

Phthorimaea lycopercicella Busck, in Hawaii (Lep). *Proc. Hawaiian Entomol. Soc.* 7:177-8.

16. Thomas, C. A. 1936. Status of the tomato pinworm, *Gnorimoschema lycopercicella* Busck, in Pennsylvania. *J. Econ. Entomol.* 29:313-317.

17. Watson, J. R. and W. L. Thompson. 1932. Pinworm on tomatoes. *Fla. Entomol.* 16:14.

18. Wolfenbarger, D. O. and S. L. Poe. 1973. Tomato pinworm control. *Proc. Fla. State Hort. Soc.* 86:139-143.

"VYDATE" L—A NEW COMPOUND FOR THE CONTROL OF LEAF MINER ON TOMATOES AND CELERY

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Abstract. Field tests were initiated in the spring of 1974 and continued in the fall and following spring season of 1975. This report summarizes the results of nine small-scale replicated tests on both tomatoes and celery for the control of leaf miner (*Liriomyza sativae* Blanchard) with "Vydate"® L oxamyl insecticide-nematicide (Methyl N', N' - Dimethyl - N - [(Methylcarbamoyl) Oxy] - 1 - Thiooxamimidate). On tomatoes, tests installed in Immokalee-Naples (4) and Ruskin (5) gave an average of 66.5, 84.3 and 92.3% control of leaf miner with oxamyl at .25, .5 and 1.0 lb. AI/A compared to the standard grower's treatment of 0% control and dimethoate at .5 lb. AI/A with 47% control. On celery, tests installed in Belle Glade (5), Zellwood (3) and Sarasota (1) with oxamyl at .25, .5 and 1.0 lb. AI/A weekly gave an average 62.5, 79.7 and 90.0% control of leaf miner compared to the standard grower's treatment with 19% control and dimethoate at .5 lb. AI/A with 67% control.

The control of leaf miner (*Liriomyza* spp.) on vegetable crops is a major problem facing Florida growers. During the 1973 spring and fall seasons, many tomato and celery growers experienced more leaf miner damage on their crops than they had in the recent past. In the spring of 1974, tests were initiated in growers' fields to measure the efficacy of "Vydate"® L oxamyl insecticide-nematicide against this insect.

Materials and Methods

Tomatoes. Three tests were established in the Ruskin area in April and May 1974. Single row plots varying from 5.6 to 18 ft. long were replicated

3 to 4 times. Two tests were on Walter tomatoes and the other on MH-1 variety. Weekly sprays of oxamyl were applied at 0.5 and 1.0 lbs. AI/A for 5 weeks and compared to an unsprayed check and the grower's standard schedule (consisting of applications of dimethoate at 1.5 pints/A, naled at 1 pt./A, and azinphos-methyl at 2 pts./A on 3 to 5 days intervals).

Two tests were initiated in the Ruskin area in May 1974 and 2 in Immokalee-Naples in October 1974. Single row plots 9 ft. long were replicated 4 times on Walter tomatoes. Weekly (twice weekly in 2 tests) sprays of oxamyl were applied at .25, .5 and 1.0 lb. AI/A for 5 to 6 weeks, and compared to an unsprayed check, to dimethoate at .5 lb. AI/A (1.5 pts.), or to the grower's standard (dimethoate 1.5 pts./A \pm azinphos-methyl 2 pts. on 4 to 7 day intervals).

Two tests in the Immokalee-Naples area were initiated in January and February of 1975. Single row plots 9 ft. long were replicated 4 times on Walter tomatoes. Weekly sprays of oxamyl at .25, .5 and 1.0 lb. AI/A were applied for 2 weeks in one test and 5 in the other and compared to an unsprayed check and dimethoate at 1.5 pts./A.

Celery. Three tests were initiated in the Belle Glade area in April and May 1974. Single row plots 18 ft. long were replicated 3 times on 214 and 1622 varieties. Three to 5 weekly sprays at .25, .5 and 1.0 lbs. AI/A were applied and compared to the unsprayed check and to the grower's standard schedule (applications of Diazinon at 1-1.5 pts., naled at .5 pt. and azinphos-methyl at 2 pts./A one day to one week intervals).

Two tests were initiated in the Belle Glade area and one in Sanford in November and December 1974. Single row plots from 13.5 to 20 ft. long were replicated 4 times on 248, 214 and 683 varieties. Three to 5 weekly sprays of oxamyl at .25, .5 and 1.0 lb. AI/A were compared to the unsprayed check and to dimethoate at 1.5 pts./A.

The remaining 3 tests on celery were installed in Sarasota and Zellwood beginning in March and

Table 1. Number of live tomato leaf miner larvae per 25 leaves, spring 1974. Average of 3 or 4 reps.

<u>Location</u>	<u>Oxamyl .5# AI/A</u>	<u>Oxamyl 1.0# AI/A</u>	<u>Grower Std.</u>	<u>Untrtd Check</u>
Fruitville	10.6	1.3	--	33.3
Ruskin	18.0	10.8	118.3	111.5
Verna	14.3	4.3	32.8	48.5
Avg.	14.3	5.5	75.6	64.4
% control	78	91	0	--

April of 1975. Single row plots by 14.5 to 20 ft. long were replicated 3 to 4 times on Foremost and 214 varieties. Five weekly sprays of oxamyl at .5 and 1.0 lb. AI/A were applied and compared to the grower's schedule (azinphos-methyl, parathion every 10-14 days).

All sprays in celery and tomatoes were applied with a CO₂ hand sprayer at 100 gals. per acre.

Results and Discussion

Tomatoes. Leaf miner pressure was very high during the spring of 1974, moderate to very low during the fall of 1974 and moderate during the spring of 1975. Where pressures were moderate to high, data was taken by counting the number of live leaf miner larvae per 10 to 25 randomly

selected leaves per rep. Where pressure was low, the total number of live leaf miner larvae found per rep was recorded. Percentage control figures compare the counts taken in the treatments with the counts taken in the untreated checks.

Results of the 3 tests in the Ruskin area initiated in April and May 1974 are given in Table 1. Weekly sprays of oxamyl at .5 lb. AI/A gave 78% control and at 1.0 lb. AI/A gave 91% control. The grower's standard spray programs in these 3 tests averaged more live leaf miners per 25 leaves than the unsprayed check.

Results of the 4 tests in the Ruskin and Immokalee-Naples area initiated in May and October 1974 are given in Table 2. Where pressure was moderate in the 2 Ruskin tests, oxamyl was applied twice weekly at .25 and .5 lb. AI/A. This

Table 2. Number of live tomato leaf miner larvae, spring & fall, 1974. Average of 4 reps.

<u>Location</u>	<u>Oxamyl .25#</u>	<u>Oxamyl .5#</u>	<u>Oxamyl 1.0#</u>	<u>Dimetho- ate .5#</u>	<u>Grower Std</u>	<u>Untrtd Check</u>
Naples	23.0	6.0	4.8	10.5		33.5
Immokalee	0.8	0.3	0.0	0.8		4.3
Ruskin (twice wkly)	1.3	0.3	0.0	--	20.3	18.3
Ruskin (twice wkly) @ .25 and .5)	1.0	0.3	0.3	--	23.0	15.8
Avg.	6.5	1.7	1.3	5.7	21.7	18.0
% control	64	91	93	68	0	--

Table 3. Number of live tomato leaf miner larvae, spring 1975. Average of 4 reps.

<u>Location</u>	<u>Oxamyl .25#</u>	<u>Oxamyl .5#</u>	<u>Oxamyl 1.0#</u>	<u>Dimetho- ate .5#</u>	<u>Untrtd Check</u>
Immokalee	3.8	2.3	1.0	10.3	15.0
Naples	4.8	2.0	--	--	13.0
Avg.	4.3	2.2	1.0	10.3	14.0
% control	69	84	93	26	--

Table 4. Percent control, compared to unsprayed check, of live tomato leaf miner larvae from nine tests installed between April 1974 and February 1975.

	<u>Oxamyl .25# (6 tests)</u>	<u>Oxamyl .5# (9 tests)</u>	<u>Oxamyl 1.0# (9 tests)</u>	<u>Dimetho- ate .5# (3 tests)</u>	<u>Grower Standard (5 tests)</u>
Spring '74 (3 tests)	--	78	91	--	0
Spring & fall '74 (4 tests)	64	91	93	68	0
Spring '75 (2 tests)	69	84	93	26	--
Avg.	66.5	84.3	92.3	47	0

Table 5. Number of live celery leaf miner larvae per 5 petioles, spring 1974. Average of 3 reps.

<u>Location</u>	<u>Oxamyl .25#</u>	<u>Oxamyl .5#</u>	<u>Oxamyl 1.0#</u>	<u>Grower Std.</u>	<u>Unsp. Check</u>
South Bay	--	10	11	35	78
Belle Glade	16	12	--	51	50
Belle Glade	--	10	2	111	30
Avg.	16	10.7	6.5	65.7	52.7
% control	70	80	88	0	--

Table 6. Number of live celery leaf miner larvae per 5 to 10 petioles, fall 1974. Average of 4 reps.

<u>Location</u>	<u>Oxamyl .25#</u>	<u>Oxamyl .5#</u>	<u>Oxamyl 1.0#</u>	<u>Dimetho- ate .5#</u>	<u>Grower Std.</u>	<u>Unsp. Check</u>
Clewiston	28	18	7	18	--	43
Belle Glade	20	13	2	14	--	43
Sanford	0.5	0.3	0.3	4	42	21.8
Avg.	16.2	10.4	3.1	12	42	35.9
% control	55	71	91	67	0	--

schedule gave much better control at .25 lb. than did weekly sprays at this rate and under moderate pressure in Naples. In these 4 tests oxamyl at .25 lb. averaged 64% control compared to 91 and 93% control for .5 and 1.0 lb., and 68% control for dimethoate at .5 lb. In the 2 Ruskin tests where the grower's standard spray program was measured, these again had higher leaf miner counts than the unsprayed check.

Results of the 2 tests installed in Immokalee-Naples in January and February of 1975 are given in Table 3. Oxamyl gave an average 69, 84 and

93% control from .25, .5 and 1.0 lb. AI/A weekly compared to dimethoate at .5 lb. with 26% control.

Table 4 summarizes all 9 of these tomato tests and shows average percent control figures of 66.5, 84.3 and 92.3 for oxamyl at .25, .5 and 1.0 lb. AI/A compared to dimethoate at .5 lb. AI/A with 47% and the grower's standard of 0% control.

Celery. Leaf miner pressure was devastating during the spring season of 1974 and quite high during the fall in the Glades area. In the spring of 1975, pressure was moderate in both the Sara-

Table 7. Number of live celery leaf miner larvae per 5 petioles, spring 1975. Average of 3 to 4 reps.

<u>Location</u>	<u>Oxamyl .5#</u>	<u>Oxamyl 1.0#</u>	<u>Grower Std.</u>	<u>Unsp. Check</u>
Sarasota	3.7	3.0	--	15.0
Zellwood	0	0.3	7.3	12.6
Zellwood	1	0.3	3.7	11.0
Avg.	1.6	1.2	5.5	12.9
% control	88	91	57	--

Table 8. Summary of 9 celery leaf miner tests installed between April 1974 and April 1975. Percent control compared to unsprayed check.

	Oxamyl .25# (4 tests)	Oxamyl .5# (9 tests)	Oxamyl 1.0# (8 tests)	Dimetho- ate .5# (3 tests)	Grower Std. (6 tests)
Spring '74 (3 tests)	70	80	88	--	0
Fall '74 (3 tests)	55	71	91	67	0
Spring '75 (3 tests)	--	88	91	--	57
Avg.	62.5	79.7	90	67	19

sota and Zellwood areas. All data was taken by randomly selecting 5 to 10 petioles per rep and counting the total number of live leaf miner larvae on those petioles. Percentage control figures relate to the counts taken in the untreated checks.

Results of the 3 tests in the Belle Glade area initiated in April and May of 1974 are given in Table 5. Weekly sprays of oxamyl at .25, .5 and 1.0 lb. AI/A gave an average of 70, 80 and 88% control of leaf miners compared to the grower's standard with 0% control (more larvae than the unsprayed check).

Table 6 gives the results of the 3 tests initiated in November and December 1974 in the Glades and in Sanford. Oxamyl gave 55, 71 and 91% control at .25, .5 and 1.0 lb. AI/A compared to dimethoate at .5 lb. with 67% and the grower's standard again with no control (more larvae than the unsprayed check).

The results of the last 3 tests installed in Sarasota and Zellwood in March and April 1975 are given in Table 7. Oxamyl at .5 lb. gave 88% control, at 1.0 lb. gave 91% and the grower's practice gave 57% control compared to the check.

Table 8 summarizes the 9 tests on celery and

shows average percent control figures of 62.5, 79.7 and 90 for oxamyl at .25, .5 and 1.0 lb. AI/A compared to dimethoate at .5 lb. AI/A at 67% control and the grower's standard with 19% control compared to the unsprayed checks.

Conclusion

The summary tables show that oxamyl at .5 to 1.0 lb. AI/A (1 to 2 qts. "Vydate"® L) will give 80 to 90% control of leaf miner, (*Liriomyza sativae* Blanchard) on both tomatoes and celery when applied at weekly intervals. Limited work on tomatoes also indicates oxamyl at .25 lb. AI/A (1 pt. "Vydate"® L) when applied twice weekly would give this same type of control.

In general, oxamyl at .25 lb. AI/A weekly was equivalent to the current standard material of dimethoate at .5 lb. AI/A.

Oxamyl, when registered, can become an important addition to the chemical control program for leaf miner on tomatoes and celery in Florida. Additional work is currently in progress to gather data to register this compound on other crops where leaf miner is a problem.