

**NEW EARLY-MATURING TRANSGENIC  
VARIETIES FROM SURE-GROW:  
SG125B/R, SG125R, SG501B/R, SG585B,  
AND SG585R  
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**Abstract**

Sure-Grow Seed, Inc. has developed two early-maturing Roundup Ready® (R), one early-maturing Bollgard® (B), and two early-maturing Bollgard®/Roundup Ready® (B/R) varieties to be introduced in the 1999 season. Sure-Grow 125R and Sure-Grow 125B/R were developed from recurrent parent Sure-Grow 125. Sure-Grow 501B/R was derived from recurrent parent Sure-Grow 501. DES119 served as the recurrent parent for Sure-Grow 585B and Sure-Grow 585R. Comparisons of the transgenic varieties with their recurrent parents suggest many similarities, although some key differences are evident. Lint yield comparisons with the leading Bollgard® and Roundup Ready® varieties in the southeast and mid-south regions indicate Sure-Grow's new transgenic varieties perform better than or as well as the leading transgenic varieties.

**Introduction**

Transgenic cotton varieties offering genetic insect control and/or herbicide tolerance have had significant increases in market share of cotton planting seed sales in the past two years. While many Bollgard® and/or Roundup Ready® varieties are available for cotton growers across the cotton belt, very few are available that offer very early to early maturity, which is key to the short-season production concept.

Sure-Grow Seed developed some of the first widely-adapted, early-maturing varieties, such as Sure-Grow 125 and Sure-Grow 501. Sure-Grow Research combined efforts with Delta and Pine Land Company and Monsanto Company to develop transgenic varieties derived from Sure-Grow 125, Sure-Grow 501, as well as DES119.

**Methods**

Yield trials were conducted in 1998 by Sure-Grow Research at Leland and Tribbett, MS, by Sure-Grow Agronomic Services at on-farm locations throughout Texas and the southeast region, by Delta and Pine Land New Technology Research and Technical Services departments throughout the cotton belt, as well as the University of Georgia Cooperative Extension Service - Decatur County, GA. Trials that compared the performance of transgenic

varieties to the recurrent parents were managed conventionally for insect and weed control. Trials comparing the performance of Sure-Grow transgenic varieties to competitor transgenic varieties were "systems" trials in which insect and/or weed control were consistent with the transgene(s) contained in the variety, as appropriate. All trials were small plot, replicated at least four times, and machine-picked. Laboratory-scale gins were used to generate lint percents from hand-picked boll samples. Fiber samples were analyzed by High Volume Instrumentation (HVI).

**Results and Discussion**

Sure-Grow 125R and Sure-Grow 125B/R were derived from Sure-Grow 125; Sure-Grow 501B/R was developed from Sure-Grow 501; DES119 served as the recurrent parent for Sure-Grow 585B and Sure-Grow 585R. Sure-Grow 125B/R, Sure-Grow 501B/R, and Sure-Grow 585B seed were grown in winter nursery in South Africa in 1997-1998; these seed exhibited dormancy symptoms, but overall quality was adequate. Sure-Grow 125R and Sure-Grow 585R seed were grown in winter nursery in Argentina in 1997-1998; these seed exhibited severe dormancy symptoms and were of very poor quality. As a result, the Argentina-grown seed tended to have lower seedling vigor, later maturity, and lower yield potential compared to that of the recurrent parents (Tables 1, 2, and 3). The seed of recurrent parents were summer-grown in Arizona.

Sure-Grow 125B/R yielded similarly to its recurrent parent. Lint percent and fiber strength values were slightly lower for Sure-Grow 125B/R compared with Sure-Grow 125; other characteristics were comparable to Sure-Grow 125, with exception to plant height at harvest. Sure-Grow 125B/R was slightly over one inch taller than Sure-Grow 125 (Table 1). Sure-Grow 125R had significantly larger bolls, was significantly later in maturity, and had lower seedling vigor compared to Sure-Grow 125 (Table 1). All other characteristics were similar to the recurrent parent. It is likely that the lower seedling vigor, later maturity, and subsequent lower lint yield were highly related to the winter-grown seed's poor quality and severe dormancy.

Sure-Grow 501 B/R had significantly larger bolls and was earlier in maturity compared to its recurrent parent, Sure-Grow 501 (Table 2). Additionally, lint percent was two percentage points lower, and fiber strength 1.6 g/tex lower for Sure-Grow 501B/R compared to Sure-Grow 501. Sure-Grow 501B/R yielded less than Sure-Grow 501 in 1998. All other characteristics were similar to Sure-Grow 501.

Sure-Grow 585B yielded 1.5% higher than its recurrent parent, DES119. Sure-Grow 585B had lower lint percent, but stronger fiber, earlier maturity, and better seedling vigor than DES119. Plants of Sure-Grow 585B were significantly taller at harvest than those of DES119 (Table 3). Sure-Grow 585R yielded less than DES119, but lint

percent, boll size, and fiber characteristics were very similar to those of DES119 (Table 3). However, the poor seed quality and severe dormancy in the seed of Sure-Grow 585R were likely related to the lower seedling vigor, later maturity, and lower yield potential observed when compared to DES119 (Table 3).

In Bollgard® and/or Roundup Ready® systems (managed for Bollgard® and/or Roundup Ready®, as appropriate) trials in 1998, data from southeastern trials indicated stable, high yields for Sure-Grow 501B/R (Table 4). In 11 southeast trials, Sure-Grow 501B/R yielded 3% higher than its nearest competitor, DP33B; in 6 southeastern trials, Sure-Grow 501B/R outyielded PM1244RR, its nearest performer, by 86 lbs. lint/acre (Table 4). In the mid-south region in 1998, Sure-Grow 125B/R was the highest-yielding transgenic variety from Sure-Grow (Table 4).

### Summary

Sure-Grow 125B/R, Sure-Grow 125R, Sure-Grow 501B/R, Sure-Grow 585B, and Sure-Grow 585R are new early-maturing transgenic varieties being introduced in the 1999 season by Sure-Grow Seed. The recurrent parents of these new varieties are proven, high-yielding, widely-adapted varieties; while some key differences exist between the transgenic varieties and the recurrent parents, the core variety growth habit and performance has been maintained, and in some cases, improved. Limited supplies of Sure-Grow 125B/R, Sure-Grow 585B, and Sure-Grow 585R will be available for sale across the cotton belt in 1999; however, Sure-Grow 125R and Sure-Grow 501B/R supplies allow only for seed production sales in 1999, in addition to testing throughout the cotton belt.

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Table 1. Characteristics of SG125B/R and SG125R compared to those of the recurrent parent, SG125, in 1998. (All fiber data are HVI)

Trait	SG125	SG125BR	SG125R	# trials
lbs. lint/acre	1040	1043	923	15
Lint %	39.4	38.2	39.6	10
g Seedcotton /boll	4.99	5.04	5.18*	6
Length (in.)	1.12	1.10	1.08	10
Strength (g/tex)	27.7	25.7	26.2	10
Micronaire	4.63	4.59	4.54	10
Maturity index (SG125=1) <sup>†</sup>	1.00	1.00	0.70*	6
Seedling vigor (1=poor; 5=excellent)	3.3	3.3	2.1*	6
Plant height (in.)	32.6	33.7*	32.3	6
Seed source <sup>‡</sup>	AZ	South Africa	Argentina	

\* Indicates a value significantly different from the recurrent parent at the 5% probability level; statistics not available for lint yield, lint percent, or fiber characteristic data.

† Maturity index = percent open bolls/mean percent open bolls for SG125 for each trial.

‡ Seed from Arizona were of excellent quality and vigor; South Africa seed were winter-grown, were of adequate quality, but exhibited some dormancy; Argentina seed were winter-grown, were of poor quality, and exhibited severe dormancy.

Table 2. Characteristics of SG501B/R compared to those of the recurrent parent, SG501, in 1998. (All fiber data are HVI)

Trait	SG501	SG501BR	# trials
lbs. lint/acre	1084	995	15
Lint %	40.9	38.6	10
g Seedcotton /boll	4.61	5.08*	6
Length (in.)	1.12	1.09	10
Strength (g/tex)	29.2	27.6	10
Micronaire	4.69	4.80	10
Maturity index (SG125=1) <sup>†</sup>	0.76	0.99*	6
Seedling vigor (1=poor; 5=excellent)	3.5	3.2	6
Plant height (in.)	33.5	33.8	6
Seed source <sup>‡</sup>	AZ	South Africa	

\* Indicates a value significantly different from the recurrent parent at the 5% probability level; statistics not available for lint yield, lint percent, or fiber characteristic data.

† Maturity index = percent open bolls/mean percent open bolls for SG125 for each trial.

‡ Seed from Arizona were of excellent quality and vigor; South Africa seed were winter-grown, were of adequate quality, but exhibited some dormancy.

Table 3. Characteristics of SG585B and SG585R compared to those of the recurrent parent, DES119, in 1998. (All fiber data are HVI)

Trait	DES119	SG585B	SG585R	# trials
lbs. lint/acre	938	952	846	11
Lint %	38.9	35.5	39.0	10
g Seedcotton /boll	4.44	4.48	4.39	6
Length (in.)	1.13	1.12	1.10	10
Strength (g/tex)	26.7	29.3	27.9	10
Micronaire	4.59	4.56	4.60	10
Maturity index (SG125=1) <sup>†</sup>	0.85	0.96	0.60*	6
Seedling vigor (1=poor; 5=excellent)	2.9	3.4	2.0*	6
Plant height (in.)	33.2	34.6*	33.2	6
Seed source <sup>‡</sup>	AZ	South Africa	Argentina	

\* Indicates a value significantly different from the recurrent parent at the 5% probability level; statistics not available for lint yield, lint percent, or fiber characteristic data.

† Maturity index = percent open bolls/mean percent open bolls for SG125 for each trial.

‡ Seed from Arizona were of excellent quality and vigor; South Africa seed were winter-grown, were of adequate quality, but exhibited some dormancy; Argentina seed were winter-grown, were of poor quality, and exhibited severe dormancy.

Table 4. Lint yield (lbs. lint/acre) comparisons among Sure-Grow transgenic varieties and the leading transgenic varieties in the southeast and mid-south regions in 1998.

Variety	11 Southeast trials 1998	5 Mid-South trials 1998	6 Southeast trials 1998	2 Mid-South/ Southeast trials 1998
SG125B/R	899	1131	1048	1238
SG501B/R	955	1078	1089	1326
SG585B	889	1019	--	--
DP33B	927	--	--	--
STBG4740	837	--	--	--
PM1220BGRR	784	--	961	--
DP32B	--	1063	--	--
DP20B	--	1143	--	--
SG125R	--	--	917	1084
SG585R	--	--	962	1145
PM1220RR	--	--	962	--
PM1244RR	--	--	1003	--
DP5415RR	--	--	937	--
DP5690RR	--	--	904	--
DP425RR	--	--	--	1110
DP436RR	--	--	--	1097
DP458RR	--	--	--	1258
DP655B/RR	--	--	--	1181

Sources: Sure-Grow, Delta and Pine Land Company, and University of Georgia Cooperative Extension.