be isonitrogenous at 16% crude protein. The DDGS replaced corn and soybean meal in the concentrate mixes so that diets contained desired amounts of DDGS. Lambs were allowed 7-d adjustment period, followed by 7-d transition period to the DDGS diets. After 135-d feeding period final weight was determined, lambs were slaughtered, and carcass characteristics were measured. Both growth and carcass quality data were analyzed as a completely randomized design. Final body wt (62.5, 61.3, and 63.0) was not different between treatments ( $P > 0.05$ ). Also, no differences were observed ( $P > 0.05$ ) in hot carcass wt (30.7, 30.1, and 30.3), cold carcass wt (30.8, 30.0, and 30.2), body wall fat (2.0, 2.2, and 2.0), ribeye area (6.55, 7.0, 7.0), 12th rib fat (0.9, 1.1, and 0.85), and kidney and pelvic fat (2.3, 1.89, 2.13) between treatments. Based upon the findings of this research, DDGS can replace a portion of the ground corn and soybean meal commonly fed to lambs, and maintains or enhances performance.

**Key Words:** distillers dried grains with solubles, sheep, performance

**894 The effect of processing type of feedstuff on the fattening performance of Awassi ram lambs.** H. Ustuner\*, S. Dikmen, and I. I. Turkmen, *University of Uludag, Bursa, Turkey.*

The objective of this study was to investigate the effect of processing type of feed on the fattening performance of Awassi ram lambs. A total of 26, 3-mo-old Awassi ram lambs were used and randomly allocated into 3 groups (group 1, fed with mash feed,  $n = 8$ ; group 2, fed with

pellet feed, n = 9; group 3, fed with extruded pellet feed, n = 9). Lambs were individually fed with the same ingredient of concentrate feed (2.5 Mcal/kg) and had free access to water until 43 kg of slaughter weight. The initial live weight of lambs were similar ( $P > 0.05$ )  $29.56 \pm 1.27$ ,  $29.89 \pm 1.07$  and  $28.89 \pm 0.83$  for group 1, 2 and 3, respectively ( $P > 0.05$ ). At the end of fattening period the final live weights of lambs were also similar ( $P > 0.05$ ). The results showed that total weight gain and average daily gain (ADG) of ram lambs during the study were  $12.75 \pm 1.05$  kg and  $180.90 \pm 17.70$  g for group 1,  $12.78 \pm 0.90$  kg and  $25.10 \pm 21.50$ g for group 2, and  $14.56 \pm 0.55$  kg and  $287.80 \pm 23.40$  g for group 3, respectively. The difference of ADG among groups were significant ( $P < 0.01$ ). The best feed conversion rate (FCR) was estimated for the lambs in group 3 ( $6.50 \pm 0.30$ ) while the other FCR results were greater than group 3 ( $8.20 \pm 0.50$  and  $6.90 \pm 0.40$  for group 1 and group 2, respectively) ( $P < 0.05$ ). Lambs fed with extruded pellet feed (group 3) tend to have lower fattening period (19 d less) than group 1 ( $P = 0.07$ ). The results of the current study shows that feeding of Awassi ram lambs with extruded feed had positive effects on fattening performance, feed conversion rate and fattening period, which are economically important for sheep farms.

**Key Words:** Awassi lambs, extruded feed, fattening performance

**895 Effect of anaerobic enzyme matrix on fiber digestibility.** H. M. Gado\*<sup>1</sup> and B. E. Borhami<sup>2</sup>, <sup>1</sup>*Ain Shams University, Department of Animal Production, Faculty of Agriculture, Cairo, Egypt*, <sup>2</sup>*Alexandria University, Department of Animal Production, Faculty of Agriculture (El-Shatby), Alexandria, Egypt*.

The intend of this study was to verify the effect of nutritive value aerobic constancy of rice straw. Also, if it could be enhanced by addition of

exogenous cellulases, hemicellulase, protease and  $\alpha$  amylase enzymes (ZAD) preparations at ensiling. Rice straw was chopped to 5 cm without treatment (control) or after treatment with ZAD (1 or 3 L/ 1 ton of DM of rice straw) including 30 kg of sugar cane molasses and 20 kg of DDGS. The enzymes were sprayed on the rice straw at ensiling (50% of water was added). Ten 500-kg replicates of chopped (5 cm) rice straw were ensiled for 30 d in plastic bales. Five plastic bales per treatment were used for chemical analysis and 5 for aerobic constancy monitoring. The silage juice was analyzed for organic acids, pH, water-soluble carbohydrates (WSC), ammonia-N, and soluble N. Samples were analyzed for crude protein (CP), neutral detergent fiber (NDF), and acid detergent fiber (ADF). In vitro digestibility of DM (IVDMD), NDF (IVNDFD), and ADF (IVADFD) were determined. Materials treated with ZAD had lower ( $P < 0.05$ ) DM losses, and lower ( $P < 0.05$ ) pH and ammonia-N concentration than control silages. Residual WSC concentration was greater ( $P < 0.01$ ) in ZAD treated silages either 1 or 3 L than in control silages. Compared with control silages, NDF concentration was lower ( $P < 0.01$ ) in silages treated with 3 L followed 1 L of ZAD. Aerobic constancy was increased ( $P < 0.05$ ) by ZAD. ZAD at 3L increased the IVDMD and IVNDFD at 6 and 48 h. The 48-h IVADFD was also increased ( $P < 0.01$ ) by treatment with 3L ZAD. These results show that 3L ZAD applied at ensiling can improve the digestibility, fermentation, and aerobic constancy of rice straw silage.

**Key Words:** nutritive value, rice straw, ZAD