

FM 5035 LL: A NEW STRIPPER VARIETY WITH NEW HERBICIDE TECHNOLOGY

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Abstract

FM 5035LL is a new cotton variety that has genetically-based resistance to the broad-spectrum herbicide, Ignite™ (glufosinate-ammonium). FM 5035LL will be commercially available in 2004 as the first LibertyLink™ variety specifically bred for the stripper-harvested cotton growing areas of the Southwestern US. The variety will be an alternative to Roundup Ready varieties and will allow for broad-spectrum, over-the-top, herbicide application (up to 80 ounces) throughout the growing season (up to 70 days pre-harvest.). Results from yield trials conducted from 2001 to 2003 show that FM 5035LL has very good yield potential, an early fruiting habit, and good storm resistance. Fiber quality of FM 5035LL is good with fiber length averaging 1.05, strength is excellent averaging 30.9, and micronaire has been within the desirable range. FM 5035LL will complement the existing product line of FiberMax varieties by providing new herbicide technology in a productive, early-mid season variety with good fiber quality.

Introduction

Bayer CropScience is releasing for the 2004-growing season a new herbicide-resistant cotton variety. FM 5035LL is resistant to the herbicide Ignite (glufosinate-ammonium). Testing of the variety began in 2001 with gene efficacy trials and expanded variety trial testing continuing in 2002 and 2003.

Materials and Methods

Tests were conducted to evaluate both varietal performance and herbicide tolerance of FM 5035LL.

Variety Trials

FM 5035LL was evaluated in multiple replicated yield trials in 2001, 2002, and 2003. For tests in 2001 and 2002 comparisons for yield, agronomic characteristics, and fiber quality were made to Paymaster (PM) HS26 and SeedCo (SC) 9023. For the 2003 variety tests SC 9023 was replaced with FiberMax (FM) 958 as a key check. FM 958LL was also added to the testing program for a LibertyLink variety comparison. A randomized complete block design was used in all tests with three replications. Tests were analyzed in Agrobase using Nearest Neighbor analysis with means adjusted for yield; all other characteristic results are presented as unadjusted means. FM 5035LL was entered into state official variety trials in 2003 but results were not available at the time of the preparation of this paper. All data presented herein are from Bayer CropScience internal tests.

Herbicide Tolerance Trials

Herbicide tolerance trials were performed in 2002 and 2003. The objective of these trials was to determine the tolerance of FM 5035LL to multiple applications of glufosinate-ammonium. Entries consisted of FM 5035LL and three other tolerant lines. Treatments included an untreated control and treated plots receiving three applications each of glufosinate-ammonium at a rate of 40 oz/acre. Applications were made at the 2-3 leaf stage, 7-8 leaf stage, and early bloom stage, with a CO₂ backpack sprayer calibrated at 10 GPA (rates used were for experimental purposes and are not the labeled rates). Experimental design for both years was a randomized split-plot with herbicide treatment assigned to main plots and experimental line to subplots. Each plot consisted of four rows, forty feet long, replicated four times. Data were collected from the two center rows of each plot. Plots were evaluated after each herbicide application for crop injury, chlorosis, necrosis, and plant height. Yield, agronomic properties, and fiber quality data were also collected. Data were subjected to analysis of variance and means were declared significant at $P \leq 0.05$.

Results and Discussion

Varietal Performance

Performance of FM 5035LL (tested as experimental line 8000345) in 2001 replicated yield trials warranted advancement to 2002 yield trials. Performance of FM 5035LL in regard to yield, agronomic characteristics, and fiber properties for 2002 is presented in Table 1. Data averaged from four tests in 2002 show that FM 5035LL yielded 108% of SC 9023 and 103% of PM HS26. Gin turnout and lint percent was slightly less for FM 5035LL compared to both checks, while storm resistance was intermediate to SC 9023 and PM HS26. Plant height was similar for all three varieties. FM 5035LL showed to be slightly earlier than PM HS26. FM 5035LL had 35.8 percent open bolls at time of evaluation compared to 31.3 percent for PM HS26. SC 9023 showed to be slightly earlier than FM 5035LL. Fiber property measurements showed FM 5035LL to have longer fiber than either of the checks, higher strength than SC 9023, and lower micronaire than both key checks.

The 2003 growing season with above average heat unit accumulation and record high temperatures in October favored longer-season varieties. Yield results for FM 958 and FM 958LL were superior to FM 5035LL and PM HS26. Gin turnout and lint percent were slightly less for FM 5035LL when compared to PM HS26. Storm resistance of FM 5035LL was slightly less than the other varieties. Plant height was similar for all four varieties. Maturity of FM 5035LL and PM HS26 were similar under 2003 growing conditions, with PM HS26 being slightly later and FM 958 and FM 958LL substantially later. FM 5035LL and PM HS26 had 39.3 and 35.7 percent open bolls (respectively) at time of evaluation compared to 29.4 and 27.7 percent for FM 958 and FM 958LL (respectively). Fiber length in 2003 for FM 5035LL was again longer than PM HS26 with similar strength and lower micronaire than PM HS26.

Herbicide Tolerance

FM 5035LL showed excellent tolerance to multiple applications of glufosinate-ammonium. Results of 2002 and 2003 herbicide tolerance trials are shown in Table 3, values shown are the means across locations. FM 5035LL showed no visual crop injury after herbicide treatments for either year. There were no significant differences in 2002 or 2003 between the sprayed and unsprayed plots for yield or any of the agronomic characteristics measured. End-of-season plant mapping data in 2002 and 2003 showed no significant differences for plant height, number of vegetative branches, total nodes, nodes to first fruiting branch, or first position fruit retention between treated and untreated plots in both 2002 and 2003 (data not shown).

Summary

FM 5035LL is a new early-mid season herbicide-tolerant variety being released by Bayer CropScience for the 2004-growing season. FM 5035LL is resistant to the broad-spectrum herbicide, Ignite. It is a productive variety, with good fiber quality adapted to the stripper-harvested cotton regions of the Southwestern US. Seed supply for the 2004 season will be limited.

Table 1. Comparisons of Yield and other Characteristics of FM 5035LL, SC 9023, and PM HS26 in four tests, 2002.

Variety	Yield		% Lint	Storm Resistance	Plant Height	Maturity	Length	Strength	Mic	% Uni
	Lbs. lint/acre	% Gin Turnout								
FM 5035LL	1018	25.67	37.77	4.5	32.8	35.8	1.06	31.4	4.4	81.6
SC 9023	940	27.44	38.82	3.6	31.8	42.5	1.05	30.4	4.6	82.1
PM HS 26	987	27.26	39.35	6.3	32.0	31.3	1.02	32.3	4.8	82.0

Table 2. Comparisons of Yield and other Characteristics of FM 5035LL, FM 958, FM 958LL, and PM HS26 in six tests, 2003.

Variety	Yield		% Lint	Storm Resistance	Plant Height	Maturity	Length	Strength	Mic	% Uni
	Lbs. lint/acre	% Gin Turnout								
FM 958	801	29.56	42.58	6.3	21.3	29.4	1.09	31.7	5.1	82.0
FM 958LL	803	29.36	41.52	5.6	20.6	27.7	1.12	31.4	4.8	82.3
FM 5035LL	664	25.37	37.27	4.8	22.9	39.3	1.05	31.1	4.6	82.7
HS 26	643	27.24	38.60	6.1	21.9	35.7	1.03	31.1	5.0	82.8

Table 3. Performance of FiberMax 5035LL in 2002 and 2003 herbicide tolerance tests, two test locations for each year.

Treatment	2002		2003	
	Treated	Untreated	Treated	Untreated
Yield (Lbs/acre)	918	922	899	926
Gin Turnout	26.20	27.53	25.08	25.54
Lint %	38.55	40.05	36.08	36.91
Storm Resistance	5.9	6.0	4.8	5.4
Plant Height	28.6	35.0	21.5	22.1
Maturity	28.3	30.3	33.8	33.8
Length	1.05	1.05	1.09	1.10
Strength	31.8	32.0	31.6	30.9
Micronaire	4.7	4.8	4.4	4.6
Uniformity	82.9	83.2	82.6	82.9