Fertilizer requirements of irrigated linseed at emerald I. nitrogen and phosphorus.

A.C.L. Douglas and L.J. Wade

Dept. of Primary Industries, P.O. Box 81, Emerald Q1d. 4720

Linseed has potential in the Emerald Irrigation Area (1). In this paper its responses to nitrogen and phosphorus fertilizer are reported.

Methods

The experiment consisted of four rates of nitrogen as nitram (0, 40, 80 and 120 kg N ha^{-}l) and two rates of phosphorus as double super (0 and 20 kg P ha^{-1}) in a factorial design with two replicates. Plot size was 22.5 m^2. Linseed cultivar Glenelg was sown on a heavy black cracking clay soil (Dg 5.12) on June 15, 1982. An even plant stand of 115 plants m^{-2} was established. The crop was sprayed twice with a 1% solution of zinc sulphate heptahydrate early in the life cycle and was irrigated to preclude the possibility of moisture stress. Grain yields were determined from an 18 m datum area of each plot.

Results and Discussion

This soil typically contains 13 ppm bicarb P (0-10 cm), 55 kg N ha^{-1} (0-60cm) and 0.5 ppm En (0-10cm) (2). A significant phosphorus response occurred (Table 1), with the addition of 20 kg P ha^{-1} increasing the yield by 159 kg ha^{-1} to 1068 kg ha^{-1} on average. The effects of nitrogen and its interaction with phosphorus were not statistically significant.

Linseed has been considered to respond well to high residual soil fertility, but often to respond poorly to direct fertilizer application (3). At the Ord River Valley, it has been shown (4) that 18 months clean fallow would provide the full nitrogen requirement of the crop, with 106 kg II ha^{-1} available at planting. After 6 months clean fallow, 33 kg II ha^{-1} was available at planting, and the addition of 45 kg N ha^{-1} was sufficient for the crop in the absence of weeds (5). Thus it is concluded that 80 kg N ha^{-1} is required to support a crop of irrigated linseed, and may best be provided through residual soil nitrogen following a well fertilized previous crop.

Phosphate for Linseed is commonly recommended at rates used for wheat (6,7). The results show a significant phosphorus response at the rate recommended (2) for irrigated wheat at Emerald (20 kg P ha^{-1}).Linseed is very susceptible to zinc deficiency, and its prevention through either soil or aerial application (8) is essential at the low levels of available zinc in Emerald soils (2).

Table 1. Grain Yields (kg ha^{-1})

Rate of Applied P	Rate of Applied Nitrogen (kg N ha^{-1}) 0	40	80	120	Mean
0 kg P ha^{-1}	858	858	981	940	909
20 kg P ha^{-1}	992	1109	1154	1018	1068
Mean	925	984	1068	978	989

Statistical Significance:			LSD 5%		LSD 1%	
	N	n.s.				
	P	**	"	86	"	130
	NxP	n.s.	"	171	"	259

1. Wade, L.J. (1962) - Proc. 2nd. Aust. Agron. Conf. Wagga Wagga, p299.

2. Wade, L.J. Qld. J. Agric. Anim. Sci. (in press).

3. McCregor, W.G. (1960) - Field Crop Abstracts 13 : 83-87

4. Wetselaar, R.; Beech, D.F.; Norman, M.J.T.; and McIntyre, G.A. (1968) -

5. Aust. J. apt. Agric. An. Husb. 8 : 59-80.

6. Beech, D.F. and Norman, M.J.T. (1964) - Aust. J. apt. Agric. An. Husb. 4 : 197-205.

7. Anon (1970) - Agric. J. 96 : 159-165.

8. Poole, N.L.; Cuyton, R.J. and Fisher, H.M. (1974) - J. Auric. W.A. 15:5-7.

9. Duncan, O.W. (1967) - Qld. J. Agric. An. Sci. 24 : 301-307