

## Deep ripping responses in annual pasture legumes

B. J. Nutt

Department of Agriculture, Geraldton, Western Australia 6530

Light textured sandy soils occupy about 50% of Western Australia's farmed land. These soils are low in nutrient and water holding capacity which makes deep rooting an essential characteristic for any successful and productive pasture legume. However these soils have a tendency to form a compacted layer through the traffic of machinery (1). This compacted layer, which forms between 10 - 40 cm deep, can restrict the effective rooting depth of cereals and pastures (2). An experiment was established in 1987 to examine the effect of deep ripping on pasture growth.

### Method

Three pasture species (Harbinger strand medic, Madeira yellow serradella and Nungarin subterranean clover) were sown on June 5 at 50 kg/ha into normally cultivated and deep cultivated (30 cm using an Agroplow) plots on deep yellow sand at East Chapman, WA in 1987.

### Results and discussion

The dry weight and root distribution results shown in Table 1 are from a harvest taken 72 days after germination when the response to ripping was at its greatest. The 1987 season up to this time had infrequent rainfall with dry periods of up to three weeks in duration. Subclover, being shallower rooted than the other two species, did not respond significantly to the disruption of the compacted layer. Deep ripping had a significant effect, however, on the root distribution of the medic and serradella. On unripped soil 11% of the medic and 3% of the serradella root mass was below 40cm depth. This contrasted with 25% and 26% respectively on ripped soil. This improved root growth was reflected in a 55% increase in top production in the medic and a 61% increase in the serradella. The deep ripped plots suffered moisture stress towards the end of the season as they had exhausted soil moisture faster with the greater early growth. Seed yields were unaffected by deep ripping due to this dry finish.

**Table 1. The effect of deep ripping on growth and root distribution of three pasture legume species 72 days after germination.**

	Harbinger		Madeira		Nungarin	
	-rip	+rip	-rip	+rip	-rip	+rip
Dry weight - Tops (g/m <sup>2</sup> )	130	202	105	169	112	134
Roots	80	107	56	78	54	72
Root weight in soil depths						
- 0-20cm	66	56	73	56	86	70
20-40cm	23	19	25	18	8	20
40-60cm	9	18	3	19	6	5
60-80cm	2	7	0	7	0	5
Seed yield (g/m <sup>2</sup> )	4.7	5.2	3.5	3.0	8.0	9.1

LSD (p<0.05) Tops - 50, Roots 24 & Seed yield 2.3 g/m<sup>2</sup>.

1. Jarvis, R. 1985. Deep ripping workshop, Geraldton, WA. p7-13.
2. Hamblin, J. and Delane, R. 1987. Proc. 4th Aust. Agron. Conf. Melbourne. p.293.