

EFFICACY OF AUGUST-PLANTED BOLLGARD II VS. BOLLGARD I AND CONVENTIONAL COTTON IN ALABAMA; THE ACID TEST?

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Abstract

DP50, 50B and 50BII were planted August 1, 2001 in Escambia County, Alabama. Plants grew slowly because of the relative cold temperatures, and frost on Nov. 4, 2001. On Nov. 10, neonate CBW were placed in white blooms on ten plants per treatment replicated five times. After 7 days, DP50 had 54% boll damage, and DP50B and DP50BII had no boll damage. Additionally, DP50B had 16% aborted bolls whereas DP50BII had only 8% aborted bolls. These results show that even under extreme conditions, Bollgard and Bollgard II provide excellent control against CBW.

Introduction

Although current commercial *Bacillus thuringiensis* (Bt) transgenic cotton plants (Bollgard) in the United States effectively and economically control lepidopteran pests such as the tobacco budworm (TBW), *Heliothis virescens*, they often are not economically efficacious against the cotton bollworm (CBW), *Helicoverpa zea* especially post bloom or at high density. Partly because of this discrepancy, Monsanto already is field testing Bollgard II which has higher activity against CBW and other lepidopteran pests such as beet armyworm (BAW), *Spodoptera exigua*, and fall armyworm (FAW), *S. frugiperda*. Because Bollgard II will most likely be at least as expensive if not more expensive than Bollgard, growers in Alabama currently are not as excited as previously expected to purchase this seed in the future. The primary reason for this reluctance is that CBW and TBW populations in most of Alabama over the last several years has been relatively low, and therefore often the price paid for Bollgard does not appear to be offset by a parallel increase in yields. In Alabama, Bollgard II only has been tested in small research plots or on small acreages. The goal of this research, therefore, was to conduct a relatively large research field study (ca. 10 acres each) to compare the efficacy and yields of conventional cotton (DP50), Bollgard cotton (DP50B) and Bollgard II cotton (DP50BII)

Materials and Methods

Cotton was planted August 1, 2001 in Escambia County, AL. Ca. 5 acres of DP50BII was planted in the middle of a 16 acre cotton field surrounded by DP50B and DP50. At bloom (Nov. 10, 2001), 10 neonate CBW (obtained from NCSU, Raleigh, NC) were placed individually into 10 white blooms per treatment, replicated five times. Damage was evaluated after seven days.

Results and Discussion

The conventional cotton (DP50) sustained 54% boll damage and 4% aborted bolls, whereas Bollgard (DP50B) sustained no boll damage and 16% aborted bolls and Bollgard II (DP50BII) sustained no boll damage and 8% aborted bolls (Figs. 1 and 2). Additionally, much of the boll damage occurred on the top of the boll, so that the upper bracts often needed to be removed before damage could be observed.

Cotton was planted on Aug. 1, 2001 because EUP approval did not occur until late July, 2001. Although plants were stunted because of cold weather, low rainfall, and frost on Nov. 4, 2001, many plants still were able to produce blooms and fruit. Although plant stress due to cold weather, drought and frost should have dramatically reduced the production of Cry1Ac in Bollgard I and Bollgard II, and Cry2Ab in Bollgard II, Bt production was still sufficient (especially in Bollgard II) to protect the cotton plants from damage caused by CBW in blooms and young bolls, where Cry toxin expression levels usually are lower than observed in other tissues such as terminals.

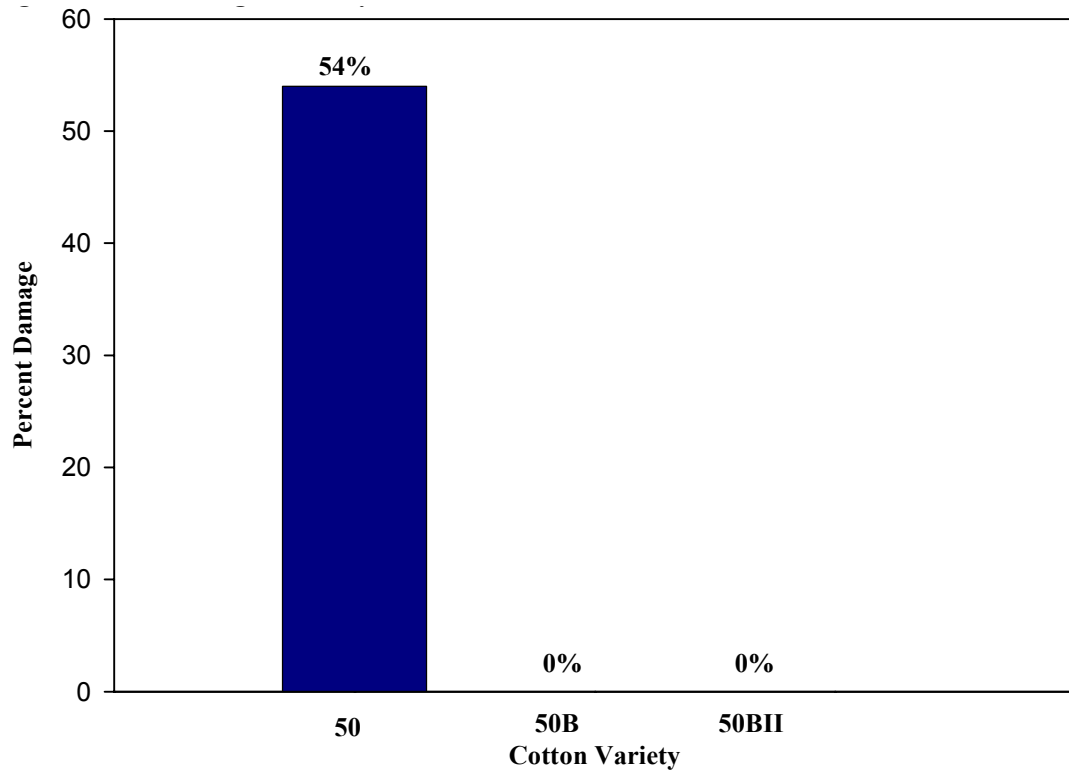


Figure 1. Percent Damaged Bolls by CBW in DP50, DP50B & DP50BII.

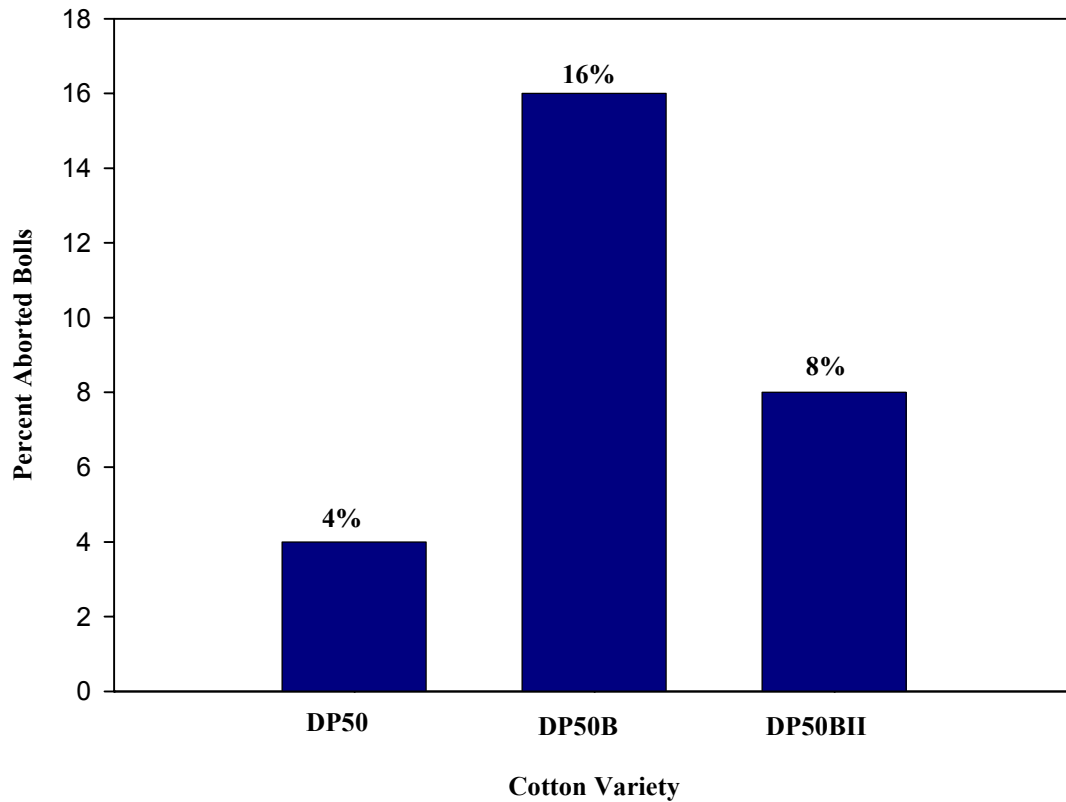


Figure 2. Percent Aborted Bolls in DP50, 50B and 50BII after infestation with CBW.