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Foliar Disease Control in Wheat

Fungicide-by- Variety Comparisons - 1989

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With the recent interest in the use of foliar fungicides for disease control in wheat, field tests for fungicide by variety comparisons were conducted on the Agronomy Research Stations at Haskell and Lahoma. The 20 varieties evaluated were the same as those used in the 1989 wheat performance tests in Oklahoma. A split plot design with 4 replications was used with the varieties being the main plots. Each main plot contained 2 subplots of a fungicide sprayed and unsprayed plot. The fungicide used was propiconazole (trade name - Tilt 3.6 E) applied at 4 oz/acre in 20 gal of water using a CO_2 back-pack sprayer. Fungicide applications were made at Feekes' growth stage 8 (flag leaves emerging but not yet fully expanded).

At Haskell, initial disease severity readings were taken just before fungicide was applied on 4/13/89. Powdery mildew (PM) was rated moderate to heavy as reported in Table 1. Traces of leaf rust (LR) were observed on the Siouxland variety, and traces of Septoria leaf blotch (SLB) were dispersed on lower leaves throughout the plots. Disease readings were taken on 5/9/89 from the flag leaves and the 2 leaves just below the flag leaf. Disease severity readings were based on percentage of leaf area covered with disease (See Figure 1).

At Lahoma, initial disease severity readings were taken on 4/17/89 prior to fungicide applications. Light infections of tan spot (TS) were observed on the 3rd and 4th leaves. The TS severity readings were fairly uniform among all varieties (Table 2). Due to the severe drought in April, no fungal disease development occurred at Lahoma. Therefore, no disease lesions were present on the flag leaves or the 2 leaves below the flag leaf on 5/11/89 in either sprayed or unsprayed plots.

At Haskell, the fungicide application provided significant reduction in powdery mildew on the leaves and significant yield increase among varieties highly susceptible to powdery mildew. Although leaf rust and Septoria leaf blotch severities remained low, some disease suppression was obtained with the fungicide. Note that some of the more highly resistant varieties to powdery mildew were among the top grain yielders, and no significant yield increases were obtained with fungicide on these varieties.

At Lahoma, early tan spot appeared heavy enough to support further disease development. With the lack of rainfall in April, no additional disease development occurred. Consequently, no measurable differences were obtained with the fungicide treatments.

Table 1. Haskell Wheat Leaf Disease Ratings and Grain Yield with and without a Foliar Fungicide.

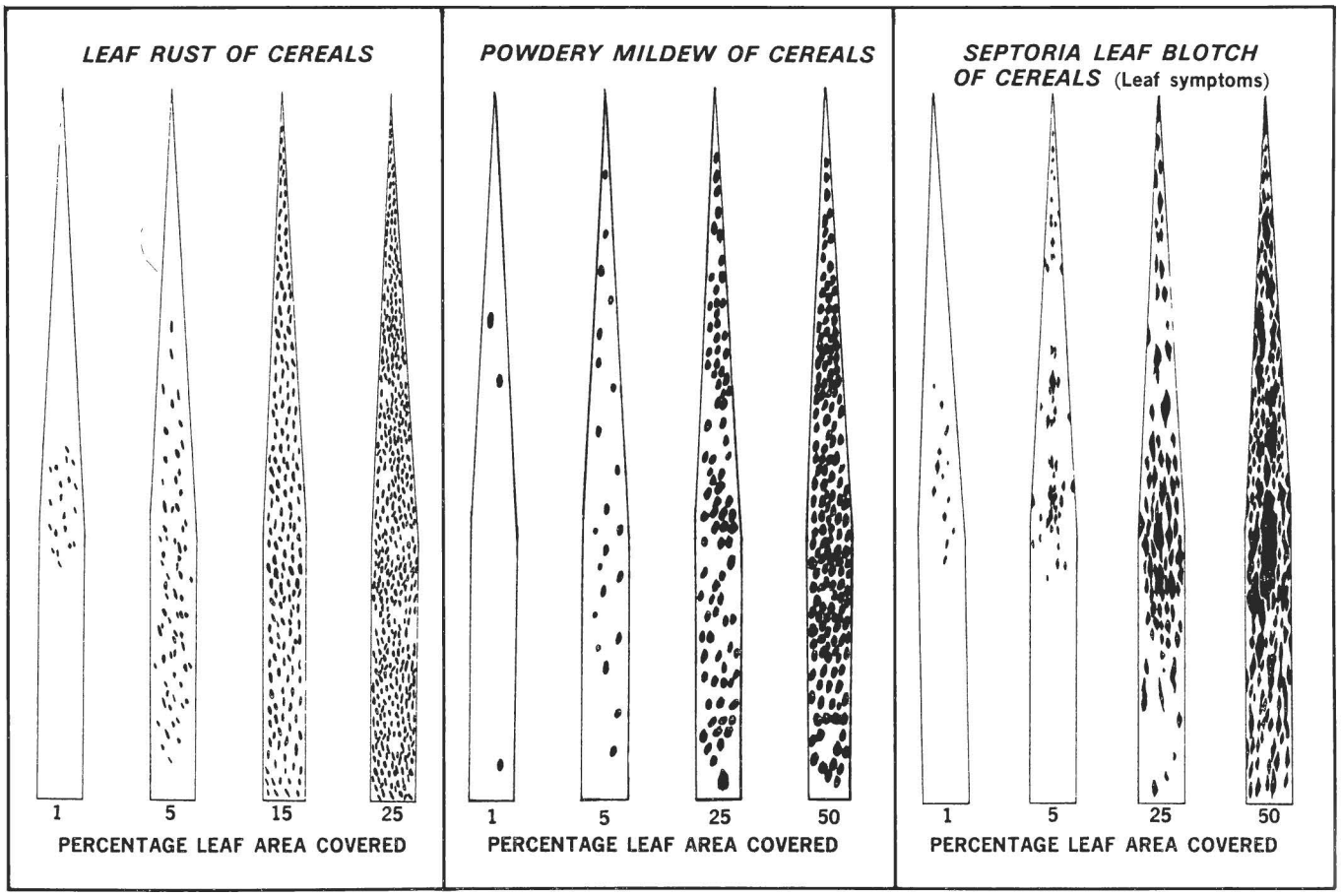
Brand	Entry*	Disease Severity (%) 4/13/89	5/9/89			Fungicide	Grain Yield Bu/A	Fungicide Response
		PM	PM	LR	SLB			
Agripro	Mesa	45	11	0.2	2	+	46.8	+11
			35	0.1	3	-	35.8	
Agripro	Wrangler	37	3	0.4	0.6	+	43.0	+10.5
			16	1.5	4	-	32.5	
Pioneer	2180	26	11	0.1	0.7	+	54.3	+ 9.9
			32	0.0	0.5	-	44.4	
	Pony	15	7	0.8	0.6	+	41.0	+ 9.1
			22	6.5	4	-	31.9	
Agripro	Thunderbird	5	4	0.4	0.7	+	49.0	+ 8.8
			12	0.4	2	-	40.2	
Pioneer	2172	22	8	0.2	0.7	+	46.8	+ 8.6
			20	0.1	3	-	38.2	
	Chisholm	19	3	2	0.4	+	42.4	+ 8.5
			20	4	3	-	33.9	
Pioneer	2157	24	6	0.4	0.4	+	48.0	+ 7.7
			22	1.4	3	-	40.3	
Agripro	Abilene	41	15	0.1	2	+	47.9	+ 6.7
			32	1.5	5	-	41.2	
	TAM W-101	15	6	0.2	0.7	+	42.8	+ 6.6
			19	0.1	5	-	36.2	
	Century	0	0.2	0.6	0.1	+	42.7	+ 6.4
			0	7	0.7	-	36.3	
	Arkan	18	5	0.1	0.6	+	37.2	+ 5.9
			20	0.2	2	-	31.3	
	Cody	11	9	3	0.5	+	36.7	+ 5
			17	1	4	-	31.7	
Agripro	Stallion	10	3	0.6	0.4	+	45.2	+ 5
			12	0.7	2	-	40.2	
Agripro	Victory	5	2	0	0.5	+	40.0	+ 4.9
			7	0.2	1	-	35.1	
AGSECO	7846	6	0.7	0.2	1	+	53.9	+ 3.5
			11	0.2	0.7	-	50.4	
	Siouxland	0	0.1	6	0.4	+	37.1	+ 3.2
			0.5	16	1	-	33.9	
AGSECO	7837	9	2	0.1	0.7	+	39.6	+ 2.8
			9	0	2	-	36.8	
	TAM 200	0	0	0	0.6	+	45.0	+ 2.1
			0	0.1	0.5	-	42.9	
	Karl	0.4	0.7	0.2	0.5	+	45.9	- 1.2
			6	0	0.7	-	47.1	
LSD P≤0.05		14	7.9	3.4	2.6			7
CV (%)		64	51	145	113			10.5
Average Yield for All Varieties:								
With Fungicide							44.2	+ 6.2
Without Fungicide							38.0	

*Varieties arranged in descending order according to fungicide yield response.

Table 2. Lahoma Wheat Leaf Disease Ratings and Grain Yield with and without a Foliar Fungicide.

		Disease Severity (%)		Grain Yield	
Brand	Entry	4/17/89 TS	Fungicide	Bu/A	Fungicide Response
	Century	7	+	51.2	+ 3.5
			-	47.7	
Pioneer	2172	12	+	53.4	+ 3.2
			-	50.2	
Agripro	Victory	6	+	44.9	+ 2
			-	42.9	
	Cody	7	+	42.0	+ 1.2
			-	40.8	
	Pony	9	+	39.8	+ 0.5
			-	39.3	
AGSECO	7837	5	+	41.7	+ 0.5
			-	41.2	
Agripro	Wrangler	11	+	40.7	+ 0.3
			-	40.4	
	Karl	2	+	45.8	+ 0.3
			-	45.5	
	TAM 200	15	+	51.7	+ 0.1
			-	51.6	
Pioneer	2157	9	+	43.5	0
			-	43.5	
Agripro	Abilene	7	+	38.6	- 0.3
			-	38.9	
Pioneer	2180	9	+	52.8	- 0.3
			-	53.1	
	Chisholm	6	+	33.2	- 0.5
			-	33.7	
	Siouxland	5	+	46.1	- 0.9
			-	47.0	
	Arkan	5	+	41.5	- 1.1
			-	42.6	
Agripro	Thunderbird	6	+	25.3	- 1.5
			-	26.8	
Agripro	Mesa	12	+	41.7	- 1.7
			-	43.4	
	TAM W-101	15	+	44.2	- 2.2
			-	46.4	
AGSECO	7846	8	+	44.7	- 3
			-	47.7	
Agripro	Stallion	6	+	34.8	- 3.4
			-	38.2	
LSD P≤0.05		5			NS
CV (%)		44			7
Average Yield for Varieties:					
With Fungicide				42.8	- 0.3
Without Fungicide				43.1	

Figure 1. Schematic Diagrams For Visual Evaluations Of Disease Severities.



Taken from Manual of Assessment Keys for Plant Diseases by Clive James, Canada Department Of Agriculture. Publication No. 1458 1971.

The scale for Septoria Leaf Blotch was also used for evaluating tan spot severities.

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