Registration of Arkot RM24 Germplasm Line of Cotton

F. M. Bourland* and D. C. Jones

A breeding line of cotton, *Gossypium hirsutum* L., designated as Arkot RM24 (Reg. no. GP-881, PI 643444) was released by the Arkansas Agricultural Experiment Station in 2006. The line was developed using the generalized procedures outlined by Bourland (2004).

Arkot RM24 was derived from a 1994 cross of ‘DES 119’ (Bridge, 1986) and Arkot 8606 (Bourland and Benson, 2002). Within F2 populations grown at the Southeast Branch Station at Rohwer, AR, in 1996, bolls from visually superior individual plants were harvested and bulked. The F2 bulk populations were grown at Rohwer in 1997 and superior individual plants were selected and harvested separately. The resulting F2 progeny were evaluated at Clarkedale (Delta Branch Station) and Rohwer, AR, in 1998. One progeny designated as RM24-12 was among the ones promoted and tested in replicated strain tests in 1999 and 2000. Individual plant selections from the F2 generation were evaluated as progenies in 2001. One of these selections produced Arkot RM24 (tested as RM24-12-04).

From 2002 through 2005, Arkot RM24 was compared to ‘PSC 355’ and ‘SG 105’ in 13 replicated field tests at five Arkansas Agricultural Research Station sites, two on-farm sites in northeastern Arkansas, four Stoneville, MS sites, and one Tifton, GA site. Arkot RM24 was also evaluated in the 2005 Regional Breeders’ Testing Network, which included ten locations from South Carolina to west Texas (www.cottonrbtn.com/ verified 23 July 2007).

Over all Arkansas tests, mean lint yields of Arkot RM24 exceeded the check cultivars by approximately 11%. Yields of Arkot RM24 were intermediate to the two check cultivars in the four Stoneville, MS, tests, but it yielded significantly less than either check cultivar at Tifton, GA, in 2004. Out of 20 entries in the 2005 RBTN, Arkot RM24 ranked tenth for lint yield (with lowest relative yield at Stoneville, MS, and two Louisiana sites) and had the highest lint percentage.

In the Arkansas tests, Arkot RM24 had micronaire and fiber length values similar to the check cultivars, but had 6% lower fiber strength and 18% lower fiber elongation. Arkot RM24 tended to have higher lint percentage (1.5% points greater), 3% lower seed index, and produced 6% more seed per area than either check cultivar. Arkot RM24 was similar to the check cultivars in plant height, but matured earlier (5% higher open bolls at defoliation) than either check cultivar. Based on a rating system developed by Bourland et al. (2003), leaf pubescence of Arkot RM24 was intermediate between the smooth leaf (SG 105) and hairy leaf (PSC 355) check cultivars. Bract size and marginal bract trichome density of Arkot RM24 was similar to PSC 355.

Arkot RM24 displays good host plant resistance traits. During selection, the line was 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. Arkot RM24 exhibited resistance to bacterial blight in annually produced seed increase blocks that were inoculated with the pathogen. In 2004, Arkot RM24 had significantly more wilted plants associated with Verticillium wilt (caused by *Verticillium dahliae*, Kleb.) than SG 105. Increased wilt symptoms are sometimes associated with early maturation. No differences in Verticillium wilt were detected in 2005.

In the 2004 and 2005 National Cotton Fusarium Wilt Test at Tallassalee, AL, Arkot RM24 had significantly less fusarium wilt [caused by *Fusarium oxysporum* Schlecht. F. sp. *vasinfectum* (Atk.) Snyd. & Hans.] than the susceptible check (Glass et al., 2004; 2005). In 2004 and 2005, Arkot RM24 was more resistant to tarnished plant bug (*Lygus lineolaris* (Palisot de Beauvois)) than the susceptible frego-bract check and equal to the normal-bract check cultivars.

The combinations of yield adaptation, early maturation, and specific host plant resistance traits make this line valuable to cotton breeding programs. Development of the line was supported in part by funding from Cotton Incorporated. Small quantities of Arkot RM24 seeds may be obtained for breeding purposes from F.M. Bourland, P.O. Box 48, Northeast Research and Extension Center, Keiser, AR 72351. Unless specifically approved by the Arkansas Agricultural Experiment Station, Arkot RM24 may not be used as recurrent parents in a breeding program.

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