Registration of RN96425, RN96527, and RN96625-1 Nematoide-Resistant Cotton Germplasm Lines

Three cotton (Gossypium hirsutum L.) germplasm lines, RN96425 (Reg. no. GP-795, PI 636102), RN96527 (Reg. no. GP-796, PI 636103), and RN96625-1 (Reg. no. GP-797, PI 636104) were released because they are resistant to the southern root-knot nematode [Meloidogyne incognita (Kofoid & White) Chitwood Race 3], have field tolerance to the reinfem nematode (Rotylenchulus reniformis Linfom & Oliveira), and good productivity and fiber quality. These lines were developed jointly by the USDA-ARS, Syngenta Seeds, Inc., and the Texas Agricultural Experiment Station and released in 2004.

RN96425 originated as a F2 plant selection from the cross MAR5PD208S-4-90/N320-2-91, with a second plant selection in the F2, MAR5PD208S-4-90 is a germplasm line developed by the Texas Agricultural Experiment Station (El-Zik and Thaxton, 1998). N320-2-91 is a root-knot nematode-resistant, reinfem nematode-tolerant germplasm line developed by the USDA-ARS and the Texas Agricultural Experiment Station (Cook et al., 1997). RN96527 originated as a F3 plant selection from the cross C21S781-2/N220-1-91, with a second plant selection in the F3. C21S781-2 is a root-knot nematode-resistant, reniform nematode-tolerant germplasm line developed by the USDA-ARS and the Texas Agricultural Experiment Station (El-Zik and Thaxton, 1998). N220-1-91 is a root-knot nematode-resistant, reniform nematode-tolerant germplasm line (1998 update). Louisiana State Agric. Exp. Stn. & Coop. Ext. Svc., Baton Rouge, LA. Selections were made in reinfem nematode-infested soil. The second cycle selection was evaluated as a F3 progeny row in 1998 and in replicated tests from 1998 through 2000. Compared with ‘Stoneville 474’, lint percentage was 2.5% lower, micronaire reading was 1.4 units lower, and fiber was 19% stronger for RN96425. The lint percentage and micronaire reading of RN96527 were 4% and 0.9 units lower, respectively, than Stoneville 474, but HVI fiber strength was 10% stronger.

RN96625-1 originated as a F2 plant selection from the cross C21S781-2/N220-1-91, followed by additional plant selections in the F2, and F3 generations. N220-1-91 is a root-knot nematode-resistant, reinfem nematode-tolerant germplasm line developed by the USDA-ARS and the Texas Agricultural Experiment Station (Cook et al., 1997). Selections were made in reinfem nematode-infested soil. The third cycle selection was evaluated as a F4 progeny row in 1997 and in replicated tests from 1998 through 2000. Compared with Stoneville 474, lint percentage of RN96625-1 was 5% lower, HVI fiber strength was 5% stronger, and micronaire reading was 1.0 unit lower.

In 1998 and 1999, the three germplasm lines were compared with Stoneville 474 in field evaluations conducted in reinfem nematode-infested and fumigated (1,3-dichloropropene) plots at Weslaco, TX. In 1998, the three lines produced significantly greater yields than Stoneville 474 in both the reinfem nematode-infested and fumigated plots. Reniform nematodes reduced yield of Stoneville 474 by 13.1%, whereas they reduced yield of the three resistant germplasm lines between 4.7% and 0.1%. In 1999, RN96625-1 had a significantly lower lint production and micronaire reading than those of Deltapine 50.

In growth chamber experiments repeated at the Texas Agricultural and Mechanical University, College Station, TX, root-knot nematode root gall indices of RN96425, RN96527, and RN96625-1 averaged 1.4, compared with 3.8 for the susceptible check Deltapine 16. In 1998, nematode egg production on RN96425 was 3%, RN96527 only 15%, and RN96625-1 only 10%, whereas those of Stoneville 474 were observed on Deltapine 16. In the 1998 and 1999 Fusarium Wilt Root Nematode Evaluations at the National Cotton Fusarium Wilt Nursery in knife, root-knot nematode gall ratings for RN96425 averaged 1.4 and 2.0 compared with 3.6 for Stoneville 474, while the corresponding average Fusarium oxysporum Schlecht f. sp. vasicina (Hans.) ratings were 1.4 and 1.9 compared with 3.6 for Stoneville 474. Averages of evaluations at the National Cotton Fusarium Wilt Nursery, Tallassee, AL, in 1999 (Glass and Gazaway, 1999) and the National Cotton Fusarium Wilt Nursery in 2002 (Glass et al., 2002) showed RN96425, RN96527, and RN96625-1 to average 1.3, 1.9, and 2.3, respectively, than Stoneville 474, but HVI fiber strength was 10% stronger. Small quantities of seed of these germplasm lines should be useful to cotton breeders and others.

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References


