

## Effect of lupin, peas and barley on a subsequent wheat crop

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There have been reports from several Australian and New Zealand workers that crops of lupins and peas increased the yield of the subsequent cereal crop.

### Methods

An experiment was carried out at Cressy, near Launceston, on a clay loam soil of pH 5.3 that had had two consecutive crops of maize. Ground limestone at 2.5 t/ha was applied prior to the first sowing. Irrigated plots received two applications of water with a drip irrigation system, at first flower and pod swell.

The four crops grown in 1982/83 were: barley cv. Shannon, white lupin cv. Kiev, blue pea cv. Cressy Blue and green pea cv. Small Sieve Freezer. Crop residues were removed from each plot and the site was deep cultivated once prior to sowing wheat cv. Bindawarra in the autumn of 1983.

### Results and Discussion

Despite being inoculated, the blue and green peas were poorly nodulated and had low nitrogenase activities over the growing season (0.03 to 1.5  $\mu$ mol C<sub>2</sub>H<sub>4</sub>/plant/hour). In contrast, the white lupin plants were well nodulated and had nitrogenase activities up to 20 times that of the peas. At final harvest the total nitrogen yield of the peas was similar to barley, whereas it was 2 - 3 times higher for lupin.

Surprisingly, the grain yield of wheat was the same after barley as after fallow.

Lupin resulted in a 15% increase in the grain yield of the subsequent wheat crop, compared with the fallow treatment. Application of ammonium sulphate did not increase the yield of wheat. We therefore conclude that the yield response of wheat after lupin was due to a factor other than nitrogen.

1982/83				1983/84			
Crop	<sup>a</sup> T'ment	<sup>b</sup> N Yield kg/ha	Grain D.M. t/ha	Crop	T'ment kg/N/ha	<sup>b</sup> N Yield kg/ha	Grain D.M. t/ha
Barley	D	56	2.47	Wheat	0	124	3.83
Barley	I	58	2.75	Wheat	0	111	3.86
Lupin	D	119	1.61	Wheat	0	150	4.46
Lupin	I	149	2.19	Wheat	0	150	4.66
B. pea	D	59	1.46	Wheat	0	121	4.09
B. pea	I	85	1.92	Wheat	0	129	4.27
G. pea	D	54	1.05	Wheat	0	142	4.24
G. pea	I	64	1.37	Wheat	0	133	4.34
Fallow	D	-	-	Wheat	0	133	3.91
Fallow	D	-	-	Wheat	25	180	3.99
Fallow	D	-	-	Wheat	65	147	4.07
Fallow	D	-	-	Wheat	140	188	4.02
L.S.D. (0.05):		21	0.30			39	0.51
<sup>a</sup> D = Dryland I = Irrigated				<sup>b</sup> Tops only, near maturity			

