2003 BELTWIDE COTTON CONFERENCES, NASHVILLE, TN – JANUARY 6-10

2002 FIELD EVALUATION OF COTTON CULTIVAR RESPONSE TO RENIFORM NEMATODES

C.G. Cook
Syngenta Seeds, Inc.
Victoria, TX
A.F. Robinson, A.C. Bridges, and A.E. Percival
USDA, ARS
College Station, TX
W.B. Prince
Syngenta Seeds, Inc.
Victoria, TX
J.M. Bradford and J.A. Bautista
USDA, ARS
Weslaco, TX

Abstract

In recent years, reniform nematodes have become a serious pest to U.S. cotton production. The USDA-ARS at Weslaco, TX has maintained a nursery for evaluating cotton cultivar response to reniform nematodes. Thirty-six entries from private and public breeding programs were evaluated in 2002. Average yield reduction between the fumigated and reniform nematode infested plots was 22.5%. Fourteen entries had significantly higher lint yields than Stoneville 474 in the reniform nematode infested plots. Four entries in the fumigated treatment, Jajo 8185, DPL 545BG/RR, Syngenta NX RN00516, and DPX 03X133, produced higher yields than Stoneville 474. Percent yield loss between treatments were lowest for Syngenta NX 00VC151 (10.3%), Syngenta NX 2723ct (12.2%), Phytogen PSC 01NM-477 (12.8%), Syngenta NX 00VC133 (14.5%) and Phytogen PSC 01NM-481 (14.5%). Reduction in yield between treatments was greatest for Stoneville 474 (33.2%).

Materials and Methods

Research plot location was the USDA-ARS North Farm, Weslaco, TX. Soil type is Hidalgo sandy clay loam. The research plots have been in continuous cotton cultivation since the 1980's. Experimental design was a split-plot, with four replications. Thirty-six entries were planted for evaluation, including Stoneville 474, which was used as the susceptible check. Fertilizer (40 lb N/acre as Ammonium Sulfate) and Telone II fumigation were applied on 14 December 2001. An additional side dress application of 40 lb N/acre (N32) was applied on 6 May 2002. Planting date was 5 March 2002. For preemergence weed control, pendimethalin was applied at 1.0 quart formulation/acre at planting. Experimental plots were one row, 30 ft long and spaced 3.3 ft apart. Harvest dates were 29 July and 7 August. Fiber properties were reported for the reniform nematode infested treatment. Standard crop management practices were used throughout the growing season.

Results

Average lint yield reduction between the fumigated and reniform nematode infested treatments was 22.5% (Table 1). In the untreated, reniform nematode infested plots, 14 entries produced significantly higher yields than Stoneville 474. Only four entries in the Telone II fumigated treatment produced significantly higher yields than Stoneville 474. When yields were compared between treatments, percent yield reduction was lowest for Syngenta NX 00VC151 (10.3%), Syngenta NX 2723ct (12.2%), Phytogen PSC 01NM-477 (12.8%), Syngenta NX 00VC133 (14.5%) and Phytogen PSC 01NM-481 (14.5%). Stoneville 474, the susceptible check, had the greatest yield reduction between treatments (33.2%). JaJo 8185 produced the highest yield in both treatments. Fiber length was longest for Fibermax 832 (1.24) and shortest for TAMU MAR 41A-1-99 (1.08) (Table 2). Fiber strength was highest for Texas 245 (34.8 g/tex) and Fibermax 832 (34.5g/tex). With the exception of Suregrow 747, all micronaire values were in the 3.5 to 4.8 range. Results indicate that germplasm with improved levels of tolerance to reniform nematodes is being developed.

Table 1. Lint yields in reniform nematode-infested (RN) and Telone II fumigated (TL) soils and percent yield reduction between treatments (PYR) of 36 cultivars and strains.

Entry	RN (lb/acre)	TL (lb/acre)	PYR (percent reduction)
JaJo 8185	1416*	1685*	15.9
Syngenta NX RN00516	1351*	1650*	18.2
Syngenta NX 2723ct	1290*	1470	12.2
TAM 96WD-22	1282*	1590	19.4
DPX 03X133	1276*	1616*	21.1
Syngenta 00VC133	1271*	1486	14.5
Suregrow 747	1270*	1588	20.0
Phytogen PSC 01NM-481	1252*	1464	14.5
Syngenta 00VC115	1234*	1521	18.9
Syngenta 00VC151	1220*	1361	10.3
Syngenta 2383-2-99	1199*	1468	18.3
Phytogen PSC 01NM-480	1198*	1497	20.0
JaJo 8190	1191*	1566	23.9
DPX 01X37	1173*	1586	26.0
DPL 545 BG/RR	1172	1670*	29.8
Phytogen PSC 01NM-479	1155	1534	24.7
Syngenta RN00526	1126	1499	24.9
Phytogen PSC 01NM-477	1120	1285	12.8
JaJo 8098	1116	1547	27.8
Texas 245	1108	1527	27.5
Syngenta 01VCF4-206	1096	1419	22.8
Syngenta 99574ct2	1092	1477	26.0
Syngenta RN00513	1076	1496	28.1
Syngenta 01VCF4-213	1066	1307	18.4
Fibermax 832	1064	1370	22.4
Phytogen PSC 01NM-476	1061	1416	25.1
DES 816	1019	1439	29.2
Syngenta 00VC211	1002	1278	21.6
DES 810	976	1264	22.8
Stoneville 474 (check)	959	1435	33.2
TAM 96WD-81	958	1364	29.8
TAM 96WD-69s	911	1297	29.8
Texas 295	910	1236*	26.3
TAMU MAR 41A-1-99	822	993*	17.2
TAMU MAR 7A-1-00	725*	1018*	28.8
TAMU MAR 16D-1-00	704*	970*	27.5

* Significantly different from Stoneville 474 at the 0.05 level of probability.

Table 2. Fiber micronaire, length, and strength of 36 cultivars and strains in reniform nematode-infested soil.

Entry	Micronaire (units)	Length (inches)	Strength (g/tex)
JaJo 8185	4.5	1.14	29.8
Syngenta NX RN00516	4.3	1.17	29.9
Syngenta NX 2723ct	4.4	1.11	29.3
TAM 96WD-22	4.3	1.16	29.1
DPX 03X133	4.5	1.16	31.3
Syngenta 00VC133	4.3	1.10	29.7
Suregrow 747	4.9	1.14	27.6
Phytogen PSC 01NM-481	4.2	1.13	30.8
Syngenta 00VC115	4.4	1.11	28.5
Syngenta 00VC151	4.3	1.11	30.3
Syngenta 2383-2-99	4.3	1.13	28.9
Phytogen PSC 01NM-480	4.2	1.19	30.9
JaJo 8190	4.3	1.13	30.1
DPX 01X37	4.7	1.11	30.6
DPL 545 BG/RR	4.6	1.12	31.2
Phytogen PSC 01NM-479	4.4	1.16	30.7
Syngenta RN00526	3.8	1.10	28.8
Phytogen PSC 01NM-477	4.2	1.17	29.3
JaJo 8098	4.4	1.12	31.6
Texas 245	4.0	1.17	34.8
Syngenta 01VCF4-206	4.3	1.11	29.1
Syngenta 99574ct2	4.2	1.13	32.7
Syngenta RN00513	4.6	1.15	31.0
Syngenta 01VCF4-213	4.5	1.13	28.4
Fibermax 832	4.0	1.24	34.5
Phytogen PSC 01NM-476	4.2	1.18	30.7
DES 816	4.5	1.18	32.9
Syngenta 00VC211	4.5	1.11	31.0
DES 810	4.2	1.13	31.1
Stoneville 474 (check)	4.7	1.12	30.9
TAM 96WD-81	4.7	1.10	28.5
TAM 96WD-69s	4.6	1.10	29.3
Texas 295	4.4	1.14	30.4
TAMU MAR 41A-1-99	4.3	1.08	31.3
TAMU MAR 7A-1-00	3.6	1.13	28.2
TAMU MAR 16D-1-00	4.4	1.09	29.6