

EFFECT OF ADJUVANTS ON KIH-9201 DEFOLIANT

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Abstract

A field study was conducted during 2003 to compare the effects of the cotton defoliant, KIH-9201 alone and in combination with various adjuvants; the fertilizer salt, ammonium sulfate; the growth regulator, Ethephon-6®; and of the cotton defoliant, Def-6® in combination with Ethephon-6, Dropp® defoliant, Finish® defoliant, and the adjuvant, HM-0307, and of Finish alone.

These combinations were applied to cotton var. 'DP 451 B/RR' at 60 to 65% 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, replicated four times, and arranged in a randomized complete block design. Visual ratings were made of the percent defoliation at 7 and 14 days after treatment (DAT) and the percent shoot regrowth at 21 DAT, whereby 0 = no effect and 100% = complete effect. The least significant difference (LSD) between means was determined by Fisher's Protected LSD test at the 5% level. The harvest aid chemicals and manufacturers are listed in Table 1. Rates and results of treatments to cotton are shown in Table 2.

KIH-9201 was applied at the rate of 2 g per 10 gpa which is below the recommended rate of 2.5 g per 10 gpa. Def-6 was applied at the lower amount of the recommended rate range of 16 to 24 oz per 10 gpa. These lower rates were used in order to detect any increase or decrease in the effect of the cotton defoliant as caused by the addition of other harvest aid chemicals.

Results in this study showed that the defoliant, KIH-9201 was most effective when applied in combination with the oil-based organosilicone adjuvant, Dyne-Amic® and with the crop oil adjuvant, Agri-Dex® and was least effective in combination with the siloxane water-based organosilicone adjuvant, Kinetic HV® and the nonionic surfactant, Induce® both of which are more effective with water-based formulations. At 7 to 14 DAT respectively, defoliation with KIH-9201 alone was 9 and 10%. Defoliation at 7 and 14 DAT respectively was increased with the addition of Agri-Dex to 65 and 73%, of Dyne-Amic to 75 and 81%, of Dyne-Amic plus Ethephon-6 to 63 and 70%, and of Dyne-Amic plus Ethephon-6 and ammonium sulfate to 76 and 83%. Defoliation was little to nonaffected at 7 to 14 DAT respectively when KIH-9201 was applied in combination with Induce, 20 and 21%, with Kinetic HV, 10 and 14%, and with ammonium sulfate alone, 11 and 14%.

Shoot regrowth at 21 DAT, using the more effective cotton defoliation treatments, was least with Def-6 plus HM-0307 (20%) and with KIH-9201 plus Agri-Dex (25%). Regrowth was moderate with KIH-9201 in combination with Dyne-Amic and Ethephon-6 (28%) and with Def-6 in combination with Ethephon-6 (35%). The greatest shoot regrowth occurred with KIH-9201 plus Dyne-Amic, Ethephon-6, and ammonium sulfate (43%) and with KIH-9201 in combination with Dyne-Amic alone (45%).

Table 1. Harvest Aid Chemicals.

Name	Description	Manufacturer
Defoliant		
DEF 6	SSS-Tributyl phosphorotrithioate	Bayer Crop Science
Dropp 50WP	Thidiazuron	Bayer Crop Science
Finish 6	Cyclanilide and Ethephon	Bayer Crop Science
KIH-9201	Fluthiacet-methyl	K-I Chemical USA, Inc.
Adjuvants		
Agri-Dex	A proprietary blend of heavy range, paraffin-based petroleum oil and nonionic surfactants; 83/17 v/v	Helena Chemical Co.
Ammonium Sulfate	Granular ammonium sulfate	AGRO Distribution, LLC
Dyne-Amic	A proprietary blend of highly refined methylated vegetable oils and organosilicone-based surfactants	Helena Chemical Co.
Ethephon 6	Two-chloroethyl phosphonic acid	Micro Flo Co.
Induce	A proprietary blend of nonionic, low foam spray adjuvants	Helena Chemical Co.
Kinetic HV	A nonionic organosilicone-based wetter/spreader/penetrant spray adjuvant	Helena Chemical Co.
HM 0307	A proprietary blend of ethephon plus organic buffering agents	Helena Chemical Co.

Table 2. Effect of the defoliant, KIH-9201 and Def-6, each applied in various combinations with adjuvants to cotton 'DP 451 B/RR' at 60 to 65% open bolls (average of 4 replications) 2003 field study.

Treatment	Rate per 10 gpa	Percent Defoliation		Percent Regrowth
		Days After Treatment		
		7	14	21
KIH 9201	2 g	9	10	53
KIH 9201	2 g	20	21	18
Induce	0.25% v/v			
KIH 9201	2 g	65	73	25
Agri-Dex	1.0% v/v			
KIH 9201	2 g	10	14	25
Kinetic HV	0.25% v/v			
KIH 9201	2 g	75	81	45
Dyne-Amic	0.5% v/v			
KIH 9201	2 g	11	14	25
Am. Sulfate	1 lb			
KIH 9201	2 g	63	70	28
Dyne-Amic	0.5% v/v			
Ethephon-6	8 oz			
KIH 9201	2 g	76	83	43
Dyne-Amic	0.5% v/v			
Ethephon-6	8 oz			
Am. Sulfate	1 lb			
KIH 9201	2 g	68	74	20
HM 0307	5 pt			
DEF-6	16 oz	74	80	35
Ethephon-6	8 oz			
DEF-6	16 oz	63	73	23
Ethephon-6	8 oz			
Dropp	0.15 lb			
DEF-6	16 oz	91	95	20
HM 0307	5 pt			
DEF-6	16 oz	81	85	53
Finish	32 oz			
Finish	32 oz	73	80	28
Untreated Check		0	0	53
LSD (0.05) ^{1/}		6	5	7

^{1/}Means within a column are not different at P≤0.05 according to Fisher's Protected LSD test.