

**EFFECT OF ADJUVANTS, NITROGEN SALTS
AND ETHEPHON ON COTTON DEFOLIANTS**

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Abstract

Field studies were conducted during 1998 to determine the effect of two adjuvants, Activate Plus® and Surf Aid®, and two ammonium sulfate products, AMS Plus® liquid formulation and AMS Spray Grade® dispersible granular formulation applied with the combination of either Def 6® or Dropp 50WP® defoliant with the harvest aid chemical Boll'd®. These combinations were applied to the cotton variety 'DPL 5409' at 60 to 70% boll opening. 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 and replicated four times arranged in a randomized complete block design. Visual ratings were made of the percent defoliation and percent boll opening at 8 and 14 days after treatment (DAT) and of the percent shoot regrowth at 14 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 with their descriptions and manufacturers are listed in Table 1.

Rates applied and results of treatments to cotton 'DPL 5409' are shown in Table 2. The defoliant Def 6 applied alone and in combination with the harvest aid chemical Boll'd and the adjuvant Surf Aid resulted in 35% defoliation at 8 DAT and 40 and 38% defoliation, respectively, at 14 DAT. The further addition of each AMS Plus and AMS Spray Grade resulted in defoliation of 45 and 73% at 8 DAT and 65 and 80% at 14 DAT, respectively. Def 6 plus Boll'd applied in combination with the adjuvant Activate Plus resulted in defoliation of 78% at 8 DAT and 81% at 14 DAT with no significant increase with the addition of either formulation of ammonium sulfate.

The defoliant Dropp 50WP applied alone resulted in 84% defoliation at both 8 and 14 DAT. The combination of Dropp and Boll'd with the addition of Activate Plus did not increase defoliation by 14 DAT. The further addition of AMS Plus increased defoliation to 89 and 93% while the addition of AMS Spray Grade increased defoliation to 88%

at both 8 and 14 DAT. The combination of Dropp and Boll'd with the addition of Surf Aid resulted in 94% defoliation at both 8 and 14 DAT with no further increase with the addition of either of the ammonium salt formulations.

Boll opening was increased at 8 DAT from 80% with Def 6 defoliant alone to 85% with the defoliant Def 6 in combination with Boll'd plus Activate Plus and with Boll'd, Activate Plus, and AMS Spray Grade. Dropp defoliant alone increased the boll opening to 89% with no significant increase with the addition of any of the other products.

Shoot regrowth at 14 DAT was 20% with Def 6 alone and 33 to 43% with Def 6 with all of the additive combinations in this study. At this same time, shoot regrowth with Dropp applied both alone and with additives was less than 10% except for 18% regrowth when applied with AMS Spray Grade and Activate Plus.

There were no frozen (or stuck) leaves at 8 DAT with any of the treatments in this study.

Table 1. Harvest Aid Chemicals

Name	Description	Manufacturer
<i>Defoliants</i>		
DEF 6	SSS-Tributyl phosphorotrithioate	Bayer Corporation
Dropp 50WP	Thidiazuron	AgrEvo USA Company
<i>Adjuvants</i>		
Activate Plus	Alkylarlpolyoxyethylene glycols, free fatty acids and IPA 90% v/v	Riverside/Terra International, Inc.
AMS Plus	Phosphate ester of polyglycoethers 43% v/v, blend of ammoniated salts 18% v/v	Riverside/Terra International, Inc.
AMS Spray Grade	Granular ammonium sulfate	Riverside/Terra International, Inc.
Boll'd (Ethephon)	Two-chloroethyl phosphonic acid	Riverside/Terra International, Inc.
Surf Aid	Alkyl polyethoxy alkylene ethers and other ethoxylated derivatives 80% v/v	Riverside/Terra International, Inc.

Table 2. Effect of various combinations of defoliant and adjuvants applied to cotton 'DPL 5409' at 60 to 70% boll opening (average of 4 replications.)

No.	Chemical(s)	Rate in 10 gpa	% Defoliation		% Boll Opening	
			8 DAT	14 DAT	8 DAT	14 DAT
1	Def 6	1 pt	35	40	80	89
2	Boll'd	1.33 pt	35	38	80	86
	Def 6	1 pt				
	Surf Aid	1 qt/100 gal				
3	Boll'd	1.33 pt	45	65	80	93
	Def 6	1 pt				
	AMS Plus	1 pt				
	Surf Aid	1 qt/100 gal				
4	Boll'd	1.33 pt	73	80	81	91
	Def 6	1 pt				
	AMS Spray	2 lb				
	Grade					
	Surf Aid	1 qt/100 gal				
5	Boll'd	1.33 pt	78	81	85	91
	Def 6	1 pt				
	Activate	1 qt/100 gal				
6	Boll'd	1.33 pt	73	80	80	93
	Def 6	1 pt				
	AMS Plus	1 pt				
	Activate	1 qt/100 gal				
7	Boll'd	1.33 pt	79	84	85	93
	Def 6	1 pt				
	AMS Spray	2 lb				
	Grade					
	Activate	1 qt/100 gal				
8	Dropp 50	0.1 lb ai	84	84	89	94
	WP					
9	Boll'd	1.33 pt	94	94	91	96
	Dropp 50	0.1 lb ai				
	WP					
	Surf Aid	1 qt/100 gal				
10	Boll'd	1.33 pt	90	91	90	95
	Dropp 50	0.1 lb ai				
	WP					
	AMS Plus	1 pt				
	Surf Aid	1 qt/100 gal				
11	Boll'd	1.33 pt	88	88	88	95
	Dropp 50	0.1 lb ai				
	WP					
	AMS Spray	2 lb				
	Grade					
	Surf Aid	1 qt/100 gal				
12	Boll'd	1.33 pt	80	84	85	90
	Dropp 50	0.1 lb ai				
	WP					
	Activate	1 qt/100 gal				
13	Boll'd	1.33 pt	89	93	90	93
	Dropp	0.1 lb ai				
	50WP					
	AMS Plus	1 pt/A				
	Activate	1 qt/100 gal				
14	Boll'd	1.33 pt	88	88	91	93
	Dropp 50	0.1 lb ai				
	WP					
	AMS Spray	2 lb				
	Grade					
	Activate	1 qt/100 gal				
15	Untreated Control		0	0	80	96
	LSD (0.05)		4	4	4	5

No.	Chemical(s)	Rate in 10 gpa	% Leaf Freezing		% Regrowth	
			8 DAT	14 DAT	8 DAT	14 DAT
1	Def 6	1 pt	0		20	
2	Boll'd	1.33 pt	0		38	
	Def 6	1 pt				
	Surf Aid	1 qt/100 gal				
3	Boll'd	1.33 pt	0		35	
	Def 6	1 pt				
	AMS Plus	1 pt				
	Surf Aid	1 qt/100 gal				
4	Boll'd	1.33 pt	0		35	
	Def 6	1 pt				
	AMS Spray	2 lb				
	Grade					
	Surf Aid	1 qt/100 gal				
5	Boll'd	1.33 pt	0		33	
	Def 6	1 pt				
	Activate Plus	1 qt/100 gal				
6	Boll'd	1.33 pt	0		39	
	Def 6	1 pt				
	AMS Plus	1 pt				
	Activate Plus	1 qt/100 gal				
7	Boll'd	1.33 pt	0		43	
	Def 6	1 pt				
	AMS Spray	2 lb				
	Grade					
	Activate Plus	1 qt/100 gal				
8	Dropp 50	0.1 lb ai	0		5	
	WP					
9	Boll'd	1.33 pt	0		9	
	Dropp 50	0.1 lb ai				
	WP					
	Surf Aid	1 qt/100 gal				
10	Boll'd	1.33 pt	0		8	
	Dropp 50	0.1 lb ai				
	WP					
	AMS Plus	1 pt				
	Surf Aid	1 qt/100 gal				
11	Boll'd	1.33 pt	0		7	
	Dropp 50	0.1 lb ai				
	WP					
	AMS Spray	2 lb				
	Grade					
	Surf Aid	1 qt/100 gal				
12	Boll'd	1.33 pt	0		6	
	Dropp 50	0.1 lb ai				
	WP					
	Activate Plus	1 qt/100 gal				
13	Boll'd	1.33 pt	0		4	
	Dropp 50WP	0.1 lb ai				
	AMS Plus	1 pt/A				
	Activate Plus	1 qt/100 gal				
14	Boll'd	1.33 pt	0		18	
	Dropp 50	0.1 lb ai				
	WP					
	AMS Spray	2 lb				
	Grade					
	Activate Plus	1 qt/100 gal				
15	Untreated Control		0		0	
	LSD (0.05)		0		4	