Rye as an alternative cereal under high rainfall conditions

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Potato growers near Ballarat, Victoria traditionally grow rye as a green manure crop before planting potatoes in spring.

Crops are seldom harvested for grain. Two flour mills that process rye products nearby obtain the bulk of their grain from areas 300-500 km away.

Farmers grow barley, wheat or oats in rotation with potatoes but due to low pH and high aluminum levels in the soil, the wheat and barley crops frequently yield poorly or fail. Rye is known to be tolerant to these conditions and also to the cold winters that prevail in the area.

The aim of these experiments was to determine the potential for using rye as an alternative grain crop.

Methods

Replicated field experiments were conducted near Springbank, (annual rainfall 900 - 950 mm) in 1986 and 1987. Separate experiments compared rates of sowing, varieties, growth regulators and nitrogen fertilizer applied at various growth stages and rates.

Results and discussion

A sawing rate of approximately 100 kg ha $^{-1}$ gave the largest grain yield in 1986. In 1987 responses to nitrogen applied at early jointing stage were recorded at both light and heavy sowing rates = (Table 1).

Table 1. Effect of sowing rate on grain yield and protein.

			1986		
Sowing rate kg ha $^{-1}$	50	100	150	200	L.S.D(P=0.05)
Grain yield t ha $^{-1}$	1.07	1.38	1.41	1.46	0.10
Grain protein %	14.2	13.3	13.0	12.3	-
			1987		
Sowing rate kg ha $^{-1}$	80	140	80(+N)*	140(+N)*	L.S.D
Grain yield t ha $^{-1}$	3.07	3.31	3.69	3.74	0.23

* 20 kg ha $^{-1}$ nitrogen applied at jointing stage.

Yield responses to growth regulator (CCC) were measured in each year (Table 2.) Multiple applications and the addition of nitrogen further enhanced yield. Crop height was reduced by approximately 15 cm with each application.

Table 2. Effect of Cycocel Growth Regulator * (CCC) on grain yield.

Decimal growth stage (Zadoks) at application	Rye yield (t ha $^{-1}$) 1986	1987
No CCC	1.84	2.97
CCC at D.G.S. 23	2.07	3.00
CCC at D.G.S. 30	1.84	3.28
CCC at D.G.S. 23 + 30	-	3.40
CCC at D.G.S. 23 + 30 + 40 kg ha $^{-1}$ N	-	4.25
L.S.D. (P = 0.05)	0.13	0.22

*Chlormequat applied at 293 g ha $^{-1}$

In a separate experiment (results not shown) the varieties Ryesun and the traditional variety S.A. Commercial were compared for two years. In each year Ryesun outyielded S.A. Commercial ($P = 0.01$) by approximately 20%.

The experiments demonstrated that Rye can be successfully grown in high rainfall environments and that high grain yields can be achieved.