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Official publication of The Australian Rangeland Society

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Does wet season spelling improve land condition?

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Keywords
Spelling, condition, composition

Abstract. This project seeks to improve the evidence base and modelling capacity underpinning recommendations for use of wet season spelling to recover poor condition grazing land and design more reliable and cost-effective spelling options for producers across northern Australia. There is limited experimental work or expert knowledge on spelling strategies to improve or maintain land condition (McIvor 2011). Site 1 has a study on the key combinations of timing, duration and frequency of spelling within a grazed 'C' land condition paddock in Central Queensland for a five year period. Site 2 will be established in the 2nd year of the project at the Wambiana grazing trial in northern Queensland on 'C' land condition sites subject to moderate and heavy grazing. Data from field trials will be used to improve the capacity of GRASP to simulate the impacts of different spelling and stocking rate regimes on pasture conditions over a range of pasture community types and seasons. The project will engage with producers and field staff at each site. Site 1 has had variable rainfall over the previous decade with predominantly dry or very dry conditions. Good growing conditions, prior to and during the first two summers of recordings have resulted in high pasture yields and crown cover. Pasture yields have been high for both *Bothriochloa ewartiana* and *Aristida spp*. While there has been a small improvement in land condition overall, there has been minimal impact so far from the spelling strategies applied compared to the continuously grazed control.

Methods
Site 1 north of Clermont looks at the combination of different timing, duration and frequency of spelling on plots of 'C' condition land within a grazed paddock over a five year period (Table 1). The paddock has been stocked at long term carrying capacity for most of the recording period. The adjoining paddock under the rotational grazing management of the owners is also monitored. It had a full wet season spell in the second summer.

Table 1. Treatments at Site 1

Grazed	Spelling	Spelling	Spelling
Continuous	Commercial rotation	Early Wet	Full Wet
Stocked at long term carrying capacity	Rotational grazing by owner	Annual Biennial	Annual Biennial Year 1,2, 3,4 or 5

Site 2 will be established in the 2nd year of the project at the Wambiana grazing trial near Charters Towers. A smaller combination of spelling strategies will be tested on 'C' land condition sites subject to moderate and heavy stocking rate. Burning and full destock of the trial site over the 2011-12 summer has meant that recordings will not commence until the beginning of the third year of the project.

Pasture yield, composition and ground cover are recorded by the Botanal method (Tothill *et al*. 1992) and the soil surface characteristics, using LFA parameters and definitions (Tongway and Hindley 2004). The PatchKey method (Corfield *et al.* 2006) using both Botanal and LFA parameters, is used to categorise land condition. The key pasture grasses *B. ewartiana* and

Aristida species are mapped on permanent quadrats to measure crown cover, persistence, recruitment and mortality. Soil cores are taken in spring to determine germinable seed reserves of pasture species. Plots are photographed at each recording. Land condition, nutrient cycling, stability and infiltration indices are calculated to better understand changes in the ecosystem.

Results

Site 1 has had variable rainfall over the previous decade with predominantly dry or very dry conditions. Good growing conditions just prior to and during the first summer, and for the second summer of recordings has resulted in high pasture yields and crown cover. The spelling treatments have had a strong impact on crown cover and a slight improvement in land condition. Pasture composition has not been affected markedly by spelling treatments (Fig. 1).

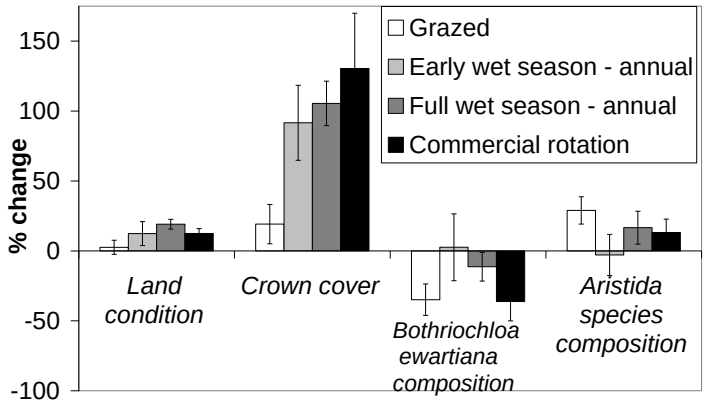

Fig. 1. The effect of spelling treatments on pasture parameters at Site1 from October 2010 to May 2012.

Pasture yields and ground cover have increased across all treatments. *B. ewartiana* and *Aristida* species have been recruiting at all recording times and most have survived.

Discussion

A significant reduction in the contribution of wire grass species to the pasture composition and crown cover is a key desired outcome of this study. At Site 1, the lack of early change in pasture parameters due to spelling treatments and good growing conditions, highlights the significant problem that land managers face when dealing with poor pasture condition. It will be interesting to see how spelling impacts the survival of perennial grass seedlings. Good growing conditions for the two years of this study appear to have had an overriding effect on the pasture parameters recorded compared to treatment effects.

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