

Potassium requirements of potatoes grown on krasnozems in Tasmania

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In Tasmania, high rates of potassium chloride (215 to 300 kg K/ha) are applied at planting to potato crops irrespective of cultivar, soil type or soil K level. Past experiments in Tasmania indicated that the cultivars Kennebec and Brownell did not respond to applied potash at soil Bicarbonate K (1) levels greater than 400 ppm (2). Since then, Russet Burbank has been introduced and is now the major cultivar grown but no local research has been carried out to determine the relative requirements of Kennebec and Russet Burbank for fertiliser K.

Methods

Four experiments (two cultivars x six rates of K) were carried out in northern Tasmania during 1985/86; two each at Forth side Vegetable Research Station (F.V.R.S.) and Elliott Research Station (E.R.S.).

The mean Bicarbonate K (1) levels for the two sites at F.V.R.S. were 188 and 583 ppm, and at E.R.S. 226 and 533 ppm. The crops were planted in October 1985 in 800 mm rows at seed spacing of 440 mm for Russet Burbank and 220 mm for Kennebec. Fertiliser was banded under the rows. The basal fertiliser was 19:23:0 at 650 kg/ha and potassium chloride was mixed with basal fertiliser to supply 80, 160, 240, 320 or 400 kg K/ha.

Experiments were irrigated with sprinklers and harvested in April 1986.

Results and discussion

Large yield responses to potash were obtained in the two experiments with low soil K (Table 1). The proportion of maximum yield on nil potash plots was 0.5 for Russet Burbank and 0.7 for Kennebec, indicating that Russet Burbank is more sensitive to K deficiency than Kennebec. Russet Burbank had lower petiole potassium levels than Kennebec.

The statistical increase in Kennebec yield from 240 kg K/ha in the experiment with high soil K at FVRS was unexpected and unlikely to have been a real effect (2).

These data indicate that critical soil Bicarbonate K level for irrigated potatoes grown on krasnozems is greater than the 200 ppm suggested by Maier for light textured soils in South Australia (3). The critical soil K value may be higher for Russet Burbank than Kennebec. Further experiments have been undertaken.

Table 1 Mean yield of processing tubers (t/ha) grown in low and high soil K

Potash applied kg K/ha	Processing Yield							
	Kennebec				Russet Burbank			
	low soil K		high soil K		low soil K		high soil K	
	FVRS	ERS	FVRS	ERS	FVRS	ERS	FVRS	ERS
	t/ha							
0	45.2	61.9	76.6	83.5	21.8	46.3	68.4	68.7
80	57.5	67.7	79.6	77.6	41.5	56.8	70.8	74.0
160	59.6	73.9	82.8	78.9	51.0	61.9	68.5	74.0
240	65.4	71.2	88.9	84.7	54.6	62.3	66.6	70.9
320	73.0	75.6	75.3	81.2	61.5	65.6	68.4	69.3
400	74.7	75.6	76.1	82.2	63.9	68.5	71.4	75.6
LSD (0.05)	7.8	10.8	10.1	8.2	7.8	10.8	10.1	8.2

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