EFFICACY OF SELECT INSECTICIDES FOR CONTROL OF HELICOVERPA ZEA IN NON-BT COTTON

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Abstract

Two tests were conducted on grower fields in Jefferson and Drew County, Arkansas to evaluate the efficacy and residual control of selected foliar insecticides and rates on cotton bollworm in conventional cotton. Selected insecticides included Prevathon, Besiege, Intrepid Edge, Brigade + Prevathon, Brigade + Acephate and an untreated check. Results indicate that higher labeled rates of Prevathon provide an increase in residual control when compared to the lower labeled rate (14 oz/acre).

Introduction

Historically, the cotton bollworm, *Helicoverpa zea* (Boddie), has been the most damaging insect pest of cotton in Arkansas and has only recently been surpassed by the tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois). In 2017, 100% of Arkansas cotton acres were infested with cotton bollworm, and 75% of these acres required supplemental insecticide treatments (Cook, et. al., 2017). Although *Bt* cotton is still very effective for control of tobacco budworm, *Heliothis virescens* (F.), the amount of *Bt* cotton acreage requiring treatment for cotton bollworm has been increasing in recent years. This has led to development of a new treatment threshold for the Mid-South of 6% damaged fruit, with bollworms present; or eggs present on 25% of plants (Studebaker et. al., 2018). High costs associated with technology fees for cotton bollworm control has encouraged growers and consultants to look for ways to reduce costs. Planting conventional cotton and using foliar insecticides for cotton bollworm control may be a more cost-effective way to grow cotton in the Mid-South.

Materials and Methods

Tests were conducted on grower fields in Jefferson and Drew County, Arkansas on a non-*Bt* variety (DP1822XF). Plot size was 12.5 ft. (4 rows) by 40 ft. Treatments were arranged in a randomized complete block design with 4 replications. Treatments included: untreated check (UTC), Prevathon (*chlorantraniliprole*) 14 and 20 oz/acre, Prevathon 20 oz/acre + Brigade 6.4 oz/acre, Prevathon 14 oz/acre + Brigade 4.5 oz/acre, Besiege (*chlorantraniliprole* + *lambda-cyhalothrin*) 7 and 10 oz/acre, Intrepid Edge (*methoxyfenozide* + *spinetoram*) 8 oz/acre, and at Jefferson county Brigade 6.4 oz/acre + Acephate 97UP (*acephate*) 0.075 lb/acre. Insecticides were applied with a Mud Master fitted with 80-02 dual flat fan nozzles with 19.5 inch spacing. Spray volume was 10 gal/acre, at 40 psi. Damage ratings at Jefferson County were taken 5, 8, 13, and 19 days after application and Drew County were taken 5, 11, 18, and 26 days after application by sampling 25 squares, blooms, and bolls per plot. Plots were harvested using a Case two row plot picker. Data was processed using Agriculture Research Manager Version 2018.5 (Gylling Data Management, Inc., Brookings, S.D.). Analysis of variance was conducted and Duncan's New Multiple Range Test (P=0.10) to separate means.

Results and Discussion

Jefferson County

At 5 days after application (DAA), all treatments reduced bollworm damage compared to the UTC (Figure 1). This trend continued through all observation dates. Prevathon 20 oz, Brigade 6.4 oz plus Prevathon 20 oz, and Brigade 4.5

oz plus Prevathon 14 oz had less damage than the Intrepid Edge 8 oz. Prevathon 20 oz/acre was the only treatment with fruit damage levels at the 6% damage threshold, all other treatments were above threshold.

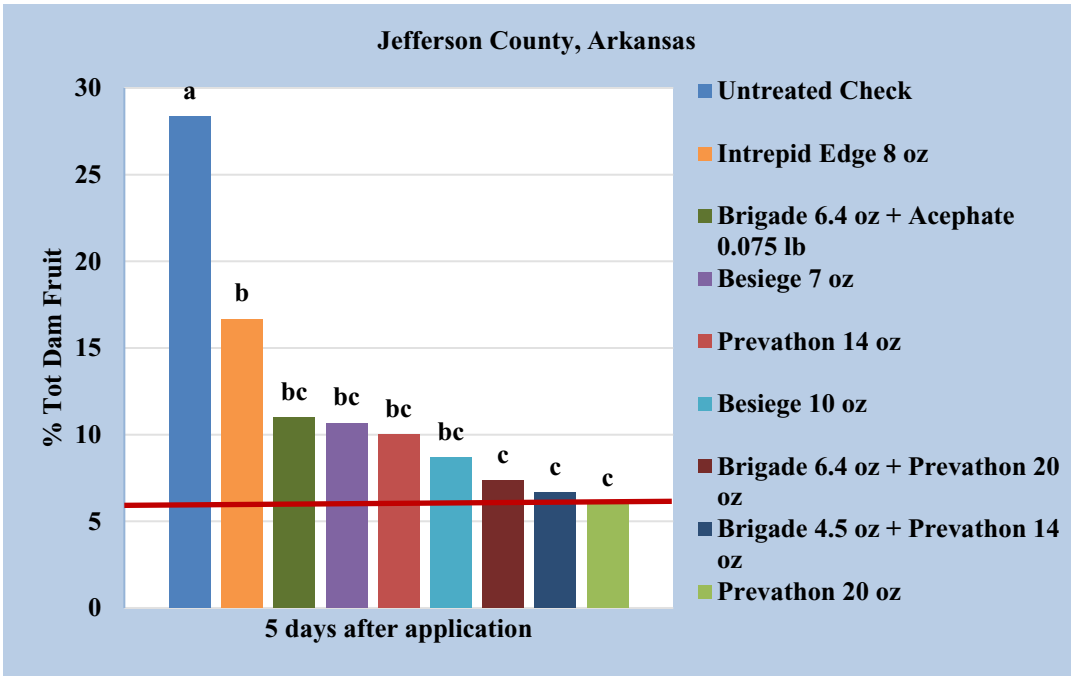

Figure 1. Assessment of damaged fruit 5 days after application of foliar insecticide.

At 8 DAA, Brigade 6.4 oz plus Prevathon 20 oz, Brigade 4.5 oz plus Prevathon 14 oz, and Besiege 7 and 10 oz had less damage than Prevathon 14 oz and Intrepid Edge 8 oz (Figure 2).

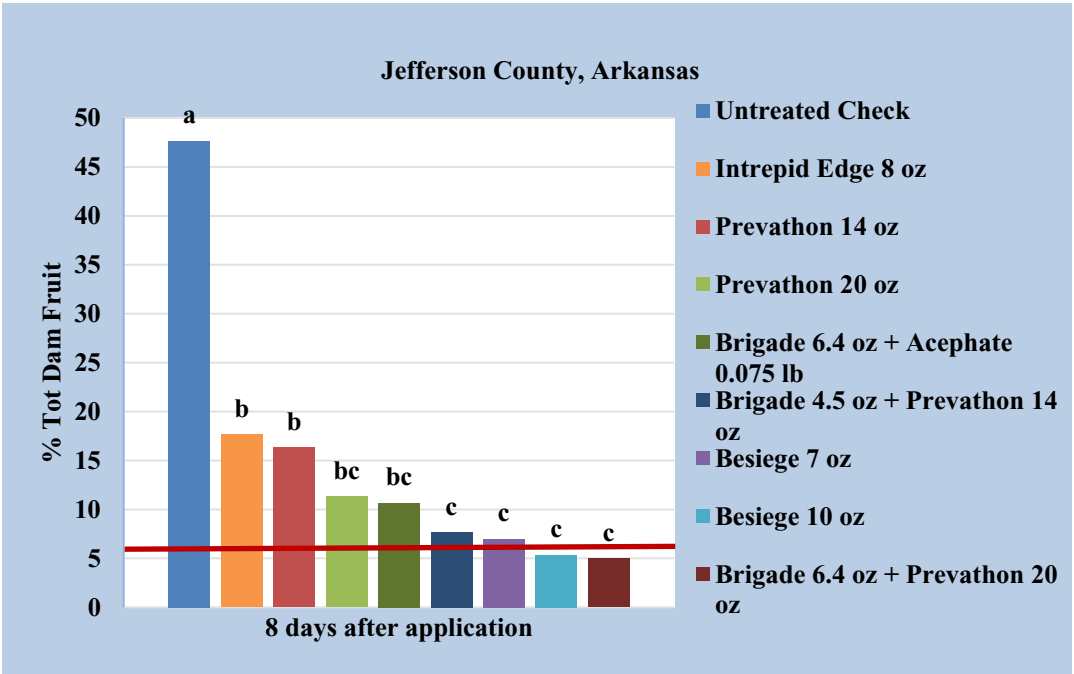

Figure 2. Assessment of damaged fruit 8 days after application of foliar insecticide.

At 13 DAA, all treatments, except for Prevathon 14 oz had less damage than Intrepid Edge 8 oz. Intrepid Edge, Prevathon 14 oz/a, and Brigade + Acephate had fruit damage at or above threshold (Figure 3).

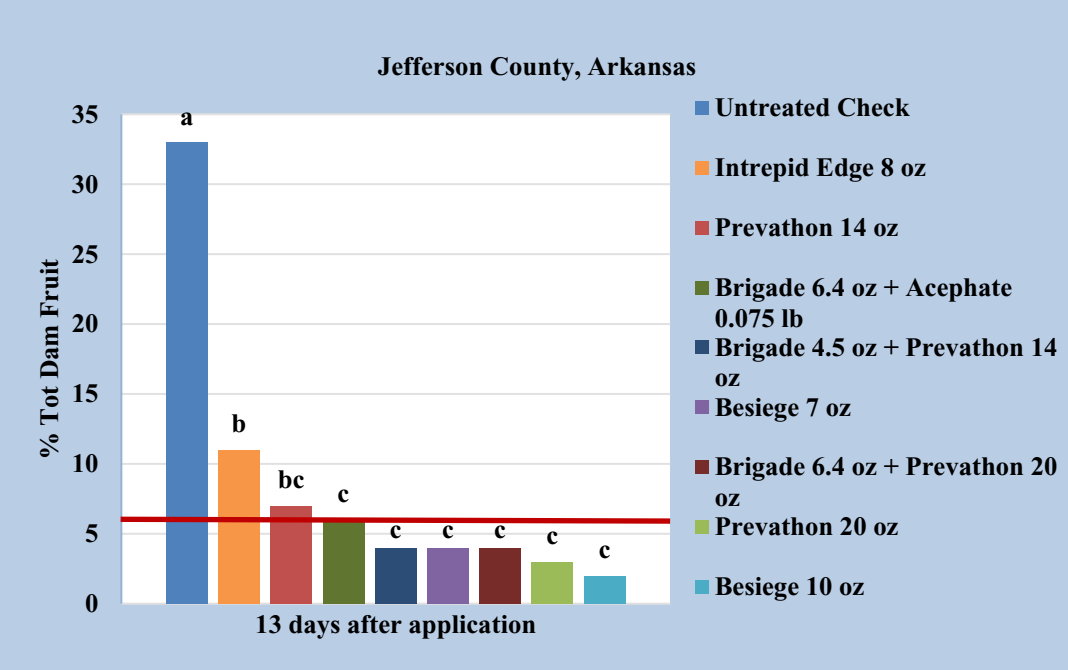

Figure 3. Assessment of damaged fruit 13 days after application of foliar insecticide.

At 19 DAA, all treatments except Intrepid Edge 8 oz had less damage than Brigade + Acephate and were below threshold (Figure 4).

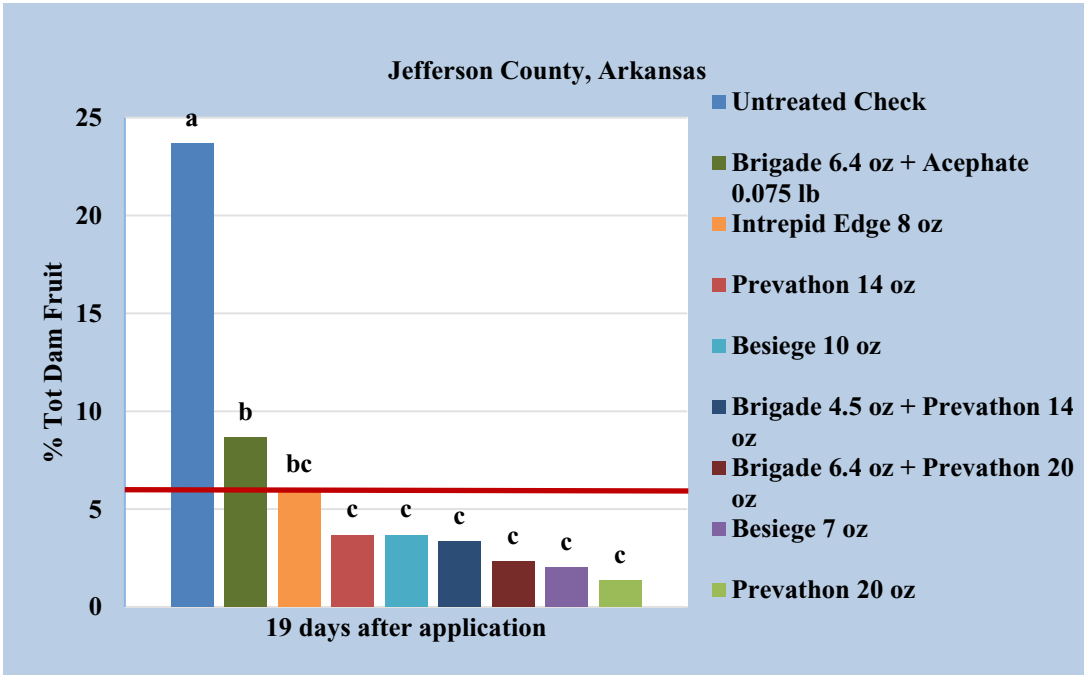

Figure 4. Assessment of damaged fruit 19 days after application of foliar insecticide.

Drew County

At 5, 11, and 18 DAA sample dates, all treatments had less damage than the untreated check. At 26 DAA only Besiege 10 oz, and Brigade 6.4 oz plus Prevathon 20 oz, and Prevathon 20 oz had lower damage than the UTC,

At 5 DAA, Prevathon 20 oz, Brigade 6.4 oz plus Prevathon 20 oz and Besiege 10 oz had less fruit damage than Intrepid Edge 8 oz and were below threshold. Besiege 10 oz had less damage than Besiege 7 oz, Brigade 4.5 oz plus Prevathon 14 oz, Prevathon 14 oz (Figure 5).

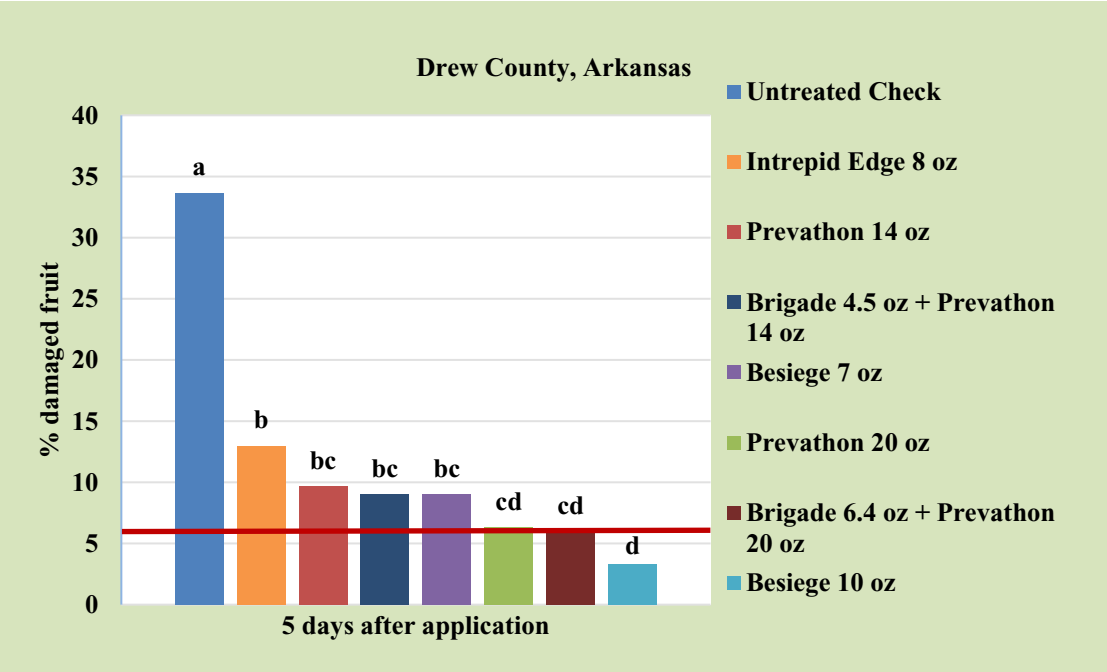

Figure 5. Assessment of damaged fruit 5 days after application of foliar insecticide.

At 11 DAA, Brigade 4.5 oz plus Prevathon 14 oz, Prevathon 14 and 20 oz, and Besiege 7 oz were at or below threshold. (Figure 6). Prevathon 14 and 20 oz and Besiege 7 oz had less damage than Intrepid Edge 8 oz.

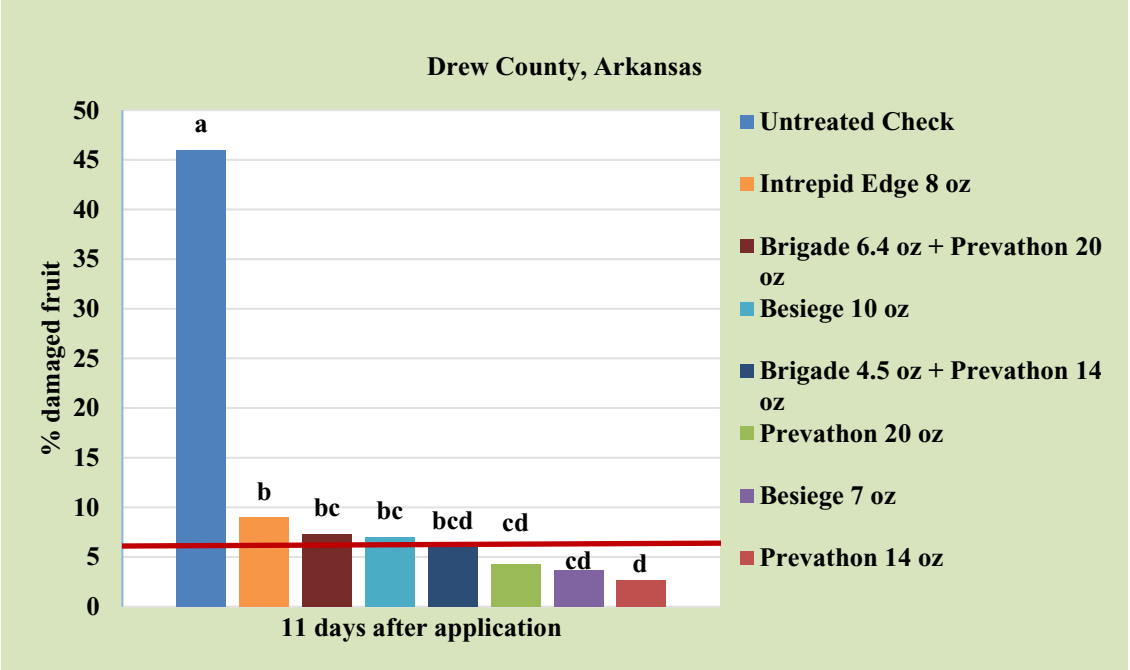

Figure 6. Assessment of damaged fruit 11 days after application of foliar insecticide.

At 18 DAA, no differences were observed between all treatments (Figure 7).

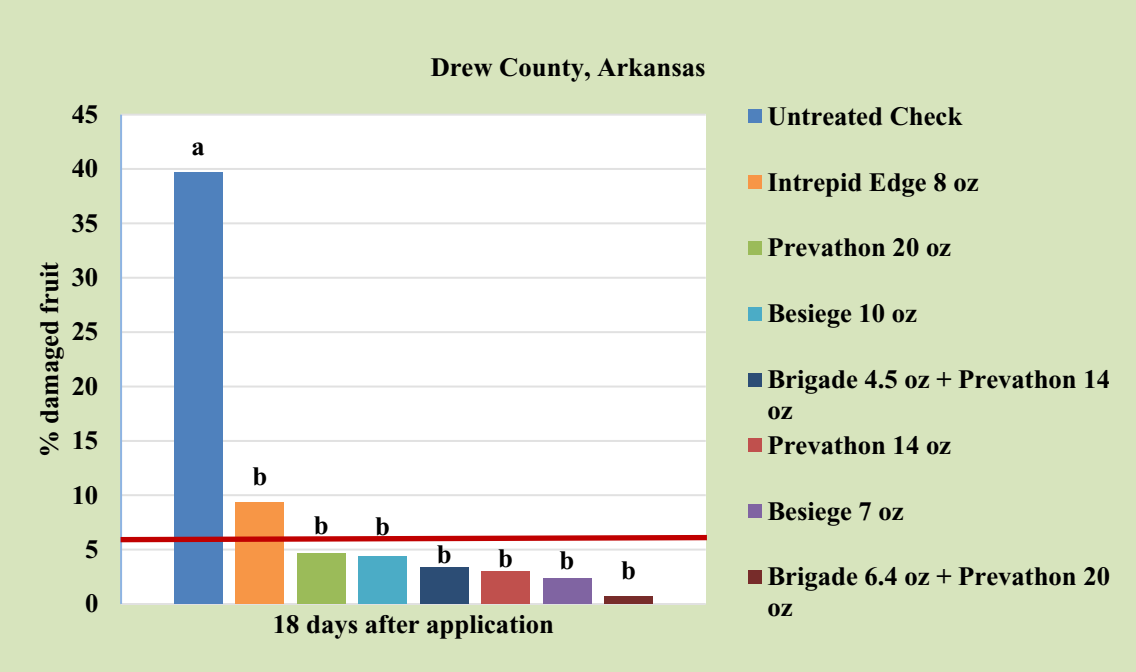

Figure 7. Assessment of damaged fruit 18 days after application of foliar insecticide.

At 26 DAA Besiege 10 oz, Brigade 6.4 plus Prevathon 20 oz and Prevathon 20 oz/a had less fruit damage than the UTC (Figure 8).

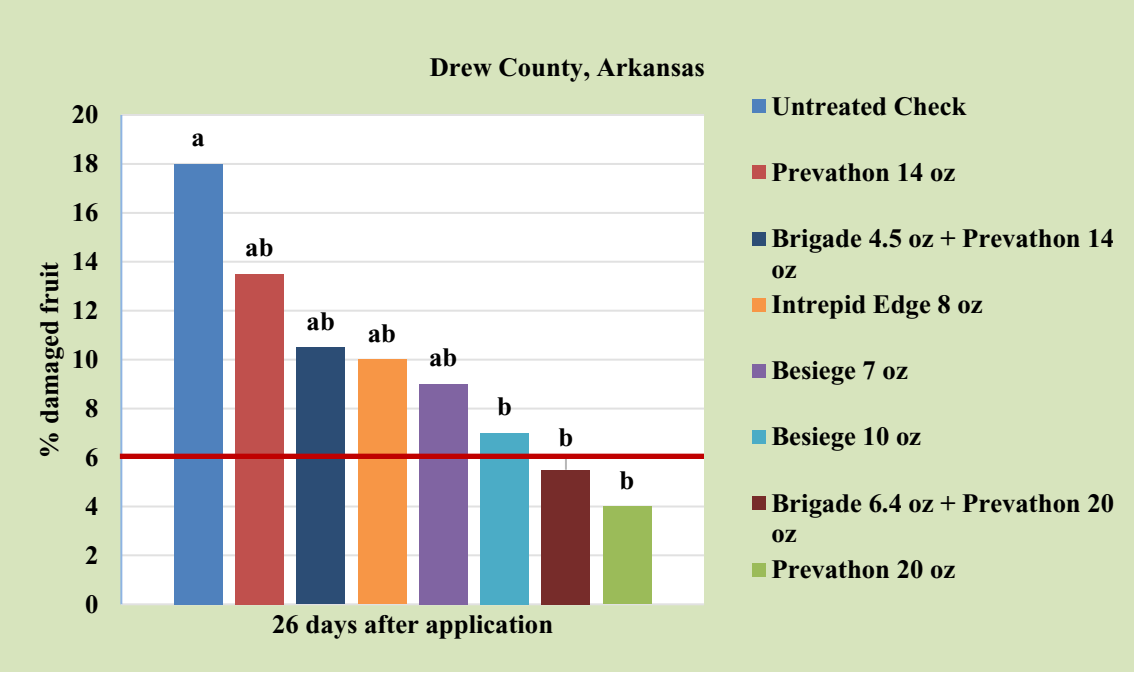

Figure 8. Assessment of damaged fruit 26 days after application of foliar insecticide.

Foliar insecticide application increased yield 230-520 lbs. seed cotton/acre above the UTC (Figure 9).

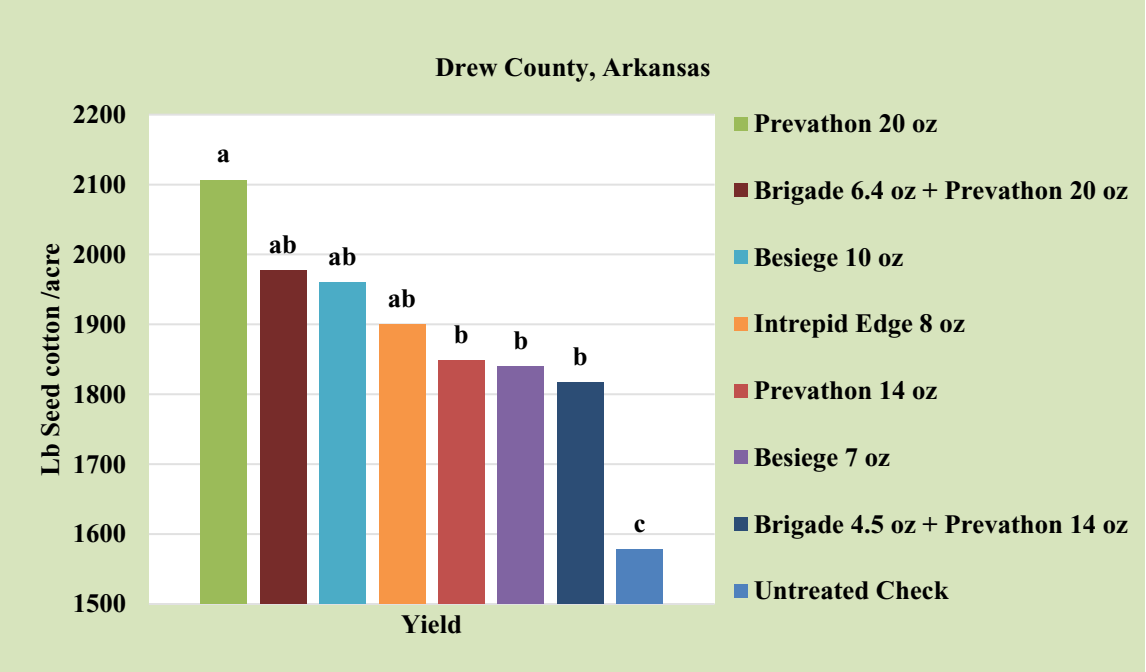

Figure 9. Yield in pounds of seed cotton per acre.

Summary

In this experiment Intrepid Edge and Brigade + Acephate did not provided adequate control of bollworms at any sample date. The addition of Brigade to Prevathon 14 and 20 oz did not provide any additional control. Prevathon 20 oz and Prevathon 20 oz plus Brigade 6.4 were the only treatments that had residual control past 26 days.

Acknowledgements

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References

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