

## Performance of perennial ryegrass in marginal environments in South-Western Victoria

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Regions in South-West Victoria with a mean annual rainfall (R) of less than 600 mm are considered to be marginal for perennial ryegrass (PRG). Comparisons were made between 34 lines of PRG at two marginal sites (Mininera 600 mm R and Balmoral 580 mm R), and between 40 lines at Hamilton (700 mm R).

### Methods

The trials were sown in May 1984 using a randomized block design with 3 replicates with 1m<sup>2</sup> plots at the first two sites and 4 replicates with 2m<sup>2</sup> plots at Hamilton. Plots were sown with 300 germinable seeds/m<sup>2</sup> of ryegrass, 8 kg/ha subterranean clover cv. Trikkala, 150 kg/ha superphosphate, 100 kg/ha lime, 50 kg/ha KC1 and topdressed annually with 200 kg/ha 3:1 superphosphate/KC1. The endophyte (*Acremonium lolii*) status of seed and mature plants was measured (1). Establishment and plant persistence were recorded in a permanent quadrat (0.4 x 1.0 m) in each plot and ryegrass yield by visual estimates and calibration cuts. Plots were hard grazed by sheep after each assessment. Crown rust (*Puccinia coronata*) infection was assessed by visual ranking and the incidence of Barley Yellow Dwarf Virus (BYDV) determined (2). Selected data are presented below.

### Results and discussion

Ellett was the most productive cultivar at Hamilton and Mininera and was as persistent as cv. Victorian at Balmoral after four years (Table 1). These results and the superior (P=0.01) resistance of cv. Ellett to crown rust and BYDV compared to cv. Victorian demonstrate that it would be a valuable cv. for such marginal areas, as it has proved to be in higher rainfall districts (3). Endophyte infected cv. Ellett was more persistent at Balmoral. The best Mediterranean line, UNE 100 was more productive (P=0.05) than all other ryegrasses in the autumn/winter and moderately resistant to crown rust. The potential of Mediterranean material for marginal environments is being examined and breeding projects have commenced.

**Table 1. Persistence and yield of perennial ryegrass in SW Victoria**

Cultivar/ selection	Endophyte infection (% seed) 6/84	Plant density (plants/m <sup>2</sup> )				Cumulative herbage yield (1985-87) DM (t/ha)		
		Ham. 4/87	Min. 4/87	Bal. 4/87	Bal. 5/88	Ham.	Min.	Bal.
Victorian	80	61	58	54	30	14.8	15.8	12.5
Victorian	3	62	63	49	25	14.1	14.4	12.0
Victorian D.S.	86	61	55	51	30	15.0	17.2	12.2
Ellett	80	57	60	51	35	21.1	20.7	14.0
Ellett	0	54	52	46	20	20.2	15.6	13.0
UNE 100	57	57	47	52	n.m.	17.0	19.4	14.1
LSD (P=0.05)		9.4	13.1	15.8	11.9	2.27	3.60	2.06

n.m. = Not measured.

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