A comparison of three inoculation treatments on lupins

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The application of Serradella-type G inoculum to lupin seed before sowing increases nodulation and grain yield (1). An experiment was conducted to determine the effects of applying inoculum by means of a soil spray at sowing compared to the usual practice of inoculating seed 2-72 hours before sowing.

Methods

Unicrop lupins were sown at 100 kg/ha on an alkaline sand with 15 kgP/ha. The treatments applied were: (a) no inoculation; (b) pre-sowing seed inoculation - 100 g Seradella-type G/100 kg seed applied as a slurry three hours before sowing; (c) soil inoculation - 150 g inoculum applied with 150 e/ha water and sprayed into the drill row from a nozzle mounted behind the sowing boot.

Results and Discussion

Both inoculation treatments resulted in more plants with nodules and increased dry matter (DM) yield per plant (tops and roots) at both harvests (Table 1). The plants from uninoculated seed were chlorotic, less branched and smaller than those from inoculated seed.

Table 1: Effects of inoculation on nodule production and plant DM yield

Inoculation treatment	63 days after sowing		94 days after sowing	
	Nodulation (% of plants)	Plant DM (g)	Nodulation (% of plants)	Plant DM (g)
Nil	20.0 a	0.36 a	67.0 a	1.30 a
Pre-sowing	90.9 b	0.41 a	99.5 b	2.12 b
Soil-applied	82.1 b	0.42 a	98.5 b	2.01 b

Values followed by the same letter in each column do not differ significantly (P<0.01).

Table 2: Location of nodules on nodulated plants (2 of nodulated plants)

	63 days after sowing			94 days after sowing		
Treatment	Tap root only (2)	Lateral root only (%)	Tap and lateral rooUCts	Tap Ta root only (%)	Lateral root only (%)	Tap and lateral ro(2)ots
Nil	65.8	24.4	9.8	7.1	66.6	26.4
Pre-sowing	42.9	12.1	45.0	10.2	19.3	70.5

Soil-applied	40.9	15.1	54.0	4.0	22.0	74.0

Most of the nodulated plants in uninoculated plots had nodules on the tap root only at 63 days after sowing (Table 2). However, 31 days later, nodule development was predominantly on lateral roots. In the inoculated plots, 63 days after sowing, plants either had nodules on the tap root only or on both the tap and lateral roots. Later nodule development was apparently on the lateral roots of plants already supporting nodules on the tap root.

There were no significant differences between the two inoculation treatments. Application of inoculum at sowing reduces grain handling and there are no problems of diminishing viability if sowing is delayed.

1. Ridge, P. E. (1980). Proc. Grain Legume Workshop, Longerenong Agricultural College, pp.2-10.