RESPONSE OF COTTON TO EARLY DEFOLIATION IN THE YAQUI VALLEY, MÉXICO.

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Abstract

Six treatments of Ginstar (Thidiazuron + Diuron) and one of Dropp (Thidiazuron) were evaluated at two maturity stages (15 y 70% boll opening) in 1995, on cotton Cv. DELTAPINE 5415, to evaluate its effect as an aid to reduce feeding sites for whitefly, especially when boll opening coincides with the peak of whitefly (*Bemisia argentifolii).* The experiment was conducted in the Yaqui Valley Experiment Station in the state of Sonora, Mexico. Early defoliation (when only 15% of bolls are open) reduced yield, and most yield and fiber quality components, but the difference was not significant. Defoliation with Ginstar in doses of 150 cc/ha or Dropp at 15 gr/ha, did not affect lint and seedcotton yield in DELTAPINE 5415. Doses of Ginstar of 250 cc/ha or larger, reduced lint yield and seedcotton at first pick, but the difference was not significant. Defoliation with 150 cc of Ginstar at 70% of boll opening, induced a higher seedcotton yield at first pick, and slight increase in fiber strength, in comparison with the check, but again the differences were not significant. No clear trend was observed in regard to boll size, seed index, and micronaire index as a result of early defoliation and higher doses in either defoliant product.

Introduction

It is not an exaggeration to say that cotton production in the Yaqui Valley, as well as in many other producing areas in the world, can be defined as before and after the appearence of the new species of whitefly (*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, fine tuning some, and devising new ones to cope with the problem.

Cotton defoliation in Mexico is practiced as in most places 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 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 are forced to defoliate prematurely, when the cotton plant is not at the optimum stage for this practice.

Since the advent of *B. argentifolii*, premature defoliation has been considered to reduce feeding sites for whitefly, especially when boll opening coincides with the peak of whitefly, 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 (1,2,3,4). Very little is known about Ginstar and its effect when applied prematurely under the Yaqui Valley conditions in México.

The objective of this study is to evaluate the effect of Ginstar in comparison with Dropp on yield and fiber quality in cotton variety under premature application in southeast Sonora, to reduce feeding sites for whitefly, and to avoid honeydew and stickiness formation.

Materials and Methods

The trial was conducted at the Yaqui Valley Experiment Station, located in the state of Sonora, Mexico. Cv. DELTAPINE 5415 was established in a late planting in february 25, 1995. Ginstar was evaluated in a split plot design, with three replications. Experimental plots were 12 m long, four rows wide, 1 m apart. Five doses of Ginstar and one of Dropp were assessed at to two stages of plant maturity (15 and 70% open bolls) and were compared with a check that involved no defoliation. Temperature at time of application (5:30 AM) was 22°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, seedcotton at first pick, yield components and fiber quality (length in inches, strength in pounds per square inch, and micronaire index).

Results and Discussion

No significant differences were detected between application dates and among treatments (Tables 1-6). Environmental conditions were very dry, especially in regard to rainfall, and with high temperatures. In regard to leaf shedding, acceptable degree of defoliation was observed (better than 80%) for the two products that were evaluated, and regrowth after 21 days was practically null in part due to scarce precipitation. Likewise, honeydew and stickiness was scarce.

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Date of Application Effects

Yield. There was a 22.6% reduction in lint yield (Table 1), observed when Defoliants were applied when 15% 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 the other hand, when defoliants were applied at 70% boll opening, there was a 8% yield increase over the check but the increase was also not significant.

Earliness. This variable measured as yield at first pick showed that defoliation at 70% open bolls gave a higher yield than the check and the 15% open boll treatment although the difference was not significant (Table 1).

Yield components. Lint percent and boll size was slightly higher in the plots that were defoliated at 15% open bolls in comparison with the check and those at 70% (Table 2), but all the comparison are statistically not significant.

Fiber quality. Early defoliation showed no significant effect on fiber length, micronaire index, and fiber strength (Table 3) as compared with the check plots and defoliation at 70% boll opening, as reported by Hernández and Pérez (1991).

Dose Effect

Yield. Application of 150 cc/ha of Ginstar produced similar effects than 15 gr/ha of Dropp (Table 4), and as the dose of Ginstar was increased over 150 cc/ha, a not significant reduction was observed in lint yield; similar results were observed in seedcotton yield, due to the high correlation that normally exists between this two variables.

Earliness. There was a variation in yields at first pick as a result of Ginstar dose increase (Table 4). The smaller doses of Ginstar and Dropp had similar levels of production, resembling the one observed in the check, and larger than those observed at higher rates of Ginstar, but the differences were not significant.

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

Fiber Quality. Among the three main components, only fiber length was slightly affected by the dose effect (Table 6). The response was similar to the one observed in regard to earliness, i. e. the smallest dose of Ginstar and 15 gr/ha of Dropp produced stronger fibers than the larger dose, 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 among the variables measured.

Conclusions

Defoliation with Ginstar in doses of 150 cc/ha, to reduce feeding sites of whitefly, did not affect lint and seedcotton yield in DELTAPINE 5415.

Defoliation with Ginstar in doses larger than 150 cc/ha caused a non significant reductions in lint as well as seedcotton yield.

Defoliation at 15% open bolls, caused a non significant reductions in lint as well as seedcotton yield.

Defoliation at 70% of boll opening, induced a higher seedcotton yield at first pick and slight increase in fiber strength.

Boll size, seed index, and micronaire index showed a trend to lower values as a result of early defoliation and higher doses in either defoliant product tested.

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Table 1. Response of cotton yield to time of defoliation, Cv. DELTAPINE 5415. Yaqui Valley, SON., MEXICO. INIFAP. 1995

	Yield, kg/ha		
% of open bolls	Lint	Seedcotton	At 1st. pick
70	1,303	3,067	2,583
15	1,062	2,467	2,114
check	1,206	2,843	2,510
D.M.S.	n.s.	n.s	n.s
C.V.	17.8	16.8	19.9

Table 2. Response of cotton yield components to time of defoliation, Cv. DELTAPINE 5415. Yaqui Valley, SON., MEXICO. INIFAP. 1995

	Yield components		
% of open bolls	Lint %	Boll weight	Seed index
70	42.5	4.8	9.6
15	43.0	4.9	9.6
check	42.4	4.9	9.7
D.M.S.	n.s.	n.s	n.s
C.V.	2.1	8.0	11.7

Table 3. Response of cotton fiber quality to time of defoliation, Cv. DELTAPINE 5415. Yaqui Valley, SON., MEXICO. INIFAP. 1995

	Quality components		
% of open bolls	Length, inches	Micronaire index	Strength (Pressley)
70	1 1/16	5.5	88,700
15	1 1/16	5.4	88,500
check	1 1/16	5.2	88,000
D.M.S.	n.s.	n.s	n.s
C.V.	11.7	3.1	4.9

Table 4. Response of cotton yield to defoliation, Cv. DELTAPINE 5415. Yaqui Valley, SON., MEXICO. INIFAP. 1995

defoliant	Yield, kg/ha		
and dose	Lint	Seedcotton	At 1st. pick
Ginstar 150	1,306	3,018	2,593
Dropp 15	1,259	2,885	2,505
Check	1,206	2,843	2,510
Ginstar 500	1,178	2,798	2,298
Ginstar 350	1,140	2,665	2,193
Ginstar 450	1,113	2,658	2,230
Ginstar 250	1,098	2,578	2,273
D.M.S.	n.s.	n.s	n.s
C.V.	17.8	16.8	19.9

Table 5. Response of cotton yield components to defoliation, Cv. DELTAPINE 5415. Yaqui Valley, SON., MEXICO. INIFAP. 1995

defoliant	Yield components		
and dose	Lint %	Boll weight	Seed index
Ginstar 150	43.3	4.3	9.0
Dropp 15	43.6	5.0	9.6
Check	42.4	4.9	9.7
Ginstar 500	42.1	4.8	9.7
Ginstar 350	42.8	4.9	9.8
Ginstar 450	41.8	5.0	10.0
Ginstar 250	42.5	5.1	9.7
D.M.S.	n.s.	n.s	n.s.
C.V.	2.1	8.0	11.7

Table 6. Response of fiber quality of cotton to defoliation, Cv. DELTAPINE 5415. Yaqui Valley, SON., MEXICO. INIFAP. 1995

	Quality components		
defoliant and dose	Length, inches	Micronaire index	Strength (Pressley)
Ginstar 150	1 1/16	5.2	92
Dropp 15	1 1/16	5.7	90
Check	1 1/16	5.2	88
Ginstar 500	1 1/16	5.4	84
Ginstar 350	1 1/16	5.3	89
Ginstar 450	1 1/16	5.5	92
Ginstar 250	1 1/16	5.5	83
D.M.S.	n.s.	n.s.	n.s.
C.V.	11.7	3.1	4.9