

COTTON GERMPLASM LINES RELEASED BY THE UNIVERSITY OF ARKANSAS IN 2013

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Abstract

Sustainability of cotton production depends on continued improvement of germplasm used to develop cotton cultivars. About 10 years is required from an initial cross to the release of a line, but germplasm at various stages of development are constantly available in an on-going program. The primary focus of the UA Cotton Breeding Program has been to develop new cotton germplasm types that meet cotton production needs of Arkansas. Released lines express various combinations of enhanced specific host plant resistance traits, improved fiber quality, and/or increased yield in Arkansas environments. From 2004 through 2012, 43 germplasm lines were released from UA Cotton Breeding Program. In 2013, Arkansas Agricultural Experiment Station released five additional germplasm lines of Upland cotton, *Gossypium hirsutum* L. – Arkot 0219, Arkot 0222, Arkot 0305, Arkot 0309, and Arkot 0316.

Both Arkot 0219 and Arkot 0222 were derived from crosses with one common parent, Arkot 9111 (Bourland and Jones, 2005). The second parent for Arkot 0219 and Arkot 0222 was the advanced breeding lines DES 810 and STX8M007, respectively. Arkot 0222 is a sister line to 'UA222' (Bourland and Jones, 2012). Both Arkot 0219 and Arkot 0222 produced higher yields than 'DP 393' and 'SG 105' at each of four test sites in Arkansas. Their high yields were achieved by a favorable combination of basic yield components, which should provide high yield stability. Both lines displayed high resistance to bacterial blight and were similar to DP 393 in their response to other diseases. Arkot 0222 displayed resistance to tarnished plant bug equal to DP 393 and UA 222, but higher than SG 105 or Arkot 0219. Fiber quality of Arkot 0219 is similar to SG 105, but inferior to DP 393 and UA222. Fiber quality of Arkot 0222 is similar to DP 393, but inferior to UA222.

Arkot 0305 and Arkot 0316 were derived from crosses with one common parent, Arkot 9203-17 (Bourland and Jones, 2006). The second parent for Arkot 0305 and Arkot 0316 was 'DP 491' and Arkot 9111 (Bourland and Jones, 2005), respectively. Arkot 0309 was derived from a cross of DP 491 and 'FM 966'. A Material Use Agreement (dated May 27, 2004) with Delta and Pine Land Company provided the University of Arkansas limited rights to cross with DP 491. All three lines exhibited high fiber density. All three lines produced equal or higher lint yields than DP 393 over four years and four test sites in Arkansas. Arkot 0305 and Arkot 0316 produced higher yields than Arkot 0309. The lines differed with respect to lint percentage, plant height, maturity, and relative trichome density on leaves, stems and bracts. All three lines displayed high resistance to bacterial blight and were similar to DP 393 in their response to other diseases. Arkot 0305 and Arkot 0306 displayed resistance to tarnished plant bug equal to DP 393, but higher than Arkot 0309. Fiber quality of Arkot 0309 was superior to Arkot 0305, Arkot 0316, and DP 393. All three lines had lower fiber strength and fiber elongation than DP 393.

Each of the five lines displayed high yielding ability, favorable yield components, specific host plant resistance traits, early maturity and acceptable to superior fiber quality. Development of the lines was supported in part by funding from Cotton Incorporated. Inquiries regarding commercial use should be directed to the Arkansas Crop Variety Improvement Program, 1091 W. Cassatt Rd., Fayetteville, AR 72704 Attn: Don Dombek ([479-575-6884](tel:479-575-6884)). Small quantities of seed of the lines 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, the lines may not be used as recurrent parents in a breeding program. Seed of the five lines have been deposited with the National Plant Germplasm System.

References

Bourland, F.M. and D.C. Jones. 2005. Registration of Arkot 9111 germplasm line of cotton. Crop Sci. 45:2127-2128.

Bourland, F.M. and D.C. Jones. 2006. Registration of Arkot 9203-03 and Arkot 9203-17 germplasm lines of cotton. *Crop Sci.* 46:1408-1409.

Bourland, F.M. and D. C. Jones. 2012. Registration of 'UA222' cotton cultivar. *J. Plant Reg.* 6:259-263.