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## Wet season spelling: a producer demonstration site

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### Abstract

Wet-season spelling of grazing land is a key recommendation for improving land condition to benefit sustainability, production and profit in agriculture. The Spelling Strategies project aims to improve the evidence base and modelling reliability underpinning such recommendations. In addition to two research sites, located at Clermont and Charters Towers, a producer demonstration site has been established south of Duaringa in Central Queensland, to monitor the capability of wet season spelling of poplar box woodland to achieve land condition maintenance and/or improvement. Four vegetation states are each subjected to two grazing treatments - continuously grazed and wet season spelled. The vegetation areas being monitored include remnant box woodland, 10-year-old box regrowth, recently cleared 10-year-old regrowth and an area completely cleared of trees by Graslan herbicide 10 years ago. Data has been recorded for two wet seasons.

Compared to the continuously grazed plots, wet season spelling had higher pasture yield while ground cover remained high and stable across all treatments. Tussock crown cover appears to have only increased under spelling in the recently cleared regrowth and regrowth treatments indicating potential for land condition improvement. The remnant treatments showed little response with tree competition probably limiting pasture growth. Wet season spelling over two summers appears to have relatively quickly improved pasture yield across all treatments, however improvements are small and variable for ground cover and crown cover. Research conducted under the Spelling Strategies project at the Clermont property has shown similar results over the 2010/11 and 2011/12 wet seasons.

### Background

Poor land condition is limiting production of grazing land across much of northern Australia (Hunt *et al.* 2014). Wet-season spelling is a key recommendation for improving land condition; however there is a lack of reliable evidence to support this recommendation in northern Australia, as much of the information is based in southern and central Queensland (Scanlan *et al.* 2014). The Spelling Strategies project aims to improve the evidence base and modelling capabilities for wet season spelling recommendations. In addition to two research sites located near Clermont and Charters Towers in Queensland, a demonstration site has been established near Duaringa to demonstrate and add further understanding of the effect of wet season spelling on a commercial operation run in conjunction with producers. Funding is acknowledged from MLA, DAFF and the Australian Government's Action on the Ground program.

### Method

Pasture and land condition parameters were assessed before and after the growing season between 2012 and 2014 at 'Oaklands' located south of Duaringa in central Queensland. There were four vegetation treatments monitored. Vegetation treatments included; remnant poplar box woodland, 10-year-old box regrowth, recently cleared box regrowth (chained in September 2012), and a 10-year old Graslan herbicide treated area. Part of each was subjected to either a full wet season spell or a continuously grazed treatment. Spelling involved destocking the treated area for the full summer wet season each year.

Pasture data was recorded using a 50x50cm quadrat on a 50 point grid across the plot. Yield, species proportions, ground cover and a range of soil surface parameters were collected using the BOTANAL method to generate a land condition index (1= very good, 4= very poor). The main factors contributing to the land condition index include the dominant species present, species functional group, tussock crown cover (%) and total ground cover (%).

## Results

The summers of 2012/13 and 2013/14 were wetter than average providing relatively good pasture growing conditions, however the 2013/14 summer followed a long dry season and therefore had lower pasture growth. Over the two years of the trial, pasture yield increased in the recently cleared regrowth and regrowth treatments, while remnant vegetation remained relatively stable and Graslan treatment were impacted by a fire in November 2013 (Table 1). Wet season spelling had higher pasture yields across all vegetation treatments and particularly the recently cleared regrowth and regrowth treatments.

Crown cover only improved with spelling in the recently cleared regrowth and regrowth treatments indicating potential for land condition improvement.

Ground cover remained relatively high and stable (average 78%) across all plots except the Graslan treatment which was burnt.

Land condition remained poor across all plots (average rating 3); however the recently cleared and spelled treatment appears to be improving due to increased tussock crown cover and pasture yield.

Table 1. Change in pasture yield, crown cover, ground cover and land condition from November 2012 to April 2014. The Graslan treatments were burnt in November 2013

Treatment	Change in yield (kg/DM)	Change in % crown cover	Change in % ground cover	Change in land condition*
Recently cleared and grazed	920.0	0.5	0.3	-0.5
Recently cleared and spelled	2324.6	1.5	0.1	-0.9
Regrowth and grazed	437.6	0.2	-4.7	0.0
Regrowth and spelled	945.6	0.5	-2.6	-0.4
Remnant and grazed	-316.4	-0.4	-4.1	0.1
Remnant and spelled	54.3	-0.5	1.8	-0.1
Graslan and grazed	-1286.4	-0.6	-19.9	0.2
Graslan and spelled	105.1	-0.4	-20.4	-0.2
Average- overall	398.1	0.1	-6.2	-0.2
spelled	857.4	0.3	-5.3	-0.4
grazed	-61.3	-0.1	-7.1	0.0

\*negative number indicates improvement in land condition

## Discussion

Wet season spelling over two summers improved pasture yield across all vegetation treatments, however only the recently cleared regrowth and regrowth treatments are starting to demonstrate an improve in land condition with higher crown cover.

Change appears minimal and slow in the remnant vegetation treatments probably due to tree competition limiting soil moisture and preventing the pasture from responding. Spelling however has maintained pasture yield and ground cover compared to the grazed treatment.

The Graslan treatment with little tree cover was burnt in November 2013 impacting the results. Spelling following the fire however allowed the pasture to regrow and build yield quickly and maintain crown cover while the grazed treatment had much lower yield at the start of the following dry season six months after the fire, with indications the crown cover is declining. This response provides some evidence to support pasture spelling following fire to enable quick recovery and maintenance or improvement in land condition.

The varying stocking rates across the site may have masked the effects of spelling. The Graslan treatment was in a separate paddock and stocked conservatively. All other plots were stocked at a higher rate than considered desirable for the long term. The stocking rate was suitable for years with average pasture growth but would have to be reduced during drier years. Pasture yield in the Graslan treatment increased significantly in the first wet season which may be due to the conservative stocking rate and better starting land condition.

Land condition remains poor across all plots. Slight improvements in pasture yield and tussock crown cover in the recently cleared treatments is encouraging and contributing to marginal improvements in land condition. It appears that the tree competition in the remnant plots is suppressing pasture growth and land condition improvement.

Wet season spelling over two summers appears to have relatively quickly improved pasture yield across all treatments, however improvements are small and variable for ground cover and crown cover. The research project at Clermont showed similar results in the first two wet seasons of recording in 2010/11 and 2011/12 where good growing conditions also prevailed.

There is still significant potential for improvement in land condition across all plots. This study indicates land condition change may take many years and the relationship between spelling, seasonal conditions and plant ecology require greater study before maximum productivity gains can be assured.

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