The residual effects of fertilizer zinc on a black earth soil from North Western New South Wales

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Zinc deficiency affects several crops including maize when grown on the extensive black earth soils of north western New South Wales. Application of zinc to the soil corrects the deficiency symptoms and increases yield. Producers need to have information on the effects of rates of initial and subsequent applications on yields and the residual effects to assist them in planning fertilizer programs for these soils.

In the 1973/73 season, a trial was established on the Liverpool Plains Research Station at Breeza, to study rates, methods of application and residual effects of zinc oxide on hybrid maize XL45. Zinc was either broadcast or drilled at initial rates of 0, 5.6, 11.3 or 38 kg Zn ha^{-1} and 0 or 5.6 kg Zn ha^{-1} in subsequent seasons.

In most seasons treatment with zinc almost doubled grain yields. Broadcasting and working in was more effective than drilling zinc with the fertilizer. Table 1 summarises for the broadcast treatments the effects of initial rate and annual applications of zinc on maize yields for each season.

TABLE l. Yield of maize grain (kg ha-l)

Year	Rate of initial zinc with no follow up (kg Zn ha^{-1})				Initial 28 kg Zn ha^{-1} plus annual 5 kg Zn ha^{-1}	Standard Error
	0	5.6	11.2	28		
1972/73	3120	5460	5560	5760	-	170
1973/74	2540	4860	5610	5220	5220	210
1974/75	4240	6960	7290	7500	7400	270
1975/76	4190	6890	6880	7860	7500	320
1976/77	1570	3470	3670	4020	4020	178
1977/78	5870	6810	6500	6760	6730	305

There were large yield responses to the initial 5.6 kg of Zn with small increases up to the highest rate of 28 kg Zn ha^{-1}. The shape of the yield curve has remained basically the same during the six years of the trial. Broadcasting and working in the initial zinc treatments gave much higher yields than drilling in the first two years.

Residual effects of the initial 5.6, 11.2 and 38 kg Zn remained evident throughout the six years and the higher rates continued to produce highest yields.