

Deep ripping experiments for wheat

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Observations in cereal crops in North-east Victoria during 1978 and 1979 indicated that stunted growth of crops was sometimes associated with root deformities and with soil hardpans. A detailed survey of the area in 1980 showed that in crops which had patches of stunted growth, hardpans occurred in 63 per cent of the paddocks, and the crop plants had root defects and small root systems in the affected areas (1).

Methods

In 1980, a preliminary experiment was started to investigate the effect of deep ripping on crop yields. The ripping treatments were followed either by conventional cultivation or minimum cultivation, to determine whether reduced traffic would enhance any long-term effects of ripping.

Results and Discussion

In the cultivated area, the soil was found to have a layer with a bulk density of 1.9 g/cc at 40-60 cm depth. Ripping through this layer increased root growth in the 40-70 cm zone from 0.06 t/ha up to 0.45 t/ha. Ripping above this depth had no effect on wheat grain yields but ripping through it permitted wheat to remain green for a longer period, and increased grain yield (Table 1). Minimum cultivation also resulted in increased grain yield.

Table 1. Wheat grain yields (t/ha) after deep ripping in 1980

		Conventional Cultivation	Minimum Cultivation
Deep rip	0 cm	5.1	6.0
	20 cm	5.1	5.8
	40 cm	5.3	6.0
	70 cm	6.1	6.3
Differences:			
	Cultivation (C)	0.54*	
	Deep rip (DR)	0.37**	
	C x DR	0.53 n.s.	

In 1981, before reseeding the experiment to lupins, cultivation was seen to have caused a thin hardpan which subsequently affected drainage of the soil. Lupin yields showed the same ranking as did those in Table 1 and the effect of deep ripping in 1980 was still evident in the soil in terms of reduced penetrometer resistance in October 1981. Indications are that where soil density is high, root growth can be improved by deep ripping, and that reduced tillage will enhance the effect of deep ripping.

1. Ellington, A., Reeves, T.G. and Pevevill, K.I. (1981) in Proc. of Conference on Soil Management, Australian Society of Soil Science, Victorian Branch. Dookie Agricultural College, Victoria, May, 1981.