EFFECT OF NOZZLE SELECTION ON WEED CONTROL AND YIELD IN MISSISSIPPI COTTON

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Abstract

A field study was conducted at the Blackbelt Research Station in Brooksville, MS to understand the effect of nozzle type and herbicide application timing on weed control in cotton. The study also compared applications made with an eight-nozzle tractor sprayer compared to a four-nozzle backpack sprayer. Herbicide applications were made at four different timings: preemergence (PRE), early post (EPost), early-mid post (EMpost), and late post (LPost) corresponding to the preemergent, 2-3 leaf, 5-6 leaf, and match head square stages respectively. Programs selected were: PRE fb EPost fb LPost; EM Post only; EPost fb LPost. Treatments included a standard herbicide treatment applied at each growth stage, with the nozzle type as the variable by each timing. Results showed no difference between sprayer type or nozzle type for weed control, where all programs resulted in control at or above 90%. For yield results, neither nozzle type nor sprayer type was significant so data were pooled across those factors. Yield results showed that the EMpost program resulted in the best yield (2600 lbs. seedcotton / acre) compared to the other two programs respectively (2312 and 2340 lbs. seedcotton / acre). The results are less indicative of pursuing a one-time application only, but rather reflects a need to further examine glufosinate tolerance among cotton varieties.

Introduction

The spray droplet size has the greatest impact on herbicide efficacy. Many nozzles have been developed which produce larger droplets in order to reduce spray drift, but less is known about their comparison for herbicide efficacy. Cotton yield is directly impacted by weed competition, so assessing a weed control program across multiple nozzle types could show what, if any differences exist with respect to herbicide efficacy by droplet size. Furthermore, the impact of application method (tractor applied versus backpack sprayer) could affect the results across multiple nozzle types. The objective of the study was to compare weed control and yield in cotton using different nozzle types and application methods.

Materials and Methods

A field study was conducted at the Blackbelt Research Station in Brooksville, MS to understand the effect of nozzle type and herbicide application timing on weed control in cotton. The study also compared applications made with an eight-nozzle tractor sprayer compared to a four-nozzle backpack sprayer. For the tractor study, five nozzle types: Ultra-Low Drift (ULD) 12004, Guardian Air (GA) 11004, Guardian Air Twin (GAT) 11004, 3D 10004, and High Flow (HF) 14008 were compared. For the backpack study, four nozzle types: Ultra-Low Drift (ULD) 12002, Guardian Air (GA) 11002, Guardian Air Twin (GAT) 11002, 3D 10002 were assessed. Applications were made at 140 L ha^{-1} (15 gal. ac^{-1}). Spray pressure for the 04 nozzles was 276 kPa (40 psi) and 138 kPa (20 psi) for the HF 08 nozzle. Herbicide applications were made at four different timings: preemergence (PRE), early post (EPost), early-mid post (EMpost), and late post (LPost) corresponding to the preemergent, 2-3 leaf, 5-6 leaf, and match head square stages respectively. Programs selected were: PRE fb EPost fb LPost; EM Post only; EPost fb LPost. Treatments included a standard herbicide treatment applied at each growth stage, with the nozzle type as the variable by each timing.

Results and Discussion

Results showed no difference between sprayer type or nozzle type for weed control, where all programs resulted in control at or above 90%. For yield results, neither nozzle type nor sprayer type was significant so data were pooled across those factors. Yield results showed that the EMpost program resulted in the best yield (2600 lbs. seedcotton / acre) compared to the other two programs respectively (2312 and 2340 lbs. seedcotton / acre). The results are less indicative of pursuing a one-time application only, but rather reflects a need to further examine glufosinate tolerance among cotton varieties.

Summary

Given that weed control results were all optimal, the difference in yield appears to be more a factor of cotton sensitivity to a late season glufosinate application than due to yield loss from weed control. The study is to be replicated in 2019, which should provide greater information to better understand results from the 2018 data.