Are early fungicide applications effective for Yellow Spot and/or Stagonospora nodorum in the Low Rainfall Zone?

Summary

In 2012, despite low rainfall and low disease levels, early fungicide application at tillering (Z22/26) did significantly reduce leaf spot disease levels at two out of three low rainfall sites in the northern agricultural region.

Best disease control was provided by a double spray strategy (early tillering spray plus an application at flag leaf, Z39) or a single high rate fungicide application at Z39.

There were no yield responses to fungicide applications at any of the three sites, though there were some grain quality benefits.

Background

Recent trends in cereal production have been towards increasing areas sown to wheat after wheat.

Stubble-borne leaf diseases such as yellow spot are a higher risk in a continuous wheat system.

Previous research in high rainfall zones or above average seasons has shown that in cases where leaf spot disease levels are high very early, fungicide application at early stages (five leaf stage – first node) is effective at reducing disease levels and increasing yield.

The trials conducted here were investigating if the same results would be obtained in lower rainfall environments.

Aim

To assess the efficacy of foliar fungicide application prior to stem extension for control of yellow spot or stagonospora (septoria) nodorum in wheat in low rainfall zones.

Trial Details

Property	Messina, Mullewa (Site 1)	Labuschegne, Mullewa (Site 2)	Earle (Smart), East Nabawa (Site 3)
Wheat variety	Calingiri	Mace	Mace
Soil type	Medium loam	Sand	Sand
Sowing Date	Early May, germinated late May	Not available at time of printing	20 May, 2012
Seeding Rate + Variety	50 kg/ha	Not available at time of printing	80 kg/ha
Fertiliser (kg/ha)	60 kg/ha Agstar Xtra at seeding, 60 kg/ha Urea post seeding	Not available at time of printing	Agstar Xtra @ 50 kg/ha at seeding, Urea @ 30 kg/ha down boot
Fungicide treatments	11 July (Z22), and 16 August, 2012 (Z37)	25 July (Z26), and 16 August ,2012 (Z37/39)	11 July (Z22), and 10 August, 2012 (Z37/39)
Paddock rotation	2011 – wheat , 2010 - wheat, 2009 – wheat	2011 – Wheat (Wyalkatchem), 2010 – Lupin , 2009 – Wheat (Wyalkatchem)	2011 – Wheat (Mace) , 2010 - Lupin (Mandelup) , 2009 – Wheat
Growing Season Rainfall	190 mm (May-Oct)	140 mm (May-Oct) estimate	125 mm (May-Oct)

Treatments:
1. Unsprayed
2. Prosaro at 150 mL/ha applied at tillering (Z22/26)
3. Prosaro at 150 mL/ha applied at tillering (Z22/26) and Prosaro at 150 mL/ha applied at flag leaf emergence (Z37/Z39)
4. Prosaro at 300 mL/ha applied at flag leaf emergence (Z37/Z39)

Trials were set up in July opportunistically in grower's established paddocks. Plot size was 20 m x 5 m, with 4 replicates of each treatment; treatments in a randomised block design. Herbicide and in-crop fertiliser products were applied by the grower.

Results

Site 1 (Messina, Mullewa)
At Z22 there was disease evident at the site (average 6 per cent on top 4 leaves). The disease was found to be a mixture of both yellow spot and septoria nodorum blotch.

The disease did not progress much at all during the season and so fungicide applications had no significant effect on disease levels. At Z57 (ear emergence nearly complete) there was only 5 per cent average disease on the top three leaves. Rainfall was very low so ultimately the application of fungicide at either time was not worthwhile at this site.

There were no significant yield differences between the fungicide treatments; average yield across all was 1.0 t/ha.

There were no significant grain quality differences between the fungicide treatments, average protein was 14.8 per cent, moisture was 10.7 per cent, average screenings were 5.9 per cent, and average hectolitre weight was 80.5 kg/hL.

Site 2 (Labuschegne, Mullewa)
At Z26 there was a low amount of disease evident at the site (3 per cent on top 4 leaves). The disease was found to be a mixture of both yellow spot and septoria nodorum blotch.

The disease did not progress much during the season. At Z55 (ears half emerged) there was only 5 per cent average disease on the top three leaves in the nil treatment but this was still significantly more than the fungicide treated plots (Table 1).

There were no significant yield differences between the fungicide treatments; average yield across all was 2.0 t/ha. The Z22 fungicide application significantly reduced screenings from 7 per cent to 6 per cent. Other grain quality measurements were not significantly affected by fungicide treatment. Average protein was 9.8 per cent, and average hectolitre weight was 82.8 kg/hL. Ultimately the application of fungicide at either time was not worthwhile at this site in 2012.

Table 1. % Leaf area diseased (LAD) for the fungicide treatments on Mace at Labuschegne's, Mullewa in 2012.

	% LAD average of top three leaves	
Fungicide treatment	**Z39**	**Z55**
Nil	1.9	4.7
Prosaro @ 150mL/ha at Z22	1.3	3.7
Prosaro @ 300mL/ha at Z39	-	2.1
Prosaro @ 150mL/ha at Z22 and Z39	-	2.0
LSD (5%)	0.5	1

Site 3 (Earle, East Nabawa)
Initially there was disease evident at the site (14 per cent on top 4 leaves at Z22). The disease was found to be predominantly yellow spot, with some septoria nodorum blotch also present (75:25).

The disease continued to progress up the canopy and all fungicide treatments did significantly reduce disease levels at Z39 and Z65 (Table 2). The double spray strategy of applying fungicide at Z22 and Z39, and the Z39 spray performed similarly in providing the best disease control.

There were no statistically significant yield differences, probably due to the dry spring — only approximately 63 mm of rain fell in the 8 weeks after flag leaf emergence.

Previous DAFWA research has found that at least 80 mm of rain needs to fall in this period for a Z39 flag leaf fungicide application to be profitable.

While there were no significant yield impacts from the fungicide treatments there were significant grain quality results. Hectolitre weight was significantly higher (81.8 compared to 81.2 kg/hL) and percent screenings significantly lower (1.7 per cent compared to 2.2 per cent) on treatments that received the flag leaf spray, Z39).

Other grain quality measurements were not significantly affected: average protein was 14.8 per cent, and average screenings were 5.9 per cent,

Table 2. % Leaf area diseased (LAD) average of the top three leaves at two disease assessment times, Z39 and Z65 on Mace at Earle's, East Nabawa in 2012.

	% LAD average of top three leaves	
	Z39	Z65
Nil	9	29
Prosaro @ 150mL/ha at Z22	5	21
Prosaro @ 300mL/ha at Z39	8	18
Prosaro @ 150mL/ha at Z22 and Z39	5	15
	1.05	4.90

Conclusion

In 2012, early fungicide application at Z22 did significantly reduce leaf spot disease levels at two out of three low rainfall sites in the northern agricultural region.

Most effective disease control was provided by a double spray strategy (early tillering spray plus an application at flag leaf, Z39) or a single high rate fungicide application at Z39, as they performed equally well.

However, disease levels were only high at one site (east Nabawa), and the very dry spring meant none of the sites responded yieldwise to the fungicide application, although there were some grain quality benefits.

So in 2012 fungicide application was not profitable at any of these low rainfall sites.

The trials will be repeated in 2013 to gather final data sets to answer the research question. If you can offer a wheat-on-wheat paddock that has early disease in a low rainfall zone please contact Ciara Beard.

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