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Age at castration after puberty has no effect on carcass weight

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INTRODUCTION

Bulls grow faster than steers but produce meat with lower quality, which presents fewer marketing opportunities. Castration post-puberty improves several attributes of meat quality compared with bulls and theoretically it could be used to exploit the faster growth rates of bulls. However, the 23 kg liveweight advantage of bulls over steers, when surgically castrated at 17 months-of-age, was lost in the subsequent 5 months to slaughter, because of poorer post-castration growth rate (Cosgrove *et al.* 1996). It was not clear whether this was because of stress from surgical castration, or physiological effects associated with their age at castration. This trial examined the effect of age at castration on subsequent growth rate and carcass characteristics at slaughter.

MATERIALS AND METHODS

Seventy, 6-month old Friesian bulls at AgResearch, Flock House, were randomly allocated to 5 groups (n=14) in February 1995. One group remained entire, and the other four were surgically castrated at either 7, 12.5, 15, or 17 months-of-age (bulls, steers, C12, C15, and C17, respectively). Animals were grazed as a single group, weighed 2-weekly, and slaughtered at 22 months-of-age (June 1996).

RESULTS

At castration, C12, C15, and C17 bulls weighed 301, 417, and 474 kg, respectively, and at these ages were 5%, 7.7%, and 8% heavier ($P<0.05$) than steers (Table 1). The liveweight advantage of C12 was lost within 1 month of castration, and from then until slaughter their liveweight gain was similar to steers. The greater liveweight advantage of C15 and C17 diminished over a longer period, but by slaughter all castrates and steers were similar in liveweight. Liveweight gain of C15 and C17 over the last 77 days before slaughter (ie commencing 4 and 2 months after C15 and C17 castrations, respectively), were lower ($P<0.01$) than that of steers, which were lower than bulls (Table 1).

Bulls produced heavier carcasses than castrates or steers ($P<0.001$), and there was no significant difference in carcass weight among castration ages. When corrected for carcass weight, clod weight (fore-quarter primal) was greater ($P<0.01$), and rump weight (hind-quarter primal) was less ($P<0.001$) for bulls than for steers or castrates, which were similar.

The carcasses of all castrates were classified as steer. When corrected for carcass weight differences, the effect

of castration differed depending on attribute measured. As age at castration increased (and time to slaughter decreased), and assuming bulls as castrated at slaughter (ie C22), neck muscle thickness increased ($r=0.87$; $P<0.001$), and fat depth decreased ($r=-0.80$; $P<0.001$). Bulls had the largest eye muscle area, but this was significantly greater ($P<0.05$) than steers and C12 castrates only, and did not differ from C15 or C17 castrates.

TABLE 1: Liveweight gain, carcass weight and carcass attributes¹ for steers and bulls, and bulls castrated at 12 (C12), 15 (C15) and 17 (C17) months-of-age.

Item	Treatment					Signif. ²
	Steers	C12	C15	C17	Bulls	
Liveweight gain ³ (kg/hd/day)	0.52	0.48	0.39	0.32	0.71	***
Carcass wt (kg)	259	261	258	265	300	***
Clod wt (kg)	7.3	7.5	7.4	7.5	8.0	**
Rump wt (kg)	4.5	4.6	4.7	4.5	4.3	***
Neck muscle thickness (mm)	35.3	37.2	39.5	43.7	47.7	***
Fat depth (mm)	3.4	3.0	2.8	1.8	1.0	***
Eye muscle area (cm ²)	61.2	60.6	64.8	63.5	67.8	*

¹ Corrected for carcass weight differences.

² *, **, *** indicate significant differences at $P<0.05$, $P<0.01$ and $P<0.001$, respectively.

³ Liveweight gain over 77 days, to slaughter.

CONCLUSION

The results indicate that independent of the age at castration, castrates grow at a slower rate than steers, at least until they attain a similar weight to steers. This depression in growth rate below that for steers lasted longest for C15 and C17 castrates. The long duration suggests that stress associated with castration is unlikely to have caused the lower LWG, and raises questions about the physiological effects of castration. Castrates developed steer-like carcasses in the relative weight of primal cuts, but did not completely lose the advantage in eye muscle area.

REFERENCES

Cosgrove *et al.* (1996) *Proceedings of the New Zealand Society of Animal Production* **56**: 390-393.