NUTRITIONAL FACTORS AFFECTING CATTLE WEANER GROWTH AND SURVIVAL IN THE DARWIN DISTRICT OF THE NT

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SUMMARY

Low growth rate and high calf mortality associated with weaning in the Darwin District of the Northern Territory was reported by McCosker et al. (1984). Recent work has concentrated on finding nutritional reasons for this ill-thrift. Evidence indicates that a lack of digestible energy was the prime cause of weaner ill-thrift and that nitrogen or protein supplementation had little effect while grazing native grasses of low digestibility. (Keywords: calf growth rate, mortality, weaners, digestible energy)

INTRODUCTION

Weaning as a management option is increasing in the northern pastoral districts of the Northern Territory, but associated problems require addressing (McCosker et al. 1984). When reviewing weaning, Moore (1984) stated that while calf removal improved cow performance, the fate of the weaned calf worsened. Similarly, McCosker et al. (1984) showed weaning at 5 to 7 months of age increased mortality rate and lowered growth rate of the calf to two years of age. They concluded that poor nutrition was the primary cause but that mortality could be reduced by weaning above 150 kg liveweight. A minimum weaning weight however, would reduce the degree to which weaning could be implemented. Schottler and Williams (1975) showed that early weaning advanced the date of next calving and Moore (1984) suggested that weaning at three months could increase birth rate from 50% to 75%. Subsequent to the losses reported by McCosker et al. (1984) several experiments and observations were conducted to investigate the effects of various nutritional options in weaner ill-thrift. This paper reports on the growth rates and survival of weaners from several nutritional regimes investigated.

MATERIALS AND METHODS

Experimental work was conducted at Mt Bundey Station 120 km south of Darwin. It has a dry monsoonal climate with an average annual rainfall of 1250 mm, 81% of which falls from December to March inclusive. Climate, soils and vegetation have been described by Story et al. (1969). Brahman cross cattle 5 to 8 months of age and weighing over 150 kg at weaning in May or June of 1983 or 1984 were used. They grazed improved pastures at high stocking rates until the end of the respective dry season. Cattle were weighed unfasted and group sizes are listed in Table 1.

<u>Experiment 1</u>: Heifers, steers and bulls grazed Panicum maximum cv Hamil pasture yielding 5.5 to 7.5 t/ha dry matter (DM) from May 1983 and had access to Uramol® blocks.

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Experiment 2: Steers grazed various improved grass based pastures (Andropogon gayanus cv Kent, Setaria sphacelata cv Kazungula, Panicum maximum cv Hamil and Digitaria decumbens, Pangola with DM yields of 9.0, 5.1, 4.2 and 5.0 t/ha respectively) with a mean dry matter digestibility (DMD) of 50% and 1.2% Nitrogen (N) in leaf, from May 1983 and had access to salt blocks.

Experiment 3: Heifers grazed mixed improved pastures comprising Kazungula (4.1 t DM/ha) and Kent (3.1 t DM/ha) with companion legumes Calopogonium mucunoides (Calopo, 1.4 t DM/ha) and Stylosanthes hamata cv Verano (1.3 t DM/ha), respectively from May 1983. Six head were added from Experiment 4 in October 1983 and the 18 yearlings were maintained on the experiment for a further year. The stock had access to Uramol® during the dry season.

Experiment 4: In 1983 thirty heifers grazed Centrosema pascuorum (Centurion 1.9 t DM/ha) and Kazungula (1.6 t DM/ha) pastures for two months and then grazed Centurion and native grass (2.5 t DM/ha) for a further two months. In 1984 thirty yearling heifers grazed Centurion (4.7 t DM/ha, 31.1% DMD and 1.2% N in leaf) with either native grass (1.6 t DM/ha, 37.5% DMD and 0.65% N in leaf) or Kazungula (1.9 t DM/ha, 56.8% DMD and 1.4% N in leaf) pastures.

Experiment 5: Four groups of heifers were fed Panicum maximum cv Hamil hay (53.5% DMD and 0.68% N in leaf) ad-lib at approximately 7 kg/hd/day in four supplement treatments from June 1984. The treatments were control (nil supplement); Ultrapro 40® (UP 40) lick block; formaldehyde treated Ultrapro 40® (FUP 40) lick block; and a urea, molasses and meatmeal (U/M/MBM) mix. Weaners had continuous access to the lick blocks while the U/M/MBM was fed twice weekly.

Liveweight gain within Experiment 4 (yearling heifers) and Experiment 5 was analysed by analysis of variance and paired comparison using Students tTest.

RESULTS

The average daily gain (ADG) for each experimental group is shown in Table 1.

Noteworthy features of Table 1 were firstly the lower performance of the pen fed animals relative to the grazing animals on grass based improved pastures (Experiment 1, 2 and 4). Secondly the animals that were grazing predominantly legume based pastures during the dry season (Experiment 3, Calopo; Experiment 4, Centurion/native grass treatment) had lower growth rates than the animals on improved grass based pastures.

In Experiment 1, a heifer and three steers died and one heifer grazing Centurion/Kazungula pasture in Experiment 4 died during 1984. No other groups had deaths, resulting in an overall annual mortality of 2.5% on improved pastures.

In Experiment 5, mean intakes of urea, molasses and meatmeal from 0 to 33 days were 25, 215 and 215 g/day respectively. To reduce crude protein intake to a level similar to that from the lick blocks the ration was decreased to 15, 125 and 125 g/day to day 78, and further reduced to 9.5, 125 and 114 g/day respectively to the end of the trial (112 days). Intake of UP 40® and FUP 40® blocks was 157 and 148 g/day respectively for the 112 day trial period. Intake of crude protein from supplements over the 112 days was 66, 62 and 121 g/day

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while molasses intake was 47, 44 and 136 g/day for UP 40, FUP 40 and U/M/MBM treatments respectively.

The difference between the ADG of Centurion/Kazungula and Centurion/native grass pastures for yearling heifers in Experiment 4 was significant ($P<0.05$). In Experiment 5 the control ADG was significantly lower ($P<0.05$) than UP 40, FUP 40 and U/M/MBM. The UP 40 and FUP 40 groups were not different but were significantly lower ($P<0.05$) than U/M/MBM.

Table 1: Average daily gains (ADG) of brahman cross weaners

Stock type	Weaned wt(kg)	No.	Period	S.R. /ha	Feeding regime	ADG (kg/d)	Standard error
Experiment 1							
heifers	170	23	5/83-12/83	0.6	Hamil guinea	0.23	0.015
steers	165	19	5/83-12/83	0.6	Hamil guinea	0.20	0.021
bulls	177	12	5/83-12/83	0.6	Hamil guinea	0.30	0.024
Experiment 2							
steers	190	8	6/83- 1/84	1.0	Various grasses	0.14	0.016
Experiment 3							
heifers	179	12	6/83-10/83	1.0	Improved Pasture mix	-0.04	0.017
		18	10/83-4/83	1.5	Improved Pasture mix	0.56	0.027
yearlings-		18	4/84-10/84	1.5	Improved Pasture mix	-0.04	0.017
Experiment 4							
heifers	184	30	6/83- 8/83	1.5	Centurion/Kazungula	0.04	0.022
heifers	-	30	8/83-10/83	1.5	Centurion/Native Grass	-0.09	0.014
yrl heif	-	30	6/84-12/84	1.5	Centurion/Kazungula	0.13	0.022
yrl heif	-	30	6/84-12/84	1.5	Centurion/Native Grass	0.03	0.022
Experiment 5							
heifers	154	16	6/84-10/84	pen	Nil/hay	-0.09	0.015
heifers	156	16	6/84-10/84	pen	UP 40/hay	-0.04	0.013
heifers	157	16	6/84-10/84	pen	FUP 40/hay	-0.04	0.017
heifers	157	16	6/84-10/84	pen	U/M/MBM/hay	+0.07	0.022

A sub-group (n = 25) of the yearling heifers in Experiment 4 grazed native grass pasture from weaning in May 1983 and had a liveweight of 204 ± 4.3 kg in June 1984. This yearling liveweight is similar to that reported by McCosker et al. (1984) for steers grazing native pastures. The yearling liveweight of heifers grazingimproved pasture from weaning (Experiment 3) was 287 ± 2.6 kg. The ADG from weaning to yearling was 0.08 and 0.26 ± 0.008 kg/day for the native pasture and improved pasture groups respectively.

DISCUSSION

Weaner ill-thrift, reported by McCosker et al. (1984), involved weaners fed ad-lib NPN sources or legumes while grazing low quality native pastures. A separate study (Eggington unpub. data) where 276 weaners were fed molasses (62 g/hd/day) and meatmeal (344 g/hd/day) as well as Uramol® (88 g/hd/day) supplements on native pasture from August to November 1982 (73 days) gave no improvement in mortality or growth over that reported by McCosker et al. (1984). Poor weaner response to NPN and true protein supplements on the Darwin district native pastures could be due to a deficiency in digestible energy (Balch 1967; Leibholz and Kellaway 1984) due to the extremely low DMD.

The penned animals (Experiment 5) on Hamil guinea hay responded to low levels of supplementary protein and energy. Higher production from the U/M/MBM could have been due to either the metabolizable energy provided in the molasses, the higher protein intake, or both. Molasses has been successfully used to supply digestible energy to weaners by Gulbransen (1984) who fed a ration of 70% molasses. The improved growth rate in the pen study compared to the paddock situation reported by McCosker et al. (1984) reflects a better quality roughage, ie. Hamil guinea hay.

Mortality on improved pastures was approximately 10 percentage points below that obtained by McCosker et al. (1984) on native pasture with supplements. Weaners grazing improved grass based pastures achieved a dry season and annual growth rate above that of groups previously supplemented on native pasture with either legume, NPN or protein supplements. These responses appear to be related to the selection of improved grass leaf which had relatively higher DMD (Moss and Murray 1984). Where the diet consisted solely of species with very low DMD, ie. Centurion and native grass treatments in Experiment 4, the significantly lower liveweight gain is thought to be a result of lower DM intake. The Centurion and native grass components were respectively 25.7% and 19.3% digestible units lower than Kazungula. The supply of digestible nutrients for maintenance and growth, especially energy and nitrogen, is important in weaners (Moore 1984) and must be in balanced proportions for efficient utilisation (Balch 1967).

For the flow on of weaning benefits to whole herd productivity, emphasis on weaned calf nutrition should be aimed at providing a more readily digestible diet. The studies conducted on Mt. Bundey Station showed that an improved grass based pasture provided the nutrients required for growth and survival of weaners, while native pasture supplemented with either NPN, true protein sources or legumes did not.

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