LATE SEASON CONTROL OF LEPIDOPTERA AND ITS IMPACT ON THE ACTIVITY OF DEFOLIANTS

Raymond Miller, Carlos A. Blanco and Kris Havelka
Rohm and Haas Company
The Americas Region
Waller, TX
and Havelka Farms
Robstown, TX

Abstract

Chemical defoliation efficiency, as measured by leaf drop and boll opening, was not decreased by late season defoliation by neither Soybean looper (*Pseudoplusia includens*) nor by simulated foliage feeder damage. In fact in each test at least one treatment showed the opposite trend based on at least one parameter.

Introduction

Late season lepidoptera defoliation can occur so late that yield is not affected. In summary, results indicate that neither defoliation nor fruit damage caused by late season beet armyworm infestation levels as high as 16.7 times the current threshold 6 hits per 91.5 meters of row significantly affected cotton yields in these studies (Mascarenhas et al., 1999). These insects occasionally feed on squares and small bolls late in the growing season, but this injury typically has not resulted in economic yield losses, because fruiting forms that are produced late in the growing season generally do not significantly contribute to yield (Jenkins et al. 1990). While yield may not be effected by late season defoliation, several growers and consultants had speculated that such late season defoliation could adversely affect the efficiency of chemical defoliation, thereby either increasing defoliation cost or increasing pin trash. Micronaire a measure of fiber fineness and maturity, was reduced by early defoliation which could be detrimental to fiber quality evaluations (Snipes and Baskin 1994). The effect of such defoliation on subsequent chemical defoliation efficiency is not well understood.

Methods

The first study was initiated following a large plot study ($\geq$ 1.0 acres) conducted in 1999 for soybean looper (*Pseudoplusia includens)* control with Intrepid® in Donna, Texas using a single block per treatment. Twelve evaluations on randomly chosen plants in the Intrepid® block with 18% defoliation and in the untreated block with 38% defoliation were made prior to and 3 days after the application of Dropp® at 0.15 lb/A, Def® at 12 oz/A, Gramoxone® at 6 oz/A by commercial ground equipment at a total spray volume of 10 gallons per acre. Data presented here are an average number of leaves per plant 3 days after treatment, to show the effectiveness of the defoliant on each treatment.

The College Station and Waller studies were conducted using simulated defoliation prior to the chemical defoliant applications. The simulated defoliation was achieved by tearing each leaf in half on 5 plants per plot. There were 4 replications per treatment. The defoliant treatments were applied with a CO^2 backpack sprayer in a total spray volume of 12 gallons per acre with 45 psi of pressure.

The College Station and Waller studies included the following treatments: Dropp® at 0.2 lb/A, Dropp® at 0.1 lb/A + Def® at 8 oz/A, and Gramoxome® at 8 oz/A. The Waller study also included a fourth treatment of Dropp® at 0.1 lb/A + Prep® at 0.33 pt/A + Def® at 8 oz/A. The data was collected 5 days after treatment and includes the number of leaves per 5 plants and the number of unopened bolls per 5 plants.

Results and Discussion

As illustrated in Table 1, the late season defoliation in the untreated plot did not decrease chemical defoliation efficiency but instead increased it as measured by number of leaves per plant.

In the College Station test (Table 2), there were no significant differences between any of the treatment except for the untreated which had significantly more leaves per 5 plants and the Gramoxone® with simulated defoliation had significantly fewer unopened bolls than the other Gramoxone® treatment.

In the Waller test (Table 3), a significant difference was observed in the number of leaves per 5 plants on the untreated plots, having more leaves than all other treatments. The Dropp® + Prep® + Def® on the simulated defoliation had significantly less leaves than all other treatments.

Our conclusion would be that late season defoliation does not decrease chemical defoliant efficiency at least with defoliation levels of 50% or less. Future studies should evaluate higher defoliation levels and fiber quality characteristics such as staple length, micronaire and overall grade.

References

Jenkins, J. N., J. C. McCarty, Jr., and W. L. Parrot. 1990. Effectiveness of fruiting sites in cotton: yield. Crop Sci. 30: 365-369.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:1184-1185 (2000)
National Cotton Council, Memphis TN

Mascarenhas, V. J., D. Cook, B. R. Leonard, E. Burris, and J. B. Graves. 1999. Late season beet armyworm (Lepidoptera: Noctuidae) infestations on cotton: defoliation, fruit damage, and yield loss. Florida Entomologist. 82(2).

Snipes, S. E., and C. C. Baskin. 1994. Influence of early defoliation on cotton yield, seed quality, and fiber properties. Field Crops Research 37:137-143.

Table 1. The efficiency of chemical defoliation in Donna, Texas.

Treatment and rate[1]	%Defoliation by Leps.	Average number of leaves per plant
Intrepid® @ 0.1	18	2.50a
Untreated	38	2.08b

[1] Pounds of active ingredient per acre

[2] Means followed by a common letter in columns do not significantly differ (alpha=.05).

Table 2. The effect of 50% simulated defoliation on various chemical defoliants in College Station, Texas.

Treatment and rate per acre	Leaves per 5 plants 5 DAT[1]	Unopened bolls per 5 plants 5 DAT[1]
Dropp® @ 0.2 lb[2]	4.23 b	0.55 ab
Dropp® @ 0.2 lb[3]	2.97 b	0.30 ab
Dropp® @ 0.2 lb + Def® @ 8.0 oz[2]	7.05 b	0.65 a
Dropp® @ 0.2 lb + Def® @ 8.0 oz[3]	3.80 b	0.23 ab
Gramoxone® @ 8.0 oz [2]	19.05 b	0.60 a
Gramoxone® @ 8.0 oz[3]	13.95 b	0.08 b
Untreated[2]	54.83 a	0.38 ab

[1]Means followed by a common letter in columns do not significantly differ (alpha=.05)

[2]Treatment with naturally occurring defoliation (5%).

[3]Treatment with 50% induced defoliation.

Table 3. The effect of 50% simulated defoliation on various chemical defoliants in Waller, Texas.

Treatment and rate per acre	Leaves per 5 plants 5 DAT[1]	Unopened bolls per 5 plants 5 DAT[1]
Dropp® @ 0.2 lb[2]	17.10 b	2.8 ab
Dropp® @ 0.2 lb[3]	7.90 bc	2.0 b
Dropp® @ 0.2 lb + Def® @ 8.0 oz[2]15.85 bc	4.8 ab	
Dropp® @ 0.2 lb + Def® @ 8.0 oz[3]	7.45 bc	2.8 ab
Gramoxone® @ 8.0 oz [2]	15.60 bc	2.3 b
Gramoxone® @ 8.0 oz[3]	8.45 bc	2.3 b
Dropp® @ 0.2 lb + Prep® @ 0.33 pt + Def® @ 8.0 oz[2]	13.13 bc	6.0 a
Dropp® @ 0.2 lb + Prep® @ 0.33 pt + Def® @ 8.0 oz[3]	7.45 c	4.0 ab
Untreated[2]	58.65 a	2.5 ab

[1]Means followed by a common letter in columns do not significantly differ (alpha=.05)

[2]Treatment with naturally occurring defoliation (5%).

[3]Treatment with 50% induced defoliation.