

ABSTRACT

Experiments were carried out to determine the effect of maturity on the chemical composition and in vitro digestibility of sugarcane and to determine the effects of age of sugarcane, season and varying levels of non protein nitrogen supplementation on intake, digestibility and nitrogen utilization of growing steers. The design in the first experiment was a randomised block design and the technique of simple regression was used to fit curves to the data. Samples from two crops were taken at twenty-eight (28) day intervals and estimations of yield, leaf/stem ratios and chemical composition were made. In the second experiment a sequential trial with steers over two seasons was used to investigate the effects of two levels of sugarcane maturity; three levels of non-protein nitrogen - 40%, 60% and 80% of total crude protein; and the seasonal response in two seasons - wet and dry seasons. There were four latin squares to cater for the two levels of cane maturity X seasons and steers were randomly assigned to receive sequential treatments within squares.

The growth curves plotted for sugarcane followed a sigmoidal pattern up to sixteen (16) months of age after which there was an exponential decrease of DM yield. Generally the dry matter content increased during the dry season and decreased during the rainy season, while the crude protein content decreased from 8.4% at two months to 3.9% at seven months for one crop examined. The trend observed in the CP content of the second crop was similar. In one crop the ash content was more or less constant throughout the growth of the sugarcane plant while in the second crop there was a decrease of ash content with age.

The neutral detergent fibre content curves plotted for both crops were similar in shape. In one crop NDF content decreased slowly from 80.3% at two months to 74.6% at seven months and then increased up to 85% at thirteen (13) months. The leaf/stem ratio decreased rapidly during the first six months of growth and more slowly thereafter. The leaf contents of dry matter, crude protein, ash and neutral detergent fibre were generally higher than those of the stem in each crop. The pH of juice extracted from the stems fluctuated between 4.80 and 5.81 while the °Brix of the juice decreased during the earlier stages of growth, then increased up to sixteen (16) months of age. Estimations of in vitro digestibility of bulked samples from both crops showed that digestibility of cellulose, dry matter, and organic matter decreased between 9 and 12 months and increased between 12 and 15 months of growth.

In the second experiment there was a marked seasonal effect on all variables observed. Dry matter intake, digestible energy of diet, digestible energy of cane, metabolizable energy of diet and nitrogen balance were superior in the dry season. Estimations of these variables obtained in the dry and wet seasons were 2.59Kg/100Kg L.Wt; 13.6 MJ/Kg DM; 14.05 MJ/Kg DM; 11.2 MJ/Kg DM; 0.293 g N per Kg L.Wt; and 2.47 Kg/100Kg L.Wt; 10.7 MJ/Kg DM; 10.15 MJ/Kg DM; 8.8 MJ/Kg DM and 0.170 g N per Kg L.Wt respectively. Digestibility of DM, NDF, ADF, NDS, CP, Cellulose and hemicellulose were higher in the wet season.

Dry matter intake and DM, and NDS digestibilities were higher on diets containing mature cane, than on those containing young cane. The effect of cane maturity on fibre and CP digestibilities, nitrogen balance and DE and ME contents were not significant. Estimations of nitrogen balance, DM intake, and DM, hemicellulose and NDF digestibilities were significantly higher on diets containing the supplement with the 40% level of NPN. There were no other significant differences due to level

of NPN.

It was suggested that the most appropriate time to cut sugarcane for maximum nutritive benefits coincided with an optimum production of DM, a high $^{\circ}$ Brix and an exponentially decreasing NDF content.