

**EFFICACY OF BOLLGARD II AS A LEPIDOPTEROUS  
LARVICIDE IN COTTON**

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**Abstract**

Larvicidal properties of transgenic cottons expressing the Cry1A(c) (Bollgard -'DP50B') and the Cry1A(c) plus the Cry2A(b) (Bollgard II - Monsanto 15985) proteins of *Bacillus thuringiensis* subsp. *kurstaki* (Berliner) were compared with conventional ('DP50') cotton in laboratory and field studies during the 1999 and 2000 seasons. Results of field studies are reported herein.

Plots 8 rows wide by 30 feet long were established with four replications in a randomized complete block. All plots were treated with acephate (0.5 lbs ai/acre) in early July to disrupt beneficial arthropods and thereby increase pressure from lepidopterous pests. Plots remained untreated thereafter. Samples were taken every 3-4 days using a beat cloth and visual examination of purple blooms.

In 1999, pressure from lepidopterous pests was low, and treatment was not necessary for these pests in undisrupted plots of Bollgard or Bollgard II genotypes. However, in acephate-treated plots, numbers of large bollworm (*Helicoverpa zea* [Boddie]) and soybean looper (*Pseudoplusia includens* [Walker]) larvae in beat cloth samples during August were significantly lower in Bollgard II compared to Bollgard.

During the 2000 season, pressure from lepidopterous pests was high and beat cloth samples during July and August in acephate-treated plots revealed significant differences in large larvae of bollworm, soybean looper and fall armyworm (*Spodoptera frugiperda* [J.E. Smith]) among the three genotypes (conventional, Bollgard, Bollgard II). These differences were also evident in boll counts in early August in 10 row feet; wherein there were essentially no bolls without damage in conventional, compared with 107 undamaged bolls in Bollgard, and 132 undamaged bolls in Bollgard II. Examination of purple blooms for Bollworm larvae >1st instar provided data similar to beat cloth samples, with highest numbers in conventional, lowest in Bollgard II, and Bollgard being intermediate. Purple bloom or bloom tag sampling may provide effective methods for determining bollworm survival in future Bollgard II varieties. Should additional studies confirm this magnitude of inherent control of lepidopterous pests, supplemental applications of insecticide may only be necessary for other pests (aphids, sucking bugs, etc.) that are not impacted by proteins in Bollgard II genotypes.