

**PEST CONTROL COSTS AND RETURNS IN CONVENTIONAL
AND TRANSGENIC COTTON MANAGEMENT SYSTEMS**

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Abstract

Most of the cotton (*Gossypium hirsutum* L.) produced in North Carolina is from transgenic seed. These varieties may be high yielding, but also associated with poor lint quality characteristics. Field studies were conducted at both the Cherry Farm Unit and the Central Crops research station in North Carolina. Objectives were to compare Roundup Ready varieties in Roundup and conventional herbicide systems, compare Bollgard varieties with and without insecticide, and to compare conventional and transgenic varieties' lint yield, quality, and the cost-return benefits of the respective systems. Nine varieties were selected including: Fibermax 958, PhytoGen 355, Stoneville 474, Delta and Pine Land 436 RR, Stoneville 4793 R, Fibermax 989 RR, Paymaster 1218 BG/RR, Delta and Pine Land 451 B/RR, and Stoneville 4892 BR. Insect thresholds were ten percent eggs in terminals or three percent larvae for cotton bollworm [*Helicoverpa zea* (Boddie)] for conventional varieties, and three percent larvae one eighth of an inch or larger on any flower or boll parts for Bollgard varieties. Varieties Fibermax 958, Delta and Pine Land 436 RR, and Paymaster 1218 BG/RR were selected to each have one treatment with no insecticide, and one with Karate at 0.04 lbs. ai/A whenever thresholds were met throughout the season. Conventional cotton was sprayed twice and Bollgard cotton sprayed once for cotton bollworm. The conventional weed control program consisted of a preemergent tank-mix of Prowl and Cotoran. The postemergent broadcast applications were Staple with and without MSMA at the two-leaf stage and Select at the six leaf stage, followed by a Cotton-Pro and MSMA tank mix post directed at layby. The Roundup program was two broadcast applications at the one and four leaf stages followed by a post-directed spray at layby. Each of the Roundup Ready varieties were included in one treatment with the conventional and one with Roundup weed control systems. Data were analyzed in SAS version 8e under the general linear model. Means were separated by Fisher's protected LSD at $\alpha=0.05$. Economic data was obtained with the 2002 Crop Loan Valuation Program (Larry Falconer, Texas A&M Cooperative Extension). Cotton included in insecticide comparisons all had fewer bolls damaged by cotton bollworm when treated with Karate pooled over variety and location. Conventional and Bollgard cotton with insecticides as well as Bollgard cotton without insecticide treatment returned more per acre than conventional cotton without any treatment. The Roundup system provided excellent control of all weeds throughout the season at both locations. The conventional herbicide program was adequate at both locations with the exception of missing some Palmer amaranth (*Amaranthus palmeri*) at the Cherry station, which is suspected to be resistant to Staple. Yield and returns for the conventional herbicide program were lower than the Roundup program at the Cherry station due to poor Palmer amaranth control. Stacked varieties yielded better and returned more than both the Roundup Ready and conventional varieties in either herbicide system. Conventional varieties exhibited superior staple length and strength than the transgenics. All varieties were within the acceptable ranges for micronaire, however PhytoGen 355 and Paymaster were on the border for being high.