

Sustainable Farming Systems Trial - Rankins Springs

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Background

The Rankins Springs regional site was established in 2000 with a view to examine the long-term environmental, biological and economic effects of alternate production systems. Rather than examining isolated management issues, farmers were interested in the performance of integrated soil management systems currently being promoted in the district. This long-term sustainable farming systems trial is the main priority of the regional site with other local issues also being investigated.

Methods

The regional site is located opposite the gates of "Wattle Park", down Anderson's Lane, off the main Rankins Springs road. There are seven systems involved, with each system allocated 3 x 1/3 ha plots (a total of 1ha) in a random block design. Plot size has been designed to suit sowing and harvesting gear.

The soil type of the site is a red sandy loam with a pH of 4.9, organic carbon 1.3%, CEC 12.32 meq/100g and a Ca:Mg ratio of 3.04. Paddock history of the site includes canola (1999); oats (1998); wheat (1997) and wheat (1996).

Annual rainfall is around 400mm, with a growing season rainfall of 250mm.

The rotation for the trial will consist of wheat 2000, lupins 2001, wheat 2002, barley 2003 . and canola 2004.

The trial will run for a minimum of 5 years, with the hope to carry this beyond 10 years so a fair analysis of each system can be made.

Participating systems include:

1. Conventional System (District Practice)
2. Soil Management Riverina
3. Alroc Mineral fertilisers
4. BioAg
5. Nutri-tec
6. Albrecht
7. Organic

Whistler wheat was sown in 2000 on 24th April at 40 kg/ha, in all systems, with the exception of the organic system, which was sown to Morava vetch in 2000. Below is a summary of the basic operations for each system in 2000.

Date & Operation	SYSTEM						
	Conventional	Control	Soil Management	Alroc	Fertico Demo	BioAg	Organic (Vetch)
7.3.00							
Offset plough	✓	✓	✓	✓	✓	✓	✓
24.3.00							
Chisel Plough	✓	✓	✓	✓	✓	✓	✓
17.4.00							
Prickle Chain	✓	✓	✓	✓	✓	✓	✓
20.4.00							
Stomp & Avadex	✓	✓	✗	✓	✓	✓	✗
20.4.00							
Prickle Chain	✓	✓	✓	✓	✓	✓	✓
24.4.00							
Pre-drill Urea	✓	✓	✗	✗	✗	✗	✗
24.4.00							
Sow	✓	✓	✓	✓	✓	✓	✓
Seed	✓	✓	✗	✓	✓	✓	✗
Treatment							
2.6.00							
Spray Jaguar	✓	✓	✓	✓	✓	✓	✓
16.12.00							
Harvest	✓	✓	✓	✓	✓	✓	✓

Note: In addition to the above operations:

1. Alroc had a lime based product applied on the 19th April and mineral coated urea spread on the 13th September;
2. BioAg had lime spread on 1st February, BioAg Phos and raw sulphate of ammonia spread on 22nd April, Soil and seed sprayed on 24th April, Balance & Grow plus urea sprayed on 2nd August and Fruit & Balance plus urea sprayed on 22nd August;
3. Organic plots were slashed during the season to minimise weed seed set. The organic system is in a building phase and as such wheat was not grown in 2000.

Results and Discussion

This was the first year of the Rankins Springs “long term” sustainable farming systems trial. There were 7 systems participating in the trial including BioAg, Soil Management Riverina, Fertico Demonstration, Alroc, organic farming, conventional and a control. In 2001 two new systems will be introduced, as mentioned above, to take the place of Fertico and the control plot. These are Nutritec and the Albrecht system.

With the main focus of the trial being the long term environmental and economical sustainability of the various production systems, it will take at least five years before an accurate assessment of each system can be made, but 2000 has shown some interesting results.

Yields: Paddock preparation and seasonal conditions played a major role in determining yields and grain quality. The lack of subsoil moisture, and the dry spell in late September/early October had a substantial impact on yields (Fig. 1).

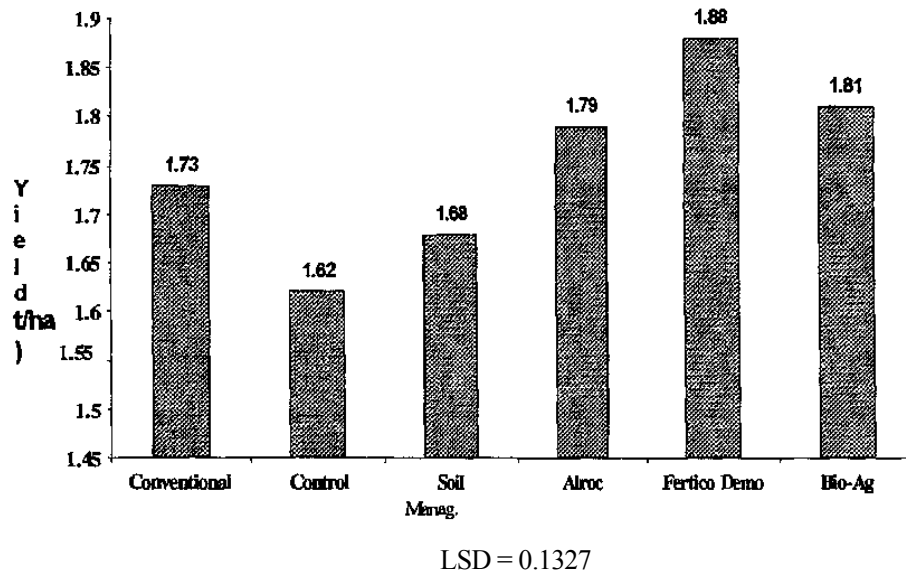


Figure. 1. Effect of contrasting soil management systems on wheat yield at Rankins Springs.

In summary, yields were all relatively similar and ranged from only 1.6-1.9 t/ha. The Fertico demonstration yielded the highest followed by Bio Ag and then Alroc. These three treatments were significantly higher yielding than the control. None of the systems were significantly greater than the conventional, although the Fertico Demonstration came close (to being significant).

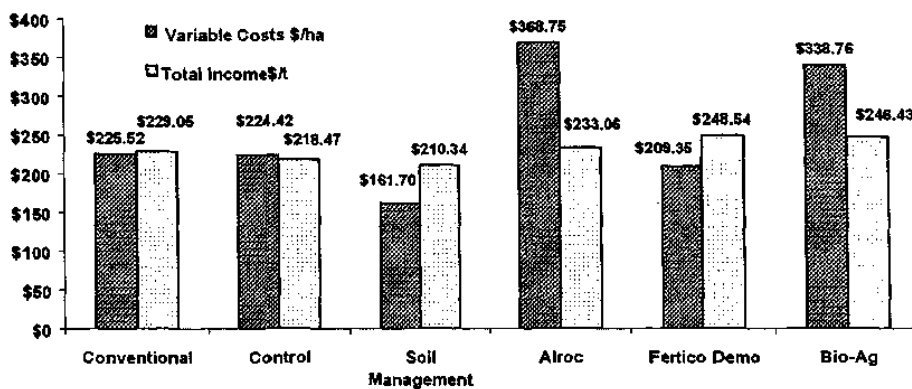
Environmental conditions were favourable early in the year and the crops had the potential for high yields. With the dry spell in September the treatments with high nitrogen inputs suffered to a greater extent, losing their extra yield potential. The Fertico demonstration had only 10 units of nitrogen applied compared to the conventional treatment, which had 34 units of nitrogen. This may be the reason why the Fertico treatment yielded the highest.

Quality: Rainfall prior to harvest caused all of the grain to be downgraded. Grain quality ranged from Feed to GP1. Pinched grain affected quality, with screenings ranging from 4 to 11% in the treatments (Table 2). There seemed to be a direct correlation between protein, nitrogen inputs and screenings of each treatment. The conventional and the control had the highest screenings as well as the highest nitrogen input. Yield potential in these treatments were reduced by the dry conditions late September/early October, as a result protein and screenings were higher.

*Central West Farming Systems***Table 2:** *The effect of soil management systems on the grain quality of wheat (analysis was carried out courtesy of Barters).*

System	i Nitrogen Input (kg N/ha)	Density	Moisture %	Protein %	Screenings %
Conventional	34	71.50	9.03	9.93	9.69
Control	34	71.33	8.93	11.03	11.24
Soil Management	14	73.00	10.13	8.03	6.85
Alroc	1 22	73.67	9.80	7.37	4.84
Fertico Demo	10	73.83	9.73	7.70	4.20
Bio Ag	27	72.33	9.03	10.03	7.81

Gross Margins: Each system varied in their seed treatments, fertiliser management, chemical application and management strategies. The gross margin is a measure of the overall profitability of each system for 2000. When interpreting these results it should be noted that both BioAg and the Alroc system have had lime applied in the first year and are bearing these costs in the first year.

**Figure 2:** *The variable cost of production and the gross income generated by contrasting soil management systems.*

Footnote: With BioAg two of their sprays could have been combined with the herbicide, reducing their variable costs by \$8.40. Soil Management also had had an extra prickly chain for herbicide incorporation which would reduce their variable costs by \$5.87.

While the dry conditions in September reduced yields substantially, the rainfall in November caused these lower yields to be of lower value, resulting in little profit being made by wheat farmers in the Rankins Springs district. The soil management system had the highest gross margin of only \$48/ha (Fig. 3).

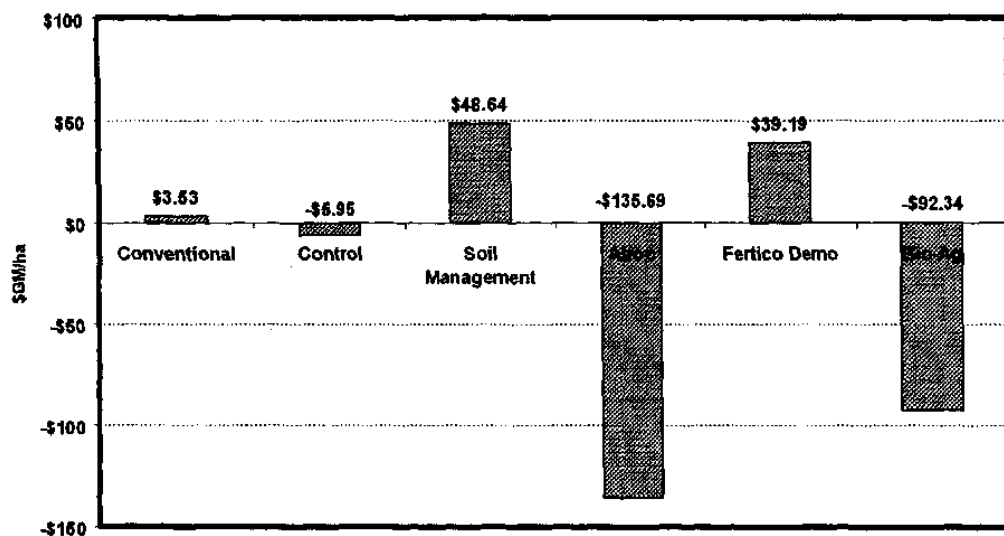


Figure 3: A comparison of the gross margins for each soil management system for the 2000 season.

Note: When interpreting these results it should be noted that both BioAg and the Alroc system have had lime applied in the first year, affecting their profitability. The benefits of lime should be distributed over a number of years.

Plans for 2001

In 2001 the Rankins Springs CWFS plan to sow lupins across all treatments with the exception of organic treatment, which is considering vetch. The original plan was for barley in 2001, **but** at the last meeting a motion was passed for lupins to be sown this year to aid soil nitrogen levels.

Acknowledgments

The Rankins Springs CWFS group and all its members would like to thank all the sponsors for their support over the past 12 months. Your continued involvement and support will ensure its success.

2000 Local Site Sponsors: Cropcare, Aventis, Dow Elanco, BASF, Monsanto, Nnfarm, Yenda Fruit & Case Supplies, F&R McNabb Ply Ltd, Incitec, Pivot, National Australia Bank, SGB, Auswest Seeds, Yenda Producers, Elders VP, Rawlinson & Brown, NSW Agriculture.