

**NOTICE OF RELEASE OF ARKOT A306 AND
ARKOT A314 GERmplasm LINES OF COTTON**

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References

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- Maredia, K.M., N.P. Tugwell, B.A. Waddle, and F.M. Bourland. 1994. Technique for screening cotton germplasm for resistance to tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois). *Southwestern Entomologist* 19:63-70.

The Arkansas Agricultural Experiment Station announces the release of two noncommercial breeding lines of cotton, *Gossypium hirsutum* L., designated Arkot A306 and Arkot A314. Both lines were derived from crosses made in 1983 with one common parent, 752120, which was a selection from a cross of 'New Rex' x 'Delcot 277J' (Sappenfield, 1979). The second parent of Arkot A306 and Arkot A314 was 'DES 422' (Bridge, 1986) and DES 210-23 (an advanced strain from the cross 'Stoneville 7A' by PD 62-164-8 made in 1966), respectively.

Both Arkot A306 (tested as A306-16) and Arkot A314 (tested as A314-07-20) were derived from individual plant selections made in 1985 from F₂ populations, with subsequent individual plants selected from F₃ progeny rows in 1986. These selections were evaluated as F_{3,4} progeny rows in 1988. Plants were bulked with F_{3,4} progeny rows and evaluated as pure lines in replicated tests from 1989 through 1995. Individual plant selections were made from A306-16 and A314-07 in 1995. These were evaluated as progeny rows in 1996, and selected ones were evaluated as strains in 1997 and 1999 in Arkansas. One selection from A314-07 (designated as A314-07-20) was considered to be superior to A314-07. None of the selections from A306-16 were retained.

Agronomic traits of A306-16 and A314-07 were compared to 'DES 119' in 23 tests from 1989 through 1995 at four Arkansas Agricultural Research Station sites in the Mississippi River Delta (Table 1). Compared to DES 119, both lines tended to have lower yield, lower lint fraction, similar micronaire, and shorter fiber length, but were earlier maturing. Fiber strength of Arkot A306 was greater than DES 119 or A314-07. The selection A314-07-20 was evaluated in six tests conducted in 1997 and 1999 (Table 2). Compared to 'Sure-Grow 125', A314-07-20 was equal in yield and tended to have lower lint fraction, fiber length and fiber elongation, but higher fiber strength and earlier maturity.

Resistance of A306-16 and A314-07 to tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois) was evaluated in field tests conducted in 1994 and 1995 (Table 3). Damage to A314-07 was equal to DES 119. A306-16 was more susceptible than DES 119, but more resistant than the frego-bract susceptible check. In the Regional Cotton Fusarium Wilt Test at Tallassee, AL, resistance of the two lines to fusarium wilt [caused by *Fusarium oxysporum* f. sp. *vasinfectum* (Atk.) Synd. and Hans.] was equal to the resistant check (Table 4).

The relative high strength and specific adaptation of Arkot A306 and Arkot A314 should make them valuable as breeding lines. Combining ability of the lines appears to be strong since crosses of the lines with other parental material have produced superior progeny.

Small quantities of Arkot A306 and Arkot A314 seed may be obtained for breeding purposes from F.M. Bourland, P.O. Box 48, Northeast Research and Extension Center, Keiser, AR 72351.

Table 1. Performance of germplasm lines at Clarkedale (Clk), Keiser (Kei), Marianna (Mar) and Rohwer (Roh), Arkansas¹.

| Year | Loc | Genotype | Lint | Lint | Open | Mic. | Len. | Str. | Elo. |
|------|-----|----------|---------------|------------|------------|-------------|-------------|-------------|-------------|
| | | | yield lb/a | fract % | bolls % | | | | |
| 1989 | Clk | A306-16 | 755 | 35.8 | 76 | 4.40 | <i>1.13</i> | 21.1 | 7.7 |
| 1990 | Clk | A306-16 | 854 | 36.2 | 82 | 4.90 | 1.11 | 28.3 | 10.3 |
| 1991 | Clk | A306-16 | <i>1329</i> | 36.8 | 91 | 4.80 | 1.09 | 22.7 | 9.9 |
| 1992 | Clk | A306-16 | 1054 | 37.5 | . | 4.82 | <i>1.13</i> | 29.8 | 8.2 |
| 1993 | Clk | A306-16 | 703 | 34.5 | 66 | 4.19 | 1.15 | 28.9 | 6.5 |
| 1994 | Clk | A306-16 | 930 | 33.9 | 53 | 4.31 | 1.19 | 31.3 | 6.9 |
| 1995 | Clk | A306-16 | 901 | 35.7 | . | 4.40 | 1.15 | 29.7 | 7.8 |
| 1990 | Kei | A306-16 | 734 | 37.5 | 86 | 4.30 | <i>1.12</i> | 30.5 | 11.3 |
| 1991 | Kei | A306-16 | 706 | 38.5 | 94 | . | . | . | . |
| 1992 | Kei | A306-16 | <i>1156</i> | 37.3 | 87 | 4.42 | 1.14 | 30.0 | 8.2 |
| 1993 | Kei | A306-16 | 713 | 36.8 | 50 | <i>4.91</i> | 1.08 | 28.0 | 7.4 |
| 1994 | Kei | A306-16 | 1279 | 38.3 | 38 | 4.32 | <i>1.16</i> | 31.5 | 7.4 |
| 1995 | Kei | A306-16 | 831 | 35.5 | . | 4.99 | <i>1.12</i> | 30.2 | 8.0 |
| 1990 | Mar | A306-16 | 876 | 36.8 | 90 | 4.40 | 1.11 | 25.3 | 9.5 |
| 1992 | Mar | A306-16 | 772 | 37.5 | . | 3.79 | 1.13 | 26.0 | 8.7 |
| 1993 | Mar | A306-16 | 920 | 34.2 | 62 | 4.57 | <i>1.15</i> | 28.4 | 6.4 |
| 1994 | Mar | A306-16 | 924 | 37.3 | 58 | 4.27 | 1.17 | 31.9 | 6.9 |
| 1995 | Mar | A306-16 | 853 | 34.4 | . | 4.69 | <i>1.13</i> | 33.1 | 6.6 |
| 1991 | Roh | A306-16 | 1012 | 36.8 | . | 4.40 | 1.14 | 21.7 | 9.7 |
| 1992 | Roh | A306-16 | 1310 | 36.5 | . | 4.65 | 1.14 | 27.6 | 8.2 |
| 1993 | Roh | A306-16 | 801 | 35.3 | 70 | 5.05 | 1.15 | 30.4 | 6.9 |
| 1994 | Roh | A306-16 | 927 | 34.8 | . | 4.47 | 1.13 | 29.8 | 7.0 |
| 1995 | Roh | A306-16 | 1097 | 35.8 | 50 | 4.90 | 1.13 | 28.9 | 5.9 |
| 1989 | Clk | A314-07 | 842 | 35.1 | 82 | 3.80 | 1.15 | 20.0 | 8.1 |
| 1990 | Clk | A314-07 | 858 | 35.0 | 87 | 4.30 | 1.18 | 27.5 | 10.1 |
| 1992 | Clk | A314-07 | 1132 | 41.5 | . | 5.00 | 1.16 | 27.6 | 7.3 |
| 1991 | Clk | A314-07 | <i>1283</i> | 37.0 | 93 | 5.10 | 1.11 | 20.5 | 9.7 |
| 1993 | Clk | A314-07 | 738 | 34.4 | 74 | 4.30 | 1.16 | 24.6 | 6.1 |
| 1994 | Clk | A314-07 | 1015 | 33.1 | 65 | 4.41 | 1.23 | 29.3 | 6.9 |
| 1995 | Clk | A314-07 | 867 | 36.5 | . | 4.40 | 1.20 | 27.1 | 7.8 |
| 1990 | Kei | A314-07 | 749 | 37.1 | 91 | 4.40 | 1.16 | 28.0 | <i>10.6</i> |
| 1991 | Kei | A314-07 | 747 | 37.9 | 91 | . | . | . | . |
| 1992 | Kei | A314-07 | <i>1081</i> | 37.1 | 88 | 4.22 | <i>1.16</i> | 27.7 | 7.6 |
| 1993 | Kei | A314-07 | 768 | 37.3 | 52 | 4.87 | 1.12 | 25.1 | 7.3 |
| 1994 | Kei | A314-07 | <i>1222</i> | 37.6 | 58 | 3.81 | 1.18 | 28.8 | 6.6 |
| 1995 | Kei | A314-07 | 870 | 38.1 | . | 4.98 | 1.15 | 26.0 | 7.7 |
| 1990 | Mar | A314-07 | 889 | 34.3 | 89 | 4.00 | 1.18 | 25.6 | 8.9 |
| 1992 | Mar | A314-07 | 795 | 34.1 | . | 3.83 | 1.14 | 27.8 | 8.1 |
| 1993 | Mar | A314-07 | 988 | 35.7 | 85 | 4.52 | <i>1.14</i> | 28.6 | 7.1 |
| 1994 | Mar | A314-07 | 1079 | 35.4 | 68 | 4.59 | 1.20 | 29.5 | 7.4 |
| 1995 | Mar | A314-07 | 1111 | 34.4 | . | 4.84 | 1.20 | 29.6 | <i>6.1</i> |
| 1991 | Roh | A314-07 | <i>814</i> | 37.2 | . | 3.90 | 1.20 | 19.9 | 9.0 |
| 1992 | Roh | A314-07 | 1283 | 40.5 | . | 5.57 | 1.12 | 23.5 | 7.2 |
| 1993 | Roh | A314-07 | 829 | 36.0 | 85 | 5.11 | <i>1.13</i> | 26.7 | <i>6.1</i> |
| 1994 | Roh | A314-07 | 1171 | 35.8 | . | 4.46 | 1.16 | 27.5 | 7.2 |
| 1995 | Roh | A314-07 | 1117 | 35.8 | 53 | 4.48 | 1.17 | 29.4 | 5.9 |
| All | Clk | A306-16 | 932 | 35.8 | 74 | 4.55 | 1.14 | 27.4 | 8.2 |
| All | Clk | A314-07 | 962 | 36.1 | 80 | 4.47 | 1.17 | 25.2 | 8.0 |
| All | Clk | DES 119 | 971 | 37.1 | 69 | 4.51 | 1.17 | 25.9 | 8.4 |
| All | Kei | A306-16 | 903 | 37.3 | 71 | 4.59 | 1.12 | 30.0 | 8.5 |
| All | Kei | A314-07 | 906 | 37.5 | 76 | 4.46 | 1.15 | 27.1 | 8.0 |
| All | Kei | DES 119 | 961 | 39.3 | 68 | 4.68 | 1.18 | 28.1 | 8.8 |
| All | Mar | A306-16 | 869 | 36.0 | 70 | 4.34 | 1.14 | 28.9 | 7.6 |
| All | Mar | A314-07 | 972 | 34.8 | 81 | 4.36 | 1.17 | 28.2 | 7.5 |
| All | Mar | DES 119 | 929 | 36.4 | 62 | 4.26 | 1.19 | 28.0 | 8.0 |
| All | Roh | A306-16 | 964 | 36.6 | 81 | 4.60 | 1.17 | 26.2 | 8.1 |
| All | Roh | A314-07 | 1043 | 37.1 | 69 | 4.70 | 1.16 | 25.4 | 7.1 |
| All | Roh | DES 119 | 1118 | 37.7 | 60 | 4.76 | 1.17 | 27.2 | 7.8 |
| All | All | A306-16 | 932 | 36.2 | 70 | 4.54 | 1.13 | 28.4 | 8.0 |
| All | All | A314-07 | 967 | 36.4 | 77 | 4.50 | 1.16 | 26.4 | 7.7 |
| All | All | DES 119 | 991 | 37.7 | 66 | 4.55 | 1.18 | 27.2 | 8.3 |

¹ Within tests, italicized and bold data are significantly (p = 0.05) less and more, respectively, than DES 119.

Table 2. Performance of A314-07-20 at four locations in Arkansas in 1997 and 1999¹.

| Year | Loc | Genotype | Lint | Lint | Open | Mic | Len. | Str. | Elo. |
|------|-----|-------------|---------------|------------|------------|-------------|-------------|------|------|
| | | | yield lb/a | fract % | bolls % | | | | |
| 1997 | Mar | A314-07-20 | 1315 | 40.3 | 80 | 4.97 | 1.16 | 27.7 | 6.5 |
| 1997 | Roh | A314-07-20 | 1560 | 40.1 | 47 | 4.54 | <i>1.14</i> | 29.4 | 6.5 |
| 1999 | Clk | A314-07-20 | 946 | 35.4 | 55 | 4.65 | 1.19 | 30.1 | 7.5 |
| 1999 | Kei | A314-07-20 | 1290 | 37.5 | 73 | 5.25 | <i>1.11</i> | 29.4 | 7.2 |
| 1999 | Mar | A314-07-20 | 1121 | 40.3 | 75 | 5.95 | 1.09 | 29.2 | 7.0 |
| 1999 | Roh | A314-07-20 | 1066 | 37.7 | 68 | 5.75 | 1.10 | 29.9 | 6.5 |
| All | All | A314-07-20 | 1216 | 38.6 | 66 | 5.19 | 1.13 | 29.3 | 6.9 |
| All | All | SG 125, ck. | 1218 | 40.2 | 62 | 5.05 | 1.15 | 28.9 | 7.8 |

¹ Within tests, italicized and bold data are significantly (p = 0.05) less and more, respectively, than Sure-Grow 125.

Table 3. Plant bug damage¹ associated with cotton lines at Fayetteville, Arkansas in 1994 and 1995.

| Genotype | 1994 | | 1995 | |
|-------------------|--------------------|--------------------|--------------------|--------------------|
| | Anthers damaged | Squares damaged | Anthers damaged | Squares damaged |
| | % | % | % | % |
| A306-16 | 6.1 | 30 | 7.7 | 34 |
| A314-07 | 4.6 | 26 | 5.0 | 28 |
| DES 119 | 1.6 | 13 | 3.6 | 21 |
| Frego-bract check | - | - | 37.1 | 83 |
| LSD 0.05 | 3.2 | 17 | 8.9 | 16 |

¹ Plant bug damage was estimated by cutting 20 squares/plot in 2 replications, then examining anthers using method of Maredia et al. (1994). Damage was expressed as estimated average percentage of anthers discolored and as percentage of squares with any discolored anthers.

Table 4. Performance of two germplasm lines the Regional Fusarium Wilt Tests at Tallassee, AL.

| Genotype | Wilted plants by year | |
|----------------------------|-----------------------|------|
| | 1991 | 1995 |
| | % | % |
| A306-16 | 54 | 20 |
| A314-07 | 57 | 14 |
| Resistant check, Auburn 56 | 38 | - |
| Resistant check, M-315 | - | 9 |
| Susceptible check, Rowden | 80 | 92 |
| LSD 0.05 | 28 | 24 |