Cotton Harvest-Aid Chemicals
Cotton Research Center, Phoenix

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Harvest-aid chemicals prepare the plant for machine harvest and reduce leaves, trash and green stain in the lint. Since maturity of cotton fiber essentially stops after the leaves shed, timing is important. Remember, if you defoliate before the last boll you wish to harvest reaches maturity, expect some reduction in fiber strength, micronaire and yield.

In these tests harvest-aid chemicals were applied to separate plots of the same field on October 6 when the temperature was a maximum of 98°F and minimum of 66°F. The applications were made with a Hi-Boy sprayer using 5 nozzles per row. The total volume of spray was 25 gpa and the pressure was 40 psi. Plant height ranged from 48 to 60 inches in a population of about 55,000 plants per acre.

Results of available and new potential harvest-air chemical tests are presented in Tables 1 and 2. In general, one application of harvest-aid chemicals did not provide adequate defoliation at either application date. Similar results have been consistently noted in previous tests.

Often cotton in Arizona requires two applications of a harvest-aid chemical before adequate defoliation is attained. Therefore, make your selection of chemicals based on the probability that an additional application may be required.

Table 1. Available Chemicals. Application Date: October 6, 1978.
Plots were evaluated by two individuals on October 20.
The results are an average of the ratings.

Percentage Leaf-drop	Chemicals	Rate per Acre
65 a [2/]	DEF-6 with Surfactant [1/]	1 pt.
65 a	DEF-6 with Surfactant	2 pts.
65 a	Sodium Chlorate and Paraquat with Surfactant	4 lbs. and 1/3 pt.
65 a	Sodium Chlorate and Accelerate with Surfactant	4 lbs. and 1 pt.
64 a	DEF-6 and Accelerate with Surfactant	2 pts. and 1/3 pt.
64 a	DEF-6 and Accelerate with Surfactant	2 pts. and 1 pt.
63 a	Tumbleleaf and Mor-Act [3/]	3 lbs.
63 a	Tumbleleaf and Mor-Act	5 lbs.
63 a	DEF-6 with Surfactant	3 pts.
63 a	Tumbleleaf and Mor-Act	4 lbs.
62 a	Sodium Chlorate with Surfactant	4 lbs.
62 a	Sodium Chlorate with Surfactant	5 lbs.
60 a	Sodium Chlorate with Surfactant	3 lbs.
39 b	Check	

1/ Surfactant rate X-77 at 0.25% v/v.

2/ Percentages followed by the same letter are not significantly different at the 5% probability level by the Student-Newman-Keul's Test.

3/ Mor-Act adjuvant at 2 pts. per acre.

Table 2. New Compounds. Application Date: October 6, 1978.
Plots were evaluated by two individuals on October 20.
The results are an average of the ratings.

Percentage Leaf-drop	Chemicals	Rate per Acre
75 a [1]	Bromoxynil and DEF-6 with Surfactant X-77 [2]	0.2 lb. + 2 pts.
73 a	Bromoxynil and DEF-6 with Surfactant X-77	0.1 lb. + 2 pts.
71 ab	DEF-6 with Surfactant X-77	2 pts.
70 ab	Nor-Am Dropp CP503	.2 lb. ai
68 ab	Bromoxynil with Surfactant X-77	.4 lb. + 0.5%
68 ab	DEF-6 and Paraquat with Surfactant X-77	2 pts. + 1/3 pt.
67 ab	Nor-Am Dropp CP503 with Sunoil 11E	.2 lb. + 1 qt.
66 ab	Nor-Am Dropp CP610	.2 lb.
65 ab	Nor-Am Dropp CP841	.2 lb.
64 ab	Nor-Am Dropp NA106	.2 lb.
63 ab	Upjohn CHI and DEF-6 with TD-12 Surfactant [3]	10g. + 34g. ai
63 ab	Bromoxynil with Surfactant O-H [4]	.4 lb.
58 b	Upjohn CHI + TD-12 Surfactant	60g.
44 c	Check	

[1] Percentages followed by the same letter are not significantly different at the 5% probability level by the Student-Newman-Keul's Test.

[2] Surfactant rate X-77 at 0.5% v/v.

[3] Surfactant rate TD-12 at 0.4% v/v.

[4] Surfactant rate O-H at 0.5% v/v.

1978 HARVEST-AID CHEMICAL RESEARCH AT YUMA

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Introduction

The cotton plants at the site of our 1978 experiments were considerably less responsive than in previous years to conventional harvest-aid chemicals and to the two other chemicals which appeared to be very effective in 1976 and 1977. Consequently, the conditions under which our 1978 experiments were conducted provided an excellent opportunity for progress in our search for improved cotton harvest-aid chemical treatments, with increased efficacy and reliability. Therefore, emphasis was placed on a continuation of the "biochemical approach" begun in 1976 and a further study of foliar spray adjuvants.

Summary of the Principles Involved in the "Biochemical Approach"

A healthy leaf remains attached to an actively growing plant indefinitely; it will not abscise unless it becomes unhealthy or senescent. In order to involve abscission, external factors must first induce senescence or injure leaf blades without adversely affecting the abscission zone. Desiccation results from injury to all plant parts contacted by the chemical or other external agents. Generally, the action of a desiccant is so rapid and the injury so severe that there is no opportunity for the physiological process of leaf abscission to take place.

Continued plant growth and development depends upon the biosynthesis of new plant material. The required additional organic compounds are synthesized from atmospheric carbon dioxide and products of catabolic processes, with the aid of reducing potential, mainly in the form of NADPH (reduced nicotinamide adenine dinucleotide phosphate) and biochemical energy, primarily resulting from the hydrolysis of ATP (adenosine-5'-triphosphate); all of which are obtainable via the essential processes