Registration of Arkot 9304a, Arkot 9304b, Arkot 9308, and Arkot 9314, Four High-Glanding Germplasm Lines of Cotton

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Four breeding lines of cotton, *Gossypium hirsutum* L., designated Arkot 9304a (Reg. No. GP-870, PI 643438), Arkot 9304b (Reg. No. GP-871, PI 643439), Arkot 9308 (Reg. No. GP-872, PI 643440), and Arkot 9314 (Reg. No. GP-873, PI 643441) were released by the Arkansas Agricultural Experiment Station in 2006. The lines were developed using the generalized procedures outlined by Bourland (2004). All four lines possess the high-glanding (HG) characteristic, which is identified by the presence of gossypol glands on the calyx lobes. Calhoun (1997) indicated that a special Gl allele was responsible for this HG phenotype. Gossypol glands on the calyx lobes are a strong deterrent and antibiotic factor against tobacco budworm (*Heliothis virescens* F.) (Parrott et al., 1989; Hedin et al., 1992).

Arkot 9304a and Arkot 9304b were derived from a 1993 cross between ‘H1244’ (Calhoun et al., 1997b) and Ark 8518-02-10, a sister line to ‘H1330’ (Bourland, 1996). Ark 8518-02-10 was developed from a cross of ‘DES 119’ (Bridge, 1986) and Miscot 7803-52 (Bourland and White, 1989). Arkot 9308 and Arkot 9314 were derived from 1993 crosses with a common parent, ‘H1215’ (Calhoun et al., 1997a). The second parents of Arkot 9308 and Arkot 9314 were derived from 1993 crosses with a common parent, ‘H1215’ (Calhoun et al., 1997a). The second parents of Arkot 9308 and Arkot 9314 were Ark 8518-17-04, and Ark 8606 (Bourland and Benson, 2002), respectively. Ark 8518-17-04 is a breeding line developed from a cross of DES 2377 (Bridge, 1987) and Miscot 7824 (Bourland and White, 1992).

Within F₂ populations grown at the Southeast Branch Station at Rohwer, AR, in 1994, bolls from visually superior individual plants were harvested and bulked. Seed from individual plants (selected from the subsequent F₂ populations grown at Rohwer in 1995) was evaluated in progeny rows at Rohwer, Clarkedale (Delta Branch Station), and Fayetteville, AR, in 1996. Progenies designated as 9304-39, 9308-17, and 9314-24 were among the lines promoted and tested in replicated strain tests in 1997 and 1998. Individual plant selections from the F₂ generation of these three strains were evaluated as progenies in 1990 and 2000. Four of these selections produced Arkot 9304a (tested as 9304-39-02), Arkot 9304b (tested as 9304-39-15), Arkot 9308 (tested at 9308-17-04), and Arkot 9314 (tested as 9314-24-16).

From 2001 through 2004, the four lines were compared to ‘PSC 355’ and ‘SG 105’ in 12 replicated field tests at four Arkansas Agricultural Research Station sites, one on-farm site in northeast Arkansas, two Stoneville, MS, sites, and two Tifton, GA, sites. Arkot 9304a, Arkot 9304b, and Arkot 9314 were also evaluated in the 2004 Regional Breeders’ Testing Network (RBTN), which included 11 locations from South Carolina to west Texas (www.cottonrbtn.com).

Mean lint yields of the four lines over all Arkansas tests were similar to PSC 355 and 1 to 5% higher than SG 105. When compared over years, Arkot 9308 and Arkot 9314 yielded more than one or both of the check cultivars at each location. Over the Tifton, GA, and Stoneville, MS, test sites, Arkot 9304b and Arkot 9314 yielded 9 and 3% higher, respectively, than the mean of SG 105 and PSC 355. Out of 24 entries in the 2004 RBTN, lint yields of Arkot 9304a, Arkot 9304b, and Arkot 9314 ranked first, second, and sixth, respectively.

In the Arkansas tests, all four lines tended to have higher lint percentage, higher seed index (heavier seed), higher lint index (more lint per seed), more fibers per seed, and fewer seed per acre than either check cultivar. According to Lewis et al. (2000), this combination of yield components (i.e., increased reliance on high lint index relative to seeds per acre) should contribute to more stable yield production.

Fiber-quality parameters (micronaire reading, length, length uniformity, strength, and elongation) of the four lines were generally similar to the two check cultivars. Two exceptions included shorter (3%) fiber length of Arkot 9304b and stronger (6%) fiber strength of Arkot 9308. Its short fiber length would limit the commercial utility of Arkot 9304b.

Plant heights of Arkot 9304a and Arkot 9304b were similar to SG 105, while height of Arkot 9308 and Arkot 9314 were 8 and 12 cm taller, respectively. At defoliation, open boll percentages...