

**NOTICE OF RELEASE OF ARKOT 8110  
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 as Arkot 8110. Arkot 8110 possesses glabrous leaves/stems and a good combination of agronomic and host plant resistant traits.

Arkot 8110 originated from a 1981 cross between 'Tamcot SP21S' (Bird, 1979) and PD6520 (Culp and Harrell, 1979), and was tested as 8110-27-07. Individual plant selections were made from the F<sub>3</sub> population and bulked. Procedures of Bird (1982), modified to permit selection for lateral root development, were used to select from the bulked F<sub>4</sub> seed to produce a line designated as 8110-27. Subsequently, seed from the F<sub>7</sub> generation were reselected using the same procedures to produce the line 8110-27-07. Additional selections were made from the line 8110-27-07 in 1991, but none of the derived lines were found superior to the F<sub>7</sub> selection.

Agronomic traits of Arkot 8110 were compared to 'DES 119' in 19 tests from 1988 through 1993 at four Arkansas Agricultural Research Station sites in Mississippi River delta. Arkot 8110 yielded significantly more than DES 119, and had similar maturity and lint fraction (Table 1). The genotype by environment interaction was associated with its relatively yields at different locations. Arkot 8110 tended to yield more than DES 119 at Marianna and Rohwer, while DES 119 tended to yield more in the northeast Arkansas locations of Keiser and Clarkedale. Fiber properties (coarser micronaire, shorter length, weaker strength, and lower elongation) of Arkot 8110 were inferior to those of DES 119. The significant genotype by environment interaction for micronaire and length was not related to specific locations, but strength of Arkot 8110 was relatively higher in the Marianna and Clarkedale tests than in the tests at Keiser and Rohwer.

Resistance of Arkot 8110 to the bollworm, *Helicoverpa zea* (Boddie) and the tobacco budworm, *Heliothis virescens* (F.) complex was equal to that of DES 119 at three sites of 1991 and 1992 Regional Bollworm/Budworm Tests, where genotypes were evaluated in the presence and absence of worm pressure (Table 2). Wide adaptation of Arkot 8110 was indicated by its relative yield in the multi-state, worm-controlled sites in both years.

Resistance to tarnished plant bug, *Lygus lineolaris* (Palisot

de Beauvois), is usually not associated with the glabrous plant trait (Meredith and Schuster, 1979). In field tests conducted in 1988 and 1994, Arkot 8110 was as resistant as DES 119 and more resistant than some other pubescent genotypes (Table 3).

During its selection, Arkot 8110 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 tests, Arkot 8110 has not shown any symptoms of bacterial blight after field inoculations with the pathogen. In the Regional Cotton Fusarium Wilt Test at Tallassee, AL, resistance of Arkot 8110 to fusarium wilt [caused by *Fusarium oxysporum* f. sp. *vasinfectum* (Atk.) Synd. and Hans.] was equal to the resistant check in each of three years (Table 4).

Having a completely glabrous plant, Arkot 8110 possesses unusually high yield capability and resistance to tarnished plant bug. Relatively poor fiber properties limit commercial use of the line, but it should be valuable as a breeding line.

Small quantities of Arkot 8110 seed may be obtained for breeding purposes from F.M. Bourland, Department of Agronomy, Plant Science 115, University of Arkansas, Fayetteville, AR 72701.

### References

1. Bird, L.S. 1982. The MAR (Multi-Adversity Resistance) system for genetic improvement of cotton. *Plant Dis.* 66:172-176.
2. Bird, L.S. 1979. Registration of Tamcot SP21S cotton. *Crop Sci.* 19:410-411.
3. Culp, T.W. and D.C. Harrell. 1979. Registration of Pee Dee 6520 germplasm line of cotton. *Crop Sci.* 19:752-753.
4. 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.
5. Meredith, W.R., Jr. and M.F. Schuster. 1979. Tolerance of glabrous and pubescent cottons to tarnished plant bug. *Crop Sci.* 19:484-488.

Table 1. Yield and fiber properties of Arkot 8110 and DES 119 over 19 tests from 1988 through 1993 at Keiser (3 tests), Clarkedale (7 tests), Mariann (7 tests), and Rohwer (2 tests), Arkansas.

Genotype	Lint yield	First pick	Lint fraction	Fiber properties			Elongation
				Micro-faire	Length	Strength	
Arkot 8110	1029	87.0	38.8	4.97	1.08	26.3	7
DES 119	980	86.7	38.2	4.65	1.16	26.7	8
LSD 0.05	38	ns	ns	0.11	0.01	0.3	0
p (G X E)	0.02	0.40	0.58	0.04	0.05	0.01	0

Table 2. Lint yields of Arkot 8110 and DES 119 extracted from the 1991 and 1992 Regional Bollworm/Budworm Tests.

Test site by worm LSD control strategy	Lint yield by year and genotype:					
	1991			1992		
	Arkot	DES	LSD	Arkot	DES	LSD
	<b>8110</b>	<b>119</b>	<b>0.05</b>	<b>8110</b>	<b>119</b>	<b>0.05</b>
<u>Worms not controlled:</u>						
North Carolina	750	870	289	--	--	--
Florence, SC <sup>1</sup>	--	--	676	616	ns	--
Tifton, GA	632	683	ns	--	--	--
Mississippi State, MS	781	660	202	352	423	160
Alexandria, LA	--	--	--	453	427	219
Mean, worms not controlled	721	737	--	494	489	--
<u>Worms controlled:</u>						
North Carolina	974	1071	289	--	--	--
Florence, SC <sup>1</sup>	--	--	636	611	ns	--
Tifton, GA	915	855	ns	--	--	--
Mississippi State, MS	1232	1223	162	1085	1085	149
Alexandria, LA	749	686	130	--	--	--
St. Joseph, LA	--	--	1126	1058	122	--
College Station, TX	1483	1272	291	479	591	110
Marianna, AR 1130	1104	171	--	--	--	--
Clarkedale, AR	--	--	--	986	972	127
Mean, worms controlled	1081	1035	--	862	863	--
<b>Overall mean</b>	<b>961</b>	<b>936</b>	<b>--</b>	<b>724</b>	<b>723</b>	<b>--</b>

1/ Seedcotton yields converted to lint yields using average lint percentages from other locations.

Table 3. Plant bug damage<sup>1</sup> for Arkot 8110 and released germplasm lines and cultivars at Clarkedale, Arkansas in 1988.

Genotype	Anthers damaged	Squares 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
<b>LSD 0.05</b>	<b>16</b>	<b>32</b>

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. Performance of Arkot 8110 in the 1989, 1991, and 1992 Regional Fusarium Wilt Tests at Tallassee, AL.

Genotype	Wilted plants by year:		
	1989	1991	1992
	%	%	%
Arkot 8110	23	30	7
Resistant check, McNair 235	34	-	-
Resistant check, Auburn 56	-	44	10
Susceptible check, Rowden	86	93	40
<b>LSD 0.05</b>	<b>27</b>	<b>29</b>	<b>19</b>