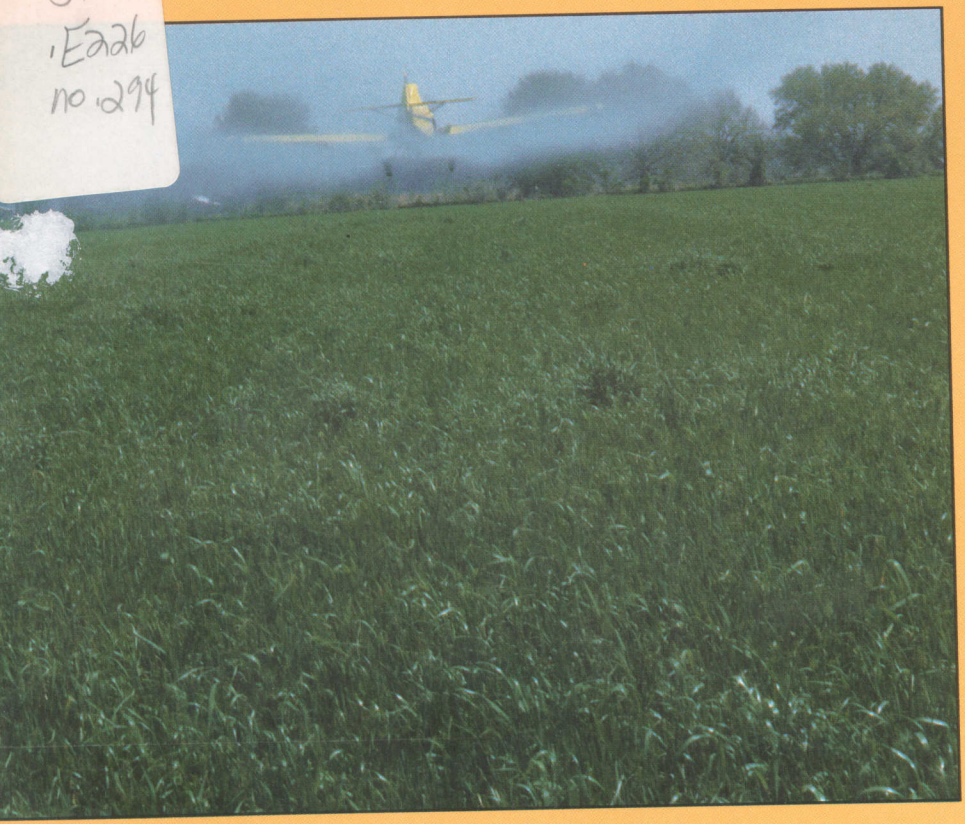

Fungicides for Control of Wheat Diseases in the Gulf Coast of Alabama

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Fungicides for Control of Wheat Diseases in the Gulf Coast of Alabama

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INTRODUCTION

IN ANY YEAR, the wheat crop throughout Alabama is subject to attack by a number of diseases[2,3]. Typically, diseases occur more often and cause greater damage in wheat grown in the warmer, humid areas of coastal Alabama. The two most damaging diseases are leaf rust, figure 1, caused by *Puccinia recondita* Rob. ex Desm. f. sp *tritici*, and Septoria leaf and glume blotch, figure 2, caused by *Leptosphaeria nodorum* Müller (anamorph *Septoria nodorum* (Berk.) Berk.). While there are wheat cultivars adapted for growing in south Alabama that are resistant to leaf rust, none are available that have good resistance to Septoria leaf and glume blotch (see recent issues of the Small Grain Variety Report, published annually by the Alabama Agricultural Experiment Station, Auburn University). However, even varietal resistance sometimes is ineffective because of the development of new races of causal agents or the occurrence of weather conditions that are so favorable for disease development that damage occurs on cultivars that would otherwise be little affected. Consequently, to insure profitable yields, it often is necessary to use fungicides to reduce disease losses.

During the period 1978-82, numerous fungicides were evaluated

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[2]GUDAUSKAS, R.T., C.G. CURRIER, AND A.K. HAGAN. 1983. Diseases and Their Control. Pages 11-23 *in* Wheat Research Report 1983. Research Report Series No. 2. Ala. Agr. Exp. Sta., Auburn University.

[3]WIESE, M.V. 1987. Compendium of Wheat Diseases. Second Edition. APS Press. The American Phytopathological Society. St. Paul, Minn.

for disease control in wheat plots at the Gulf Coast, Lower Coastal Plain, Sand Mountain, and Tennessee Valley substations[2]. Although the tests have been continued at most of these locations, lack of consistent disease development has precluded meaningful results from many of them. However, incidence and severity of leaf rust and/or Septoria blotch were sufficiently high at the Gulf Coast Substation, Fairhope, during each of the past 5 years that fungicides could be evaluated for controlling these diseases. Results from these tests are reported here.

MATERIALS AND METHODS

Plots of Blueboy, Fla. 301, and McNair 1003 wheat were planted in the fall with a standard grain drill at a seeding rate of 90 pounds per acre. Blueboy and McNair 1003 were selected because they were susceptible to Septoria blotch and leaf rust; Fla. 301 was also susceptible to Septoria blotch, but was considered to be resistant to leaf rust[2]. Fla. 301 and McNair 1003 plots were fertilized according to standard soil test recommendations for wheat. Blueboy plots received 60 pounds of additional N in the spring in an attempt to further potentiate yield while controlling diseases.

Fungicides were applied in 20 gallons of water per acre to 7- X 20-foot plots of wheat using a $C0_2$-pressurized sprayer. Treatments were made in one or two applications, and were arranged in a randomized block design with five replications. Disease severity in each plot was determined at growth stage 11.2 (Feekes' Scale; soft dough stage) by rating the flag leaves and/or heads of 10-15 plants using a scale of 0-10, where 0 = no disease and 10 = severe disease. At crop maturity, a 5- X 15-foot swath of each plot was harvested with a plot combine for grain yield determinations. Fungicides tested during the 5-year period included benomyl (Benlate® 50W), capatafol (Difolatan® 4F), CGA-449 50W, chlorothalonil (Bravo® 500), copper-sulfur (Top Cop® with sulfur; 50% S, 4.4% Cu), diniconazole (Spotless® 25W), DS-57654, DPX H6573, fenpropimorph, mancozeb (Dithane® M-45, Manzate® 200), myclobutanil (Systhane® 40W), propiconazole (Tilt® 3.6E), RE-36116, terbutrazole (Folicur® 1.2E), triadimefon (Bayleton® 1.8E, 2E, 50W), and triadimenol (KWG-0519).

RESULTS

Results are summarized by wheat cultivar in tables 1-3. Tests were conducted with Blueboy wheat during 1983-85, but discontinued thereafter. Septoria blotch and leaf rust developed in the tests in all 3 years, and most triadimefon and propiconazole treatments consis-

tently reduced the severity of both diseases, table 1. Addition of mancozeb did not increase efficacy or yield response with triadimefon or propiconazole except in 1985. Myclobutanil gave excellent disease control and yield response in 1985, the only year of testing with this material. Yield increases associated with fungicide treatments ranged from 11 to 15 bushels in 1983, 8 to 20 bushels in 1984, and 9 to 27 bushels in 1985. The additional N applied to the Blueboy plots did not appear to effect any appreciable increase in yield.

In the Fla. 301 plots, incidence of Septoria leaf and/or glume blotch was low in 1984, 1985, and 1986, table 2, and too insignificant to rate in 1987; leaf rust developed to appreciable levels only in 1986, table 2. In 1984 and 1985, one or two applications of most of the fungicides tested reduced the severity of Septoria blotch as compared to the unsprayed controls. In 1986, only one application of each fungicide was made, and that not until plants were in the initial stages of head emergence. All fungicides gave good to excellent control of both Septoria leaf blotch and leaf rust. Significant yield increases were associated only with the DPX H6573 and propiconazole + chlorothalonil treatments in 1984, and with the terbutrazole, myclobutanil + mancozeb, and propiconazole treatments in 1986. Magnitude of the yield increase was 10 to 12 bushels in each year.

In the McNair 1003 plots, Septoria blotch occurred at significant levels only in 1985, and then only on leaves; whereas, the incidence of leaf rust was sufficient to distinguish treatments in each of the 4 years of testing, table 3. Depending on the fungicide, one or two applications gave good to excellent control of leaf rust in 1984, 1985, and 1986, and of Septoria leaf blotch in 1985. Yields from each of the fungicide-treated plots in those years were significantly higher than those from unsprayed plots, ranging in an order of increase of 13 to 33 bushels per acre in 1984, 12 to 25 bushels in 1985, and 21 to 40 bushels in 1986. In 1987, leaf rust appeared relatively late in the season and did not develop to high levels. The first application of fungicide was not made until plants were in the early stage of head emergence, and some plots were inadvertently sprayed again after the crop was in the full head stage. All fungicides tested reduced the severity of leaf rust as compared to unsprayed controls, and yield increases of 5 to 7 bushels per acre were associated with most of the fungicide treatments.

DISCUSSION

The results of these tests show that yields of the susceptible cultivars Blueboy and McNair 1003 were significantly reduced by dis-

eases. Leaf rust occurred more frequently and appeared to cause greater damage than Septoria blotch during the years these tests were conducted. The incidence of both diseases was consistently lower on Fla. 301 wheat, and this cultivar appeared to be less affected by the diseases than the other two cultivars in the tests. As noted earlier, Fla. 301 was regarded as being resistant to leaf rust. However, the increasing occurrence of rust on Fla. 301 in these tests and in variety trials planted at the Gulf Coast Substation and elsewhere in the State[4] indicates that races of the leaf rust fungus that are capable of attacking Fla. 301 are becoming common.

These tests also showed that several fungicides gave good to excellent control of Septoria blotch and leaf rust, and that significant yield increases were associated with many of the treatments. Results from these and earlier tests[2] generally indicated that maximum control was achieved when the first application of fungicide was made around the time of flag leaf emergence. The comparative efficacy of one application versus two applications was not determined for every fungicide included in these studies. However, the results did show that, in some years, a one-time application of fungicide was sufficient for season-long disease control. This was particularly true for fungicides with systemic activity, e.g. diniconazole, terbutrazole, propiconazole, and triadimefon. For fungicides such as mancozeb that do not have systemic activity, or in years of heavy disease pressure, an additional application(s) might be required for satisfactory control. Fungicides presently labeled for control of leaf rust and Septoria leaf and glume blotch on wheat include mancozeb, benomyl + mancozeb, propiconazole, triadimefon, and triadimefon + mancozeb[5].

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[4]THURLOW, D.L. AND W.C. JOHNSON. 1987. The 1987 Alabama Performance Comparison of Small Grain Varieties. Agron. and Soils Dept. Series No. 117. Ala. Agr. Exp. Sta., Auburn University.

[5]HAGAN, A.K. 1988. Small Grains Disease Control. Pages 80-82 *in* 1988 Alabama Pesticide Handbook. Circular ANR-500. Ala. Coop. Ext. Ser., Auburn University.

TABLE 1. DISEASE SEVERITIES AND GRAIN YIELDS FOR PLOTS OF BLUEBOY WHEAT SPRAYED WITH FUNGICIDES, GULF COAST SUBSTATION, FAIRHOPE

Fungicide, a.i.[1]/acre	App. stage[2]	Disease severity[3,4]			Yield/ acre, bu.[4]
		Septoria blotch		Leaf rust	
		Leaf	Glume		
1983					
Mancozeb (25.6 oz.)**	8, 10.1	—[5]	3.9 c	6.3 ab	23.7 bcd
Propiconazole					
1.8 oz.**	8, 10.1	—	3.5 cd	2.0 f	29.6 ab
3.6 oz.**	8, 10.1	—	3.0 de	1.7 f	27.5 abc
1.8 oz. + mancozeb (25.6 oz.)**	8, 10.1	—	2.7 e	2.2 ef	33.7 a
3.6 oz. + mancozeb (25.6 oz.)**	8, 10.1	—	2.7 e	1.6 f	34.3 ab
Sulfur					
46.4 oz. + copper (4 oz.)**	8, 10.1	—	5.3 a	7.1 a	17.9 d
Triadimefon 50W					
1 oz.**	8, 10.1	—	4.0 bc	4.3 c	27.3 abc
2 oz.**	8, 10.1	—	3.7 cd	3.5 cd	27.3 abc
1 oz. + mancozeb (25.6 oz.)**	8, 10.1	—	3.7 cd	5.5 b	27.4 abc
2 oz. + mancozeb (25.6 oz.)**	8, 10.1	—	3.4 cde	2.9 de	30.0 ab
None (check)		—	4.7 ab	6.8 a	18.6 cd
1984					
Chlorothalonil (16.6 oz.)**	8, 10.1	2.1 c	2.3 b	2.0 a	32.8 c
Mancozeb (25.6 oz.)**	8, 10.1	3.1 b	3.8 a	2.4 a	27.7 cd
Propiconazole					
1.8 oz.**	8, 10.1	0.5 fg	1.5 c	1.4 b	50.8 a
3.6 oz.**	8, 10.1	0.2 g	1.3 c	1.1 b	53.6 a
1.8 oz. + mancozeb (25.6 oz.)**	8, 10.1	0.9 ef	1.6 bc	1.3 b	47.6 ab
3.6 oz. + mancozeb (25.6 oz.)**	8, 10.1	0.3 ab	1.4 c	1.1 b	52.5 a
Sulfur					
46.4 oz. + copper (4 oz.)**	8, 10.1	3.7 ab	3.5 a	2.5 a	29.1 cd
Triadimefon 50W					
1 oz.**	8, 10.1	1.8 cd	1.8 bc	2.1 a	43.2 b
2 oz.**	8, 10.1	1.5 c	1.5 c	1.2 b	49.0 ab
1 oz. + mancozeb (25.6 oz.)**	8, 10.1	1.2 de	1.4 c	1.2 b	47.3 ab
2 oz. + mancozeb (25.6 oz.)**	8, 10.1	1.3 c	1.2 de	1.3 b	49.5 ab
None (check)		4.0 a	3.8 a	2.6 a	24.3 d

(Continued)

TABLE 1 (CONTINUED). DISEASE SEVERITIES AND GRAIN YIELDS FOR PLOTS OF BLUEBOY WHEAT SPRAYED WITH FUNGICIDES, GULF COAST SUBSTATION, FAIRHOPE

Fungicide, a.i.[1]/acre	App. stage[2]	Disease severity[3,4]			Yield/ acre, bu.[4]
		Septoria blotch		Leaf rust	
		Leaf	Glume		
1985					
Mancozeb (25.6 oz.)*	9, 10.1	—[5]	2.0 b	2.9 b	23.0 e
Myclobutanil					
3 oz.*	9, 10.1	—	0.7 cd	2.0 cd	29.7 cd
3 oz. + mancozeb (25.6 oz.)*	9, 10.1	—	0.4 de	0.8 fg	33.9 bc
Propiconazole					
1.8 oz.	9, 10.1	—	0.3 e	1.4 de	30.9 cd
3.6 oz.	9, 10.1	—	0.2 e	0.6 g	34.8 b
1.8 oz. + mancozeb (25.6 oz.)*	9, 10.1	—	0.2 e	0.7 fg	35.4 b
3.6 oz. + mancozeb (25.6 oz.)*	9, 10.1	—	0.1 e	0.3 g	41.0 a
Triadimefon 50W					
1 oz.*	9, 10.1	—	1.5 b	2.8 b	27.3 de
2 oz.*	9, 10.1	—	1.0 c	2.2 c	28.5 d
1 oz. + mancozeb (25.6 oz.)*	9, 10.1	—	1.0 c	1.8 cd	32.3 bcd
2 oz. + mancozeb (25.6 oz.)*	9, 10.1	—	0.5 cde	1.2 ef	35.8 b
None (check)		—	4.6 a	3.9 a	14.4 f

[1]Active ingredient.

[2]Crop stage at time of application, based on Feekes' scale: 8 = flag leaf just visible, 9 = flag leaf emerged, 10.1 = head beginning to emerge.

[3]0 - 10 scale; 0 = disease free, 10 = severely diseased.

[4]In a given year, values in the same column and followed by the same letter are not significantly different, according to Duncan's Multiple Range Test (p = .05).

[5]Disease did not develop.

*Plus Triton CS-7 at 1 pint per 100 gallons.

**Plus Penetrator II at ½ pint per acre.

FIG. 1. Wheat leaves with pustules, or spore masses, of leaf rust.

FIG. 2. Symptoms of Septoria leaf (right) and glume (left) blotch.

TABLE 2. DISEASE SEVERITIES AND GRAIN YIELDS FOR PLOTS OF FLA. 301 WHEAT SPRAYED WITH FUNGICIDES, GULF COAST SUBSTATION, FAIRHOPE

Fungicide, a.i.[1]/acre	App. stage[2]	Disease severity[3,4]			Yield/ acre, bu.[4]
		Septoria blotch		Leaf rust	
		Leaf	Glume		
1984					
Chlorothalonil (16.6 oz.)	8, 10.1	0.9 cd	0.9 cd	—[5]	52.5 abc
Diniconazole					
0.8 oz. + captafol (16 oz.)	8, 10.1	0.4 de	0.4 ef	—	52.5 abc
DPX H6573					
1 oz.*	8, 10.1	0.2 e	0.7 cdef	—	53.4 abc
1.5 oz.*	8, 10.1	0.2 e	0.9 bc	—	55.1 ab
2 oz.*	8, 10.1	0.2 e	0.6 cdef	—	50.1 abc
1 oz. + mancozeb (25.6 oz.)*	8, 10.1	0.3 e	0.8 cde	—	47.1 bc
DS 57654 (16 oz.)	8, 10.1	1.3 c	1.0 bc	—	47.8 abc
Mancozeb (25.6 oz.)*	8, 10.1	2.0 b	1.3 b	—	49.9 abc
Propiconazole					
0.9 oz.**	8, 10.0	1.1 e	1.1 bc	—	48.9 abc
1.8 oz.	9	0.4 de	1.1 bc	—	46.5 bc
1.8 oz.**	8, 10.0	0.2 e	0.9 bc	—	51.6 abc
1.8 oz. + chlorothalonil (17.6 oz.)	9, 10.3	0.1 e	0.3 f	—	58.0 a
RE 36116 (8 oz.)	8, 10.1	0.1 e	0.4 def	—	52.5 abc
Terbutrazole					
2 oz.	8	0.7 cde	1.1 bc	—	48.0 abc
4 oz.	8	0.2 e	0.8 bcd	—	51.9 abc
2 oz. + triadimenol (0.5 oz.)	8	0.4 de	0.9 bcd	—	48.8 abc
2 oz. + triadimenol (1 oz.)	8	1.1 c	0.9 bcd	—	52.3 abc
None (check)		3.8 a	1.8 a	—	43.3 c
1985					
CGA 449					
4 oz.	9, 10.2	1.3 def	—	—	53.5 a
8 oz.	9, 10.2	1.6 cdef	—	—	50.3 abcd
Diniconazole					
0.8 oz.	9	2.2 abcd	—	—	51.9 abc
0.8 oz.****	9	2.3 abcd	—	—	47.3 cd
1.6 oz.	9	2.8 ab	—	—	47.7 bcd
1.6 oz.****	9	2.5 abc	—	—	49.3 abcd
Fenpropimorph					
8 oz.	9	3.0 a	—	—	48.1 bcd
12 oz.	9	2.9 a	—	—	49.7 abcd
16 oz.	9	2.9 a	—	—	45.5 d

(Continued)

TABLE 2 (CONTINUED). DISEASE SEVERITIES AND GRAIN YIELDS FOR PLOTS OF FLA. 301 WHEAT SPRAYED WITH FUNGICIDES, GULF COAST SUBSTATION, FAIRHOPE

Fungicide, a.i.[1]/acre	App. stage[2]	Disease severity[3,4]			Yield/ acre, bu.[4]
		Septoria blotch		Leaf rust	
		Leaf	Glume		
1985					
Mancozeb (25.6 oz.)*	9, 10.2	1.0 ef	—[5]	—	49.9 abcd
Propiconazole					
1.8 oz.	9	1.0 ef	—	—	48.3 bcd
1.8 oz.	9, 10.2	1.0 ef	—	—	50.3 abcd
1.8 oz. / CGA 449 (8 oz.)	9/ 10.2	0.9 ef	—	—	50.7 abc
Terbutrazole (3.6 oz.)	9, 10.2	0.9 ef	—	—	53.9 a
Triadimefon 2E (4 oz.)	9, 10.2	1.3 def	—	—	52.3 ab
Triadimefon 50W (4 oz.)	9, 10.2	1.8 bcde	—	—	47.9 bcd
Triadimenol (4 oz.)	9, 10.2	0.7 f	—	—	50.3 abcd
None (check)		3.0 a	—	—	50.9 abc
1986					
Diniconazole					
0.8 oz.***	10.2	0.9 cde	—	0.1 ef	51.4 ab
1.6 oz.***	10.2	1.1 c	—	0.1 ef	53.5 ab
0.8 oz. + mancozeb (25.6 oz.)***	10.2	1.1 c	—	0 f	44.6 b
Mancozeb (25.6 oz.)*	10.2	1.6 b	—	2.3 b	49.5 ab
Myclobutanil					
1.9 oz.*	10.2	0.5 fg	—	1.3 c	48.6 ab
1.9 oz. + mancozeb (25.6 oz.)*	10.2	0.6 ef	—	0.7 d	55.0 a
Propiconazole					
1.8 oz.	10.2	0.3 gh	—	0.4 e	52.4 ab
3.6 oz.	10.2	0.1 h	—	0 f	57.2 a
Terbutrazole (3.6 oz.)	10.2	0.1 h	—	0 f	57.0 a
Triadimefon 1.8E (4 oz.)	10.2	0.7 def	—	0.4 e	54.0 ab
Triadimefon 50W					
4 oz.	10.2	1.0 cd	—	0.3 ef	53.0 ab
1 oz. + mancozeb (25.6 oz.)*	10.2	1.0 cde	—	0.7 d	53.9 ab
None (check)		3.4 a	—	4.4 a	45.1 b

[1]Active ingredient.

[2]Crop stage at time of application, based on Feekes' scale: 8 = flag leaf just visible, 9 = flag leaf emerging, 10 = late boot, 10.1-10.2 = head beginning to emerge.

[3]0 - 10 scale; 0 = disease free, 10 = severely diseased.

[4]In a given year, values in the same column and followed by the same letter are not significantly different, according to Duncan's Multiple Range Test (p = .05).

[5]Disease did not develop.

*Plus Triton CS-7 at 1 pint per 100 gallons.

**Plus Penetrator II at ½ pint per acre.

***Plus Crop Oil Concentrate at 1 percent (v/v).

****Plus WK Surfactant at 1 percent (v/v).

TABLE 3. DISEASE SEVERITIES AND GRAIN YIELDS FOR PLOTS OF MCNAIR 1003 WHEAT SPRAYED WITH FUNGICIDES, GULF COAST SUBSTATION, FAIRHOPE

Fungicide, a.i.[1]/acre	App. stage[2]	Disease severity[3,4]			Yield/ acre, bu.[4]
		Septoria blotch		Leaf rust	
		Leaf	Glume		
1984					
Chlorothalonil (16.6 oz.)	8, 10.1	—[5]	—	1.4 c	54.0 f
Diniconazole					
0.8 oz.	8, 10.1	—	—	0 d	64.8 bcd
0.8 oz. + captafol (16 oz.)	8, 10.1	—	—	0 d	70.6 ab
DPX H6573					
1.5 oz.*	8, 10.1	—	—	0 d	68.1 abc
2 oz.*	8, 10.1	—	—	0 d	66.3 abc
1 oz. + mancozeb (25.6 oz.)*	8, 10.1	—	—	0 d	66.4 abc
DS 57654 (16 oz.)	8, 10.1	—	—	0.1 c	58.8 def
Mancozeb (25.6 oz.)*	8, 10.1	—	—	1.5 c	55.7 ef
Myclobutanil					
3 oz.	8, 10.1	—	—	0 d	64.3 bcd
4 oz.	8, 10.1	—	—	0 d	63.9 bcd
Propiconazole					
1.8 oz.	9	—	—	0.2 d	68.9 ab
1.8 oz.**	8, 10.1	—	—	0 d	72.7 a
1.8 oz. + chlorothalonil (17.6 oz.)	9, 10.3	—	—	0 d	71.8 a
RE 36116 (8 oz.)	8, 10.1	—	—	2.9 b	52.9 f
Terbutrazole					
2 oz.	8	—	—	1.2 c	58.8 def
2 oz. + triadimenol (0.5 oz.)	8	—	—	1.1 c	61.8 def
Triadimefon 50W (2 oz.)	8	—	—	1.5 c	55.5 ef
None (check)		—	—	4.8 a	40.2 g
1985					
CGA 449					
4 oz.	9, 10.2	6.4 b	—	7.1 b	39.2 f
8 oz.	9, 10.2	6.0 b	—	7.0 b	39.4 f
Diniconazole					
0.8 oz.	9	2.3 cd	—	1.5 f	50.9 cde
0.8 oz.****	9	2.4 cd	—	1.3 ef	55.8 bc
1.6 oz.	9	1.9 de	—	1.0 ef	54.8 bcd
1.6 oz.****	9	2.1 d	—	1.1 ef	53.7 bcde
Fenpropimorph					
8 oz.	9	4.1 b	—	4.2 bc	50.3 de
12 oz.	9	3.7 bc	—	3.5 cd	49.1 e
16 oz.	9	4.5 b	—	3.9 cd	48.7 e

(Continued)

TABLE 3 (CONTINUED). DISEASE SEVERITIES AND GRAIN YIELDS FOR PLOTS OF MCNAIR 1003 WHEAT SPRAYED WITH FUNGICIDES, GULF COAST SUBSTATION, FAIRHOPE

Fungicide, a.i.[1]/acre	App. stage[2]	Disease severity[3,4]			Yield/ acre, bu.[4]
		Septoria blotch		Leaf rust	
		Leaf	Glume		
1985					
Mancozeb (25.6 oz.)*	9, 10.2	4.0 b	—[5]	2.6 de	48.9 e
Myclobutanil (3 oz.)*	9, 10.2	1.2 def	—	1.1 ef	51.9 cde
Propiconazole					
1.8 oz.	9, 10.2	0.3 f	—	0.1 f	55.0 bcd
1.8 oz. / CGA (8 oz.)	9/ 10.2	1.0 def	—	0.9 f	53.1 bcde
Terbutrazole (3.6 oz.)	9, 10.2	0.2 f	—	0.1 f	62.0 a
Triadimefon 2E (4 oz.)	9, 10.2	1.2 def	—	1.1 ef	52.3 cde
Triadimefon 50W (4 oz.)	9, 10.2	1.1 def	—	1.3 ef	50.9 cde
Triadimenol (4 oz.)	9, 10.2	0.5 f	—	0.3 f	57.4 b
None (check)		6.9 a	—	7.3 a	36.8 f
1986					
Diniconazole					
0.8 oz.***	9, 10.2	—	—	0 f	76.6 bcd
1.6 oz.***	9, 10.2	—	—	0 f	76.7 bcd
0.8 oz. + mancozeb (25.6 oz.)****	9, 10.2	—	—	0.1 f	82.8 ab
Mancozeb (25.6 oz.)	9, 10.2	—	—	2.6 b	70.4 de
Myclobutanil					
1.9 oz.*	9, 10.2	—	—	0.6 de	69.7 de
1.9 oz. + mancozeb (25.6 oz.)*	9, 10.2	—	—	0.2 f	75.4 bcde
Propiconazole					
1.8 oz.	9	—	—	0.8 d	73.7 cde
1.8 oz.	9, 10.2	—	—	0.3 ef	78.2 abcd
Terbutrazole					
3.6 oz.	9	—	—	0 f	81.1 abc
3.6 oz.	9, 10.2	—	—	0 f	86.6 a
Triadimefon 1.8E (4 oz.)	9, 10.2	—	—	0.1 f	79.9 abc
Triadimefon 50W					
4 oz.	9, 10.2	—	—	0.1 f	76.2 bcd
1 oz. / mancozeb (25.6 oz.)*	9/ 10.2	—	—	1.6 c	67.2 e
None (check)		—	—	4.9 a	46.0 f

(Continued)

TABLE 3 (CONTINUED). DISEASE SEVERITIES AND GRAIN YIELDS FOR PLOTS OF MCNAIR 1003 WHEAT SPRAYED WITH FUNGICIDES, GULF COAST SUBSTATION, FAIRHOPE

Fungicide, a.i.[1]/acre	App. stage[2]	Disease severity[3,4]			Yield/ acre, bu.[4]
		Septoria blotch		Leaf rust	
		Leaf	Glume		
1987					
Benomyl					
4 oz. + mancozeb (25.6 oz.)*	10.2, 10.5	—[5]	—	1.5 b	27.0 bcd
Diniconazole					
0.8 oz.***	10.2	—	—	0.1 c	28.9 abc
0.8 oz.***	10.2, 10.5	—	—	0.1 c	30.4 ab
1.6 oz.***	10.2	—	—	0.1 c	29.8 ab
1.6 oz.***	10.2, 10.5	—	—	0 c	28.2 abc
0.8 oz. + mancozeb (25.6 oz.)***	10.2, 10.5	—	—	0.1 c	32.2 a
Mancozeb					
25.6 oz.*	10.2	—	—	1.5 b	28.2 abc
25.6 oz.*	10.2, 10.5	—	—	1.5 b	29.3 ab
25.6 oz. + triadimefon (1 oz.)*	10.2, 10.5	—	—	0.2 c	30.2 ab
Propiconazole					
0.9 oz.	10.2, 10.5	—	—	0.1 c	30.9 ab
1.8 oz.	10.2	—	—	0.1 c	31.5 a
1.8 oz.	10.2, 10.5	—	—	0 c	30.0 ab
3.6 oz.	10.2	—	—	0.2 c	28.2 abc
Terbutrazole (3.6 oz.)	10.2	—	—	0 c	31.3 a
Triadimefon 50W					
2 oz.	10.2, 10.5	—	—	0.2 c	29.1 abc
4 oz.	10.2	—	—	0.4 c	29.3 ab
None (check)		—	—	3.4 a	24.5 cd

[1]Active ingredient.

[2]Crop stage at time of application, based on Feekes' scale: 8 = flag leaf just visible, 9 = flag leaf emerging, 10 = late boot, 10.1-10.2 = head beginning to emerge, 10.5 = head fully emerged.

[3]0 - 10 scale; 0 = disease free, 10 = severely diseased.

[4]In a given year, values in the same column and followed by the same letter are not significantly different, according to Duncan's Multiple Range Test (p = .05).

[5]Disease did not develop.

*Plus Triton CS-7 at 1 pint per 100 gallons.

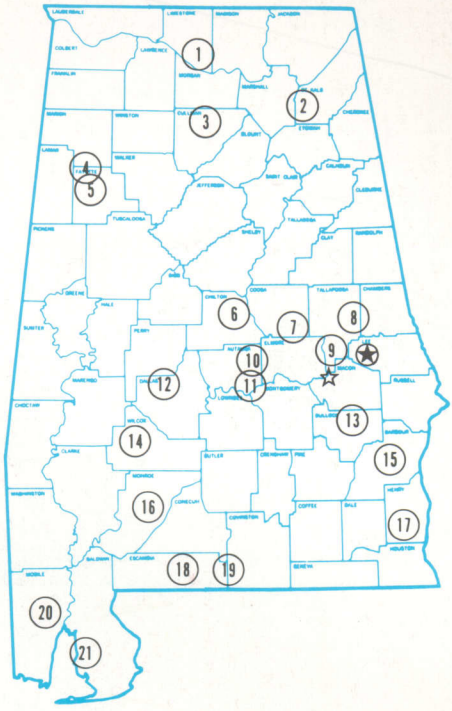
**Plus Penetrator II at ½ pint per acre.

***Plus Crop Oil Concentrate at 1 percent (v/v).

****Plus WK Surfactant at 1 percent (v/v).

Alabama's Agricultural Experiment Station System
AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.
☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Chilton Area Horticulture Substation, Clanton.
7. Forestry Unit, Coosa County.
8. Piedmont Substation, Camp Hill.
9. Plant Breeding Unit, Tallassee.
10. Forestry Unit, Autauga County.
11. Prattville Experiment Field, Prattville.
12. Black Belt Substation, Marion Junction.
13. The Turnipseed-Ikenberry Place, Union Springs.
14. Lower Coastal Plain Substation, Camden.
15. Forestry Unit, Barbour County.
16. Monroeville Experiment Field, Monroeville.
17. Wiregrass Substation, Headland.
18. Brewton Experiment Field, Brewton.
19. Solon Dixon Forestry Education Center, Covington and Escambia counties.
20. Ornamental Horticulture Substation, Spring Hill.
21. Gulf Coast Substation, Fairhope.