

EFFECTS OF FOLIAR APPLICATIONS OF ARY-0469-001 AND ARY-0527-01 ON YIELD COMPONENTS OF GLYPHOSATE-TREATED FLEX COTTON

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Abstract

The addition of glyphosate-compatible and yield-enhancing agrochemicals to the tank mix would further enhance the benefits of using the Roundup Ready® Flex technology developed for cotton by Monsanto Company. A study was conducted at the Texas AgriLife Research and Extension Center at Corpus Christi in 2008 to evaluate the effects of foliar applications of Arysta LifeScience North America Corporation's ARY-0469-001 and ARY-0527-01 on yield components of a Flex cotton cultivar subjected to label-rate applications of glyphosate. Results from this one-year, one-location study indicates that the beneficial effects of using the Roundup Ready® Flex cotton technology would be enhanced with the addition of 5oz/A of ARY-0469-001 to an application of glyphosate at the 12th node stage or with the addition of 4oz/A of ARY-0527-01 to a double application of glyphosate at the 8th and 12th node stages.

Introduction

Roundup Ready® Flex cotton technology (Monsanto Company) offers producers an increased margin of crop safety regarding weed control due to an extended tolerance to the herbicide glyphosate during fruiting. This technology allows for a more flexible and wider window for over-the-top applications of glyphosate from emergence through layby, which is a key time for the control of economically damaging weeds in cotton. Addition of glyphosate-compatible and yield-enhancing agrochemicals to the tank mix would further enhance the benefits of using this technology.

A study was conducted in 2008 to evaluate the effects of foliar applications of Arysta LifeScience North America Corporation's ARY-0469-001 and ARY-0527-01 on yield components of a Flex cotton cultivar subjected to label-rate applications of glyphosate. This poster presents data on lint yield and the related primary yield components number of harvested bolls per unit area, average seed cotton mass per boll, and lint turnout.

Materials and Methods

The study was conducted at the Texas AgriLife Research and Extension Center at Corpus Christi, Nueces Co. Soil type at the experimental site is Victoria Clay (VcA). The upland cotton cultivar FM9063 B2F was planted to a plant population of 50,000/A on 38" row spacing with a 4-row Monosem NG+ vacuum precision planter on March 18, 2008. General production management practices followed recommendations from the Texas AgriLife Extension Service. Fertilizer and a selective herbicide for pre-emergence control of annual grasses and broadleaf weeds were applied broadcast and incorporated in the topsoil before planting. Fertilization rate was 44 lbs ac⁻¹ of P₂O₅ and 110 lbs ac⁻¹ of N.

Due to lack of adequate rainfall, supplemental irrigation was applied during the growing season using an aboveground drip system. No rainfall events occurred from planting to first-square. Cumulative rainfall from first square to first open boll in all studies was 2.5 inches (89% of normal). Cumulative rainfall from first-bloom to first-open boll was 2.7 inches in all studies (60% of normal). Irrigation was applied on April 22 (.92 inches), May 30 (1.01 inches), and June 1, (2.48 inches).

Primary phenological dates were as follows: emergence on March 25, first square on April 21, first bloom on May 27, 5NAWF on June 13, and first open boll on July 8.

Experimental treatments were as follows:

- 1) Untreated check (UTC, weed free control)
- 2) Glyphosate 8th node plus 12th node @ 22 ounces

- 3) Glyphosate plus ARY-0527-01 [4 ounces] @ 8th node
- 4) Glyphosate plus ARY-0469-001 [5 ounces] @ 8th node
- 5) Glyphosate plus ARY-0527-01 [4ounces] @ 12th node
- 6) Glyphosate plus ARY-0469-001 [5 ounces] @ 12th node
- 7) Glyphosate plus ARY-0527-01 [4 ounces] @ 8th and 12th node
- 8) Glyphosate plus ARY- 0469-001 [5 ounces] @ 8th and 12th node.

Treatments at the 8th node stage were applied on May 8, while treatments at the 12th node stage were applied on May 19. Treatments were applied at a volume rate (water plus product) of 20 gallons acre⁻¹ with a four-row plot sprayer (Model 3220-GC 2wd Lee Spider Spray-Trac, Lee Company, Inc., Idalou, TX). Treatments, including an untreated check (UTC), were arranged in a randomized complete block design with four replications. Experimental plots were four rows wide and 75 ft long.

Hand-harvest of 1/1000th of an acre of study plots was performed on August 11 upon defoliation treatment on August 1. Data collected at harvest included the number of plants per plot, number of harvested bolls per plot, and seed cotton per plot. Average seed cotton boll mass was calculated as seed cotton per plot divided the number of harvested bolls. Harvested seed cotton was then ginned to calculate lint turnout and lint yield.

Experimental data was organized and processed using Microsoft Excel X for Mac® software (1985-2001 Microsoft Corporation). Statistical analyses of data, including analysis of variance, Fisher's Protected Least Significant Difference (LSD) at 1, 5, and 10% levels of probability, and contrast of means to test the probability (P) of wrongly rejecting the null hypothesis of the difference between a treatment and the untreated check, were performed using SuperANOVA® software version 1.11 (1989-1991 Abacus Corporation, Inc., Berkeley, CA).

Results and Discussion

The double application of glyphosate had no significant effect on lint yield or any of the primary yield components (Figs. 1 through 4). Lint yield of the untreated check (treatment #1) was 745±50 lbs/A. This yield was attained with 242,500±843 bolls/A, an average seed cotton mass of 3.67±0.12 g per boll, and a lint turnout of 0.38±0.01 g of lint per g of seed cotton. The low average boll mass reflected the effects of water deficits during the boll growth period. Supplemental irrigation applied at the early stage of boll growth was insufficient to compensate for low precipitation (60% of normal) and maintain a high boll growth rate.

Two treatments increased lint yield over the glyphosate-only treatment (Fig. 4). These treatments were the addition of 5oz/A of ARY-0469-001 to the second application of glyphosate at the 12th node stage (treatment #6) and the addition of 4oz/A of ARY-0527-01 to both applications of glyphosate at the 8th and 12th node stages (treatment #7). Treatments #6 and #7 increased lint yield 89 and 88 lbs/A, 11.7 and 11.7% respectively, over the glyphosate-only treatment. These lint yield increases resulted from significant increases in average boll mass observed in treatments #6 and #7; 0.65 g/boll (18.2%) and 0.33 g/boll (9.3%), respectively.

Other significant effects were observed in this study, but none of them resulted in significant effects on lint yield. Namely, treatment #5 decreased 9.7% the number of harvested bolls; average boll mass was decreased 7.6% by treatment #3, but increased 10.7% by treatment 5; and treatments #4 and #8 both increased lint turnout 3.5 and 2.4%, respectively.

Results from this one-year, one-location study indicates that the beneficial effects of using the Roundup Ready® Flex cotton technology would be enhanced with the addition of 5oz/A of ARY-0469-001 to an application of glyphosate at the 12th node stage or with the addition of 4oz/A of ARY-0527-01 to a double application of glyphosate at the 8th and 12th node stages. More studies are needed to confirm these results.

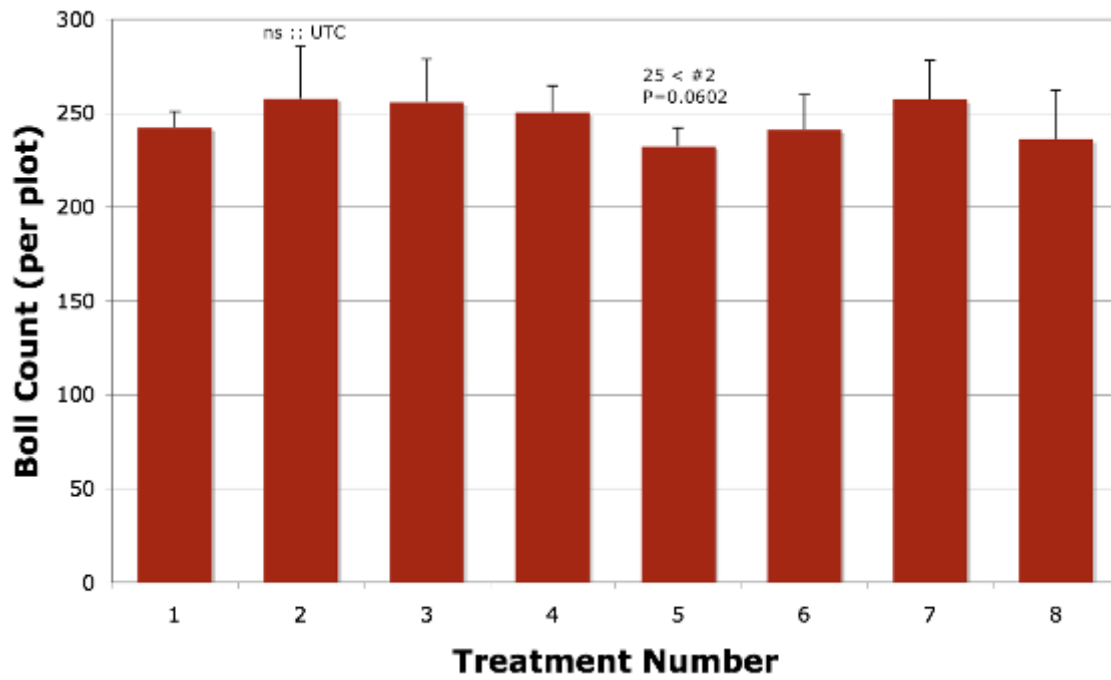


Figure 1. Effects of ARY-0527-01 and ARY-0469-001 on number of harvested bolls over the glyphosate-only treatment.

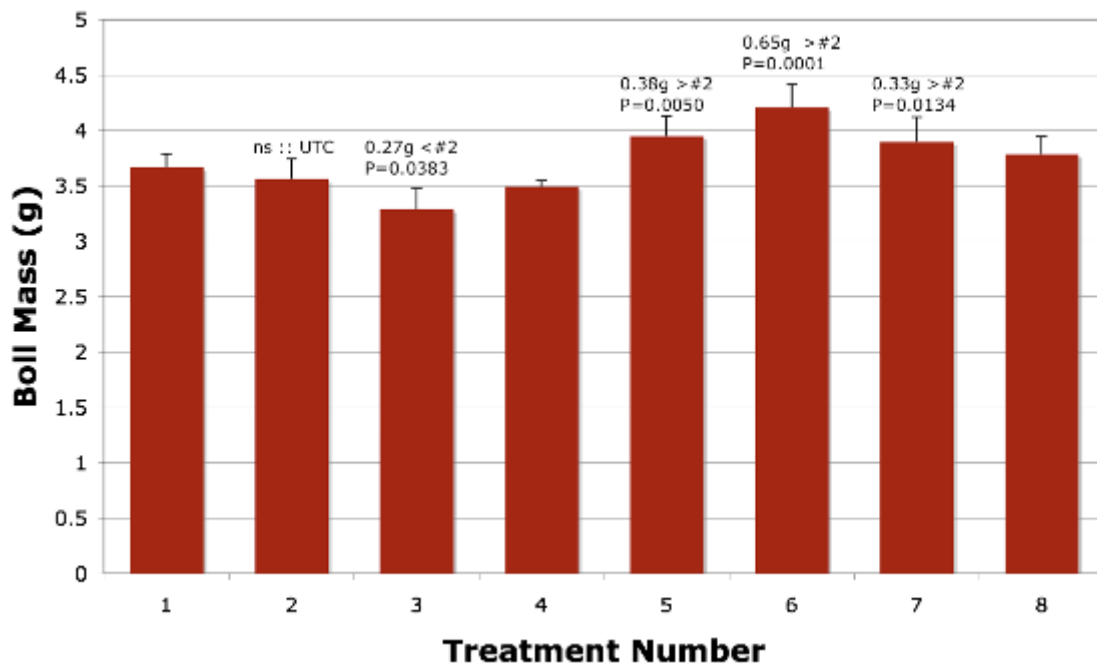


Figure 2. Effects of ARY-0527-01 and ARY-0469-001 on average seed cotton mass of harvested bolls over the glyphosate-only treatment.

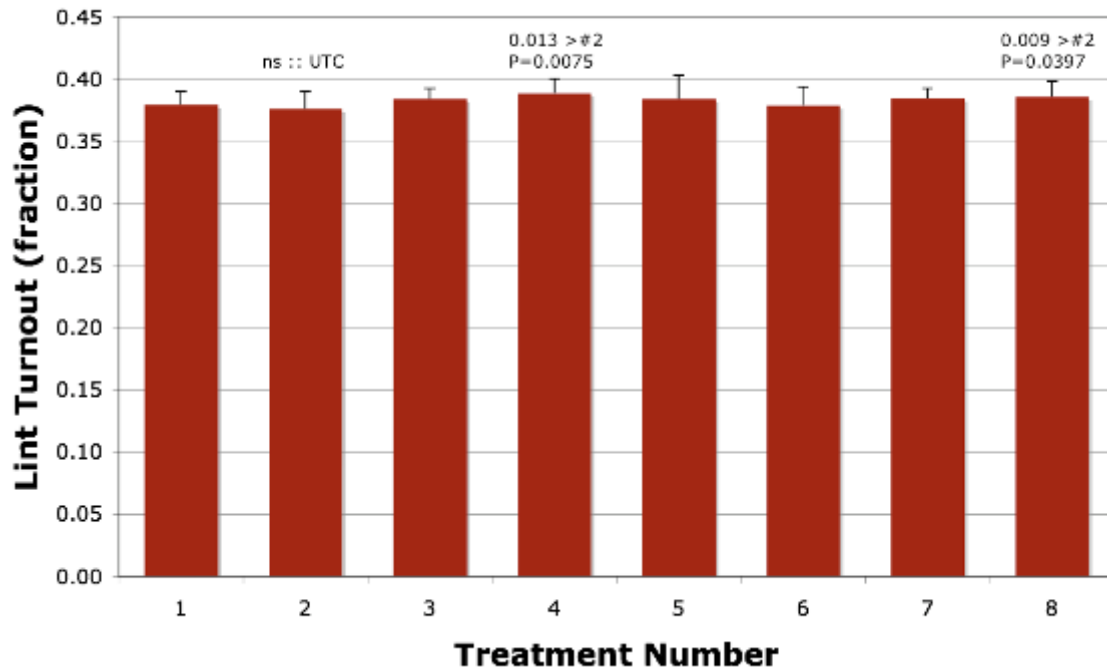


Figure 3. Effects of ARY-0527-01 and ARY-0469-001 on lint turnout over the glyphosate-only treatment.

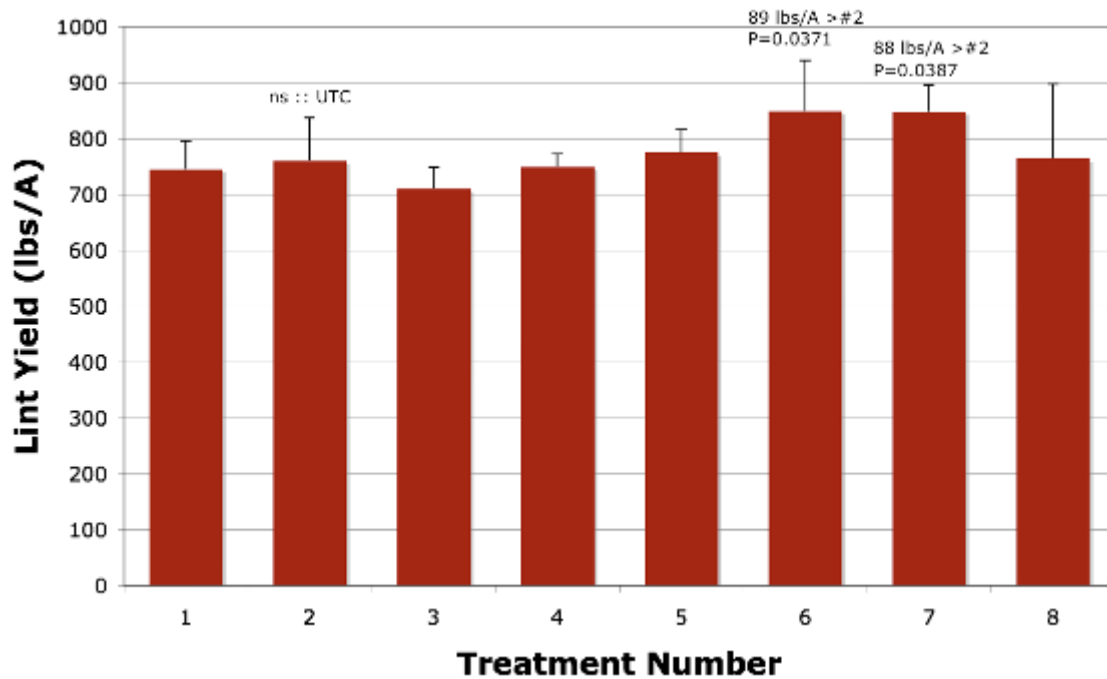


Figure 4. Effects of ARY-0527-01 and ARY-0469-001 on lint yield per acre over the glyphosate-only treatment.

Acknowledgements

Texas AgriLife Research and Arysta LifeScience North America Corporation supported this study.