

INSPIRE EC[®], A NEW SYNGENTA COTTON HARVEST AID
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Abstract

Inspire EC[®] is a new cotton harvest aid currently being developed by Syngenta Crop Protection, Inc. The active ingredient butafenacil is a member of the protoporphyrinogen oxidase (PPO) inhibitor class of chemistry. The product will be formulated as an emulsifiable concentrate containing 0.83 pounds of active ingredient per gallon. As a cotton harvest aid, Inspire EC causes cell membrane disruption and a release of ethylene in the cotton leaf. Leaf defoliation begins within 7 days after application. Inspire EC has proven to be an effective cotton harvest aid material in trials established by Syngenta and university researchers across the cotton belt. An added benefit of Inspire EC is its effectiveness in desiccating vines that may be present at harvest.

Introduction

Syngenta Crop Protection, Inc. initiated development of butafenacil as a cotton harvest aid material in 1995. A member of the PPO class of chemistry, butafenacil causes cell membrane disruption and a release of ethylene in the cotton leaf. Defoliation is observed within 7 days after application. Several objectives have been addressed in numerous field trials conducted from 1995 to 2001. Multiple trials conducted across the cotton belt were established to 1) define the most effective rate of butafenacil, 2) determine the optimum application timing, 3) evaluate the effect of various adjuvants, 4) determine tank mix options, and 5) evaluate efficacy of butafenacil when applied by air.

Materials and Methods

Results reported in this paper represent a summary of data generated by Syngenta and university researchers. Trials were conducted on various cotton varieties utilizing either ground or aerial application equipment. Butafenacil was applied using either a CO₂ backpack sprayer, Hi-Cycle or tractor mounted sprayer, or a spray coupe, which delivered 10 to 20 gallons of water per acre. Plot size was 4 rows up to 30 feet in length. Aerial trials were conducted in 2000 and 2001 at two locations each year. In these trials butafenacil was applied using a carrier volume of 5 GPA on plots up to 1 acre in size.

All plots were evaluated for percent defoliation, percent leaf desiccation, and percent green leaves at 7 and 14 days after application. Percent regrowth was evaluated at 14 and 21 days after application. All data were subjected to an analysis of variance at the 95% level of confidence.

Results and Discussion

Inspire EC was evaluated at rates ranging from 0.042 lb ai/A to 0.089 lb ai//A. Overall, a flat rate response in leaf defoliation and leaf desiccation was observed across butafenacil rates regardless of application timing (60 to 90% open bolls). However there was a trend towards increased defoliation as the percent open bolls increased. Several adjuvants classified as either a crop oil concentrate, non-ionic surfactant, or organosilicant were evaluated with Inspire EC to assess their effects on product performance. Overall, Inspire EC was effective in defoliating cotton regardless of adjuvant type used; however the addition of a crop oil concentrate or organosilicant tended to increase defoliation with only a minimal increase in leaf desiccation.

Several trials were conducted in 2000 and 2001 to evaluate the efficacy of Inspire EC versus other harvest aid materials. These trials also compared reduced rates of tank mixtures of Inspire EC with standard defoliant to the labeled rate of each. In direct comparison with standard harvest aid materials, Inspire EC, 0.069 lb ai/A at 11 to 15 days after application provided defoliation comparable to Ginstar[®] EC (thidiazuron + diuron), 0.094 lb ai/A, and Def[®] 6 (tribufos), 0.75 lb ai/A + Dropp[®] 50 WP (thidiazuron), 0.05 lb ai/A. Defoliation afforded by Inspire EC was superior to Dropp 50WP, 0.1 lb ai/A, Finish[®] brand 6 (ethephon), 1.125 lb ai/A, Def 6, 0.75 lb ai/A, and Def 6 + Prep[™] both at 0.75 lb ai/A. Reduced rates (0.035 and 0.053 lb ai//A) of Inspire EC in tank mixture with either Finish brand 6 or Dropp at one-half the standard rate resulted in defoliation comparable to Inspire at 0.069 lb ai/A alone, but superior to either Dropp or Finish brand 6 at their normal use rate.

Sequential applications of Inspire EC, at 0.069 lb ai/A followed by either Inspire EC, 0.069 lb ai/A or Cyclone Max[®] (paraquat) 0.25 lb ai/A resulted in a 10% to 13% increase in cotton defoliation compared to Inspire EC in a single application. No significant increase in leaf desiccation was observed in a single versus sequential application. Results from aerial trials

conducted in 2000 and 2001 confirmed Inspire EC as an effective cotton harvest aid when applied by air. Direct comparisons of Def 6 to Inspire EC revealed a trend for higher levels of cotton defoliation with Inspire EC.

Conclusions

Inspire EC[®] has proven to be an effective cotton harvest aid material. Good to excellent cotton defoliation performance was obtained with Inspire EC at 0.069 lb ai/A alone and at reduced rates in tank mixture with other materials regardless of adjuvant used. Cotton defoliation was effective when Inspire EC was applied at 60% open bolls; however a trend towards increased defoliation was observed when higher percentage bolls were open at time of application.

Syngenta is pursuing registration of Inspire EC as a cotton harvest at 0.069 lb ai/A or 0.0834 lb ai/A if vine desiccation is desired. Applications will be targeted to mature cotton beginning when harvestable bolls are 60% open. Proposed labeling includes ground and aerial applications with options to tank mix with other registered boll openers, defoliant, and desiccants.