Evaluation of Different Fungicide Application Timings for Management of Septoria Leaf Blotch Complex in Two Wheat Varieties, 2020

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Introduction

The "Septoria leaf blotch complex" of wheat that occurs in Kentucky consists of two different pathogens, *Zymoseptoria tritici* and *Parastagonospora nodorum*. At one point in time, both pathogens were considered to be in the Genus *Septoria*, but current research has placed them into different genera with new scientific names. Regardless, both pathogens regularly occur in Kentucky and cause leaf blotch symptoms on wheat. Leaf symptoms caused by both pathogens can be almost identical and can occur in the same field and the same leaf, which is why the two pathogens may be considered a "disease complex". This disease complex can be managed effectively with fungicides, but depending on disease onset, different application timings may be needed to maximize disease control. This research evaluated the effect of different fungicide treatments applied at different timings on two wheat varieties that differed in susceptibility to the Septoria leaf blotch complex at two different Kentucky locations during the 2019-2020 growing season.

Procedures

The soft red winter wheat varieties AgriMaxx 496 (mod-resistant to leaf blotch) and Pembroke 2016 (mod-susceptible to leaf blotch) were no-till planted into corn stubble at a field in Caldwell County and a field in Logan County, KY. Fungicide treatments were applied to wheat plots using a CO_2-pressurized backpack sprayer, and included the following treatments:

- Non-treated check
- Tilt applied at Feekes 6 (4 fl oz/A)
- Tilt applied at Feekes 9 (4 fl oz/A)
- Miravis Ace applied at Feekes 10.51 (13.7 fl oz/A)
- Tilt applied at Feekes 6, followed by Tilt applied at Feekes 9
- Tilt applied at Feekes 6, followed by Miravis Ace applied at Feekes 10.51
- Tilt applied at Feekes 9, followed by Miravis Ace applied at Feekes 10.51

Leaf blotch severity was evaluated several times during the season, but we have presented only the ratings collected on May 11, 2020 for this report. These ratings best represent the efficacy observed for the applied treatments. Plots were harvested with a small plot combine, and yield and test weight were calculated. The trial was set up in a randomized complete block design with 4 replications. Data collected were statistically analyzed using SAS software (v. 9.4; Cary, NC).

Results

Caldwell County:

At the Caldwell County location on AgriMaxx 496, leaf blotch severity was significantly (statistically significant with 95% confidence) reduced by Tilt applied at Feekes 9 and Tilt at Feekes 6 followed by Miravis Ace at Feekes 10.51 (Table 1), compared to the nontreated check. On Pembroke 2016, leaf blotch severity was significantly reduced by Tilt at Feekes 6 followed by Tilt at Feekes 9 and by Tilt at Feekes 9 followed by Miravis Ace at Feekes 10.51. As expected, the Pembroke 2016 variety tended to have greater leaf blotch severity overall compared to AgriMaxx 496.

TABLE 1. EFFECT OF DIFFERENT FUNGICIDE TREATMENTS APPLIED TO TWO WHEAT VARIETIES AT DIFFERENT TIMINGS AT TWO LOCATIONS ON LEAF BLOTCH SEVERITY, TEST WEIGHT, AND GRAIN YIELD.

County	Variety	Treatment	Timing	Leaf blotch severity %)	Test weight (lb/bu)	Yield (bu/A)
Caldwell	AgriMaxx 496	Nontreated		66	55.3	96.6
		Tilt	Fks 6	64	55.1	90.3
		Tilt	Fks 9	55	55.2	94.7
		Miravis Ace	Fks 10.51	59	54.7	102.0
		Tilt fb Tilt	Fks 6 fb* Fks 9	61	55.3	90.1
		Tilt fb Miravis Ace	Fks 6 fb Fks 10.51	54	55.8	99.1
		Tilt fb Miravis Ace	Fks 9 fb Fks 10.51	59	55.4	104.1
	Pembroke 2016	Nontreated		70	54.7	61.9
		Tilt	Fks 6	68	54.9	65.7
		Tilt	Fks 9	63	55.1	64.7
		Miravis Ace	Fks 10.51	66	56.2	69
		Tilt fb Tilt	Fks 6 fb* Fks 9	60	55.3	64.8
		Tilt fb Miravis Ace	Fks 6 fb Fks 10.51	67	55.8	62.9
		Tilt fb Miravis Ace	Fks 9 fb Fks 10.51	59	55.8	69.3
			LSD 0.05**	9	0.8	8.7
Logan	AgriMaxx 496	Nontreated		64	58.9	52.8
		Tilt	Fks 6	62	58.6	50.3
		Tilt	Fks 9	63	59.3	59.0
		Miravis Ace	Fks 10.51	69	59.7	55.3
		Tilt fb Tilt	Fks 6 fb* Fks 9	61	59.4	58.1
		Tilt fb Miravis Ace	Fks 6 fb Fks 10.51	62	60.1	54.7
		Tilt fb Miravis Ace	Fks 9 fb Fks 10.51	60	60.1	60.9
	Pembroke 2016	Nontreated		85	59.5	31.7
		Tilt	Fks 6	87	59.2	32.7
		Tilt	Fks 9	74	60.5	36.6
		Miravis Ace	Fks 10.51	79	60.2	29.5
		Tilt fb Tilt	Fks 6 fb* Fks 9	77	59.8	35.8
		Tilt fb Miravis Ace	Fks 6 fb Fks 10.51	78	60.1	35.3
		Tilt fb Miravis Ace	Fks 9 fb Fks 10.51	69	60.7	33.7
			LSD 0.05**	10	NS***	12.8

*Followed by (fb).
**Fisher's least significant difference value at the 95% level of confidence (LSD 0.05). When compared, means that have a difference of at least this value are considered significantly different.
***No statistically significant differences were detected (NS).

No differences among fungicide treatments were observed for test weight on AgriMaxx 496. On Pembroke 2016, Miravis Ace at Feekes 10.51 and both treatments that included Tilt followed by Miravis Ace, significantly increased test weight compared to the nontreated check. Within wheat varieties, no differences in yields were observed among fungicide treatments. Overall, AgriMaxx 496 had a greater yield than Pembroke 2016. Pembroke 2016 had greater damage from an early freeze event than AgriMaxx 496, which was the likely reason for the large difference in yield between the two varieties.

Logan County:

At the Logan County location, no differences among fungicide treatments were observed on AgriMaxx 496 for leaf blotch severity (Table 1). On Pembroke 2016, the only treatment that significantly reduced leaf blotch severity compared to the nontreated check was Tilt applied at Feekes 9. Similar to what was observed at the Caldwell County location, AgriMaxx 496 tended to have less leaf blotch severity than Pembroke 2016 overall.

No differences among fungicide treatments or varieties were observed for test weight at the Logan County location. Within varieties, no differences among fungicide treatments were observed for their effects on grain yield. AgriMaxx 496 had a significantly greater yield than Pembroke 2016 overall, which was likely due to greater freeze damage that occurred to Pembroke 2016 compared to AgriMaxx 496. Overall, freeze damage was more severe on both varieties at the Logan County location compared to the Caldwell County location.

Conclusions

No clear trends were observed with this first year of research. The largest differences observed were between varieties rather than among fungicide treatments. Freeze damage affected both locations, but the greatest freeze damage occurred at Logan County. Pembroke 2016, which was an earlier-maturing variety than AgriMaxx 496, was damaged the greatest by freeze damage at both locations. This trial will be repeated again during the 2020-2021 growing season.

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