

TEXAS A&M PLANT BREEDING BULLETIN -- December 2012

Our Mission: Educate and develop Plant Breeders worldwide.

Our Vision: Alleviate hunger and poverty through genetic improvement of plants.



Dr. Jane Dever joined Texas A&M AgriLife Research as an Associate Professor-cotton breeding in 2008. She received her B.S. in Textile Technology and Management, her M.S. in Crop Science, and her Ph.D. in Agronomy-Plant Breeding Emphasis from Texas Tech University. Jane held a number of positions prior to her present position as cotton breeder at the Lubbock Research and Extension Center, including Global Cotton Breeding Manager for Bayer CropScience from 2000 to 2008 and Product Development Manager for

FiberMax Cottonseed. She has extensive experience with textiles, not only through her educational experiences but also as Senior Research Scientist for BioTex and as Textile Engineer for Plains Cotton Cooperative Association during 1994 and 1995. Major research focus of Dr. Dever's program includes development of new and differentiated germplasm with enabling technology and screening exotic germplasm collections for useful traits to be used in breeding cotton. Breeding targets include improved fiber quality, drought tolerance, nematode tolerance, disease tolerance to *Verticillium dahliae*, *Theilaviopsis basicola*, and *Xanthamonas* (bacterial blight) and yield component improvement in improved fiber quality lines. Incorporating native traits discovered in the screening program into cultivars through classical breeding for organic production and preserving

genetic resources in a recombinant DNA environment are primary goals of Jane's breeding program.

Dr. Dever teamed with Dr. Terry Wheeler, Plant Pathologist at the Lubbock REC, to develop and release CA 4002 cotton germplasm line that combines a high level of resistance to *Verticillium* wilt with competitive yield and fiber quality in a genetic background unique among sources of resistance to Vert wilt. CA 4002 was developed through standard pedigree breeding method with 12 cycles of individual plant selection in the Lubbock *Verticillium* wilt nursery. The parents of CA 4002 are Paymaster 147 (PI 601733, PVP8900269) and Stahman P X CA 2266 (a breeding line of Texas A&M AgriLife Research-Lubbock). F1 seed were increased at the USDA winter nursery in Tecoman, Mexico; F2 seed were planted in the *Verticillium* wilt nursery and individual plant selections made on visual assessment of productivity, boll type and lack of visual symptoms associated with *Verticillium* wilt. Individual plant to progeny row planting continued from 1997 through 2007 in the *Verticillium* wilt nursery. A 2008 progeny row, 08-10-706 had a *Verticillium* wilt rating of 5.76 compared to the nearest susceptible check, Lankart 57, of 18.54 and the nearest resistant check, Paymaster 147, of only 1.86. This row was harvested for seed for performance trials and increase for subsequent testing.

Dr. Terry Wheeler, left, and Dr. Jane Dever inspect cotton plants in their Vert wilt nursery at the Lubbock Texas A&M AgriLife Research and Extension Center.



CA 4002 was tested at four locations on the Texas High Plains during 2009 and 2011 and three locations in 2010. One of the test locations each year was naturally infested with *V. dahliae*, the causal agent of *Verticillium* wilt. Performance of CA 4002 was compared with the performance of FiberMax 958 and FiberMax 989, a partially resistant cultivar.

Data in Table 1 below indicate that CA 4002 is competitive in yield potential and fiber quality when performance was averaged over 11 locations from 2009 through 2011. Table 2 verifies the level of Verticillium wilt resistance in this new upland cotton germplasm line.

Table 1. Agronomic performance of CA 402 averaged over 11 locations-years.

Designation	Yield kg ha ⁻¹	Percent		Length mm	Uniformity %	Strength kN m kg ⁻¹	Elongation %
		lint %	Micronaire units				
CA 4002	1037 b	33.5 b	3.7 a	29.5 a	82.1 a	322 a	7.4 a
FM958	1133 a	36.4 a	4.0 a	28.9 a	81.4 b	312 b	6.7 b
FM989	1089 ab	36.4 a	3.8 a	29.2 a	81.6 b	325 a	6.9 b
CV (%)	12.1	4.5	7.5	2.7	0.8	3.5	4.7

Table 2. Reaction of CA 4002 to Verticillium wilt

Status	Designation	Stem puncture assay				Microsclerotia	
		Test 1		Test 2		Test 1	
		AUDPC	Rank	AUDPC	Rank	AUDPC	Rank
NEW REL.	CA 4002	7.5 a	1	3.5 a	1	5.0 a	1
Res. Check	FM9160B2F	9.8 ab	5	4.0 ab	2	22.6 ab	11
Res. Check	NG3348B2F	9.5 ab	4	6.9 ab	8	32.6 bc	26
Field Check	FM989	10.8 ab	7	6.7 ab	7	21.4 b	9
Field Check	FM958	14.2 bc	25	10.1 b	27	41.5 c	32
Susc. Check	CG3035RF	19.2 c	33	16.7 c	33	37.1 bc	28

Table extracted from larger experiment with 33 entries.

Self-pollinated seed (180) from F13 plants grown at Texas A&M AgriLife Research and Extension Center in Lubbock during 2010 and tested to be free from genetically modified traits were planted in 60 hills at the winter nursery in Tecoman, Mexico. Seed were self-pollinated and bulk harvested. Inquiries regarding seed for potential commercial use should be directed to Texas A&M University System Office of Technology and Commercialization, 800 Raymond Stotzer Parkway, Suite 2020, College Station, TX 77845. Small quantities of CA 4002 for research purposes can be requested from J. K. Dever, Texas A&M AgriLife Research, 1102 E. FM 1294, Lubbock, TX 79403. Unless specifically approved by Texas A&M AgriLife Research, CA 4002 may not be used as a recurrent parent in a breeding program. CA 4002 was developed with partial financial support from

the Cotton Incorporated Texas State Support Committee and Plains Cotton Improvement Program.

Dr. Dever has authored or co-authored more than 40 scientific publications and holds two U.S. cotton-related patents. She is a native of Abernathy, TX where she grew up on a cotton, grain sorghum and soybean farm. She is one of 23 siblings and adopted siblings. Jane enjoys hosting parties for her extended family. She and her husband of 30 years, James, moved back to the ancestral farm to help care for her father in 2008, and she spends time away from work sorting through generations of memories.

Other News

Congratulations:

The following plant breeding students received degrees in December:

Justin Duncan: MS-NTO

Chad Hayes: MS

Carol Lange: MS

Michael McKee: MS

Juliana Osorio: PhD

Reminder: NAPB Annual Meeting, 2-5 June 2013 in Tampa, FL

Visit <http://www.plantbreeding.org/napb/Meetings/pbccmeeting2013.html> for information on the seventh annual meeting of The National Association of Plant Breeders. The annual meeting is an opportunity for breeders and allied scientists to stay updated on recent innovations in plant science and to discuss public policy issues relevant to plant breeding. The meeting also provides an important venue for graduate students to present their research, meet with potential employers, and become acquainted with plant breeding graduate students from other universities. This year's meeting will be hosted by the University of Florida.

For information about the Plant Breeding Distance M.S. and Ph.D. Program contact:

Wayne Smith

Department of Soil and Crop Sciences

2474 TAMU

College Station, TX 77843-2474

Tel. 979.845.3450 Fax 979.458.0533
cwsmith@tamu.edu

Mike Arnold

Department of Horticultural Sciences
2133 TAMU
College Station, TX 77843-2133
Tel. 979.845.1499
ma-arnold@tamu.edu

LeAnn Hague

Distance Education Coordinator
Department of Soil and Crop Sciences
2474 TAMU
College Station, TX 77843-2474
Tel. 979.845.6148 Fax 979.458.0533
Leann.hague@tamu.edu

Additional Websites

eLearning at Texas A&M University: <http://elearning.tamu.edu>

Office of Graduate Studies: <http://ogs.tamu.edu>

Please direct comments concerning this bulletin to Wayne Smith,
cwsmith@tamu.edu or 979.845.3450.