

Perennial grasses for medium to low rainfall areas

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Traditionally there has been little use of sown perennial pastures in the medium to low rainfall wheatbelt of southern Australia. There are several reasons for this. Firstly, many of the more common grass species have been developed in higher rainfall areas and have failed to produce and persist in lower rainfall environments. Secondly, cropping up until recently has been more economically viable than animal enterprises so there has been little focus on the need for high quality pastures. Finally, there has been a reluctance to include perennial grasses in the pasture phase of cropping rotations due to perceived threats of grasses carrying over diseases to following crops, using excessive amounts of nitrogen fixed by legumes and therefore leaving little for use by crops and difficulty of removing perennial grass species at the end of the pasture phase. However, returns for cropping have been declining for a number of years making animal production enterprises more economically appealing. Year round animal productivity can be enhanced by addition of perennial grasses. Perennial grasses also offer significant environmental benefits. Dryland salinity is a major threat facing valuable agricultural land in New South Wales. Perennial grasses use water year round in contrast to annual pasture and crop systems. The ability to use more water reduces recharge and helps prevent watertable rise which causes dryland salinity. The aim of this study was to evaluate a range of perennial grasses for their suitability to medium-low rainfall areas with the aim of identifying more persistent and productive types capable of enhancing animal production and increasing water use. This paper reports on the most successful species identified so far. The evaluation will continue for a further two years.

Methods

A range of perennial grasses were sown at a site 12km east of Barmedman in May 2003. Average annual rainfall is 500mm. In 2003 and 2004

only 300mm was recorded. Soil at the site is a sandy loam with pH (CaCl₂) 4.8 and negligible exchangeable aluminium. Grasses sown included cocksfoot, phalaris and tall fescue cultivars with a range of summer and winter activities (Table 1). Other species sown included wallaby grass and perennial veldt grass. Measurements of dry matter production have been taken on a seasonal basis with basal and frequency counts of persistence recorded in spring and autumn.

Results

Phalaris and Kasbah cocksfoot have been the most productive of species sown at this site (Table 1). Increasing levels of summer activity has resulted in higher plant mortality and this is particularly obvious by comparing the results for the three lines of cocksfoot (Table 1). Kasbah is a highly summer dormant cultivar and has shown excellent survival. Tas 1795 is an experimental line with high summer activity and this line has failed to persist in adequate density beyond the first summer. Survival of the more strongly summer dormant Atlas PG phalaris was higher compared to Sirolan. The summer active tall fescue AU Triumph has failed to persist through the first summer while Resolute a summer dormant variety has shown higher survival though it is still inferior to Kasbah cocksfoot. Perennial veldt grass is a relatively new species in eastern Australia and has performed well so far in this evaluation.

Discussion

The results of this evaluation so far indicate that long term persistence of temperate perennial grasses in the medium to low rainfall cropping belt is greatly enhanced by increasing levels of summer dormancy. This is probably because continued attempts by grasses to respond to small rainfall events in this environment over the summer period rapidly depletes plant reserves leaving

Table 1. Dry matter production (kg DM/ha) May 2003 – August 2004 and persistence expressed as a percentage of original density at Barmedman

Species	Cultivar	DM kg/ha	Persistence % original density
Phalaris	Atlas PG	6661	57
	Sirolani	6040	33
Cocksfoot	Kasbah	6478	73
	Currie	3619	30
	Tas 1795	2772	7.5
Tall Fescue	AU Triumph	3160	7.2
	Resolute	3525	32
Perennial veldt grass	Mission	3084	83
Wallaby grass (<i>Austrodanthonia</i> spp.)	Taranna	1587	157
	Trangie exp line	2180	137

them more susceptible to stress imposed by long dry spells. The persistence of Kasbah cocksfoot has been particularly impressive given the two well below average rainfall years since sowing. Atlas PG phalaris has also shown acceptable survival. Survival of the summer dormant tall fescue Resolute has been better than AU Triumph, but is still below acceptable levels. Mission perennial

veldt grass appears highly promising in this environment. Wallaby grass has performed very well at this site and is the only species to increase in density over time. However high seed costs and variable seed quality issues need to be overcome before this species can be an economically viable option.