EVALUATION OF VYDATE ON CUCUMBER IN SPRING

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Introduction

Nematodes are a serious problem on vegetables in Southern Georgia. As the availability of methyl bromide is reduced and we approach the total ban on its use, alterative materials must be researched. This study evaluates the use of Vydate applied through drip tape as a potential to reduce the nematode damage on cucumber.

Materials and Methods

This study was located at the Blackshank Farm, CPES, Tifton, GA, and the field site had been planted previously with assorted vegetables. Soil was prepared using all current University of Georgia Extension Service recommendations. Plots were arranged in randomized complete blocks consisting of single bed plots replicated five times. Each plot was 30 feet long and 30 in wide.

On 6 April, 2004, the soil fumigant methyl bromide (67% methyl bromide + 33% chloropicrin chisel-injected at 300 lbs/A) was applied and all test plots were covered with black polyethylene mulch with drip tape in the center of the bed approximately 1 in. deep. Vydate was applied at planting (15 April), and two and four weeks post plant through the drip tape at a rate of 2 qts/A per application. Vydate was also applied thru drip tape on 15 April and at one, two , three, four, and five weeks after planting at a rate of 1 qts/A per application.

Cucumber seedlings, cv . Thunder, were purchased from Lewis Taylor Farms. A single cucumber plant was transplanted 12 inches apart using a mechanical type transplanter, which cuts holes in the plastic just ahead of the planters in the center of the plastic bed adjacent to the drip tape on 15 April.

As per the recommendation of the University Of Georgia Extension service, all plots received 500 lbs. of fertilizer (10-10-10) incorporated prior to planting. Additional fertilizer was added biweekly in the form of liquid fertilizer (4-0-8) injected through the irrigation tubing during the growing season. All plots were sprayed with Bravo 720 (Chlorothalonil) (2 pts/A on 18 and 29 April; 9, 20, and 27 May; 3, 10, 17, and 24 June; 1 and 8 July) for control of foliar diseases, and Lannate (Methomyl) (1 pt/A on 27 May and 17 June) and Asana XL (Esfenvalerate) (10 oz./A on 9 and 20 May; 3, 10, and 24 June; 1 and 8 July) for insect control.

Stand counts were conducted to record live plants and plant vigor ratings were performed starting at 21 days after planting. Vigor ratings were also conducted on 13 and

25 May. Plant vigor was rated on a 1 to 10 scale, 10 representing live and healthy plants and 1 representing dead plants.

Twelve cores of soil, 2.5-cm-diam by 25-cm-deep, were collected from the center of each plot at planting (4 April) and at harvest (20 June). Nematodes were extracted from a 150-cm^3 soil sub-sample using a centrifugal sugar flotation technique. The nematodes from these samples were then counted.

On 26 May (at flowering stage) an early root gall evaluation was done on three plants per plot using a 0 to 10 scale, whereby, 0 = no galls, 1 = very few small galls, 2 = numerous small galls, 3 = numerous small galls of which some are grown together, 4 = numerous small and some big galls, 5 = 25 % of roots severely galled, 6 = 50 % of roots severely galled, 7 =75 % of roots severely galled, 8 = no healthy roots but plant is still green, 9 = roots rotting and plant dying, 10 = plant and roots dead. Again following final harvest on 20 June five plants per plot were evaluated for root galls using that same scale.

All cucumber fruits were hand-harvested from the 15-ft center area of each bed (15 plants per plot). Each harvest was separated into marketable and cull fruits, counted, and weighed. There were a total of six harvests, on 27 and 31 May, and 3, 7, 10, and 14 June.

Summary

All treatments reduced root gall index rating on cucumber when ratings were made on 26 May, 2005. However, by 17 June the population of nematodes had rebounded and the plots receiving only methyl bromide (Mebr) had root gall indexes that in some treatments were higher than Mebr+Vydate (Table 1).

Marketable yield was higher for all treatments when compared to the control. The vigor, number of fruit, and weight of fruit tended to increase with the application of Vydate (Table 2).

Root knot juvenile populations and stubby nematode populations were not significantly different at plant or at final harvest. The at harvest soil nematode counts may suggest that nematodes may not be in the soil, but may be in roots at the time of sampling (Table 3 and 4).

Table 1. Effect of Vydate on Root Knot Nematode and Vigor on 'Thunder' cucumber, Spring 2005 Tifton, GA.

Number[a]	Treatment[b]	Application Rate/A	Gall Rating (0-10)[c]		Vigor Rating (0-10)[d]		
			May 26	June 17	May 6	May 18	May 25
1	MeBr	300lbs/A	1.5b	5.3ab	7.8a	7.3ab	7.9bc
2	MeBr	300lbs/A	1.6b	4.1bc	6.9abc	6.7b	7.2c
3	MeBr Vydate	300lbs/A 2qt/A x 3 applications	0.9b	2.2c	7.2ab	8.2a	8.8a
4	MeBr Vydate	300lbs/a 1qt/A x 6 applications	1.1b	2.9c	6.4bc	7.6ab	8.5ab
5	Untreated		5.2a	7.1a	5.9c	3.7c	4.6d

a. Data are means of five replications. Means in the same column followed by the same letter are not different (P = 0.05) according to LSD.

b. MeBr (67% methyl bromide + 33% chloropicrin) was applied by chisel injection at 300 lbs/A. Drip application was made through drip tape for two hours at twelve psi.

c. Gall ratings were done on a scale of 0-10 with 10 = dead plant and roots and 0 = no galls and a healthy plant. An average was taken of the gall ratings for 26 May and 17 June.

d. Vigor was done on a scale of 1-10 with 10 = live and healthy plants and 1 = dead plants and an average was taken of vigor for 18 May and 25 May.

Table 2. Effect of Vydate on yield and vigor on 'Thunder' cucumber, Spring 2005 Tifton, GA.

Number[a]	Treatment[b]	Application Rate/A	Marketable Yield/Plot Number[c]	Marketable Yield/Plot Weight (lbs)[d]	Cull Yield/Plot Number[e]	Cull Yield/Plot Weight (lbs)[f]	Total Yield/Plot Number[g]	Total Yield/Plot Weight (lbs)[g]
1	MeBr	300lbs/A	131.6ab	72.7ab	1.4a	1.0a	133.0ab	73.7ab
2	MeBr	300lbs/A	124.6b	65.7b	1.6a	0.8a	126.2b	66.5b
3	MeBr Vydate 2qt/A x 3 applications	300lbs/A	146.4a	84.5a	1.8a	1.2a	148.2a	85.7a
4	MeBr Vydate 1qt/A x 6 applications	300lbs/A	132.4ab	81.9a	0.8a	0.4a	133.2ab	81.6a
5	Untreated		47.4c	27.7c	1.0a	0.5a	42.4c	28.2c

a. Data are means of five replications. Means in the same column followed by the same letter are not different (P = 0.05) according to LSD.
b. MeBr (67% methyl bromide + 33% chloropicrin) was applied by chisel injection at 300 lbs/A. Drip application was made through drip tape for two hours at twelve psi.
c. The fruit from each individual plot that was considered to be marketable and showed no symptoms of disease was separated and counted on 27 May, 31 May, 3 June, 7 June, 10 June, and 14 June.
d. The fruit was collected separately by each plot and the fruit considered marketable and non-diseased was weighed on 27 May, 31 May, 3 June, 7 June, 10 June, and 14 June.
e. The fruit from each individual plot that was considered to be non-marketable and diseased was separated and counted on 27 May, 31 May, 3 June, 7 June, 10 June, and 14 June.
f. The fruit was collected separately from each plot and the fruit considered non-marketable and diseased was weighed on 27 May, 31 May, 3 June, 7 June, 10 June, and 14 June.
g. The number of marketable and non-marketable fruit from the harvests on 27 May, 31 May, 3 June, 7 June, 10 June, and 14 June were totaled for each plot.
h. The weight of marketable and non-marketable fruit from the harvests on 27 May, 31 May, 3 June, 7 June, 10 June, and 14 June were totaled for each plot.

Table 3. Populations of plant-parasitic nematodes at plant of cucumber, as affected by fumigants, Spring 2005 Tifton, GA.

Number[a]	Treatment[b]	Application Rate/A	Plant Parasitic Nematodes / 150 cc soil[c] Root-knot	Stubby
1	MeBr	300lbs/A	24.0a	40.0a
2	MeBr	300lbs/A	30.0a	18.0a
3	MeBr Vydate	300lbs/A 2qt/A x 3 applications	42.0a	28.0a
4	MeBr Vydate	300lbs/A 1qt/A x 6 applications	60.0a	130.0a
5	Untreated		52.0a	52.0a

a. Data are means of five replications. Means in the same column followed by the same letter are not different (P = 0.05) according to LSD.

b. MeBr (67% methyl bromide + 33% chloropicrin) was applied by chisel injection at 300 lbs/A. Drip application was made through drip tape for two hours at twelve psi.

c. The at plant soil samples were taken on 4 April. Root-knot nematode (*Meloidogyne* spp.); Stubby root nematode (*Paratrichodorus* spp.).

Table 4. Populations of plant-parasitic nematodes at harvest of cucumber, as affected by fumigants, Spring 2005 Tifton, GA.

Number[a]	Treatment[b]	Application Rate/A	Plant Parasitic Nematodes / 150 cc soil[c] Root-knot	Stubby	Sting	Ring
1	MeBr	300lbs/A	202.0a	40.0ab	0.0a	2.0a
2	MeBr	300lbs/A	196.0a	30.0b	6.0a	2.0a
3	MeBr Vydate	300lbs/A 2qt/A x 3 applications	166.0a	66.0a	0.0a	0.0a
4	MeBr Vydate	300lbs/A 1qt/A x 6 applications	72.0a	28.0b	0.0a	0.0a
5	Untreated		168.0a	50.0ab	2.0a	6.0a

a. Data are means of five replications. Means in the same column followed by the same letter are not different (P = 0.05) according to LSD.

b. MeBr (67% methyl bromide + 33% chloropicrin) was applied by chisel injection at 300 lbs/A. Drip application was made through drip tape for two hours at twelve psi.

c. The at harvest soil samples were taken on 20 June. Root-knot nematode (*Meloidogyne* spp.); Stubby root nematode (*Paratrichodorus* spp.); Sting Nematode (*Belonolaimus longicaudatus*); Ring nematode (*Criconernella* spp.).