

Evaluation of Different Fungicide Application Timings for Management of Septoria Leaf Blotch Complex in Two Wheat Varieties, 2021

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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 2020-2021 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 CO₂-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 and combined to calculate area under disease progress curve (AUDPC) values. 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, no significant (statistically significant with 95% confidence) effects of treatments on leaf blotch severity or test weight were observed (Table 1). For AgriMaxx 496, the only treatment that provided a significantly greater yield than the nontreated control was Tilt applied at Feekes 6, followed by Miravis Ace at Feekes 10.51. For Pembroke 16, all treatments except Tilt applied at Feekes 6 provided a significantly greater yield than the nontreated control.

Logan County:

At the Logan County location, only Tilt applied at Feekes 6 and Tilt applied at Feekes 6 followed by Miravis Ace at Feekes 10.51 significantly reduced leaf blotch severity compared to the nontreated control for AgriMaxx 496. No differences in leaf blotch severity were observed among fungicide treatments on Pembroke 16. In general, Pembroke 16 had greater leaf blotch severity than Agrimaxx 496 (Table 1). For test weight, all fungicide treatments resulted in a significantly greater test weight than the nontreated control for Agrimaxx 496, but no differences among fungicides were observed for test weight on Pembroke 16. No significant differences were observed among treatments for yield at the Logan County location.

CONCLUSIONS:

Choosing a variety with a greater level of resistance to the Septoria leaf blotch complex can result in reduced leaf blotch severity. In some cases, multiple fungicide applications significantly improved yield over both the non-treated control and the single application of Miravis Ace at Feekes 10.51. Economic analyses currently are being conducted on these data, which may provide additional insight as to which treatments were the most economically viable.

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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 (AUDPC ^a)	Test weight (lb/bu)	Yield (bu/A)
Caldwell	AgriMaxx 496	Nontreated		2464	62.1	92.9
		Tilt	Fks 6	2330	61.7	93.0
		Tilt	Fks 9	2299	62.1	104.2
		Miravis Ace	Fks 10.51	2378	60.4	93.0
		Tilt fb Tilt	Fks 6 fb ^b Fks 9	2327	61.8	104.2
		Tilt fb Miravis Ace	Fks 6 fb Fks 10.51	2369	62.8	105.7
		Tilt fb Miravis Ace	Fks 9 fb Fks 10.51	2383	62.5	101.6
	Pembroke 2016	Nontreated		2377	61.8	78.8
		Tilt	Fks 6	2543	62.3	89.7
		Tilt	Fks 9	2511	62.6	95.1
		Miravis Ace	Fks 10.51	2452	62.7	97.4
		Tilt fb Tilt	Fks 6 fb ^b Fks 9	2564	62.0	96.7
		Tilt fb Miravis Ace	Fks 6 fb Fks 10.51	2536	62.9	100.0
		Tilt fb Miravis Ace	Fks 9 fb Fks 10.51	2540	62.4	95.8
		LSD 0.05 ^c	NS ^d	NS ^d	12.0	
Logan	AgriMaxx 496	Nontreated		2859	57.6	69.3
		Tilt	Fks 6	2659	58.5	61.3
		Tilt	Fks 9	2727	59.1	67.9
		Miravis Ace	Fks 10.51	2807	59.2	67.8
		Tilt fb Tilt	Fks 6 fb ^b Fks 9	2731	58.8	64.3
		Tilt fb Miravis Ace	Fks 6 fb Fks 10.51	2840	59.5	68.8
		Tilt fb Miravis Ace	Fks 9 fb Fks 10.51	2682	59.8	61.2
	Pembroke 2016	Nontreated		3403	59.6	56.9
		Tilt	Fks 6	3233	59.8	53.5
		Tilt	Fks 9	3351	60.3	57.1
		Miravis Ace	Fks 10.51	3461	60.3	59.2
		Tilt fb Tilt	Fks 6 fb ^b Fks 9	3245	60.2	61.3
		Tilt fb Miravis Ace	Fks 6 fb Fks 10.51	3342	60.1	57.3
		Tilt fb Miravis Ace	Fks 9 fb Fks 10.51	3344	60.0	59.8
		LSD 0.05 ^c	175	0.9	NS ^d	

^aArea under disease progress curve (AUDPC).

^bFollowed by (fb).

^cFisher'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.

^dNo statistically significant differences were detected (NS).