

# CHEMICAL DEFOLIATION OF NEW COTTON VARIETIES

A. S. Godoy, A. L. Moreno and C. E. A. Garcia  
INIFAP-SAGAR, Mexico

## Abstract

The response of three new cotton varieties to Thidiazuron application was evaluated in a field research conducted during the 1995 cotton growing season at Matamoros, Coahuila, Mexico. The experimental design was a randomized complete block with split-split arrangement and four replications. Number of leaves, percent of open bolls after application, cotton yield, and fiber quality were evaluated. Leaf drop was superior with the Thidiazuron application at 125. Open bolls at 14 days after treatment was 81 and 72% in the treatments applied at 125 and 118 days after planting respectively. The cotton yield was not affected by application date of Thidiazuron. The fiber length was the fiber quality component affected in the new cotton varieties.

## Introduction

Earliness is one of the most important characteristic that Mexican cotton breeders are working on in their breeding programs. The main objective is to reduce costs and control insect-pest. Chemical defoliation helps to harvest on time, to maintain the fiber characteristics, and contributes in the integrated pest management. The contribution of chemical defoliation in the integrated pest management is that it reduces the food and reproduction sites of insects such as white fly, that are present at the end of the cotton growing season.

The plant condition prior to the application and environmental factors during and after application play an important role in the efficacy of a defoliant (Kerby et al., 1984). The complete defoliation of the cotton plant reduced boll growth and the early defoliation reduced yield and fiber quality, especially micronaire (Burch et al., 1989). There were significant differences in percent of defoliation between cotton cultivars with application of defoliant such as Dropp, Def, Prep as well as the mixtures among them (Guthrie, 1988). The application of Thidiazuron and Merphos in a early cotton variety, applied at about 5% open bolls, significantly affected the micronaire. However, the micronaire values were within the requirements of the textile industry (Hernandez and Perez, 1991).

The objective of this research was to evaluate the response of new cotton varieties to chemical defoliation.

## Materials and Methods

This field study was conducted at La Laguna Experimental Station, located at Matamoros, Coahuila, Mexico during the 1995 cotton growing season. Cotton varieties were planted at April 23. The distance between rows was 0.70 m and the distance between plants was 0.12 m.

The experimental design was a randomized complete block with four replications. Treatments were laid out in a split-split plot arrangement. Main plots were the three varieties Cian Precoz, Cian 95 and Laguna 89; subplots were the date of Thidiazuron application (118 and 125 days after planting) and small control plots without Thidiazuron application.

Number of open bolls and number of leaves per m<sup>2</sup> remaining on the plants after 7, 14 and 21 days after defoliant application were collected to evaluate the effect of the defoliant treatments. Seedcotton yield (kg/ha) was determined by harvesting two center rows of each plot. A 20-boll sample of seedcotton was hand picked prior to harvest and lint percentages and fiber properties were determined from these samples. Fiber analysis was done at the Laguna Experimental Station Cotton Fiber Testing laboratory and included span length in mm, fiber strength in pounds per square inch, and fiber fineness as micronaire index. The cultural practices used during the crop growing season were those normally recommended for cotton production in the Lagunera region.

## Results and Discussion

### Number of Leaves as Affected by Defoliant Treatments

The number of leaves per m<sup>2</sup> was not affected by the defoliant treatments during the 20 days after application (Table 1). The most effective defoliation was obtained applying the defoliant 125 days after planting. After 7 days of the defoliant application, the number of leaves remaining on the plants for the first application date was 33% more than obtained in the second application date. This difference was reduced to 18 and 23% by 14 and 21 days after the application. The Thidiazuron application reduced the leaf numbers on the plant for the three cotton cultivars. The greatest leaf abscission occurred 14 days after defoliant application.

### Percent of Open Bolls as Affected by Defoliant Treatments

The percent of open bolls before the first defoliant application date was 8, 5 and 5% for Cian Precoz, Cian 95 and Laguna 89, respectively. The Thidiazuron application at 125 days after planting was made at 41, 37 and 32% open bolls of Cian Precoz, Cian 95 and Laguna 89, respectively. The three cotton varieties had an increment in the percent of open bolls after 14 days defoliant application. In the last evaluation the percent of open bolls for the three cotton varieties ranged from 83 to 93%.

The defoliant application at 125 days after planting had the largest percent of open bolls at 21 days after defoliant application compared with the defoliant application made at 118 days after planting. Thidiazuron application had a significant increment compared with no defoliant application on the percent of open bolls at 14 days after defoliant application, which was reduced to 2% at the third sampling date, 21 days after defoliant application.

### **Seedcotton Yield and Fiber Quality as Affected by Defoliant Treatments**

Seedcotton yield was not affected by the defoliant treatments evaluated in this study (Table 3). The result indicates that when the Thidiazuron application was made the three cotton varieties had the sufficient bolls required to obtain the final seedcotton production. The defoliant application date did not affect the seedcotton yield. Significant differences in fiber length were detected among the cotton varieties. However, the fiber quality obtained for the three cotton varieties can be considered excellent (Table 3). The fiber quality parameters measured in the three cotton varieties was not affected by the defoliant application date.

### **Conclusions**

Under the specific conditions of this study we can conclude:

There was no difference in the number of leaves remaining in the plants after the Thidiazuron application among cotton cultivars.

The best defoliation was obtained applying Thidiazuron at 125 days after planting.

Seedcotton yield was not affected by the Thidiazuron application date.

Fiber quality of the three cotton cultivars was not affected by defoliation treatments.

### **Literature Cited**

Burch T. A., S. H Crawford, D. Rester, and E. P. Millahon 1989. Harvest Aids for Cotton in Louisiana. Louisiana Cooperative Extension Service. Louisiana State University Agricultural Center, U.S.A., Pub. 2291. 9 pp.

Guthrie, D.S., 1988. Cotton cultivar response to selected defoliation treatments. p. 69-70. In J.M.Brown (ed.) Proc. Beltwide Cotton Prod. Res. Conf., New Orleans, LA.

Hernandez J. A., and S. L. Perez, 1991. Effect of early defoliation on yield and fiber quality in cotton (*Gossypium hirsutum* L.). p. 525-527. In D.J.Herber (ed.) Proc. Beltwide Cotton Conferences, Nashville, TN.

Kerby T. A., S. Johnson, and H. Yamada. 1984. Efficacy of cotton defoliant. California Agriculture 38 (9):24-25.

Table 1. Effect of application date of Thidiazuron on number of leaves of three cotton varieties. 1995.

Treatment	Days after application		
	7	14	21
Leaves/m <sup>2</sup>			
<b><u>Variety</u></b>			
Cian Precoz	333	270	245
Cian 95	287	245	214
Laguna 89	339	256	206
<b><u>Defoliation date</u></b>			
118 dap <sup>1</sup>	382 a*	283 a	252 a
125 dap	256 b	231 b	192 b
<b><u>Defoliant</u></b>			
With Thidiazuron	165 b	112 b	102 b
Without	474 a	402 a	342 a
<b><u>Thidiazuron</u></b>			

\* Values followed by the same letter are not significantly different (Tukey, 0.05).

<sup>1</sup> Days after planting.

Table 2. Effect of Thidiazuron on the percent of open bolls of three new cotton varieties. 1995.

Treatment	Days after application		
	7	14	21
Percent			
<b><u>Variety</u></b>			
Cian Precoz	57 <sup>2</sup>	82	93
Cian 95	50	71	83
Laguna 89	50	78	87
<b><u>Defoliation date</u></b>			
118 dap <sup>1</sup>	37 b*	70 b	83 b
125 dap	67 a	84 a	92 a
<b><u>Defoliant</u></b>			
With Thidiazuron	49	72 b	86 b
Without Thidiazuron	55	81 a	88 a

\* Values followed by the same letter are not significantly different (Tukey, 0.05).

<sup>1</sup> Days after planting.

<sup>2</sup> Percent.

Table 3. Effect of Thidiazuron on the yield and fiber quality of three new cotton varieties. 1995.

Treatment	Yield kg/ha	Fiber Characteristic		
		Length (mm)	Strength	Micro
<b><u>Variety</u></b>				
Cian Precoz	4081	27.5 b	90.7	4.3
Cian 95	4362	29.7a*	92.3	4.0
Laguna 89	4114	28.7ab	93.8	4.2
<b><u>Defoliation date</u></b>				
118 dap <sup>1</sup>	4239	28.7	92.9	4.1b
125 dap	4033	28.5	91.7	4.3a
<b><u>Defoliant</u></b>				
With Thidiazuron	4149	28.7	91.9	4.1b
Without Thidiazuron	4223	28.6	92.7	4.2a

\* Values followed by the same letter are not significantly different (Tukey, 0.05).

<sup>1</sup> Days after planting.