TRANSGENIC Bt COTTON - CONSULTANTS' VIEWS & OBSERVATIONS

Roger Carter
Agricultural Management Services, Inc.,
Clayton, LA
James Clower
Clower Consulting Service,
St. Joseph, LA
Ray Young
Ray Young Insect Control,
Wisner, LA
Harold Lambert
Lambert Agricultural Consulting, Inc.,
Innis, LA

Abstract

Tobacco budworms (TBW) are consistently major pests of cotton in the Mid-South. The development of transgenic Bt cotton enhances management of TBW and helps ensure maximum economic cotton production. Insect control costs were often $150/acre or greater in regions of the mid-South where TBW outbreaks occurred in 1995. Because of the rapid dissemination of Bt cotton from laboratory to the farm, less knowledge was available to consultants and producers than with any previously introduced technology. Therefore, Bt cotton planted in 1996 was essentially an experimental crop that cotton consultants had to manage while working behind blindfolds - blindfolds being lack of data generated under many different conditions.

Several consultants from the Mid-South, Southwest, and Southeast noticed similar patterns developing in cotton varieties containing the Bollgard® technology as the 1996 season progressed. We were able to share these experiences via the Consultants Instant Information Network (CIIN) sponsored by FMC. Alerting consultants on the network of potential problems probably saved cotton producers thousands of dollars in lost revenue. Sharing these observations will enhance the possibility of improving our ability to manage Bollgard® cotton and conventional varieties as well.

Discussion

Observations of Bollgard® cotton under cotton bollworm pressure were made by James Clower, Ray Young, Jessie Young, Dan McGee, Grady Coburn, Harold Lambert, Tim White, Richard Griffing, Ward Griffing, Arnie Pardue, Fred Posey, Matt Myers, Walter Myers, Jay Welch and others from Louisiana along with Chuck Farr and Charles Denver in Arkansas, Lonnie Bull in South Carolina, and Mike Edwards and Tucker Miller III in Mississippi. Many of the same problems and attributes were seen in these different areas.

Observations included:

1. Vigor of Bollgard® cotton seedlings was acceptable.
2. Cotton bollworm (CBW) infestations were effectively controlled in most cases early season when bollworms moved from winter vegetation to young cotton seedlings.
3. NuCotn® 33B tended to shed fruit more readily under cloudy, wet conditions than our standard varieties.
4. Fruiting patterns on Bollgard® cotton was irregular with some abortion of entire fruiting branches.
5. NuCotn® 33B required higher amounts of growth regulators to limit plant height.
6. Plant bugs, stink bugs, boll weevils, and fall armyworms were a continuing problem in Bollgard® cotton that was not treated on a regular basis.
7. NuCotn® varieties failed to adequately control some CBW infestations during July and August (Table 1).
8. Application of pyrethroid insecticides based on sustained bollworm egg-lay appears to be the most efficacious control means (Table 1).
9. Control of CBW on the lower portion of the cotton plants with pyrethroid insecticides was less than desirable after populations had become established (Table 1).
10. CBW egg-lay was greater in Bollgard® cotton than standard varieties when fields were adjacent and Bollgard® cotton was not treated simultaneously (Table 2).
11. Bollgard® cotton gave superior control of tobacco budworms as compared to other control measures currently available.
12. NuCotn® 33B required higher rates of defoliants since maturity was later than standard varieties.
13. The use of boll-opening materials did not in most cases reduce the need for second picking of NuCotn® 33B.
14. The use of insecticide oversprays including Fury®, Karate®, or Orthene® increased yields of Bollgard® cotton (Table 3).
15. Cost of production of NuCotn® 33B was greater than standard varieties in 1996 due to higher inputs (Table 4).

Table I. Typical cotton bollworm infestation levels in NuCotn® 33B at Louisiana Delta Plantation, Jonesville, LA.

Date	Per 100 Squares		Per 100 Terminals		Per 100 Bolls	
	Damage	Worms	Worms	Eggs	Damage	Worms
7/8	0	0	0	18	0	0
7/12	0	0	5	90	0	0
7/17	8	6	45	175	2	0
7/22	2	0	15	45	20	4
7/25	2	2	5	50	2	0
7/31	0	0	15	90	4	2
8/5	4	0	10	45	22	12
8/8	2	0	0	15	10	1
8/13	2	0	5	80	16	2
8/19	1	1	30	180	4	2

Applications:
7/10 Bidrin®8E (1/20 gal/ac)
7/18 Baythroid®2E (1/60 gal/ac)
8/5 Asana®XL (1/20 gal/ac) + Bidrin®8E (1/20 gal/ac)
8/15 Asana®XL (1/20 gal/ac) + Lorsban® 4L (1/12 gal/ac)

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:874-875 (1997)
National Cotton Council, Memphis TN

Table 2. Comparison of cotton bollworm egg-lay in NuCotn® 33B vs DPL 5415 fields, treated vs non-treated, Louisiana Delta Plantation, Jonesville, LA.

Date	Cotton Bollworm Eggs/100 Terminals			
	Untreated		Treated	
	NuCotn 33B	DPL 5415	NuCotn 33B	DPL 5415
7/20	60	30	60	30
7/24	40	32	24	24
7/28	66	40	42	27
8/1	100	60	25	25
8/5	75	33	27	30

Applications:
7/21 Karate® (1/40 gal/ac)
7/29 Karate® (1/40 gal/ac) + Orthene® (1/2 lb/ac)

Table 3. Yield of NuCotn® 33B oversprayed with various insecticide programs, Willard Kassel Farms, Clayton, LA.

Treatment	Yield (lbs lint/acre)
1. Karate®1E (7-day schedule)	1230
2. Karate®1E (20% egg-lay)	1278
3. Karate®1E (20% worms)	1265
4. Fury®1.5EC (7-day schedule)	1218
5. Orthene®90S (7-day schedule)	1142
6. Standard	1120

Table 4: Average of inputs from four pairs of comparable adjacent fields of Bollgard® cotton vs. standard varieties.

Input	Bollgard®	Standard
1. Growth Regulator	$14.75	$8.37
2. Bollworm Applications	$15.60	$22.95
3. Budworm Applications	$0.00	$45.00
4. Plant Bug Applications	$23.76	$9.78
5. Weevil Applications	$34.75	$15.66
6. Harvest Aids	$28.50	$20.60
7. Biotechnology	$32.00	$0.00
8. Scrapping Costs	$27.50	$0.00
Total	$176.86	$122.36
Yields (lbs lint/acre)	1176	1079