

## Merriwagga Crop Rotation Trial 2001 Results

Myles Parker, NSW Agriculture, Griffith Ben  
Braysher

### Background and Method

In 1999 a long term farming system trial was established to investigate the consequences of four different cropping practices at Merriwagga under 2 tillage systems. The trial is located on Geoff and Ian Barber's property "Sylvanham", 10km west of Merriwagga Township. The paddock chosen has had a long history of traditional low input cropping. Within

the four different systems the performance of zero tillage and conventional tillage is being compared in this 375mm-rainfall environment on alkaline red earth soils (pH 7.2 CaCl<sub>2</sub>). The trial has been designed so that all operations are performed using local farm equipment. All treatments are replicated 3 times, making a total of thirty 1 hectare plots.

*Table 1: cropping timetable for each treatment. NB Continuous cropping treatment is repeated out of sync. (1 & 2) for greater reliability of results.*

Farming System Treatments		Cropping Timetable				
		1999	2000	2001	2002	2003
1	continuous wheat	wheat	wheat	wheat	wheat	wheat
2	continuous rotational cropping 1	peas	wheat	canola	wheat	peas
3	fallow/wheat/fallow/wheat	fallow	wheat	fallow	wheat	fallow
4	continuous rotational cropping 2	wheat	peas	wheat	canola	wheat
5	lev /fallow /wheat	lev	fallow	wheat	Ley/vetch	fallow

### 2001 Results

*Table 2: Table of yield means for 2001 (t/ha)*

Trt	Rotation Name	2001 Crop	Overall Mean	Conventional Tillage	No Tillage	No Tillage Penalty
1	continuous wheat	Wheat	1.113	1.123	1.103	-0.020
2	continuous rotation 1	Canola	0.208	0.218	0.198	
3	fallow/wheat/fallow/wheat	Fallow	NA	NA	NA	
4	continuous rotation 2	Wheat	1.188	1.237	1.140	-0.097
5	lev/fallow/wheat	Wheat	0.920	1.200	0.640	-0.560
Average SED			0.104	0.147		
Average LSD			0.220	0.311		

In 2001 the greatest yield penalty for no tillage is 560 kg/ha for the ley/fallow/wheat treatment. The least

effect of no tillage was a yield penalty of only 20kg/ha in the continuous wheat treatment.

*Table 3: Wheat yield means across three years adjusted for year effects (t/ha)*

Rot	Rotation Name	Overall Mean	Conventional Tillage	No Tillage	No Tillage Penalty
1	continuous wheat	1.760	1.872	1.648	-0.224
2	continuous rotation 1*	2.170	2.283	2.057	-0.226
3	fallow/wheat/fallow/wheat*	2.138	2.523	1.753	-0.770
4	continuous rotation 2	1.646	1.662	1.630	-0.032
5	ley/fallow/wheat*	1.472	1.752	1.192	-0.560
Average SED		0.199	0.194		
Average LSD		0.399	0.389		

♦Rotations 2, 3, and 5 have only been in wheat once so far. Their overall means should be regarded with caution.

The overall yield means for the past three years of cropping, adjusted for year\*, (Table 3) are highest for the first continuous rotation (2) and the fallow/wheat/fallow rotation (3). The lowest yield mean is the ley/fallow/wheat (5). \*data adjusted to remove effect of poor season, allowing comparison of tillage systems.

The yield penalty for no tillage (compared to cultivation) is 770 kg/ha for the fallow/wheat/fallow rotation and 560kg/ha for the ley/fallow/wheat rotation, whereas it is only 224kg for continuous wheat and 226kg and 32kg respectively for the two continuous cropping rotations.

#### Discussion

The trial is showing clearly that the early years of no tillage come with a significant yield penalty in most treatments. This is most significant when coming out of a spray fallow as seen in both the ley/fallow/wheat treatment and the wheat/fallow/wheat treatment. It must be noted that this trial began on a heavily cropped, (tired) conventional paddock. The trial site has never been deep ripped and has a classic plough pan. This result was expected and no farmer would be wise going straight into a no-till system

"cold turkey" from a conventional system in those conditions. It is interesting to note that the difference in yield between the no-till and conventional treatments in the continuous wheat is apparently reducing over time. In 2001 the yield difference of 20kg/ha was not significant. Is this treatment starting to show the benefits of no tillage and surface stubble retention? Time will tell. This trial will continue as long as funding and interest is maintained.

#### Acknowledgements

Thanks to Geoff & Ian Barber, Jeff & Trevor Muirhead, Vic Harrison, Peter Dart and John Wesley for co-operating, sowing and other farming operations.

#### Site Sponsors

Thanks to:  
Cropcare, Aventis, Novartis, Nufarm, Harrison Ag services, Monsanto, Incitec, Pivot, Mobil, Louston Pty Ltd, Farmoz, Westpac, Harvest Grain Australia, PIBA, Cyanmid, Cropfacts, Yenda Producers, Elders VP, Rawlinson & Brown, NSW Agriculture.