Department of Primary Industries and Regional Development
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Economic return of controlling spot type net blotch Kwinana East Port Zone

Kylie Chambers, Department of Primary Industries and Regional Development, Merredin

Key messages

- Fungicide spray significantly reduced the disease severity of spot type net blotch in barley in Muntadgin in 2017.
- There was no yield penalty from not applying fungicide in the 2017 growing season in Muntadgin.
- There was no economic benefit from fungicide spray for controlling STNB in Muntadgin in 2017.

Aims

To investigate the economic return of spraying fungicide for spot type net blotch in barley in the eastern wheatbelt.

Background

Spot type net blotch (STNB) is a foliar disease of barley found across the wheatbelt. It is most damaging in medium–high rainfall regions of WA; however, the disease is still seen in the eastern wheatbelt, a low rainfall region of WA. The disease is stubble-borne so cropping continuous barley poses the greatest risk of disease, especially given that most varieties are susceptible. In conducive seasons, STNB can cause up to 44% yield loss and increase screenings.

A grower scale demonstration was set up in Muntadgin to investigate the economic return of spraying fungicide for spot type net blotch in a low rainfall environment.

Method

Site details

The paddock was chosen opportunistically as it had comparatively higher levels of spot type net blotch than other paddocks in the region. The demonstration was managed as per standard grower practice, except for six lengths of 48m where foliar fungicide was not applied.

Table 1. Site details

Location	Muntadgin
Rotation	2016 Barley cv. Litmus (S seedling and adult) 2017 Barley cv. Spartacus (SVS seedling; S adult)
Seed dressing	1L/ t Vincit ®C (25 g/L flutriafol, 4 g/L cypermethrin)
Seeding rate	60kg/ha
Row spacing	9 in (22.5cm)
Seeding date	10 May 2017
Fertiliser	80kg NPKTE (MOP based) blend and flutriazol
Pre-seeding herbicide	1% SOA, 0.1 metribuzin, 2.4 Triflur®X, 1.3 Gladiator®, 0.2% wetter
In-season herbicide	1% SOA, 0.06 alpha forte, 0.25 prop, 0.4 Ester 680, 0.9 Midas®, 0.2% wetter
Fungicide treatment	250mL/ ha Tilt (250 g/L propiconazole) applied on 11 July at ~GS32.

Trial details

The demonstration was set up in an unburnt area of a paddock in Muntadgin which was Litmus (S seedling and adult) in 2016 and sown to Spartacus CL in 2017 (SVS seedling S adult). Plots were 45m x 48m to work with the spacings of the grower's equipment with six replicates of sprayed and unsprayed plots. The demonstration was sprayed with propiconazole on 24 July. The STNB disease levels were at 6.89% on the top four leaves at the time of foliar spraying.

Foliar disease scoring

The disease severity of STNB was determined by estimating the percentage of leaf tissue affected by STNB on the newest four leaves. For the initial scoring, 50 plants within the plot area were used as an indicator of overall disease. Once the plots had been sprayed the top four leaves of 25 plants per plot were scored during the growing season.

Harvest

Yield was assessed in each plot with five hand cuts (1m x 1m), using electric shears at the base of the stem. Biomass of the cuts were weighed, threshed and re-weighed.

Grain was seed cleaned and grain quality measurements including hectolitre weight, two hundred grain weight, protein levels and screenings (% <2.2mm screen) performed on the samples.

Analysis

Disease levels, yields, protein and screenings for the unsprayed and sprayed plots were compared using ANOVA in GenStat® 18th Edition statistical software (VSN Intl. Ltd).

Results and discussion

Disease

The STNB disease levels were at 7% leaf area affected, averaged across the top four leaves, at the time of foliar fungicide application. Three weeks post fungicide application there was a significant reduction in the level of disease on the flag-1, -2 and -3 leaves in the sprayed compared with the unsprayed plots (Table 2).

Later in the season (six weeks post fungicide) the foliar disease levels were re-assessed and disease severity was significantly reduced on the flag-1, -2 and -3 leaves in the sprayed plots (Table 2). Foliar fungicide application reduced STNB disease severity by approximately 40–45% of the untreated levels. Despite a significant difference in disease levels, the disease scores recorded in this paddock in 2017are still quite low. This may be due to 2017 being a fairly dry season.

Table 2. In-season STNB disease levels (% leaf area affected) in Muntadgin paddock in 2017**.**

Scoring date	Treatment	Leaf				Mean % of leaf area affected by STNB for top four leaves
		Flag	Flag -1	Flag -2	Flag -3	
15/08/17	**Sprayed**	0	0.2	2.7	8.1	2.8
	Unsprayed	0.04	1.3	6.6	15.4	5.8
	LSD	ns	0.4	1.4	2.7	
08/09/17	**Sprayed**	2.4	4.3	7.5	14.7	7.2
	Unsprayed	4.3	6.2	11.6	26.2	12.1
	LSD	ns	1.4	2.3	6.9	

Harvest yield

Yield was assessed in each plot with five hand cuts 1m^2 in size. There was no yield penalty from not applying foliar fungicide in the demonstration (Figure 1). Trials by Hills *et al.* (2016) have also shown that even if a fungicide application significantly reduces STNB disease severity, there is not always a yield response. Yield responses and economic benefits to fungicides are more likely in high disease pressure situations and conducive seasonal conditions, particularly with good spring rainfall to support disease development up canopy (Hills et al. 2016). The low rainfall experienced throughout the 2017 growing season in the eastern wheatbelt was not conducive to STNB which may have also contributed to the lack of yield response in this demonstration.

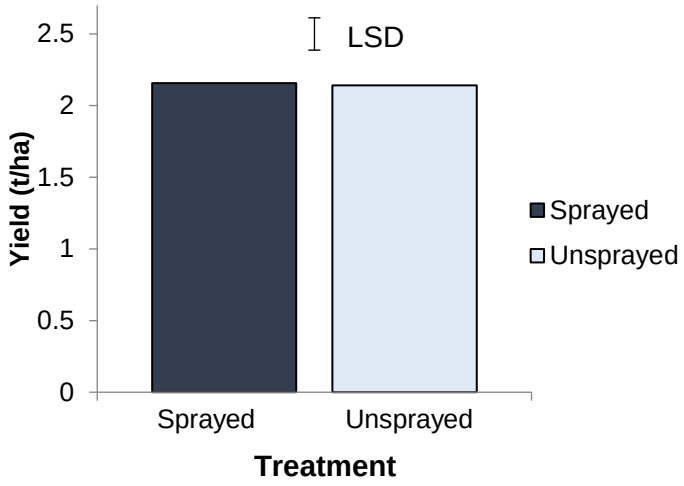

Figure 1: Barley yield of Muntadgin sprayed and unsprayed plots.

Protein and screenings

Protein levels were not significantly different between sprayed and unsprayed plots (Figure 2). In some cases, it is possible for screenings to be negatively impacted by STNB even though yield is not, however in this demonstration screenings were not affected (9.8% compared to 10.3% screenings in sprayed vs. unsprayed plots respectively).

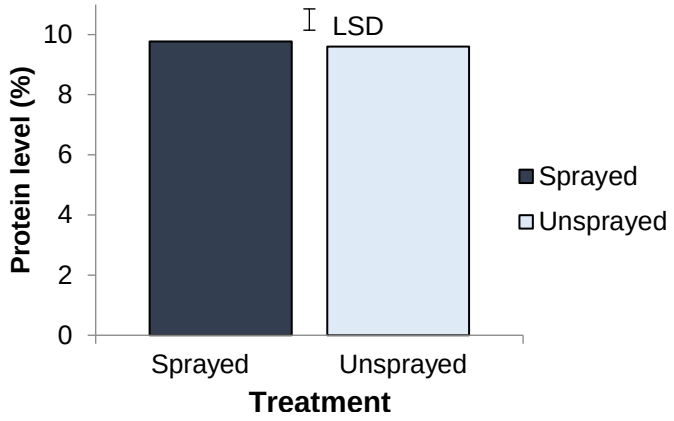

Figure 2: Barley protein levels of Muntadgin sprayed and unsprayed plots

Economic return

The lack of yield penalty from not applying fungicide meant that there was no return on investment for spraying for STNB in Muntadgin in 2017. However, spraying for STNB in one season may reduce the disease inoculum for the subsequent season. Further work needs to be done to investigate the effects of spraying on disease burden in the following season if the paddock is re-sown to barley.

Gross margins

Foliar fungicide cost $9.50/ L with no yield benefits being observed in the year of application. Benefits may exist in subsequent years with a reduced STNB inoculum load; however, further work is required to investigate this.

Conclusion

Foliar fungicide application significantly reduced STNB disease levels. Despite this reduction in disease there was no corresponding yield or grain quality benefit from spraying. Yield impact of STNB and subsequent responses to fungicide application is dependent on seasonal weather conditions supporting disease development. The 2017 season was drier than recent years and disease development and yield response were limited. Further work is required to see if there is a farming systems advantage to spraying with potentially reduced inoculum loads for the following season.

References

Hills A, G Thomas, A Grey, M Field, R Horbury, K Jayasena, C Beard and B Paynter (2016). Yield response to fungicide control of barley spot type net blotch in Western Australia. 2016 GRDC Grains Research Update, Perth.

Key words

Spot type net blotch, eastern wheatbelt, economic return, fungicide

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Important disclaimer