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EFFECT OF SWARD SURFACE HEIGHT ON HERBAGE INTAKE AND PERFORMANCE OF FINISHING BEEF CATTLE

A thesis presented in partial fulfilment of the requirements for the degree of Master of Applied Science in Plant Science at Massey University.

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ABSTRACT

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This study examined the effects of sward surface height (SSH) on the herbage intake, ingestive behaviour and performance of steers finished on ryegrass (*Lolium perenne*) /white clover (*Trifolium repens*) pastures during summer. The influence of this initial treatment contrast on subsequent cattle performance under common grazing conditions during early-autumn was also studied. Twenty six month-old steers with an initial liveweight of 522 ± 7.6 kg, 14 Angus x (Hereford x Friesian) and 10 Angus x (Hereford x Jersey), were set stocked on swards maintained at SSHs of 5 and 10 cm (L vs. H) from 18 November 1996 to 4 March 1997, with 3 replicate groups of 4 animals per treatment balanced as far as possible for "breed". Six steers from each treatment balanced for "breed" were slaughtered on 4 March and carcass and meat quality characteristics compared. The remaining animals were grazed for another 5 weeks on common pastures until the final slaughter on 8 April.

Over the SSH control period, the 5 and 10 target swards averaged 4.8 ± 1.36 and 10.0 ± 3.24 cm. Herbage on the H swards contained more dead material, less crude protein, lower dry matter digestibility and live:dead tiller ratio than that on the L swards. Estimates of herbage dry matter intake were higher for steers grazing at 10 cm than for those grazing at 5 cm SSH (8.0 vs. 4.8 kg DM d^{-1} from 2 estimates and 2 alkane pairs, $P < 0.05$ for each comparison). Steers were unable to increase their grazing time in response to limiting sward conditions sufficiently to compensate for lower intake rates in short swards, resulting in reduced herbage intakes. Daily liveweight gain over the summer was higher on the 10 cm than on the 5 cm SSH (1.10 ± 0.23 vs. 0.32 ± 0.21 kg d^{-1}, $P < 0.01$) and carcass weight at first slaughter was significantly higher for steers on the H swards (332 ± 10.6 vs. 287 ± 7.5 kg, $P < 0.05$). SSH treatment did not affect other carcass or meat quality characteristics of steers. Liveweight and carcass weight gain per hectare were 71 % and 43 % greater (318 vs. 186 kg and 166 vs. 116 kg) for steers grazing at 10 cm despite the lower stocking rate (2.86 vs. 5.80 steers ha^{-1}) maintained by the tall swards.

Over the common grazing period previously restricted steers had higher intakes, greater grazing and ruminating times, lower resting time and grew faster compared to steers previously grazed at 10 cm SSH. However, none of these parameters were significantly different between the steer groups with the exception of resting time. Increased autumn growth rates by previously restricted steers did not compensate for the differences in liveweight established during summer, and significant differences in carcass weight were still evident at the end of the compensatory period between the steer groups (335 ± 9.4 vs. 297 ± 9.4 kg, $P < 0.05$). There were no significant differences in meat quality characteristics with the exception of meat brightness which was higher for previously restricted steers.

These results suggest that maintaining a sward height of 10 cm offers advantages in terms of individual animal output and output per hectare compared with grazing at 5 cm and that compensatory growth does not seem to be an important phenomenon in heavy (over 500 kg liveweight) finishing steers.

Keywords: sward height; herbage intake; grazing behaviour; n-alkanes; liveweight; carcass; meat quality; compensatory growth; beef cattle.

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