Tillage and stubble management effects on lupin yields in a long term wheat/lupin rotation on a red earth soil at Wagga Wagga

D.P. Heenan and A.C. Taylor

NSW Agriculture and Fisheries, Agricultural Research Institute, Wagga Wagga, N.S.W, 2650

Lupin is becoming an important part of the rotations on many wheat farms and its role in terms of maintaining or improving soil nitrogren fertility and reducing wheat disease problems is being recognised. However, with the swing to conservation tillage for cereal farming to reduce soil degradation, there is a need to examine the effect of various cultivation/sowing techniques on lupin particularly in the long term.

Methods

The experiment commenced in 1979 and consisted in part of wheat/lupin rotations with three levels of tillage combined with two levels of stubble management. Details are given in another paper reported to this conference (1). The herbicide simazine was used with post emergent herbicides to control weeds.

Results and discussion

Following sowing of Danja lupin in May 13 1988, the total rainfall for May 1988 was well above average (165 mm cf. 51 mm). Long term averages show that maximum yields were obtained with direct drilling into burnt wheat stubble (Table 1). Where stubble was burnt three cultivations prior to sowing reduced yields by 17%.

Table 1. Tillage and stubble management effects on lupin yields (t/ha) for 1988 and the long term mean (1979-88).

Stubble management	Direct drilled	One cultivation	Three cultivations
Retained	1.57 (1.29)*	1.33 (1.24)	1.34 (1.24)
Burnt	1.35 (1.35)	0.94 (1.19)	1.03 (1.12)

* Figures in parenthesis represent long term mean yields.

During the wet winter of 1988 lupin yield was affected (P 0.05) by stubble management and tillage. Seedling death from damping off organisms was particularly severe in treatments where stubble was burnt followed by one to three cultivations. The damage was considerably reduced by direct drilling into either burnt or retained stubble. At early pod formation, plant numbers were greater and dry matter increased (P 0.01) where stubble was retained. Direct drilling also produced higher dry matter and plant number, only where stubble was burnt, resulting in an interaction (P 0.05) between stubble management and tillage. The effects of stubble and tillage on final grain yields were mainly related to effects on plant number at maturity. These results demonstrate the effect long term conservation farming can have on a lupin crop in a wet year.

1. Meenan, D.P. and Taylor, A.C. 1989 (This Proceedings)