USING SUPPLEMENTARY GRAIN TO INCREASE MARKETABILITY OF CULLED COWS

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SUMMARY

Culled cows in poor body condition and grazing mature, low-quality pastures were fed supplementary grain and cottonseed meal in an endeavour to market them quickly and profitably. Grain and cottonseed meal significantly increased carcase gains. The cows converted grain and cottonseed meal to extra carcase gain at conversion ratios of 22:l and 9:l respectively.

The feeding programme was profitable, because the extra carcase weight increased the price per kilogram of the whole carcase. This increase was in addition to the price of the extra carcase weight itself. As well as providing a short-term financial benefit, the practice can have other commercial advantages.

INTRODUCTION

Between 0.8 and 1.0 million female cattle are slaughtered annually in Queensland. Many of these are in very poor body condition and produce carcases with little value to the producer or to the processor. Cows from which calves have recently been weaned, and which are to be culled, are often in this category. Normally, these animals are retained on pasture to grow and finish, or are sold to keep pasture available for more valuable stock. In both cases, potential beef production and revenue are lost.

Livestock market reports and price schedules from meatworks indicate that relatively small increases *in* carcase weight and carcase finish often can lead to large increases in carcase value, particularly for lightweight cows. This experiment, at Brian Pastures Research Station, in sub-coastal south-east Queensland, showed that feeding supplementary grain for a short period can produce profitable increases in the value of carcases from grazing culled cows.

MATERIALS AND METHODS

Sixty Sahiwal x Hereford crossbred cows, *4-8* years old and with a mean initial fasted live weight (LW) of *367* $\pm$ s.e. *7.9* kg, were used. Their calves had recently been weaned from them. After stratification on the basis of fasted live weights (24 h without feed, 12 h without water), twelve cows were slaughtered and the remainder were randomly allocated to two replicates of each of the following treatments in a 3 x 2 factorial design.

- (i) graze native pasture (NP)
- (ii) graze NP + grain 1/2 *ad lib.*
- (iii) graze NP + grain *ad lib.*
- (iv) graze NP + 1 kg/hd/d cottonseed meal (CSM)
- (v) graze NP + grain 1/2 *ad lib.* + 1 kg/hd/d CSM
- (vi) graze NP + grain *ad lib.* + 1 kg/hd/d CSM

Seasonal conditions were dry and the pastures mature when grazing commenced in March 1988. The speargrass pastures had been ungrazed for six months before being stocked at 1 cow/hectare for this experiment. The sorghum grain was cracked in a roller-mill and mixed with 1% urea, 1% limestone and 1% salt. Supplements were fed daily and the cows were weighed fortnightly. On weigh

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days, treatment groups were rotated randomly through paddocks within replicates.

Two cows from each group were slaughtered after 40 days and the remaining two after 87 days. At slaughter, hot carcase weights and fat depths at the P8 rump site were obtained for all cows. Dressing percentages (D%) were calculated using hot carcase weights and fasted LW's (24 h without feed, 12 h without water). Fasted liveweight gains (LWG) were calculated from initial and final fasted LW's. Initial carcase weights of the experimental cows were estimated from the D%'s of the initial slaughter group. Treatment effects on these parameters were compared by analysis of variance.

RESULTS

The mean D% of the cows slaughtered at the start of the experiment was 44.6. In the first 40 days the cows ate 8.0 and 4.8 kg/hd/d of grain at the high *(ad lib,)* and low (1/2 *ad lib.)* levels of feeding respectively. Intakes increased slightly during the second period and averaged 9.4 and 5.2 kg/hd/d respectively for the total of 87 days.

Since there *were* no significant interactions between factors ($P>0.05$), only the main effects are presented, Supplementary CSM did not affect fasted LWG or D% at either 40 or 87 days ($P<0.05$). It increased CWG, but the differences *were* significant only at 87 days (0.58 vs. 0.47 kg/d; $P<0.05$). After 40 days, the P8 fat depth was significantly less for cows fed CSM than for those not fed CSM (1.3 vs. 2.0 mm;$P<0.05$). CSM did not influence P8 fat depth at 87 days.

Supplementary grain increased CWG and P8 fat depth for both 40 and 87 days of feeding ($P<0.05$; Tables 1 and 2). Fasted LWG at 87 days also increased with grain intake ($P<0.01$), but the differences were not significant after 40 days (Tables 1 and 2). D% increased with grain intake but the differences were significant only after 40 days ($P<0.05$).

Table 1 Effects of grain intake *on* fasted liveweight gain (LWG), carcase weight gain (CWG), dressing percentage (D)% and P8 fat depth after 40 days

	Grain intake (kg/hd/d)			s.e. (mean)
	0	4.8	8.0	
Fasted LWG (kg/d)	0.01^{x}	0.15^{x}	0.29^{x}	0.071
CWG (kg/d)	0.14^{y}	0.39^{x}	0.45^{x}	0.062
D%	46.1^{y}	48.8^{x}	48.3^{x}	0.56
P8 fat depth (mm)	1.0^{yz}	1.5^{xz}	2.4^{x}	0.25

Within rows, means with the same superscripts are not significantly different ($P>0.05$)

In the first 40 days, CWG ranged from -0.02 kg/d for unsupplemented cows to 0.53 kg/d for cows fed 8.0 kg/hd/d grain plus 1 kg/hd/d CSM. Following rainfall, all groups grew faster in the period from 40 to 87 days. After 87 days CWG's were 0.27 and 0.77 kg/d respectively for unsupplemented cows and cows fed 9.4 kg/hd/d of grain plus 1 kg/hd/d/CSM.

Table 2 Effects of grain intake on fasted 'liveweight gain (LWG), carcase weight gain (CWG), dressing percentage (D)% and P8 fat depth after 87 days

	Grain intake (kg/hd/d)			s.e. (mean)
	0	5.2	9.4	
Fasted LWG (kg/d)	0.31^{z}	0.55^{y}	0.84^{x}	0.064
CWG (kg/d)	0.30^{z}	0.54^{y}	0.74^{x}	0.034
D%	48.1^{x}	50.8^{x}	52.1^{x}	0.88
P8 fat depth (mm)	2.8^{y}	5.4^{y}	11.4^{x}	1.25

Within rows means with the same superscript are not significantly different (P>0.05)

Conversion ratios of grain (as fed) to additional CWG (kg grain:kg CWG) for cows fed 4.8 and 8.0 kg/d grain for the first 40 days *were* 19.1 and 26.1 respectively, and were 22:1 for cows fed either 5.2 or 9.4 kg/d grain for 87 days.

DISCUSSION

The price for a beef carcase derives essentially from its weight and its price per kilogram. The price per kilogram depends on its suitability for a particular market, which often relates closely to the finish or fat cover. At the time of this study prices for boner cows ranged from $1.30/kg for carcases weighing 130-160 kg, to $1.80/kg for carcases weighing *more* than 200 kg. This range in prices is largely a reflection of the costs involved in slaughtering cattle. Better finished carcases that were heavier than 180 kg attracted a further premium of 10c/kg. Changes in carcase weight may therefore increase the value per kilogram of the whole carcase, and have far greater worth than the value of the extra weight alone.

Supplementary CSM increased carcase ADG, but each extra kilogram of carcase gain required 9 kg of CSM. This makes the supplement unprofitable if the only benefit is extra carcase weight. *However,* in a longer period of feeding the response may be large enough to increase the price per kg of the whole carcase. The CSM appeared to reduce P8 fat depth in the first 40 days(P<0.05). The most likely way for a supplement to influence fat depth is by changing carcase weight. In this case CSM had little effect on carcase gain, so the depression of P8 fat depth is probably an artifact resulting from the very low fat cover on the cows.

As intakes of grain increased, so too did carcase ADG and P8 fat depth, no doubt in response to a nett increase in the intake of dietary energy. Responses in fasted ADG followed the same pattern but in grain/pasture systems changes in live weight often do not accurately reflect changes in carcase weight. This is because gut fill decreases (and D% increases) with increasing grain content in the diet (Tayler and Wilkinson 1972), while D% also increases with increasing fatness (Foot and Greenhalgh 1970). In the case of the unsupplemented cows, the increase in D% up to 40 days probably arose from a decrease in gut fill with the availability of some green feed following rainfall.

Cows which have recently come through a period of LW loss, such as those used in this experiment, could be expected to eat large quantities of feed-and make rapid, efficient compensatory gains (Wilson and Osbourn 1960). Price and Berg (1981) have reported conversion ratios of a feed-lot diet to carcase gain of 19:1, in cows with a mean starting weight of 477 kg and fed for 63 days. In the present experiment the conversion ratio of supplementary grain to extra carcase gain was 22:1, compared with 14:1 reported for similar cows in a feedlot (Plasto, pers. comm.). However, the conversion ratio of 22:1 did not take account of the effects of the substitution of grain for roughage in the animals' diet, and is likely to have underestimated the actual efficiency of conversion of the grain (Gulbransen 1974). This is the most likely explanation for the apparently inefficient utilization of grain, particularly for the longer feeding period, when the unsupplemented cows gained rapidly.

Supplementation proved to be profitable despite the apparently inefficient and uneconomical conversion of supplementary grain and CSM to extra carcase weight. During the first 40 days of feeding the average return was approximately $30/head after subtracting supplement costs. While responses to the supplements for the extended feeding period *were* similar to those in the 40 day period, the rapid growth of unsupplemented cows following rain eroded the financial benefits of extra gain resulting from the supplements.

The explanation for overall profitability despite uneconomical feed conversion, lies in the price increments received for increases in carcase weight and carcase fat depth. For example, at the prices existing at the time of this work, increasing carcase weight from 155 kg to 185 kg added $122 to the value of the carcase, and a bonus of 10c/kg for better finish would have added a further $18.50. At a conversion ratio of 22:1 this carcase gain would require 660 kg of grain, which at $150/tonne fed, would cost $99. This leaves a gross margin of about $40/head.

The increase in carcase value came from extra weight and better finish, but mostly from moving the carcases into higher-priced weight ranges. This resulted in useful short-term profits, although that is only one of the benefits this management practice can have. Other benefits include accelerated disposal of culled cows to reduce grazing pressure and an evening-out of cash-flow by providing sale cattle at a time when they are not normally available. It can also speed up cash-flow by bringing sales forward, allowing earlier access to capital previously tied up.

In short, feeding supplementary grain to culled cows can provide the commercial cattleman with a wide range of benefits and options. However, before beginning to feed, he needs to ensure that a worthwhile increase in price per kilogram of carcase can be produced within a reasonable period of feeding.

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