

Reduction of **PINK BOLLWORM MOTHS** *in Southern California* *by Early Crop Termination*

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The effects from early and late defoliation of cotton on the numbers of overwintering pink bollworm, *Pectinophora gossypiella* (Saunders), were studied in the Imperial Valley of southern California. Fewer moths emerged from cotton defoliated in September than from October defoliations. Cotton defoliated in early September resulted in a 90 per cent reduction in emerging moths the following spring, while cotton defoliated in late September resulted in only a 66 per cent reduction in emerging moths.



Screen cages used for pink bollworm emergence studies. Cages cover .001 acre and are 3½ ft high.

TABLE 1. SCHEDULE OF CULTURAL OPERATIONS IN COTTON TERMINATION TRIALS, IMPERIAL VALLEY FIELD STATION, 1968-69 AND 1969-70

Cultural operation	1968-69		1969-70	
	Early	Late	Early	Late
Last irrigation:	August 8	Sept. 9	Aug. 12	Sept. 16
Defoliation:	Sept. 26	Oct. 8	Sept. 11	Oct. 19
Harvest:	Oct. 13	Nov. 12	Oct. 23	Dec. 22
Shred:	Oct. 15	Nov. 13	Oct. 28	Dec. 30
Disk 2x:	Oct. 15	Nov. 13	Nov. 5	Dec. 30
Irrigation 1:	Oct. 22	Nov. 13	Nov. 12	Dec. 30
Irrigation 2:	Dec. 13	Jan. 8	Jan. 8	—

TABLE 2. MOTH EMERGENCE IN EARLY AND LATE DEFOLIATION EXPERIMENTS, IMPERIAL VALLEY FIELD STATION, 1969 AND 1970

Defoliation date	Number of moths emerged			% Moth reduction	
	Suicidal	Non-suicidal*	Total	Total	Non-suicidal
Sept. 26, 1968	211	139	350	66.4	67.1
Oct. 8, 1968	619	422	1041		
Sept. 11, 1969	96	21	117	90.1	89.2
Oct. 19, 1969	989	194	1183		

* Moths emerged after 1st squares formed (May 15).

THE PINK BOLLWORM, *Pectinophora gossypiella* (Saunders), has been firmly established in southern California cotton growing areas for the past five seasons. During this time, several measures have been used to control, or at least suppress populations of this insect to numbers below the economic injury level. The primary control method has been the scheduled use of insecticides, applied at 5- to 7-day intervals following the first treatment. This approach to the pink bollworm problem has proved to be quite expensive in terms of immediate costs for chemicals and application, and in disruptions of other insects on cotton and on neighboring crops.

Growth termination

Another method of reducing pink bollworm populations relies upon the termination of cotton fruiting and growth before the pink bollworm larvae begin to enter their diapause, or overwintering stage. This method of control has been used successfully in many areas of the United States where pink bollworm has been a persistent problem.

This report presents the results of field trials in the Imperial Valley during the period 1968-70, in which early crop termination was evaluated as a method for reducing emerging spring populations of pink bollworm moths.

1968-69 tests

A small field of Delta Pine 16 cotton was grown in 1968 at the Imperial Valley Field Station near El Centro, California. The cotton was not treated for pink bollworm, but two treatments of Perthane were applied to control cotton leaf perforator.

Green bolls in this field were 100 per cent infested with pink bollworm larvae by late July. The ensuing schedule of cultural operations, including "early" and "late" defoliation treatments on September 26 and October 8 respectively, is given in table 1. All shredding was done with a non-contoured flail shredder, and after disking, the plots were flooded twice with approximately 3 inches of water each irrigation.

Last irrigation

After the last irrigation, 12 large screen cages (photo) were placed in each of six replicates per treatment to collect pink bollworm moths as they emerged during the spring of 1969. All cages were in place by March 1, 1969, which is about the time when significant emergence begins. The effect of early crop termination (defoliation) on emergence of pink bollworm moths in 1968 is shown in table 2.

Fewer moths

A total of 691, or 66.4 per cent fewer moths emerged from the September 26 defoliation treatment as compared with the October 8 defoliation. Approximately 60 per cent of the total emergence in both the early and late treatments occurred before May 15, 1969, representing suicidal emergence. In comparing the non-suicidal emergence in these two treatments, however, it was found that the September defoliation resulted in 67 per cent fewer moths than the October defoliation. This latter figure compares closely with the total percentage of reduction in emergence of pink bollworm moths shown by early defoliation results in this trial.

1969-70 tests

Another similar experiment with early and late defoliation on cotton heavily infested with pink bollworm was conducted at the Imperial Valley Field Station in 1969-70. The field was sprayed once with Perthane for cotton leaf perforator. The cultural schedule for this second trial is also outlined in table 1. The cultural operations and plot design were essentially the same as in the previous year, except that only four replicates, each with eight cages, were used per treatment. Also, the late-defoliated plots received only one irrigation in 1969 instead of two.

Greater reduction

The effect of early defoliation in this trial (table 2) showed an even greater reduction (90.1 per cent) in total moth emergence than in the preceding year. More importantly, however, there was an 89 per cent reduction in numbers of non-suicidal moths from the early defoliated treatment when compared to the later defoliation.

Too late

The results of these experiments conducted in the Imperial Valley indicate that the early defoliation treatment, September 26, 1968, was applied too late to have the desired effect in reducing the overwintering pink bollworm population. Other research in the Imperial Valley has shown that numbers of diapausing larvae increase quite rapidly after September 10. Consequently, a relatively high proportion of the larval population was already in diapause when the first defoliation treatment was applied in 1968. In 1969, however, the early defoliation was applied before great numbers of larvae entered diapause—predictably having a detrimental effect on the numbers of overwintering larvae.

The technique of early crop defoliation therefore seems to have merit in pink bollworm control programs in California, provided that defoliating treatments are applied prior to mid-September.

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