

UNITED STATES DEPARTMENT OF AGRICULTURE  
Agricultural Research Service  
Washington, D.C.

and

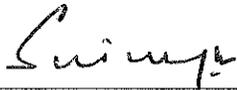
TEXAS TECH UNIVERSITY  
Lubbock, TX

**NOTICE OF RELEASE OF FOUR UPLAND COTTON GENETIC STOCK MUTANTS  
WITH TOLERANCE TO IMAZAMOX HERBICIDE**

The Agricultural Research Service, United States Department of Agriculture and Texas Tech University announce the release of four upland cotton genetic stock mutants with tolerance to imazamox herbicide. These mutants are SCM3-4-3, SCM3-7-3, RM3-8-1, and EM4-3-1. They will increase weed management tools available to cotton growers who have become dependent on glyphosate-based crop production system alone. These mutants originated from the High Plains cotton cultivars SC 9023, Rocket, and Explorer through induced chemical mutagenesis of seeds with ethyl methane sulfonate (EMS). In 1997, seeds from the above three cultivars were treated with 2.45% v/v EMS. The seeds were first imbibed in distilled water for 16 hours and treated with EMS for two hours and immediately planted in the field. Subsequent growing of the various mutant generations (M1-M6) from 1997 to 2004 and treatment with 88 and 350 g a.i./hectare (ha) imazamox identified four stable, true breeding tolerant lines to imazamox. These four mutants along with the original non-mutated parents were planted in the field during 2005 and 2006 in a randomized complete block design with three replicates and treated with 0, 88, 175, 350, and 700 g a.i./ha imazamox. As the imazamox rates increased, lint yields of the four tolerant mutants decreased only slightly whereas yields of the susceptible non-mutated cultivars decreased drastically. In 2005, application of 88 g a.i./ha imazamox reduced lint yields of the tolerant mutants by 2% compared to 41% for the non-mutated susceptible cultivars. In 2006, this rate reduced lint yields in the tolerant mutants by 3% whereas 25% yield reduction was observed in the susceptible cultivars. These mutants clearly demonstrated elevated levels of tolerance to imazamox. Imazamox rates, however, did not appear to have significant effect on fiber quality parameters. F2 populations resulting from susceptible x tolerant crosses gave a good fit to a 1:2:1 Tolerant(T)/Intermediate(I)/Susceptible(S) ratio indicating segregation of a single gene for resistance to imazamox. BC F1 populations gave a good fit to a 1:1 I:S ratio, confirming the single locus hypothesis. Allelism tests were conducted by crossing the four mutants among themselves. No intermediate or susceptible progeny were observed in the F2 of all the crosses. The tolerant genes in the four mutants are therefore either alleles at the same locus or very tightly linked. D'01A finger printing also indicated that there were genetic differences between the mutants and their original non-mutated parents. The research and development of the released genetic stocks was led by Efreem Bechere (currently, Crop Genetics and Production Unit at Stoneville, MS), and Dick L. Auld (Texas Tech University, Lubbock, TX). Peter Dotray, of Texas AgriLife Research at Lubbock, TX handled the herbicide formulation and application and Hirut Kebede (currently, Crop Genetics and Production Unit at

Stoneville, MS) did the molecular genetics analysis. Small quantities of seeds are available to cotton breeders, geneticists, weed scientists, and other research personnel upon written request to: Efreem Bechere, Crop Genetics and Production Unit, USDA-ARS, 141 Experiment Station Road, P.O. Box 345, Stoneville, MS 38776. It is requested that appropriate recognition of the source be given when these genetic stocks contribute to the development of a new breeding line, hybrid, or cultivar. Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes including development and commercialization of new cultivars.

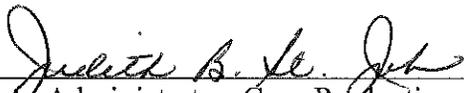
**Signatures:**



\_\_\_\_\_  
Associate Dean for Research  
College of Agricultural Sciences and Natural Resources  
Texas Tech University



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Date



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Deputy Administrator, Crop Production and Protection  
Agricultural Research Service, U.S. Department of Agriculture



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Date

**Summary of combined lint yield and quality parameters for tolerant mutants and non-tolerant cultivars grown in Lubbock, Texas in 2005 and 2006.**

Imazamox Rates (g.a.i ha-1)	Lint Yield (Kg ha-1)	Fiber Length (mm)	Fiber Strength (kN m Kg-1)	Micronaire
Imazamox Tolerant	Mutantst			
0	841	27.4	283	4.7
87.5	1067	27.7	280	4.5
175	995	27.7	281	4.4
350	654	24.4	273	4.4
700	888	27.4	274	4.2
LSD (0.05)	123	0.4	8.4	0.2
CV (%)	23.4	2.5	5.2	8.3
Non-tolerant cultivars±				
0	803	27.7	286	4.6
87.5	375	26.7	268	3.5
175	93	26.7	265	3.4
350	48	27.2	262	3.9
700	134	26.9	256	3.8
LSD (0.05)	136	0.44	6.4	0.4
CV (%)	70	2.4	3.6	14.6

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EM4-3-1, RMr 8-1, SCMr 4-3, SCMr 7-3  
Explorer, Rocket, and SC 9023