

2002
National
Cotton
Fusarium
Wilt
Report



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AUBURN, AL 36849

THIS REPORT IS A JOINT CONTRIBUTION BETWEEN
USDA-ARS, CROP SCIENCE RESEARCH LABORATORY, MISSISSIPPI STATE UNIVERSITY, MISSISSIPPI, AND
THE ALABAMA AGRICULTURAL EXPERIMENT STATION, AUBURN UNIVERSITY, ALABAMA

2002 NATIONAL COTTON FUSARIUM WILT REPORT

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Cotton cultivars and elite breeding lines submitted by 24 cooperators were evaluated for Fusarium wilt resistance under field conditions at the E. V. Smith Research Center, Plant Breeding Unit, Tallahassee, Alabama. These entries were grown on an Independence loamy fine sand highly infested with the Fusarium wilt fungus (*Fusarium oxysporum*) Schlect. f. *vasinfectum* [Atk.] (Snyd. & Hans.) and southern root-knot nematodes (*Meloidogyne incognita*).

In 1994, a soil analysis for nematodes revealed that southern root-knot (*Meloidogyne incognita*) and lance (*Hoplolaimus galeatus*) are the 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 were planted in single 20-foot rows on 40-inch centers, separated by 5-foot alleys. Four replications of the test entries and checks were evaluated in a randomized complete block design with a split plot restriction on randomization. The set of eight test cultivars submitted by a cooperator was always evaluated as a group together with two control plots within each replicate. Both susceptible (Rowden) and resistant (M-315) cultivars were included as check subplots in the two center rows of each main plot (Fig. 1).

Plots were planted May 22. Initial plant counts were made on June 20. Wilted plants were counted and removed on July 10, July 31, August 20, and September 3. The remaining live plants were counted and recorded on September 24. Total percent wilted plants were then determined and mean wilting for a given entry calculated.

The average % wilted plants for the susceptible check **Rowden** was 52%, with a range from 6 to 100% on an individual plot basis (Fig. 1). The resistant check **M-315** had, on the average, 1% wilted plants with a range from 0 to 12% on an individual plot basis. There were, on the average, 52x more wilted plants in **Rowden** plots than in **M-315** plots. **Critical evaluations of breeding lines should be made relative to the two checks listed at the bottom of each group.**

For the first time in the history of this test we also present least squares means. The data were subjected to a two-dimensional nearest neighbor adjustment, which was highly significant ($P < 0.001$). Least squares entry means and associated probabilities that the mean is different from 0 are given in the two right-hand columns.

Fig. 1. Field plot layout and % wilt for control plot of Rowden (susceptible) and M-315 (resistant). Distances (ft) from the NE corner of the trial are given in the left hand column and the bottom row.

N-S		14	0	53	0	6	0				
400		Rowden	M-315	Rowden	M-315	Rowden	M-315				
	375	35	0	11	2	32	1	28	0	89	2
	350	20	0	60	1	17	4	14	3	69	7
	325	10	1	43	0	55	0	29	1	82	0
	300	23	1	56	0	59	0	31	0	84	1
	275	45	4	39	0	32	0	32	0	99	1
	250	66	3	9	0	62	0	15	0	56	6
	225	66	0	21	1	87	1	31	0	88	3
	200	63	0	28	37	0	74	0	63	3	75
	175	70	3	44	1	11	0	73	0	53	3
	150	76	0	68	0	19	1	97	0	58	0
	125	80	3	68	1	20	1	67	0	19	0
	100	92	12	77	1	48	12	56	0	32	0
	75	100	0	84	0	58	5	84	2	49	0
	50	100	4	76	3	30	2	63	0	43	0
	25	86	6	61	0	56	1	51	0	22	0
0		76	1	49	1	23	0	77	0	44	0
E-W		27		60		93		127		160	

8 ROWS 8 ROWS 8 ROWS 8 ROWS 8 ROWS

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2002 Fusarium Wilt Test, Plant Breeding Unit, EVSRC, Tallassee, AL

Entry	Cultivar/Line	Percent wilt per replicate				Avg.	LS Mean	P-value
		Rep1	Rep2	Rep3	Rep4			
C. Wayne Smith, Texas A&M University, 2474 TAMUS, College Station, TX 77843-2474								
101	CWS1	14	0	0	1	4	1	0.744
102	CWS2	100	74	23	12	52	51	<.0001
103	CWS3	42	51	58	59	53	50	<.0001
104	CWS4	10	4	47	1	15	6	0.114
105	CWS5	13	9	6	0	7	16	<.0001
Paul Fox, Stoneville Pedigreed Seed, 7622 Moore Rd, Memphis, TN 38120								
106	PF1	66	24	76	0	42	37	<.0001
Al Balducchi, Stoneville Pedigreed Seed, 7622 Moore Rd, Memphis, TN 38120								
107	AB1	17	11	8	0	9	15	0.000
108	AB2	20	8	81	5	28	26	<.0001
	Rowden	86	48	75	59	67	70	<.0001
	M-315	6	12	0	0	4	7	0.064
Luther Bird, G & P Seed Co., 729 Shady Lane, Bryan, TX 77802								
201	LB_1	10	14	29	6	15	13	0.001
202	LB_2	7	15	11	12	11	12	0.004
203	LB_3	9	9	7	41	17	17	<.0001
204	LB_4	0	0	3	6	2	3	0.403
205	LB_5	0	8	0	6	4	5	0.243
206	LB_6	5	0	15	28	12	12	0.003
207	LB_7	11	3	20	16	13	12	0.002
208	LB_8	5	0	6	4	4	5	0.216
	Rowden	43	56	23	43	41	40	<.0001
	M-315	0	0	1	0	0	1	0.774
Fred Bourland, University of Arkansas, P.O. Box 48, Keiser, AR 72351								
301	FB-1	4	0	1	1	2	1	0.781
302	FB-2	4	6	1	1	3	2	0.670
303	FB-3	25	48	21	6	25	27	<.0001
304	FB-4	12	21	8	10	13	12	0.003
305	FB-5	28	66	34	7	34	33	<.0001
306	FB-6	3	78	31	11	31	26	<.0001
307	FB-7	0	13	5	8	7	10	0.008
308	FB-8	3	71	1	5	20	18	<.0001
	Rowden	56	70	32	11	42	43	<.0001
	M-315	1	3	0	2	2	4	0.293

continued

2002 Fusarium Wilt Test, Plant Breeding Unit, EVSRC, Tallassee, AL

Entry	Cultivar/Line	Percent wilt per replicate				Avg.	LS Mean	P-value
		Rep1	Rep2	Rep3	Rep4			
Don Keim, Delta and Pine Land Co., P.O. Box 157, Scott, MS 38772								
401	LMS001	3	1	1	21	6	5	0.176
402	LMS002	2	0	0	2	1	1	0.820
403	LMS003	49	0	7	3	15	15	0.000
404	LMS004	0	2	1	1	1	2	0.692
405	LMS005	0	0	4	3	2	3	0.504
406	LMS006	3	8	8	5	6	7	0.097
407	LMS007	21	8	4	2	9	8	0.044
Kathryn M. Glass, Dept. of Agronomy & Soils, Auburn University, AL 36849-5412								
408	Fiber Max FM 991R	0	5	1	2	2	6	0.121
	Rowden	58	11	15	6	22	22	<.0001
	M-315	5	0	0	0	1	1	0.729
Frank Bordelon, PhytoGen Cottonseed, P.O. Box 27, Leland, MS 38756								
501	PHY-FB1	7	1	0	7	4	7	0.065
502	PHY-FB2	16	54	2	16	22	22	<.0001
503	PHY-FB3	20	23	5	1	12	14	0.001
504	PHY-FB4	4	9	0	4	5	0	0.970
505	PHY-FB5	0	2	0	0	1	4	0.334
506	PHY-FB6	11	97	15	27	37	36	<.0001
507	PHY-FB7	2	0	0	4	2	2	0.598
508	PHY-FB8	6	28	0	0	8	3	0.429
	Rowden	84	63	63	14	56	55	<.0001
	M-315	2	0	3	3	2	2	0.592
Randall McPherson, PhytoGen Cottonseed, P.O. Box 27, Leland, MS 38756								
601	PHY-RM1	0	3	9	5	4	5	0.202
602	PHY-RM2	0	0	3	2	1	4	0.295
603	PHY-RM3	10	3	0	1	4	5	0.241
604	PHY-RM4	2	0	2	2	1	2	0.623
605	PHY-RM5	3	0	3	4	2	-1	0.859
606	PHY-RM6	4	4	3	30	10	11	0.006
607	PHY-RM7	6	0	2	0	2	3	0.453
608	PHY-RM8	7	0	3	17	7	7	0.061
	Rowden	84	28	9	82	51	50	<.0001
	M-315	0	0	0	0	0	0	0.949

continued

2002 Fusarium Wilt Test, Plant Breeding Unit, EVSRC, Tallassee, AL

Entry	Cultivar/Line	Percent wilt per replicate				Avg.	LS Mean	P-value
		Rep1	Rep2	Rep3	Rep4			
Gary L. Rea, Delta and Pine Land Co., 247 US HWY 380 W, Haskell, TX 79521								
701	GLR 1	9	4	1	0	3	7	0.074
702	GLR 2	0	0	1	0	0	1	0.712
703	GLR 3	1	0	0	1	1	2	0.563
704	GLR 4	7	0	0	0	2	0	0.957
705	GLR 5	37	0	3	1	10	7	0.087
706	GLR 6	65	11	4	4	21	20	<.0001
707	GLR 7	1	0	0	1	1	2	0.581
Kathryn M. Glass, Dept. of Agronomy & Soils, Auburn University, AL 36849-5412								
708	Deltapine DP 436RR	15	2	1	0	4	3	0.448
	Rowden	76	58	32	14	45	46	<.0001
	M-315	1	0	0	0	0	0	0.960
Peggy Thaxton, Texas A&M University, Soil & Crop Sciences, College Station, TX 77843-2474								
801	PMT-1	26	2	14	21	16	19	<.0001
802	PMT-2	88	0	66	3	39	35	<.0001
803	PMT-3	98	0	62	2	40	36	<.0001
804	PMT-4	99	13	14	5	32	31	<.0001
805	PMT-5	97	3	42	3	37	29	<.0001
806	PMT-6	95	23	78	14	52	55	<.0001
807	PMT-7	9	7	17	3	9	12	0.002
808	PMT-8	84	46	11	1	36	35	<.0001
	Rowden	92	19	56	53	55	51	<.0001
	M-315	12	0	0	0	3	9	0.023
John Green, Seed Source, Inc., P.O. Box 28, Stoneville, MS 38776								
901	SSI-1	14	23	8	6	13	16	<.0001
902	SSI-2	6	22	8	97	33	33	<.0001
903	SSI-3	0	0	29	27	14	7	0.069
904	SSI-4	0	0	26	41	17	19	<.0001
905	SSI-5	12	15	9	6	11	12	0.002
906	SSI-6	4	0	20	9	8	6	0.131
907	SSI-7	11	1	1	4	4	8	0.040
908	SSI-8	4	6	46	14	18	17	<.0001
	Rowden	23	97	56	89	66	65	<.0001
	M-315	0	0	6	2	2	2	0.530

continued

2002 Fusarium Wilt Test, Plant Breeding Unit, EVSRC, Tallassee, AL

Entry	Cultivar/Line	Percent wilt per replicate				Avg.	LS Mean	P-value
		Rep1	Rep2	Rep3	Rep4			
Richard Sheetz, Delta and Pine Land Co., RR 2, Box 60, Hale Center, TX 79041								
1001	RS-1	1	0	5	2	2	1	0.713
1002	RS-2	0	1	0	0	0	2	0.603
1003	RS-3	0	0	0	0	0	0	0.934
1004	RS-4	0	0	2	0	0	3	0.462
1005	RS-6	0	0	2	0	1	-1	0.778
1006	RS-7	1	5	3	3	3	4	0.318
1007	RS-8	4	1	1	1	2	2	0.554
Kathryn M. Glass, Dept. of Agronomy & Soils, Auburn University, AL 36849-5412								
1008	Deltapine DP 451 B/RR	1	1	2	2	2	2	0.630
	Rowden	44	67	45	29	46	46	<.0001
	M-315	0	0	4	1	1	1	0.792
Curtis Williams, Delta and Pine Land Co., 381 William Gibbs Rd, Tifton, GA 31794								
1101	CW_1	14	4	0	2	5	6	0.144
1102	CW_2	34	7	4	7	13	10	0.010
1103	CW_3	1	1	1	7	3	5	0.181
1104	CW_4	8	8	7	0	6	6	0.128
1105	CW_5	37	3	4	2	11	11	0.005
1106	CW_6	21	9	5	0	9	7	0.078
1107	CW_7	3	2	9	0	4	5	0.167
Kathryn M. Glass, Dept. of Agronomy & Soils, Auburn University, AL 36849-5412								
1108	Sure Grow 521 R	5	13	18	6	10	10	0.009
	Rowden	49	68	66	10	48	48	<.0001
	M-315	1	0	3	1	1	1	0.799
O. Lloyd May, University of Georgia, P.O. Box 748, Tifton, GA 31793-0748								
1201	GA96-211	8	6	1	1	4	4	0.320
1202	GA98028	3	23	18	0	11	10	0.009
1203	GA98033	13	3	1	4	5	4	0.341
1204	GA98066	24	6	26	4	15	16	<.0001
1205	GA98079	16	5	3	1	6	6	0.161
1206	GA98084	16	13	15	11	14	15	0.000
1207	GA98091	8	7	7	10	8	9	0.025
1208	GA99029	5	2	3	6	4	5	0.229
	Rowden	63	44	87	32	57	58	<.0001
	M-315	0	1	1	1	1	1	0.880

continued

2002 Fusarium Wilt Test, Plant Breeding Unit, EVSRC, Tallassee, AL

Entry	Cultivar/Line	Percent wilt per replicate				Avg.	LS Mean	P-value
		Rep1	Rep2	Rep3	Rep4			
Jack E. Jones, Jajo Genetics, 246 Maxine Dr., Baton Rouge, LA 70808-6831								
1301	Jajo 1	59	0	19	0	19	20	<.0001
1302	Jajo 2	23	10	4	0	9	16	<.0001
1303	Jajo 3	59	3	14	3	20	26	<.0001
1304	Jajo 4	98	2	79	5	46	41	<.0001
1305	Jajo 5	11	3	3	3	5	4	0.350
1306	Jajo 6	7	2	0	4	3	3	0.423
1307	Jajo 7	81	0	20	0	25	21	<.0001
1308	Jajo 8	45	1	5	4	14	7	0.059
	Rowden	100	53	39	28	55	53	<.0001
	M-315	0	3	0	0	1	3	0.400
Dawn Fraser, Delta and Pine Land Co., P.O. Box 1529, Hartsville, SC 29550								
1401	DF_1	77	36	32	6	38	35	<.0001
1402	DF_2	3	16	0	4	6	6	0.111
1403	DF_3	2	0	36	1	10	10	0.009
1404	DF_4	1	3	7	1	3	6	0.112
1405	DF_5	13	18	2	3	9	7	0.076
1406	DF_6	2	23	14	0	10	8	0.033
1407	DF_7	3	3	0	5	3	3	0.432
Kathryn M. Glass, Dept. of Agronomy & Soils, Auburn University, AL 36849-5412								
1408	Deltapine Delta Pearl	14	4	1	18	10	9	0.031
	Rowden	49	19	62	20	37	37	<.0001
	M-315	0	1	0	0	0	3	0.503
Doug Wessel, Delta and Pine Land Co., 38768 W. Farrell Rd, Maricopa, AZ 85239								
1501	DW-1	0	4	0	5	2	2	0.545
1502	DW-2	0	1	0	1	1	0	0.932
1503	DW-3	0	4	6	6	4	6	0.151
1504	DW-4	0	8	16	59	21	20	<.0001
1505	DW-5	5	6	6	25	10	7	0.080
1506	DW-6	17	23	25	75	35	39	<.0001
1507	DW-7	0	0	6	14	5	5	0.176
Kathryn M. Glass, Dept. of Agronomy & Soils, Auburn University, AL 36849-5412								
1508	Stoneville ST 5599BR	1	2	1	17	5	4	0.282
	Rowden	22	73	74	69	59	60	<.0001
	M-315	0	0	0	7	2	3	0.434

continued

2002 Fusarium Wilt Test, Plant Breeding Unit, EVSRC, Tallassee, AL

Entry	Cultivar/Line	Percent wilt per replicate				Avg.	LS Mean	P-value
		Rep1	Rep2	Rep3	Rep4			
Jeff Klingenberg, Aventis Cotton Seed Inter, 117 Kennedy Flat Road, Leland, MS 38756								
1601	ACSI-JK-1	42	33	1	13	22	18	<.0001
1602	ACSI-JK-2	56	24	4	3	21	27	<.0001
1603	ACSI-JK-3	56	50	0	8	28	28	<.0001
1604	ACSI-JK-4	19	26	14	7	17	21	<.0001
1605	ACSI-JK-5	9	68	0	33	28	29	<.0001
1606	ACSI-JK-6	27	7	3	6	11	12	0.003
1607	ACSI-JK-7	41	4	2	2	12	9	0.017
1608	ACSI-JK-8	68	30	6	0	26	25	<.0001
	Rowden	76	77	31	17	50	52	<.0001
	M-315	3	1	0	4	2	7	0.073
Jeff Gwyn, Aventis Cotton Seed Inter, 117 Kennedy Flat Road, Leland, MS 38756								
1701	ACSI-JJG-1	56	11	43	24	34	26	<.0001
1702	ACSI-JJG-2	4	23	100	10	34	28	<.0001
1703	ACSI-JJG-3	44	3	97	3	37	28	<.0001
1704	ACSI-JJG-4	100	20	13	20	38	45	<.0001
1705	ACSI-JJG-5	95	2	8	3	27	28	<.0001
1706	ACSI-JJG-6	63	16	61	5	36	29	<.0001
1707	ACSI-JJG-7	38	4	3	7	13	23	<.0001
1708	ACSI-JJG-8	97	15	1	5	30	29	<.0001
	Rowden	100	20	88	60	67	68	<.0001
	M-315	4	1	3	1	2	4	0.308
Forest Robinson, USDA-ARS, 2765 F&B Road, College Station, TX 77845								
1801	FR-1	10	17	0	7	9	7	0.067
1802	FR-2	0	9	4	8	5	6	0.146
1803	FR-3	30	5	13	7	13	14	<.0001
1804	FR-4	5	2	11	7	6	4	0.295
Al Balducchi, Stoneville Pedigreed Seed, 7622 Moore Rd, Memphis, TN 38120								
1805	AB3	0	7	37	24	17	17	<.0001
1806	AB4	3	1	2	0	2	1	0.827
1807	AB5	0	0	0	9	2	3	0.475
1808	AB6	0	0	4	12	4	6	0.114
	Rowden	77	68	37	55	59	59	<.0001
	M-315	0	1	0	0	0	1	0.795

continued

2002 Fusarium Wilt Test, Plant Breeding Unit, EVSRC, Tallassee, AL

Entry	Cultivar/Line	Percent wilt per replicate				Avg.	LS Mean	P-value
		Rep1	Rep2	Rep3	Rep4			
Kim Palmer, Stoneville Pedigreed Seed, 4852 Old Leland Rd, Leland, MS 38776								
1901	KP1	27	30	3	1	15	15	<.0001
1902	KP2	15	16	7	0	9	14	<.0001
1903	KP3	15	4	0	19	9	8	0.036
1904	KP4	24	17	22	61	31	27	<.0001
Randy Wood, Stoneville Pedigreed Seed, P.O. Box 569, Maricopa, AZ 85239								
1905	RW1	28	26	27	23	26	22	<.0001
1906	RW2	8	8	8	7	8	13	0.001
1907	RW3	0	49	11	7	17	18	<.0001
1908	RW4	13	60	14	97	46	40	<.0001
	Rowden	61	76	21	84	60	60	<.0001
	M-315	0	0	1	1	1	4	0.312
Lloyd McCall, Stoneville Pedigreed Seed, 7622 Moore Rd, Memphis, TN 38120								
2001	LM1	0	0	13	0	3	1	0.793
2002	LM2	0	2	2	3	2	9	0.025
2003	LM3	5	2	72	4	21	17	<.0001
2004	LM4	16	2	94	2	29	25	<.0001
Mark Barfield, Stoneville Pedigreed Seed, 2409 Commerce Lane, Albany, GA 31707								
2005	MB1	25	2	66	2	24	21	<.0001
2006	MB2	3	3	1	2	2	6	0.117
2007	MB3	1	0	1	2	1	5	0.226
2008	MB4	4	4	6	1	4	5	0.182
	Rowden	51	32	99	35	54	51	<.0001
	M-315	0	0	1	0	0	0	0.931
Mike Robinson, Stoneville Pedigreed Seed, 4852 Old Leland Rd, Leland, MS 38776								
2101	MR1	65	61	0	5	33	32	<.0001
2102	MR2	1	40	13	1	14	13	0.001
2103	MR3	17	99	1	10	32	34	<.0001
2104	MR4	27	67	23	0	29	25	<.0001
Steve Calhoun, Stoneville Pedigreed Seed, Rt. 2, Box 233, Hwy 82 East, Idalou, TX 79239								
2105	SC1	5	31	21	0	14	18	<.0001
2106	SC2	2	36	0	3	10	5	0.248
2107	SC3	2	32	1	0	9	9	0.017
2108	SC4	25	87	3	1	29	26	<.0001
	Rowden	30	80	66	31	52	54	<.0001
	M-315	2	3	0	0	1	4	0.281