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# NOTICE OF RELEASE OF ARKOT 8712 GERMPLASM LINE OF COTTON

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The Arkansas Agricultural Experiment Station announces the release of a noncommercial breeding line of cotton, *Gossypium hirsutum* L., designated Arkot 8712, which was derived from the double cross of $F_1$ (Deltapine 50 / Miscot 7913-51 // $F_1$ (Miscot T8-27 / Miscot 7803-52). The germplasm lines Miscot 7913-51 (Bourland, 1988), Miscot T8-27 (Bourland and Bridge, 1988) and Miscot 7803-51 (Bourland and White, 1989) were developed by crossing lines from the Texas A&M Multi-Adversity Resistance Cotton Breeding program (Bird, 1982) by lines adapted to the Mississippi River Delta region. Deltapine 50 was a widely grown, smooth-leaf, early maturing cultivar released in the early 1980's.

Arkot 8712 (tested as 8712-09-20) was derived from an $F_3$ individual plant selection made in 1989 using procedures of Bird (1982) modified to permit selection for lateral root development . Subsequently, additional individual plant selections, based upon visual appearance, were made in the $F_5$ and the $F_8$ generations. The resulting line was evaluated in 43 replicated field tests at four Arkansas Agricultural Research Station sites in the Mississippi River Delta and compared to 'DES 119' in 1995-1997, 'ST474' in 1999-2000, and 'PSC 355' in 2001-2003.

Over all locations, lint yields of Arkot 8712 were similar to the check cultivars, but yields of Arkot 8712 were relatively better in the north Arkansas locations (Keiser and Clarkedale) than in the south Arkansas locations (Marianna and Rohwer) (Table 1). Fiber properties of Arkot 8712 were similar to the check cultivars, except that Arkot 8712 consistently produced longer fiber length. Negatively, lint fraction of Arkot 8712 was inferior to the check cultivars. Leaf pubescence of Arkot 8712 averaged 2.8 using a rating scale of 1 (smooth leaf) to 7 (very hairy) (Bourland et al., 2003).

**Table 1. Performance of Arkot 8712 compared to check cultivers[1] in irrigated (ir) and/or non-irrigated (ni) tests at Clarkedale (C), Keiser (K), Marianna (M), and Rohwer (R), Arkansas in 1994 through 2003.**

| Year | Loc | Entry | Lint yield | Lint fract. | Micro-naire | Len | Len unif. | Str. | Elong. | Leaf pub. | Plant ht. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | lb/a | % | | in. | %. | g/tex | % | | cm |
| 95-03 | C-ir | Ar8712 | 964 | 36.2 | 4.4 | 1.21 | 85.1 | 30.4 | 7.9 | 2.6 | 125 |
| 95-03 | C-ir | Check | 903 | 37.6 | 4.5 | 1.15 | 84.5 | 29.7 | 8.1 | 6.9 | 131 |
| 95-03 | C-ir | H,E,L[2] | 2,6,0 | 0,4,4 | 1,6,1 | 6,2,0 | 2,6,0 | 2,6,0 | 1,4,3 | 0,0,1 | 0,1,2 |
| | | | | | | | | | | | |
| 95-03 | K-ir | Ar8712 | 1030 | 37.5 | 4.9 | 1.20 | 85.6 | 30.2 | 7.8 | 2.0 | 101 |
| 95-03 | K-ir | Check | 1014 | 39.1 | 5.1 | 1.14 | 85.0 | 30.7 | 8.1 | 4.7 | 108 |
| 95-03 | K-ir | H,E,L[2] | 1,7,0 | 0,5,3 | 0,4,4 | 6,2,0 | 2,6,0 | 0,6,2 | 1,4,3 | 0,0,5 | 0,4,1 |
| | | | | | | | | | | | |
| 99-03 | K-ni | Ar8712 | 722 | 38.9 | 4.7 | 1.14 | 84.5 | 30.0 | 8.2 | 3.9 | 69 |
| 99-03 | K-ni | Check | 701 | 41.0 | 5.1 | 1.08 | 84.2 | 30.7 | 8.8 | 6.4 | 67 |
| 99-03 | K-ni | H,E,L[2] | 0,5,0 | 0,4,1 | 0,3,2 | 3,2,0 | 0,5,0 | 1,3,1 | 0,2,3 | 0,0,1 | 0,4,0 |
| | | | | | | | | | | | |
| 94-03 | M-ir | Ar8712 | 1103 | 37.4 | 5.0 | 1.19 | 85.3 | 29.8 | 7.9 | 2.9 | 126 |
| 94-03 | M-ir | Check | 1114 | 39.0 | 4.9 | 1.15 | 85.0 | 29.4 | 8.3 | 5.1 | 126 |
| 94-03 | M-ir | H,E,L[2] | 1,6,2 | 0,4,5 | 1,8,0 | 6,3,0 | 0,9,0 | 0,9,0 | 1,4,4 | 0,0,5 | 1,4,0 |
| | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 99-03 | M-ni | Ar8712 | 626 | 37.0 | 4.8 | 1.14 | 84.1 | 31.2 | 8.4 | 3.0 | 98 |
| 99-03 | M-ni | Check | 675 | 39.7 | 5.0 | 1.08 | 83.9 | 30.4 | 8.4 | 6.1 | 98 |
| 99-03 | M-ni | H,E,L[2] | 0,3,2 | 0,3,2 | 0,4,1 | 5,0,0 | 0,5,0 | 3,0,2 | 2,0,3 | 0,0,1 | 0,3,1 |
| | | | | | | | | | | | |
| 95-03 | R-ir | Ar8712 | 1379 | 37.7 | 4.9 | 1.19 | 85.5 | 29.6 | 7.7 | 2.7 | 106 |
| 95-03 | R-ir | Check | 1476 | 40.0 | 5.1 | 1.14 | 84.9 | 29.3 | 8.1 | 5.6 | 105 |
| 95-03 | R-ir | H,E,L[2] | 2,5,1 | 0,3,5 | 0,6,2 | 6,2,0 | 2,6,0 | 3,5,0 | 0,6,2 | 0,0,2 | 0,2,1 |
| | | | | | | | | | | | |
| All yr | All | Ar8712 | 971 | 37.5 | 4.8 | 1.18 | 85.0 | 30.2 | 8.0 | 2.8 | 104 |
| All yr | All | Check | 980 | 39.4 | 4.9 | 1.12 | 84.6 | 30.0 | 8.3 | 5.8 | 106 |
| All yr | All | H,E,L[2] | 6,32,5 | 0,23,20 | 2,31,10 | 32,11,0 | 6,37,0 | 9,29,5 | 5,20,18 | 0,0,15 | 0,18,5 |

[1]Check cultivar was DES119 in 1995-97, St474 in 1999-2000, and PSC355 in 2001-03.

[2]Number of tests that Arkot 8712 was statistically higher (H), equal to (E) and less than check cultivars.

During selection, Arkot 8712 was screened for resistance to races 1, 2, 7, and 18 of *Xanthomonas campestris* pv. *malvacearum* (Smith) Dye, the causal agent of bacterial blight. Resistance to these races conveys resistance to all known U.S. races of this pathogen. In subsequent tests, Arkot 8712 has not exhibited symptoms of bacterial blight even after field inoculations with the pathogen. In the Regional Cotton Fusarium Wilt Test at Tallassee, AL, resistance of Arkot 8712 to fusarium wilt [caused by *Fusarium oxysporum* Schlect. F. sp. *vasinfectum* (Atk.) Snyd. & Hans.] was equal to the resistant check (Table 2).

**Table 2. Percentage of wilted plants associated with Arkot 8712 in the Regional Cotton Fusarium Wilt Test at Tallahassee, AL, in 1997 and 2001.**

| Line | 1997 | 2001 |
|---|---|---|
| | % | % |
| Arkot 8712 | 29 | 12 |
| Rowden (susceptiblecheck) | 82 | 45 |
| M-315 (resistant check) | 18 | 7 |
| | | |
| LSD0.05 | 14 | 16 |

Performance of Arkot 8712 in 1996 through 1999 Regional High Quality Strain Tests are available at http://msa.ars.usda.gov/ms/stoneville/cgpr/rayburn.html. The combination of adaptation to the northern Delta, good fiber properties (particularly fiber length), and the near smooth-leaf characteristic of Arkot 8712 make the line valuable in a cotton breeding program. Small quantities of Arkot 8712 seed may be obtained for breeding purposes from F.M. Bourland, P.O. Box 48, Northeast Research and Extension Center, Keiser, AR 72351.

## References

Bird, L.S. 1982. The MAR (Multi-Adversity Resistance) system for genetic improvement of cotton. Plant Dis. 66-172-176.

Bourland, F. M. and B. W. White. 1989. Registration of Miscot 7803-51 and Miscot 7803-52 germplasm lines of cotton. Crop Sci. 29:242-243.

Bridge, R. R. 1986. Registration of >DES 119' cotton. Crop Sci. 26:646-647.

Bourland, F. M. 1988. Registration of Miscot 7913-51, Miscot 7913-83, and Miscot 7913-84 germplasm lines of cotton. Crop Sci. 28:200-201.

Bourland, F. M., J. M. Hornbeck, A. B. McFall, and, S. D. Calhoun. 2003. A rating system for leaf pubescence of cotton. J. Cotton Sci. 7:8-15.

Bourland, F. M. and R. R. Bridge. 1988. Registration of Miscot T8-27 cotton germplasm. Crop Sci. 28:1035.