

Effect of defoliation and clover scorch on the competitive relations of two subterranean clover cultivars in mixture

C.W. Thorn, W.R. Stern and W.J. Collins

Department of Agronomy, University of Western Australia, Nedlands, W.A. 6009.

Subterranean clover genotypes low in formononetin and resistant to clover scorch (caused by *Kabatiella caulivora*) are being developed to replace existing cultivars in the 500-800 mm rainfall zones of southern Australia.

Whether new genotypes co-exist with or replace existing cultivars will depend on their competitive ability, seed producing capacity (Rossiter 1966) and their ability to re-establish in the presence of existing cultivars.

A replacement series (de Wit 1960, Harper 1977) was established to study the competitive relations between a new cultivar, Esperance, and an existing one, Dinninup. The overall sowing rate was 300 kg ha⁻¹. Two defoliation treatments were used and these began about 9 weeks after sowing: in D₁, frequent cutting continued until the beginning of flowering and in D₃, until the end of flowering. In the Mt. Barker experiment one half of each treatment was sprayed to maintain it free of clover scorch (K₀) and the other half was infected with the disease (K₁).

The relative crowding coefficient (RCC) was used as a measure of competitive ability. The RCC of Esperance with respect to Dinninup was calculated from total dry matter data (including the mown material) at the end of the growing season.

Proportion in Mixture	Perth		Mt. Barker			
	D ₁	D ₃	D ₁		D ₃	
Exp : Din			K ₀	K ₁	K ₀	K ₁
0.8E : 0.2D	0.56	0.74	0.62	0.68	0.55	0.76
0.5E : 0.5D	0.57	0.74	0.41	0.64	0.55	0.75
0.2E : 0.8D	0.62	0.97	0.52	0.81	0.82	0.94
\bar{x}	0.58	0.82	0.52	0.71	0.64	0.82

The RCC was less than one for all treatments at both sites, indicating that Dinninup was the stronger competitor. Severe defoliation D₃ and clover scorch K₁, improved the competitive ability of Esperance in comparison to the D₁ and K₀ treatments. In the absence of clover scorch Esperance was less competitive at Mount Barker than in Perth. This may have been due to the fact that at Perth swards were defoliated weekly, while at Mount Barker they were defoliated fortnightly. The competitive ability of Esperance was generally greater in the 0.3E : 0.8D than the other mixtures.

Defoliation frequency and duration and clover scorch altered the competitive relationship between the new genotype cv. Esperance and the existing one cv. Dinninup.

Studies of this type permit an appraisal of the competitive performance of new genotypes in the field without having to continue experiments indefinitely. They characterise these genotypes and provide information on the chance of success in replacing existing cultivars.

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