The performance of rapeseed on salt-affected soils of the Wimmera region of Victoria

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For more than a decade, concern about loss of productivity due to soil salinit⁹ has been increasing in southern Australia. In western Victoria, soil salinization is accelerating at various locations including parts of the Wimmera flood plains, a major dryland cropping region. The main crops grown in the Wimmera (360-580mm annual rainfall) are winter growing cereals, legumes and oilseeds. The identification of a profitable crop to effectively utilize salt-affected areas would help sustain productivity in this region.

In a two year study (1984 and 1985) the rapeseed was investigated to determine its productivity and salt uptake when grown on soils containing appreciable levels of salinity.

Methods

In both years, 8 commercial crops of rapeseed (Brassica napus) grown on uniform grey clays were selected on the basis of containing areas recognized as being saline. At maturity, each crop was randomly sampled using ten Im x Im cuts at ground level. Dry matter yields were determined for each site and plant samples were analysed for chloride content. Immediately after harvest, 100cm soil cores were sampled for salt determination.

Results and discussion

The district's seasonal conditions during 1984 and 1985 were well within the normal range; the rainfall was 90% and 96% of the long-term average (447mm) for the two years respectively.

Table 1, below, summarizes the available data for dry matter yields obtained for the various categories of soil salinity investigated; sample processing is currently being completed.

EC	Seeds	Stubble	Plant Cl	
dS m ⁻¹	t ha ⁻¹	t ha ⁻¹	%	
/0.5	1 78 (0	20)* 4 21 (0 52)	0 76 (0 55)	
0.5-1.0	1.73 (0.	34) 4.36 (0.68)	1.15 (0.60)	
1.0-1.5	1.34 (0.	33) 3.44 (0.58)	1.80	
1.5-2.0	0.93 (0.	04) 2.92 (0.45)	1.80	
2.0-2.5	0.79 (0.	15) 2.13 (0.56)	3.40 (0.50)	
2.5-3.0	- 1	11104 I.H.) All	+	
3.0-3.5	0.31 (0.	29) 1.00 (0.46)	5.90 (4.10)	

	Table 1: Effect of soil salinit	y on dry matter	production and	chloride content	of rapeseed
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The data shows that soil profiles (0-100 cm) with EC of up to at least 2.5dS m produced rapeseed yields within the district range (0.5-2.5 t ha) and total dry matter containing up to 116 kg ha chlorides. On very highly saline soils (EC >3.15 dS m) rapeseed failed to yield economically. However, analysis of plant material from these areas showed that rapeseed plants contained up to 8.8% chlorides.

The results of this study indicate that rapeseed is a crop of high agronomic potential on the at-risk saline soils in western Victoria. In addition to its favourable cash value, the crop extracts appreciable amounts of salts from the soil profile. Removal of stubble from the paddock would remove more of these salts.