1. COMMERCIAL RUST CONTROL IN YITPI WHEAT

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Location of trial: *Rex and Tracey Parsons', Jerramungup*
Trial managers*: Andrew Heinrich, Quality Agronomics and Rex Parsons*

AIM: To investigate strategies for managing stripe rust in WA.

TAKE HOME MESSAGES:

- In the absence of stripe rust but the presence of leaf and stem rust and powdery mildew, an integrated fungicide strategy is critical for maximising yield and grain quality.
- Early application of fungicide (e.g. seed treatment or in-furrow) alone is insufficient to optimise grain yield and quality.

WHY DO THE TRIAL?

The introduction into and rapid spread of Stripe Rust around Western Austraila in 2002 caused concern for many farmers. The most economical and effective way to manage the disease needed to be identified.

The summer of 2002/2003 was wet, with a significant green bridge carried over between seasons. With this in mind, it was considered that there was a very high risk of a stripe rust epidemic in 2003. The supply of seed with adequate resistence to the new strain of stripe rust was very limited and strategies for managing the new disease in WA needed to be developed and proven on a commercial scale.

SITE DETAILS:

Location:	State:	Western Australia
	District:	South Coast
	Town:	Jerramungup
	Grower group:	Fitzgerald Biosphere Group
Rainfall:	Winter dominant. Average annual total: 450 mm 2003 annual total: 583 mm 2003 Apr-Oct: 407 mm	
Stored moisture at sowing:	Moderate stored moisture	
Paddock history	2000 – wheat; 2001 – pasture; 2002 – wheat.	
Soil:	Type:	Grey brown loam
	pH:	CaCl = 4.6
	P (Colwell):	16 ppm
	Available nitrate N:	14 ppm (0-10cm)
District 5 year average wheat yield:	2.2 t/ha	
Farm 5 year average for crop being tested:	2.3 t/ha	
Yields:	Potential:	4.4 t/ha
	Actual:	3.2 t/ha
Water use efficiency:	11 kg/mm/ha	

METHODS:

The trial was sown, sprayed and harvested with commercial equipment. The plots were 14.5 m wide and 220 m long.

10 treatments were applied, which were split in 2, with a foliar application of Triadimefon at Z39 (flag leaf fully emerged). Each treatment was replicated 3 times in a split plot design.

TREATMENTS:
1. Jockey seed treatment applied at 4.5 L/t of seed
2. Real seed treatment applied at 1.5 L/t of seed
3. 1L/ha Triadimefon 125 EC applied at Z39
4. 250 mL/ha Impact applied at Z9
5. Untreated control
6. Impact in-furrow 400 mL/ha applied to the granular fertiliser
7. Triadimefon 125 EC in-furrow 1.0 L/ha applied the granular fertiliser
8. Triadimefon 500 WP in-furrow 200 g ai/ha applied to granular fertiliser
9. Triadimefon 125 EC in-furrow 1.0 L/ha applied in Flexi-N
10. Impact in-furrow 400 mL/ha applied in Flexi-N

- Sowing date of trial: May 27th 2003
- Sowing rate: 70 kg/ha
- Crop: wheat; Variety: Yitpi
- Fertiliser: 100 kg/ha Agstar (N:P:K:S 14.3:14.0:0:9.4 + 0.3% Ca + 0.04% Zn) drilled with the seed and 50 kg Urea (except treatments 9 and 10)
- 50 kg/ha Muriate of Potash

WHAT HAPPENED?
At the time of spraying the Z39 foliar fungicide treatments, 20 tillers from the control plots were sampled and assessed for disease by the Plant Pathology Laboratories. Powdery Mildew represented 88% of the disease present and Leaf Rust the remaining 12%. No stem rust or stripe rust was detected at this stage. Stem rust became evident later in the season. Leaf area damaged at the time of sampling was: Flag leaf: 0%; F-1: <5%; F-2: 5-20%; F-3: 100%.

Only modest differences between initial fungicide treatments were observed at the time of spraying the foliar fungicides at Z39. These differences were not considered sufficient to warrant scoring at that time. Obviously with the harvest yields that were achieved these modest differences were significant.

Highly significant yield and quality increases were achieved with the application of integrated fungicide treatments (see table 1.1). A yield increase from 1.7 t/ha to 3.1 t/ha was achieved by applying in-furrow fungicides or Jockey and applying 1.0 L/ha of Triadimefon 125 EC at Z39. Furthermore, the lowest yielding treatment, the untreated control, only achieved feed grade due to light hectolitre weight, whereas integrated fungicide treatments achieved higher test weight resulting in higher grades being achieved.

When the fungal staining and field mould defects are ignored, the integrated fungicide treatments would have achieved APW grade which would have further increased the gross income/ha over and above those achieved by feed grade. These defects are not present every year and are subjective assessments at the time of sampling.

CONCLUSIONS AND RECOMMENDATIONS: An integrated approached to fungal disease control is required to optimise yield and quality as indicated by the treatment effects without the Z39 application of Triadimefon where only feed quality grain was achieved. Fungicide applications at seeding time alone are not adequate for season long disease control.

Early disease control is essential to optimise yield and quality with full flag leaf application of fungicides as indicated by treatments 2 and 5 where Triadimefon was applied at Z39 and feed grade was still achieved due to light weight. Furthermore, the yields of these treatments were significantly lower than the other treatments where early disease control and post flag leaf control was carried out.

Fungicide application had no significant effect on the occurrence of fungal staining or field mould. Where fungal staining and field mould are ignored, the increased yield and quality achieved by an integrated fungicide strategy results in significant increases in gross margins. When fungal staining and field mould are included in the grading of samples, the improvement in yield alone has a sufficient return on investment to warrant the use of fungicides.

***Table 1.1**: Grain yield, quality results and gross income for Yipti wheat with a range of fungicide treatments for rust and powdery mildew control.*

Treatment No.	Grain Yield kg/ha		Protein %		Hect kg/hl		Screenings %		Fungal Staining		Field Mould		Grade		Gross Income $/ha	
	No Triadimefon	Triadimefon at Z39	No Triadimefon	Triadimefon at Z39	No Triadimefon	Triadimefon at Z39	No Triadimefon	Triadimefon at Z39	No Triadimefon	Triadimefon at Z39	No Triadimefon	Triadimefon at Z39	No Triadimefon	Triadimefon at Z39	No Triadimefon	Triadimefon at Z39
1	2152	2940	10.8	10.1	70.2	73.6	7.1	6.9	13	18	2	4.7	Feed	Feed	408.81	558.62
2	1875	2668	10.5	9.7	68.9	73.5	10.2	6.5	16.7	15.7	1	0.7	Feed	Feed	356.31	506.86
3	2443	3038	10.2	9.8	71.5	74.8	7.8	5.8	12.7	12.7	2.3	2.3	Feed	GUVV	464.12	640.96
4	2207	2940	10.1	9.7	70	73.8	8.6	5.7	20.3	12	2.3	2.7	Feed	Feed	419.31	558.62
5	1713	2490	10.7	9.8	68.2	72.4	8.7	6.5	24.3	16	2	3	Feed	Feed	325.51	473.16
6	2150	2984	10.5	9.8	70.2	74	7.2	7.3	20	14.3	3	2.7	Feed	GUVV	408.46	593.77
7	2325	2989	10.8	10.2	71.4	74.3	6.5	5.2	16	14	2	3	Feed	GUVV	441.71	636.64
8	2056	3048	10.6	10.2	70	74.3	9.7	4.8	21	13.3	3	3.3	Feed	GUVV	390.61	649.23
9	2358	2981	10.8	10.2	71.8	73.7	8.6	6.2	13	15.7	2	3	Feed	Feed	448.01	566.43
10	2205	3061	11	10.1	72.1	74.2	8.7	8.2	16.7	10	2.7	3	Feed	GUVV	418.96	602.99
F pr.		<0.001		<0.001		<0.001		NS.		NS.		NS.				
LSD		207		0.4		1.3										

MAKING IT COMMERCIAL PRACTICE: The use of an integrated fungicide strategy, such as in-furrow fungicide or Jockey at seeding, followed by the application of foliar fungicides at Z39 maximises yield and quality. Utilising early fungicide application to minimise the early development of disease and the subsequent control later in the season with foliar applications of fungicides appears to be the most effective use of fungicides.

Allowing disease to develop then trying to control it in the crop is ineffective as adverse effects on potential yield of the early disease can not be overcome with late applications of foliar fungicides. Multiple applications of foliar fungicides may be warranted in high-pressure disease years. An earlier foliar application may improve later season control of disease and result in higher yields and better quality grain.

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