FEEDING GRAIN FOR PROFITABLE FINISHING OF GRAZING STEERS

Kay M. *TAYLOR** and *B. GULBRANSEN**

SUMMARY

Grain feeding in the paddock can be a profitable way of quickly turning off steers at the end of the growing season. Unfinished, three-year-old Brahman steers were fed grain for 61 days at one of three levels: (i) nil, (ii) l/2 *ad lib.* (7 kg/hd/d) or (iii) *ad lib,* (11 kg/hd/d), whilst grazing mature native pasture. Carcase weight gains over this period *were -0.09,* 0.52 and 0.59 kg/hd/d respectively. Corresponding fat thicknesses *were* 8.7, 12.0 and 13.3 mm at the P8 rump site. Gross margin analysis revealed profits of -$7.00, $45.00 and $35.00 per head for the three treatments. Grain conversion was most efficient at the l/2 *ad lib.* level. We recommend grain feeding in the paddock during the dry season for the profitable finishing of steers, providing that price margins and costs permit.

INTRODUCTION

Beef production in many areas of the tropics and sub-tropics is restricted by the seasonal nature of pasture production. For example, at Gayndah in the Central Burnett region of Queensland, the rainfall pattern is summer dominant, of which about 70% occurs between October and March. At the end of a normal *growing* season, the pasture matures and sets seeds. Producers commonly sell finished cattle by this time. As well, summer droughts sometimes occur, leading to increased numbers of unfinished cattle.

These cattle may be finished in one of two ways. The first, and probably most common, involves keeping the steers for another six to twelve months until ready for market. The second is to adopt some management strategy which will increase growth rate significantly during the dry season. One such strategy is to feed grain to steers grazing native pasture. The grain provides a source of highly digestible energy.

There are several possible advantages of this procedure. Weight and fat depth (finish) can be increased at a time when weight gains are normally low or negative. These two factors, either individually or jointly, often will lead to an increase in price/kg of carcase due to improved grading. Age of turnoff will also be reduced, with the added benefit of reducing grazing pressure on the property by the start of the next wet season. Less capital will be tied up in livestock at any time, and the annual cash flow can be evened out compared with that for a normal native pasture production system. These factors can all contribute to increasing profitability.

While the effects of protein supplements and molasses/urea mixes on dry season weight gains on native pasture have been widely studied (Winks 1984), similar work has not been done with grain. However, grain has been studied as a supplement to high quality forages such as oats (Gulbransen 1976). This experiment, conducted at Brian Pastures Research Station, was designed to measure growth responses to different quantities of grain fed to *grazing steers* during the dry season, and to assess the profitability of this practice.

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* *Queensland Department of Primary Industries, Brian Pastures Research Station, Gayndah, Qld, 4625.*

MATERIALS AND METHODS

Drought conditions during the normal wet season caused this experiment to commence 3-4 months earlier than would normally be expected. 472 mm of rain had fallen in the previous 12 months, just 65% of the annual average. The conditions were similar to those which are normally expected later in the year, but warmer.

Thirty, 3-year-old Brahman steers with an average live weight of 608 kg were used in the experiment. Most were heavy enough for the target market (Japanese Ox.), but unfinished. The steers were stratified on the basis of fasted live weight (24 h without feed, 12 h without water), and randomly allocated to a slaughter group of 12 animals, and to two replicates of each of the following three treatments:

(i) Control - grazed native pasture (NP),
(ii) NP + 1/2 *ad lib.* grain, and
(iii) NP + *ad lib.* grain.

Six 4 ha paddocks of predominantly black speargrass *(Heteropogon contortus)* and forest bluegrass *(Bothriochloa bladhii)* pasture were used. They had been destocked for 10 months prior to the start of the experiment and had about 3,500 kg DM/ha, similar to the yield that would be expected for these pastures at the end of a normal growing season. The stocking rate was 1 steer to 1.3 ha, but under commercial conditions in a normal season the paddocks would be continuously stocked more lightly, and previous destocking would be unnecessary.

A mixture of roller-milled sorghum grain, 1% urea, 1% limestone and 1% salt was fed daily in covered troughs for 61 days from March to May, 1988. Grain allocations were set by allowing the *ad lib.* groups virtually unlimited access to grain, and feeding approximately half of this amount *to* the 1/2 *ad lib.* groups. The groups were randomly rotated around the paddocks within replicates on the weigh day each fortnight, to cater for differences between paddocks and grazing pressures. Feeding stopped and all steers were slaughtered when most animals in the *ad lib.* grain groups were considered suitable for the Japanese market. Such carcases must weigh a minimum of 280 kg and have 10 to 32 mm of fat cover at the P8 rump site,

RESULTS

Over the duration of the experiment, rainfall totals for March, April and May were 1.8, 89.6 and 25.0 mm respectively. The rainfall was much higher than normal in April, but below average for the total period. No frosts occurred.

Measurements from the initial slaughter group gave averages of 293 kg carcase weight, 11.8 mm P8 fat depth and 48.5 dressing percentage (D%). The latter was used to estimate the initial carcase weights of the experimental steers.

The average grain intakes of the steers over the feeding period were 7 kg/hd/d for the 1/2 *ad lib.* group and 11 kg/hd/d for the *ad lib.* group. The conversion ratio (kg grain/kg extra carcase gain) for steers fed 1/2 *ad lib.* grain was 12:1, compared with 18:1 for steers fed *ad lib.* grain. Liveweight gains (LWG), carcase weight gains (CWG), fat depths and dressing percentages *were* measured (Table 1).

Table 1 Steer liveweight and carcase weight gains (LWG and CWG), fat depths (mm) and dressing percentages (D%)

	Grain intake (kg/hd/d)			s.e.m.
	Nil	7 (1/2 *ad lib.*)	11 (*ad lib.*)	
LWG (kg/hd/d)	-0.54^a	0.17^b	0.27^b	0.121
CWG (kg/hd/d)	-0.09^a	0.52^b	0.59^b	0.122
P8 fat (mm)	8.7^a	12.0^b	13.3^b	0.67
D%	50.4^a	52.9^a	53.2^a	0.67

Within rows, values with the same superscript do not differ significantly (P>0.05)

DISCUSSION

Feeding grain to unfinished steers grazing mature native pasture proved a profitable management strategy, with both carcase weight and fat depth increasing. Grain-feeding resulted in significantly greater CWG's and LWG's than those from pasture alone (P<0.05), but the higher grain feeding level gave no extra advantage. It appears that the extra 4 kg of grain fed to the *ad lib,* group substituted for roughage and therefore 'did not greatly increase the energy available for growth. This substitution probably explains the large reduction in the apparent efficiency of conversion of grain to carcase, which we observed (conversion ratios of 12:1 and 18:1 for the 1/2 *ad lib.* and *ad lib.* grain groups respectively). The feed conversion ratio for lot-fed steers of similar weight was 11.3 kg feed/kg LWG (D. H. Cameron pers. comm.), or approximately 17 kg feed/kg CWG (Morris 1969).

Feeding grain significantly increased the fat thickness of the steers (P<0.05), but again there was no advantage from the higher level of grain feeding.

In all treatments, the CWG exceeded LWG, because the D% increased markedly without a large change in LWG. The D% of our nil grain steers increased, probably because gut fill declined when green feed became available after rain in April. The change in gut fill also explains the large liveweight loss of 0.54 kg/hd/d for nil grain steers, which is greater than normal dry season loss at Brian Pastures.

The measurement of responses to supplements must relate eventually to changes in carcase weight, so factors affecting D% are clearly important. D% increases systematically as animals grow (Field and Schoonover 1967), and Tayler and Wilkinson (1972) have shown that the inclusion of concentrates in the diet reduces gut fill, which will in turn increase D%. Gut fill is negatively related to fat content (Foot and Greenhalgh 1970), which increases as body weight increases (ARC 1980). In our study, the presence of grain in the diet did not significantly increase D% (P>0.05), although the difference was very close to significance at the *ad lib.* level.

The profitability of this grain-feeding exercise is determined by the efficiency of feed conversion and the size of the increases in carcase weight, carcase finish and value per kilogram of carcase (due to higher grading/classification). Based on a price of $150/t of grain fed out, and values of $2.25/kg dressed weight (DW) for steers and $2.50/kg DW for Japanese -export bullocks, *gross* margins were -$7.00, $45.00 and $35.00 per head for the steers fed nil, 7 and 11 kg grain/day respectively. This indicates a need to restrict grain intakes to maximize profitability.

Numerous other benefits may result from feeding grain to steers in the paddock. For example, the system requires small inputs of capital and labour when compared with feedlotting. Feeding grain in the paddock can also reduce the age of turnoff of steers by six to twelve months, as demonstrated in this experiment. This releases pasture for other animals. The resultant reduction in grazing pressure may be particularly important after the start of the next wet season, when the pasture is actively growing and susceptible to damage from overgrazing. Consecutive years of drought conditions, as experienced in recent seasons, have emphasized how important this is.

Cash flow, as well as beef production on native pasture, depends largely on seasonal conditions. This grain-feeding strategy has the ability to speed up and even out annual cash flow by bringing income forward, whilst releasing tied-up capital.

CONCLUSIONS

Feeding grain is a profitable way to finish steers grazing native pasture when feed quality and perhaps quantity have deteriorated. This strategy may be more widely used under normal dry season conditions, but this experiment has also proven its value during a drought. We have shown that short-term feeding with grain during the dry season, at a restricted level, has the potential to make a worthwhile profit through increased carcase weight, better finish, higher price/kg carcase and efficient conversion of grain to carcase. This practice may have application at any location where there is a stand of mature native pasture during the dry season. Profitability will depend on animal size, target markets, price margins and costs.

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