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EFFECT OF SPRAY NOZZLE TYPE ON COTTON HARVEST AID PERFORMANCE

Mark Kelley and Randy Boman
Texas Cooperative Extension
Lubbock, TX
Todd Baughman
Texas Cooperative Extension
Vernon, TX
Robert Lemon and Joel Pigg
Texas Cooperative Extension
College Station, TX

Abstract

Harvest aid chemicals are used extensively for cotton (*Gossypium hirsutum* L.) production across Texas. Various nozzle types are available from TeeJet® Spraying Systems Company. Flat fan (TeeJet®) nozzles produce large droplets at lower pressures (15-20 psi) resulting in reduced drift, and generate smaller droplets at higher pressures (30-60 psi) which result in better coverage and canopy penetration. Hollow cone (ConeJet®) nozzles produce finely atomized spray droplets for better coverage and penetration. Turbo TeeJet® nozzles produce large droplets for less drift and provide more uniform coverage over a wide range of application pressures when compared to flat fan nozzles. Air induction (AI TeeJet®) nozzles produce large, air filled droplets which aid in drift reduction. As the large droplets come in contact with the target canopy they "burst", theoretically resulting in smaller droplets and better coverage. The purpose of this project was to determine the effect of spray nozzle type on harvest aid chemical performance in Texas cotton production.

A two-factor factorial arrangement of treatments was utilized at each location. Treatments consisted of three harvest aid chemical regimes applied using four nozzle types, for a total of twelve treatments. At the Vernon and College Station locations, 3 replications of each treatment were utilized, while at the Lubbock location, 4 replications were used. Harvest aid chemical treatments consisted of Gramoxone Max® (3 lb/gal paraquat dichloride), Ginstar® EC (1.0 lb/gal thidiazuron, 0.5 lb/gal diuron), and Aim™ EC (2 lb/gal carfentrazone-ethyl), applied at 16, 6, and 1 oz product/acre, respectively. Nozzle types consisted of flat fan, hollow cone, Turbo TeeJet®, and air induction. Plots were visually evaluated for percent defoliation and desiccation at 14 days after treatment (DAT) and percent regrowth (terminal and basal) at 21 DAT at all locations.

When comparing nozzle types for each chemical separately, significant differences were observed at the Vernon location for percent defoliation and desiccation at 14 DAT. Use of air induction nozzles resulted in significantly lower defoliation percentages for both the Aim™ EC and Ginstar® EC harvest aid treatments as compared to the use of flat fan and hollow cone nozzles for the same chemicals. For percent desiccation, Aim™ EC applied through hollow cone nozzles was significantly lower than Aim™ EC applied through Turbo TeeJet® nozzles. At the Lubbock site, treatments of Aim™ EC applied through flat fan and hollow cone nozzles had lower defoliation percentages than those applied through Turbo TeeJet® and air induction nozzles. The highest defoliation percentage for the Ginstar® EC treatments was achieved with the flat fan nozzles which was significantly greater than both the Turbo TeeJet® and the air induction nozzles. Desiccation percentages for Aim™ EC applied through hollow cone nozzles was significantly lower than Aim™ EC applied through either the flat fan or air induction nozzles. At the College Station location, Aim™ EC applied using flat fan nozzles had a significantly greater percentage defoliation when compared to the Turbo TeeJet® and air induction nozzles. No other differences were observed among nozzle types within each harvest aid treatment for percent defoliation or desiccation. When averaged across replications and harvest aid chemicals, air induction nozzles tended to have a detrimental effect on defoliation when using Aim™ EC and Ginstar® EC at the Vernon location and when using Aim™ EC at the College Station location. However, nozzle type had no effect on harvest aid performance for any of the remaining parameters at any of the locations.