

ADJUVANT AND NOZZLE EFFECTS ON COTTON DEFOLIANTS

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Abstract

Hollow cone nozzles are often used for ground application of defoliants due to the smaller droplet size and higher pressures they are used at. The higher spray pressure can help to improve penetration of the spray into the canopy but can also lead to increased off-target spray drift. Venturi-type nozzles can be utilized at higher spray pressures and has a reduced percentage of driftable spray droplets and can improve spray deposition in cotton. Adjuvants added to the spray mixture can enhance the activity of cotton defoliants. Ammonium-based fertilizers, such as ammonium sulfate, have been shown to enhance the activity of some chemical defoliants, particularly ethephon. This research was conducted to determine the efficacy of Finish or Aim EW as influenced by adjuvants, spray nozzles, or spray systems. Research was conducted at Memphis, TN in September, 2002. Individual plot size was 4 rows in width by 30 ft in length. Treatments for each trial were arranged in a randomized, complete block design with 4 replications. Six nozzles and seven different adjuvants were used. A novel spraying system designed to apply pesticides over the top and between the rows was also utilized in this research (DropSpray[®], Micron Sprayers Ltd.) using TXVS-6 spray nozzles. The efficacy of Finish or Aim EW was evaluated in separate trials. Finish was applied at 2 pt/ac in 10 gpa spray volume while Aim EW was applied at 0.75 fl oz/ac. Plots were evaluated visually for percent defoliation at 7 and 14 days after treatment. Cotton defoliation was enhanced by Finish. The adjuvants HM9001 (AMS replacement), HM7912 (crop oil concentrate), and HM9743 (methylated seed oil/organosilicone/nitrogen blend) enhanced Finish activity at the 7 DAT rating. Cotton defoliation was greater when Finish was applied through air induction nozzles compared to hollow cone nozzles. The adjuvant AB0201 (EO/PO block copolymer) enhanced Finish activity when applied through the Hardi Injet nozzle. The Drop Spray[®] spray system tended to enhance cotton defoliation compared to over the top sprays with hollow cone nozzles. Aim EW enhanced Cotton defoliation. The adjuvants AX0232 (microemulsified methylated seed oil), HM7912, HM8802-A (organosilicone/methylated seed oil blend), and HM9743 enhanced Aim EW activity at the 7 DAT evaluation and the adjuvants AX0211 (paraffinic oil/surfactant blend), AX0232, HM7912, HM8802-A, and HM9743 increased Aim EW activity at the 14 DAT evaluation. The inclusion of ammonium nitrate in the spray solution (the adjuvant HM9743) did not further enhance cotton defoliation. Cotton defoliation was similar when Aim EW was applied through air induction nozzles or hollow cone nozzles. However, the Lechler Flatfan air induction nozzle tended to have slightly lower enhancement than the remaining air induction or hollow cone nozzles. The adjuvant AB0201 tended to decrease Aim EW activity when applied through the Hardi Injet nozzle. The DropSpray[®] spray system tended to enhance cotton defoliation compared to over the top sprays with hollow cone nozzles. The ammonium-containing adjuvants HM9001 and HM9743 enhanced Finish defoliation the most while HM8802-A tended to be the most effective adjuvant for Aim EW. Cotton defoliation when air induction nozzles were used was either improved or similar to that when hollow cone were used. The amount of air entrapped by the air induction nozzles did not appear influence the effectiveness of either defoliant. The Drop Spray[®] spray system enhanced cotton defoliation compared to over the top applications due to precise placement of the defoliants. It is possible for producers to alter application parameters to improve defoliant efficacy.