

## The effect of tillage on the fate of hard seeds of subterranean clover

G. B. Taylor

Division of Land Resources Management. CSIRO, P.O., Wembley, W.A. 6014

Natural regeneration of annual legume pastures after a crop depends on the persistence of hard (ieimpermeable) seeds through the crop year and their subsequent softening prior to the break of season in the pasture year. Tillage in the crop year will result in burial of some of the clover seeds with a consequent effect on future pasture establishment. This experiment was aimed at determining the effect of several tillage systems on the depth distribution of clover seeds and the subsequent pattern of seedling emergence.

Subterranean clover (cv. Daliak) was sown on a sandy gravelly loam soil on a clover-free site at Bakers Hill. W.A. in 1976. Tillage treatments, which were imposed on replicated plots in May-June 1977 after the break of season, were as follows: no tillage; minimum tillage (scarified once); and conventional tillage (disc ploughed to 10 cm and scarified twice). No crop was actually sown. Regenerating clover plants were killed by spraying with a herbicide in August 1977 to prevent further seed set.

**TABLE 1. Effect of tillage on depth distribution of seeds, seedling establishment and residual seed numbers (numbers/dm<sup>2</sup>)**

	No Tillage	Minimum Tillage			Total	Conventional Tillage			Total
	Total (0-2 cm)	0-2	2-6	6-10 cm		0-2	2-6	6-10 cm	
<b>Seed numbers in August 1977</b>									
Mean	112	62	46	3	111	36	46	22	104
± SE	12	4	4	0.4	7	4	5	2	9
<b>Seedling numbers in June 1978</b>									
Mean	29				19				11
± SE	3				1				1
<b>Seed numbers in August 1978</b>									
Mean	14	17	23	2	42	10	30	19	59
± SE	2	2	4	0.4	5	1	3	2	6

There were clear effects of tillage treatments on the depth distribution of the clover seeds (Table 1). Tillage buried 44 and 55% of the seeds below 2 cm in the minimum and conventional treatments respectively. These treatment differences were reflected in the seedling densities obtained in 1978 with the no tillage treatment producing the highest density. On the other hand there were considerably more residual seeds in the tilled treatment.

Tillage affects the fate of seeds in at least two ways. Firstly it places some seeds below a depth from which they are able to emerge (= 3 cm). Secondly seed burial reduces the rate of softening by insulating the seeds from extremes of daily temperature fluctuations. Results from this experiment suggest that, at least in the early stages of a crop-pasture system, tillage will reduce pasture establishment in the following year. However, it is possible that in the longer term this effect may be offset by the build up of a reserve of seeds in the soil which can be brought to the soil surface by later tillage. The effect of a further series of tillages in the present experiment is being investigated.