Managing long season wheat varieties in WA – enhancing their yields

Christine Zaicou-Kunesch, Ciara Beard and Brenda Shackley,
Researchers, Department of Agriculture and Food, Western Australia

Purpose: Determine how management with foliar fungicide and an in-furrow fungicide may influence the yield response of long season wheat varieties with an early sowing opportunity

Location: Eneabba

Soil Type: Sandy earth

Soil Test Results: source Summit

Depth	NO_3^- N	NH_4^+ N	P	K	S	Cu	Zn	OrgC	pH $CaCl_2$	Al	EC	PBI
0-10	5.67	2.00	15.00	47.33	7.00	0.26	0.51	1.40	6.10	0.55	0.06	10.87
10-20	1.00	0.67	6.67	24.33	3.33				5.60	0.33	0.02	
20-30	6.33	0.67	11.00	39.33	3.33				4.73	1.24	0.02	

Rotation: 2013 (wheat); 2012 (lupin); 2011 (wheat)

Growing Season Rainfall (April- October 2014):

BACKGROUND SUMMARY

Late maturing varieties can take advantage of early sowing opportunities, however early sowing can increase the leaf disease (yellow spot/septoria) pressure on varieties. Thistrial will examine the yield response of varieties, from different maturity classes, under natural disease levels or without any disease though the use of fungicide. In addition, it is recognized that root diseases are an increasing risk in continuous cropping rotations, a new in-furrow fungicide treatment can potentially provide control for both foliar and root disease will be employed.

TRIAL DESIGN

The trial had four main disease management treatments of 1) Nil, 2) Foliar Fungicide, 3) In-furrow Fungicide on Fertiliser Dressing (IFFD), 4) IFFD + Foliar Fungicide.

Plot size: 1.54 x 10m

Machinery use: 7row cone seeder

Repetitions: 3

Treatments: Wheat varieties (18 - varieties and cross breds) x Disease managements (4)

Seeding rates and dates: sown on 5th May 2014 Agstar Extra (100 kg/ha drilled with seed) + 50 kg/ha Urea topdressed.

Rotation: wheat stubble

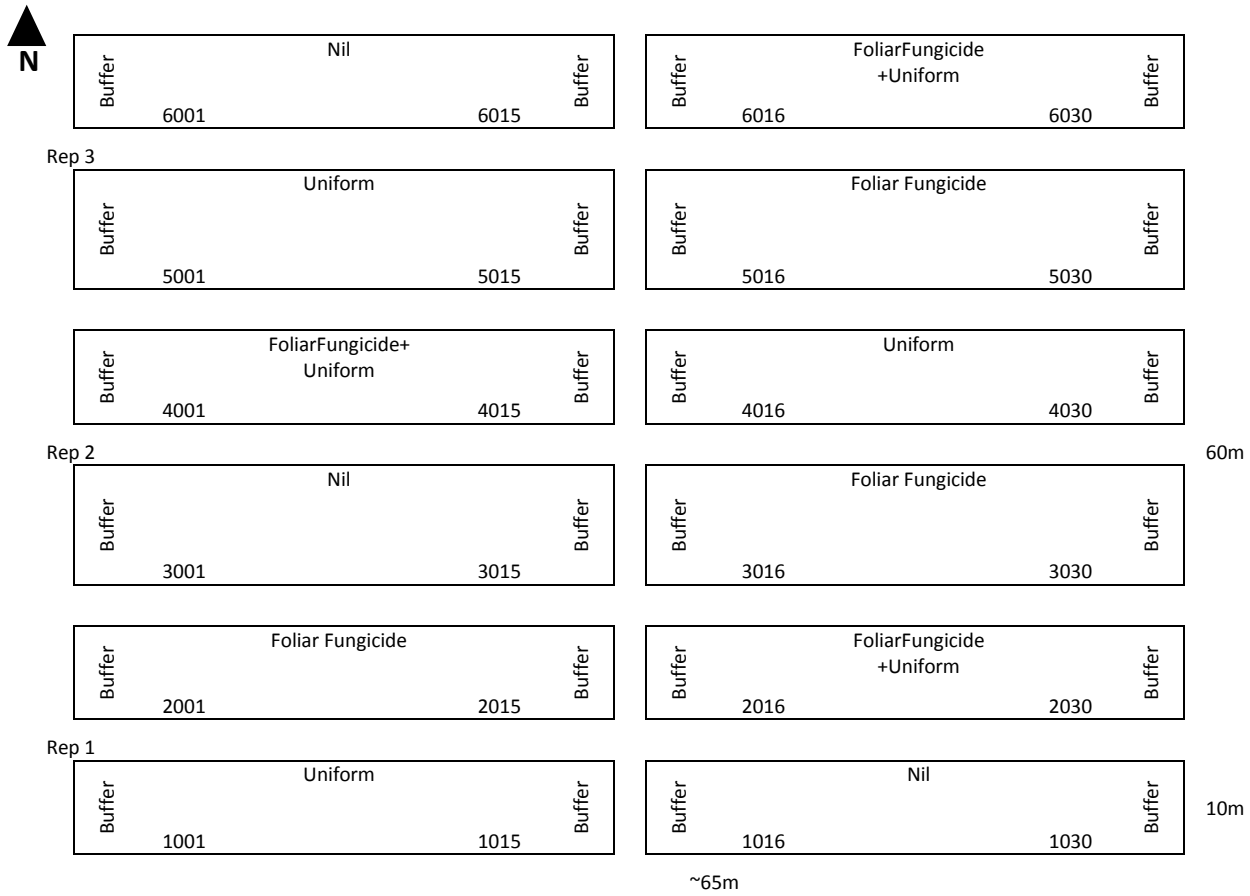
Treatment rates and dates: (includes fertilizer and chemical treatments)

Disease management: 1.Nil; 2. Foliar Fungicide [Prosaro® at 150ml/ha on 1st July (Magenta Z31) followed by second application on 29th July (Magenta Z39)]; 3. In-furrow treatment (Uniform®* at 400mL/ha); 4. In-furrow treatment (Treatment 3) + Foliar Fungicide (Treatment 2).

*Uniform® (active ingredients: azoxystrobin + metalaxyl-m) is a newly registered fungicide for suppression of yellow spot and control of rhizoctonia root rot, stripe rust, and pythium root root in wheat.

Wheat varieties Common: Yitpi, Magenta, Estoc, Mace, Cobra, Justica, Wyalkatchem; New: Harper, Trojan, Zen and Bremer; Long season wheat entries: IGW4012, ADV03.0056, ADV07.0094 and ADV08.0065.

TRIAL LAYOUT



RESULTS/STATISTICS

Table 1. Effect of fungicide treatments on % leaf area diseased on flag -3 (fourth leaf) at Z31 (14 July 2014) of selected wheat varieties at Eneabba in 2014

	Bremer	Cobra	Estoc	Harper	Justica	Mace	Magenta	Trojan	Wyalkatchem	Yitpi	Zen
In-furrow fertiliser dressing	55	52	**60**	**63**	**55**	37	42	64	**33**	**69**	**42**
Nil	52	56	78	80	82	38	50	66	61	86	63

LSD (0.1) –Fungicide x Variety 17 (between) 17 (within). CV% 19.2%. Bold figures are significantly different from the nil treatment.

Table 2. Effect of fungicide treatments on grain yield (t/ha) of selected wheat varieties at Eneabba in 2014

Variety	Nil	In-furrow fertiliser dressing	Foliar Fungicide*	Fungicide* and in-furrow fertiliser dressing	Average
Bremer	2.80	3.06	3.14	3.90	3.22
Cobra	2.33	2.76	3.41	3.23	2.93
Estoc	1.65	1.95	2.43	2.22	2.06
Harper	1.75	1.88	2.27	2.18	2.02
Justica	1.45	1.71	2.12	2.54	1.96
Mace	2.99	2.68	2.99	3.78	3.11
Magenta	2.02	2.80	2.79	2.84	2.61
Trojan	1.35	1.75	2.58	2.85	2.13
Wyalkatchem	2.26	2.69	3.92	3.60	3.12
Yitpi	1.43	1.84	2.27	2.53	2.02
Zen	3.13	2.79	3.42	3.79	3.28
Average	2.11	2.36	2.85	3.04	2.59

LSD (0.05) – Fungicide 0.62t/ha; Variety 0.27t/ha; Fungicide x Variety 0.75 (between) 0.54 (within). CV% 11.9%

Table 3. Effect of fungicide treatments on grain screenings (%) of selected wheat varieties at Eneabba in 2014

Variety	Nil	In-furrow fertiliser dressing	Foliar Fungicide	Fungicide and in-furrow fertiliser dressing	Average
Bremer	3.18	2.42	2.57	2.61	2.70
Cobra	2.94	3.42	3.39	3.59	3.34
Estoc	9.80	8.10	5.79	5.81	7.37
Harper	8.68	7.43	6.74	6.98	7.46
Justica	4.68	2.83	2.67	2.70	3.22
Mace	3.99	3.62	3.30	3.73	3.66
Magenta	4.19	4.03	3.87	3.81	3.98
Trojan	10.63	7.19	5.81	4.70	7.08
Wyalkatchem	3.33	2.81	2.55	2.40	2.77
Yitpi	6.39	5.11	4.62	5.61	5.43
Zen	2.13	1.93	1.74	1.66	1.86
Average	5.45	4.44	3.91	3.96	4.44

LSD (0.05) – Fungicide 0.39%; Variety 0.25%; Fungicide x Variety 0.62% (between); 0.50 (within). CV% 14.5%

OBSERVATION/ DISCUSSION/ MEASUREMENTS

This trial was sown early in May, however despite this relatively early sowing date the longer maturing varieties did not perform significantly better than mid maturing varieties. This is likely due to the environment (warm winter and low rainfall) not favoring the later maturity types or their susceptibility to leaf disease. The trial was sown into wheat stubble and disease pressure was high (a mixture of yellow spot and septoria nodorum blotch) early in the season (tillering – stem extension). Late rains in September may have supported late

disease development (not measured) and this may have influenced yield penalties of susceptible varieties.

The trial was sown into moist soil with a high stubble load. Across all treatments, plant establishment averaged 145 plants/m^2. A high level of leaf disease was evident at early growth stages (a mixture of yellow spot and septoria (stagonospora) nodorum blotch) but dry conditions limited the spread of disease up the canopy between stem extension and heading. Disease was assessed at three times – 14 July (Z31), 29 July (Z39) and 27 August (Z69) and involved assessing the diseased area on the top 4 leaves on 10 tillers per plot.

At first node stage (Z31), about 10 weeks after sowing, and prior to foliar fungicide treatment, the in-furrow fungicide was significantly reducing disease on the fourth leaf and varieties varied significantly in levels of disease (Table 1). There was no evidence of rhizoctonia at the site so the benefit of the in-furrow fertiliser dressing is most likely from early suppression of leaf disease.
Following the foliar fungicide application in July (Z31), significant differences in disease severity were evident between varieties and fungicide was significantly reducing disease on the fourth leaf. Average percentage leaf area diseased for fourth leaves was 65% in nil treatment but only around 50% in both in-furrow and foliar fungicide treatments. Due to low rainfall disease levels did not progress much during this period, consequently fungicide effects which we would have expected on leaves higher in the canopy were not observed. By the end of crop flowering there were no fungicide effects in terms of percentage disease observed on any of the leaves assessed but there were significant variety differences. The percentage average leaf area diseased of Cobra and Magenta were significantly less than Harper, Mace and Yitpi. Significant rain events occurred in early spring after the final disease assessment in late August. At the time of the field day, major differences between varieties were evident, with complete death of flag leaves in some untreated susceptible varieties and residual fungicide impacts evident on retention of green leaf area on flag leaves.

Despite a relatively dry spring (decile 2 to 3) the average yield response to two applications of foliar fungicide was still nearly 0.8 t/ha. There was also an interaction between the fungicide treatments and variety, with varieties such as Mace and Zen achieving high yields with the absence of fungicide and not responding as clearly to foliar fungicide. Meanwhile Trojan, Magenta, Yitpi and Cobra had a significant yield response with the application of foliar fungicide (Table 2).

Fungicide applications had the biggest impact on grain quality of the disease susceptible mid-long maturing varieties. Yitpi's screenings reduced from 6.39% with nil fungicide to 4.62% with the application of foliar fungicide (Table 3). Similar responses were observed for Trojan and Harper (Table 3). In contrast, screenings of the mid-short maturing varieties Cobra, Mace and Wyalkatchem and more resistant mid-long maturing varieties Zen and Magenta were less than 5% for each fungicide treatment (Table 3).This site had high potential disease pressure, it was sown in early May into wheat stubble, resulting in extended exposure to inoculum of stubble borne diseases. Favourable weather for disease development in early growth stages resulted in significant disease development, particularly in susceptible varieties. Despite dry conditions in the mid-season limiting disease severity for a period, significant yield responses to fungicide were seen in most varieties, this is likely a response to disease development in early and later growth stages of the crop. No benefit from longer maturing varieties was evident.

PEER REVIEW/REVIEW

Geoff Thomas, DAFWA

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