THE EFFECT OF GENOTYPE AND ZERANOL IMPLANTATION ON PERFORMANCE OF STEERS GRAZING MITCHELL GRASS PASTURES IN NORTH-WEST QUEENSLAND

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SUMMARY

Steers of seven different genotypes were purchased from six locations in north-west Queensland and their liveweight performance was compared while grazing Mitchell grass pastures.

Only small differences were recorded in liveweight gain between steers containing the approximate breed components of Africander 3 Shorthorn 5, Sahiwal 3 Shorthorn 5, Santa Gertrudis, Brahman 4 British 4, and Brahman 6 British 2. The Bos indicus infused steers had annual liveweight gains of 135 compared with 110 kg/head/year in the comparable age Hereford group.

Zeranol implantation gave 6% advantage in liveweight gain during the first 84 d post implantation. This response was consistent across genotype groups. Final liveweight of treated steers was 3% heavier than of untreated steers, although zeranol treatment was given 444 d before slaughter.

INTRODUCTION

There is a paucity of information documenting liveweight performance of steers grazing predominately Mitchell grass (Astrebla spp.) pastures growing on open downs country in north-west Queensland. The environmental constraints of high temperatures, incidence of bovine infectious keratoconjunctivitis and fluctuating nutrition suggest that Bos indicus infused steers would have higher liveweight gains than Bos taurus steers (Rudder 1978). However, the introduction of Bos indicus infused cattle in the area has lagged behind that of other areas in Queensland (Anon 1982).

Tyler and Arthur (1977) reported average annual liveweight gains of 0.29 and 0.36 kg/head/d from Shorthorn and Brahman Shorthorn steers grazing Mitchell grass pastures. Liveweight gains of 0.19, 0.33 and 0.36 kg/head/d during a 265 d period starting 23rd July were reported by Dodt (1980) using Shorthorn, Sahiwal Shorthorn and Africander Shorthorn steers grazing Mitchell grass pastures.

This paper reports liveweight and carcase performance of five Bos indicus infused genotypes and two Bos taurus genotypes grazing Mitchell grass pastures in north-west Queensland. Also, the effect of zeranol implants on each genotype was observed.

MATERIALS AND METHODS

This experiment was conducted at Toorak Research Station (21°2' S 141°48' E) which is approximately 50 km south from Julia Creek. The major pasture species were Mitchell (Astrebla spp.) and Flinders (Iseilema spp.) grasses growing on the grey and brown self mulching cracking clay soils of the open downs.

Mean annual rainfall is 401 mm with 77 percent of this total expected

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during December to March (Anon 1975) but seasonal and annual rainfall in this region is extremely variable.

Seven genotypes each of 44 steers were purchased 3 to 15 months before the trial started on 8/8/80. The steers were purchased from six locations in north-west Queensland. These were: Shorthorn (Sh) - Richmond; Africander Shorthorn (A3 Sh5) - Camooweal; Santa Gertrudis (SG) - Richmond; Hereford (H) - Richmond; Sahiwal Shorthorn (Sa3 Sh5) - Camooweal; Brahman British (B4 Br4) - Richmond; High Grade Brahman British (B6 Br2) - Julia Creek. The steers from Camooweal were bred on the same property but were reared in different paddocks until weaning.

The letters and numerals in the abbreviations describing the crossbred steers indicate the approximate components of each breed. The British component represents both Shorthorn and Hereford ancestry.

At the start of liveweight recording the Sh steers were approximately 2.5 years of age and the other six genotypes were approximately 1.5 years of age.

The steers grazed as a common group during the pre-experimental and experimental periods. The stocking rate varied from one steer to 5.44 ha during the first 13 months of the experiment to one steer plus 2.60 pregnant ewes to 5.44 ha during the last eight months of the experiment. During this period the stocking rate was estimated to be one steer equivalent to 4.11 ha using the assumption that eight sheep have the same grazing requirement as one steer.

Fasted liveweight was recorded during the experimental period and carcase weight and fat depth at the 12/13th rib site were recorded at slaughter. The travelling and pre-slaughter spelling period was four days during which the steers had access to water but not feed.

On the 19/2/81 the steers were randomly allocated within genotype to two groups and one group was implanted with 36 mg zeranol.

Liveweight, liveweight gain, carcase weight, dressing percentage and fat thickness were analysed by analysis of variance. The method of least squares was used to fit constants for genotype and zeranol treatment effects. Pairwise differences between genotypes were tested by the protected LSD proceedure. Average LSD values are shown but the values used to test for significant differences were those appropriate for each pairwise contrast.

RESULTS AND DISCUSSION

Table 1 shows the effect of genotype on liveweight, liveweight gain, carcase weight, dressing percentage and fat depth.

There were significant differences between genotypes in initial liveweight. This was a result of previous environmental conditions as well as genotype differences. The advantage to the Bos indicus infused steers over the comparable age Hereford steers ranged from 20 to 32 percent. This advantage is within the range reported from comparative trials between Bos indicus infused and British cattle in tropical environments (Rudder 1978).

During the first dry season (8/8/80 to 12/11/80) all genotypes lost live-weight. Liveweight losses were least in the H and B6 Br2 groups. At similar liveweights the Bos indicus infused genotypes could be expected to lose least liveweight because of lower maintenance requirements (Frisch and Vercoe 1978). Lack of agreement with this expectation is probably due to higher initial

live weight in the Bos indicus infused groups and increased age in the Sh group.

From 12/11/80 to 9/12/81 there was no difference between the Bos indicus infused genotypes in liveweight gain. The H group gained at a lower rate than the infused groups but the older Sh group gained at a similar rate to the infused groups.

During the 9/12/81 to 9/5/82 period there was no significant difference between the Bos indicus infused genotypes in liveweight gain. The H and Sh groups had a similar liveweight gain which was lower than for the infused groups.

Table 1 Effect of genotype on initial liveweight, liveweight gain, carcase weight, dressing percentage and fat depth.

Genotype	Initial weight kg	Liveweight gain kg/day			Final weights		Dressing %	Fat mm
		8/8/80 12/11/80	12/11/80- 9/12/81	9/12/81- 9/5/82	Live	Carcase		
Sh	262^{b}	-0.18^{bc}	0.38^{a}	0.50^{bc}	463^{bc}	227^{c}	48.9^{b}	6.9^{a}
A3 Sh5	257^{bc}	-0.20^{c}	0.37^{a}	0.58^{a}	465^{bc}	229^{c}	49.4^{ab}	5.9^{ab}
SG	278^{a}	-0.21^{c}	0.37^{a}	0.54^{ab}	483^{a}	243^{a}	50.2^{a}	4.8^{c}
H	210^{d}	-0.09^{a}	0.30^{b}	0.48^{c}	394^{d}	188^{d}	47.6^{c}	2.8^{d}
Sa3 Sh5	259^{bc}	-0.20^{c}	0.37^{a}	0.56^{a}	472^{abc}	233^{bc}	49.4^{ab}	6.1^{ab}
B4 Br4	261^{bc}	-0.15^{b}	0.38^{a}	0.55^{a}	479^{ab}	239^{ab}	50.0^{a}	5.1^{bc}
B6 Br2	251^{c}	-0.14^{ab}	0.36^{a}	0.54^{ab}	461^{c}	228^{c}	49.7^{ab}	4.6^{a}
LSD (P = 0.05)	11	0.05	0.02	0.04	16	10	0.9	1.1

Means in the same column with different superscripts are significantly different.

Amongst the Bos indicus infused groups, annual liveweight gain based on the 12/11/80 to 9/12/81 period averaged 135 kg/head while the comparable age H group gained 110 kg/head. This is a 23% advantage to tropically adapted steers. Tyler and Arthur (1977) reported annual gains of 131 and 106 kg/head in B4 Sh4 and Sh steers respectively. The older Sh steers gained 139 kg/head annually which is similar to the Bos indicus infused steers and 29 kg more than the H steers. Sutherland (1959) reported that steers aged approximately 21 months at the start of the annual period gained an average of 58 kg/year more than steers 12 months younger. However, the effect of genotype and any residual effect of pre-purchase treatment cannot be separated.

Final liveweights and hence carcase weights were strongly influenced by initial liveweight. Comparisons between the groups of steers indicate that slaughter age at a constant body weight would be reduced approximately one year by using Bos indicus infused steers.

Bos indicus infused groups had higher dressing percentage than the comparable age H group. This is consistent with previous work (Hewetson 1962). The fat depth of all groups except the H group was sufficient for most markets. Therefore the requirement to retain Bos taurus cattle for an extra year is not due only to body weight but also fat cover.

Table 2 shows the effect of zeranol treatment on liveweight, carcase weight, dressing percentage and fat depth.

During the 84 days post implantation, treated steers gained at a faster rate than untreated controls (0.99 vs. 0.91 kg/head/d, $P < 0.01$). The advantage to zeranol treatment apparently continued during the following 67 and 87 d periods with gains of 0.45 vs. 0.40 kg/head/d ($P < 0.05$) and 0.38 vs. 0.34 ($P < 0.05$) respectively. However the apparent advantage from 84 to 248 d post implantation should be interpreted cautiously because the activity period of zeranol implants is thoughtto last for up to 120 d with an optimum response period of 65 to 90 d after treatment (Bennett et al. 1974).

Table 2 Effect of zeranol implantation on liveweight, carcase weight, dressing percentage and fat depth.

	Liveweight kg					Carcase	Dressing	Fat
	19/2/81	14/5/81	15/10/81	9/12/81	9/5/82	kg	%	mm
Control	254	331[a]	388[a]	371[a]	452[a]	221[a]	49.3	5.0
Zeranol	260	342[b]	407[b]	387[b]	467[b]	230[b]	49.3	5.4
LSD(P=0.05)	7	8	8	8	9	5	0.5	0.6

Means in the same column with different superscripts are significantly different.

The advantage due to zeranol implantation was partially lost from 15/10/81 to 9/5/82 but some remained at slaughter. This advantage was consistent across genotypes.

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