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EFFECT OF SELECTED DRIFT CONTROL AGENTS ON THE EFFICACY OF DEF-6 PLUS PREP DEFOLIANT MIXTURES

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Abstract

Drift of agricultural chemicals is a major concern with many agricultural cropping systems. Previous research has shown that certain drift control agents can be added to spray solutions of agricultural chemicals which will reduce drift by decreasing the percent of very fine droplets (<144 μ) in the total spray volume. A field study was conducted in 2002 to compare the effects of the combination of Def®-6 cotton defoliant and Prep™ boll opener as applied alone and in combination with each of five selected drift control agents.

These mixtures were applied to cotton var. 'Delta Pine 451 B/R' at 65 to 70% open bolls. Treatments were applied in water at 10 gallons per acre (gpa) to cotton in plots of four rows each, spaced 40 inches apart, 40 feet long, arranged in randomized complete block designs, and replicated three times. Visual ratings were made of the percent defoliation at 7 and 14 days after treatment (DAT), whereby, 0 = no defoliation and 100% = complete defoliation and of the percent shoot regrowth at 21 DAT, whereby 0 = no shoot regrowth and 100% = complete regrowth of the cotton shoot. The least significant differences (LSD) between means were determined by Fisher's Protected LSD test at the 5% level. The harvest-aid chemicals and manufacturers are listed in Table 1. Rates of chemicals applied and results of defoliation and shoot regrowth are shown in Table 2.

Def-6 was applied at 10 oz/A, which was below the recommended rate of 16 oz/A, in order to detect any increase or decrease in the effect on defoliation or shoot regrowth as caused by the addition of a drift control agent. The percent cotton defoliation at each 7 and 14 DAT with the combination of Def-6 and Prep without a drift control agent was 77 and 78%, respectively. The percent defoliation was significantly increased to 83 and 85%, respectively, by the addition of HM 2005-B. Defoliation was not significantly affected by the addition of HM 2007 (73 and 73%) and was reduced by the addition of HM 2052 to 70 and 70%, HM 2006 to 62 and 68% and HM 9752 to 37 and 37% at 7 and 14 DAT, respectively.

The percent shoot regrowth was significantly greater with the addition of HM 9752 (40%) and HM 2006 (40%) than with the Def-6 and Prep mixture without a drift control agent (27%) or in combination with HM 2005-B (22%), HM 2007 (27%), or HM 2052 (20%).

Table 1. Harvest Aid Chemicals.

Name	Description	Manufacturer
Defoliant		
DEF 6	SSS-Tributyl phosphorotrithioate	Bayer Corporation
Adjuvant and Drift Control Agents		
Prep	Ethephon (2-Chloroethyl) phosphonic acid	Bayer Corporation
HM 9752	Proprietary blend of polymeric viscosity modifiers and ammonium sulfate	Helena Chemical Co.
HM 2005B	Proprietary blend of plant nutrients and water soluble organic polymers	Helena Chemical Co.
HM 2006	Proprietary blend of nonionic water soluble organic polymers and ammonium salts	Helena Chemical Co.
HM 2007	Proprietary blend of nonionic water soluble organic polymers and ammonium salts	Helena Chemical Co.
HM 2052	Distillates (petroleum), hydrotreated light paraffinic	Helena Chemical Co.

Table 2. Effect of the combination of the defoliant, DEF 6, and Prep with and without a drift control agent applied to cotton 'Delta Pine 451 BR' at 65 to 70% boll opening (average of 3 replications) 2002 field study.[1/]

Chemical	Rate Product in 10 gpa	% Cotton Defoliation 7 DAT	% Cotton Defoliation 14 DAT	% Cotton Regrowth 21 DAT
Def	10 oz/A	77	78	27
Prep	8 oz/A			
Def	10 oz/A	37	37	40
Prep	8 oz/A			
HM9752	9 lb/100 gal			
Def	10 oz/A	83	85	22
Prep	8 oz/A			
HM2005-B	9 lb/100 gal			
Def	10 oz/A	62	68	40
Prep	8 oz/A			
HM2006	9 lb/100 gal			
Def	10 oz/A	73	73	27
Prep	8 oz/A			
HM 2007	9 lb/100 gal			
Def	10 oz/A	70	70	20
Prep	8 oz/A			
HM2052	0.5% v/v			
Untreated Check	--	0	0	0
LSD (0.05)[2/]		6	7	11

[1/]Cotton 'Delta Pine 451 BR' was planted on May 8, 2002 and treated on September 5, 2002. Treatments were applied at 10 gallons per acre with TeeJet® Flat-Fan, Extended Range 110015VS nozzles at 52 psi spray pressure. [2/]Means within a column are not different at $P \leq 0.05$ according to Fisher's Protected LSD test.