

EVALUATION OF TRANSGENIC VERSUS CONVENTIONAL VARIETIES

D. Eddie McGriff

Cooperative Extension Service, University of Georgia

Bainbridge, GA

Steve M. Brown

University of Georgia

Tifton, GA

Abstract

Most University cotton variety tests are conducted to determine the genetic potential of each variety, hence, all varieties are treated the same. This study was undertaken to determine how each variety would perform in their designed technology system. Each variety was planted in a block of their technology system-- Bollgard (Bt); roundup ready (RR); stacked (BT/RR) or conventional-- and treated according (see Materials and Method).

Introduction

Twenty-six conventional and twenty-three transgenic cotton varieties were replicated three times in a complete block design. Plots were two rows, 36 inch centers and 125 feet in length. Plots were planted under irrigation in a Lucy soil in Decatur County, Georgia. Each technology system was scouted for insects and weeds twice per week and sprayed according to University of Georgia Extension recommendations. Bt varieties were duplicated three times in random block replication with one set getting oversprayed with a pyrethroid and the other set sprayed according to UGA Extension recommendations to determine the value of overspraying Bt cotton. Fall armyworms (FAW); tobacco budworms (*Heliothis virescens*); and cotton bollworms (*Heliothis zea*) moths traps were put up around the edge of the field and monitored bi-weekly and pyrethroid oversprays on July 6 and July 17 were triggered by FAW moth flights.

Materials and Methods

May 13	Planting Date At Plant: 3.5 lbs Temik applied in Furrow 10 gals 10-34-0 dribbled on top of ground twoinches to side of seed Seeding Rate: 3.5 seed/ft NonBt and Bt: Broadcasted 1 qt Prowl + 1 qt Meturon 4L/acre Preemerge RR and RR/Bt: Broadcasted 1 qt Prowl/acre Preemerge
June 2	Applied 300 lbs 0-7-28/acre (all treatments)
June 3	Sprayed 2 pint Dimethoate/acre (all treatments) for thrips control
June 5	Banded 22 gallons 28-0-0-5/acre (all treatments)
June 8	Broadcasted 2 pints/acre of Roundup Ultra over-the-top of RR and RR/Bt. Cotton was at 4-leaf stage.
June 16	Direct sprayed in 18 inch band 2b pints MSMA + 1.6 qts Meturon 4L + 2 pints crop oil Conc/acre. Also plow row middles (all treatments)
June 19	RR and RR/Bt: Sprayed 1.2 oz/acre Staple over-the-top/acre + 1qt non-ionic surfactant/100 gallons solution for small flower morningglory control
June 23	Non-Bt and RR: Sprayed 3.2 oz Baythroid/acre
June 27	Sprayed 8 oz Pix + 1.25 lb Solubor/acre (all treatments)
July 2	Applied 35 gallons 28-0-0-5/acre (all treatments)
July 3	Sprayed 1 pint Pix + 1.25 lb Solubor/acre (all treatments)
July 3	Spread 300 lbs 0-0-41/acre (all treatments)
July 6	RR, non-Bt and Bt (overspray plots): Sprayed 3.2 oz Baythroid + 10 oz Larvin per acre
July 11	RR and non-Bt: Sprayed 2.1 oz Baythroid + 2 oz Tracer/acre
July 17	RR, non-Bt and Bt (overspray plots): Sprayed 3.2 oz Baythroid/acre
July 23	RR and non-Bt: Sprayed 2.1 oz Baythroid/acre
July 30	RR and non-Bt: Sprayed 3.2 oz Baythroid/acre
Aug. 13	Sprayed 3.2 oz Baythroid + 3 gals urea/acre (all treatments)
Sept. 8	1 pint methyl parathron 4E/acre (all treatments)
Oct. 13	2 pints Finish + 8 oz Ginstar/acre
Oct. 27-29	Harvested plots
Nov. 9	Ginned variety samples at Coastal Plains Research Station for gin turnout

Results

Twenty-six conventional varieties averaged 1,212 lbs./acre; nine Bt varieties averaged 1,180 lbs./acre; five Bt/RR varieties averaged 1,117 lbs./acre; and nine RR varieties averaged 1,105 lbs./acre. Yield loss due to boll rot was heavy which contributed to mid-to-full season varieties, which set fruit and opened over a longer period, outperforming early season varieties, which set fruit and opened in a shorter period, making them more susceptible to unfavorable conditions contributing to boll rot. Twenty-nine mid-to-full varieties averaged 1,233 lbs./acre compared to twenty early season varieties averaging 1,095 lbs./acre.

There was no yield advantage to Bt pyrethroid oversprayed plots, which averaged 1,156 lbs./acre, compared to the Bt plots not oversprayed which averaged 1,180 lbs./acre. Boll rot may be the reason there was no yield advantage in the oversprayed plots. Most of the lower bolls that may have been protected from FAW and cotton bollworms were lost to boll rot.

There was no significant difference in the DPL RR varieties and their parents. The Suregrow RR seed were produced in Argentina and seed quality was reported to be poor (although we achieved a good stand in the variety test), which may explain Suregrow RR varieties poor performance compared to their parents.

1998 Decatur County Cotton Variety Test

VARIETY	MATURITY ¹	LBS/ACRE
HS 46	med-full	1450
HS 12	med-full	1442
PSC 952	med-full	1405
DPL 35B	med-full	1403
AP 9263	med-full	1382
SG 248	med-full	1380
AP 4103	medium	1332
AP 7126	med-full	1303
AP 6101	med-full	1296
DPL 5415	medium	1274
DPL 33B	med-full	1270
DPL 90B	med-full	1265
SG 501	early	1255
DPL 5557	med-full	1252
DPL 5415RR	medium	1250
SG 180	med-full	1232
SG 125	early	1221
DPL 90	full	1218
AP 9257	med-full	1211
DPL 32B	medium	1208
DPL 5690RR	med-full	1196
DPL 90RR	med-full	1190
SG 585BG	early	1189
SG 125Bt/RR	early	1181
DPL 458Bt/RR	med-full	1161
DPL 5111	early	1160
DPL 428B	early	1159
FM 832	medium	1157
SG 821	early-med	1140
SG 747	early	1134
DPL 655Bt/RR	med-full	1133
DPL 425RR	early	1132
PM 1244BG	medium	1129
PM 1244RR	medium	1119
SG 585RR	early	1107
DPL 5409	medium	1097
ST 474	early	1093
SG 501Bt/RR	early	1086
PSC 636	med-full	1077
DPL 51	early	1060
ST 4740BG	early	1044
PSC 569	med-full	1031
PM 1220BG/RR	early	1024
SG 501RR	early	1018
SG 125RR	early	997
FM 989	medium	972
PM 1560BG	early-med	954
ST 373	early	937
PM 1220RR	early	933

¹Varies with weather, location and cultural practices.

Overspraying Bt Cotton with Pyrethroids

Variety	Not Oversprayed Lbs/Acre	Oversprayed*Lbs/Acre
DPL 35B	1403	1365
DPL 33B	1270	1208
DPL 90B	1265	1270
DPL 32B	1208	1276
SG 585BG	1189	1246
DPL 428B	1159	1051
PM 1244BG	1129	1036
ST 4740BG	1044	1030
PM 1560BG	954	921
AVERAGE	1180	1156

*Oversprayed plots were sprayed with 3.2 oz of Baythroid and 10 oz of Larvin per acre on July 6 and 3.2 oz of Baythroid on July 17

Comparison of Rr Varieties with Parent

RR	Lbs/Acre	Parent	Lbs/Acre
DPL 5415RR	1250	DPL 5415	1274
DPL 90RR	1190	DPL 90	1218
DPL 425RR	1132	DPL 51	1060
SG 501RR	1018	SG 501	1255
SG 125RR	997	SG 125	1221