RESPONSE OF COTTON TO DROPP[7] ULTRA IN YAQUI VALLEY SONORA, MÉXICO.

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Abstract

Five doses (50, 100, 200, 300, and 375 cc/ha) of DROPP[7] ULTRA, FINISH[7] + DROPP[7] ULTRA (2 l/ha + 50 and 300 cc/ha), were applied at two defoliation dates (at 40 and 80% of open bolls) in DELTAPINE 5415. These treatments were compared with the regional check DROPP[7] (150 g per ha), DEF[7] (2 lt/ha) and a treatment without defoliation. This experiment was carried out in Yaqui Valley Experiment Station in 1998. The defoliation treatments were analyzed under an experimental design of randomized blocks with three replications. Higher defoliation percentages were achieved in treatments of 200 cc/ha or higher of DROPP[(R)] ULTRA and regular ones with DEF[7]. DROPP[7] ULTRA and FINISH[7] combination did not seem to improve defoliation. No significant yield difference between defoliation treatments was observed, also, there is no negative effect of defoliation on yield components and fiber quality.

Introduction

Cotton defoliation is a common and necessary practice to facilitate and to obtain a cleaner, dryer, and timely harvest. In Southern Sonora region, where fiber recollection unfortunately coincides with the rainy season, this labor acquires utmost importance: DROPP[7] (Thidiazuron) and DEF[7] (Butifos) are the defoliant products most widely used in this region. However, the appearance of the new Silverleaf Whitefly specie *Bemisia argentifolii* BELLOWS & PERRING, has prompted to consider the early application of defoliants as a medium to reduce feeding sites and by this practice affect the pest population. This objective of this experiment is to determine the effects of products and doses in early defoliation over yield and quality in cotton.

Materials and Methods

The present evaluation consisted of two experiments: the first one, defoliants where applied at 40 % of open bolls and the second one at 80% of open bolls. These were established in Yaqui Valley Experiment Station, DELTAPINE 5415 was the variety where treatments were applied. Treatments for both dates are presented in Table 1.

In both experiments an experimental random block design was used with three replications; the experimental plots consisted of three rows of 10 m in length, separated at 100 cm, yield was estimated on 10 m^2 plots.

Defoliant application was done with a motorized backpack sprayer with constant pressure on July 25th and August 8th (155 and 169 days after planting), at 8:00 AM, with calm winds. Observed temperatures during treatment applications were 23E - 261 C, with a relative humidity of 90% in average. To estimate defoliant product efficiency, a visual evaluation was done on defoliation percentage seven days after defoliant application; because this estimation is subjective (discontinuous distribution) it was not subject to analysis of variance.

Harvest of both experiments was done in a single pick on August 12th; in both cases, 10 boll samples were taken to estimate open boll characteristics and lint yield estimation. In addition to lint and seed cotton yield, parameters were estimated for the following variables: open boll, fiber percentage, length, micronaire index, and fiber strength. The hypothesis of non significant differences was tested at 0.05 and 0.01 probability level; least significant difference (L. S. D.) were calculated at the 0.05 level was calculated when the analysis indicated it.

Results and Discussion

Defoliation percentage

Visual observation of foliage defoliation efficiency indicate excellent values, of 70 to 80%, when defoliants were applied at 40% open bolls (Table 2). They are excellent, if humidity of soil is taken into consideration, because soil content was high at the time of application, because the last irrigation was done 6 days prior to the application. The check plots did not have natural defoliation. The best defoliation percentage (80%) was obtained with DROPP[7] ULTRA at 300 cc/ha. Defoliant application accelerated boll opening but only with DROPP[7] ULTRA at 100 cc/ha treatment. Furthermore, FINISH[7] application seemed not to have any positive effect in this characteristic. At the second application date, at 80% open bolls, better defoliation percentages were obtained, because the plant was less turgid since the soil was dry. The best defoliation percentages were observed in the same doses as in the 40% application. In the other doses, the results were regular. Worth mentioning is that in treated parcels at 40% open bolls, presented a slight re-growth, due to rains before harvest, that delayed harvest a week.

Statistical analysis of continuos variables, indicated that there was no significant statistical differences among treatments, excluding fiber resistance in the first date.

Yield

Yield level was as expected for a February planting, ranging from 1,600 to 2,100 kg/ha of cotton lint (Table 3). As previously mentioned we did not detect significant

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differences among treatments for lint and seed cotton yield in each defoliation dates. Lint yield (kg per ha), fluctuated from 1,472, for DROPP[7] ULTRA 750 cc/ha, to 1,317 for DROPP[7] ULTRA 250 cc/ha. Yield of check plots (without defoliation) was intermediate to the mentioned values.

Yield Components

Concerning fiber percentage, boll weight and seed index, no important changes were observed independently of product or applied dose (Table 3).

Fiber Quality

Significant differences were observed (Table 4) only for fiber resistance, when cotton was defoliated at 40% open bolls, but results don=t show marked tendencies, to reduction or increase of that characteristic, due to the application of DROPP[7] ULTRA, DROPP[7], or DEF[7].

Summary

Effective defoliation is achieved in most DROPP[7] ULTRA doses. No significant differences were detected for yield, its components and fiber quality characteristics, when cotton was defoliated at 40% open bolls, with the exception of fiber resistance. FINISH[7] has no promoter effect in defoliation.

Table 1. Defoliation treatment Matrix. CEVY B CIRNO BINIFAP, 1998.

Treatment	Product B Dose
1	Check without application
2	DROPP[7] ULTRA 50 cc/ha
3	DROPP[7] ULTRA 50 cc/ha + FINISH[7] 2 l/ha
4	DROPP[7] ULTRA 100cc/ha
5	DROPP[7] ULTRA 200 cc/ha
6	DROPP[7] ULTRA 300 cc/ha
7	DROPP[7] ULTRA 375 cc/ha
8	DROPP[7] ULTRA 300 cc/ha + FINISH[7] 2 l/ha
9	DEF[7] 2 l/ha
10	DROPP[7] 150 gr/ha

Table 2. Open Boll percentage increase in defoliation as a function of season, product, and dose, seven days after cotton defoliation, Cv DELTAPINE 5415. CEVY B CIRNO B INIFAP, 1998.

Treatment	Dose	% Increase [(1)]
DROPP[7] ULTRA	50 cc/ha	31
DROPP[7] ULTRA + FINISH[7]	50 cc/ha +2 l/ha	38
DROPP[7] ULTRA	100 cc/ha	83
DROPP[7] ULTRA	200 cc/ha	50
DROPP[7] ULTRA	300 cc/ha	52
DROPP[7] ULTRA	375 cc/ha	43
DROPP[7] ULTRA + FINISH[7]	300 cc/ha + 2 l/ha	58
DEF[7]	2 l/ha	54
DROPP[7]	150 gr/ha	56

[(1)] Check without application 38%

Table 3. Cotton response to timing of defoliant application. CEVY - CIRNO B INIFAP, 1998.

Timing of application	Yield, kg/ha		Boll Characteristics		
	Lint	Seed Cotton	Lint %	Boll weight	Seed index
40%	1,866	4,226	44.0	5.0	8.3
80%	1,831	4,157	43.9	5.0	8.4

Table 4. Fiber strength response to defoliant application at 40% open bolls. CEVY - CIRNO B INIFAP, 1998.

Treatment	Dose	Fiber strength
Check		86,000
DROPP[(R)] ULTRA	50 cc/ha	90,000
DROPP[(R)] ULTRA + FINISH[(R)]	50 cc/ha +2 l/ha	90,000
DROPP[(R)] ULTRA	100cc/ha	83,000
DROPP[(R)] ULTRA	200 cc/ha	83,333
DROPP[(R)] ULTRA	300 cc/ha	84,667
DROPP[(R)] ULTRA	375 cc/ha	84,000
DROPP[(R)] ULTRA + FINISH[(R)]	300 cc/ha + 2 l/ha	84,000
DEF[(R)]	2 l/ha	84,333
DROPP[(R)]	150 gr/ha	78,333
D. M. S. (0.05)		7,535