

**NOTICE OF RELEASE OF SEVEN
MULTI-ADVERSITY RESISTANT MAR-5
GERMPLASM LINES
OF UPLAND COTTON**

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The Texas Agricultural Experiment Station (TAES) announces the release of seven multi-adversity resistant (MAR) germplasm lines of Upland Cotton (*Gossypium hirsutum* L.) from the MAR-5 gene pool. The lines are designated as CABCHUS-2-86, BLLCABS-3-86, LBBCABCHUS-1-87, LBBCHU2GS-1-87, C5HUG2BES-2-87, CDP37HPIH-1-1-86, and LBBCD3H-1-87. These lines were developed by the TAES-MAR Cotton Genetic Improvement Program, utilizing specific seed, seedling, and plant selection techniques and procedures for the simultaneous genetic improvement of resistance to pests (plant pathogens and insects) and abiotic stresses, in addition to increased yield potential, earliness, and improved fiber and seed quality (3,6).

Performance evaluations were conducted over three years in eight nurseries (Weslaco, Corpus Christi, College Station, Temple, McGregor, Munday, Chillicothe, and Halfway) to determine levels of resistance to adversities (insects, plant pathogens, drought), and for improved lint yield, earliness, boll size, gin turnout, lint percentage, and fiber properties. Levels of resistance to pests were determined in comparisons with cotton lines and varieties having known levels of resistance and susceptibility to those pests (Table 1). The lines also were compared with Tamcot CAMD-E (1), Tamcot CAB-CS (4), Tamcot CD3H (5), Tamcot HQ95 (7), and to the non-MAR Lankart LX571 for lint yield, boll size, lint percentage, gin turnout, and fiber quality traits (Table 2).

The MAR-5 lines have significantly higher levels of broad spectrum resistance to insects (thrips, fleahopper, boll weevil, tobacco budworm and bollworm), and to pathogens causing diseases (seed-seedling, bacterial blight, Verticillium wilt, Fusarium wilt/root-knot nematode, Phymatotrichum root rot, and leaf spots), and to environmental stresses than the earlier released MAR germplasm. Five of the lines are glabrous (CABCHUS-2-86, BLLCABS-3-86, LBBCABCHUS-1-87, LBBCHU2GS-1-87, C5HUG2BES-2-87), which reduces fiber trash content, incur much less egg laying and subsequent damage from tobacco budworm and bollworm, and less damage from silverleaf whiteflies. All

five glabrous lines have a longer and stronger fiber than the glabrous Tamcot CAB-CS variety. All seven lines are highly resistant to the bacterial blight pathogen. These lines are as early in maturity as Tamcot CAMD-E. Fiber qualities of these lines are better than those of Tamcot CAMD-E and Tamcot CAB-CS.

CABCHUS-2-86 is a glanded, glabrous type from the cross CABCS-1-81 x CAHUS-1-81. It is a selection from the previously released line CABCHUS-1-84 that was screened, tested, and identified in a second MAR cycle. It has the $B_2B_3B_7$ genes for bacterial blight resistance. CABCHUS-2-86 has high yield potential, higher than Tamcot CAMD-E and Tamcot CAB-CS, and similar to Tamcot CD3H and Tamcot HQ95. Lint percentage is higher, and fiber quality traits are better or equal to the other released Tamcot varieties. Fiber strength averages 1.2 g/tex higher than Tamcot HQ95. CABCHUS-2-86 has resistance levels to pests equal to the other Tamcot varieties, and higher resistance to seed-seedling pathogens.

BLLCABS-3-86 is a glanded, glabrous type from the cross BLLEBOS-1-83 x CABCS-1-81 (Tamcot CAB-CS). BLLEBOS-1-83 originated from a cross between LEBO-3 (Lewis and Bonham germplasm) and BL²CS-2. It has the $B_2B_3B_7$ genes for resistance to bacterial blight. This line has the highest gin turnout of the MAR-5 releases and above average lint percentage. BLLCABS-3-86 has a fiber length which averages 1.12 inches in addition to a yield equal to Tamcot CAB-CS. It has above average level of resistance to seedling disease, Phymatotrichum root rot, and Fusarium wilt/root-knot nematode complex than do the other lines.

LBBCABCHUS-1-87 is a glanded, glabrous type from the cross between LEBOCBS-1-2-84 and CABCHUS-1-84, two previous MAR germplasm releases. It has the $B_2B_3B_7$ genes for resistance to bacterial blight. Levels of resistance to pests is equal to previously released MAR germplasm, with above average resistance to the Fusarium wilt/root-know nematode complex.

LBBCHU2GS-1-87 is a glanded, glabrous type from the cross LBBCHUS-1-85 x CAHUGS-1-84. LBBCHUS-1-85 originated from the cross LEBOCBS-1-81 x CAHUS-2-81, both previously released MAR lines. CAHUGS-1-84 is a previously released line resulting from the cross CAHUS-2-81 x GCAS-1-81. It has the $B_2B_3B_7$ genes for resistance to bacterial blight. This line also has a higher level of resistance to the Fusarium wilt/root-know nematode complex than the other lines. Fiber length is significantly longer than previously released Tamcot varieties, except Tamcot HQ95.

C5HUG2BES-2-87 originated from the cross C4HUGBES-1-84 x CAHUGS-1-84. C4HUGBES-1-84 resulted from a cross between (Tamcot CAB-CS x

CAHUS) and (CACES x the glandless line GCAS). CAHUGS-1-84 was previously released. C5HUG2BES is a glanded, glabrous plant type with the $B_2B_3B_7$ genes for resistance to bacterial blight. This line has fiber quality similar to Tamcot HQ95. It has a higher level of resistance to Verticillium wilt than the other MAR-5 lines.

CDP37HPIH-1-1-86 was developed from a cross between Tamcot CD3H [Tamcot SP37H (2) x CDPS-1-77] and a line from Argentina, Pora Inta. This line is a glanded, hairy (pubescent) plant type with the $B_2B_3B_6B_7$ genes for resistance to bacterial blight. It is more hairy than previously released MAR germplasm. Lint percentage is higher than the other MAR-5 lines and reference varieties. This line has excellent fiber quality with an average fiber strength of 25.9g/tex combined with high yield potential. It has higher levels of resistance to Verticillium and Fusarium wilts, and Phymatotrichum root rot than do most of the other lines.

LBBCD3H-1-87 is a glanded, hairy (pubescent) type developed from a cross between LEBOBCS-1-2-84, a previous released MAR germplasm, and Tamcot CD3H. It has the $B_2B_3B_6B_7$ genes for resistance to bacterial blight. This line combines the high yield potential and early maturity, in addition to the high MAR levels.

These germplasm lines should be useful to commercial cotton breeders in the development of varieties with broad and higher levels of resistance to insects and pathogens causing diseases, and improved fiber quality. Small quantities of seed of these lines are available for distribution upon written request to K. M. El-Zik, Department of Soil & Crop Sciences, Heep Center, Texas A&M University, College Station, Texas 77843-2474.

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Table 1. Percentage of plants with disease symptoms for four cotton diseases for MAR-5 cotton lines and reference varieties.†

Line/Variety	Final Field Stand (Seed-Seedling Disease)		Fusarium Wilt	Verticillium Wilt	Phymatotrichum Root Rot	
	1988 EFP	1989 UMAR	1989	1989	1988 EFP	1989 UMAR
MAR-5 Lines						
CABCHUS-2-86 (sm)‡	61 c §	69 bc	54.4 c	36.1abc	42ab	62 cd
BLLCABS-3-86 (sm)	58 c	68 c	----	47.0 bc	40ab	56 bcd
LBBCABCHUS-1-87 (sm)	63 c	71 bc	32.0 b	49.6 bc	50abcd	58 bcd
LBBCHU2GS-1-87 (sm)	67ab	70 bc	27.3ab	46.6 bc	54 bcde	52 bcd
C5HUG2BES-2-87 (sm)	66 b	69 bc	----	24.0ab	61 cde	48abc
CDP37HPIH-1-1-86 (H)	72a	71 bc	25.0a	30.9abc	58 bcde	44ab
LBBCD3H-1-87 (H)	69a	73ab	27.3ab	47.5 bc	62 cde	55 bcd
Reference Varieties						
Tamcot CAMD-E (H)	65 bc	73ab	----	----	56 bcde	55 bcd
Tamcot CD3H (H)	68a	77a	32.2 b	26.0abc	53 bcde	64 d
Tamcot CAB-CS (sm)	67ab	71 bc	28.8ab	----	65 cde	61 cd
Tamcot HQ95 (H)	66 b	70 bc	50.0 c	47.5 bc	51abcd	54 bcd
Resistant check	74a	77a	26.3a	16.4a	32a	35a
Susceptible check	25 d	57 d	73.5 d	52.2 c	68 e	92 e
Test Mean	62	71	31.6	46.4	54	57

† Data were abstracted from the Early Field Planting (EFP) and Uniform MAR (UMAR) tests.

‡ H=hairy, sm + glabrous line.

§ Means within a column followed by the same letter are not significantly different at the 0.05 probability level.

Table 2. Mean lint yield, boll size, gin turnout, lint percent, and fiber quality traits for seven MAR-5 cotton lines and reference varieties.†

Line/Variety	Lint Yield	Boll Size	Gin Turnout	Lint Percent	Fiber Traits‡					
					Length U.H.M.	Uniformity	Strength	Elongation	Micro-naire	
MAR-5 Lines		lb/acre		%	%	inches	index	g/tex	%	units
CABCHUS-2-86	(sm)§	458abc¶	90a	28.4bc	37.0ab	1.07bcd	84.5ab	26.5a	6.7abc	4.2b
BLLCABS-3-86	(sm)	440 bc	86ab	30.4a	37.2ab	1.12a	81.3c	24.1de	6.8ab	4.2b
C5HUG2BES-2-87	(sm)	418 bc	86ab	26.3de	34.3e	1.10ab	82.7bc	25.0bcd	6.5bc	3.7de
LBBCABCHUS-1-87	(sm)	404 c	91a	25.7e	34.2e	1.09abc	83.3b	24.5cd	6.4bc	3.5e
LBBCHU2GS-1-87	(sm)	402 c	91a	26.0de	34.7de	1.11a	83.5ab	24.6cd	6.5bc	3.9cd
CDP37HPIH-1-1-86	(H)	480ab	82b	29.2ab	37.8a	1.07bcd	85.0a	25.9ab	6.7abc	4.6a
LBB3CD3H-1-87	(H)	459ab	89a	27.1cd	35.7cd	1.12a	83.3b	24.5cd	6.2c	3.9cd
Reference Varieties										
Tamcot CAMD-E	(H)	447 bc	86ab	27.7bcd	36.0 bc	1.06cd	82.9bc	22.7f	6.9ab	4.0bc
Tamcot CD3H	(H)	498a	85ab	29.4ab	36.8abc	1.04d	83.5ab	23.3ef	6.5bc	4.2b
Tamcot CAB-CS	(sm)	486ab	85ab	29.4ab	36.8abc	1.04d	83.5ab	23.3ef	6.5bc	4.2b
Tamcot HQ95	(H)	497a	85ab	28.6abc	36.7abc	1.11a	83.6ab	25.3bc	6.1c	4.1bc
Lankart LX571	(H)	356 d	67 c	25.7 e	34.6 de	1.07bcd	83.9ab	25.0bcd	7.2a	4.7a

† Average of the 1988 Early Field Planting tests (2 locations) and 1989 Uniform MAR tests (7 locations). Data were abstracted from the tests.

‡ Fiber analysis performed by the Interantional Textile Center, Texas Tech University, Lubbock, TX, utilizing the High Volume Instrument (HVI) double line.

§ H = Hairy, sm = Glabrous line

¶ Means within a column followed by the same letter are not significantly different at the 0.05 probability level.

