

**NOTICE OF RELEASE OF ARKOT A129 AND
ARKOT A132 GERMPLASM LINES OF COTTON**
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The Arkansas Agricultural Experiment Station announces the release of two noncommercial breeding lines of cotton, *Gossypium hirsutum* L., designated as Arkot A129 and Arkot A132. Both lines were derived from crosses made in 1981 with one common parent, FTA266. The second parent of Arkot A129 and Arkot A132 was 'Cascot L7' and 'Stoneville 825', respectively. FTA266, which is the source of high fiber strength in these lines, was developed by a complex series of crosses described by Culp and Harrell (1975). The pedigree of FTA266 includes Triple Hybrid 108, Triple Hybrid 171, AHA 6-1-4, 'Earlistaple', and 'Sealand 542'.

Arkot A129 was tested as A129-02, and Arkot A132 was tested as A132-22. Both were derived from individual plant selections made in 1983 from F₂ populations, with a subsequent individual plant selected from F₃ progeny rows in 1984. These selections were evaluated as F_{3,4} progeny rows in 1988. Seed from F_{3,4} progeny rows were evaluated as pure lines in replicated tests from 1989 through 1993.

Agronomic traits of the two lines were compared to 'DES 119' in 13 tests at four Arkansas Agricultural Experiment Station sites in the Mississippi River Delta (Table 1). In addition, Arkot A129 was evaluated at eight sites in the 1992 Regional Short-Season Strain Test (Table 2) and Arkot A132 was evaluated at 10 sites in the 1992 Regional High Quality Strain Test (Table 3). Performance of the two lines followed similar trends in all experiments. Lint yields of both lines tended to be lower than DES 119 and 'Deltapine 51', but the differences were usually not statistically significant. Fiber strength of both lines was consistently high in all tests. However, lint fraction and fiber elongation were consistently low. Arkot A129 had slightly longer and finer fibers than Arkot A132.

In field tests conducted in 1994 and 1995, Arkot A132 was equal to DES 119 in resistance to tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois) (Table 4). Arkot A129 was more susceptible than the resistant checks, 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 5).

The relative high strength and specific adaptation of Arkot A129 and Arkot A132 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 A129 and Arkot A132 seed may be obtained for breeding purposes from F.M. Bourland, Department of Agronomy, Plant Science 115, University of Arkansas, Fayetteville, AR 72701.

References

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

Culp, C.W. and D.C. Harrell. 1975. Influence of lint percentage, boll size, and seed size on lint yield of Upland cotton with high fiber strength. *Crop Sci.* 15:741-746.

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.

Table 1. Yield and fiber properties of Arkot A129, Arkot A132 and DES 119 in Arkansas¹, 1898-1993.

Genotype	Lint yield pick lb/a	First fract. %	Lint naire %	Fiber properties			
				Length unit in.	Strength g/tex	Elong ation %	
Arkot A129	878	81	34.8	4.54	1.19	27.9	8.1
Arkot A132	903	83	35.8	4.92	1.17	27.1	7.8
DES 119	948	82	38.2	4.59	1.17	25.9	9.1
LSD 0.05	ns	ns	0.6	0.12	0.01	0.7	0.2
Pr>F _(GXF)	0.97	0.34	0.20	0.03	0.06	0.06	<.01

¹/ The lines were evaluated at Keiser (3 tests), Clarkedale (5 tests), Marianna (3 tests), and Rohwer (2 tests).

Table 2. Performance of Arkot A129 and Deltapine 51 (DP51) in the 1992 Regional Short-Season Strain Test.

Variable by Test Site	Arkot		LSD 0.05
	A129	DP 51	
Lint yield (lb/a):			
Starkville, MS w/TBW ¹	272	360	168
Starkville, MS w/o TBW	913	1027	183
Leland, MS	1352	1559	171
Keiser, AR	999	1162	109
Alexandria, LA	762	941	140
Weslaco, TX	810	970	188
Lubbock, TX	261	334	178
Shafter, CA	2128	2204	229
Mean	937	1048	--
Lint fraction (%):			
Leland, MS	35	37	--
Keiser, AR	35.1	36.7	ns
Alexandria, LA	33.9	37.1	1.1
Lubbock, TX	28.5	27.6	4.5
Shafter, CA	29.8	31.7	1.9
Mean	32.5	34.0	--
Micronaire (unit):			
Leland, MS	4.1	4.3	--
Alexandria, LA	3.58	3.78	0.25
Weslaco, TX	4.41	4.82	0.29
Lubbock, TX	3.0	3.0	0.54
Shafter, CA	4.11	4.34	0.36
Mean	3.84	4.05	--
Length (in.):			
Leland, MS	1.12	1.12	--
Alexandria, LA	1.17	1.14	0.03
Weslaco, TX	1.19	1.17	0.04
Lubbock, TX	1.04	1.03	0.04
Shafter, CA	1.17	1.13	0.01
Mean	1.14	1.12	--
Strength (g/tex):			
Leland, MS	28	26	--
Alexandria, LA	30.8	26.7	1.7
Weslaco, TX	34.3	28.9	2.5
Lubbock, TX	24.6	24.0	2.7
Shafter, CA (T-1)	19.8	17.8	1.1
Mean	27.5	24.7	--
Elongation (%):			
Leland, MS	6.5	7.1	--
Alexandria, LA	6.4	6.9	0.5
Weslaco, TX	6.5	7.4	0.5
Lubbock, TX	9.7	12.1	1.0
Mean	7.3	8.4	--

¹ Genotypes were evaluated in the presence and absence of tobacco budworm (TBW), *Heliothis virescens* (F.).

Table 3. Performance of Arkot A132 in the 1992 Regional High Quality Strain Test over 10 southeast US test sites.

Parameter ¹	Arkot	Deltapine	Acala
	A132	51	1517-88
Agronomic:			
Lint yield (lb/a)	898 a	979 a	781 b
Boll size (g)	5.44 a	5.33 ab	5.07 b
Lint fraction (%)	37.0 ab	36.1 b	38.0 a
Seed factors:			
Seed index (g/100 seed)	11.6 a	10.3 b	10.7 b
Free gossypol (%)	1.06 a	0.91 b	0.73 c
Seed oil (%)	19.89 ab	19.19 b	20.22 a
Seed nitrogen (%)	3.38 b	3.30 b	3.62 a
Fiber properties:			
Yarn tenacity (kN/m/kg)	135 b	115 c	155 a
Stelometer T1 (kN/m/kg)	215 b	191 c	248 a
Strength HVI g/tex	30.1 b	26.3 c	32.4 a
Stelometer E1 (%)	7.4 b	9.3 a	7.3 b
HVI elongation (%)	7.4 ab	7.5 a	7.3 b
Micronaire (unit)	4.72 a	4.23 b	4.03 b
Micronaire, HVI (unit)	4.74 a	4.33 b	4.05 c
2.5% SL, Fibrograph (in.)	1.15 b	1.15 b	1.19 a
2.5% SL, HVI (in.)	1.14 b	1.15 b	1.20 a
50% SL, Fibrograph (in.)	0.59 a	0.57 b	0.59 a
Unif. index, HVI (ratio)	85.4 a	85.0 a	85.5 a

¹ Values within rows followed by different letters vary significantly at the 0.05 level of probability.

Table 4. Plant bug damage¹ associated with germplasm lines at Fayetteville, Arkansas in 1994 and 1995

Genotype	1994		1995	
	Anthers damaged	Squares damaged	Anthers damaged	Squares damaged
	%	%	%	%
DES 119	1.6	13	3.6	21
Arkot 8110	1.4	9	5.0	25
Arkot A129	6.0	38	5.0	38
Arkot A132	3.9	21	9.4	35
Frego-bract check	-	-	37.1	83
LSD 0.05	3.2	17	8.9	16

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

Table 5. Performance of three Arkot germplasm line the Regional Fusarium Wilt Tests at Tallassee, AL.

Genotype	Wilted plants by year	
	1990	1991
	%	%
Arkot A129	33	39
Arkot A132	43	38
Resistant check, S-35	14	-
Resistant check, Auburn 56	-	38
Susceptible check, Rowden	94	80
LSD 0.05	42	28