Effects of varying intakes of sorghum, barley or cottonseed meal on liveweight performance of weaner steers


Increased growth rates of cattle grazing low quality pastures are dependent upon increases in the animal’s intake of metabolisable energy and protein. Supplements based on cereal grains and protein meals have been widely used to this end. Although these supplement types vary widely in chemical composition, estimations based on nutritional principles indicate much less pronounced differences in nutrient supply to the animal, i.e. of metabolisable protein and energy (see McLennan et al. 1995). For graziers, decisions on the type and level of supplementation for different production goals require good dose response information for the range of supplement types available. As part of a larger MRC funded project, our experiment reports on an initial screening of 3 commercially-utilised supplements.

Brahman crossbred weaner steers (initial liveweight (LW) 160 kg) were fed individually, in pens for 63 days, a basal diet of Rhodes grass (Chloris gayana) hay (0.9% N) ad libitum, together with supplements based on grain sorghum (2.2% N), barley (2.4% N) or cottonseed meal (CSM; 7.0% N) at intakes of 0.5, 1.0, 1.5, or 2.0% of liveweight (adjusted weekly). There were 3 steers per treatment group, and an unsupplemented control group (6 steers). The grain supplements comprised 93.9% grain, 2.0% bentonite, 1.74% urea, 0.36% ammonium sulphate, 1.0% molasses and 1.0% limestone.

Figure 1. Effect of supplement intake on the growth rate of steers receiving supplements of sorghum (circles), barley (triangles) or CSM (squares). Points depict individual steers

Average daily gain (ADG; kg) was linearly related to supplement intake (INT; %LW) for the sorghum (ADG=0.097+0.371 INT; R²=0.93, P<0.01) and barley (ADG=0.086+0.549 INT; R²=0.95, P<0.01) treatments, with different slopes for the two lines (P<0.01), but an asymptotic relationship best described the CSM treatment (ADG=1.187-1.11 e^-2*INT; R²=0.91). This reflected the much steeper increase in growth rate for CSM compared with the grain sources, and suggests a primary response to increased absorption of amino acids. At maximum supplement intake, total DM intakes averaged 63, 41 and 55% greater, and hay intake 22, 49 and 27% lower (LW corrected) for the sorghum, barley and CSM treatments respectively compared with the control (3.4 kg/day). The lower total intake and higher substitution rate with barley compared to sorghum is consistent with a greater degree of fermentation in the rumen, and the higher growth rate may consequently be associated with greater production of microbial protein. Combined with economic parameters, and supported by grazing studies, these results provide options for supplementing cattle under commercial conditions.