

WHEAT BASED RATIONS FOR BEEF CATTLE

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SUMMARY

Pregnant Hereford cows were fed one of four drought rations commencing 3-6 months pre calving, and then one of two drought rations during the first 13 weeks of lactation. Cows fed 4.0 kg cracked wheat (CW) +0.5 kg pasture hay lost less weight pre-calving than those fed a similar amount of whole wheat (WW) (+0.6 vs -27.0 kg, respectively; $P<0.05$). Some cows in all groups had difficulty adapting to the wheat rations, and the addition of small amounts of hay to the ration did not solve this problem. Feeding frequency (every 2 or 4 days) had no effect on performance.

There was no significant difference ($P>0.05$) in either cow liveweight change, calf growth rate or milk production between feeding 5.1 kg WW +1.5 kg pasture hay or 6.0 kg WW only/cow/d during the first 13 weeks of lactation.

Over a 10 week period, there were no differences in health or weight change between steers fed 4% bentonite and introduced to 4 kg WW/hd/d within 1 week, or introduced to 4 kg WW only/hd/d within 3 weeks.

(Keywords: drought, feeding wheat, breeding cows, bentonite).

INTRODUCTION

Recent experimental work (Graham et al. 1984) on the feeding of wheat to beef cows encouraged some producers to feed wheat to cattle during the 1982/83 drought in western Victoria. However, it was felt that further work was needed to evaluate the role of small amounts of roughage in wheat based rations, the effects of feeding frequency, the processing of wheat prior to feeding and the addition of bentonite to drought rations.

MATERIALS AND METHODS

Sixty pregnant Hereford cows of live weight 502 ± 5 kg (mean $\pm$ SE) and condition score 3.4 ± 0.1 , and due to commence calving on March 1, were allocated to three blocks and, using stratification on live weight, allocated at random into the following four treatments:

- (i) 4.0 kg whole wheat (WW) + 0.5 kg pasture hay/cow/d fed every second day;
- (ii) 4.0 kg cracked wheat (CW) + 0.5 kg pasture hay/cow/d fed every second day;
- (iii) 4.2 kg WW/cow/d fed every second day;
- (iv) 4.2 kg WW/cow/d fed every fourth day.

The wheat in ration (ii) was coarsely cracked using a roller mill.

After calving, 26 cows were re-allocated to two blocks on the basis of calving date and then allocated at random to two treatments using stratified live weight. The two treatments during lactation were:- (v) 5.1 kg WW+1.5 kg pasture hay/cow/d and (vi) 6.0 kg WW/cow/d, both rations being fed every second day.

The percentage crude protein (dry basis) and percentage digestibility (in vitro, DDM% DM) of the hay and wheat used was 8.5 and 57.9, 13.0 and 89.2, respectively.

The experiment commenced on December 28 1983 and the cows were gradually introduced to their full ration over a 2-week period. WW feeding continued daily

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for a further 14 days and then progressed, over 7 days, to feeding every second day. Groups receiving CW were kept on their daily ration for an extra 7 days before being introduced to feeding every second day because they were not consuming all their ration. The transition from feeding every second day to every fourth day for group (iv) occurred over a further 4 weeks and they were on their full treatment on February 25.

Each block of each nutritional treatment group (i.e. 5 cows) was fed separately in troughs in feedlots. Ground limestone at 50 g/cow/d was added to all rations. Cows were weighed weekly and condition scored (Graham 1982) monthly. Acidosis was diagnosed on clinical signs and treated following principles suggested by Edwards (1979).

On March 21 cows that had calved were re-allocated to the two lactation treatments. On April 19 the remaining cows were allocated to their respective lactation treatments. Cows and calves were weighed weekly. Milk production figures (l/24 h) were calculated when cows were separated from their calves overnight after being suckled dry, and following an injection of 20 iu oxytocin, were machine milked. Cows and calves were put out to pasture 11 weeks after the commencement of feeding.

On June 26, 20 steers of live weight 342 ± 8 kg and previously fed all hay rations, were allocated at random (using stratified live weight) to two groups and introduced to 4 kg WW/hd/d, fed every second day using two regimes. One group was introduced over a period of 3 weeks and the other had 4% bentonite added to their ration and was receiving 8 kg WW every second day within 7 days. All animals were individually fed for a period of 10 weeks.

Analysis of variance using Duncan's test was applied to the data; data from cows that became chronically ill were excluded from analysis.

RESULTS

Animal health During the trial a total of 14 cows became ill, 11 of which were treated for acidosis; 3 in each of groups (i), (ii) and (iii), and 2 in group (iv). One from each group subsequently died from acidosis. Those cows treated for acidosis became ill between 16 to 43 days, with deaths occurring from 31 to 55 days after the commencement of feeding. One animal in each of groups (ii), (iii) and (iv) was also affected by pregnancy toxæmia between 49 and 64 days, with those in groups (ii) and (iv) subsequently dying 58 and 70 days after the start of feeding, respectively. One animal in group (vi) became ill and was removed from the trial.

There were six calf deaths during the trial, with two in treatment (iii) and one in treatment (ii) dead at birth. Two calves in treatment (ii) died 1 and 2 days after birth, and one calf in treatment (iv) died from starvation 2 weeks after birth. At the end of the trial cows and calves went directly to pasture and no problems resulted.

Cow live weight and condition score changes These are shown in Table 1. Over the pre calving period, cows in treatment (ii) maintained weight and condition whilst cows in all other groups lost ($P < 0.05$). During lactation no significant differences ($P > 0.05$) in weight or condition score loss occurred between groups.

Calf birth weight and growth rate There were no significant differences ($P > 0.05$) in calf birth weight or growth rate between groups (v) and (vi), although with both groups growth rate during the first 28 days was greater ($P < 0.05$) than

that during the last 28 days of the trial (Table 1).

Milk production Nutritional treatment had no significant influence on milk production, milk fat per cent or milk protein content (Table 1).

Steer liveweight change and health No significant difference in animal health or liveweight change was observed between groups, the liveweight changes(kg) being -23.6 and -22.5 for the wheat only and bentonite groups respectively.

Table 1 Changes in cow live weight and condition score, calf birth weight, calf growth rate, milk production and milk composition for treatment rations consisting of whole wheat (ww), cracked wheat (CW) or hay (H)

	Pre calving ration (kg/cow/d)			
	(i) 4.0WW+0.5H [†]	(ii) 4.0CW+0.5H [†]	(iii) 4.2WW [†]	(iv) 4.2WW [†]
<u>Liveweight change</u>				
28/12 - calv. (kg)	-27.8a	+0.6b	-27.7a	-25.5a
28/12 - calv. (kg/d)	-0.4a	0.0b	-0.3a	-0.3a
28/12 - 1/2 (kg)	-18.6	-12.8	-16.9	-13.9
1/2 - 29/2 (kg)	-7.5	+0.3	-9.3	-11.3
29/2 - 28/3 (kg)	+2.1	-0.9	-3.9	-8.8
6 wk pre calv. - calv. (kg)	-12.1b	+7.5a	-9.0ab	-10.6ab
<u>Calf birth wt.</u> (kg)	32.2	30.1	32.0	30.6
<u>Condition score change</u>				
28/12 - pre calv.	-0.8	-0.5	-0.7	-0.5
28/12 - 22/2	-0.4	-0.4	-0.4	-0.4
	Rations fed during lactation (kg/cow/d)			
	(v) 5.1WW+1.5H [†]	(vi) 6.0WW [†]		
Cow wt. change start-end (kg)	-30.1	-37.6		
Cow wt. change start-end (kg/d)	-0.38	-0.47		
Cond. score change start-end	-0.3	-0.3		
Calf growth rate start-end (kg/d)	0.47	0.42		
Calf growth rate start - 28 d (kg/d)	0.57	0.54		
Calf growth rate final 28 d (kg/d)	0.35	0.34		
Milk prod. 92 d post calv. (1/24h)	2.95	2.44		
Milk fat (%)	3.5	3.6		
Milk protein (%)	3.3	3.3		

[†] Fed every second day; [†] fed every fourth day

Figures within rows with different superscripts differ significantly (P<0.05)

DISCUSSION

The number of cow deaths and illnesses during this experiment was unacceptably high, and problems occurred during the first 1-2 months of feeding in all groups indicating that the addition of a small amount of hay (0.5 kg) to a wheat based ration will not solve these problems. This contradicts the findings of Hamilton and Maßen (1980) that digestive upsets in steers fed all grain rations ceased with the addition of a small quantity of hay. Under ideal circumstances a better balanced ration of hay and grain (i.e. a higher proportion of hay) should reduce these problems. Based on these results it seems probable that once cows are well adapted to a wheat based ration (and this may require 3 months) they can perform quite well on wheat only rations, since performance in this trial was satisfactory in late pregnancy and early lactation.

The problems encountered with the introduction of drought rations consisting of a high proportion of wheat may be largely due to uneven intake between individual animals in a group feeding situation. No animal health problems were

observed in our steer experiment where the animals were fed individually. We cannot make a firm conclusion on the value of bentonite in our experiment, but the absence of any health problems, despite a very short introductory period of 1 week when bentonite was included, is noteworthy. Dunn et al. (1979) reported that the addition of 2% bentonite offered protection from acidosis in lambs fed high concentrate rations.

The lower liveweight loss of treatment (ii) pre calving indicated that animals are more efficient at utilising CW rather than WW, and approximately 19% more WW would be required to produce similar weight changes as group (ii) (Anon 1976). Similar findings were reported by Hamilton and Maden (1980). Bishop and Saxton (1978) found no advantage in crushing wheat when fed alone as a drought ration to steers, but when fed with hay crushing gave a response. The apparent benefit of feeding cracked grain is decreased because of the cost of processing, the longer introductory period and the greater frequency of rejection of the ration offered (Corah et al. 1975). Also troughing would almost certainly have to be provided, whereas whole grain can be satisfactorily fed directly onto the ground (Graham et al. 1984).

Calf growth rate figures declined significantly during lactation, indicating that strategic early weaning, or perhaps creep feeding of calves, may be options to consider during extended droughts. The 24 hour milk production of mature Hereford cows in normal years would be expected to be higher than that obtained in this trial, though similar to production obtained by Saul and Morgan (1976) from 2 year old Hereford cows grazing at pasture. As could be expected with cows on a high concentrate diet, the milk fat percentages in this experiment were lower than those observed by Saul and Morgan (1976).

The choice of feeding levels during drought is dependent upon the condition of animals and pastures at the start, and the anticipated duration. Based on these and earlier experiments (Graham et al. 1984), we suggest that feeding whole grain on declining pasture residues would often be the most useful practice. It is difficult to estimate the contribution of drought affected pastures to the ration, but they appear to contribute to energy requirements and also reduce grain poisoning. Although we agree with the findings of Morris (1968) on feeding frequency, when calculating rations in the absence of pasture intake we suggest that the levels of feeding recommended by him would often be inadequate.

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