

PERFORMANCE AND BENEFITS OF KARATE® INSECTICIDE ON BOLLGARD® COTTON

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Abstract

Several large plot demonstrations were implemented on BOLLGARD® cotton across the Southern U.S. cotton belt to determine the performance and benefits of KARATE® insecticide applications. Studies were conducted by private consultants, universities and ZENECA personnel. On average, timely applications of KARATE® provided increased lint yields by 115 pounds per acre when compared to untreated BOLLGARD® cotton. This increase in yield was attributed to the broad spectrum activity of KARATE® which controlled many pests not affected by the Bt toxin in the BOLLGARD® cotton. In addition, the repellency activity of KARATE® on bollworm moths appeared to reduce egg counts in treated cotton.

Introduction

The introduction of Bt cotton into the Mid-South during the 1996 growing season ushered in a new era of insect control in the cotton industry. Many thought the use of insecticides would dramatically decrease with this introduction. However, others warned that there would be a continued need for control of many pests not controlled by the Bt toxin. During 1995, two Mississippi growers sprayed their Bt cotton with KARATE® insecticide and demonstrated yield benefits when compared with cotton that was not sprayed or sprayed with a non pyrethroid insecticide. These data indicated that KARATE® has a good fit within the Bt cotton system. Therefore, several large and small plot demonstrations were conducted in 1996 by university and extension personnel, private consultants, and ZENECA field development and product service lead representatives to clarify the benefits of KARATE® on Bt cotton.

Materials and Methods

BOLLGARD® cotton was sprayed with KARATE® at 29 locations across the Southern U.S. cotton belt. The majority (23) of these tests were large plot demonstrations (not replicated) conducted by private consultants. KARATE® rates ranged from 0.02 - 0.033 lbs. ai/A and were applied by airplanes using standard procedures for that area. The untreated and KARATE® treated fields were usually separated by a turn road. The remainder of the trials were replicated small plot studies. Pest counts and yield data were obtained from most locations. KARATE® was applied on a treat as needed (TAN) basis in all locations except

four. A 7 day treatment schedule was used at those four locations.

Results

The results of these trials indicate a clear trend towards increased yields of BOLLGARD® cotton when treated with KARATE® insecticide (Table 1). A summary of all the data reveals that an average of 4.2 applications of KARATE® increased lint yield by 115 pounds per acre when compared to untreated BOLLGARD® cotton. The results from the private consultants showed an average of 95 pounds of lint per acre increase from 4.2 applications of KARATE®. Average lint yield increases from using KARATE® in the university and ZENECA studies were 189 and 202 pounds per acre, respectively.

A comparison of the treat as needed (TAN) versus 7-day spray schedule indicates that both increase yields over the untreated (Table 2). However, the average increase in yield is higher for the TAN compared to the schedule. In addition, the average number of applications is lower for the TAN compared to the 7 day schedule.

The results from the insect control data support the fact that KARATE® is a very effective broad spectrum insecticide (Table 3). Estimates of percent damage from stink bugs and boll worms on BOLLGARD® cotton show less damage on cotton treated with KARATE®. In addition, cotton treated with KARATE® had fewer plant bugs and live larvae than the untreated BOLLGARD® cotton. Fewer eggs also were observed where KARATE® had been sprayed.

Discussion

The results from these trials demonstrate that KARATE® insecticide can play an important role in maximizing a growers investment in BOLLGARD® cotton. An average of four applications increased lint yield by 115 pounds per acre. The economics of this scenario suggest that an investment of about \$25 per acre of KARATE® will return \$80 per acre in lint (assuming cotton price of \$0.70 per pound). Actually, the economics are better if the KARATE® is applied on a treat as needed basis and timed correctly for the appropriate pest. In addition, the repellency activity of KARATE® against bollworm moths was observed at several locations which resulted in lower egg counts.

Summary

The broad spectrum activity of KARATE® is an economical investment on BOLLGARD® cotton to control insect pests against which the Bt toxin has little or no activity.

Table 1. Average lint yields of untreated BOLLGARD® cotton, KARATE®-treated BOLLGARD® cotton, and average number of KARATE® applications.

Treatments	<i>All locations</i>	<i>Priv. Cons.</i>	<i>Univ.</i>	<i>ZENECA</i>
Untreated	924 ¹	953	841	760
KARATE®	1039	1048	1030	962
Yield Increase	115	95	189	202
Avg. # applications	4.2	4.2	4.5	4

¹Pounds lint per acre

Table 2. Average lint yields of KARATE®-treated and untreated BOLLGARD® cotton when treatments were applied as needed or on a 7-day schedule.

Treatments	<i>Treat As Needed</i>	<i>7-Day Schedule</i>
Untreated	910 ¹	1007
KARATE®	1028	1109
Yield Increase	118	102
Avg. # applications	3.9	6

¹Pounds lint per acre

Table 3. Control of various insect pests with KARATE® applied to BOLLGARD® cotton.

	<i>Stink bugs</i>	<i>Plant bugs</i>
Treatments	<i>% Damage</i>	<i>Avg. No. / 25 Sweeps</i>
Untreated	5.5	55.8
KARATE®	2.1	5.9

	<i>Bollworm</i>		
Treatments	<i>% Damage</i>	<i>% Larvae</i>	<i>% Eggs</i>
Untreated	8	7.4	18.5
KARATE®	3	3.3	11.3