

Defoliation of Pima Cotton at 3000 Feet Elevation Safford Agricultural Center, 1991

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Abstract

A preliminary study of several defoliant and/or combinations was made on the Safford Agricultural Center. Even though conditions were less than ideal because of cool temperatures, acceptable defoliation occurred under several of the treatments. In fact, three of the treatments performed better than sodium chlorate, which is the predominant defoliant used in the area.

Introduction

Over the past several years the Supima organization has made a push to improve the quality of Pima cotton to increase its value in the export market. One way to improve the quality is to eliminate some of the leafy trash by defoliating the cotton plant prior to harvest. A number of studies have been conducted across Arizona from elevations of 150 to 2000 feet above sea level (1), but none have been done to help the growers in the high desert areas in the state. At the higher elevations, the night time temperatures in late September and early October, when defoliations need to be done, will fall below 50°F which reduces the effectiveness of many of the chemical defoliants available. Silvertooth (1) also indicates that combinations of materials are many times more effective than a chemical alone. With these things in mind, an experiment was planned to test various chemicals and/or combinations to verify their effectiveness on Pima cotton at the 3000 foot elevation.

Materials and Methods

Pima S-6 cotton was planted on the 26th of April in a clay loam soil on the Safford Agricultural Center at an elevation of approximately 3000 feet above sea level. The crop was well maintained having a total of 124 pounds of nitrogen fertilizer applied during the season and the soil moisture level was maintained below 50% depletion using the AZSCHED irrigation scheduling software. The last irrigation was applied on the 12th of September. The plants were tall and vigorous so as to be a challenge for the defoliants. Eight treatments were applied including sodium chlorate, the most commonly used defoliant in the Safford area and an untreated check. The experiment utilized small plots with a randomized complete block design. The treatments were applied on October 17th and observations were made on the October 28th.

Results and Discussion

Figure 1 shows the maximum and minimum temperatures and heat units during the two week period following the application of the defoliant treatments. Only one day had a minimum above 50°F and the heat unit accumulation was 135, considerably short of the 200 heat units that would be considered cool by low desert standards. One can also see on figure 1 that a hard freeze occurred on the morning of the 29th, the day after the observations were made. In spite of these cool temperatures, many of the defoliants did a good job of

dropping leaves. Table 1 shows the percent leaf drop and also the percent of leaves that were "frozen" on the plants. Dropp, Def and Sylgard combinations and one of the Dropp + Sylgard treatments dropped more than 80% of the leaves. Only two of the treatments desiccated the leaves so quickly that the leaves were frozen on the plants. It looks like some of the treatments might be superior to the chlorate standard used in the Safford valley. It must be noted that the coefficient of variabilities are very high. This is due, in part, to the small means in some of the samples, but also due to the variability between samples. Thus, the results of this study must be considered as preliminary findings. A follow-up study is planned.

Acknowledgements

Appreciation is expressed to Nor-Am and MoBay Chemical Companies for their financial support to adapt the sprayer for small plot work and for providing the chemicals for the study.

References

1. Silvertooth, Jeffrey C. 1991. Defoliation of Pima Cotton. Extension Report. The University of Arizona, Tucson, AZ.

Table 1. Percent of leaves dropped and frozen on the plants by defoliation treatment, Safford Agricultural Center, 1991.

Treatment	Percentages	
	Leaves dropped	Leaves frozen on
DROPP + DEF + Sylgard 309 (0.15 + 0.75 + 0.5%)	85.0 a	5.0 b
DROPP + Sylgard (0.15 + 1%)	82.0 a	0.0 b
DROPP + DEF + Sylgard 309 (0.15 + 0.75 + 1.0%)	81.3 a	20.0 a
Sodium Chlorate (3 gal/ac)	66.8 a	5.0 b
DROPP + Sylgard (0.15 + 0.5%)	62.5 a	15.0 a
DROPP + DEF + Oil (0.15 + 0.750 + 1 pint)	62.5 a	0.0 b
DROPP + Oil (0.15 + 1 pint)	7.5 b	0.0 b
Untreated Check	2.5 b	0.0 b
Average	56.3	5.6
LSD(05)	21.9	5.4
C.V.(%)	61.3	142.3

Values within a column that are followed by the same letter are considered to be not significantly different at the 5% level of probability, using Duncan's Multiple Range test.

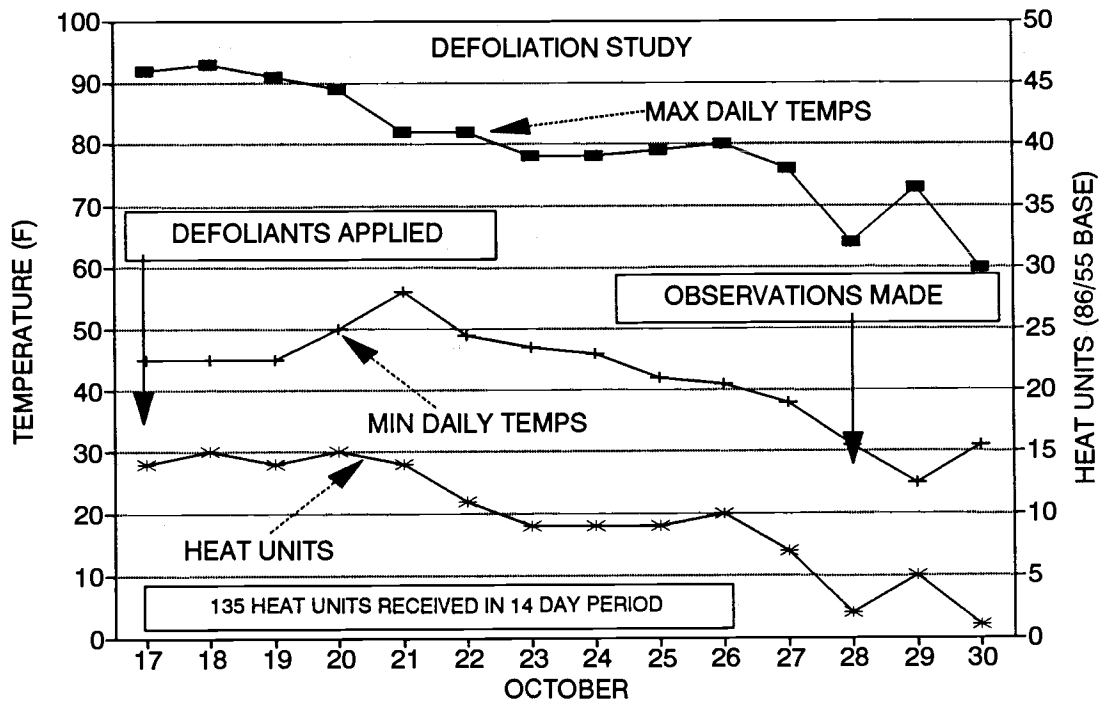


Figure 1. Maximum and minimum daily temperatures and heat units (86/55 degree base) for the two week period following the application of defoliants, Safford Agricultural Center, 1991.