

UTILISATION OF GRAIN RATIONS ON SOWN PASTURES IN CENTRAL QUEENSLAND

M. JEFFERY^A, I. LOXTON^B, T. JAMES^C and R. HOLROYD^D

^A Dept of Primary Industries, Brigalow Research Station, Theodore, Qld 4719

^B Dept of Primary Industries, Box 5545, Rockhampton, Qld 4702

^C Dept of Primary Industries, PO Box 967, Charters Towers, Qld 4820

^D Dept of Primary Industries, Locked Bag 4, Moorooka, Qld 4105

A number of studies on Brigalow Research Station, Theodore, in Central Queensland, investigated the performance of different classes of cattle, with or without grain diets, on sown tropical pastures based on buffel and rhodes grasses. These studies were conducted for the Meat Research Corporation's DAQ 065 research project and monitored the growth, carcass attributes, meat quality and market suitability of weaner heifers and steers, 2½ year-old steers and aged cull cows. The majority of grain feeding was on an *ad lib.* basis during the winter-spring period when cattle growth rates on pastures are traditionally at or just above maintenance level.

Feeding grain to 450 kg 2½ year-old steers at pasture that were targeted at the Korean market, decreased time to turn-off by up to 90 days compared to steers grazing pasture alone. There were no differences in carcass attributes, including rump fat depth, eye muscle area, dentition, meat or fat colour or market suitability between the grain assisted or pasture finished steers at slaughter.

In another project, the proportion of steers meeting minimum carcass weights (280 kg) for the Japanese grass-fed market increased from 10% to 80 and 90% for steers grazing pasture or those supplemented with grain in either their second, or first and second winter-spring periods post weaning respectively. Compensatory growth by the steers fed in the second winter-spring period eroded all live weight advantages of those fed in the first year. Compensatory growth of the non-supplemented steers during the summer periods also decreased the advantages to grain feeding. In order to achieve maximum economic returns from grain feeding, animals are best fed in the final winter-spring period before slaughter. In general, animals should be turned off during or at the end of this period rather than carrying them over to the next summer.

Grain feeding weaner heifers on pasture to maintain growth rates above 0.5 kg per day reduced age of turn-off at all targeted carcass weights, yet influenced carcass parameters and market suitability at light carcass weights only. Feeding a grain ration reduced time to turn-off compared to pasture finished heifers by 200 days when the animals were slaughtered at carcass weights of 200, 240 and 280 kg. Rump fat depths of the grain-assisted 200 kg carcass weight heifers were greater than the pasture finished 200 kg carcass weight heifers (14.6 mm vs 11.3 mm). At heavier carcass weights, the pasture finished heifers had greater fat depths, 25.4 mm vs 22.6 mm at 240 kg carcass weight and 26.9 mm vs 26.0 mm at 280 kg carcass weight. The decreased age of turn-off of the grain-assisted heifers resulted in lower dentition values than the pasture finished groups at the same carcass weight. All grain-assisted heifers had dentition values suitable for the markets they were targeted at, while 10% of the pasture finished heifers turned off at 200 kg carcass weight, and 18% turned off at 240 kg carcass weight, had four permanent teeth, making them unsuitable for the domestic market.

Grain supplements had no effect on meat colour at any carcass weight, while fat colour was influenced only slightly at light carcass weights. None of the heifers in either the grain-assisted or pasture finished groups had fat colours outside the desired market ranges. Marbling scores of heifers were influenced by grain assistance at 240 kg carcass weight (2.2 vs 1.5 for the grain assisted and pasture finished groups respectively) but not at 280 kg carcass weight, where each finishing system had an average marbling score of 2.0. Ninety-five per cent of the grain assisted heifers slaughtered at 240 kg carcass weight had marbling scores of ≥ 2 compared to 41% of the pasture finished group. Overall fat content of the *Longissimus dorsi* (LD) was influenced by nutrition. Grain assistance increased the fat content of the LD muscle by 0.6% at 200 and 240 kg carcass weights and by 3.1% at 280 kg carcass weight.

There was little direct effect of supplemental grain on meat quality. Ultimate pH levels of the LD muscle were not influenced by grain assistance. Warner-Bratzler shear force initial yield values were lower at all carcass weights for the grain-assisted groups than the pasture-finished heifers. The main reason for this however, is the younger age at slaughter of the grain-assisted heifers, not the nutritional regime.

Reducing the age of turn-off of surplus heifers from 3 years to 2 years of age can be shown, through modelling, to increase total breeding herd sales by up to 16%. In finishing enterprises, this decrease in turn-off age has a far greater effect, increasing sales by up to 50% over 3 years.

Carcass and liveweight gains of 0.6 and 0.7 kg per day were achieved by feeding up to 9 kg of grain per day to poor, aged cows grazing winter-spring pastures. These growth rates were twice those of similar cows grazing pastures alone. Carcass gains of 80 kg were achieved in 130 days compared to 243 days required for the pasture only cows to reach the same weights. Net increases in value of the grain assisted cows of \$130 per head compared to \$300 per head for the pasture finished cows with grain rations valued at \$210 per tonne. The faster rate of carcass gain in the grain assisted cows would however allow up to 3 turn-off groups each year, compared to only 1½ turn off groups per year from pasture finished cows. When slaughtered at the same carcass weight, there were no differences in market grading, rump fat depths or yields of saleable meat between the grain assisted or pasture finished cows.

The greatest effect of feeding grain on animals grazing pasture in all the studies has been increased growth rates. This has resulted in significant differences in turnoff age and reductions in time to turn-off. There was very little direct influence of grain feeding on carcass parameters at heavy carcass weights, or meat quality at any carcass weight. The increase in growth rate due to grain feeding can increase the turnover rate of animals and allow more flexibility in marketing, especially of young animals. In order to maximise economic returns from grain feeding on pasture, animals should be slaughtered during or as soon as possible after feeding is completed. Compensatory growth by contemporary non-supplemented animals during periods of good pasture growth will reduce the benefits of feeding.