The Effect of Post-Pubertal Castration on Behaviour in Beef Cattle

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Castration of male beef cattle is advantageous for management, however pre-pubertal (early) castration results in comparative losses in growth rate (Jago *et al*., 1996). Post-pubertal (late) castration may maintain growth rate but lead to management problems. The behavioural differences between early castrates (9mo) and late castrates (18mo), which may have an effect on growth rate were studied.

One hundred and fifty one calves of 3 genotypes (*Bos indicus* (n=51), *B. taurus* (n=53), and F_1 cross (n=47)) grazing together, were allocated to four treatment groups; – early castration (n=43) or late castration under sedation (n=108), with (n=81) or without (n=70) estradiol (E_2) implanted at castration. A sample of 9 animals from the early castrate +E_2 group and 9 from late castrate +E_2 group (TRT, early/late) were randomly selected for observation (n=3 for each genotype). The average growth rate for each sample group reflected that of each corresponding treatment group.

Cattle were observed during 24 sessions over 3 weeks (12 in the morning and 12 in the afternoon), both 1mo before (March 1999) and 6mo after (September 1999) the 18mo castration date (PERIOD). Each animal was observed for 12 consecutive 10-second intervals during each session. Therefore, each animal was observed for a total of 288 10s intervals both in Mar and Sept.

During each 10s interval it was noted if the animal was lying, standing, slowly walking or quickly walking (*State*). Other behaviours recorded were *Intake* (grazing/ruminating or not), *Energetic* behaviour (milling, pushing, continually tail flicking or not), everyday miscellaneous behaviours (*EMB*; drink, defecate, sleep), annoyance behaviours (*AB*; tail flick, head swish), comfort behaviours (*CB*; rub, self groom), aggressive sexual behaviours (*ASB*; butt, sniff, lip curl), other miscellaneous behaviours (*OMB*; call, chew/sniff object), sexual behaviours received (*SBR*; sniffed, lip curled), mounting (*MNT*), being mounted (*MTD*), pushing (*PSH*) and being pushed (*PSD*).

The chi-squared test was used to determine the relationship between TRT and *State* in Mar and Sept. The occurrence of *Intake*, *Energetic*, *EMB*, *AB*, *CB*, *ASB*, *OMB*, *SBR*, *MNT*, *MND*, *PSH* and *PSD* was converted to a proportion of the total observation time. These data were arcsine transformed and subjected to analysis of variance using the split-plot formation for repeated measures data, where the factor PERIOD was the subplot treatment.

There were no behavioural differences between genotypes. Some large differences in *AB*, *ASB*, *PSH* and *Energetic* were observed due to PERIOD (Table 1). All other behaviours occurred only minimally or with no significant difference due to PERIOD.

Table 1. Proportion of time (%) spent in activity by both TRT groups.

PERIOD	*AB*	*ASB*	*PSH*	*Energetic*
March	33.0	2.44	0.91	8.12
September	3.1	0.44	0.06	0.68
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*** $p<0.001$

During the Mar PERIOD both TRT groups spent 54% of the time standing, 23% slowly walking, 19% quickly walking and 4% lying. During the Sept PERIOD both TRT groups were less active and there were differences ($p<0.001$) between TRT groups. The late castration group spent 62% standing and 34% slowly walking and the early group 49% and 49% respectively. TRT had no effect any other behaviour except *EMB*, which occurred only minimally (<1%). *Intake* was not significantly different between TRT groups, excluding any effect of late castration on intake causing differences on growth rate.

The differences in behaviour between Mar and Sept may be confounded by the 18mo castration, E_2 treatment, aging or seasonal changes, therefore they can not be attributed to any one of these factors. The change in comparative activity levels with time may be related to changes in the herd's social hierarchy due to the decreased level of testosterone in the late castrates (Jago *et al*., 1996). The lack of TRT effect may be attributed to herd animals imitating each other's behaviour (Fraser 1980). Individuals may form subgroups by adopting common behavioural strategies (eg "walkers" and "non-walkers", Arnold & Dudzinski, 1978). In this study the observed difference in percentages of *State* may be explained by just 1 animal changing strategy group.

In order to determine differences in behaviour and their effects on growth rate it may be necessary to design an experiment with treatment groups separated.

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