

SURE-GROW 105, A NEW EARLY-MATURING, CONVENTIONAL PICKER VARIETY

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Abstract

Delta and Pine Land Company, through its Sure-Grow breeding program, has developed a new early-maturing, conventional picker variety to be introduced in the 2000 season. Sure-Grow 105 was developed by Dr. Bob Bridge at Leland, MS, as a conventional variety widely-adapted to all regions of the cotton belt. Sure-Grow 105 has demonstrated yield and agronomic performance superior to leading conventional and transgenic varieties in all regions of the cotton belt.

Introduction

Sure-Grow developed and released Sure-Grow 747 (SG747) in the 1999 as the leading very early-maturing conventional picker variety. In the 2000 season, we will introduce and launch another conventional picker variety, Sure-Grow 105 (SG105), that is slightly later in maturity. Providing growers with a high-yielding conventional variety that exhibits good agronomic and fiber quality traits adds a valuable tool for risk management. Risks of weather and other environmental factors beyond the control of management inputs can be minimized by planting varieties with different maturity classifications.

Methods

Sure-Grow 105 originated from a cross made in 1989 between D6-70 x B3-33 at Leland, MS. D6-70 was derived from a cross between DES119 x DP50, and B3-33 originated from a cross between DP50 x DES56. Sure-Grow 105 was entered into a Sure-Grow Research replicated trial in 1995 at Leland, MS, and then was entered into 6 strains replicated trials in MS, AR, and TN in 1996. In 1997, SG105 was tested in selected university official variety trials, and in all university official variety trials in 1998 and 1999. In 1997, 15 acres of seed increase was grown in AZ, and 75 acres in 1998. Large-scale production in multiple seed production regions was conducted in 1999. The Technical Services department at Delta and Pine Land began testing SG105 in replicated trials across the cotton belt in 1997. Lint yield, lint percent (lint fraction from a laboratory-scale gin), seedling vigor ratings, in-season growth (expressed as plant height and height-to-node ratio), maturity, and fiber properties (analyzed

by High Volume Instrumentation) were collected, and are reported.

Results and Discussion

Sure-Grow 105 has smooth leaves, large seed (4,300 - 4,900 seed/lb.), a bushy fruiting habit, and has short plant height. Sure-Grow 105 is an early-mid maturing variety that has good storm tolerance and very good seedling vigor. It is widely adapted to most soil types in the cotton belt, and has performed well in conventional- and no-till systems. Seed availability of SG105 in 2000 is adequate.

Growth and Development

Seedling vigor of SG105 is superior that of SG747 and SG501 (Table 1). SG105 initiates its first fruiting branch at 5.51 nodes, which is lower than SG501, but higher than SG747, indicating that its maturity status is between that of SG747 (very early) and SG501 (early-mid) (Table 1). Plants of SG105 are shorter than those of SG747 or SG501, and this characteristic is seen as early as first square stage and continues until crop maturation (Table 1). Similarly, height-to-node ratios (HNR) are less for SG105 compared to the other two varieties at all stages throughout the season, although at harvest HNR of SG105 is not different from that of SG501 (Table 1). As suggested by the node of the first fruiting branch data, maturity index, which is based on percent open bolls, indicates that the maturity status of SG105 is intermediate compared to SG747 and SG501 (Table 1). Beltwide percent lint data suggest that SG105 has a lower lint fraction than either SG747 or SG501 (Table 1).

Irrigation Response

Data from the University of Arkansas (Marianna and Clarkdale locations) and Louisiana State University (Winnsboro location) compare the irrigation response of several varieties. Table 2 shows data for SG105 and ST BXN47 averaged across these locations for 1998 and 1999. SG105 outperformed ST BXN47 in the irrigated as well as the non-irrigated trial, indicating SG105 is well-suited for irrigation. The data also suggest that SG105 is adapted for dryland production, despite its short plant stature.

Southeast Performance

Yield performance of Sure-Grow 105 in the Southeast region (AL, FL, GA, NC, VA) indicates very good adaptation to this environment. Head-to-head comparison data in Table 3 show that the only varieties that outyield SG105 on average are: SG747, SG125R, SG125BR, SG501BR, and PM1218BR. When SG105 yield performance is compared to the remaining 21 varieties in Table 3, substantial yield advantage is observed in many instances.

Fiber length of SG105 is similar to that of SG747, SG501, ST474, DP51, and NC33B in the southeast (Table 4). Fiber

strength is superior to all varieties listed in Table 3, except for SG501; however, micronaire values for SG105 in the Southeast region are higher on average than all varieties in the comparison (Table 4).

Mid-South Performance

Sure-Grow 105, having been developed in the Mid-South (AR, LA, MS, MO, TN), is very well adapted to this growing region. When compared to 27 varieties in the Mid-South, the only varieties that outperform SG105 in terms of yield are SG747, SG821, and PM1218BR (Table 5). As with the Southeast yield data (Table 3), most of the yield differences between SG105 and the remaining 24 varieties are substantial in most cases (Table 5).

Fiber quality for SG105 in the Mid-South region is compared to that of other varieties in Table 6. The data show that SG105 has the longest and strongest fiber of the varieties included in the comparison. Micronaire values for SG105 are similar to those for SG747 and ST474, but are slightly higher than those for ST BXN47 and DP436RR.

Southwest Performance

In the Southwest region (TX, OK), yield performance of SG105 was compared to that of 24 competitor varieties (Table 7). SG105 outperformed 18 of the 24 varieties; however, many of the comparisons include data from only 1999 (as of December, 1999). More trial data from 1999 are expected and will be compiled.

Fiber quality of SG105 in the Southwest region is compared to that of SG747 and DP50 for 1998-1999 (Table 8). Fiber length and strength values were similar for all three varieties. Micronaire for SG105 was lower than that for SG747, but slightly higher than that for DP50.

Western Performance

Sure-Grow 105 yield performance was compared to 6 other varieties in the Western region (AZ, CA, NM) (Table 9). Data indicate that SG105 outyielded SG501, DP5415, and NC33B. Yields of SG747, SG125, and ST474 were higher than that for SG105.

Fiber properties for SG105 were compared to those for 8 other varieties in 1997 for the Western region (Table 10). Fiber length for SG105 was similar to that for SG747, while fiber strength was most similar to ST474. Micronaire values exceeded 5.0 for all varieties in the comparison.

Summary

Sure-Grow 105 yield performance is equal to or better than most of the leading competitor varieties in all four growing regions of the cotton belt. It is well-adapted to most soil types in the cotton belt, and is adapted to conventional- and

no-till systems. Good fiber characteristics have been observed for SG105 in all four regions. Sure-Grow 105 is an early- to mid-maturity variety that provides the grower with a very useful tool with regard to risk management. Planting varieties of differing maturity status is an effective method of minimizing risks associated with weather and other environmental factors that affect crop growth and yield. Sure-Grow 105 is a short-statured variety that makes it very suitable for fields that have an aggressive growth history. Sure-Grow 105 responds well to irrigation, but also yields well in dryland conditions, despite its short plant height.

Table 1. Growth characteristics of Sure-Grow 105 compared to Sure-Grow 747 and Sure-Grow 501.

| Characteristic | SG105 | SG747 | SG501 | Year(s) | # trials |
|-------------------------|-------|-------|-------|---------|----------|
| Seedling Vigor † | 3.24 | 3.02 | 3.08 | 97-99 | 27 |
| Node of 1 st | | | | | |
| Fruiting Branch | 5.51 | 5.38 | 5.68 | 97-98 | 17 |
| Plant Height (in) | | | | | |
| First Square | 13.80 | 14.31 | 14.14 | 97-98 | 17 |
| Early Bloom | 28.33 | 29.43 | 29.91 | 97-98 | 16 |
| Harvest | 32.47 | 34.16 | 34.96 | 97-98 | 15 |
| Height-to-Node | | | | | |
| Ratio (in/internode) | | | | | |
| First Square | 1.36 | 1.46 | 1.40 | 97-98 | 17 |
| Early Bloom | 1.77 | 1.94 | 1.88 | 97-98 | 16 |
| Harvest | 1.66 | 1.74 | 1.67 | 97-98 | 15 |
| Maturity Index ‡ | 0.95 | 1.00 | 0.82 | 97-98 | 9 |
| g Seedcotton/boll | 4.91 | 5.06 | 4.83 | 97-99 | 21 |
| % Lint | 39.2 | 40.1 | 40.5 | 97-99 | 35 |

† Based on visual rating: 1=poor; 5=excellent.

‡ Based on percent open bolls of each trial, where the mean of SG747 at each location is adjusted to an index of 1; values lower than 1 indicate maturity is later than SG747; values greater than 1 indicate maturity is earlier than SG747.

Table 2. Irrigation response (lbs. lint/acre) of SG105 and ST BXN47 in 5 trials conducted in 1998-99. (Univ. of Ark. and LSU data)

| | Irrigated | Non-irrigated |
|----------|-----------|---------------|
| SG105 | 1262 | 696 |
| ST BXN47 | 1216 | 597 |

Table 3. Head-to-head lint yield comparisons of SG105 vs. competitor varieties in the southeast region. (as of December, 1999)

| Varieties Compared | lbs. Lint/Acre | Year(s) | # of trials | State(s) |
|--------------------|----------------|---------|-------------|-----------------|
| SG105 | 1033 | | | |
| SG747 | 1046 | | | AL, FL, GA, SC, |
| SG125 | 1010 | 97-99 | 54 | NC, VA |
| SG105 | 1041 | | | AL, FL, GA, SC, |
| SG501 | 1037 | 97-99 | 50 | NC, VA |
| SG105 | 826 | | | AL, FL, GA, SC, |
| SG821 | 756 | 98-99 | 8 | NC |
| SG105 | 1046 | | | AL, FL, GA, SC, |
| ST474 | 1019 | 97-99 | 56 | NC, VA |
| SG105 | 956 | | | AL, FL, GA, SC, |
| ST BXXN47 | 940 | 98-99 | 22 | NC, VA |
| SG105 | 979 | | | AL, FL, GA, SC, |
| DP51 | 891 | 97-99 | 17 | NC, VA |
| SG105 | 987 | | | |
| DP5409 | 913 | 98-99 | 17 | AL, FL, GA, VA |
| SG105 | 1001 | | | AL, GA, SC, NC, |
| DP5111 | 939 | 97-99 | 33 | VA |
| SG105 | 1002 | | | |
| DP388 | 921 | 98-99 | 13 | AL, GA, NC |
| SG105 | 1066 | | | |
| FM832 | 951 | | | |
| FM989 | 970 | 98-99 | 4 | AL, VA |
| SG105 | 1291 | | | |
| NC33B | 1066 | 99 | 3 | AL, GA |
| SG105 | 1028 | | | AL, FL, GA, SC, |
| DP20B | 956 | 97-99 | 33 | NC, VA |
| SG105 | 1049 | | | AL, FL, GA, NC, |
| PM1560BG | 1001 | 98-99 | 26 | VA |
| SG105 | 1027 | | | AL, FL, GA, NC, |
| DP428B | 989 | 98-99 | 30 | VA |
| SG105 | 1008 | | | |
| SG125R | 1045 | | | |
| SG125BR | 1049 | | | |
| SG501BR | 1073 | | | |
| DP451BR | 997 | 99 | 11 | AL, GA, NC |
| SG105 | 1025 | | | |
| DP5415RR | 937 | 98 | 7 | FL, VA |
| SG105 | 1005 | | | AL, FL, GA, NC, |
| DP425RR | 917 | 98-99 | 28 | VA |
| SG105 | 1079 | | | |
| DP436RR | 954 | 98-99 | 21 | AL, GA, NC, VA |
| SG105 | 979 | | | AL, FL, GA, NC, |
| PM1218BR | 1009 | 98-99 | 23 | VA |
| SG105 | 901 | | | |
| DP422BR | 857 | 99 | 8 | AL, NC |
| SG105 | 1077 | | | |
| DP458BR | 991 | 98-99 | 4 | AL, FL, GA |

Table 4. Fiber properties of SG105 compared to competitor varieties in the southeast region.

| Varieties | Length (1/32 in) | Strength (g/tex) | Micronaire |
|-----------|------------------|------------------|------------|
| SG105 | 35.2 | 29.2 | 5.0 |
| SG747 | 35.1 | 27.2 | 5.0 |
| # trials | 8 | 14 | 14 |
| SG105 | 35.4 | 29.3 | 5.0 |
| SG501 | 35.1 | 31.1 | 4.8 |
| # trials | 7 | 13 | 13 |
| SG105 | 35.6 | 29.4 | 5.0 |
| ST474 | 35.1 | 28.5 | 5.0 |
| # trials | 6 | 12 | 12 |
| SG105 | 34.0 | 28.3 | 5.0 |
| DP51 | 34.0 | 26.4 | 4.7 |
| # trials | 1 | 5 | 5 |
| SG105 | 35.8 | 29.8 | 5.0 |
| NC33B | 35.4 | 29.2 | 4.6 |
| # trials | 4 | 4 | 4 |

Table 5. Head-to-head lint yield comparisons of SG105 vs. competitor varieties in the mid-south region. (as of December, 1999)

| Varieties Compared | lbs. Lint/Acre | Year(s) | # of trials | State(s) |
|--------------------|----------------|---------|-------------|--------------------|
| SG105 | 1116 | | | |
| SG747 | 1119 | | | AR, LA, MO, MS, TN |
| SG125 | 1045 | 97-99 | 53 | |
| SG105 | 1128 | | | AR, LA, MO, MS, TN |
| SG501 | 1100 | 97-99 | 46 | |
| SG105 | 1403 | | | LA |
| SG821 | 1442 | 99 | 2 | |
| SG105 | 1049 | | | AR, LA, MO, MS, TN |
| ST474 | 1016 | 97-99 | 45 | |
| SG105 | 1044 | | | AR, LA, MO, MS, TN |
| ST BXN47 | 969 | 97-99 | 41 | |
| SG105 | 900 | | | |
| DP51 | 754 | 98 | 5 | MO, TN |
| SG105 | 912 | | | |
| DP5409 | 860 | 98-99 | 9 | MO, TN |
| SG105 | 996 | | | AR, LA, MO, MS, TN |
| DP5111 | 928 | 98-99 | 31 | |
| SG105 | 1006 | | | AR, LA, MO, MS, TN |
| DP388 | 959 | 98-99 | 28 | |
| SG105 | 996 | | | |
| FM832 | 895 | 98-99 | 14 | AR, MO |
| SG105 | 966 | | | |
| FM989 | 759 | 98-99 | 16 | AR, MO |
| SG105 | 1117 | | | AR, LA, MO, MS, TN |
| NC33B | 980 | 98-99 | 28 | |
| SG105 | 1025 | | | AR, LA, MO, MS, TN |
| DP20B | 973 | 98-99 | 40 | |
| SG105 | 1037 | | | AR, LA, MO, MS, TN |
| PM1560BG | 1000 | 98-99 | 41 | |
| SG105 | 1027 | | | AR, LA, MO, MS, TN |
| DP428B | 954 | 98-99 | 39 | |
| SG105 | 957 | | | |
| DP50B | 877 | 98 | 11 | AR, MO, MS |
| SG105 | 1040 | | | |
| SG125R | 904 | 99 | 8 | AR, MO, TN |
| SG105 | 1034 | | | AR, LA, MO, MS, TN |
| DP425RR | 869 | 98-99 | 42 | |
| SG105 | 1036 | | | AR, LA, MO, MS, TN |
| DP436RR | 890 | 98-99 | 42 | |
| SG105 | 1007 | | | |
| SG125BR | 902 | 99 | 10 | LA, MO, TN |
| SG105 | 980 | | | |
| SG501BR | 913 | 99 | 12 | AR, LA, MO, TN |
| SG105 | 1034 | | | AR, LA, MO, MS, TN |
| PM1218BR | 1060 | 98-99 | 37 | |
| SG105 | 819 | | | |
| PM1560BR | 812 | 98-99 | 3 | MO, MS |
| SG105 | 949 | | | |
| DP422BR | 839 | 99 | 9 | LA, MO, TN |
| SG105 | 1008 | | | |
| DP451BR | 936 | 99 | 8 | AR, LA, TN |
| SG105 | 1085 | | | |
| DP458BR | 834 | 98-99 | 13 | AR, MO |

Table 6. Fiber properties of SG105 compared to competitor varieties in 24 mid-south region trials, 1998-99. (Univ. of Ark., MSU, and Univ. of TN data)

| Varieties | Length (in) | Strength (g/tex) | Micronaire |
|-----------|-------------|------------------|------------|
| SG105 | 1.13 | 29.1 | 4.79 |
| SG747 | 1.12 | 27.9 | 4.76 |
| ST474 | 1.09 | 28.4 | 4.77 |
| ST BXN47 | 1.10 | 28.4 | 4.59 |
| DP436RR | 1.12 | 27.5 | 4.62 |

Table 7. Head-to-head lint yield comparisons of SG105 vs. competitor varieties in the southwest region. (as of December, 1999)

| Varieties Compared | lbs. Lint/Acre | Year(s) | # of trials | State(s) |
|--------------------|----------------|---------|-------------|----------|
| SG105 | 902 | | | |
| SG747 | 974 | 97-99 | 15 | TX |
| SG105 | 904 | | | |
| SG125 | 864 | | | |
| SG501 | 891 | 97-99 | 14 | TX |
| SG105 | 929 | | | |
| SG821 | 888 | 98-99 | 13 | TX |
| SG105 | 921 | | | |
| ST474 | 901 | 98-99 | 9 | TX |
| SG105 | 1010 | | | |
| ST BXN47 | 952 | | | |
| DP388 | 933 | | | |
| PM1218BR | 1076 | | | |
| PM1560BR | 1060 | 99 | 9 | TX |
| SG105 | 895 | | | |
| DP50 | 783 | 98-99 | 9 | TX |
| SG105 | 745 | | | |
| DP5409 | 741 | 97-98 | 5 | TX |
| SG105 | 999 | | | |
| Sphinx | 886 | 99 | 8 | TX |
| SG105 | 1076 | | | |
| FM832 | 1225 | 99 | 9 | TX |
| SG105 | 964 | | | |
| NC33B | 931 | 99 | 6 | TX |
| SG105 | 989 | | | |
| DP20B | 1034 | 99 | 8 | TX |
| SG105 | 1167 | | | |
| DP5415RR | 1034 | | | |
| FM989 | 1151 | 99 | 6 | TX |
| SG105 | 980 | | | |
| SG125R | 910 | | | |
| SG125BR | 942 | | | |
| SG501BR | 986 | | | |
| PM1560BG | 959 | 99 | 10 | TX |
| SG105 | 661 | | | |
| DP451BR | 627 | 99 | 3 | TX |
| SG105 | 813 | | | |
| DP436RR | 776 | 99 | 4 | TX |
| SG105 | 1061 | | | |
| DP458BR | 959 | 99 | 8 | TX |

Table 8. Fiber properties of SG105 compared to competitor varieties in the southwest region (TX), 1998-99.

| | Length (in.) | Strength (g/tex) | Micronaire | # of trials |
|-------|--------------|------------------|------------|-------------|
| SG105 | 1.07 | 27.7 | 4.82 | 7 |
| SG747 | 1.08 | 27.0 | 5.01 | |
| SG105 | 1.06 | 27.7 | 4.93 | 5 |
| DP50 | 1.08 | 27.4 | 4.75 | |

Table 9. Head-to-head lint yield comparisons of SG105 vs. competitor varieties in the western region. (as of December, 1999)

| Varieties Compared | lbs. Lint/Acre | Year(s) | # of trials | State(s) |
|--------------------|----------------|---------|-------------|----------|
| SG105 | 1622 | 96-98 | 11 | AZ |
| SG747 | 1764 | | | |
| SG125 | 1636 | | | |
| SG105 | 1620 | 96-98 | 10 | AZ |
| SG501 | 1483 | | | |
| SG105 | 1517 | 97-98 | 7 | AZ |
| ST474 | 1566 | | | |
| SG105 | 1592 | 96-98 | 9 | AZ |
| DP5415 | 1415 | | | |
| SG105 | 1687 | 98 | 3 | AZ |
| NC33B | 1636 | | | |

Table 10. Fiber properties of SG105 compared to competitor varieties in 5 western region (AZ) trials, 1997.

| Varieties | Length (in) | Strength (g/tex) | Micronaire |
|-----------|-------------|------------------|------------|
| SG105 | 1.14 | 26.8 | 5.4 |
| SG747 | 1.14 | 25.4 | 5.4 |
| SG821 | 1.15 | 27.5 | 5.3 |
| SG125 | 1.13 | 25.7 | 5.2 |
| SG248 | 1.19 | 28.4 | 5.2 |
| SG501 | 1.15 | 29.8 | 5.1 |
| SG180 | 1.17 | 27.9 | 5.1 |
| ST474 | 1.13 | 26.7 | 5.5 |
| DP5415 | 1.17 | 27.7 | 5.3 |