DIET SELECTION BY FRIESIAN WEANERS GRAZING AN IRRIGATED TROPICAL GRASS PASTURE

R.J. MOSS* and R.M. MURRAY**

SUMMARY

Changes in yield and chemical composition of a leniently stocked Setaria anceps cv. Kazungula pasture were measured in north Queensland at monthly intervals through the main pasture growing season. Diet selection by weaners grazing these pastures was estimated at the same times, using three oesophageally fistulated Friesian weaners. Pasture was irrigated and fertilized with urea at 336 kg N/ha/annum applied in equal dressings every six weeks. It was set stocked at 10 weaners/ha for the duration of the experiment.

Yield of pasture on offer increased from 1 960 kg DM/ha in September to 9 700 kg DM/ha in January when it was in full inflorescence, Nitrogen content of the pasture on offer was highest in early November at 19.3 g N/kg DM, and declined with increasing maturity of the pasture to 7.3 g N/kg DM in early January. IVDMD reduced from 66% in early November to 47% in January. Oesophageally fistulated calves selected a green leaf diet of 96.5% leaf. Crude protein and IVDMD content of pasture eaten was higher than that on offer and varied little throughout the experiment. Animals selected pasture with a nitrogen content of 25.8 g N/kg DM and 66% IVDMD, Provided yield of pasture on offer was high, weaner calves were very efficient at harvesting green leaf despite increasing maturity of the sward.

INTRODUCTION

The digestibility of tropical pastures is low, but the potential for dietary selection within these pastures is high because of the large difference in nutritive value between leaf and stem (Hacker 1971). Cattle preferentially graze leaf and the quality of the diet selected can vary considerably from that in the total pasture on offer. At lenient grazing pressures, cattle may compensate for low quality feed by selectively grazing the more nutritious parts of the plant with a consequent increase in productivity. Young animals have a high requirement for digestible nutrients. Although concentration of energy and protein in tropical pastures is low relative to the requirements of young growing animals, the selection exercised by these animals will have a large influence on the need for supplementation. In this study, the botanical and chemical composition of the pasture diet selected by Friesian calves from a leniently stocked tropical grass pasture was observed. Three oesophageally fistulated calves were used for these observations.

---

* Mutdapilly Research Station, M.S. 825, Ipswich, Queensland , 4305.
** Dept. Tropical Veterinary Science, James Cook University, Townsville, Queensland , 4811

MATERIALS AND METHODS

The experiment was conducted at Ayr Research Station (latitude 19° 36' S, longitude 147° 23' E and altitude 10 m) in a tropical coastal environment with a predominantly summer rainfall (1 092 mm per annum), The pasture was Kazungula Setaria (Setaria anceps cv. Kazungula) spray irrigated and fertilized with 730 kg urea, 490 kg superphosphate and 120 kg muriate of potash/ha/annum. Urea was applied in equal dressings every six weeks,

Forty-eight two month old Friesian weaners were used in a replicated experiment of six treatments varying in level of protein and **energy** supplementation (Moss 1983). Pastures were set stocked at 10 weaners/ha. The experiment commenced on 31.8.77 and was terminated on 5.1.78. Three Friesian weaners of similar size and age were fitted with oesophageal fistulae. They were maintained at the same stocking rate on an area of setaria pasture adjacent to the experiment and supplemented with 1.0 kg maize/head/day.

Pastures were sampled monthly and dry matter presentation yield, nitrogen (N) and phosphorus (P) content, in vitro dry matter digestibility (IVDMD), fibre components (NDF, ADF and lignin) determined. At similar times the oesophageally fistulated calves were used to sample the experimental paddocks between 0630 and 0830 hours over two to three days until all paddocks were sampled. During sampling, the oesophagus was blocked by insertion of a foam sponge, and the extrusa totally collected, Botanical composition of oesophageal extrusa was estimated by microscopic examination using the microscope point hit technique (Heady and Torell 1959). Oesophageal extrusa samples collected from each paddock at each sampling date were examined for proportions of leaf, stem, inflorescences, weeds and dead material. Leaf and stem were further subdivided into green 'or mature fractions. Mature material was defined as that leaf or stem showing chlorosis **(yellowing** of tissues). Two hundred points per sample were counted. Sub samples of oesophageal extrusa were dried at 70°C for **24** hours and chemical analysis determined as for pasture on offer, Saliva was not removed from these samples.

RESULTS

Pasture on Offer

Rapid plant growth during summer resulted in high yields of mature pasture in December and January in all treatments. Mean (±SE) pasture dry matter (DM) on offer increased from 1 960 ± 560 kg DM/ha in September **to 9 700** ± 1 180 kg DM/ha in January (Fig, 1). Mean (±SE) organic matter content of pasture throughout the experiment was **87** ± 1%. Nitrogen content of the pasture was highest in spring, reaching a mean (±SE) maximum of 19.3 ± 1.8 g N/kg DM at the November harvest, and then fell to 7.3 ± 0.8 g N/kg DM in January (Fig. 1). Phosphorus content of pasture was adequate and did not alter throughout the experiment, being 0.31 ± 0.01%. Pre-experimental grazing removed much of the green leaf, and with slow growth of pasture in winter, there was a higher proportion of stem at the initial harvest.

In vitro dry matter digestibility increased from 41% in September to 66% in November, then declined to 47% in January with increased plant maturity (Fig. 1). Changes in fibre components (NDF, ADF and lignin) reflected increasing maturity of the pasture.

Composition of Oesophageal Extrusa

Oesophageally fistulated calves were very efficient at selecting green pasture material and almost exclusively harvested leaf. At the initial harvest, with less green leaf and total pasture DM available calves consumed 84% green leaf, 6% mature leaf, 7% green stem and 3% mature stem. With increasing pasture growth in spring, calves selected 98% green leaf and 2% green stem to the end of November. At the end of the experiment with pastures in full inflorescence, calves still selected a diet of 96% green leaf, 2% mature leaf and 2% stem. Negligible quantities of mature stem, pasture seed heads or weeds were eaten.

Oesophageally fistulated calves selected a diet with a higher nitrogen content and IVDMD, and lower NDF, ADF and lignin content than in the total pasture on offer (Fig. 1).

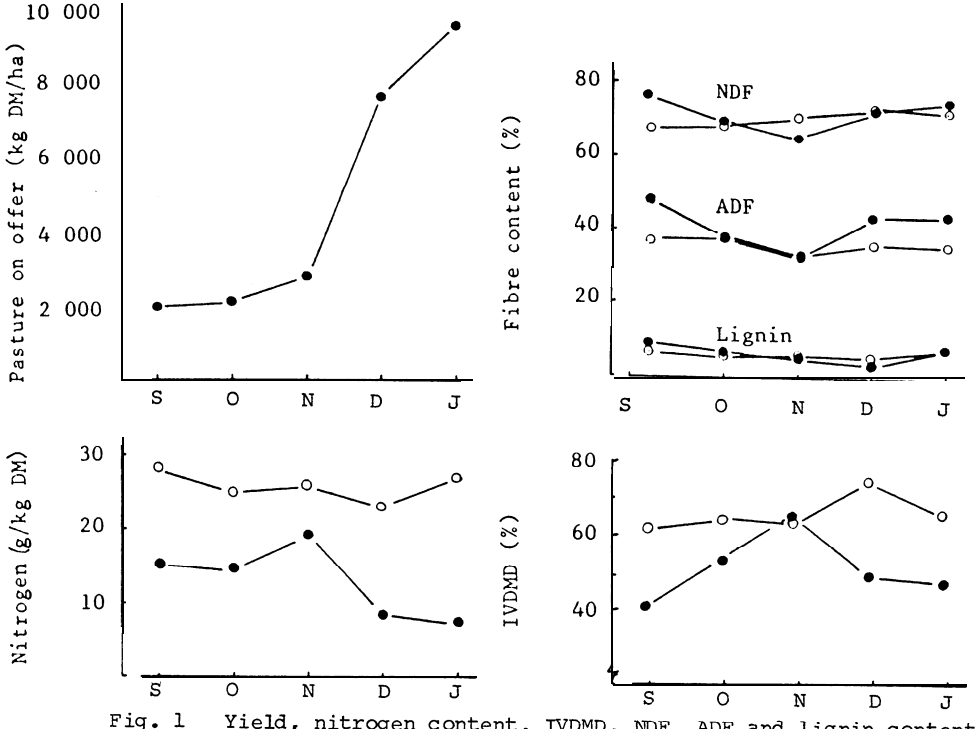

Fig. 1 Yield, nitrogen content, IVDMD, NDF, ADF and lignin content of pasture on offer (●); and of pasture selected by oesophageally fistulated calves (0).

Despite considerable variation in the pasture on offer, chemical composition of the diet selected varied little throughout the experiment. Mean (±SE) nitrogen content of oesophageal extrusa was 25.8 ± 0.6 g *N/kg* DM. Phosphorus content of the bolus (uncorrected for salivary contamination) averaged 0.36 ± 0.04%. In vitro dry matter digestibility of the pasture selected was also consistently high, with a mean (±SE) of 66 ± 1.0 percentage units.

DISCUSSION

Despite the declining quality of pasture on offer with increased maturity of the sward, the diet selected by oesophageally fistulated weaner calves was consistently of higher 'quality than pasture on offer and showed little variability throughout the experiment. These animals were very efficient at harvesting leaf, with leaf making up 96.5% of the pasture diet. Observations with mature dairy cows showed they selected a diet containing 60 to 40 percent leaf from Gatton Panic or Signal grass pastures (Davison et al 1981). Stobbs (1978) found that when grazing short term regrowth pastures with a high leaf content, mature cows could select a diet in excess of 80% leaf from Gatton Panic or Rhodes grass. Chacon and Stobbs (1976) found that cows first introduced to a leafy sward of Kazungula Setaria would select a diet containing more than 90% leaf, but this declined to around 56% as the pasture was grazed down.

Visual estimates by people experienced in estimating leaf content of pastures (Davison et al 1981) suggested that leaf content of the pasture was approximately 40% in spring, but in summer would have only made up about 25% of the pasture on offer when the Setaria was tall and flowering. Leaf content of the diet selected by calves in this period was unchanged, indicating that young weaner calves were able to preferentially select leaf from a sward in which percentage leaf on offer is low. However despite the low percentage leaf in the pasture, high pasture yields meant that yield of leaf was high throughout the experiment. Davison et al (1981) found that milk yield of dairy cows was more closely related to yield of leaf than to percentage leaf in the sward.

These results indicate that provided yield of leaf available does not limit animal intake, young weaner calves are able to select a diet of very high green leaf content from an actively growing but mature pasture in which percentage leaf on offer is low. By grazing only green leaf, pasture eaten is of fairly high quality. Thus pasture management practices aimed at increasing leaf content of the pasture may not have the effect of increasing leaf content of the animal's diet.

REFERENCES

CHACON, E. and STOBBS, T.H. (1976). Aust. J. Agric. Res. 27: 709.
DAVISON, T.M., COWAN, R.T. and O'ROURKE, P.K. (1981). Aust. J. Exp. Agric. Anim. Husb. 21: 196.
HACKER, J.B. (1971). J. Aust. Inst. Agric. Sci. 37: 155.
HEADY, H.F. and TORELL, D.T. (1959). J. Range Mgt. 18: 144.
MOSS, R.J. (1983). M. Sc. Thesis, James Cook University, Townsville, Qld.
STOBBS, T.H. (1978). Aust. J. Exp. Agric. Anim. Husb. 18: 5.