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Grazing management for the tropical savannas of northern Australia utilisation rates and timing of spelling

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Key words : tropical savannas, grazing systems, spelling, utilisation rates

Introduction The survival and continuing productivity of native perennial grasses are the foundation of sustainability for the cattle industry in northern Australia. Cattle have grazed the Victoria River District of the Northern Territory for almost 130 years and the current thrust is for production intensification to meet the increasing cost price squeeze. Year-round set stocking is the commonly used grazing system, but there is interest in alternatives that incorporate spelling with higher utilisation rates to enhance both productivity and ecological sustainability. This paper reports the preliminary results of a study to investigate optimum spelling and utilisation rates for three key native perennial grass species.

Materials and methods Treatments were spelling for the early, late or full wet season, and utilisation rates of: 0% (control), 20%, 30%, 40%, 50% and 60% of the leaf height of each plant. Twenty plants of each of the desirable hoop Mitchell grass (*Astrela elymoides*) and curly bluegrass (*Dichanthium fecundum*), and of the non-preferred feathertop wiregrass (*Aristida latifolia*) were subjected to the 18 different treatment combinations at two locations during the 2005-06 and 2006-07 wet seasons. Defoliation was achieved by repeated clipping of individual plants to the desired height. Prior to the treatments being imposed all plants were cut to a standard height of 10 cm and again at the end of the growing season. Plant mortality, basal area, yield, leaf height and incidence of flowering were all recorded at the time of clipping. Rainfall during the 2005-06 wet season (October to April) was 1069 mm, with the smallest monthly totals being 57 and 55 mm in November and February. In the shorter 2006-07 wet season 557 mm fell between December and March, with December recording 15 mm and February 12 mm.

Results Results were generally similar between species, but varied between seasons and some treatments, although some consistent trends emerged. Across all species, full wet season spelling consistently promoted higher yields compared with part wet season spelling (Figure 1), with basal area either increasing or its decline being lessened. Consistent with seasonal conditions, higher yields were evident in 2005-06 for utilisation rates up to 40% for all spelling treatments. An increase in the utilisation rates from 0 to 60% produced an almost linear decline in basal area for 2005-06 $R^2 = 0.96$, $P < 0.001$ and for 2006-07 $R^2 = 0.92$, $P < 0.001$ (Figure 2). Higher plant mortalities occurred in 2006-07 but this was not consistent across the treatments. Contrary to expectations based on rainfall, basal area either increased, or declined less, in 2006-07 (Figure 2). While the reasons for this are not clear, in 2006-07 the mean basal area of wiregrass in each treatment increased from 3% to 94% compared with changes for the other species of between -51% to +16%. Wiregrass basal area declined between 26% to 61% in 2005-06.

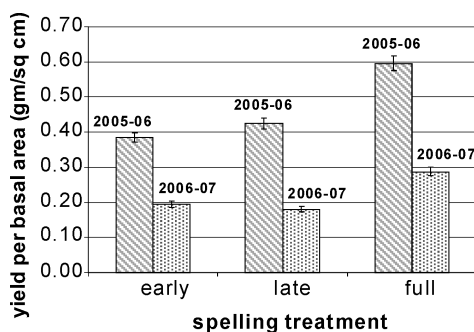


Figure 1 Yield per plant (\pm SE) for all species combined for different spelling treatments.

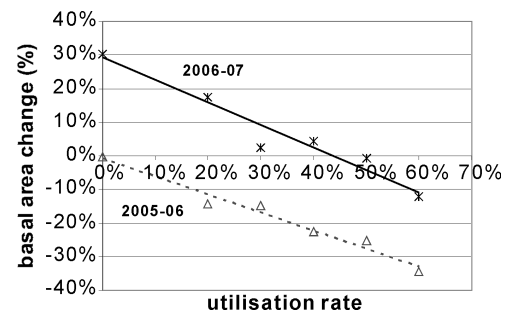


Figure 2 Change in basal area with different utilisation rates.

Conclusions The data suggests that to promote a favourable species mix and maintain productivity of the native perennial grasses, grazing management should include spelling for a full wet season and maximum utilisation of 40% of the individual plant leaf height. Full wet season spelling promotes increased pasture yield in both good and bad wet seasons, while the adoption of lower utilisation rates seems more important for maintaining pasture condition in good seasons.