Registration of MS-01RKN, MS-24RKN, MS-30RKN, MS-33RKN, MS-35RKN, and MS-37RKN Cotton Germplasm Lines with Resistance to Root-Knot Nematode

Roy G. Creech, Johnie N. Jenkins,* Jack C. McCarty, Russell Hayes, John B. Creech, Dan Haire, and Roy Cantrell

The cotton (Gossypium hirsutum L.) germplasm lines MS-01RKN (Reg. No. GP-882, PI 644074), MS-24RKN (Reg. No. GP-883, PI 644075), MS-30RKN (Reg. No. GP-884, PI 644076), MS-33RKN (Reg. No. GP-885, PI 644077), MS-35RKN (Reg. No. GP-886, PI 644078), and MS-37RKN (Reg. No. GP-887, PI 644079) were developed by the Mississippi Agricultural and Forestry Experiment Station, the USDA-ARS, and Cotton Incorporated and were released in 2006. The lines combine resistance to the southern root-knot nematode (RKN), [Meloidogyne incognita (Kofoid & White) Chitwood] with good yield and fiber quality. These germplasm lines provide both public and private breeders with germplasm resources with resistance to root-knot nematode and acceptable yield and fiber quality for the Mid-South and southeastern USA.

The nematode resistance in these lines is from the Auburn 634 RNR source (GP166), Shepherd, (1982). The nematode-resistant parent in all the crosses was M-240 RNR (PI592511) (Shepherd et al., 1996). M-240 RNR was developed with the cultivar Deltapine 61 as the recurrent parent. The nematode-resistant line M-240 RNR was crossed with ‘Suregrow 501’ (SG501), ‘Suregrow 125’ (SG125), and ‘DES119’. These F₁s were then crossed with commercial cultivars or released elite breeding lines. R.G. Creech evaluated progeny of the three-way crosses in the greenhouse for resistance to root-knot nematode, using methods similar to those described by Shepherd (1982). Individual plants were selected and their progeny were grown in field plots, without nematodes, for agronomic performance. Selections that yielded similar to commercial cultivars in the test were again evaluated in the greenhouse for nematode resistance and individual plant selections were also planted in field plots without nematodes. A number of cycles of progeny evaluation and selection was available; however, we believe two or more cycles were involved.

Pedigrees of the released lines are as follows: MS-01RKN is SG404/(M240/SG501); MS-24RKN is (M240/30RKN is DES211-39/(M240/SG125); MS-33RKN is SG125); MS-35RKN is (DES119/M240)/DES119.

Following the retirement of R.G. Creech, individual plants were selected and their progeny were evaluated in two field trials on a Deltapine sandy clay loam in Mississippi State, MS, and in two greenhouse evaluations for resistance using gall score and eggs produced as the criteria for resistance. Three replications of five plants each were used in each evaluation. Galls were scored on a 1 to 5 scale (1, very light galling; 2, light; 3, moderate; 4, heavy; 5, very heavy galling). Roots of the five plants in each replication were bulked, and eggs were extracted and counted (Haire, 2006). The selections were increased and evaluated for resistance using gall score and eggs produced as the criteria for resistance. Three replications of five plants each were used in each evaluation. Galls were scored on a 1 to 5 scale (1, very light galling; 2, light; 3, moderate; 4, heavy; 5, very heavy galling). Roots of the five plants in each replication were bulked, and eggs were extracted and counted (Haire, 2006). The selections were increased and evaluated for resistance using gall score and eggs produced as the criteria for resistance. Three replications of five plants each were used in each evaluation. Galls were scored on a 1 to 5 scale (1, very light galling; 2, light; 3, moderate; 4, heavy; 5, very heavy galling). Roots of the five plants in each replication were bulked, and eggs were extracted and counted (Haire, 2006).