

**NOTICE OF RELEASE OF ARKOT 8102,
ARKOT 8506, AND ARKOT 8514
GERMPLASM LINES OF COTTON
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The Arkansas Agricultural Experiment Station announces the release of three noncommercial breeding lines of cotton, *Gossypium hirsutum* L., designated as Arkot 8102, Arkot 8506, and Arkot 8514. The three lines share one common parent, Miscot T8-27 (Bourland and Bridge, 1988). Direct selection from Miscot T8-27 gave rise to 'Stoneville 132'. Also, Miscot T8-27 is one of two parents in the backgrounds of 'Hartz H1215', 'Hartz H1220', and 'Hartz H1244'.

The second parent of Arkot 8102, Arkot 8506, and Arkot 8514 was 'Stoneville 825', Miscot 7803-52 (Bourland and White, 1989), and Miscot 7801 (Bourland and White, 1992), respectively. Arkot 8102, tested as 8101-1-1, was derived from an individual plant selection made in 1983 from the F₂ population of a 1981 cross. Subsequently, the strain 8102-1-1 was selected in the F₆ generation using procedures of Bird (1982), modified to permit selection for lateral root development. Both Arkot 8506, tested as 8506-23, and Arkot 8514, tested as 8514-13, were derived from crosses made in 1985. Single bolls from selected F₂ plants were harvested in 1986. The F₃ seeds of each population were bulked and selected using the modified procedures of Bird (1982) to produce seeds for F₄ progeny rows. Subsequently, seed from the F₆ generation were reselected using the same procedures in 1989, but none of the derived progeny appeared to be superior to the F₃ selections.

Agronomic traits of the three lines were compared to 'DES 119' (Bridge, 1986) in tests from 1988 through 1993 at four Arkansas Agricultural Research Station sites in Mississippi River delta. Yield, maturity, lint fraction, and micronaire of Arkot 8102 was similar to DES 119, but Arkot 8102 had significantly shorter and weaker fibers (Table 1). Both Arkot 8506 and Arkot 8514 yielded significantly less than DES 119, but genotype by test interactions were significant for both lines. Yields of Arkot 8514 were relatively higher at Marianna and Rohwer than at the northeast locations of Clarkedale and Keiser. The significant interaction for Arkot 8506 was associated with contrasting yields at Clarkedale over years. Compared to DES 119, Arkot 8506 was significantly earlier maturing and had a lower lint fraction and fiber elongation. Arkot 8514 had coarser micronaire, weaker strength, and lower elongation than DES 119. Leaf pubescence of Arkot 8506 and Arkot 8514

was classed as "very hairy" (same as DES 119), while Arkot 8102 was classed as "hairy" (same as Miscot T8-27).

Average yield of Arkot 8514 was similar to that of DES 119 in 1991 Regional Bollworm/Budworm Tests, where genotypes were evaluated in the presence and absence of worm [bollworm, *Helicoverpa zea* (Boddie) and the tobacco budworm, *Heliothis virescens* (F.) complex] pressure (Table 2). Except for Stoneville 825, each parent of the three lines has shown relatively high resistance to the worm complex. In field tests conducted in 1988 and 1995, each of the three lines were equal to DES 119 in resistance to tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois) (Table 3 & 4).

During their selection, each line was screened for resistance to races 1, 2, 7, and 18 of *Xanthomonas campestris* pv *malvacearum* (Smith) Dye, the causal agent of bacterial blight. In subsequent seed increases, susceptible plants were rogued from the lines. In the Regional Cotton Fusarium Wilt Test at Tallassee, AL, resistance of the three lines to fusarium wilt [caused by *Fusarium oxysporum* f. sp. *vasinfectum* (Atk.) Synd. and Hans.] was equal to the resistant check (Table 5).

The three lines possess specific agronomic and host plant resistance traits that 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 8102, Arkot 8506, and Arkot 8514 seed may be obtained for breeding purposes from F.M. Bourland, Department of Agronomy, Plant Science 115, University of Arkansas, Fayetteville, AR 72701.

References

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2. Bridge, R.R. 1986. Registration of 'DES 119' cotton. *Crop Sci.* 26:646-647.
3. Bourland, F.M. and R.R. Bridge. 1988. Registration of Miscot T8-27 cotton germplasm. *Crop Sci.* 28:1035.
4. 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.
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Table 1. Yield and fiber properties of three Arkot germplasm lines and DES 119 from 1988 through 1993 on research stations in Arkansas.

Genotype ¹	Lint yield	First pick	Lint fraction	Fiber properties			Elongation
				Micro- naire	Length	Strength	
Arkot 8102	1047	85.8	37.5	4.29	1.11	26.4	6.5
DES 119	995	84.0	37.0	4.43	1.16	28.1	7.2
LSD 0.05	ns	ns	ns	ns	0.03	1.0	0.2
p (G X E)	0.17	0.76	0.64	0.03	0.31	0.35	0.21
Arkot 8506	946	91.0	35.6	4.70	1.16	27.7	7.5
DES 119	1028	86.1	37.3	4.54	1.15	27.6	8.7
LSD 0.05	69	1.8	1.4	ns	ns	ns	0.6
p (G X E)	0.05	0.06	0.34	0.01	0.13	0.48	0.89
Arkot 8514	987	88.2	37.4	4.49	1.15	25.9	7.2
DES 119	1046	87.7	38.0	4.69	1.16	26.8	8.7
LSD 0.05	46	ns	ns	0.11	ns	0.8	0.6
p (G X E)	0.01	0.13	0.02	0.02	0.06	0.46	0.21

¹/ Arkot 8102 and Arkot 8506 were evaluated at Clarkedale (3 tests) and at Marianna (3 tests) in different years; Arkot 8506 was evaluated at Keiser (2 tests), Clarkedale (7 tests), Marianna (6 tests), and Rohwer (2 tests).

Table 2. Lint yields of Arkot 8514 and DES 119 extracted from the 1992 Regional Bollworm/Budworm Test.

Test site by worm control strategy	Lint yield by genotype:		
	Arkot 8514	DES 119	LSD 0.05
-----lb/a-----			
<u>Worms not controlled:</u>			
Florence, SC	618	616	ns
Mississippi State, MS	240	423	160
Alexandria, LA	536	427	219
Mean, worms not controlled	464	489	--
<u>Worms controlled:</u>			
Florence, SC	528	611	ns
Mississippi State, MS	936	1085	149
St. Joseph, LA	1165	1058	122
College Station, TX	578	591	110
Clarkedale, AR	858	972	127
Mean, worms controlled	813	863	--
Overall mean	682	723	--

Table 3. Plant bug damage¹ for germplasm lines and cultivars at Clarkedale, Arkansas in 1988.

Genotype	Anthers	Squares
	damaged	damaged
	%	%
Arkot 8110	7	22
Miscot 7803-52	14	37
DES 119	14	44
Miscot T8-27	18	56
Arkot 8102	19	58
Stoneville 506	18	62
Arkot 518	31	65
LSD 0.05	16	32
Hartz 1330	12	47
DES 119	23	66
Stoneville 506	19	67
Arkot 8514	29	75
Arkot 8506	32	84
Hartz 1380	33	88
LSD 0.05	15	25

¹/ Plant bug damage was estimated by cutting 12 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. Plant bug damage¹ for germplasm lines at Fayetteville, Arkansas in 1995.

Genotype	Anthers	Squares
	damaged	damaged
	%	%
DES 119	3.6	21
Arkot 8110	5.0	25
Arkot 8514	6.3	35
Arkot 8506	7.2	40
Arkot 8102	7.7	34
Frego-bract check	37.1	83
LSD 0.05	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 5. Performance of three Arkot germplasm line the Regional Fusarium Wilt Tests at Tallassee, AL.

Genotype	Wilted planted by year:		
	1989	1990	1991
		%	%
Arkot 8102	49	-	-
Arkot 8506	-	20	-
Arkot 8514	44	27	44
Resistant check, McNair 235	34	-	-
Resistant check, S-35	-	36	-
Resistant check, Auburn 56	-	-	44
Susceptible check, Rowden	86	80	93
LSD 0.05	27	29	29