

DP 448 B, A NEW MID-MATURITY BOLLGARD VARIETY

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Abstract

DP 448 B is a new mid-maturity Bollgard variety being released by Delta and Pine Land Company for the 2002 crop season. This variety was developed from DP 5415, using back-crossing, but this line was not a part of the NuCOTN 33B bulk. Field tests have been carried out on DP 448 B since 1996 to present. Comparisons to other Bollgard varieties from Delta and Pine Land Company (D&PL) tests and public sector tests (University variety trials and Extension / County Agent trial) are presented here. DP 448 B has a 5% better yield than NuCOTN 33B, based on the Beltwide summary of all tests (193 locations). The yield performance of DP 448 B is strongest in the western U.S., especially Arizona and the Imperial Valley of California. The agronomic characteristics and most fiber properties of DP 448 B are very similar to NuCOTN 33B. Fiber strength of DP 448 B is 0.6 g/tex less than NuCOTN 33B, while all other fiber properties are very similar. Plant mapping data indicates that DP 448 B begins fruiting earlier and completes its fruiting cycle slightly quicker to result in slightly earlier maturity. DP 448 B is slated as a replacement variety for NuCOTN 33B, with improved yield, similar agronomics, and similar fiber.

Introduction

Delta and Pine Land Company introduced the first transgenic cotton varieties in the U.S. market in 1996 with NuCOTN 33B and NuCOTN 35B. In the 2002 season, D&PL will introduce a new Bollgard picker variety that is slated as the replacement variety for NuCOTN 33B. DP 448 B is a widely adapted, medium-maturing picker Bollgard variety that has improved yields over NuCOTN 33B in a wide range of environments, and will provide growers with a new choice in Bollgard varieties.

Materials and Methods

DP 448 B is a new mid-maturity Bollgard variety that Delta and Pine Land Company will release for commercial sales in 2002. DP 448 B was developed at D&PL's Western Research Division in Maricopa, AZ (formerly Casa Grande, AZ) using the back-cross approach. Single plant selections from progeny rows were made in 1993 with further selections made in 1994. DP 448 B was derived from a single row in 1995. Field tests of yield and agronomic traits have been carried out on DP 448 B from 1996 to present. Even though the pedigree of DP 448 B and NuCOTN 33B are similar, the experimental line that became DP 448 B was not included in NuCOTN 33B. Seed supply of DP 448 B is expected to be very good for the 2002 growing season.

Data reported herein are from either Delta and Pine Land Company Technical Services Agronomic Service Trials (ASTs) and/or from various state university official variety trials (OVTs). Crop values, expressed in \$/acre based on the 2001 USDA loan charts with a base loan value of \$0.50/lb. +/- premiums and discounts, are shown for the subset of data for which all necessary HVI data were collected and reported. All data reported are from all trials available in Delta and Pine Land Company's Agronomic Information System as of December 21, 2001.

Results and Discussion

The agronomic traits of DP 448 B are very similar to NuCOTN 33B and are summarized in Table 1. This comparison is based on average values for the varieties for all tests where the variety was present, and may differ slightly from the head-to-head comparison values given in tables 2 and 3. The characteristics of DP 448 B have made it well adapted to full-season areas of the Cotton Belt, especially the Western U.S. and Arizona, Imperial Valley of California, and Texas. This variety also possesses excellent adaptation to the heat of the irrigated deserts of the Western U.S. The DP 448 B has a node of the first fruiting branch almost 1 node lower than NuCOTN 33B, and 0.6 fewer fruiting branches than NuCOTN 33B. This lower, quicker fruiting cycle results in slightly earlier maturity for DP 448 B, compared to NuCOTN 33B.

Beltwide Performance

The Beltwide yield results of DP448 B compared to NuCOTN 33B, DP 20 B, DP 428 B, and PM 1560 BG are summarized in Table 2 comparing only head-to-head data. DP 448 B had superior lint yields and crop value per acre compared to the Bollgard varieties included in the analysis. The largest dataset of comparisons is between DP 448 B and NuCOTN 33B,

where DP 448 B had 5% improved yield and \$14/acre better crop value. The overall lint yields were also greater for DP 448 B than DP 20 B, DP 428 B, and PM 1560 BG, ranging from 15 to 27 lb/acre yield improvement. Crop value, based on premiums and discount in the USDA 2001 loan chart, was also better for DP 448 B than the three other comparison varieties; ranging from \$9/acre to \$18/acre improvement. Staple length of DP 448 B was slightly longer than DP 20 B (+0.4 32nd's inch), and PM 1560 BG (+0.3 32nd's inch), while it was equal to DP 428 B and NuCOTN 33B. Fiber strength of DP 448 B was greater than DP 20 B and DP 428 B and less than NuCOTN 33B and PM 1560 BG. Micronaire of DP 448 B was less than NuCotn 33B, DP 428 B, and PM 1560 BG and greater than DP 20 B. The gin turnout of DP 448 B was greater than NuCOTN 33B and DP 428 B, and less than DP20 B and PM 1560 BG.

Regional Performance

The regional breakout of yield and agronomic performance of DP 448 B compared to NuCOTN 33B (Table 3) shows the consistent performance of DP 448 B across the Cotton Belt, especially in the western areas. In the Upper and Lower Southeast regions, DP 448 B had lint yields 20 to 38 lb/acre greater than NuCOTN 33B, while in the North and South Delta, DP 448 B had lint yields 22 to 63 lb/acre greater than NuCOTN 33B. The North Delta performance indicated the value of the earlier first fruiting node and slightly earlier maturity of DP 448 B, compared to NuCOTN 33B for a mid-maturity variety grown in a short season environment. The performance of DP 448 B was strongest in the comparisons from Texas west through Arizona and California's Imperial Valley. Yield comparisons in Texas and New Mexico found DP 448 B with yields 63 lb/acre (7.2%) better than NuCOTN 33B, and in AZ/CA yields of DP 448 B were 89 lb/acre (5.5%) better than NuCOTN 33B. The crop value of DP 448 B compared to NuCOTN 33B, similar to the lint yields, was strongest in the Texas/New Mexico, and Arizona/California regions, with \$18 to \$55 per acre improvement vs. NuCOTN 33B. The strong performance of DP 448 B in the western portion of the U.S. Cotton Belt is indicative of the excellent adaptation that DP 448 B has in that region, in particular, likely due to its breeding origins in Arizona.

Summary

DP 448 B is a smooth-leaf, mid-maturity, Bollgard variety with similar genetic background to NuCOTN 33B, but 5% improved yield in Beltwide comparisons of 193 test locations. DP 448 B has earlier fruiting than NuCOTN 33B, leading to slightly earlier maturity. DP 448 B had improved performance in the North Delta region, likely due to the slightly earlier maturity. The strongest relative performance of DP 448 B compared to NuCOTN 33B was in the Texas / New Mexico region and the Arizona / California region. This strong performance of DP 448 B in the western areas is likely due to its breeding origins in Arizona. DP448 B is slated as a replacement variety for NuCOTN 33B. This multi-year analysis shows that DP 448 B is adapted broadly across the U.S. Cotton Belt, similar to NuCOTN 33B, with similar agronomic and fiber quality traits (0.6 g/tex lower fiber strength), and 5% improved yield Beltwide.

Table 1. Agronomic and Fiber Characteristics of DP 448 B compared to NuCotn 33B.

Characteristic	DP 448 B	NuCOTN 33B
Maturity	Mid – Full	Mid – Full
Plant Height	Medium-Tall	Medium-Tall
Leaf Pubescence	Smooth	Smooth
Range of Seed Size (#/lb.)	4,750 to 5,800	4,700 to 5,850
Storm Resistance	Very Good	Very Good
<i>Fusarium</i> Resistance	Very Good	Very Good
<i>Verticillium</i> Resistance	Very Good	Very Good
Bronze Wilt	Not Observed	Not Observed
Node of 1 st Fruiting Branch	5.8	6.7
Total No. Fruiting Branches	13.8	14.4
Staple (32 nd 's inch)	35.1	34.7
Micronaire	4.4	4.4
Fiber Strength (g/tex)	27.5	28.2
Leaf Grade	2.2	2.1
% Gin Turnout	34.8	34.2
Length Uniformity (%)	81.9	81.8

Table 2. Head-to-head comparisons of DP 448 B and early to mid maturity BG alternatives across the Belt in D&PL ASTs and state university OVTs, as of 21 December, 2001.

Varieties	Lbs. lint/acre	% Wins	Staple (1/32 in)	Strengt h (g/tex)	Micro-naire	Leaf Grade	% Turn-out	% Uni-formity	Crop Value[†] (\$)
DP 448 B	1035	66	35.1	27.5	4.40	2.2	34.8	81.9	502.84
NuCOTN 33B	987	34	35.2	28.1	4.43	2.1	34.2	81.8	488.97
No. Tests: 193									
DP 448 B	958	51	35.3	27.6	4.30	2.3	34.6	82.0	471.57
DP20 B	943	49	34.9	27.0	4.20	2.6	35.3	82.0	462.54
No. Tests: 92									
DP 448 B	977	55	35.2	27.6	4.29	2.2	34.7	81.9	490.77
DP 428 B	950	45	35.2	26.8	4.41	2.1	34.1	82.0	481.01
No. Tests: 110									
DP 448 B	976	54	35.2	27.5	4.31	2.1	33.8	82.0	465.01
PM 1560 BG	959	46	34.7	28.8	4.64	2.3	34.9	82.5	447.34
No. Tests: 121									

[†] Based on loan value of \$0.50/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots.

Table 3. Head-to-head comparisons of DP 448 B to NuCOTN 33B across the Belt and by regions in D&PL ASTs and state university OVTs, as of 21 December, 2001.

Varieties	Lbs. lint/ acre	% Wins	Staple (1/32 in)	Strength (g/tex)	Micro- naire	Leaf Grade	% Turn- out	% Uni- formity	Crop Value [†] (\$)
Beltwide									
DP 448 B	1035	66	35.1	27.5	4.40	2.2	34.8	81.9	502.84
NuCOTN 33B	987	34	35.2	28.1	4.43	2.1	34.2	81.8	488.97
No. Tests: 193									
Upper Southeast									
DP 448 B	979	53	35.6	30.0	4.21	1.9	37.8	81.7	473.19
NuCOTN 33B	959	47	35.5	30.2	4.22	1.7	37.1	81.7	466.86
No. Tests: 19									
Lower Southeast									
DP 448 B	974	58	34.8	27.2	4.48	2.1	36.4	81.6	494.37
NuCOTN 33B	936	42	34.9	27.9	4.42	1.9	35.8	81.6	495.24
No. Tests: 36									
North Delta									
DP 448 B	932	73	34.4	26.5	4.27	3.7	35.4	81.8	430.00
NuCOTN 33B	869	27	34.6	26.6	4.35	3.8	35.4	81.4	421.59
No. Tests: 15									
South Delta									
DP 448 B	990	70	35.2	27.5	4.48	1.9	33.3	82.4	477.14
NuCOTN 33B	968	30	35.1	28.0	4.58	2.1	33.0	82.0	463.77
No. Tests: 54									
Texas / NM									
DP 448 B	940	68	34.6	25.7	4.20	2.3	31.6	81.2	467.21
NuCOTN 33B	877	32	34.6	26.5	4.19	2.1	31.1	81.4	449.47
No. Tests: 34									
AZ / CA									
DP 448 B	1707	71	36.6	28.7	4.61	1.5	37.2	82.5	830.24
NuCOTN 33B	1618	29	36.5	29.1	4.68	1.3	36.3	82.6	775.09
No. Tests: 17									

[†] Based on loan value of \$0.50/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots.

Upper Southeast – VA, NC, Northern SC

Lower Southeast – Southern SC, GA, FL, Southern AL

North Delta – MO, TN, N. AL, N. AR, N. MS

South Delta – LA, S. AR, S. MS

AZ, CA – AZ, Imperial Valley of CA

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