RESPONSE OF NuCotn 33^B TO EARLY DEFOLIATION IN THE YAQUI VALLEY, SONORA, MÉXICO.

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Abstract

The Silverleaf Whitefly has become one of the major pests in Northwest México. Among other practices, early defoliation has been proposed to diminish population by reducing feeding sites, but untimely defoliation can reduce yield potential and affect yield components and fiber quality.

Introduction

Cotton production in the Yaqui Valley, as well as in many other producing areas in the world, has changed significantly since the appearence of the new species of the Silverleaf Whitefly (SLWF, *Bemisia argentifolii*). In the Yaqui Valley infestation occurs early in the vegetative stage, exploding at the end of the blooming period; due to its infestation, agricultural practices had to be modified, adjusting some, and devising new ones to cope with the problem.

Cotton defoliation in Mexico is practiced as an aid at harvest time. On the other hand, Mexican cotton farmers in the Yaqui Valley of Sonora face adverse weather conditions in one out of every five years at harvest time. This stage coincides with the onset of the monsoon season. Adverse weather reduces production and affects fiber quality. To avoid or reduce the risk of losses caused by boll rot during the rainy season many of the farmers, some get so scared and defoliate prematurely, when the cotton plant is not in its prime for this practice.

Since the advent of *B. argentifolii*, premature defoliation has been considered as an strategy to reduce feeding sites for SLWF, especially when boll opening coincides with the population peak of SLWF, as part of an integrated pest management strategy.

Most of the information on defoliation deals with the performance of defoliants DROPP and Def under normal conditions for application (1, 2, and 4). Very little is known about DROPP and its effect when applied prematurely on transgenic cultivars under the Yaqui Valley conditions in México.

The objective of this study was to evaluate the response of cotton under premature defoliation in southeast Sonora, when this practice is used to reduce feeding sites for SLWF and to avoid honeydew and stickiness formation.

Materials and Methods

The trial was conducted at the Yaqui Valley Experiment Station, located in southeast Sonora, México. Cv. NuCotn 33^B was established in a late planting in March 5, 1995. The experimental design was a randomized block with three replications. Experimental plots were 10 m long, three rows wide, 1 m apart.

Three doses of DROPP (25, 50, and 75 gr/ha) were assessed at two stages of plant maturity (28 and 70% open bolls) and were compared with two treatments: a commercial check treatment (150 gr/ha, at 70% boll opening) and an absolute check that involved no defoliation.

Temperature at time of application (8:30 AM) was 24°C, relative humidity was 90%, and the average temperature from day of first application to total harvest was 35°C.

The variables that were measured were lint yield, yield components and fiber quality (length in inches, strength in pounds per square inch, and micronaire index).

Results

In regard to leaf shedding, acceptable degree of defoliation was observed, better than 90% (Table 1) when the dose of DROPP was 75 gr/ha or better. Regrowth after 21 days was observed due to a slight precipitation, although honeydew and stickiness was scarce, because SLWF population was much lower in comparison to 1996 and 1995.

Date of Application Effects

Yield. There was a 7.7% reduction on lint yield in NuCotn 33^B (Table 2), observed when Defoliants were applied when 28% of the bolls were open, in comparison with the treatment at 70%. These results are in agreement with those reported by Hernández and Pérez (1991) on a conventional variety, however in that test, the yield reduction was higher and statistically significant. On the other hand, when defoliants were applied at 70% boll opening, there was a slight yield increase over the absolute check but the increase was also not significant.

Yield components. Lint percent, boll size, and seed index were slightly higher in the plots that were defoliated at 28% open bolls, in comparison with the two checks and those

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defoliated at 70% (Tables 3, 4, and 5), but all the comparison are statistically not significant.

Fiber quality. Early defoliation showed only significant effects on micronaire index (Table 8). Early defoliation produced in general higher micronaire indexes, similar as those observed in the absolute check, and higher than those observed in the other treatments.

Dose Effect

Yield. The three doses of 25, 50, and 75 gr/ha of DROPP caused a non-significant reduction in lint yield in comparison to the dose of 150 gr/ha of DROPP in the commercial check (Table 2), the larger reduction was observed in the 25 gr/ha dose.

Yield Components. Very small and non-significant differences were observed due to dose effects (Tables 3-5).

Fiber Quality. Among the three main components (Tables 6-8), only fiber length was slightly affected (Table 6), but the differences were not significant and in any event this effect will not cause problems of acceptance by the textile industry.

Date x Dose Interaction

No significant interactions were detected.

Summary

Early defoliation when used to reduce feeding sites of SLWF, caused a non significant reduction in lint yield in NuCotn 33^{B}. Defoliation with DROPP in doses of 75 gr/ha had similar efficacy than the commercial dose of 150 gr/ha. Boll size, seed index, seed index, and micronaire index showed a trend to higher values as a result of early defoliation.

References

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Table 1. Percent of defoliation as a function of time and dose. Yaqui Valley, Son., México. INIFAP. 1997.

Dropp,	Open bolls percentage			Absolute
gr/ha	30	75	Check 75	check
25	55	55		
50	76	70		
75	92	90		
150			90	
0				5

Table 2. Response of cotton yield to dose and time of defoliation, Cv. NuCotn 33^{B}. Yaqui Valley, Son., México. INIFAP. 1997.

Dropp,	Open bolls percentage			Absolute
gr/ha	30	75	Check 75	check
25	1,395	1,422		
50	1,492	1,543		
75	1,370	1,623		
150		1,544		
0				1,509

Table 3. Response of lint percent to dose and time of defoliation, Cv. NuCotn 33^{B}. Yaqui Valley, Son., México. INIFAP. 1997.

Dropp,	Open bolls percentage			Absolute
gr/ha	30	75	Check 75	check
25	39.1	39.3		
50	39.4	39.5		
75	39.9	39.4		
150			38.3	
0				38.6

Table 4. Response of boll size to dose and time of defoliation, Cv. NuCotn 33^{B}. Yaqui Valley, Son., México. INIFAP. 1997.

Dropp,	Open bolls percentage			Absolute
gr/ha	30	75	Check 75	check
25	5.5	5.2		
50	5.2	5.2		
75	5.4	5.0		
150			5.5	
0				5.7

Table 5. Response of seed index to dose and time of defoliation, Cv. NuCotn 33^{B}. Yaqui Valley, Son., México. INIFAP. 1997.

Dropp,	Open bolls percentage			Absolute
gr/ha	30	75	Check 75	check
25	10.1	8.2		
50	9.3	8.9		
75	8.7	8.9		
150			9.4	
0				9.0

Table 6. Response of fiber lenght to dose and time of defoliation, Cv. NuCotn 33^{B}. Yaqui Valley, Son., México. INIFAP. 1997.

Dropp,	Open bolls percentage			Absolute
gr/ha	30	75	Check 75	Check
25	34	35		
50	34	35		
75	33	34		
150			36	
0				34

Table 7. Response of fiber strength to dose and time of defoliation, Cv. NuCotn 33B. Yaqui Valley, Sonora, México. INIFAP. 1997.

Dropp, gr/ha	Open bolls percentage 30	75	Check 75	Absolute Check
25	92,000	87,000		
50	79,333	80,000		
75	80,667	86,000		
150			82,667	
0				84,667

Table 8. Response of micronaire index to dose and time of defoliation, Cv. NuCotn 33B. Yaqui Valley, Sonora, México. INIFAP. 1997.

Dropp, gr/ha	Open bolls percentage 30	75	Check 75	Absolute Check
25	5.2	5.0		
50	5.4	5.0		
75	5.1	5.0		
150			4.8	
0				5.3

L. S. D. = 0.3 at the 0.05 level.