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YIELD AND ECONOMIC COMPARISON OF BOLLGARD VARIETIES IN THE TEXAS GULF COAST REGION

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Abstract

The performance of Bollgard and non-Bollgard varieties based on lint yield/acre was examined in variety trials conducted from 1996-2001 in the Gulf Coast Region of Texas. A total of 196 comparisons between Bollgard or Bollgard Roundup Ready varieties and their recurrent parent (129 comparisons) or Roundup ready equivalent (67 comparisons) were made using the variety trial data. The data set was acquired from D&PL trials, state OVTs, county extension trials and consultant trials. All trials were grown using conventional management for insect and weed control. Comparisons were made across and within years for the entire Gulf Coast Region and for three distinct growing areas within this region. A dollar return per acre for the Bollgard varieties over and above the non-Bollgard varieties was figured using the base loan rate of $.5165. Bollgard varieties produced a 49-lb. yield increase over the non-Bollgard varieties when averaged across all years and location. Yield differences within years for the entire region varied from a low of 9-lbs./ac in 1998 to a high of 98-lbs./ac in 1999. The dollar returns per acre for the Bollgard varieties over and above the non-Bollgard varieties varied from a low of $4.65/ac in 1998 to a high of $50.62/ac in 1999 with an average dollar return per acre of $25.31.

Introduction

Cotton varieties containing the Bollgard gene have been widely accepted and planted on a significant number of cotton acres across the cotton belt. Numerous studies evaluating the yield and economic performance of Bollgard varieties compared to conventional varieties have been conducted and reported in the Beltwide Cotton Conference Proceedings (Stark 1997, Bryant et al. 1999, Carlson et al. 1998, Cooke and Freeland 1998, Wier et al. 1998, Mullins and Mills 1999, Cooke et al. 2000, Miller et al. 2000 and Seward et al. 2000). In all but a few of these studies the Bollgard varieties offered an increased yield and/or lower insect control costs resulting in an economic advantage to the Bollgard cotton varieties. However, some cotton producing areas have been reluctant to adopt this technology presumably due to a lack of economic returns. One such area is the Gulf Coast Region of Texas. The objectives of this study was to evaluate the yield performance of Bollgard or Bollgard Roundup Ready cotton varieties compared to their recurrent parent or Roundup Ready equivalent in the Gulf Coast Region of Texas and to determine if differences in yield provide economic advantage and incentive to use the Bollgard technology.

Methods and Materials

Yield data was collected from variety trials conducted in the Gulf Coast Region of Texas from 1996-2001. The data collected includes D&PL variety trials, state OVTs, county extension variety trails and consultant variety trials. The trial types included large plot strip trials, large plot replicated trials and small plot replicated trials. All trials were grown using conventional insect and weed control.

Individual comparisons were made with Bollgard or Bollgard Roundup Ready varieties and their recurrent parent or Roundup Ready equivalent within individual trials. Data from the following varietal families were included in the comparisons: DP50, DP51, DP20, DP5409, DP5690, DP90, DP5415, DeltaPEARL, PM1560, PM1220, SG125, SG501, ST474, FM832 and FM989. Yield comparisons were made for each of the six years and across all years for the entire Gulf Coast Region. Theses same comparisons were also made for three distinct growing areas within the gulf coast. The three areas include the Upper Gulf Coast, the Coastal Bend and the Rio Grande Valley. The base loan price of $.5165 was used to calculate gross revenue per acre.

Results and Discussions

Texas Gulf Coast

The Bollgard varieties consistently out yielded the conventional varieties. The yield difference varied from a low of 9 lbs./ac in 1998 to a high of 98 lbs./ac in 1999. When averaged across all years the Bollgard varieties had a 49 lbs./ac yield advantage over the conventional varieties (Table 1). The dollar return per acre over and above the conventional varieties was a low of $4.65/ac in 1998 to a high of $50.62/ac in 1999 with an average across all years of $25.31/ac (Table 5).

Upper Gulf Coast

In the Upper Gulf Coast area the Bollgard varieties out yielded the conventional varieties in all years except 2000. In 2000 the conventional varieties out yielded the Bollgard varieties by 12 lbs./ac. The yield difference ranged from a low of (12) lbs./ac 2000 to a high of 111 lbs./ac. in 1999. When averaged across all years the Bollgard varieties had a 44 lb./ac yield advantage over the conventional varieties (Table 2). The dollar return per acre over and above the conventional varieties was a low of –($6.20)/ac in 2000 to a high of $57.33/ac in 1999 with an average across all years of $22.73/ac (Table 5).

Coastal Bend

In the Coastal Bend the Bollgard varieties consistently out yielded the conventional varieties. The yield difference ranged from a low of 20 lbs./ac in 1997 to high of 123 lbs./ac in 1999. When averaged across all years the Bollgard varieties had a 50 lb./ac yield advantage over the conventional varieties (Table 3). The dollar return per acre over and above the conventional varieties was a low of $10.33/ac in 1997 to a high of $63.53/ac in 1999. The average across all years was $25.83/ac (Table 5).

Rio Grande Valley

In the Rio Grande Valley the Bollgard varieties out yielded the conventional varieties in all years except 1998. In 1998 the conventional varieties out yielded the Bollgard varieties by 44 lbs./ac. The yield difference across years varied from a low of (44) lbs./ac in 1998 to a high of 131 lbs./ac in 2001. When averaged across all years the Bollgard varieties out yield the conventional varieties by 48 lbs./ac (Table 4). The dollar return per acre over and above the conventional varieties was a low of –($22.73)/ac in 1998 to a high of $67.66 in 2001. The average for all years was $24.79/ac (Table 5).

Summary

The Bollgard varieties had a consistent yield advantage in each year and across all years in the Gulf Coast Region of Texas when compared to the non-Bollgard varieties. However the degree of yield advantage varied from year to year and location to location. Within years or locations the yield advantage was not enough to cover the cost of the technology for every comparison made but across multiple locations or years the yield advantage alone produced enough additional revenue to cover the cost of the technology.

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Table 1. Average lint yields (lbs./ac) of Bollgard and non-Bollgard varieties for the Gulf Coast Region of Texas.

Year	N	Bollgard	Non-Bollgard	Bollgard Advantage
1996	24	635	582	53
1997	24	839	800	39
1998	50	558	549	9
1999	48	1086	988	98
2000	20	957	918	39
2001	30	942	899	43
96-01	196	831	782	49

Table 2. Average lint yields (lbs./ac) of Bollgard and non –Bollgard varieties for the Upper Gulf Coast of Texas.

Year	N	Bollgard	Non Bollgard	Bollgard Advantage
1996	11	649	575	74
1997	5	741	721	20
1998	17	484	468	16
1999	14	973	862	111
2000	2	666	678	12
2001	7	1054	1017	37
96-01	56	752	708	44

* Upper Gulf Coast includes Victoria, Calhoun, Jackson, Wharton, Matagorda, Brazoria, Fort Bend and Colorado counties.

Table 3. Average lint yields (lbs./ac) of Bollgard and non-Bollgard varieties for the Coastal Bend of Texas.

Year	N	Bollgard	Non-Bollgard	Bollgard Advantage
1996	5	523	486	37
1997	12	754	734	20
1998	24	476	452	24
1999	22	1159	1036	123
2000	12	950	891	59
2001	20	817	790	27
96-01	91	791	741	50

* Coastal Bend includes Kleberg, Nueces, San Patricio, Bee, Jim Wells and Refugio counties.

Table 4. Average lint yields (lbs./ac) of Bollgard and non-Bollgard varieties for the Rio Grande Valley of Texas.

Year	N	Bollgard	Non-Bollgard	Bollgard Advantage
1996	8	686	636	50
1997	7	1056	968	88
1998	9	917	961	(44)
1999	15	1051	987	64
2000	6	1083	1052	31
2001	4	1337	1206	131
96-01	49	993	945	48

* Rio Grande Valley includes Cameron, Willacy and Hidalgo counties.

Table 5. Dollar return per acre for Bollgard varieties compared to non-Bollgard varieties.

Year	Upper Coast	Coastal Bend	Rio Grande Valley	Gulf Coast
1996	$38.22	$13.95	$25.38	$27.37
1997	$10.33	$10.33	$45.45	$20.14
1998	$8.26	$12.40	($22.73)	$4.65
1999	$57.33	$63.53	$33.06	$50.62
2000	($6.20)	$30.47	$16.01	$20.14
2001	$19.11	$13.95	$67.66	$22.21
96-01	$22.73	$25.83	$24.79	$25.31

* Dollar return figured using the base loan price of $.5165 times the yield difference per acre.