

# Cotton Defoliation Evaluations, 1995

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## *Abstract*

*A single field experiment was conducted near Coolidge, AZ in 1995 to evaluate the effectiveness of a number of defoliation treatments on Upland cotton (var. DPL 5415). All treatments consisted of materials commercially available in Arizona, and each showed promise in terms of overall effectiveness. Results do provide reinforcement for current defoliation guidelines for Arizona which recommend using low rates (relative to the label ranges) under warm weather conditions, and increasing rates as temperatures cool.*

## **Introduction**

Due to the rather indeterminate nature of the cotton (*Gossypium spp*) plant, crops are often still actively growing late in the growing season. As a result, many cotton growers have experienced difficulty in satisfactorily defoliating the crop in preparing for harvest. Ideally, growers would like to accomplish a complete and satisfactory defoliation with a single application of defoliant. Historically, it has often required two applications and sometimes even three or four applications to accomplish defoliation. This can be further complicated later in the fall and at higher elevations due cooler weather conditions, which serves to slow down physiological activity of the plant and the resultant activity of chemical defoliant on both Upland (*G. hirsutum* L.) and Pima (*G. barbadense* L.) fields.

Defoliation work in this program began in 1987, when a single field experiment was conducted in the Yuma Valley to compare several defoliation treatments on a field of Pima cotton (Silvertooth and Howell, 1988). That experiment was followed by a series of at least four similar experiments each year from 1988 (Silvertooth et al., 1989), 1989 (Silvertooth et al., 1990) and 1990 (Silvertooth et al., 1991) in an effort to expand locations, and treatment comparisons. Some treatment consistencies were identified from the 1987, 1988, and 1989 experiences, which were then used for the 1990, 1991, 1992, 1993, and 1994 experimental projects (Silvertooth et al., 1992; Silvertooth et al., 1993; Silvertooth et al., 1994; and Silvertooth and Norton, 1995). Nelson and his associates have also conducted a number of experiments concerning defoliation factors and refinement (Nelson and Hart, 1991a; Nelson and Hart, 1991b; and Nelson and Silvertooth, 1991). Common treatments resulting from this earlier work include Dropp + DEF and Dropp + Accelerate combinations, with increasing rates as temperature conditions cool. The 1995 experiments represent an extension of this general project in terms of evaluating some new combination treatments and attempting to refine recommendations and guidelines.

## Methods

A single field experiment was conducted near Coolidge, AZ in 1995 as outlined in Table 1. Treatments employed are listed in Table 5. All treatments were applied with ground rig application, with treatments being arranged in a randomized complete block design within a commercial production field. Plots were 18 rows wide and extended the full length of the irrigation run in each case.

After treatments were applied, visual estimates of percent defoliation, and the regrowth/topgrowth control ratings were made at approximately 14 days past the treatment date. Weather conditions following the defoliant treatment applications are described in terms of heat units (HU, 86/55 °F thresholds) accumulated during that 14 day period. Measurements and ratings were made at multiple locations within each plot. Regrowth ratings were made on a scale of 1 - 10, with a rating of 1 indicating excellent regrowth and topgrowth control and 10 indicating very poor control.

## Results

Defoliation and regrowth (topgrowth) ratings from Coolidge are presented in Table 2, where 219 HU were accumulated 14 days after defoliants were applied. All treatments performed very well in terms of overall defoliation ratings. One interesting feature associated with this test was that of slightly lower topgrowth control with the lowest Ginstar treatment.

## Summary

The information gained from this single study provides further evidence that Ginstar (a relatively new defoliation material) can serve as an adequate, single treatment approach to cotton defoliation. The most substantial difference among the treatments compared in these two studies was that of regrowth/topgrowth control.

## Acknowledgements

The authors would like to express their appreciation for the support and valuable cooperation provided by Prechel Farms.

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Table 1. Experimental conditions for Coolidge, AZ, cotton defoliation study, 1995.

Defoliant Application	10 October
HU*, 14 Days Post Defoliation	219
Elevation (approx.)	1,385 ft.
Method of Application	Ground
Carrier Rate (gpa)	14

\* HU = Heat Units, 86/55°F limits.

Table 2. Treatments used in Arizona cotton defoliation experiments, 1995.

Treatment	Rate		Defoliation	Topgrowth
	--lbs. a.i./acre--	--oz./acre--	- % -	
1. Ginstar	0.075 lb. a.i.	6.4	90	7
2. Ginstar	0.100 lb. a.i.	8.8	90	5
3. Ginstar	0.150 lb. a.i.	12.8	90	2
	---lbs./acre---	--pts./acre--		
4. Dropp + DEF*	0.1	0.5	88	4
5. Dropp + DEF*	0.2	1.0	80	4

\* Treatments included 1.0 pt. Agridex/acre.