EFFECT OF SEASON, STOCKING RATE, GRAIN SUPPLEMENTATION AND ANTHELMINTIC ON GROWTH OF FRIESIAN WEANERS GRAZING TROPICAL GRASS PASTURES

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SUMMARY

Forty-eight Friesian weaners grazed irrigated Setaria anceps cv. Kazungula pastures for 12 months. Treatments were (i) 8.25 weaners/ha and 0.5 kg maize/head/day; (ii) 8.25 weaners/ha and 1.0 kg/head/day; (iii) 10.75 weaners/ha and 1.0 kg/head/day; (iv) 10.75 weaners/ha and 1.5 kg/head/day. Half the calves in each treatment were treated with anthelmintic at four weekly intervals. The increased level of maize increased growth of calves. An increase in stocking rate reduced weight gain/weaner by 8%, though this decrease was reduced if a concurrent increase was made in the level of maize supplementation. Anthelmintic treatment increased growth with the greatest response in younger animals. During the wet season liveweight gains in all treatments were low and mortalities high.

INTRODUCTION

In north Queensland, dairy replacements are reared on tropical pastures. These pastures are capable of producing high dry matter yields but their digestibility is low. High stocking rates permit greater utilization of pastures, but concentrate supplementation may be. necessary to maintain intake of digestible energy by young animals. Calf losses on commercial dairy farms can be high, particularly during the wet season. In this experiment the effects of stocking rate and level of grain supplementation on growth of dairy weaners grazing irrigated tropical grass pastures were studied. The limitations to liveweight gain caused by internal parasites (nematodes) and by seasonal conditions were also investigated.

MATERIALS AND METHODS

The experiment was conducted at Ayr Research Station, situated in a tropical coastal area of predominantly summer rainfall (1092 mm annual average) 90 km south of Townsville, Queensland. Summers are hot and humid and winters cool and dry. Mean maximum and minimum temperatures are 25°C and 11°C respectively in July and 33°C and 23°C in January. Pasture was Setaria anceps cv. Kazungula, fertilized annually with superphosphate (43 kg P/ha/annum) and muriate of potash (62 kg K/ha/annum). Nitrogen fertilizer was applied as urea in equal dressings every six weeks (336 kg N/ha/annum). Pastures were spray irrigated and set stocked.

Forty-eight Friesian weaners (32 female, 16 male castrates) aged between two and seven months were used in a replicated randomized block of four main treatments:

(i) Stocking rate 8.25 weaners/ha; 0.5 kg maize/head/day
(ii) Stocking rate 8.25 weaners/ha; 1.0 kg maize/head/day
(iii) Stocking rate 10.75 weaners/ha; 1.0 kg maize/head/day
(iv) Stocking rate 10.75 weaners/ha; 1.5 kg maize/head/day

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Hammermilled maize was group fed in each treatment three times/ week (Monday, Wednesday, Friday). Two female and one male calf in each treatment replicate were treated with Nilverm at 4 cc/50 kg live weight (7 mg levamisole/kg) (maximum dose 10 cc/animal) every four weeks. Final anthelmintic treatment was given on 2.11.76. Remaining calves were not treated. All calves were treated prior to commencement of the experiment on 4.12.75 and the experiment terminated on 20.1.77. Analysis of liveweight data was covariance corrected for age of animals at entry. Sex was examined as a covariate but was not used in the presentation of results as it had little effect.

RESULTS

Prolonged periods of wet weather were experienced between December and March (summer). Calves were not provided with shelter and during this period seven young calves died during wet weather. These animals were on average 68 days old and weighed 53 kg at commencement of the experiment. Primary cause of death was considered to be exposure and pneumonia although helminthosis would have contributed to later losses. In summer abundant pasture was available in all treatments and liveweight gain and calf survival were not related to either stocking rate or level of grain fed, and calves gained only 0.21 kg/day. Highest liveweight gains were recorded during spring (Table 1).

Table 1 Effect of stocking rate (animals/ha) grain supplementation (kg/day) and anthelmintic on calf mortality, live weight (kg) and liveweight gain (kg/day) of Friesian weaners at different periods of the year

		Live Weight		Liveweight Gain				
Treatment	Deaths	4.12.75	17.12.76	4.12.75 to 20.2.76	20.2.76 to 5.5.76	5.5.76 to 5.8.76	5.8.76 to 17.12.76	4.12.75 to 17.12.76
(i)	1	86.3	239	0.23	0.37	0.22^{a}	0.64	0.42
(ii)	3	83.0	259	0.23	0.41	0.35^{b}	0.68	0.46
(iii)	1	86.7	248	0.18	0.41	0.33^{b}	0.61	0.42
(iv)	3	82.9	261	0.20	0.47	0.29^{ab}	0.69	0.46
SE		4.44	8.2	0.036	0.032	0.028	0.033	0.025
Drench	2	81.7	257	0.23	0.45^{a}	0.34^{a}	0.66	0.45
Nil	6	87.9	246	0.19	0.38^{b}	0.26^{b}	0.65	0.42
SE		3.26	5.8	0.026	0.022	0.020	0.024	0.018

Means with differing superscripts are significantly different ($P < 0.05$)

Initially stocking rate had little effect of liveweight gain, but the effect increased during the course of the experiment (Table 1). Additional supplementation increased calf growth, particularly during winter (Table 1). Increased maize supplementation maintained growth rates at the higher stocking rate. Anthelmintic treatment increased weight gains in the first part of the experiment (Table 1). The death of one untreated calf aged 7½ months on 4.3.76 was attributed to the effects of internal parasites.

Anthelmintic treatment had no effect on calf performance in spring when the mean age of calves was 12 months. Faecal samples taken from each animal on 17.12.76 and 20.1.77 for worm egg counts revealed negligible parasite levels in all animals.

Growth of calves during summer was related to size and age of animals at entry. To illustrate this relationship the heaviest and the lightest surviving animal were selected from each treatment replicate. Data for these animals have been pooled across stocking rate and supplementation treatments (Fig. 1). At entry light calves averaged 12 weeks of age and weighed 64 kg, while the heavy calves were 27 weeks old and weighed 105 kg.

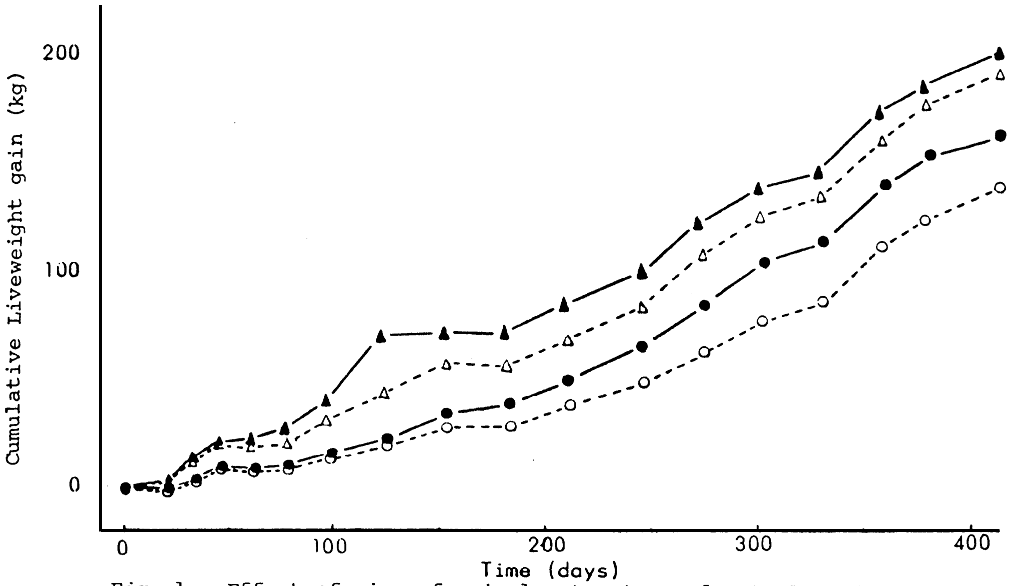

Fig. 1 Effect of size of animals at entry and anthelmintic treatment on liveweight change
(●, light calves treated; O, light calves untreated;
▲ heavy calves treated; Δ, heavy calves untreated)

DISCUSSION

Liveweight gains followed the seasonal pattern observed by Deans et al (1976), being lowest in the wet season and highest in spring. Young calves were most affected by climatic stress and several calves died during the wet season. Surveys of heifer rearing on dairy farms in north Queensland showed that mortality rates up to 45% can occur. Most of these deaths occurred during the summer wet season (Cook pers comm). Donaldson and Larkin (1963) observed low growth rates in beef cattle during summer in north Queensland and concluded that high temperatures and humidity during the wet season caused marked distress in cattle.

Grazing pressure increased with increased size of animals over time, and effects of the higher stocking rate became more apparent towards the end of the experiment. It is unlikely that low pasture yield would have restricted intake towards the end of the experiment but opportunity for selection may have been reduced.

Weaner calves in our experiment grew more slowly than did animals reared on irrigated pangola pastures in an earlier experiment at Ayr Research Station (Deans et al 1976), and liveweight gains were less than those achieved by heifers grazing kikuyu (Cowan et al 1976). Increased grain supplementation did not alleviate the problem of poor growth and response to grain was lower than might be expected considering the low digestibility of tropical pastures. This low response suggests either a high level of substitution of grain for pasture, or that growth of calves may have been limited by a low protein intake. Protein content of maize is approximately 9%, and calves may not have been able to obtain sufficient protein from pasture to efficiently utilize the energy component of their diet. In other experiments with young calves grazing tropical pastures, liveweight gains have been increased when additional protein was included in supplements fed (Moss et al 1982).

This experiment supports the observations of poor growth and deaths in young weaner calves during the tropical wet season. Both during the wet season and in the rest of the year there was an advantage in survival and growth to anthelmintic treatment of calves. It is suggested that additional protein in the concentrate supplement may be required if young dairy weaners are to achieve desired growth rates on tropical pastures,

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