

Rankins Springs CWFS Alternative Farming Systems Trial

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Background

The Rankins Springs CWFS site was established in 2000 with a view to examine the long term environmental, biological and economical effects of alternate production systems. This long term sustainable farming systems trial is the main priority of the site with other local issue also being investigated.

The trial has now been running for two cropping seasons and is starting to show some interesting results. It is set up to compare each of the alternative systems against each other as well as against the normal farming practice within the area. An organic system was also set up for comparison.

Why?

It came about as growers around the Rankins Springs district were finding that conventional type fertilisers and seed dressings were not entirely meeting their needs. They have long been interested in the various alternative products on the market which are becoming increasingly popular and have been looking at ways to improve their environmental and economic performance, but were confused by the variety of different ideas and methods being advanced. Most farmers within the group have done on-farm trials with microbial, nutritional or tailored products with many inconclusive results.

When concepts like remineralisation and biological farming started to turn up in the district local farmers wanted to get a clearer picture of what was

available, the strengths and weaknesses of each system and what works best in local conditions.

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.

Method

The Rankins Springs CWFS site is located opposite the gates of "Wattle Park", down Anderson's Lane, off the main Rankins Springs road.

There are seven systems involved in the trial including BioAg, Soil Management Riverina, Nutri-tec Solutions, Alroc, Albrecht, Organic and a conventional district practice Treatment. Each system is replicated three times, with plot size equating to 1 hectare over the three replicates. Plot size was primarily determined by sowing gear, but also for ease of calculations.

Each system varies in the type and amount of inputs they provide including fertiliser, soil ameliorants, seeding rates, seed dressings, and herbicides. The local farming group work in with each of the systems to complete sowing and harvest, mainly to keep variability down. All other specialised inputs, including chemicals, seed treatments, soil amendments, fertilisers and foliar sprays are the responsibility of the participants, although the group are available to assist. The farming group is also responsible for keeping records of the activities of the site, including crop and financial data.

Results and Discussion

In 2001 all plot of the Rankins Springs CWFS were sown to lupins, with the exception of the organic treatment,

which was still in an organic conversion phase and was sown to vetch. The difference in inputs in the different systems has been one of the big surprises for most of the local growers.

Crop details for 2001 were as follows.

- ♦ Sowing date of trial: April 19, 2001
- ♦ Seed rate: 70 kg/ha.
- ♦ Crop and variety: Wonga Lupins

(a mix of Popany & Blanche Fleur Vetch sown on Organic site @ 70kg/ha)

The following table outlines the inputs and operations for each system for 2001.

1. CONVENTIONAL SYSTEM

16 th Dec 00	Spray Roundup CT Co! 1.3 L/ha	
1 st March 01	Spray Roundup CT @ 1.3 L/ha	
19 th April 01	Spray Simazine " @ 2.0 L/ha	+ Roundup Max @ 0.8 L/ha
19 th April 01	Sow Wonga Lupins @ 70 kg/ha	+ Inoculum Group G (2x rate)
		+ Grain Legume Super @ 50 kg/ha
12 th July 01	Spray Verdict @ 0.07 L/ha	
11 th Nov 01	Spray Roundup CT @ 1.0 L/ha	

Yield = 0.43 t/ha

Variable Costs = \$154 Income = \$132 Gross Margin = -\$21 2 yr Cumulative GM = -\$18.00

****2. ALBRECHT SYSTEM**

16 th Dec 00	Spray Roundup CT @ 1.3 L/ha	
1 st March 01	Spray Roundup CT @ 1.3 L/ha	
19 th April 01	Spread Lime @ 4.0 t/ha	+ Zinc monohydrate @ 40 kg/ha
19 th April 01	Spray Simazine @ 2.0 L/ha	+ Roundup Max @ 0.8 L/ha
		+ Copper Sulphate @ 35 kg/ha
19 th April 01	Sow Wonga Lupins @ 70 kg/ha	+ Inoculum Group G (2x rate)
		+ Fertiliser 15:13 @ 101 kg/ha
12 th July 01	Spray Verdict @ 0.07 L/ha	
11 th Nov 01	Spray Roundup CT @ 1.0 L/ha	

Yield = 0.33 t/ha

Variable Costs = \$524 Income = \$101 Gross Margin = -\$423

3. ALROC MINERAL FERTILISERS				
16 th Dec 00	Spray Roundup CT	@ 1.3 L/ha		
1 st March 01	Spray Roundup CT	@ 1.3 L/ha		
19 th April 01	Spray Simazine	@ 2.0 L/ha	+ Roundup Max @ 0.8 L/ha	
19 th April 01	Sow Wonga Lupins	@ 70 kg/ha	+ Inoculum Group G (2x rate) ALROC	
			+ ACTIVE 8 seed dressing SUPA-ACTIVE	
			+ phosphate @. 105 kg/ha	
12 th July 01	Spray Verdict	@ 0.07 L/ha		
11 th Nov	Spray Roundup CT	@ 1.0 L/ha		
<i>Yield = 0.2t/ha</i>				
Variable Costs	=S183	Income =S61	Gross Margin =	- 2 yr Cumulative GM = -\$258.00
				S122

4. SOIL MANAGEMENT RIVERINA				
16 th Dec 00	Spray Roundup CT @ 1.3 L/ha			
1 st March 01	Spray Roundup CT @ 1.3 L/ha			
19 th April 01	Spread MFert @ 110 kg/ha			
19 th April 01	Spray Simazine @ 2.0 L/ha	+ Roundup Max @ 0.8 L/ha		
19 th April 01	Sow Wonga Lupins @ 70 kg/ha	+ Inoculum Group G (2x rate)		
		+ Legico 3 fir?) 33 kg/ha		
12 th July 01	Spray Verdict @ 0.07 L/ha			
11 th Nov 01	Spray Roundup CT @ 1.0 L/ha			
<i>Yield = 0.2 t/ha</i>				
Variable Costs	=S183	Income =S61	Gross Margin = -S122	2 yr Cumulative GM =-\$74.00

**5. NUTRI-TECH				
16 th Dec 00	Spray Roundup CT @ 1.3 L/ha			
1 st March 01	Spray Roundup CT @ 1.3 L/ha			
19 th April 01	Spray Simazine @ 2.0 L/ha	+ Roundup Max @ 0.8 L/ha		
19 th April 01	Sow Wonga Lupins @ 70 kg/ha	+ Inoculum Group G (2x rate)		
		+ 4/20 Brewed Microbes		
		+ Leg-Tech T10 @ 0.3 L/ha		
		+ Seed-Tech @ 0.3 L/ha		
		+ Bio-P @ 0.15 L/ha		
		+ B-Sub @ 0.15 L/ha		
		+ MAP @ 70 kg/ha		
		+ Potassium Ilumate @ 4.0 kg/ha		
		+ Zinc Monohydrate @ 5.0 kg/ha		
		+ Stabilised Boron @ 5.0 kg/ha		
		+ Copper Sulphate @ 3.0 kg/ha		
12 th July 01	Spray Verdict @ 0.07 L/ha	+ Leg-Tech T10 @ 3.0 L/ha		
		+ Bio-Plex @ 0.125 L/ha		
11 th Nov 01	Spray Roundup CT @ 1.0 L/ha			
<i>Yield = 0.35 t/ha</i>				
Variable Costs	=S266	Income =S108	Gross Margin =-\$158	

6. BIOAG			
16 th Dec 00	Spray Roundup CT @ 1.3 L/ha		
1 st March 01	Spray Roundup CT @ 1.3 L/ha		
19 th April 01	Spread BioAgPhos @ 80 kg/ha		
19 th April 01	Spray Simazine @ 2.0 L/ha	+	Roundup Max (@ 0.8 L/ha
19 th April 01	Sow Wonga Lupins @ 70 kg/ha	+	Inoculum Group G (2x rate)
		+	Soil & Seed Microbes @ 2.5 L/ha
		+	BioAg Microbes @ 2.5 L/ha
12 th July 01	Spray Verdict @ 0.07 L/ha	+	Fruit & Nut @ 1.9 L/ha
11 th Nov 01	Spray Roundup CT @ 1.0 L/ha		
Yield = 0.39 t/ha			
Variable Costs = \$196 Income = \$118 Gross Margin = -\$78 2 yr Cumulative GM = -\$170.00			

*7. ORGANIC			+	Inoculum Group G (2x rate)
29 th Jan 01	Chisel Plough			
19 th April 01	Spread BioAg Phos @ 40 kg/ha			
21 st April 01	Spread Gypsum @ 300 kg/ha			
20 th April 01	Cultivate			
20 th May 01	Sow Vetch @ 70 kg/ha			

*Note: At time of writing no financial data was available for the organic system

** Note: that the Albrecht system and Nutri-Tech system have only been part of the trial for the last year, so there is no cumulative gross margin data available.

When last year's wheat crop was harvested in mid-December, the summer weeds were already well established, mainly melons and heliotrope. A week after harvest all plots, with the exception of the organic plot, were sprayed with Roundup CT @ 1.3L /Ha. This held the paddock until the 1st of March when the plots were again sprayed with Roundup CT @ 1.3L/ha, which in turn held the paddock till sowing.

Lupins were sown dry on the 19th April (except Organic), as there was moisture at depth but too deep to sow at. The plots were sown with 70kg/ha of Wonga lupins (G Inoculum). Just prior to sowing the plots were sprayed with 0.8 L/ha of Roundup Max plus 2 L/ha of Simazine. 18mm of rain followed on the 24th of April.

Plant establishment and weed counts were taken early July and given the

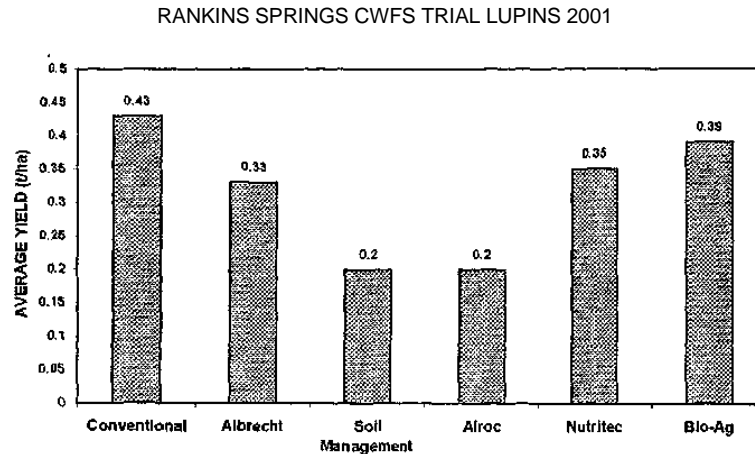
results it was decided not to spray for broadleaves but to spray for grasses with verdict @ 75 mls/ha on the 12th July. In hindsight it may have been advantageous to spray the mustards if only to keep them in check for future crops in the rotation.

Yields

2001 was a very dry year, once again putting each system to the test. The dry spell between April and June had an impact on growth, and reduced yield potential. Based on neighbouring rainfall figures the Growing Season Rainfall (GSR) was 153mm, with summer rainfall 33.3mm. Total yearly rainfall was 265.5mm or 10.6 inches.

The lupins were sown in April as a dry sowing operation and fortunately managed to get enough rain to germinate and grow prior to most other crops in the district being sown.

Below is a graph showing the yields of the different systems in 2001.



These results are yet to be statistically analysed but showed some interesting trends. In summary, yields in 2001 showed some large variations. The conventional system yielded the best with 0.43 t/ha, followed by BioAg with 0.39 t/ha, Nutri-tech with 0.35 t/ha, Albrecht with 0.33 t/ha and then Alroc and Soil Management Riverina with 0.2 t/ha. The organic treatment has been run as an "in conversion to organic" system for the past two seasons. In 2003 this system will be brought in line with the structure of the other systems

so a full comparison of each system can be directly made.

Gross Margins

As each system varies in their seed treatments, fertiliser management, chemical application and management strategies the gross margin figures paint a picture of the overall profitability of each system.

Below is a comparison of the variable costs of each treatment against total income, gross margin per hectare and yield from 2000 to 2001.

	SYSTEM						
	Conventional	Albrecht	Soil Management Riverina	Alroc Mineral Fertilisers	Nutri-tech	BioAg	Organic
YEAR 1 - 2000	Wheat		Wheat	Wheat		Wheat	<i>Vetch</i>
Yield (t/ha)	1.73	-	1.68	1.79	-	1.81	2.5
Break Even Yield (t/ha)	1.70	-	1.29	2.83	-	2.50	?
Total Variable Costs (\$/ha)	225.52	-	161.70	368.75	-	338.76	80.50
Total Income (\$/ha)	229.05	-	210.34	233.06	-	246.43	?
Gross Margin (\$/ha)	3.53	-	48.64	-135.69	-	-92.34	?
Gap From Best (\$/ha)	-45.11	-	0	-184.33	-	-140.98	■?
YEAR 2 - 2001	Lupins	Lupins	Lupins	Lupins	Lupins	Lupins	<i>Vetch</i>
Yield (t/ha)	0.434	0.331	0.199	0.2	0.354	0.386	1.68?
Break Even Yield (t/ha)	0.51	1.72	0.60	0.60	0.87	0.64	9
Total Variable Costs (\$/ha)	154.08	524.06	183.12	183.54	266.28	195.88	118.42
Total Income (\$/ha)	132.37	100.96	60.7	61	107.97	117.73	■?
Gross Margin (\$/ha)	-21.71	-423.11	-122.43	-122.54	-158.31	-78.15	?
Gap From Best (\$/ha)	0	-401.4	-100.72	-100.83	-136.6	-50.44	
Total GM after 2 years	-16.02	-423.11	-79.91	-256.24	-158.31	-168.28	-198.92
Average Yearly GM Rank after 2 years	-8.01 1	-211.56 6	-35.96 2	-128.12 5	-79.16 3	-84.14 4	-99.46 *?

* Note: a complete set of data for the organic vetch plot was unavailable at time of writing

FOOTNOTE: In 2001 the sowing & fertiliser application were mistakenly separate operations for the Alroc system, which may have impacted on yield.

The organic plot for the first 2 years of the trial was in an "in conversion" to organic phase.

As 2000 was the first year of the trial, it would be inadvisable to read too much into the results as conditions of the trial site leading up to sowing were far from ideal and the first year was very much a settling-in period. Preparation of the site started in March 2000, much later than ideal, given the summer weeds on the paddock, leaving little sub-soil moisture available for the crops. This in turn had an impact on the performance of all systems.

Gross Margins were also skewed by start-up costs in the first year, with some treatments spending large sums

on fertilisers and lime, which will be spread out over the life of the trial.

Input differences between systems of almost \$400 per hectare in 2001 will certainly test the financial boundaries. After the second year of the trial the conventional system has come out on top financially, followed by Riverina Soil Management, Nutri-Tech, BioAg, Alroc Mineral Fertilisers and then Albrecht.

The next year or two will be instrumental in the comparison of each of the farming systems as yields are expected to increase with additional

nutrition making up for the financial losses over the previous two years.

In Summary

The results are showing up trends and possible differences between treatments, but being a long term trial it may take at least five years before any meaningful data or an accurate assessment of each system can be made.

Plans for 2002

2001 Local Site Sponsors: Cropcare, Avetitis, Dow AgroSciences, BASF, Monsanto, Syngenta, Nufarm, Yenda Fruit & Case Supplies, F & R McNabb Pty Ltd, Incitec, Pivot, Hi-Fert, National Australia Bank, PIBA, SGB, Auswest Seeds, Hart Bros. Seeds, Pacific Seeds, Pioneer Seeds, Yenda Producers, Elders VP, Rawlinson & Brown, Wesfarmers Landmark.

CWFS Major Sponsors: Grain Growers Association, AWB, GRDC & NSW Agriculture.

In 2002 the Rankins Springs CWFS plan to sow H45 wheat across all treatments, including the organic plots.

Acknowledgements

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 is important for our ongoing success.