Irrigated crop rotations on beds in the Murrumbidgee Valley 2. Summer crop growth and yields

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Double cropping on raised beds offers a means of increasing productivity and income to irrigation farmers in southern N.S.W. Such a system requires a number of changes in the normal agronomic management of crops. Consideration must be given to adaptability of the crop to direct drilling, growth duration, weed control, stubble management and nutrition. The performance of a range of summer crops in a double cropping experiment was examined over two seasons at Leeton Field Station.

Methods

The main details of the irrigated crop rotation experiment are given in a previous paper presented to this conference (1). Commercial varieties of soybeans (Chaffey), sunflowers (Hysun 32), maize (Colonel) and millet (Shirohie) were direct drilled into burnt or standing wheat stubble on December 20 and 19 1984 and 1985 respectively. Post emergent herbicides were used for all crops except millet which suffered severe competition from barnyard grass. The non legume crops received 133kg/ N ha in 1984-85 and 118 kg N/ha in 1985-86 as split applications. Maize received a further 50kg N/ha in 1985-86. All crops received 15kg P/ha at sowing and were irrigated up.

Results and discussion

In 1984-85 all crops except soybeans established well. Some reductions in 1985-86 establishment were evident where the wheat stubble (7.3t/ha) was retained. In both seasons early vegetative growth and plant height were reduced by standing stubble but the effect was less in the second season. Stubble retention also delayed flowering of sunflowers, maize and millet by 7-14 days in 1985 and a few days in 1986.

Table 1. Effects of stubble management on grain yield of summer crops.

Stubble Management	Maize	Millet	Soybean	Sunflower
		1984-85		
Burnt	6.8t/ha	1.7	1.6	3.5
Retained	5.5	1.6	1.9	2.5
		1985-86		
Burnt	5.3	1.8	2.4	2.5
Retained	4.3	1.5	2.7	2.1

In the final year grain yields of sunflowers were higher that the commercial average and maize yields were satisfactory. Soybeans were disappointing but higher in the second season probably due to better establishment. In both years the millet suffered severe competition from barnyard grass. Yields of non legume crops were reduced by stubble retention suggesting that some effect of the stubble may have been due to N immobilisation. Lower yields of maize and sunflower in the second season could reflect increasing nutritional stress particularly during early growth and where stubble was retained.

Growth and yields of sunflowers have been particularly encouraging while the ability of soybeans to supply its own N is an obvious advantage. The long growth duration of the present varieties of soybeans and maize can make sowing the winter crop difficult particularly if autumn rains interfere with harvest and stubble is to be removed or burnt.

1. 1. Thompson, J.A., Heenan, D.P. and Bacon, P.E. 1987. Prac. 3rd Aust. Agron. Conf.