Registration of D94-6041 Soybean Germplasm Line Resistant to Phytophthora Rot and Soybean Cyst Nematode Races 3 and 14

Soybean [Glycine max (L.) Merr.] germplasm line D94-6041 (Reg. no. GP-189, PI 597649) was developed by the USDA-ARS, Stoneville, MS, in cooperation with the Mississippi Agricultural and Forestry Experiment Station, Stoneville, and released in August 1996. This line has value as a parent because of its resistance to phytophthora rot (caused by Phytophthora sojae M.J. Kaufmann & J.W. Gerdemann) and Races 3 and 14 of the soybean cyst nematode (Heterodera glycines Ichinohe).

D94-6041 was developed by backcrossing the gene Rps4 from PI 86050 into the cultivar Bedford (3). Rps4 confers resistance to Races 1 to 4, 10, 12 to 16, 18, 19, 21, and 25 of P. sojae (1,2). D94-6041 was selected in the F3 generation from the cross Bedford × PI 86050. Because PI 86050 has two genes for resistance (Rps1-c and Rps4), Races 4 and 7 of P. sojae were used to identify Rps4 in the segregating population. Rps4 provides resistance to Race 4, but susceptibility to Race 7 remains; Rps1-c provides resistance to Race 7, but susceptibility to Race 4 remains. Only Race 4 was used in subsequent backcross populations. The reaction of 12 F3 seedlings, inoculated by the hypocotyl puncture method (4), was used to identify lines uniformly resistant to phytophthora rot. Selected resistant lines were used as pollen parents for each crossing cycle. After the sixth backcross, an F3 line uniform for resistance to phytophthora rot was increased, and 100 F4 plants were inoculated with Race 4. Evaluation for the soybean cyst nematode (SCN) Races 3 and 14 was conducted by L.D. Young at Jackson, TN (5). The F3 line that became D94-6041 had the same level of resistance to Races 3 and 14 as Bedford. D94-6041 was retested for resistance to SCN Races 3 and 14 after the F5 generation to verify earlier results.

D94-6041 is of Maturity Group V, and is very similar to its recurrent parent, Bedford, for all other observable traits. In a replicated yield test on clay soil at Stoneville in 1995, D94-6041 yielded 2932 kg ha⁻¹, compared with 2926 kg ha⁻¹ for Bedford; in 1996, D94-6041 yielded 3464 kg ha⁻¹, and Bedford yielded 3369 kg ha⁻¹. A sample of 50 seeds will be available for at least 5 yr for research purposes by writing to the corresponding author.

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References and Notes


6. T. C. Kilien, USDA-ARS, P.O. Box 196, Stoneville, MS 38776; L.D. Young, USDA-ARS, Nematology Res., 605 Airways Blvd., Jackson, TN 38301. Cooperative investigation of the USDA-ARS and the Mississippi Agric. & Forestry Exp. Stn. Registration by CSSA. Accepted 30 June 1997. *Corresponding author (tkilien@ug.ag).


Registration of Arkot A129 and Arkot A132 Germplasm Lines of Cotton with High Fiber Strength

Two germplasm lines of cotton (Gossypium hirsutum L.), designated as Arkot A129 (Reg. no. GP-668, PI 598082) and Arkot A132 (Reg. no. GP-669, PI 598083) were developed by the Arkansas Agricultural Experiment Station and released in 1996 (1). These lines possess high fiber strength coupled with wide adaptation to the Mississippi River Delta. They were released to provide additional germplasm for use in breeding programs to improve fiber strength.

Arkot A129 and Arkot A132 were derived from crosses made in 1981 with one common parent, FTA 266, the source of high fiber strength in these lines. The other parents of Arkot A129 and Arkot A132 were 'Cascot L-7' and 'Stoneville 825', respectively. FTA 266 was developed by a complex series of crosses, described by Culp and Harrell (3), which included Triple Hybrid 108, Triple Hybrid 171, AHA 6-1-4, 'Earlistaple 7' (4), and 'Sealand 542' (4). FTA 266 is one of the two lines bulked together to form the germplasm FTA, released by Culp and Harrell (4) in 1980.

Arkot A129 (tested as A129-02) and Arkot A132 (tested as A132-22) were individual plant selections made in 1983 from their respective F2 populations, with a subsequent individual plant selection from F3 progeny rows in 1984. These selections were evaluated as F34 progeny rows in 1988. Seed from those progeny rows were composited, and the lines were evaluated in replicated tests from 1989 through 1993.

Agronomic traits of the lines were compared with 'DES 119' (2) in 13 tests at four Arkansas sites in the Mississippi River Delta. In addition, Arkot A129 was evaluated at eight sites in the 1992 Regional Short-Season Strain Test; and Arkot A132 was evaluated at 10 sites in the 1992 Regional High Quality Strain Test (7). Performance of the two lines followed similar trends in all experiments. Over all tests, Arkot A129 and Arkot A132 yield was 93 and 95%, respectively, of DES 119. Fiber strength of the lines was 16 kN m kg⁻¹ stronger than DES 119 in the Arkansas tests and 25 kN m kg⁻¹ stronger than 'Deltapine 51' in the Regional tests. In the same tests, the lines had a lower lint fraction (2.9 and 1.3 units less than DES 119 and Deltapine 51, respectively) and a lower fiber elongation (1.1 and 0.9 units less than DES 119 and Deltapine 51, respectively). Fiber length of Arkot A132 was equal to DES 119, but shorter than Arkot A129. Fiber micronaire reading of Arkot A129 was similar to DES 119, but finer than Arkot A132. Morphological traits of the lines are similar to DES 119.

In Arkansas field tests conducted in 1994 and 1995, Arkot A132 was equal to DES 119 in resistance to tarnished plant bug [Lygus lineolaris (Palisot de Beauvois)]; Arkot A129 was more susceptible than DES 119, but more resistant than the fregio-bract susceptible check. In the Regional Cotton Fusarium Wilt Test at Tallassee, AL, resistance of the two lines to fusarium wilt [caused by Fusarium oxysporum f.sp. vasinfectum (Atk.) Syd. & Hans.] was equal to the resistant check, S-35 in 1990 (5) and 'Auburn 56' in 1991 (6).

The relative high fiber strength and wide area of adaptation of Arkot A129 and Arkot A132 should make them valuable as breeding lines. Combining ability of the lines appears to be good since crosses with other parental material have produced superior progeny. Small quantities of Arkot A129 and Arkot A132 seed may be obtained for breeding purposes from the corresponding author.

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