Evaluation of Conventional Cotton Varieties in Virginia

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Abstract

Three *conventional* (non-Bt, non-RR/RF) cotton varieties were evaluated in 2010 and 2011 at the Virginia Tech Tidewater Agricultural Research and Extension Center (small-plots) and on commercial growers' fields (replicated strip trials). Insect pressure by bollworm was documented by weekly scouting of plots and insecticides were applied according to recommended thresholds. Boll damage was assessed throughout the season by sampling bollworm populations and boll damage. Differences in product use compared with *standard* BG2/RF or WS/RF varieties were also documented. Estimated costs (seed, herbicide, insecticide, number of applications) of the *conventional* vs. *standard* variety programs were compared to lint plus seed value (lb/A at average $/lb).

Objective

To evaluate the fit and value of selected *conventional* cotton varieties (non-Bt and non-Roundup Ready) in Virginia.

Introduction

There is interest by growers to evaluate the fit for *conventional* cotton varieties. They see these varieties as a possible option for use in 'marginal' fields where yield potential is limited. Also, as the number of glyphosate-tolerant weed species is increasing, growers are having to incorporate more 'traditional' herbicides into their weed management programs, reducing the value of the Roundup Ready technology. Our data over several years have shown that in general, BG2/RF and WS/Flex varieties must be treated at least one time for bollworm to prevent economic damage. Generally, non-Bt cotton has to be treated only two times. This project documented in six field plot studies the value of *conventional* vs. *standard* cotton varieties.

Methods and Materials

Three *conventional* cotton varieties were evaluated in a total of six field trials in 2010 and 2011: SSG HQ 110 CT, SSG HQ 210 CT, and SSG HQ 212 CT (Seed Source Genetics, Bishop, TX). Phytogen 375 WS/RF was used as the *standard* variety in most comparisons (except for DP 1028 B2/RF in 2011 at the Grizzard Farm) because of its widespread use in Virginia. Split-plot replicated trials were established at the Virginia Tech Tidewater AREC (Suffolk, VA), where main plots received either two threshold-based insecticide applications (Baythroid XL at 1.6 and 2.6 oz), or no insecticide for bollworm management. Large-block replicated trials were conducted at the Everett (Southampton Co.), Grizzard (Southampton Co.), and Lowe (Surry Co.) commercial farms, with threshold-based insecticide applications as needed for bollworm management.

The overall value of *conventional* and BG2/WS/RF systems was determined by considering the value of the cotton (lb lint and seed/acre x estimated $/lb) and the costs of bollworm management (insecticide cost, number of applications, and application cost), weed management (herbicide cost, number of applications, application cost), and seed (seed cost with base fungicide only for *conventional* varieties, and seed cost with the insecticide and RF technology fee for *standard* varieties).

Results and Discussion

Overall, *conventional* varieties yielded well compared with *standard* varieties. This was evident in the six field trials (Tables 1-3) and from the Official Variety Trials in Virginia (Figs. 1 and 2). Crop value with *conventional* varieties ($893-$943/acre) was also comparable to *standard* varieties ($818-$998) (Table 5). The weed and insect management program products (listed in Table 4) for the *conventional* varieties cost $34.13 and $4.98, respectively, compared with $6.34 and $1.21 for the *standard* varieties, and the *conventional* varieties required an average of 1.16 ($4.02) additional applications (either insecticide or herbicide). However, these additional costs associated with conventional varieties were offset by the lower seed cost. These studies show that growing *conventional* cotton varieties, although requiring more intensive weed and insect management programs, can be profitable in Virginia. In talking with growers, some see *conventional* cotton not as a wholesale change but as a fit for 15-20% of their acreage—their marginal fields or where there are troublesome weed species that no longer respond to glyphosate applications.

Acknowledgments

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Table 1. Bollworm damage and yield—2010.

Location	Variety	% Bollworm damage[1] (Aug. 16-17)		Lint lb/acre	
		Treated	Un-treated	Treated	Un-treated
Tide-water AREC[2]	SSG HQ 110 CT	1.0	6.0	829 b	777 b
	SSG HQ 210 CT	1.0	8.0	995 a	895 a
	SSG HQ 212 CT	0.0	5.0	973 a	916 a
	LSD	NS	NS	48.8	107.1
Everett[3]	SSG HQ 110 CT	3.0	n/a	1022	n/a
	SSG HQ 210 CT	5.0	n/a	810	n/a
	SSG HQ 212 CT	3.0	n/a	774	n/a
	LSD	NS	n/a	---	n/a

[1]Based on inspecting 25 bolls/plot for external bollworm damage.
[2]Treated plots received Baythroid XL @ 1.6 and 2.56 oz/A.
[3]Plots received Karate Z @ 2 oz/A and 2 apps. of Baythroid XL @ 3 oz/A.

Table 2. Bollworm damage and yield—Lowe, Grizzard, and Everett locations, 2011.

Conventional variety	Lowe		Grizzard		Everett	
	% Damage	Lint lb/A	% Damage	Lint lb/A	% Damage	Lint lb/A
SSG HQ 110 CT	2.0	682 b	1.0	1025	0.0	942
SSG HQ 210 CT	5.0	838 a	4.0	953	0.0	1069
SSG HQ 212 CT	5.0	618 b	0.0	928	0.0	1020
LSD	NS	153	NS	---	NS	NS

Table 3. Bollworm damage and yield—Tidewater AREC, 2011 (insecticide treated vs. untreated plots).

Conventional variety	% Damage, Aug 8		% Damage, Aug 15		Lint lb/acre	
	Treated	Un-treated	Treated	Un-treated	Treated	Un-treated
SSG HQ 110 CT	0.0	2.0	0.0	0.0	949	887
SSG HQ 210 CT	0.0	2.0	0.0	5.0	854	739
SSG HQ 212 CT	0.0	1.0	1.0	5.0	912	725
LSD	NS	NS	NS	NS	NS	NS

Fig. 1. Lint yields—2010 OVT.

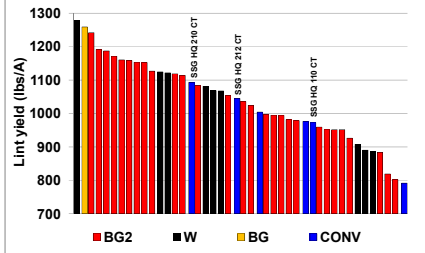

Fig. 2. Lint yields—2011 OVT.

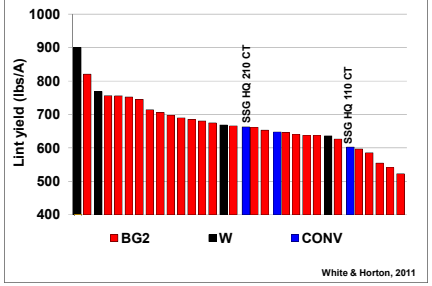

Table 4. Herbicide and insecticide programs[1].

Location	Year	Transgenic		Conventional	
		Herbicide	Insecticide	Herbicide	Insecticide
Tidewater AREC	2010	Roundup (x2)	Steward	Gramoxone, Select Max (x2), MSMA, Envoke, Cotton Pro	Baythroid
Tidewater AREC	2011	Roundup, Credit	None	MSMA, Envoke, Cotton Pro	Baythroid
Everett	2010	Touchdown (x2)	None	Prowl, Reflex, Gramoxone, Envoke	Baythroid
Everett	2011	Touchdown (x2)	None	Prowl, Reflex, Gramoxone, Arrow	None
Grizzard	2011	Roundup (x2)	None	Reflex, Acumen,Staple, MSMA, Suprend	Baythroid (x2)
Lowe	2011	Roundup (x2), Response (x2)	None	Ignite, Pendipro, Cotoran, Staple, Response	Baythroid (x2), Acephate 97

[1]Only post-emergent herbicides and insecticides directed at bollworm were included.

Table 5. Value ($) of conventional and transgenic cotton.

Variety	Seed cost/A	Herb-icide cost Δ	# Herb-icide apps.	Insect-icide cost Δ	# Insect-icide apps.	Lint lb/acre	Lint value/lb	Seed value/ ton	Turnout factor (% lint)	Total apps.	Spray app. cost	Lint value/A	Seed value/A	Total value/A	Total cost/A	Crop value/A
SSG HQ 110 CT[1]	18.47	34.13	2.3	4.98	2.0	908	0.97	170	0.39	4.3	14.95	877	119	997	73	924
SSG HQ 210 CT[1]	18.47	34.13	2.3	4.98	2.0	920	0.97	170	0.38	4.3	14.95	890	125	1015	73	943
SSG HQ 212 CT[1]	18.47	34.13	2.3	4.98	2.0	871	0.97	170	0.37	4.3	14.95	842	123	965	73	893
PHY 375 WRF[1]	83.62	6.37	2.0	1.45	1.2	870	0.96	168	0.44	3.2	11.04	828	92	921	102	818
PHY 375 WRF[2]	83.19	5.76	2.0	2.42	1.3	1013	0.93	160	0.45	3.3	11.50	943	98	1041	103	938
DP 1028 B2RF[3]	94.69	6.20	2.0	0.00	1.0	980	1.00	180	0.41	3.0	10.35	980	129	1109	111	998

[1]Based on 5 locations/years.
[2]Based on 3 locations omitting 2 low yielding sites.
[3]Based on 1 location/year.