

Water use of wheat in the Victorian Mallee

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In 1980, an experiment was commenced at the Mallee Research Station, Walpeup, to investigate the effect of cropping sequence on cereal diseases. The subsequent performance of crops grown intensively in rotation has often equalled or bettered those grown on traditional winter fallow, due to the control of cereal diseases and grass weeds (1). This paper reports the changes in soil moisture in wheat crops grown under intensive and traditional rotations.

Methods

The experiment was designed to repeat rotations sequentially over a period of years. In 1984 and 1985 all the rotations in a particular sequence were sown to wheat. Sowing dates in those years being July 17 and June 3 respectively. Soil moisture was measured gravimetrically to a depth of one metre at presowing and postharvest. Crop water use was inferred from changes in soil moisture and growing season rainfall.

Results and discussion

Total rainfall was 281mm (1984), 267mm (1985) and growing season rainfall 200 mm and 199 mm in these years respectively.

Table 1 Crop Water Use and Wheat Yield under Several Rotations

Rotation		Crop Water Use (mm)		Yield t/ha	
		1984	1985	1984	1985
W M F W	a	249	262	1.18	2.13
W W W W	b	231	247	1.53	0.87
L W P W	c	234	272	1.76	1.74
R B L W	d	255	257	1.82	1.79
W M L W	e	257	256	1.74	1.84
M W M W	f	233	234	1.58	1.62
LSD (P<0.05)		n.s.	n.s.	0.19	0.31

W = Wheat, B = Barley, M = Medic, F = Fallow, L = Lupin,
P = Pea, R = Rape

In 1984 and 1985, water use by wheat crops in all rotations (Table 1) was the same, regardless of previous crop history. Yearly rainfall and during the growing season was very similar in both years. However, during the fallow period in 1983 rainfall was greater than for a similar period in 1984. In spite of this there was no advantage to fallow for increased yield in 1984, and only a marginal increase in 1985, when compared to those rotations under intensive management. Moreover the yield advantage was insufficient to make the extra workings involved in fallowing economic.

From these results it is concluded that any advantage in yield obtained by winter fallowing is almost entirely due to the control of grassy weeds and cereal disease in the fallow, and not to the amount of water stored in the soil during the fallow period.

1. Kollmorgen, J.F., Griffiths, J.B. and Walsgott, D.N. 1985. Ecology and Management of Soilborne Plant Pathogens. The American Phytopathological Society.

