Verticillium Wilt Variety Trials for 2021

By Terry Wheeler[1] and Cecilia Monclova-Santana2

[1]Texas A&M AgriLife Research, Lubbock

[2]Texas A&M AgriLife Extension Service, Lubbock

Plainview: The trial was planted on 21 May. The plots were 2 rows wide (40-inch centers) and 35 feet long. There were 36 cultivars in the trial, each replicated four times. The field was irrigated with a center pivot system. Verticillium wilt symptoms developed early in this site and were advanced by the 11th of August when wilt incidence ratings were made. All subsequent ratings were for % defoliation. The ratings from 9 September are presented in Table 1. The plots were harvested on 11 November. Value/acre was calculated by multiplying the loan value x lint yield. Micronaire was a problem for some varieties (Table 2) which lowered their loan values substantially. The order of cultivars presented in Table 1 is by value/acre. To recommend a variety, it should be in the "**A**" group (represented in bold) for wilt incidence, defoliation, yield, and value/acre. FM 2334GLT and DP 2123 B3XF both met all four criteria. FM 2202GL was among the best in terms of low wilt incidence, high yield, and high value/acre, but had slightly higher defoliation than the "A" group. However, it has yielded well in both 2020 and 2021 and appears to have good tolerance to Verticillium wilt, even though it defoliates more than FM 2334GLT.

Ropesville: The trial was planted on 22 May. The plots were 2 rows wide (40-inch centers) and 35 feet long. There were 40 cultivars in the trial, each replicated four times. The field was irrigated with subsurface drip tape under every bed. Root-knot nematode was also present at this site. Verticillium wilt was slow to develop at this site, and wilt incidence presented in Table 3 is from 1 September. Defoliation ratings were made on 22 September. The test was harvested on 16 November. Micronaire was a problem for some varieties (Table 4) which lowered their loan values substantially. The order of cultivars presented in Table 3 is by value/acre. No variety met the criteria for being in the "A" group for wilt, defoliation, yield, and value/acre (see bolded values). The cultivars with the highest yield and value/acre were: FM 2498GLT, ST 4993B3XF, PX4B08W3FE (breeding line from Phytogen), and ST 5091B3XF. Only one of these are root-knot nematode resistant (PX4B08W3FE), so from a disease standpoint, it is difficult to relate disease resistance (either to Verticillium wilt or root-knot nematode) with higher yields.

ACKNOWLEDGEMENTS: The funding for this work was provided by the Texas Cotton State Support Committee.

Table 1. Effect of Verticillium wilt on cultivars in a trial near Plainview, TX.

Variety	Plants /ft row	% Wilt 8/11	% Defol-iation 9/9	Lint Yield (lbs/a)	Value $/a	Loan Value $/lb	Turn Out %
DP 1822 XF	2.74	43.8	46.9	**1,172**	**672.49**	0.5738	27.66
FM 2202GL	2.19	**33.6**	36.2	**1,199**	**666.18**	0.5558	32.27
FM 2334GLT	2.69	**21.7**	**16.7**	**1,143**	**659.37**	0.5770	29.36
DP 2123 B3XF	3.05	**34.5**	**25.9**	**1,131**	**633.84**	0.5603	26.26
DP 2012 B3XF	2.95	**33.3**	43.2	1,065	**607.50**	0.5705	29.55
DP 1820 B3XF	2.08	42.3	38.3	1,050	**606.40**	0.5778	30.24
PHY 205 W3FE	3.04	36.4	37.9	1,093	587.49	0.5375	29.14
DP 2022 B3XF	2.45	49.9	**17.8**	1,060	537.95	0.5075	26.95
FM 1621GL	2.28	40.4	46.9	938	536.67	0.5723	30.60
FM 2398GLTP	2.19	53.0	49.4	943	533.08	0.5653	30.67
PHY 350 W3FE	2.79	**30.5**	44.4	1,066	529.55	0.4970	28.98
PX3E33W3FE	2.91	**31.9**	50.0	944	527.56	0.5590	26.06
DP 2020 B3XF	2.80	42.7	52.3	935	525.47	0.5620	28.80
AR 9371 B3XF	2.61	46.4	59.6	926	519.49	0.5610	29.54
NG 3500 XF	1.45	61.8	34.2	1,034	518.91	0.5018	29.25
PHY 250 W3FE	2.38	38.1	39.4	987	513.65	0.5205	26.59
NG 3195 B3XF	2.44	**35.2**	56.5	889	504.63	0.5678	28.39
AR20XT9B3XF	3.20	**34.2**	50.2	887	499.06	0.5628	31.22
FM 1730GLTP	2.37	46.4	33.8	973	498.83	0.5128	27.25
BX2296B3XF	2.17	37.5	**29.4**	861	486.01	0.5648	32.31
NG 3930 B3XF	2.66	**25.1**	39.4	1,004	477.52	0.4755	26.37
PHY 210 W3FE	3.18	40.5	44.6	960	470.09	0.4898	28.82
ST 5091 B3XF	2.40	38.8	64.2	871	465.77	0.5350	30.03
AR21XW2XF	2.26	**24.2**	57.0	892	455.81	0.5110	27.71
NG 3956 B3XF	2.76	**29.4**	45.4	883	455.42	0.5160	26.12
DP 1909 XF	2.06	50.7	38.6	826	429.31	0.5200	26.01
BX2295B3XF	2.35	47.4	37.3	762	428.02	0.5620	29.41
ST 4480B3XF	2.58	46.6	48.6	827	426.15	0.5153	25.80
DP 2115 B3XF	2.43	43.1	41.1	723	394.97	0.5463	28.77
BX2298B3XF	2.33	45.4	62.4	728	383.15	0.5263	30.20
DP 1612 B2XF	2.76	51.5	66.7	723	381.34	0.5278	26.17
ST 4990B3XF	2.61	**32.6**	67.8	659	361.06	0.5483	27.01
AMX20B037B3XF	1.84	56.1	67.2	624	339.50	0.5445	26.06
ST 4993B3XF	2.01	49.1	63.7	632	330.35	0.5225	28.67
NG 2982 B3XF	2.45	42.1	57.8	775	311.01	0.4013	27.61
BX2297B3XF	2.13	44.1	69.1	476	242.78	0.5103	25.59
Prob>F	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.013
MSD (0.05)	0.33	13.5	15.1	131	70.84	0.0471	

Table 2. Fiber properties for cultivars in a Verticillium wilt trial near Plainview, TX

Variety	Mic.	Length	Unif.	Strength	Elon.	Rd	+b	Leaf	Color
AMX20B037B3XF	3.41	1.16	81.95	32.15	6.1	82.5	7.8	1.5	11-2, 21-2
AR20XT9B3XF	3.73	1.12	79.40	29.10	7.0	83.1	8.0	1.0	11-1, 21-1
AR21XW2XF	3.32	1.17	80.60	30.00	7.8	81.5	7.2	4.0	21-2, 31-1
AR 9371 B3XF	3.69	1.10	81.00	26.65	6.4	83.2	7.7	2.0	11-2, 21-1
BX2295B3XF	3.55	1.13	79.70	27.75	6.8	82.0	7.7	3.0	21-1, 21-2
BX2296B3XF	4.35	1.11	80.30	27.60	6.6	82.7	8.1	1.0	11-2, 21-1
BX2297B3XF	3.58	1.07	79.85	25.20	6.6	81.2	8.1	2.5	21-1, 21-2
BX2298B3XF	3.76	1.05	79.70	26.30	6.5	82.1	8.0	2.0	11-2, 21-1
DP 1612 B2XF	3.29	1.12	80.70	28.70	6.8	81.2	7.7	2.5	21-1, 31-1
DP 1820 B3XF	3.87	1.16	80.50	31.00	5.9	82.9	7.5	2.0	21-1
DP 1822 XF	3.70	1.15	81.00	31.20	6.2	82.7	7.6	2.0	11-2, 21-2
DP 1909 XF	3.24	1.18	81.70	31.05	6.0	84.3	6.7	3.0	21-1, 21-2
DP 2012 B3XF	3.53	1.14	80.90	28.45	6.0	82.8	8.0	2.5	11-1, 21-1
DP 2020 B3XF	3.56	1.12	79.50	27.70	6.0	83.1	7.7	1.5	11-2, 21-1
DP 2022 B3XF	3.39	1.09	78.95	27.15	6.0	81.9	6.7	3.5	31-1
DP 2115 B3XF	3.57	1.09	79.45	27.55	7.1	81.6	7.7	3.5	21-1, 21-2
DP 2123 B3XF	3.61	1.13	79.55	29.10	5.8	81.7	7.6	3.5	21-1, 31-1
FM 1621GL	3.58	1.14	82.10	29.90	5.6	81.5	7.4	4.0	21-2
FM 1730GLTP	3.20	1.19	82.45	32.95	5.8	82.8	7.1	3.5	21-1, 21-2
FM 2202GL	3.74	1.10	80.60	31.90	6.6	81.0	8.0	3.5	21-1
FM 2334GLT	3.76	1.19	81.20	30.40	6.0	83.2	7.4	2.0	21-1
FM 2398GLTP	3.50	1.11	80.60	28.80	6.3	81.7	7.6	2.5	21-1, 31-1
NG 2982 B3XF	2.66	1.08	80.45	29.35	6.4	78.2	6.8	6.0	41-1
NG 3195 B3XF	3.87	1.13	81.00	27.90	5.9	81.1	7.3	3.0	11-2, 31-2
NG 3500 XF	3.27	1.10	80.60	30.50	7.2	80.5	8.3	2.5	21-1, 31-1
NG 3930 B3XF	2.99	1.12	79.50	27.10	6.7	80.9	8.0	4.0	21-1, 31-1
NG 3956 B3XF	3.34	1.09	79.95	28.80	7.0	81.9	8.2	3.0	11-2, 21-1
PHY 205 W3FE	3.50	1.08	82.15	31.25	6.0	79.4	7.0	5.0	21-2, 41-1
PHY 210 W3FE	3.24	1.09	80.60	31.25	5.8	82.8	7.0	3.0	21-2
PHY 250 W3FE	3.29	1.11	79.75	30.05	5.9	80.5	6.9	5.0	21-2, 41-1
PHY 350 W3FE	3.31	1.11	79.20	27.70	6.8	82.3	7.7	2.5	21-1, 21-2
PX3E33W3FE	3.53	1.12	80.20	29.60	6.6	81.4	8.2	2.5	11-2, 21-1
ST 4480B3XF	3.37	1.14	79.60	28.15	6.1	83.7	6.4	2.0	21-2, 31-1
ST 4990B3XF	3.50	1.16	81.70	27.25	6.8	83.4	7.4	2.0	11-2, 21-1
ST 4993B3XF	3.33	1.12	81.80	32.50	6.8	83.1	8.1	1.5	11-1, 11-2
ST 5091B3XF	3.48	1.10	79.75	29.40	6.5	81.6	8.2	2.0	21-1
Prob>F	0.0001	0.0001	0.0004	0.0001	0.0001	0.04	0.0001	0.013	
MSD (0.05)	0.41	0.05	1.66	1.93	0.5	3.6	0.6	2.8	

Table 3. Effect of Verticillium wilt and root-knot nematode (RK) on cultivars in a trial near Ropesville.

Variety	Plants /ft row	% Wilt	% Defoli-ation	Lint Yield (lbs/a)	Value $/a	Loan Value $/lb	Turn Out %	RK rating
FM 2498GLT	3.36	13.7	23.6	**1,629**	**933.95**	0.5735	27.89	S
ST 4993B3XF	2.59	21.8	50.0	**1,516**	**870.35**	0.5743	30.32	S
PX4B08W3FE	3.58	**5.5**	37.5	**1,587**	**863.92**	0.5398	27.80	R
ST 5091B3XF	3.02	13.1	55.7	**1,663**	**857.78**	0.5158	31.06	S
AMX20B037B3XF	2.41	23.9	55.7	1,482	**857.49**	0.5788	30.61	S
DP 2127 B3XF	2.84	15.4	57.8	1,495	849.15	0.5468	30.87	S
DP 1820 B3XF	2.96	11.7	46.1	1,500	848.40	0.5778	29.71	S
PHY 332 W3FE	3.47	**9.7**	25.9	1,501	832.07	0.5433	26.10	R
DP 1612 B2XF	3.26	16.7	51.5	**1,518**	831.12	0.5415	25.97	S
NG 4050 XF	2.79	**5.2**	**9.7**	**1,618**	821.62	0.5078	26.60	S
AR 9831 B3XF	2.94	25.8	41.3	**1,574**	820.42	0.5443	29.24	S
DP 2038 B3XF	3.09	18.9	34.6	**1,570**	813.39	0.5180	28.95	S
FM 2334GLT	3.16	**4.7**	**8.7**	1,465	784.39	0.5503	26.87	S
PHY 350 W3FE	3.41	12.9	23.0	1,416	777.25	0.5490	25.55	PR
DP 2141NR B3XF	3.27	**8.1**	28.7	**1,537**	776.06	0.5050	28.83	R
BX2296B3XF	2.99	18.3	44.4	1,349	775.55	0.5748	29.68	S
NG 5150 B3XF	2.84	**8.9**	**19.5**	1,476	774.09	0.5370	28.33	S
ST 5600B2XF	3.08	**8.7**	26.9	**1,528**	770.75	0.5045	25.59	R
AR21XR2B3XF	3.10	15.3	24.2	1,480	758.59	0.5023	28.12	S
PHY 400 W3FE	3.36	**8.3**	35.6	1,431	739.51	0.5318	26.18	PR
PX3E33W3FE	3.36	11.8	42.1	1,426	728.48	0.5143	25.85	R
NG 4190 B3XF	3.04	24.8	47.5	1,456	723.34	0.5068	27.15	S
PHY 443 W3FE	3.44	11.6	25.7	1,318	719.15	0.5303	24.31	R
ST 4946GLB2	3.34	11.8	39.6	1,416	716.86	0.4980	25.07	PR
PHY 394 W3FE	3.30	**4.9**	**6.4**	1,426	707.13	0.4958	24.00	R
ST 4990B3XF	3.19	15.0	52.0	1,334	703.82	0.5273	26.57	S
DP 2143NR B3XF	3.29	**8.0**	29.6	1,225	699.60	0.5468	25.80	R
AR20XT9B3XF	3.68	13.1	37.7	1,370	698.56	0.5170	27.47	S
BX2297B3XF	2.95	16.1	38.6	1,264	686.08	0.5430	27.34	S
ST 5707B2XF	3.22	16.3	64.2	1,240	645.55	0.5205	24.65	S
ST 4480B3XF	3.16	20.1	53.5	1,247	634.42	0.5220	24.24	S
DP 1845 B3XF	2.84	13.5	42.1	1,240	626.69	0.5055	25.49	S
NG 4098 B3XF	3.18	15.3	22.0	1,261	626.16	0.4935	25.76	S
DP 2055 B3XF	2.76	22.4	68.9	1,214	622.78	0.5130	25.55	S
PHY 480 W3FE	3.32	15.4	39.0	1,345	621.73	0.4668	25.50	R
DP 2044 B3XF	3.09	19.9	32.6	1,288	619.65	0.4810	25.14	S
DP 1840 B3XF	2.88	15.4	37.5	1,204	611.14	0.5078	26.50	S
BX2295B3XF	2.97	28.7	47.5	1,183	602.87	0.5095	26.03	S
NG 4936 B3XF	2.60	21.9	67.2	1,088	590.16	0.5423	25.43	S
PHY 545 W3FE	3.42	**7.6**	29.3	1,202	584.18	0.4885	24.61	R
Prob>F	0.0001	0.0001	0.0001	0.0001	0.0001	0.027	4.78	
MSD (0.05)	0.23	6.7	14.9	151	77.88	0.0791	0.006	

RK=root-knot nematode ratings where S=susceptible, R=resistant, PR=partially resistant.

Table 4. Fiber properties for a variety test near Ropesville.

Variety	Mic.	Length	Unif.	Strength	Elon.	Rd	+b	Leaf	Color
AMX20B037B3XF	3.80	1.16	83.25	32.15	6.7	84.6	7.8	1.5	11-1, 11-2
AR20XT9B3XF	3.26	1.18	81.15	30.35	7.7	85.2	7.5	2.5	11-1
AR21XR2B3XF	3.10	1.12	80.60	29.65	6.4	85.0	7.0	2.5	11-2, 21-1
AR 9831 B3XF	3.73	1.13	80.95	29.10	7.8	84.4	7.7	3.0	11-1, 11-2
BX2295B3XF	3.29	1.16	79.95	28.80	7.4	83.2	7.1	3.5	21-1, 31-1
BX2296B3XF	3.52	1.16	82.80	29.80	7.2	84.9	7.6	2.0	11-1
BX2297B3XF	3.42	1.12	81.45	27.35	7.3	84.1	7.6	2.5	11-2
DP 1612 B2XF	3.47	1.17	81.50	29.90	8.0	82.9	7.6	4.0	21-1
DP 1820 B3XF	3.78	1.17	81.60	30.65	7.1	83.0	7.6	2.5	11-1, 21-2
DP 1840 B3XF	3.16	1.18	81.00	29.30	7.5	84.9	7.8	1.5	11-1, 11-2
DP 1845 B3XF	3.04	1.21	79.65	29.90	7.8	84.8	6.6	3.5	21-1, 21-2
DP 2038 B3XF	3.48	1.10	80.75	27.65	7.2	80.0	7.5	1.0	11-1, 41-2
DP 2044 B3XF	2.72	1.20	79.60	31.80	6.3	82.5	7.6	3.5	21-1, 21-2
DP 2055 B3XF	3.17	1.18	80.00	28.30	7.6	85.6	7.3	2.0	11-1, 11-2
DP 2127 B3XF	3.63	1.14	82.30	28.80	7.1	85.2	7.4	1.5	11-1
DP 2141NR B3XF	3.17	1.15	79.90	29.85	7.0	83.6	7.6	3.0	11-2, 21-1
DP 2143NR B3XF	3.40	1.15	81.65	29.70	7.1	84.6	7.2	3.0	11-2, 21-1
FM 2334GLT	3.50	1.23	81.80	28.80	6.5	86.0	7.0	2.0	11-1, 11-2
FM 2498GLT	3.57	1.15	81.00	28.45	6.6	84.6	7.1	2.5	21-1
NG 4050 XF	3.19	1.16	81.45	29.65	7.2	83.4	7.5	2.5	11-2, 21-1
NG 4098 B3XF	2.98	1.19	79.35	31.70	6.6	81.9	7.2	4.5	21-2, 31-1
NG 4190 B3XF	3.12	1.16	80.95	28.65	7.0	85.6	7.1	1.5	11-1
NG 4936 B3XF	3.28	1.22	82.25	29.65	7.4	86.4	6.8	2.5	11-1
NG 5150 B3XF	3.32	1.14	81.25	28.20	7.3	84.7	7.3	2.5	11-1, 11-2
PHY 332 W3FE	3.29	1.19	81.70	30.80	7.0	84.0	7.8	2.0	11-1, 11-2
PHY 350 W3FE	3.36	1.16	81.85	29.40	7.2	85.1	7.1	2.0	11-1, 21-2
PHY 394 W3FE	2.90	1.20	80.10	29.55	6.5	82.8	7.2	3.5	21-1, 21-2
PHY 400 W3FE	3.24	1.20	81.90	30.35	6.9	84.9	7.2	2.0	11-1, 21-1
PHY 443 W3FE	3.14	1.17	81.85	30.20	6.9	83.3	7.4	3.0	11-1, 21-2
PHY 480 W3FE	2.81	1.14	81.95	28.80	7.9	83.9	7.5	3.0	11-1, 21-1
PHY 545 W3FE	2.95	1.12	81.80	29.25	7.3	84.8	7.2	1.5	11-2
PX3E33W3FE	3.23	1.14	80.90	30.20	7.1	83.7	7.9	3.0	11-1, 21-1
PX4B08W3FE	3.57	1.12	82.40	31.05	7.4	84.8	7.3	2.5	11-2, 21-1
ST 4480B3XF	3.38	1.16	80.50	29.70	6.4	82.8	8.2	2.5	11-2, 1-3
ST 4946GLB2	3.08	1.12	81.95	29.70	7.6	82.8	7.9	3.0	11-2, 21-1
ST 4990B3XF	3.27	1.17	82.90	30.35	7.0	84.6	7.2	2.0	11-1, 21-1
ST 4993B3XF	3.77	1.14	82.70	31.05	7.5	83.7	7.8	4.0	11-1, 21-1
ST 5091B3XF	3.29	1.18	81.55	28.15	6.6	85.9	7.1	2.0	11-1, 11-2
ST5600B2XF	3.13	1.15	80.90	30.50	7.3	84.0	7.6	2.5	11-1, 21-1
ST5707B2XF	3.19	1.17	82.55	31.60	7.1	83.3	7.9	2.0	11-1, 21-1
MSD	0.003	0.0001	0.0001	0.0001	0.0001	0.336	0.258	0.618	
Prob>F	0.58	0.03	1.43	1.91	0.6				