2005 Beltwide Cotton Conferences, New Orleans, Louisiana - January 4 - 7, 2005

NOTICE OF RELEASE OF RN96425, RN96527, AND RN96625-1 GERMPLASM LINES OF COTTON

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

Abstract

Three Upland cotton (*Gossypium hirsutum* L.) germplasm lines, RN96425, RN96527, and RN96625-1 were released because they possess valuable traits that confer resistance to the southern root-knot nematode [*Meloidogyne incognita* (Kofoid & White) Chitwood] (Race 3), field tolerance to reniform nematode (*Rotylenchulus reniformis* Linford & Oliveira), and good productivity and fiber quality. The lines were developed jointly by the USDA-ARS, Syngenta Seeds, Inc. and the Texas Agricultural Experiment Station and released in 2004. These germplasm lines should provide useful traits to breeders and geneticists.

Introduction

RN96425, RN96527, and RN96625-1 were derived from crosses between root-knot and reniform nematode resistant germplasm released by USDA-ARS and Texas A&M University and various germplasm releases and experimental breeding lines developed by the USDA-ARS, Texas A&M University, and Rio Farms, Inc. Individual plant selections were made at Weslaco, TX in reniform nematode-infested soils in the F_3 and F_4 generation and progeny row selection made in the F_5 generation.

Results and Discussion

From 1998-1999, RN96425, RN96527, and RN96625-1 were compared to Stoneville 474, a widely adapted commercial variety, in reniform nematode-infested and fumigated experimental field plots at Weslaco, TX. In 1998, the three germplasm lines produced significantly greater yields than Stoneville 474 in the reniform nematode infested plots (Table 1). 1998, reniform nematode lint yield reductions for RN96425, RN96527, and RN96625-1 were less than 50 percent of that observed for Stoneville 474. Reniform nematode population estimations (Log reniform nematode population/100 g soil) for the three germplasm lines were significantly less than that of Stoneville 474. In 1999, RN96625-1 produced a significantly greater lint yield than Stoneville 474 and had a lint yield reduction of less than 50 percent of that observed for Stoneville 474 (Table 2). For both years, the three germplasm lines had lower lint percent, lower micronaire, and higher fiber strength than Stoneville 474, while RN96425 had a longer fiber length. In 2000 at Weslaco, TX, an eight-replication yield test conducted in reniform nematode-infested soils compared RN96425, RN96527, and RN96625-1 with Deltapine 50, another widely adapted commercial cultivar. Yields of the three germplasm lines ranged from 41 to 54 percent higher than that of Deltapine 50 (Table 3). RN96425 had a lower micronaire, longer fiber length, and higher fiber strength than Deltapine 50. RN96625-1 had a lower lint percent and lower micronaire than Deltapine 50.

Laboratory tests conducted in 1998 and 2002 at the USDA-ARS, College Station, TX to evaluate the germplasm lines for root-knot nematode resistance showed RN96425, RN96527, and RN96625-1 to have lower gall ratings than Deltapine 16, the susceptible check, but higher ratings than Auburn 623, the resistant check (Table 4). The number of root-knot nematode eggs per gram of root followed a similar trend. Root-knot nematode gall ratings at Bossier City, LA in 1998 for RN96425, RN96527, and RN96625-1 were 1.4, 1.9, and 1.3 compared to 3.9 for Stoneville 474. In 1999, Bossier City, LA gall ratings for RN96425 and RN96527 were 1.4 and 2.1 compared to 3.4 for Stoneville 474. Field evaluations of 1999 and 2002 at Tallassee, AL in soil infested with both fusarium wilt (*Fusarium oxysporum* Schlect. F. sp. *Vasinfectum* [Ark.] Snyd. & Hans.) and root-knot nematodes showed RN96425, RN96527, and RN96625-1 to be more resistant to the fusarium wilt/root-knot nematode disease complex than Rowden, the susceptible check. RN96425 and RN96625-1 were very similar

to M-315, the resistant check (Table 5). Fusarium wilt ratings from Bossier City, LA showed a similar trend to the root-knot nematode ratings, with wilt symptoms of the three germplasm lines being significantly less than Stoneville 474.

A limited quantity of seed is available for distribution to cotton geneticists, breeders, and other research personnel upon written request to: USDA-ARS, Cotton Germplasm Curator, 2765 F&B Road, College Station, TX 77845. If this germplasm contributes to the development of a new cultivar it is requested that appropriate recognition be given to its source.

Table 1. 1998 Lint yield and mean fiber data for three cotton germplasm lines and Stoneville 474.

	Lint Yield		Yield	Reniform	Lint		Fiber	Fiber
Cultivar	Untreated	Fumigated	Reduction	Reproduction	Percent	Micronaire	Length	Strength
	Kg ha^{-1}	Kg ha^{-1}	%	Log_{10} RN/100 g soil	%	units	mm	g tex^{-1}
RN96425	1238	1259	1.7	2.6	37.2	3.6	28.4	33.7
RN96527	1126	1225	8.1	2.2	34.1	4.3	28.7	31.6
RN96625-1	1170	1225	6.5	1.9	34.1	4.2	28.4	30.3
Stv. 474	948	1091	13.1	3.2	38.5	5.1	27.9	28.4

Table 2. 1999 Lint yield and mean fiber data for three cotton germplasm lines and Stoneville 474.

	Lint Yield		Yield	Reniform	Lint		Fiber	Fiber
Cultivar	Untreated	Fumigated	Reduction	Reproduction	Percent	Micronaire	Length	Strength
	Kg ha^{-1}	Kg ha^{-1}	%	Log_{10} RN/100g soil	%	units	mm	g tex^{-1}
RN96425	1264	1538	17.8	2.6	34.9	3.7	28.7	32.7
RN96527	1281	1497	14.4	2.7	35.1	4.1	28.4	30.4
RN96625-1	1413	1543	8.4	2.6	32.4	4.0	27.9	28.7
Stv. 474	1289	1639	21.4	2.8	38.7	5.1	28.2	27.5

Table 3. 2000 Lint yield and fiber data for three cotton germplasm lines and Deltapine 50.

	Lint	Reniform	Lint		Fiber	Fiber
Cultivar	Yield	Reproduction	Percent	Micronaire	Length	Strength
	Kg ha^{-1}	Log_{10} RN/100g soil	%	units	mm	g tex^{-1}
RN96425	1035	2.7	33.1	3.7	29.7	27.5
RN96527	1008	2.8	33.5	4.5	28.4	26.2
RN96625-1	1104	2.7	32.3	4.2	28.7	26.2
DPL 50	714	2.8	34.4	4.7	28.7	25.4

Table 4. Root-knot nematode ratings for four cotton germplasm lines.

	College Station, TX				Bossier City, LA		
Cultivar	1998	2002	Avg.	1998	1998	1999	Avg.
	gall rating			eggs/g root	gall rating		

RN96425	1.4	1.7	1.6	232	1.4	1.4	1.4
RN96527	2.4	2.3	2.4	1111	1.9	2.1	2.0
RN96625-1	2.0	0.7	1.4	394	1.3	n/a	n/a
DPL 16	4.3	3.2	3.8	7190	n/a	n/a	n/a
Auburn 623	0.9	0.3	0.6	126	n/a	n/a	n/a
Stv. 474	n/a	n/a	n/a	n/a	3.7	3.4	3.6

Table 5. Fusarium wilt ratings for four cotton germplasm lines.

	Tallasee, AL			Bossier City, LA		
Cultivar	**1999**	**2002**	**Avg.**	**1998**	**1999**	**Avg.**
	% wilt			**wilt rating**		
RN96425	4	6	5	1.2	1.5	1.4
RN96527	9	13	11	1.9	1.9	1.9
RN96625-1	8	5	7	2.3	n/a	n/a
Rowden	20	67	44	n/a	n/a	n/a
M-315	1	2	2	n/a	n/a	n/a
Stv. 474	n/a	n/a	n/a	3.9	3.3	3.6