Registration of Arkot 9202 and Arkot 9208
Germplasm Lines of Cotton

Two germplasm lines of cotton (Gossypium hirsutum L.) designated as Arkot 9202 (Reg. no. GP-858, PI 641159) and Arkot 9208 (Reg. no. GP-859, PI 641160) were released in 2005 by the Arkansas Agricultural Experiment Station. The lines were developed using the generalized procedures outlined by Bourland (2004).

Both lines were derived from crosses made in 1992 with a common parent, the unreleased breeding line GA 88–166 with pedigree GA81–225/‘PD-1’, obtained from Shelby Baker, University of Georgia, Coastal Plain Experiment Station, Tifton, GA. The second parents of Arkot 9202 and Arkot 9208 were ‘H1330’ (Bourland, 1996) and Ark 8603–05, respectively. Ark 8603–05 is a breeding line developed from a cross of Miscot 7853 (Bourland and White, 1989) and Miscot 7918 (Bourland et al., 1990). Within F1 populations grown at the Southeast Branch Station at Rohwer, AR, in 1993, bolls from visually superior individual plants were harvested and bulked. Plants derived from F1 seeds were selected using modified procedures of Bird (1982) to produce seeds for F2 progeny rows grown in 1995. Progenies designated as 9202–24 and 9208–05 were among the ones promoted and tested in replicated strain tests in 1996 and 1997. Individual plant selections from the F2 generation of these two strains were evaluated as progenies in 1998 and 1999. Two of these selections produced Arkot 9202 (tested as 9202–24–13) and Arkot 9208 (tested as 9208–05–01).

Arkot 9202 and Arkot 9208 were included in 18 replicated field tests at four Arkansas Agricultural Research Station sites in the Mississippi River Delta and compared to ‘SG 747’ in 2001, ‘SG 105’ in 2002 to 2003, and ‘DP 444 BG/RR’ in 2004. Over all tests, lint yields of the lines were equal to the check cultivars. However, lint yields of Arkot 9202 and Arkot 9208 were significantly higher than yields of the check cultivars within five and three of the 18 tests, respectively. Arkot 9202 tended to yield relatively better in north Arkansas locations while Arkot 9208 tended to yield better in south Arkansas sites.

Basic yield components (i.e., lint index and number of seed per acre) of the two lines in the 18 Arkansas tests were similar to the check cultivars. Arkot 9202 had 4% higher lint fraction and 4% smaller seed than the check cultivars. Opposite trend (3% lower lint fraction and 7% higher seed index relative to check cultivars) was found for Arkot 9208. Fibers of Arkot 9202 tended to be finer (7% lower micronaire readings) and have equal length and strength and 9% lower elongation than the check cultivars. In contrast, fibers of Arkot 9208 tended to have the same micronaire readings, 3% longer length, 5% higher strength, and equal elongation in comparison to the check cultivars.

Arkot 9202 and Arkot 9208 were 4 and 8% taller, respectively, than the check cultivars. Although taller than the check cultivars, open boll ratings in 2003 and 2004 indicated that maturity of the lines was similar to the check cultivars. Over six tests, leaf pubescence of Arkot 9202 and Arkot 9208 averaged 5.1 and 3.3, respectively, based on a rating scale of 1 (smooth leaf) to 7 (very hairy) (Bourland et al., 2003).

Arkot 9202 and Arkot 9208 displayed good host plant resistance traits. During selection, both lines were screened for resistance to multiple races of Xanthomonas campestris pv. malvacearum (Smith) Dye, the causal agent of bacterial blight. Resistance to the multiple races conveys resistance to all known U.S. races of this pathogen. In subsequent tests, neither line exhibited symptoms of bacterial blight even after field inoculations with the pathogen. In 2002, both lines had significantly fewer wilted plants [associated with Verticillium wilt (caused by Verticillium dahliae Kleb.)] than ‘PSC 555’, but significantly more wilted plants than SG 105. In 2003, wilted plants of the lines were equal to DP 444BG/RR and ‘ST 4892BR’, but significantly greater than ‘FM 960BR’. In the 2004 National Cotton Fusarium Wilt Test at Tallassee, AL, response of Arkot 9202 to Fusarium wilt [caused by Fusarium oxysporum Schlect. Fr. f. sp. vasinfectum (Atk.) Snyd. & Hans.] was equal to the resistant check (Glass et al., 2004). In 2003, both lines were more resistant to tarnished plant bug [Lygus lineolaris (Palisot de Beauvois)] than the susceptible fregi-bract check and equal to the check cultivars.

Arkot 9202 and Arkot 9208 had the fifth and ninth highest yields of 19 lines evaluated over eight southeast U.S. locations in the 2003 Regional Breeders’ Network Test (www.cottonrbtn.com; verified 2 Feb. 2006). These data suggest that the lines have wide adaptation. Yields of each line did not vary significantly from the highest yielding line at three of the eight locations. Over locations, Arkot 9202 had second highest lint percentage and Arkot 9208 had the second longest fiber length.

The combinations of yield, adaptation, fiber properties, and specific host plant resistance traits of these lines make the lines valuable to cotton breeding programs. Development of the two lines was supported in part by funding from Cotton Incorporated. Small quantities of Arkot 9202 and Arkot 9203 seed may be obtained for breeding purposes from the corresponding author. Unless specifically approved by the Arkansas Agricultural Experiment Station, the lines may not be used as recurrent parents in a breeding program.

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References


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