THE COMPARATIVE LIVE WEIGHT AND CARCASS PERFORMANCE OF FIRSTCROSS BRAHMAN CROSSBRED STEERS IN CENTRAL QUEENSLAND

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SUMMARY

Firstcross (F1) steers resulting from joining either Simmental or Hereford bulls to Brahman cows, or joining Brahman bulls to Hereford cows over three years from 1981 to 1983 were compared on a commercial beef property in central Queensland. Simmental sired steers recorded significantly higher ($P<0.05$) live weight gains after weaning, and were significantly heavier ($P<0.05$) at approximately 48 months of age than the other two genotypes (703 v 658 and 668 kg, respectively). Carcass weights of the Simmental and Brahman sired steers were significantly greater ($P<0.05$) than the Hereford sired steers. However, Simmental sired steers had significantly less ($P<0.05$) P8 rump fat than either of the other two genotypes (17 v 27 and 22 mm, respectively).

INTRODUCTION

Crossing the original British *Bos taurus* breeds such as Hereford and Shorthorn *in* tropical and sub-tropical regions of Australia *to Bos indicus* (mainly Brahman) resulted in increased herd productivity due mainly to increased growth rates and lower mortality rates (Rudder 1978). The *Bos indicus x Bos taurus* crossbreds were better able to express their inherent productive capacity due to better adaptation to environmental constraints (Turner 1975). Mason (1971) reported that large European *Bos taurus* breeds such as Simmental had higher growth rates than British *Bos taurus* breeds. There is, however, a paucity of information to indicate whether this increased capacity for growth can be exploited in *Bos indicus x Bos taurus* crossbreds in tropical and sub-tropical environments. This paper reports on a breed comparison with firstcross steers resulting from joining Simmental or Hereford bulls to Brahman cows, or joining Brahman bulls to Hereford cows.

MATERIALS AND METHODS

The trial was conducted on the commercial beef property, "Junedale", located 24°45'S, 149°50'E, approximately 180 km south-west of Rockhampton in the central Queensland brigalow region. Average annual rainfall is 720 mm of which approximately 70% is received between November and April. Maximum and minimum ambient temperatures vary from means of 33°C and 21°C in January to 21° and 6°C in July respectively. In addition to high ambient temperatures, environmental constraints include cattle ticks, gastro intestinal helminths, blight and fluctuating pasture nutritional levels.

The trial animals grazed improved pastures comprising buffel grass (*Cenchrus ciliaris),* rhodes grass (*Chloris gayana),* green panic (*Panicum maximum* var. trichoglume) and native species growing on duplex and cracking clay soils. These grazing conditions would be expected to produce annual liveweight gains in growing animals in the range 145-220 kg (Rudder *et al.* 1982).

The 215 datum animals were firstcross (F1) steers resulting from joining Simmental bulls with Brahman cows (SxB; 17, 26 and 27 calves born in 1981, 82 and 83 respectively), Brahman bulls with Hereford cows (BxH; 18, 32, and 29 calves respectively) and Hereford bulls with Brahman cows (HxB; 20, 27 and 19

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calves respectively); in each case, animals were naturally mated in multiple-sire groups. The bulls were commercially available herd bulls. During the joining season from December to March, the cows grazed in separate groups. For the rest of the year the Brahman cows grazed together while the Hereford cows were kept separate to suit property management needs. However, all cows grazed similar pastures at the same stocking rate.

During the calving period (September-December), calves were given a permanent identification number, cow/calf identification was carried out, and birth dates estimated on four occasions at monthly intervals. After weaning in June at approximately 7 months of age, all steers grazed together on pastures as described above until approximately three months before sale when they grazed dryland forage oats. Steers were not treated to control parasites (internal or external) and did not receive growth promotants. Unfasted liveweights were taken at weaning and at approximately six monthly intervals. After sale for slaughter, steers were randomly loaded onto trucks and transported approximately 200 km to the meatworks. The interval between final weighing and slaughter was 7 days in 1982 and 1984, and 12 days in 1983. Hot carcass weight and P8 rump fat were measured on the slaughter floor. (Table 1)

Table 1 Mean dates of birth, weaning, final weighing and slaughter for the three year groups

Year weaned	Birth	Weaning	Final weight	Slaughter
1982	22 Nov 81	15 Jun 82	13 Nov 85	20 Nov 85
1983	26 Oct 82	14 Jun 83	15 Nov 86	27 Nov 86
1984	14 Nov 83	13 Jun 84	30 Sep 87	7 Oct 87

Statistical methods

The main effects of year, genotype, and their interaction were fitted in a fixed effects unbalanced ANOVA model using least-squares. Error was estimated from the variation amongst individual animals within year and genotype groups. Means were compared using the protected LSD procedure at the 5% level of significance.

RESULTS AND DISCUSSION

There was no significant year X genotype interaction ($P>0.05$) for either liveweight or carcass measurements. Steers from Brahman cows (SxB and HxB) were heavier at weaning than steers from Hereford cows (BxH), but only the SxB steers were significantly ($P<0.05$) heavier than BxH steers (Table 2). The weaning weights of the reciprocal Brahman-Hereford genotypes were not significantly different ($P>0.05$).

While genotype comparisons are confounded with any pre-weaning management group effects, we believe that the differences recorded in weaning weight are due mainly to the superior mothering ability of the Brahman cows in this environment. The advantage to the HxB steers over BxH steers at weaning is expected because Brahman cows are better adapted to the sub-tropical environment and would produce more milk than Hereford cows rearing BxH steers.

Although the dam effect would be expected to be eroded at 18-20 months of age (Seifert et *al.* 1980), SxB steers grew significantly ($P<0.05$) faster after weaning and were significantly ($P<0.05$) heavier at final weighing than the other two genotypes. After weaning, the BxH steers had significantly higher ($P<0.05$) liveweight gains than the HxB steers resulting in no significant difference (P>0.05) in final weight between the two reciprocal Brahman-Hereford genotypes.

Table 2 Weaning weight, post-weaning average daily gain, and final weight for the three F1 genotypes

Genotype	n	Weaning weight (kg)	Average daily gain post-weaning (kg)	Final weight (kg)
SxB	70	221[a+]	0.391[a]	703a
BxH	79	203[b]	0.378[b]	668b
HxB	66	212[ab]	0.362[c]	658b
Average l.s.d.[#] (P=0.05)		11	0.013	17

+ Where superscripting is used within columns, the F test in the ANOVA was significant at P = 0.05. Means within columns not followed by common letters are significantly different.
# Average l.s.d. is presented but exact values were used in pairwise testing.

Table 3 Carcass weight and rump fat for the three F1 genotypes

Genotype	Hot carcass weight (kg)	Rump fat at the P8 site(mm) Mean	Carcasses (% of total) in the range: <12mm	12-32mm	>32mm
SxB	383[a+]	16.8[c]	24	73	3
BxH	376[a]	26.6[a]	3	76	21
HxB	362[b]	22.3[b]	9	82	9
Average l.s.d.[#] (P=0.05)	10	2.5			

+ Where superscripting is used within columns, the *F* test in the ANOVA was significant at P = 0.05. Means within columns not followed by common letters are significantly different.
# Average l.s.d. is presented but exact values were used in pairwise testing.

Carcass weights of the BxH steers were not significantly different (P>0.05) from those of the SxB steers. HxB carcasses were significantly lighter (P<0.05) than the other two genotypes (Table 3). Subcutaneous fat thickness at the P8 rump site of the SxB steers was significantly lower (P<0.05) than the HxB which in turn was significantly lower than the BxH. While the majority of all steer genotypes were within the preferred fat range (12-32 mm or score 4 and 5 in the AUS-MEAT language), 24% of SxB steers had less than 12 mm compared to 3 and 9% for the BxH and HxB steers respectively. At the other end of the range, 21% of the BxH steers had greater than 32 mm of rump fat compared to 3 and 9% for the SxB and HxB steers respectively. Fat measurements were taken at the P8 site only, and there were no observable genotype differences in distribution of subcutaneous fat.

CONCLUSIONS

In terms of post-weaning liveweight performance and final weight at approximately 48 months, firstcross Simmental x Brahman steers were superior to firstcross Brahman X Hereford and Hereford X Brahman *steers.* The superior growth rates of the Simmental X Brahman steers compared to the Hereford X Brahman steers would indicate that the increased growth potential of the European *Bos* taurus breeds, such as Simmental, can be exploited in tropical and sub-tropical environments. The heavier carcass weight and lower rump fat measurement in the SxB steers would result in higher saleable meat yield (Johnson 1988). The majority of carcasses from all genotypes were within the preferred rump fat range of 12 to 32 mm for this class of cattle. However, even at these high slaughter weights, 24% of the SxB had less than 12mm (less than AUS-MEAT score 3) and close attention would need to be paid to fat deposition during selection of Simmental X Brahman genotypes in a breeding programme to ensure that a proportion of carcasses are not penalized because of insufficient fat cover, given the current market specifications. While the accumulation of excess fat is wasteful before and after slaughter, overfat carcasses can be trimmed to suit a specification whereas lean carcasses have limited market outlets. Also, in areas of low to moderate nutritional levels the earlier maturity and the ability of the Brahman-Hereford genotypes to finish at lighter weights would allow greater versatility in turn-off regimes.

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