Hard seed reserves of subterranean clover at various soil phosphate levels

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The cost of superphosphate has risen dramatically over the past 15 years and as a consequence, its application to pastures has fallen. Subterranean clover responds well to applications of superphosphate, and its dry matter production (DMP) and possibly persistence are dependent on soil phosphate levels. A number of clovers were compared in terms of DMP and seed reserves (SR) at 4 soil phosphate levels.

Methods

Near pure stands of 4 commercial cultivars and 6 strains of subterranean clover, selected for persistence at low soil phosphate, were established in 1986 on a phosphate deficient grey sandy loam soil. A total of 0, 200, 400 and 800 kg/ha of superphosphate was applied over 1986 and 1987 to produce soil phosphate levels of 14, 17, 20 and 30 ppm (Colwell NaHCO3) in January 1988.

Results and discussion

The ability of a clover strain to persist is dependent on its seed production and level of hardseededness. These two factors in combination allow a build up of SR which can buffer the effects of false breaks, dry finishes, insect attack etc. The cumulative hard seed reserves, taken in spring before seed set, of a selection of clover cultivars and strains showed that although there were large differences between clovers, the level of soil phosphate had little effect on SR. (Table 1 - strain data restricted for simplicity). In contrast, the clover DMP increased significantly with soil phosphate level in both years ($p < 0.001$). The DMP of strains 38 and 68, over all phosphate levels, was not significantly different from the best commercial line in 1987 and 1988 except for lower DMP of strain 68 in 1988 ($p < 0.001$).

An early finish to the season in both 1987 and 1988 reduced the DMP and lowered seed set, especially in 1987. Investigation of these strains is continuing.

Table 1. Cumulative hard seed reserves (kg/ha) taken in spring for 6 clovers grown at 4 soil phosphate levels (mean of 4 reps).

	Soil phosphate level (ppm)									
	14		17		20		30		Mean	
Clover	1987	1988	1987	1988	1987	1988	1987	1988	1987	1988
Trikkala	154	196	313	398	207	270	169	191	211	241
Woogenellup	231	117	310	64	252	48	369	53	291	70
Mt.Barker	112	32	192	21	126	11	135	0	141	16
Karridale	314	212	284	212	386	170	462	186	361	195
38	400	259	500	313	520	350	340	228	440	288
68	395	356	429	275	445	456	530	424	449	378
Mean	268	195	338	199	323	218	334	180		

Clover P<0.001; Phosphate level N S; Clover x phosphate interaction N S
LSD (5%) Clover: 1987, 93 ; 1988, 77.