

Caterpillar Damage to Tomatoes

results based on one-year survey indicate no evidence of resistance to insecticides in nine commercial tomato fields

John Underhill and A. E. Michelbacher

Suspected resistance to DDD and DDT in controlling caterpillars attacking tomatoes—the corn earworm, in particular—was investigated in San Joaquin County during the 1955 season.

Nine commercial tomato fields were selected in several localities from the west to the east side of the county. The growers co-operated in the project and kept records of the material used and the date and rate of application.

During the growing period, four surveys were conducted to determine the seasonal trend of infestation. Excellent control of caterpillars was obtained with two to three treatments. Very little evidence of infestation was found during

the maturing of the crop, and nearly all the loads delivered to the cannery were graded as being free of worm damage.

The results based on this one year survey would not indicate any evidence of resistance. However, further investigation is needed for it is possible that the 1955 season was one which was unfavorable to the development of large caterpillar populations. Evidence obtained on other crops indicated that this might have been the case. For example, caterpillar pests of walnut appeared to be less abundant and destructive in 1955 than in previous years.

The activity of other pests was observed in the selected fields. In none of

them was any damage by the tomato mite encountered. By midseason some increase in the leaf miner population was observed in some of the fields. However, in only one out of the nine did the population reach a moderate level, and in three not enough were found to make it worth while to record.

The effectiveness of the tomato insect control program has held up remarkably well. Cases of poor control are probably due—in part—to inadequate timing and improper application. Fields should be watched closely, and thorough and even treatments applied before destructive populations develop.

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Treatments and Per Cent of Tomatoes Infested During Growth of Crop and the Degree of Worm Damage Found in Tomatoes Delivered to the Cannery.^a

Location	First application			Second application			Third application		
	Date	Insecticide	Pounds per acre	Date	Insecticide	Pounds per acre	Date	Insecticide	Pounds per acre
Vernalis	July 23	5% DDD 75% sulfur	30	Aug. 27	5% DDD 50% sulfur	35	.....	...	..
Tracy	July 11	5% DDD 50% sulfur	30	Aug. 7	5% DDD 75% sulfur	35	.....	...	..
Tracy	July 13	5% DDD 50% sulfur	30	Aug. 14	5% DDD 75% sulfur	30	Sept. 5	10% DDT	30
Union Island	July 20	5% toxaphene sulfur	30	Aug. 8	5% DDD 75% sulfur	30	.....	...	..
Roberts Island	June 28	5% DDT	25	July 12	5% DDD 50% sulfur	30	Aug. 26	5% DDD 75% sulfur	35
Roberts Island	Aug. 1	5% DDD 50% sulfur	30	Sept. 1	5% DDD 50% sulfur	35	.....	...	..
Linden	July 22	5% DDD 75% sulfur	35	Sept. 3	5% DDD 75% sulfur	35	.....	...	..
Linden	July 26	5% DDD 75% sulfur	35	Aug. 29	5% DDD 50% sulfur	50	.....	...	..
Linden	June 23	5% DDD 75% sulfur	25	Aug. 7	5% DDD 75% sulfur	40	.....	...	..

Per cent of infested tomatoes on indicated dates and worm damage in delivered loads.^b

Location	July 26	Aug. 15	Aug. 30	Sept. 15	Number of loads delivered to cannery	
	Corn earworm	Corn earworm	Corn earworm	Corn earworm	No worm damage	Graded 1/2% worm damage
Vernalis	0.0	1.0	0.0	0.0	69.0	3.0
Tracy	0.0	0.0	0.3	0.0	..	..
Tracy	0.0	0.0	0.0	0.0	61.0	0.0
Union Island	..	..	..	0.0	243.0	5.0
Roberts Island	0.0	0.0	0.3	0.0	131.0	5.0 ^d
Roberts Island	0.0	0.3	..	0.0	71.0	0.0
Linden	0.0	0.0	0.0	0.0	81.0	0.0
Linden	..	0.0	0.0	1.0	9.0 ^e	..
Linden	0.0	0.0	0.0	0.5	204.0	2.0

^a With exception of one first treatment all applications were made by airplane.

^b No evidence of recent infestation by hornworms, western yellow-striped armyworm, beet armyworm, potato tuber moth or tomato pinworm were encountered in any of the four surveys conducted.

^c Field harvested for green market.

^d One load graded 1% worm damage.

^e Many more loads delivered and grower believed all were free of worm damage.

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actual frost conditions. However, tests were made under atmospheric conditions which were quite similar to those occurring under actual frost conditions.

During these tests—just before sunrise—no hot air from the ramjets escaped as every bit of it was drawn into the propeller blast. The warm blast from the machine did reach the ground out in the orchard. So much air had been mixed with the hot exhaust from the ramjets that by the time the blast reached the ground the temperature of the mixture was not appreciably higher than that of the air in an orchard under the protection of heaters. The blast had no more tendency to rise out of the orchard than the air in an orchard under any other form of adequate protection.

The results of these preliminary tests are encouraging and some reduction in the noise is promised. Further tests of the ramjet-rotor machine under actual frost conditions are planned for 1957.

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Harry Hansen, United States Frost Warning Service, members of the University of California Agricultural Extension Service, and individual growers co-operated in the studies reported in the above progress report.