

PREP and DROPP for Controlling Pink Bollworms in 1986 Tests

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INTRODUCTION

Tests were conducted to continue tests of chemicals as a means to terminate the fruiting of the cotton plant. This technique has been shown to eliminate or reduce the number of green bolls on the plants at harvest. The numbers of diapause pink bollworm, (Saunders), larvae are thus reduced. When these materials have been properly applied and timed correctly, there has been little or no reduction in yields, and reductions in diapause pink bollworm larvae of 95% have been attained.

METHODS AND RESULTS

There are 2 chemicals that are registered for use on cotton. These are ethephon (= Prep), a boll opener and harvest-aid chemical, and thidiazuron (= Dropp), a defoliant. In tests in 1984 and 1985, these 2 chemicals were found to be effective when properly applied and dose and time of application was at the optimum rate and time.

In 1986, tests were conducted at Maricopa, AZ, and at Brawley, CA, in small plots to determine rates and dates of applications for Prep and Dropp.

MARICOPA, AZ

Plots at Maricopa were 4 rows wide and 72 ft long; each treatment replicated 4 times, DPL-90 was the variety, and the last irrigation was applied on August 6. Pink bollworm infestations were high, as few applications of insecticides were made. Treatments were Prep at 1.0 and 1.5 lb/acre applied on September 3, September 10, and September 17; Prep at 1.0 lb/Ac on September 3, plus 1.0 on September 17; Dropp at 0.05 and 0.1 lb/Ac on September 3, September 10, and September 17; and Dropp at 0.5 on September 3 plus 0.1 on September 17. All plots were defoliated with Dropp at 0.4 lb/Ac plus surfactant on September 23, and 2 rows/plot machine-picked on October 16. The number of green bolls on one row/plot were counted on October 17. The results are shown in Table 1.

In general, the numbers of green bolls were reduced by all treatments. However, the reductions by Prep at 1 lb on 9/17 and both rates of Dropp on 9/17 were slight and non-significant. The greatest reductions were caused by the Dropp treatments on 9/3, and the dual treatments. The dual treatment with Prep was the most effective. The higher rate of either chemical generally reduced bolls more than the lower rate, though this difference was not always significant.

There were no significant differences in yield among any of the treatments. The least yields were found in plots treated on 9/3 with either material at both rates. At the time of application on 9/3, maximum temperatures were above 100-degrees F, and considerably more defoliation occurred than when later treatments were applied, especially with Dropp.

BRAWLEY, CA

The test at Brawley was a split-plot design with a combination of irrigation cutoff and chemical termination. Plots were 8 rows wide, 50 ft long, and replicated 6 times. DPL-61 was the variety. The first chemical termination treatment was applied ca. 2 weeks after the last irrigation with a ground machine;

the second treatment of both chemicals was applied 2 weeks after the first, and defoliation was applied ca. 10 days after the second chemical termination treatment. When the leaves were off, 13.1 ft of row in each plot was hand picked for yield and green bolls counted. Irrigation cutoff was the main plot treatment with last irrigations on July 16, July 30, August 13, and August 27. The chemical termination treatments were Dropp at 0.04 lb/Ac and 0.02 + 0.04 lb/Ac, and Prep at 1.0 lb/Ac and 1.0 + .0 lb/Ac. The results are shown in Table 2.

The date of last irrigation influenced the reduction of green bolls and yield more than the chemical termination treatment. The most green bolls were found in 8/27 irrigation date, the 8/13 date reduced them more than the 8/27 date, but not the 7/16 and 7/30 dates. There were no differences in boll reduction between 7/16 and 7/30. In all instances the untreated check had more green bolls than any of the chemical termination treatments, but this was significant only for the 8/27 date. Yields were greatest in the 8/13 and 8/27 irrigation dates, with no significant differences among the treatment and the check of those 2 dates. The yields of 7/16 and 7/30 dates were generally lower than the later dates. The 2 Dropp treatments on 7/16 irrigation date were significantly less than the untreated check and all other treatments.

DISCUSSION

These tests show that chemical termination treatments can eliminate late-season squares and green bolls and remove the food and habitat for diapause populations of pink bollworms. Both Prep and Dropp appear to be suitable. However, each has certain limitations. Dropp is highly sensitive to temperatures, with high temperatures causing yield reduction and leaf drop at a time when that may not be desired. This occurred at Brawley on 7/16, and to a lesser degree at Maricopa on 9/3. The rate of Prep must be 1.5 lb/Ac or more after mid-September to be effective. A possible combination of these 2 chemicals could be Prep at 1.0 lb/Ac followed by Dropp at 0.05 or 0.1 lb/Ac (depending on temperature) 2 or 3 weeks later. Tests using these and other rates are planned for 1987.

Table 1. Average number of green bolls/Ac and yields in lint lbs/Ac in

Treatment	Rate	Date	Green bolls per acre a/	Yields lint/acre
Untreated	--	--	21719 a	1330
Prep	1.0	9/03	9931 cde	1234
	1.5	9/03	8974 cde	1222
	1.0	9/10	8668 cde	1332
	1.5	9/10	6657de	1281
	1.0	9/17	17659 ab	1384
	1.5	9/17	6280 de	1288
	1.0 + 1.0	9/03 + 9/17	6396 de	1328
	Dropp	0.05	9/03	4766 e
0.1		9/03	5726 de	1212
0.05		9/10	9729 cde	1304
0.1		9/10	8814 cde	2327
0.05		9/17	16543 abc	1294
0.1		9/17	13372 bcd	1377
0.05 + 0.1		9/03 + 9/17	4216 e	1341

a/ Means followed by the same letter are not significantly different at the 5% level, Duncan's NMRT.

Table 2. Average number of green bolls and lint yields on chemical termination plots with various last dates of irrigation. Brawley, CA.

Chemical	Rate	Date of Last Irrigation			
		7/16	7/30	8/13	8/27
Green bolls/Ac (x 1000) a/					
Untreated	--	3.33 gh	12.3 e-h	29.67 cd	66.5 a
Dropp	0.04	2.67 gh	1.17 gh	15.83 d-g	53.83 ab
	.02 + .04	1.17 gh	0.67 h	24.0 de	52.83 b
Prep	1.0	9.67 e-h	8.33 fgh	26.83 d	49.0 b
	1.0 + 2.0	1.33 gh	11.33 e-h	20.83 def	41.83 bc
Yields, Lbs Lint/Acre a/					
Untreated	--	1382 bcd	1457 a-d	1612 a	1570 a
Dropp	0.04	1146 e	1366 cd	1542 ab	1548 ab
	.02 + .04	1333 e	1330 d	1511 abc	1575 a
Prep	1.0	1394 bcd	1371 cd	1591 a	1531 abc
	1.0 + 1.0	1325 d	1391 bcd	1561 a	1537 ab

a Means within a category followed by the same letter are not significantly different, Duncan's NMRT.

Table 3. Squares, green bolls, and percent open bolls in Prep-treated and control plots, 1986

Prep (Lb/A)	Date Applied	Pretreatment Count	9/18 to a/ 10/9	
Squares				
1.5	9/15	95	47	
Control	--	216	196	
Green Bolls < 1 Inch				
1.5	9/15	99	27	
Control	--	78	77	
Green Bolls > 1 Inch				
1.5	9/15	125	65	
Control	--	102	96	
Percent Open Bolls:				
1.5	9/15	58	9/26	10/9
Control	--	64	81	91
			61	71

a Seven sampling dates, 4 replications.