NOTICE OF RELEASE OF 'TAMCOT LUXOR' COTTON

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Abstract

'Tamcot Luxor' cotton (*Gossypium hirsutum* L.) was developed in the Multi-Adversity Resistance (MAR) Genetic Improvement Program and released in March 1999 by the Texas Agricultural Experiment Station. The established MAR techniques and procedures utilize seed, seedling, and plant screening and selection in the laboratory and greenhouse in the fall and winter, followed by an extensive annual four-stage field testing and evaluation at 10 locations throughout Texas. These procedures make it possible to identify superior cotton germplasm with simultaneous genetic gains for resistance to pests (insects and plant pathogens) and abiotic stresses in addition to increased yield potential, earliness, and fiber and seed quality (Bird 1982; El-Zik and Thaxton 1989).

Tamcot Luxor was developed from a cross between the MAR-6 gene pool strains CABUCAHUGS-1-88 and CABUCAG8US-1-88. Individual F_3 plants were selected using the MAR laboratory-greenhouse procedures (Bird 1982; El-Zik and Thaxton 1989) and an F_4 progeny row therefrom was selected in 1991 and given the strain designation MAR-CABU2HGC8H-2-91.

Tamcot Luxor is a glanded, pubescent, normal leaf and bract, and nectaried cotton. It is more pubescent (hairy) than other MAR germplasm releases. Tamcot Luxor has a cylindrical shaped growth habit, short internodes, flowers with cream pollen, and storm resistant bolls. Plants are of medium height, taller (0.8 inch) than 'Tamcot Sphinx' (Thaxton and El-Zik 1994) and shorter (1.2 inches) than 'Tamcot CAB-CS' (Bird et al. 1986). Tamcot Luxor is similar in fruiting characteristics to Tamcot Sphinx.

Tamcot Luxor was tested extensively throughout Texas and in Oklahoma for five years for resistance to insects and pathogens causing diseases, drought tolerance, agronomic characteristics, earliness, yield potential, and fiber quality characteristics. Data were collected from 40 tests conducted in Texas over five years, 1992-1997 excluding 1995, at 12 sites at Weslaco, Corpus Christi, College Station, Temple, McGregor, Chillicothe, and Halfway.

Based on seedling disease evaluation and field stand counts, Tamcot Luxor had stand ability and vigor similar to the MAR-4 to MAR-6 Tamcot variety releases (Table 1). Tamcot Luxor has the $B_2B_3B_7$ major genes that confer high levels of resistance to the 19 designated U.S. races of the bacterial blight pathogen (*Xanthomonas campestris* pv. *malvacearum*). It has higher levels of resistance to the reniform nematode than Tamcot CAB-CS and 'Tamcot HQ95' (El-Zik and Thaxton 1990). Tamcot Luxor has similar levels of resistance to root pathogens causing Verticillium wilt, the Fusarium wilt-root-knot nematode complex, Phymatotrichum root rot, and leaf spots (caused by *Alternaria, Cercospora* and other spp.) as Tamcot Sphinx and Tamcot HQ95 (Table 1).

Levels of resistance to insects were determined by including varieties and genotypes with known levels of resistance and susceptibility in the tests for comparison. Tests were monitored for insect presence, level and damage throughout the season. Tests were rated four times and a grade of one (very little damage) progressing to five (severe insect damages) was assigned to each plot. Tamcot Luxor has higher levels of resistance to insects than Tamcot CAB-CS and previously released MAR germplasm, and similar resistance levels to six insects (aphids, thrips, fleahopper, boll weevil, tobacco budworm and bollworm) as Tamcot HQ95 and Tamcot Sphinx (Table 2).

Results from the 40 tests conducted over five years indicated that Tamcot Luxor produced the highest lint yield (772 lb/acre), although not significantly greater than Tamcot Sphinx (759 lb/acre) (Table 3). Tamcot Luxor produced significantly more lint than Tamcot CAB-CS (700 lb/acre), Tamcot HQ95 (693 lb/acre), and Deltapine 50 (601 lb/acre) (Table 3). It is similar in maturity to Tamcot HQ95 and Tamcot CAB-CS, and matures earlier than Tamcot Sphinx. All the Tamcot varieties are significantly earlier in maturity than Deltapine 50 (Table 3). Tamcot Luxor has a significantly larger boll (79 bolls per pound of seed cotton) than the Tamcot varieties and Deltapine 50. It has a 1.2% higher lint percentage than Tamcot Sphinx and 3.8% higher than Deltapine 50. Gin turnout of Tamcot Luxor was similar to that of Tamcot Sphinx and 2.5% higher than Deltapine 50 (Table 3).

Fiber quality characteristics of Tamcot Luxor are similar to or better than the comparison varieties, except Tamcot Sphinx (Table 4). In comparison with Tamcot Sphinx, fiber length of Tamcot Luxor is 0.03 inches shorter, strength 2.1 g/tex lower, and micronaire 0.4 units lower; however, all fiber traits are within the premium quality range. The fiber of Tamcot Luxor is 1.9 g/tex and 0.2 micronaire units higher than the fiber of Tamcot CAB-CS (Table 4).

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The Foundation Seed Service of the Texas Agricultural Experiment Station will produce, maintain and sell foundation seed to producers of registered and certified classes. Tamcot Sphinx has U.S. Plant Variety Protection (PVP) requiring that it be sold by variety name only as a class of certified seed.

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Table 1. Mean field stand, disease symptoms and/or plant death for Tamcot varieties and reference cotton genotypes.

Tamcot Variety	Field Stand[1]	Bacterial Blight[2]	Vert-icillium wilt[3]	Phymato-trichum root rot[4]	Fus-arium Wilt[5]
	%		%	%	%
Luxor (MAR-7)	62.3	1.1	26.9	28.5	29.3
Sphinx (MAR-6)	73.3	1.1	25.4	33.7	---
HQ95 (MAR-5)	66.3	1.1	28.4	28.0	---
CAB-CS (MAR-4)	64.0	1.2	22.8	26.1	---
Susceptible genotype	42.2	7.2	42.6	54.1	65.0
Resistant genotype	73.3	1.1	19.7	24.2	6.6
Mean	63.6	2.1	27.6	32.4	33.6
LSD (P = 0.05)[6]	11	12	12	19	20

[1] Based on performance of 1992-94, 1997 Uniform MAR tests.
[2] Reaction to U.S. races of the bacterial blight pathogen, on a grade scale of 1 (immune) to 10 (fully susceptible).
[3] Mean performance (percentage of plants with symptoms) in the 1992-94, 1997 Chillicothe strains test.
[4] Mean performance (percentage of dead plants) in the 1992-1994 UMAR tests (Temple and McGregor).
[5] Mean performance in the 1994-1996 Fusarium wilt nursery in Tallassee, Alabama.
[6] Least significant difference between two means within a column.

Table 2. Response of Tamcot Luxor to insects in comparison with Tamcot varieties and susceptible cotton genotypes.

	Insect[1]				
Tamcot Variety	Aphids	Flea-hopper	Boll Weevil	Bud-worm	Boll-worm
Luxor (MAR-7)	2.2	1.5	2.3	2.6	2.5
Sphinx (MAR-6)	2.0	1.6	2.4	2.6	2.5
HQ95 (MAR-5)	2.1	1.7	2.5	2.8	2.8
CAB-CS (MAR-4)	2.9	2.5	2.9	3.1	3.0
Susceptible genotype	4.2	4.4	4.5	4.7	4.7

Table 3. Mean lint yield, earliness, boll size, gin turnout, and lint percentage of Tamcot Luxor in comparison with Tamcot and commercial cotton varieties abstracted from 40 tests over a five-year period, 1992-1997, excluding 1995.

Variety	Total Yield	Earliness	Boll Size	Lint Percent	Gin Turnout
	Lb/a	%		%	%
Tamcot Luxor	772	59.3	79	38.2	28.1
Tamcot Sphinx	759	50.0	87	37.0	27.9
Tamcot CAB-CS	700	56.1	85	36.1	26.5
Tamcot HQ95[1]	693	63.0	87	36.9	27.7
Deltapine 50[1]	601	37.2	91	34.4	25.6
Mean	705	53.1	86	36.5	27.2
LSD (P= 0.05)[2]	42	3.3	2.0	0.4	0.3

[1] Means do not include 1997 UMAR tests.
[2] Least significant difference between two means within a column.

Table 4. Mean fiber quality traits of Tamcot Luxor in comparison with Tamcot and commercial cotton varieties abstracted from 40 tests over a five-year period, 1992-1997, excluding 1995.

	Fiber Quality Traits[3]				
Variety	UHM Length inches	Uniformity	Strength g/tex	Elongation	Micronaire units
Tamcot Luxor	1.07	82.9	28.5	6.0	4.2
Tamcot Sphinx	1.10	83.4	30.6	6.1	4.6
Tamcot CAB-CS	1.10	82.8	26.6	6.2	4.0
Tamcot HQ95[1]	1.10	83.1	27.8	6.0	4.0
Deltapine 50[1]	1.12	83.2	27.8	6.5	4.5
Mean	1.10	83.1	28.2	6.2	4.3
LSD (P= 0.05)[2]	0.01	0.2	0.4	0.1	0.1

[1] Means do not include 1997 UMAR tests.
[2] Least significant difference between two means within a column.
[3] Fiber analysis performed by the International Textile Center, Texas Tech University, Lubbock, Texas, utilizing the double line HVI system.