REPORT OF THE VERTICILLIUM WILT AND FUSARIUM WILT COMMITTEE - 1995

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Verticillium Wilt Report

Texas - K. M. El-Zik and P. M. Thaxton - (Genetic Improvement and Disease Incidence). MAR-7 strains were evaluated for resistance in the Verticillium wilt nursery at Chillicothe, Texas. Plants with foliar Verticillium wilt symptoms were counted four weeks prior to maturity. Percent diseased plants ranged from 31.7% for LBCHGHQWIS-4-92 to 70.3% for CGL2HGRPIH-1-93, with a test mean of 44.2%. Six MAR-7 strains had significantly lower disease incidence than the other strains in the test. Cool night temperatures and wet conditions this summer enhanced the expression of disease symptoms.

Tennessee - A. Y. Chambers - (Occurrence of Verticillium Wilt and Research in 1995). Verticillium wilt was not an extremely serious problem for cotton producers in Tennessee in 1995. Losses were estimated at 1.0 percent. Many producers received a shock when the wilt appeared in epidemic proportions after a cool, rainy period in June. Varieties which have been considered fairly tolerant of Verticillium wilt as well as susceptible varieties had severe leaf symptoms and considerable dropping of leaves. However, as the weather improved, the wilt went into "remission" and the affected plants recovered and, in most instances, made normal growth and yields. Long-term observers of Verticillium wilt had never seen the disease appear that early before and had never seen it subside so that affected plants made almost complete recovery. The wilt made a second appearance in mid to late August but was too late to cause significant yield losses.

Sixteen cultivars which were suggested for grower use in 1995 or appeared to have promise for production in Tennessee were planted May 9 at the University of Tennessee Milan Experiment Station at Milan to evaluate their reaction to Verticillium wilt. Plots were located on an area which has a history of Verticillium wilt injury and which had severe wilt damage in 1994. The plot area, in a creek bottom, had been planted for over 20 years in a highly-susceptible cultivar every other year and evaluation of cultivars for wilt reaction was made in alternate years. Seed of the cultivars were packaged and planted with a four-row, tractor-mounted cone planter. Terraclor Super X and Temik granules were applied to the seed furrow for seedling disease and early-season insect control. Weather conditions were similar to those that occurred in most of the cotton-producing areas of the State, and moderate to severe symptoms of wilt (depending on the cultivar) developed in June. Most of the symptoms disappeared until August. Cultivars were rated September 11 and rechecked October 13 and 30 for extent of wilt symptoms and injury. One a scale of 0 to 10 with 10 being the most severe wilt damage, 'Hartz H1244' was rated significantly higher than the other cultivars at 7.2. 'Hartz H1215' and 'Hartz H1220' had higher ratings than the other 13 cultivars with 5.7 and 5.6, respectively. 'Chembred 1135' and 'Chembred 333' had lowest ratings of 3.4 and 3.5. 'Sure-Grow 501', 'Stoneville LA887', 'Deltapine 20', and 'Deltapine 50' had ratings of 3.8, 3.8, 3.9, and 3.9. 'Deltapine 51', 'Stoneville 132', 'Deltapine 5409', 'Stoneville 474', 'Hartz H1330', 'Sure-Grow 404', and 'Sure-Grow 125' were rated 4.0, 4.1, 4.2, 4.2, 4.3, 4.6, and 4.7, respectively. Even with a relatively high wilt rating, Hartz H1244 had a yield of 1165 pounds of lint per acre (harvested October 10 and 30). Hartz H1215 and Hartz H1220 had yields of 1085 and 1169 pounds. Chembred 1135 and Chembred 333 produced 937 and 755 pounds. Yields of Sure-Grow 501, Stoneville LA887, Deltapine 20, and Deltapine 50 were 815, 898, 1065, and 987 pounds. Deltapine 51, Stoneville 132 (poor stand), Deltapine 5409, Stoneville 474, Hartz H1330, Sure-Grow 404, and Sure-Grow 125 produced 839, 924, 1080, 1061, 923, 960, and 946 pounds, respectively,

In an adjourning plot area, rates of potassium chloride fertilizer were evaluated for effect on incidence and severity of Verticillium wilt. Applications of KCl and K_2SO_4 were also compared for effect on wilt. As in the cultivar evaluation, symptoms of wilt appeared at severe levels in June in the Hartz H1244 cultivar planted but practically disappeared until August. Treatments of KCl reduced diseases ratings significantly compared to no potassium and K_2SO_4 treatments. Yields were not significantly different. Comparison of no-till and conventional tillage in the plots did not show any differences in wilt severity or yields.

Table 1. Yield and numbers of plants with foliar symptoms of Verticillium wilt.

Cultivar	Number of Plants with Foliary symptoms/200 ft.	Seed cotton per plot (lbs)
Hartz 1330	3.8 bcd	900a
Deltapine 50	5.8 a-d	876 ab
Deltapine 5409	7.3 a-d	849 abc
Suregrow 1001	5.5 a-d	849 abc
Chembred 232	7.0 a-d	844 a-d
Germaine 9033	1.8 d	818 a-e
KC311	2.5 cd	801 a-f
Hyperformer 39	11.5 abc	793 a-g
Deltapine 5690	6.3 a-d	785 a-h
BS 44	6.3 a-d	780 a-i
Chembred 333	4.5 a-d	776 a-i
HS 46	2.5 cd	773 a-i
Deltapine 20	10.3 a-d	751 a-i
Terra 292	7.8 a-d	749 a-i
Chembred 1135	7.0 a-d	743 b-i
Hartz 1215	11.8 abc	740 b-i
Deltapine 90	4.8 a-d	739 b-i
Hartz 1244	3.8 bcd	731 b-i
Stoneville 453	8.8 a-d	729 b-i
Suregrow 125	12.5 ab	719 c-i

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Table 1. Yield and numbers of plants with foliar symptoms of Verticillium wilt. (Cont.)

Suregrow 404	11.8 abc	718 c-i
Chembred 1310	1.0 d	716 c-i
Chembred 830	7.3 a-d	713 c-i
Chembred 1233	3.5 bcd	710 c-i
Stoneville 132	11.5 abc	698 c-i
Stoneville 495	5.5 a-d	696 d-i
Terra 366	8.8 a-d	693 d-j
Stoneville 474	13.8 a	691 e-k
Hartz 1220	4.5 a-d	688 e-k
Terra 302	7.5 a-d	670 e-k
Suregrow 119	8.8 a-d	660 f-k
Deltapine 51	11.8 abc	658 f-k
Stoneville LA 887	2.5 cd	641 g-l
Stoneville 506	5.8 a-d	639 h-l
Hartz 1280	6.5 a-d	633 h-l
Suregrow 501	5.0 a-d	629 l-l
Deltapine 5415	8.5 a-d	540 j-m
Acala GC-510	1.3 d	538 klm
Acala Royale	11.3 abc	503 lm
Acala Maxxa	4.0 bcd	476 m

Mississippi - W. E. Batson, Jr. J. C. Caceres, Frank Killebrew and Art Smith - (Evaluation of cultivars for yield and disease reaction in the presence of Verticillium wilt). In 1995, forty cultivars were planted on a 61 acre site with a history of severe Verticillium wilt and poor yield near Walls, MS. Plots were four-rows by 126.5 feet (0.38A) arranged in a randomized complete block design with four replications. All plots received Ridomil PC and Temik infurrow at recommended rates to minimize the impact of seedling disease and early season insects. Standard production practices were followed throughout the season. Numbers of plants exhibiting foliar symptoms within four 50-ft sampling sites of each plot was determined at 60 days after planting. High temperatures inhibited further foliar symptoms development. Weight of seedcotton was obtained for each plot.

Fusarium Wilt Report

Texas - K. M. El-Zik and P. M. Thaxton. Resistance to the Fusarium wilt/root-knot nematode was evaluated in the 1995 Regional Test at Tallassee, Alabama. Of the 8 advanced MAR-7 strains tested, percentage of plants with wilt ranged from 35% for CUBQHGRPIS-1-92 to 78% for PD24BLPD9H-1-93. Two MAR strains had disease incidence similar to the resistant check M-315.

Alabama - W. S. Gazaway . Fusarium wilt in Alabama was confined to a few bottom land cotton fields situated along the Tallassee river in central Alabama. These fields are located within a few miles of the Tallassee experiment field where the National Fusarium Wilt Trials are conducted. Some fusarium wilt also occurs in a few fields near Selma, AL in Dallas county. Verticillium wilt which occurs throughout the Tennessee Valley in north Alabama was not a serious problem during the 1995 season. In 1994 outbreaks of this wilt, triggered by unusually cool nights, occurred sporadically throughout north Alabama.

Kathryn M. Glass and W. S. Gazaway (1995 Regional Cotton Fusarium Wilt Report). Cotton cultivars and elite breeding lines submitted by 20 cooperators were evaluated for fusarium wilt resistance under field conditions at the E. V. Smith Research Center, Plant Breeding Unit, Tallassee, Alabama. These entries were grown on an Independence loamy fine sand highly infested with both the fusarium wilt fungus (Fusarium oxysporum) Schlect. f. vasinfectum [Atk.] (Snyd. & Hans.) and root-knot nematodes (Meloidogyne incognita.).

Plots were 40-inch-wide rows, 20 feet in length, separated by 5-foot alleys. Four replications of the test entries and checks, arranged in a block design, were evaluated. Both susceptible (Rowden) and resistant (M-315) cultivars were included as checks. Auburn 56 was used as the resistant check in the Regional Fusarium Wilt Test for many years. However, M-315 is now being used as the resistant check, because it is the most consistently resistant cultivar available. Rowden was planted in row 5 and every tenth row thereafter (15, 25,...,265) and M-315 in row 10 and every tenth row thereafter (20, 30,...,270) throughout the test. Plots were planted May 22. Initial plant counts were made on June 16. Wilted plants were counted and removed on July 6, July 27, and August 15. The remaining live plants were counted and recorded on August 22. Percent wilted plants were then determined and mean wilting for a given entry calculated.

Average wilting of the susceptible Rowden was 89, 83, 93, and 93 percent for the four replications (90 percent average). Corresponding wilt percentages for the resistant check, M-315, were 4, 6, 8, and 9 percent (7 percent average). Critical evaluation of a given entry should be made relative to the checks closest to the entry within each replication. Evaluation of breeding process or evaluation of entries over years should be made only between the relative value of this entry and that of the closest susceptible check rows for each year.

A soil analysis for nematodes revealed that southern root-knot (Meloidogyne incognita) and lance (Hoplolaimus galeatus) are two predominant nematode species in the test plots. High populations of both species are found throughout the test area. Other nematode genera present are stubby root (Trichodorus sp.) and stunt (Tylenchorhynchus sp.). Root-knot nematodes, however, appear to be causing the major damage to cotton in the Fusarium Wilt Test as indicated by the high galling indices found on the roots of all cotton lines.

Entries submitted by Kathryn Glass are commonly grown cultivars or advanced commercial materials and are listed by name. Entries submitted by other cooperators are listed by their coded numbers. Additional information regarding the genetic background of a specific coded entry should be obtained from the named cooperator.

Information contained herein is available to all persons regardless of race, color, sex, or national origin.

1995 Fusarium Wilt Test
E. V. Smith Research Center, Tallassee, Alabama

Test entry Percent wilt by replication designation.

		1	2	3	4	Mean
1	Richard Sheetz, Paymaster Cottonseed, P.O. Box 8, Aiken, TX 79221					
001	1	43	51	41	71	51
002	2	59	36	19	69	46
003	3	87	49	53	86	69
004	4	8 5	29	37	20	
005	**ROWDEN**	85	74	95	64	79
006	5	2 4	10	14	8	
007	6	4 6	0	29	10	
008	7	2 3	16	22	11	
009	8	9 5	16	10	10	
010	**M-315**	0 0	3	2	1	
2	Laval M. Verhalen, Dept. of Agronomy, Oklahoma State University, Stillwater, OK 74078					
011	OKLA-1	16	9	10	0	9
012	OKLA-2	0 10	3	8	5	
013	OKLA-3	36	8	32	27	25
014	OKLA-4	23	14	35	52	31
015	**ROWDEN**	97	85	95	98	94
016	OKLA-5	3 7	14	21	11	
017	OKLA-6	2 13	12	75	25	
018	OKLA-7	10	4	13	59	21
019	OKLA-8	0 0	0	10	2	
020	**M-315**	0 8	12	3	6	
3	Fred Bourland, 115 Plant Science Bldg., Univ. of Arkansas, Fayetteville, AR 72701					
021	ARK-1	26	17	23	15	20
022	ARK-2	8 11	14	23	14	
023	ARK-3	34	19	65	12	32
024	ARK-4	46	46	74	16	46
025	**ROWDEN**	96	83	96	92	92
026	ARK-5	40	78	26	805	6
027	ARK-6	42	24	3	21	22
028	ARK-7	96	100	95	85	94
029	ARK-8	61	92	31	50	59
030	**M-315**	5 6	2	24	94	
4	O. Lloyd May, CPRU, P.O. Box 3039, Florence, SC 29502-3039					
031	1	53	95	60	73	70
032	2	78	94	38	33	61
033	3	56	95	62	31	61
034	4	43	51	22	26	35
035	**ROWDEN**	51	100	88	94	83
036	5	10	63	19	19	27
037	6	25	65	98	27	54
038	7	19	23	70	13	31
039	8	15	58	74	58	51
040	**M-315**	4	5	13	4	6
5	C. Wayne Smith, Dept. of Soil & Crop Sci., Texas A&M Univ., College Station, TX 77843-2474					
041	CWS-1	4	12	6	18	10
042	CWS-2	11	14	6	65	24
043	CWS-3	14	2	27	82	31
044	CWS-4	19	5	9	59	23
045	**ROWDEN**	91	82	92	93	89
046	CWS-5	100	91	94	100	96
047	CWS-6	6	6	6	23	10
048	CWS-7	94	71	96	91	88
049	CWS-8	51	50	33	34	42
050	**M-315**	3	3	2	12	5
6	Peggy Thaxton, Dept. of Soil & Crop Sci., Texas A&M Univ., College Station,TX 77843-2474					
051	MAR-1	60	33	25	47	41
052	MAR-2	35	48	72	37	48
053	MAR-3	24	55	70	65	54
054	MAR-4	65	73	48	79	66
055	**ROWDEN**	87	77	98	84	86
056	MAR-5	64	52	80	56	63
057	MAR-6	46	9	58	26	35
058	MAR-7	58	17	13	55	36
059	MAR-8	97	46	73	97	78
060	**M 315**	7	9	6	10	8
7	Michael Swindle, Jacob Hartz Seed Co., Inc., P.O. Box 946, Stuttgart, AR 72160					
061	1	83	15	6	50	39
062	2	90	4	11	62	42
063	3	65	51	43	94	63
064	4	53	25	100	85	66
065	**ROWDEN**	100	67	99	98	91
066	5	95	6	100	88	72
067	6	24	11	16	86	34
068	7	8	9	63	32	28
069	8	49	27	79	13	42
070	**M-315**	0	10	2	4	4
8	A.L. Germany, Stoneville Pedigreed Seed Co. Inc., Box 167, Stoneville, MS 38776					
071	ALG-1	28	96	27	63	53
072	ALG-2	3	36	1	5	11
073	ALG-3	79	67	100	67	78
074	ALG-4	81	91	100	84	89
075	**ROWDEN**	90	97	98	98	96
076	ALG-5	83	91	80	71	81
077	ALG-6	39	4	24	33	25
078	ALG-7	26	21	43	100	47
079	ALG-8	6	4	3	23	9
080	**M-315**	2	6	15	21	11
9	Donald M. Panter, Stoneville Pedigreed Seed Co., Inc., P.O. Box 167, Stoneville, MS 38776					
081	DMP-1	13	8	39	22	20
082	DMP-2	19	54	39	64	44
083	DMP-3	17	39	90	46	48
084	DMP-4	58	31	93	14	49
085	**ROWDEN**	91	90	97	91	92
086	DMP-5	39	97	33	67	59
087	DMP-6	66	10	39	25	35
088	DMP-7	55	100	50	23	57
089	DMP-8	71	86	18	41	54
090	**M-315**	5	11	4	20	10

10	Dr. Joel F. Mahill, Germain's Cotton Research, P.O. Box 80247, Bakersfield, CA 93380				
091	GC95-1 68	100	89	94	88
092	GC95-2 62	100	14	56	58
093	GC95-3 84	93	38	21	59
094	GC95-4 47	70	35	38	47
095	**ROWDEN** 96	100	93	94	96
096	GC95-5 31	65	47	58	50
097	GC95-6 52	51	100	30	58
098	GC95-7 13	9	68	12	25
099	GC95-8 6	18	10	38	18
100	**M-315** 2	0	5	6	3
11	R.R. Bridge, Suregrow Research, P.O. Box 312, Leland, MS 38756				
101	SG-1 .....6 13	93	19	33	
102	SG-2 .....4 3	36	62	26	
103	SG-3 46	96	55	100	74
104	SG-4 33	6	12	31	21
105	**ROWDEN** 97	96	88	88	92
106	SG-5 .....9 12	37	24	20	
107	SG-6 33	60	86	38	54
108	SG-7 72	67	100	49	72
109	SG-8 .....7 39	41	13	25	
110	**M-315** 18	2	2	20	10
12	Shelby H. Baker, Univ. of Georgia, Coastal Plain Station, P.O. Box 748, Tifton, GA 31793				
111	GA-1 16	18	86	4	31
112	GA-2 34	19	89	10	38
113	GA-3 43	30	89	71	58
114	GA-4 65	21	63	55	51
115	**ROWDEN** 100	41	100	91	83
116	GA-5 100	35	100	71	76
117	GA-6 39	33	98	82	63
118	GA-7 88	21	60	89	64
119	GA-8 97	13	65	100	69
120	**M-315** 3	8	7	23	10
13	Bill Fagala, Terra International Inc., P.O. Box 171376, Memphis, TN 38187				
121	1 99	23	19	55	49
122	2 90	6	4	84	46
123	3 100	19	8	0	32
124	4 100	72	90	93	89
125	**ROWDEN** 100	93	98	100	98
126	5 72	9	67	21	42
127	6 28	19	23	39	27
128	7 14	10	24	22	17
129	8 15	6	64	11	24
130	**M-315** 4	4	3	0	3
14	Freddie M. Miller, Terra International, Inc., P.O. Box 171376, Memphis, TN 38187				
131	1 19	17	25	47	27
132	2 15	74	74	40	51
133	3 31	19	92	15	39
134	4 38	19	26	18	25
135	**ROWDEN** 87	93	92	99	93
136	5 43	48	12	25	32
137	6 85	28	37	77	56
138	7 20	81	16	75	48
139	8 13	50	17	53	33
140	**M-315** 0	5	14	3	5
15	Cindy Green, Delta and Pine Land Co., P.O. Box 1529, Hartsville, SC 29550				
141	1 33	24	80	33	43
142	2 40	30	43	64	44
143	3 21	11	63	14	27
144	4 33	25	76	10	36
145	**ROWDEN** 90	98	100	97	96
146	5 86	94	84	94	90
147	6 16	69	51	57	48
148	7 42	93	83	71	72
149	8 62	92	61	90	76
150	**M-315** 5	11	13	8	9
16	John Green, Seed Source Inc., P.O. Box 28, Stoneville, MS 38776				
151	SS 9501 63	99	55	78	74
152	SS 9502 23	56	28	84	48
153	SS 9503 32	69	80	87	67
154	SS 9504 6	33	65	34	35
155	**ROWDEN** 96	97	89	100	97
156	SS 9505 8	32	36	61	34
157	SS 9506 18	12	79	28	34
158	SS 9507 72	17	97	45	58
159	SS 9508 14	37	14	84	37
160	**M-315** 0	0	2	5	2
17	W. P. Sappenfield, 115 Mango Cove, Leesburg, FL 34748				
161	AZ-1 18	40	46	81	46
162	AZ-2 8	19	0	24	13
163	AZ-3 12	84	15	86	49
164	AZ-4 68	12	38	75	48
165	**ROWDEN** 80	94	65	97	84
166	AZ-5 20	20	43	28	28
167	AZ-6 17	23	39	11	22
168	AZ-7 11	16	38	13	20
169	AZ-8 37	56	41	54	47
170	**M-315** 0	0	2	2	1
18	Joseph Vasek, Chembred Inc., P.O. Box 1050, Maricopa, AZ 85239-1050				
171	CBX 456 1	13	18	14	12
172	CBX 457 23	0	39	8	17
173	CBX 458 0	11	14	40	16
174	CBX 620 22	32	11	59	31
175	**ROWDEN** 87	72	100	90	87
176	CBX 466 89	22	89	54	63
177	CBX 477 28	11	39	14	23
178	471342 10	8	5	15	9
179	341342 26	3	16	22	17
180	**M-315** 8	15	11	0	9
19	Doug Wessel, Delta and Pine Land Co., 1305 N VIP Blvd., Casa Grande, AZ 85222				
181	DW-1 99	87	100	60	86
182	DW-2 90	9	88	54	60
183	DW-3 15	19	31	35	25
184	DW-4 88	15	94	23	55
185	**ROWDEN** 100	72	100	88	90
186	DW-5 40	11	100	46	49
187	DW-6 57	27	32	63	45
188	DW-7 5	5	16	27	13
189	DW-8 5	11	52	36	35
190	**M-315** 3	4	4	12	6
20	Kathryn M. Glass, Dept. of Agronomy and Soils, Auburn University, Auburn University, AL 36849-5412				
191	Hy Performer HS 44 15	16	6	65	26
192	Hy Performer HS 46 7	44	57	35	36
193	Deltapine DP 5409 30	11	100	25	41
194	Deltapine DPX 0227 ..10	33	81	78	51
195	**ROWDEN** 66	76	93	100	84
196	Terra 302 4	64	31	74	44
197	Terra 366 46	10	46	81	46
198	Suregrow 125 23	48	33	88	48
199	Suregrow 404 12	0	6	83	25
200	**M-315** 2	3	43	22	17
201	Hartz H 1277 10	9	28	52	25
202	Hartz H 1560 3	15	17	35	17
203	Stoneville 474 46	20	86	71	56
204	Stoneville 495 20	7	53	82	41
205	**ROWDEN** 71	47	80	100	75
206	Chembred CB 1233 19	34	17	78	37
207	Chembred CB 232 2	30	22	44	25
208	UAP X 001 49	59	84	57	63
209	UAP X 003 19	66	61	75	55
210	**M-315** 5	10	2	0	4