

Perennial grass evaluation for southern mixed farming systems

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Research in southern Australia has shown that the use of pastures dominated by perennial species assists in maintaining the sustainability of agricultural systems by reducing waterlogging, soil acidification and weed infestation and by protecting and improving soil structure. Lucerne is often the species of choice but is poorly adapted to acid and waterlogged soils, requires rotational grazing to persist and competes poorly with many annual weeds. We believe pastures that are dominated by a mixture of perennial legumes and grasses will provide the greatest benefits for animal production and subsequent cropping and it is therefore essential that well adapted species are available.

Few grasses have been available which can persist well over hot, dry summers. Some recent claims of improved persistence in a number of grasses therefore initiated a trial at Barellan (34°17'S, 146°34'E, 442 mm average annual rainfall) to test the validity of these claims. The trial was sown in May 1998, was located on a red-brown earth and comprised small plot evaluation of a number of populations and cultivars of cocksfoot (*Dactylis glomerata*), *Phalaris aquatica*, tall wheatgrass (*Thinopyrum ponticum*) and various wallaby grasses (*Austrodanthonia spp.*). Single superphosphate (SSP) and nitrogen were applied at sowing and annually thereafter at 100 SSP and 50 kg N/ha respectively. Frequency counts were used to assess persistence and productivity was measured by taking herbage cuts.

Table 1. Productivity in July 1999, persistence in February 2000 and mean palatability scores (1= most palatable, 5 = least palatable) in July 2000, of a range of cultivars and populations of cocksfoot (Dg), phalaris (Pa), tall wheatgrass (Tp), *Austrodanthonia richardsonii* (Ar), *A. linkii* (Al) and *A. caespitosa* (Ac) at Barellan, NSW.

Genotype	Yield (kg/ha)	Frequency %	Palatability (1–5)	Genotype	Yield (kg/ha)	Frequency %	Palatability (1–5)
Dg (Tas1714)	1744	42.0	3.3	Pa (Sirolan)	2180	41.0	2.0
Dg (Tas1703)	1861	38.7	3.3	Pa (Atlas PG)	1874	40.3	1.7
Dg (Tas1715)	1711	39.7	3.0	Pa (Perla bulk)	2145	49.3	1.7
Dg (Tas769)	1946	32.7	2.3	Tp (Tyrell)	1641	34.0	3.0
Dg (Kasbah)	2368	55.3	3.3	Tp (Dundas)	2024	30.0	2.7
Dg (Currie)	2036	51.3	2.3	Ar (Taranna)	1479	35.0	3.7
Dg (Vic#79)	1909	28.3	1.7	Al (Bunderra)	1135	18.3	2.7
				Ac (Dc1)	2592	50.0	4.7
LSD 0.05	454	13.1			454	13.1	

Rainfall for the year from May 1998 to April 1999, and the 10 month period from May 1999 to February 2000 was 496 and 436 mm respectively. Although the rainfall over the summers of 1998/99 and 1999/00 was somewhat higher than normal, results still indicated (Table 1) that genotypes which exhibited summer dormancy, eg Kasbah cocksfoot, Perla retainer (bulk) phalaris, had high levels of persistence. High persistence had also been recorded by Kasbah cocksfoot in July 1999 (data not presented). Kasbah and Perla

retainer (bulk) phalaris were also highly productive early in the season, which is advantageous as this is a time of low feed availability. The high productivity and persistence of *Austrodanthonia caespitosa* indicate good adaptation although the unavailability of seed precludes commercial use. The *Austrodanthonia caespitosa* in this study was not summer dormant and appeared to use incidental rainfall for growth. However, it flowered early and at any time of the year and results of a July assessment indicated that palatability to sheep was lower than other genotypes. Future research should occur in a mixed sward as little is known about the compatibility of these grasses with a perennial legume and this will aid development of the "model pasture".

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