

TAMCOT 8104: A NEW MID SEASON COTTON CULTIVAR FOR CENTRAL AND SOUTH TEXAS

C. Wayne Smith

Department of Soil and Crop Sciences

Texas A&M University

College Station, TX

Tamcot 8104 is a new cultivar of upland cotton, *Gossypium hirsutum* L., that combines high yield potential with excellent fiber properties in a mid to full-season maturity level cultivar. Tamcot 8104 can be planted along with early-season and mid to full-season cultivars in Central and South Texas to spread crop production risk. This cultivar is adapted to production regions of the state from the Lower Rio Grand Valley to the northern Blacklands, and westward to the Winter Garden area.

Origin and Breeding History

Tamcot 8104 originated as a single F_{2:3:4} plant from the cross of Deltapine 90, a full-season cultivar developed by the Delta and Pine Land Company, and 7193-9W-78, a breeding line of complex pedigree that includes Paymaster 1209, Lankart 57, Acala 5675, and Tamcot SP37. Single plant selection was based on apparent yield potential, overall plant conformation, and fiber quality parameters. The resulting F₅ progeny row, 88G-104, was selected for further evaluation as a pure line. Selection was again based on apparent yield potential, plant conformation, and fiber quality parameters. TAM 88G-104 has been treated subsequently as a pure line and evaluated throughout Central and South Texas since 1990. Tamcot 8104 is phenotypically homogenous and stable.

Description

Tamcot 8104 is a mid to full-season, picker-type upland cotton cultivar with a growth habit intermediate to Deltapine 50 and Deltapine 90 when grown with supplemental irrigation at College Station. Tamcot 8104 will be slightly shorter (116 cm height for Tamcot 8104 compared to 122 cm height for Deltapine 90 in 1997) and have a more spreading growth habit (i.e., greater lateral extension of fruiting limbs) than Deltapine 90. Average node of first fruiting limb is similar to Deltapine 90 and two nodes higher than Deltapine 50 or Tamcot Sphinx. Flowers are typical for upland cotton; cream-colored petals and anthers/pollen. Full-size green bolls are longer than their width with about 10% broadest at the base while the majority are broader in the middle. Bolls predominately have four locks with five occasionally. Open bolls resist shattering but are not stormproof and fluff adequately for picker harvest.

The shape and color of the leaves of Tamcot 8104 is typical of the majority of upland cotton cultivars. Tamcot 8104 has smooth leaves, averaging 2 trichomes/cm² on fully expanded leaves while Deltapine 90, Deltapine 50, and Tamcot Sphinx average 10, 16, and 26, respectively. Tamcot 8104 produces fibers that are longer than Tamcot Sphinx and stronger than Deltapine 50. Micronaire is usually less than that of Deltapine 50 and similar to Tamcot Sphinx.

Tamcot 8104 had larger bolls and seeds, and higher lint weight/seed than Deltapine 90. Tamcot 8104 averaged about the same number of seeds/boll as did Deltapine 90 during those years.

Tamcot 8104 is resistant to the silverleaf whitefly, *Bemisia argentifolii*, that is a reoccurring pest in the Lower Rio Grande Valley. It is moderately susceptible to ABronze Wilt, @ causal agent unknown, and is moderately resistant to bacterial blight, *Xanthomonas malvacearum*. Tamcot 8104 carries a level of resistance/susceptibility to other insects and diseases affecting cotton similar to other commercial cultivars available to producers in Central and South Texas.

Tamcot 8104 is a mid to full-season cultivar. Averaged over two years at College Station and grown under irrigated culture, Tamcot 8104 reached 60% open bolls in 136 days from planting while Deltapine 50 required 129 days and Tamcot Sphinx required 126 days. Tamcot 8104 was not later in percent first harvest at Stoneville, MS during 1996 (91.0% first harvest for Tamcot 8104 versus 89.6% for Deltapine 50), but was later in percent first harvest than Deltapine 51, a sib line of Deltapine 50, at Bossier City, LA (86.8% versus 91.7%) during 1996.

Tamcot 8104 has been evaluated since 1990 at several locations in Central and South Texas. These locations include Weslaco, Kingsville, Corpus Christi, Sinton, Upper Coastal Bend region, College Station, Thrall, Uvalde, Temple, Dallas (including Prosper), and Chillicothe. Performance of Tamcot 8104 relative to a number of current cultivars is shown in tables 1 through 9.

Tamcot 8104 averaged 5% higher lint yields than Deltapine 50, the most popular cultivar in the U.S. during recent years, during 1990 through 1997 (Table 1). Averaged over years, Tamcot 8104 was higher yielding than Deltapine 50 at 5 of 11 locations, lower yielding at one location, and not different at the remaining 5 locations (Table 2). Tamcot 8104 yielded more lint/ac. than Deltapine 50 during 1991, 1992, 1996, and 1997 when all locations within those years were averaged (Table 6). It was lower yielding during 1990, 1993, and 1995, and not different than Deltapine 50 in 1994. Tamcot 8104 has a higher (P=0.01) percent lint than Deltapine 50 (Table 1).

Compared with Stoneville 132, Tamcot 8104 was not different ($P=0.82$) in yield potential when compared in 27 performance trials from 1993 through 1996 (Table 1). Averaged across years, Tamcot 8104 outyielded ($P=0.05$) Stoneville 132 at Corpus Christi, Sinton (San Patricio County), and Uvalde (Table 3). It was lower yielding than Stoneville 132 in the Upper Coast region and at College Station, and not different at the other six locations tested. When locations were averaged within years, Tamcot 8104 was not different in lint yield than Stoneville 132 in 1993, 1994, 1995, nor 1996. Tamcot 8104 and Stoneville 132 have equivalent lint percentage (Table 1).

Tamcot 8104 has been compared with Tamcot HQ95 and Tamcot Sphinx as representatives of ultra early-maturing phenotypes. These phenotypes have been and continue to be popular in many parts of Central and South Texas. Tamcot 8104 would complement these type cultivars well by allowing producers to spread their planting patterns and provide for the possibility of avoidance of in-season stress such as drought. In 19 comparisons with Tamcot HQ95 during 1990, 1993 and 1994, Tamcot 8104 averaged 670 lb. lint/ac., 72 lb./ac. more ($P=0.01$) than Tamcot HQ95 (Table 1). Tamcot 8104 outyielded Tamcot HQ95 at five locations when averaged over years and was lower yielding at only one location (Table 4). When locations were averaged within years, Tamcot 8104 was numerically higher yielding during all three years (Table 8). Tamcot 8104 averaged 39.5% lint across these 19 tests while Tamcot HQ95 averaged 36.7 (Table 1).

During 1996 and 1997, Tamcot 8104 averaged 829 lb. lint/ac. compared with 731 lb. for Tamcot Sphinx ($P=0.01$) across seven locations. Tamcot 8104 was significantly higher yielding at seven of the ten test sites and lower yielding at only one, Chillicothe, when averaged over 1995 - 1997 (Table 5). When averaged over locations, Tamcot 8104 averaged more lint than Tamcot Sphinx during 1996 and 1997 (Table 9). Tamcot 8104 averaged approximately 2% higher lint percent than Tamcot Sphinx across these 22 comparisons (Table 1).

Other Yield Data

Tamcot 8104 was the highest yielding entry in the Nueces County Extension demonstration trials at the Prince Farm near Corpus Christi during 1996 and yielded only 8 lbs. less than the highest entry in 1997. Tamcot 8104 was the highest yielding genotype in cultivar trials conducted by the Dallas Research and Extension Center during 1997 at Dallas and Prosper, and the second highest yielding at Princeton. All three of these locations are in the northern Blacklands area of Texas. Data from the El Paso Research and Extension Center suggest that Tamcot 8104 is competitive in Far West Texas. Tamcot 8104 ranked tenth of 27 cultivars evaluated during 1995 and seventeenth of 32 cultivars evaluated during 1996.

Supporting Data - Fiber Quality

Tamcot 8104 exhibits excellent fiber quality. Micronaire, an indicator of fiber fineness and/or maturity, of Tamcot 8104 averaged 4.1 across seventeen cultivar trials in Central and South Texas during 1996 and 1997. The average micronaire of all entries in these seventeen trials was 4.7. Lower micronaire within the base range of 3.5 - 4.9 is desirable as it indicates finer yet mature fibers that will accept dye and will be more versatile for spinning a wider array of yarn sizes than fibers having higher micronaires. Tamcot 8104 micronaire was outside the base range for micronaire in only three of the seventeen trials; readings of 5.1, 5.0, and 3.4. The average of all entries within each trial was outside the 3.5-4.9 range six times; all 5.0 or greater.

Upper Half Mean (UHM) length of Tamcot 8104 fibers averaged 1.09 inches during 1996 and 1997 whereas the average of all cultivars/strains tested in the cultivar performance trials averaged 1.08 inches. Tamcot 8104 ranged from 0.96 inches UHM to 1.18 inches while all entries averaged from 0.99 to 1.14 inches. High volume instrument fiber bundle strength of Tamcot 8104 averaged 28.2 g/tex across these seventeen cultivar trials compared with 28.4 g/tex for the average of all entries.

These data indicate that Tamcot 8104 has excellent fiber quality that will be competitive with other cultivars available to producers in Central and South Texas. The tendency toward lower micronaire without being outside the lower base limits will increase profits for producers by preventing price-received discounts for high micronaire, a not uncommon problem for producers growing Midsouth-developed cultivars such as Deltapine, Stoneville, and Paymaster-Hartz.

Research leading to the development and testing of Tamcot 8104 was supported by the Texas Food and Fibers Commission and Cotton Incorporated.

Seed will be available for commercial production in 1999.

Table 1. Lint yields (lb/a) and lint percent of Tamcot 8104 compared with commercial cultivars at up to eleven locations in central and south Texas, 1990-1997.

Cultivar	Yield	Lint		Lint		Lint		Lint	
		Yield	%	Yield	%	Yield	%	Yield	%
Tamcot 8104	750	37.9	682	38.6	670	39.5	802	37.0	
Deltapine 50	712	33.9	-	-	-	-	-	-	
Stoneville 132	-	-	670	38.5	-	-	-	-	
Tamcot HQ 95	-	-	-	-	598	36.7	-	-	
Tamcot	-	-	-	-	-	-	719	35.1	
Sphinx									
Pr>F	0.06	0.01	0.82	0.08	0.01	0.01	0.41	0.01	
Loc.-yr. tests	55		27		19		22		
Years tested	1990-1997		1993-1996		1990-1994		1995-1997		

Table 2. Lint yield (lb/a) of Tamcot 8104 compared with Deltapine 50 at eleven locations throughout central and south Texas, 1990-1997.

Cultivar	W	K	CC	N	SP	UC
Tamcot 8104	838 a	619 b	720 a	682 a	716 a	703 a
Deltapine 50	866 a	748 a	625 b	588 b	569 b	673 a
Loc.-yr.	10	2	7	2	4	7
Cultivar	CS	S	U	D	Ch	
Tamcot 8104	749 a	710 a	1150 a	693 a	520 a	
Deltapine 50	788 a	673 a	973 b	677 a	445 b	
Loc.-yr.	8	3	4	3	5	

W=Weslaco REC; K=Kingsville; CC=Corpus Christi REC; N=Nueces County; SP=San Patricio County; UC=Upper Coastal production region; S=Stiles Research Foundation at Thrall; U=Uvalde REC; D=Dallas REC (includes Prosper); Ch=Chillicothe/Vernon REC.

Table 3. Lint yield (lb/a) of Tamcot 8104 compared with Stoneville 132 at eleven locations throughout central and south Texas, 1993-1996.

Cultivar	W	K	CC	N	SP	UC
Tamcot 8104	546 a	619 a	824 a	862 a	610 a	616 b
Stoneville 132	514 a	627 a	701 b	630 a	523 b	684 a
Loc.-yr.	5	2	2	2	3	4
Cultivar	CS	S	U	D	CH	
Tamcot 8104	686 b	750 a	1050 a	743 a	597 a	
Stoneville 132	740 a	865 a	889 b	686 a	631 a	
Loc.-yr.	4	1	3	1	1	

W=Weslaco REC; K=Kingsville; CC=Corpus Christi REC; N=Nueces County; SP=San Patricio County; UC=Upper Coastal production region; S=Stiles Research Foundation at Thrall; U=Uvalde REC; D=Dallas REC (includes Prosper); Ch=Chillicothe/Vernon REC.

Table 4. Lint yield (lb/a) of Tamcot 8104 compared with Tamcot HQ 95 at ten locations throughout central and south Texas, 1990, 1993, and 1994.

Cultivar	W	K	CC	N	SP	UC
Tamcot 8104	778a	660 b	127 a	682 a	771 a	618 a
Tamcot HQ95	671 b	812 a	120 a	559 b	567 b	640 a
Loc.-yr	4	1	1	2	1	4
Cultivar	CS	S	TM	U	Ch	
Tamcot 8104	848 a	672 a	463 a	898 a	426 a	
Tamcot HQ95	699 b	630 a	419 a	737 b	409 a	
Loc.-yr.	2	2	1	2	2	

W=Weslaco REC; K=Kingsville; CC=Corpus Christi REC; N=Nueces County; SP=San Patricio County; UC=Upper Coastal production region; S=Stiles Research Foundation at Thrall; TM=Temple; U=Uvalde REC; D=Dallas REC (includes Prosper); Ch=Chillicothe/Vernon REC.

Table 5. Lint yield (lb/a) of Tamcot 8104 compared with Tamcot Sphinx at ten locations throughout central and south Texas, 1995-1997.

Cultivar	W	K	CC	SP	UC	CS
Tamcot 8104	1043 a	398 a	643 a	658 a	1050 a	670 a
Tamcot Sphinx	940 b	453 a	482 b	510 b	908 b	734 a
Loc.-yr.	3	2	2	2	2	3
Cultivar	S	U	D	CH		
Tamcot 8104	774 a	1467 a	721 a	536 a		
Tamcot Sphinx	477 b	1193 b	622 b	633 a		
Loc.-yr.	1	2	2	3		

W=Weslaco REC; K=Kingsville; CC=Corpus Christi REC; SP=San Patricio County; UC=Upper Coastal production region; S=Stiles Research Foundation at Thrall; U=Uvalde REC; D=Dallas REC (includes Prosper); Ch=Chillicothe/Vernon REC.

Table 6. Annual lint yield (lb/a) of Tamcot 8104 and Deltapine 50 averaged over locations in central and south Texas.

Cultivar	1990	1991	1992	1993	1994	1995	1996	1997
Tamcot 8104	826 b	859 a	1117 a	642 b	690 a	487 b	754 a	785 a
Deltapine 50	901 a	702 b	1016 b	677 a	711 a	528 a	664 b	735 b
Locations	3	3	5	13	8	5	13	5

Table 7. Annual lint yield (lb/a) of Tamcot 8104 and Stoneville 132 averaged over locations in central and south Texas.

Cultivar	1993	1994	1995	1996
Tamcot 8104	642 a	756 a	516 a	730 a
Stoneville 132	723 a	775 a	496 a	641 a
No. locations	8	5	4	10

Table 8. Annual lint yield (lb/a) of Tamcot 8104 and Tamcot HQ 95 averaged over locations in central and south Texas.

Cultivar	1990	1993	1994
Tamcot 8104	826 a	630 a	651 a
Tamcot HQ 95	626 b	624 a	558 a
No. locations	3	8	8

Table 9. Annual lint yield (lb/a) of Tamcot 8104 and Tamcot Sphinx averaged over locations in central and south Texas.

Cultivar	1995	1996	1997
Tamcot 8104	467 b	806 a	850 a
Tamcot Sphinx	644 a	688 b	774 b
No. locations	3	9	10