BELT 4 SC (FLUBENDIAMIDE): A NEW INSECTICIDE FOR CONTROL OF HELIOTHINES IN CONVENTIONAL COTTON

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Abstract

In 2006, Belt™ (flubendiamide) was evaluated in studies in Arkansas and Louisiana. Field experiments were conducted in Jefferson County, Arkansas and at Winnsboro, Louisiana at the Macon Ridge Research Station to evaluate the efficacy of Belt insecticide compared to existing and experimental insecticides to control the heliothine complex. The treatments selected for the Arkansas study were Belt at multiple rates, Belt and Larvin (thiodicarb) tank mixed, Larvin alone, Tracer (spinosad), Tracer and Capture (bifenthrin) tank mixed, Experimental I, Denim (emamectin benzoate), and Steward (indoxacarb). Significant differences were observed among treatments for seasonal total damage and seasonal total larvae. The treatments selected for the Louisiana study were Belt at multiple rates, Belt and Larvin tank mixed, Larvin, Tracer, and a Bollgard II variety. Significant differences were observed among treatments for seasonal total damage and yield.

Introduction

Belt is a new foliar applied insecticide being developed by Bayer CropScience for use on annual and perennial crops. Belt is used to control bollworm, Helicoverpa zea, and tobacco budworm, Heliothis virescens. Belt has been researched using the experimental code number NNI-0001 and is the first member of a new chemical class, the phthalic acid diamides.

Materials and Methods

The Arkansas field experiment was conducted in 2006 in Jefferson County, Arkansas. Plots were 8 rows (38 inch spacing) and 50 feet in length in a randomized complete block design with four replications. Treatments were applied using a John Deere 6500 Hi-Cycle with an 8 row boom on 19-inch nozzle spacing. The nozzles used for application were Tee Jet TXVS-6. Operating pressure was 45 pounds per square inch and 9.69 gallons per acre of volume.

The trial compared Belt with traditional and experimental insecticides in conventional non-*Bt* cotton. Delta Pine 434 was planted on May 16, 2006. Insecticide applications were made on 10 July and 20 July and 31 July. Treatments included an untreated check, Belt at 2 oz/a, Belt at 2.5 oz/a, Belt at 3 oz/a, Belt at 0.5 oz/a, Belt at 0.5 oz/a tank mixed with Larvin at 5 oz/a, Larvin alone at 5 oz/a, Tracer at 2.5 oz/a, Tracer at 2 oz/a tank mixed with Capture at 2.75 oz/a, Denim at 8 oz/a, Experimental I, and Steward at 0.1 lb a/a. Evaluations were made on 13 July (3 DAT), 17 July (7 DAT), 24 July (4 DAT), 31 July (11 DAT), 3 August (3 DAT), 9 August (9 DAT). Evaluations consisted of examining random samples of 25 terminals, squares, blooms, and bolls in each plot. Data were analyzed using Agricultural Research Manager Version 7 using Analysis of Variance and LSD (P=.10, Student-Newman-Keuls).

The Louisiana field experiment was conducted in 2006 in Winnsboro, Louisiana at the Macon Ridge Research Station. Plots were 3 rows (40 inch spacing) and 30 feet in length in a randomized complete block with three replications. Treatments were applied using a sprayer with a 26 foot boom on 20-inch nozzle spacing. The nozzles used for application were TX-12. Operating pressure was 38 psi and 10 gallons per acre of volume.

The trial compared Belt and traditional insecticides in conventional non-*Bt* cotton to a Bollgard II variety. Stoneville 4686R was planted on June 5, 2006. Insecticide applications were made on 9 August and 21 August. Treatments included Belt at 2 oz/a, Belt at 2.5 oz/a, Belt at 3 oz/a, Belt at 0.5 oz/a, Belt at 0.5 oz/a tank mixed with Larvin at 5 oz/a, Larvin alone at 5 oz/a, Tracer at 2.25 oz/a, an untreated check and a Bollgard II variety. Evaluations were made on 14 August (5 DAT), 17 August (8 DAT), 21 August (12 DAT), and 28 August (7 DAT). Evaluations consisted of examining random samples of 50 squares in each plot. Data were analyzed using Agricultural Research Manager using Analysis of Variance and LSD (P=.05, Duncan's New MRT).

Results and Discussion

In the Arkansas trial, significant differences were observed among treatments for seasonal total damage and seasonal total larvae. All treatments performed significantly better than the untreated check for seasonal total damage. Tracer alone and Experimental I performed statistically better than the untreated check, Belt at 0.5 oz/a, Belt at 0.5 oz/a tank mixed with Larvin at 5 oz/a, Larvin alone, Tracer tank mixed with Capture, Denim and Steward comparing seasonal total damage, but did not significantly differ from Belt at 2 oz/a, 2.5 oz/a, or 3 oz/a. All treatments performed significantly better than the untreated check in for seasonal total larvae, but no differences were observed among any other treatments. No treatments significantly differed from the untreated check for yield.

In the Louisiana trial, significant differences were observed among treatments for seasonal total damage and yield. Belt at 2.5 oz/a, Belt at 3 oz/a, Belt at 0.5 oz/a tank mixed with Larvin at 5 oz/a, Tracer, and Bollgard II performed significantly better than the untreated check for seasonal total damage. Belt at 3 oz/a was statistically better than Belt at 2 oz/a, Belt at 0.5 oz/a, and Larvin alone. Belt at 2.5 oz/a, Belt at 3 oz/a, Belt tank mixed with Larvin, Tracer, and Bollgard II performed significantly better than the untreated check in regard to yield in lint lbs/a. Belt at 2.5 oz/a and Bollgard II performed numerically the best in regard to yield and were statistically better than Belt at 2 oz/a, Belt at 0.5 oz/a, and Larvin alone. No significant differences were observed among treatments for seasonal total larvae found.

Practical Application

Belt has been shown to perform statistically equivalent to traditional insecticides at certain rates for controlling heliothines in conventional non-*Bt* cotton for seasonal total damage, seasonal total larvae found, and yield.

Acknowledgements

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Fig. 1. Seasonal damaged terminals, squares, blooms and bolls for Arkansas study, 2006.

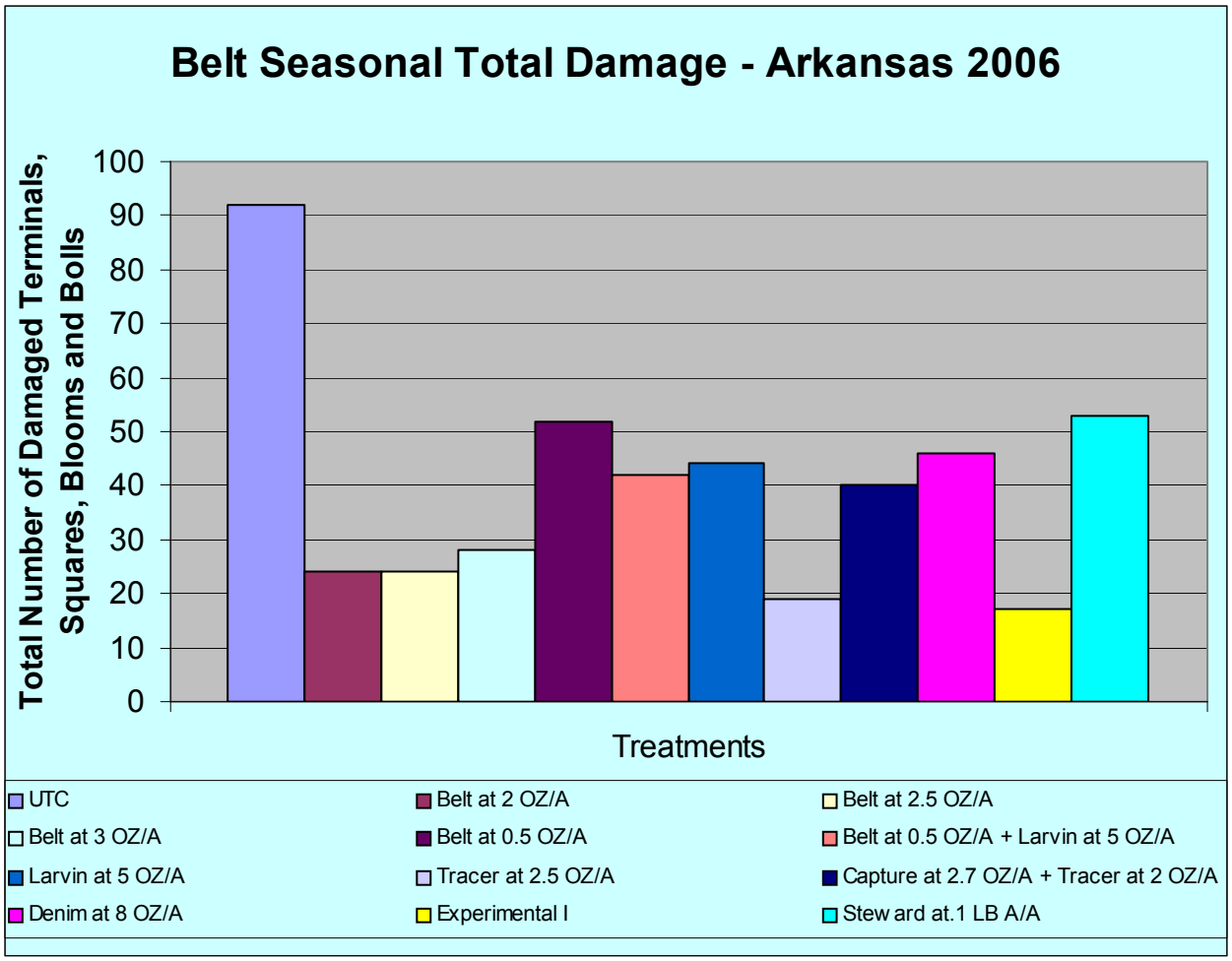

Fig. 2. Seasonal damaged squares for Louisiana study, 2006.

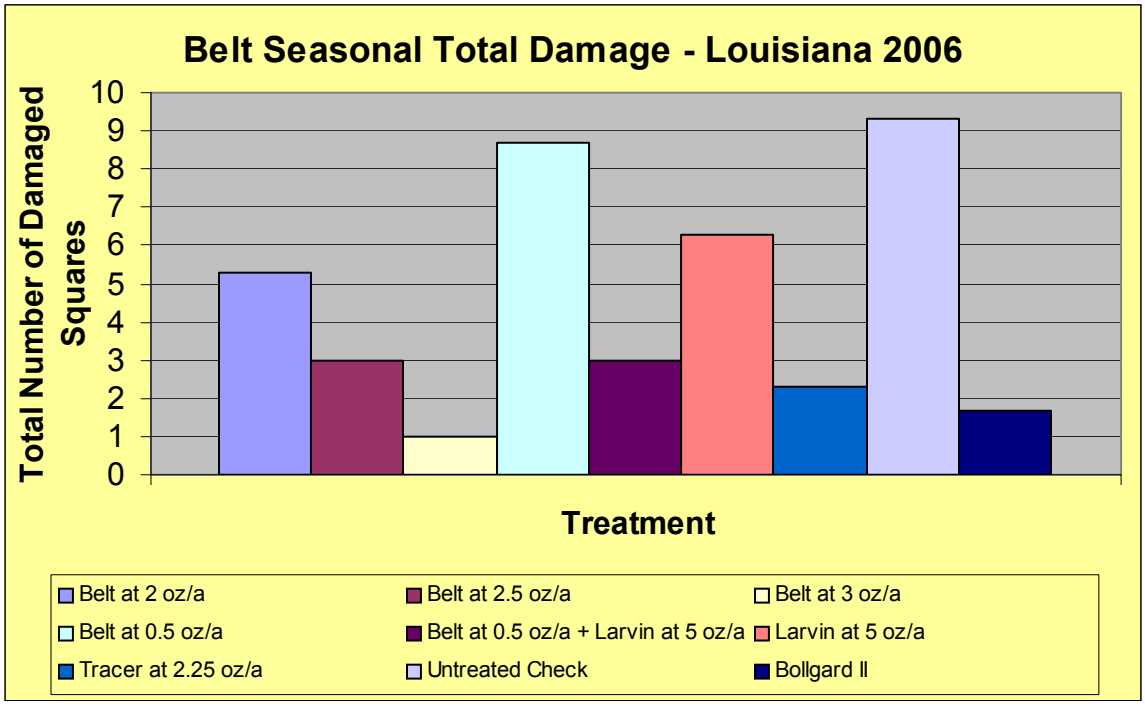

Fig. 3. Lint yield for Louisiana study, 2006.