Gairdner + Tilt	1.71	424.08	185.33	238.75
Gairdner + Dividend + Tilt	1.64	406.72	186.91	219.81
Gairdner	1.64	406.72	178.83	227.89
Gaidner + Dividend	1.62	401.76	180.41	221.35

Based on farm gate return of $248/t for feed barley as of 28th December, 2006.

COMMENTS

- Baudin produced a statistically higher yield than Gairdner under all treatment regimes.
- The dry growing season lead to a very low disease presence in the plots. This therefore eliminated any yield reductions that may be caused by disease infection, rendering fungicide treatments ineffective.
- Under non-experimental cropping situations, foliar fungicide sprays would not have been applied in the absence of disease, however in this trial the cost of foliar applications were not returned through improved yield.

ACKNOWLEDGEMENTS

Thank you to Tony White for conducting the demonstration.

REFERENCE

Motley, K., Rice, A. & Murray, G. (2004) *Protecting this years cereal crop with foliar fungicides*. Grains research and development co-operation, Forbes, NSW.

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ROTATION STILL A BENEFIT IN DRY YEARS

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AIM

To explore constraints to wheat yield potential in the northern sandplain region.

BACKGROUND

In our environment, wheat yield is ultimately limited by rainfall amount and distribution. However, the rainfall-limited yield potentials are rarely met. Previous results from this experiment suggest that potential yields can be approached using management tools available to growers. This is the second cycle of an experiment which has included rotation crops, ripping and nitrogen rates.

TRIAL DETAILS

Property	Liebe Long Term Trial Site, West Buntine	
Plot size & replication	Main plots (Rotation)	= 10m 40m
	Subplots (N rates x Ripping)	= 2.5m 20m
	Treatment Design	= Factorial
	Experimental Design	= randomized complete block
	Replicates	= 4
Soil type	Deep yellow sand	
Sowing date	24 May 2006	
Seeding rate	Wheat (cv. Wyalkatchem) 90 kg/ha	

Fertiliser (kg/ha)	N as per treatment: 0, 40, 80 or 120 kg/ha
Paddock rotation	As per treatment: 2003 2004 2005 2006 wheat wheat wheat wheat canola wheat canola wheat lupin wheat lupin wheat serradella wheat serradella wheat lucerne lucerne lucerne wheat
Herbicides	Roundup 4 L/ha Trifluralin 1.7 L/ha
Growing Season Rainfall	128mm

RESULTS

This season's results were remarkable for the lack of response by the wheat crop to nitrogen or ripping. Neither factor affected yield or grain size / screenings. There was however, a considerable effect of rotation on yield. The yield of wheat after wheat was 1.44 t/ha and that of wheat after lupins was 1.93 t/ha. That is an increase of over 30% in yield. Grain size was not adversely affected by this increase in yield. All grain sizes were large and all treatments had less than 2% screenings except for the N=0 treatment in the wheat after wheat rotation. The N=0 treatments had received no N for four seasons.

It is interesting to note that the benefit of the lupin rotation could not be replaced by the application of fertiliser N in this season.

Lucerne has the benefit of drawing water from deep in the profile over the whole year, which is helpful for reducing the risk of salinity. However, this can cause a yield penalty in crops following lucerne if it is a dry season. In our results, even given the very dry season in 2006, there was no penalty relative to wheat after wheat, but wheat after lucerne did yield substantially less than wheat after the other two legume rotations.

Table 1: Yield and screenings of wheat sown in 2006 after different rotation species. Results are averaged over the ripping and fertilizer treatments since these had no effect. Grain protein results are not yet available.

Rotation	Yield (t/ha)	Protein (%)	Grain size (mg)	Screenings (%)
Wheat after Wheat	1.44	N/A	42.5	1.55
Wheat after canola	1.78	N/A	42.7	1.24
Wheat after lupin	1.93	N/A	42.1	1.14
Wheat after Serradella	2.08	N/A	43.1	1.20
Wheat after lucerne	1.34	N/A	41.0	1.09
LSD (5%)	0.16		0.8	

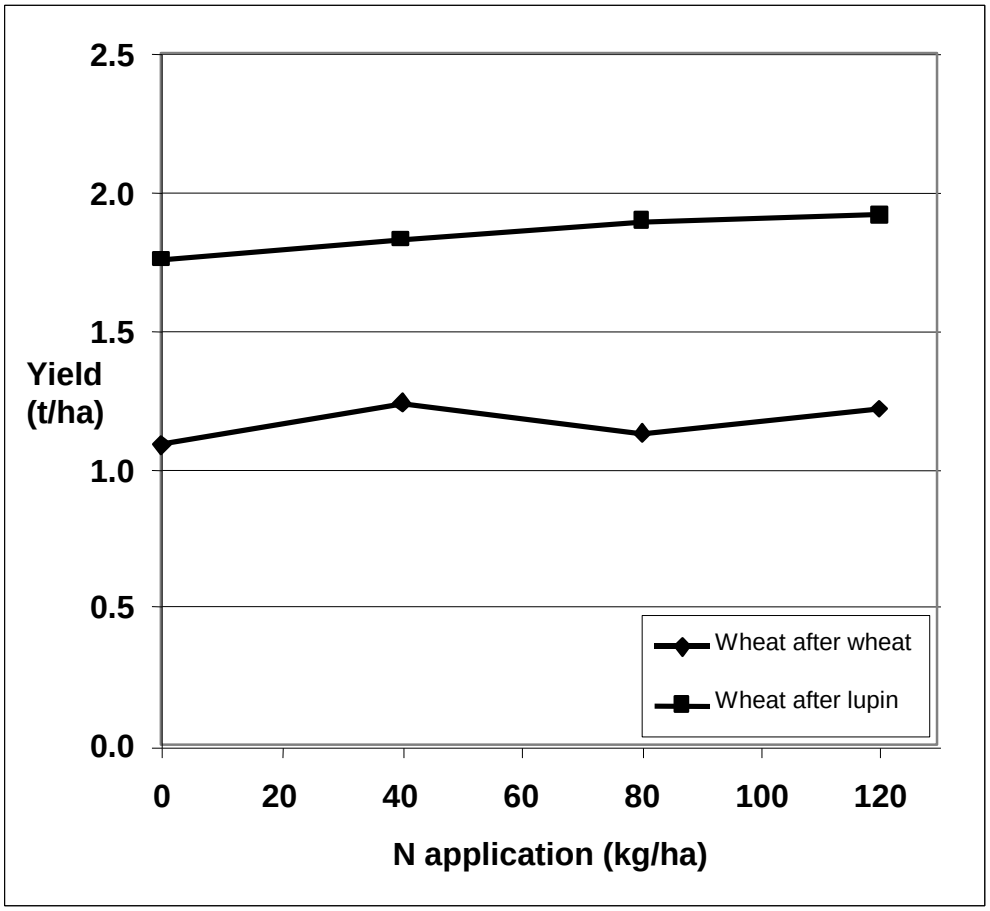

Figure 1: Yield of wheat grown after wheat and of wheat grown after lupin for four rates of nitrogen applied to the wheat. Applied N did not increase yield for either treatment in this year.

ECONOMIC ANALYSIS

Table 2: Cumulative gross margin for the lupin/wheat and wheat/wheat cropping sequences. For clarity, calculations are all based on 2006 prices.

Year	Yield (t/ha)	Lupin/wheat	Wheat/Wheat
2005	Crop	*Lupin*	*Wheat*
	Yield (t/ha)	*1.46*	*1.89*
	Gross Return	$284.70	$367.57
	Variable costs	$184.94	$160.32
	Gross Margin	$99.76	$207.25
2006	Crop	*Wheat*	*Wheat*
	Yield (t/ha)	*1.93*	*1.44*
	Gross Return	$375.35	$280.05
	Variable costs	$211.32	$211.32
	Gross Margin	$164.03	$ 68.74
Combined	Cumulative GM	$263.79	$275.99

Wheat price based on EPR for ASW Base Price $229/tonne. Lupin price based on ABARE data for Dec 2006. Input costs based on actual seed, fertilizer and herbicide, with other costs taken from DAFWA estimates for the NAR.

COMMENTS

Yields were low due to low rainfall. In spite of this marked constraint, there was still a clear benefit in wheat yield from the rotation crops. At this stage of the analysis it is not possible to separate out the reasons for this. It could be due to reduced disease, altered root penetration or other causes. In both cycles of the experiment the two-year cumulative gross margin for the lupin/wheat sequence has been similar to the wheat/wheat sequence. The low returns from lupin were offset by the increased yield of the subsequent wheat crop. The actual economic benefit of the cropping sequences depends to a large extent on the relative prices of the grains.

Using the French-Shultz analysis based on rainfall indicates a very high water use efficiency by the wheat. There was considerable preseason rain that is often not counted in French-Shultz calculations. In a dry season this makes up a significant proportion of the total water use. A full analysis of the water use of the crops over the course of the experiment will be reported later in the year as part of the final report of this project which concludes in mid 2007.

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