Managing the Persistence of Perennial Grasses Through Drought

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Pastures in the northern high rainfall, temperate zone have a relatively short life, lasting only 8-10 years. Re-sowing pastures can cost $160-$250/ha. Increasing the longevity of pastures by defining management options to ensure persistence through periods of drought will result in large financial gains for the grazier which will, in turn, encourage the sowing of greater areas of productive pastures. In this project, we aim to quantify the effects of varying intensities of defoliation and drought and its seasonal timing on the persistence/mortality of a range of introduced and native temperate perennial grasses. This work is linked to a similar project being conducted under grazing conditions by Jim Virgona of NSW Agriculture in a winter-wet/summer-dry region at Wagga Wagga.

Methods

The project is being carried out in small plots ($1m^2$) separated vertically by layers of plastic to a depth of 1 m to prevent soil water movement between plots. The grasses being studied include four important introduced species with a range of persistence characteristics (perennial ryegrass, phalaris, cocksfoot and tall fescue), and two native species (*Microlaena* and *Danthonia*). The plots will be cut regularly to simulate grazing at two intensities - moderate and severe. Three moisture regimes, determined from climatological records, will be applied ranging from non-limiting moisture to severe drought.

The mortality of the grasses will be assessed over two different seasonal combinations of drought, spring-summer and summer-autumn. Drought will be imposed with the use of an automatic rain-out shelter which will remain off the plots during dry weather to permit realistic light and temperature regimes whilst moving over the plots during rain to prevent uncontrolled watering of the plots. The levels of drought will be imposed by varying the level of irrigation water applied to the plots in a manner which simulates natural rainfall. Pasture production and quality, ground cover, tiller number, crown growth rates, carbohydrate reserves and mortality will be assessed as will soil moisture.

The detailed information collected will assist in the validation of computer models which predict growth and persistence under the full range of environmental conditions experienced by graziers over the long term.

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