

EVALUATION OF TAPS ON FALL SQUASH

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Introduction

This study evaluates TAPS in an area moderately infested with root-knot nematode. The TAPS was applied as a pre-plant incorporated (PPI) or drip applied product and compared to Vydate drip applied.

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 four times. Each plot was 25 feet long and 30 in wide.

TAPS was incorporated into the soil pre-plant at a rate of 25 gal/A and 50 gal/A on 22 August and all test plots were covered with white polyethylene mulch with drip tape in the center of the bed approximately 1 in. deep. TAPS was also applied at planting (23 August) thru the drip tape at a rate of 25 gal/A and 50 gal/A. Vydate was applied at planting (23 August) at a rate of 3 qt/A.

Squash seedlings, cv. Prelude II, 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 23 August.

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 26 August; and 2, 9, 16, 23, and 30 September) for control of foliar diseases, and Admire (Imidacloprid) (16 oz./A 6 and 20 September), Asana (Esfenvalerate) (10 oz./A on 30 September), Intruder (Acetamiprid) (1.1 oz./A on 9 September), Lannate 2.4LV (Methomyl) (2pt/A on 16 and 23 September), and Thiodan (Endosulfan) (1 qt/A on 26 August; and 2 September) for insect control.

Stand counts were conducted to record live plants at eight days after planting and plant vigor ratings were performed on 8 September starting at 16 days after planting. Another vigor rating was also conducted on 14 September. 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 × 25-cm-deep, were collected from the center of each plot at planting (18 August) and at harvest (7 October). Nematodes were

extracted from a 150-cm³ soil sub-sample using a centrifugal sugar flotation technique. The extracted nematodes were then counted.

On 15 September 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 on 26 September during mid-season and following final harvest on 6 October, ten plants per plot were evaluated for root galls using that same scale.

All squash fruits were hand-harvested from the 10-ft center area of each bed (10 plants per plot). Each harvest was separated into marketable and cull fruits, counted, and weighed. There were a total of two harvests, on 20 September and 3 October.

Summary

Drip application of TAPS at planting caused phytotoxicity and killed several plants in those plots (Table 1). Plants were replanted a week later and good survival was noted (stand count 20 August). Vigor ratings were greatest with Vydate on both 8 September and 14 September and least with TAPS drip applied. Gall rating was similar for all treatments; however, there appeared to be a numerical reduction in gall rating index with the TAPS PPI treatments (Table 1). Only the Vydate treatment had marketable yields greater than the non treated control. Total yields were not different for any of the treatments (Table 2). The root-knot populations in plots were not different for any of the treatments at planting or at harvest (Tables 3 and 4).

Table 1. Effect of TAPS on Root Knot Nematode and Plant Vigor and Counts on 'Prelude II' squash, Fall 2005 Tifton, GA.

Treatment ^a	Application ^b Rate/A	Gall Rating (0-10) ^c			Stand Counts ^d		Vigor Ratings (1-10) ^e	
		Sept. 15	Sept. 26	Oct. 6	Aug. 24	Aug. 30	Sept. 8	Sept. 14
1 TAPS	25gal/A PPI	2.5a	2.7ab	2.6b	24.8a	25.8a	5.1ab	5.1ab
2 TAPS	50 gal/A PPI	1.8a	2.2b	2.5b	23.8a	24.5a	4.3ab	5.4ab
3 TAPS	25 gal/A Drip	3.6a	5.1a	4.4ab	9.5c	22.8a	3.8ab	4.0ab
4 TAPS	50 gal/A Drip	2.1a	2.1b	3.2ab	15.3bc	23.3a	2.6b	3.0b
5 Vydate	3qt/A Drip	1.9a	3.0ab	3.2ab	20.3ab	25.0a	6.4a	7.3a
6 Untreated		3.8a	3.2ab	5.3a	22.8a	24.8a	4.8ab	4.9ab

- a. Data are means of six replications. Means in the same column followed by the same letter are not different ($P = 0.05$) according to LSD. No letters indicate a non-significant difference.
- b. TAPS was applied as a pre-plant incorporated, PPI, using a boom sprayer and a rototiller. Drip application was made through drip tape for two hours at thirty 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 15 September, 26 September, and 6 October.
- d. Counts of live plants were taken on 24 August. Treatments 3 and 4 were replanted on 26 August. Live plants were counted again on 30 August.
- e. 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 8 September and 14 September.

Table 2. Effect of TAPS on Yield on ‘Prelude II’ squash, Fall 2005 Tifton, GA.

Treatment ^a	Application ^b	Marketable Yield/Plot		Cull Yield/Plot		Total Yield/Plot	
	Rate/A	Number ^c	Weight (lb) ^d	Number ^e	Weight (lb) ^f	Number ^g	Weight (lb) ^h
1 TAPS	25gal/A PPI	14.8a	5.8b	5.5a	3.0a	20.3a	8.8ab
2 TAPS	50 gal/A PPI	16.3a	6.8ab	2.5a	1.1a	18.8a	7.9ab
3 TAPS	25 gal/A Drip	14.5a	5.2b	3.3a	0.9a	17.8a	6.1ab
4 TAPS	50 gal/A Drip	12.5a	4.2b	4.5a	1.7a	17.0a	5.8b
5 Vydate	3qt/A Drip	17.5a	9.2a	1.8a	0.7a	19.3a	9.9a
6 Untreated		15.0a	5.4b	5.0a	2.7a	20.0a	8.1ab

- a. Data are means of six replications. Means in the same column followed by the same letter are not different ($P = 0.05$) according to LSD. No letters indicate a non-significant difference.
- b. TAPS was applied as a pre-plant incorporated, PPI, using a boom sprayer and a rototiller. Drip application was made through drip tape for two hours at thirty 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 20 September and 3 October.
- d. The fruit was collected separately by each plot and the fruit considered marketable and non-diseased was weighed on 20 September and 3 October.
- e. The fruit from each individual plot that was considered to be non-marketable and diseased was separated and counted on 20 September and 3 October.
- f. The fruit was collected separately from each plot and the fruit considered non-marketable and diseased was weighed on 20 September and 3 October.
- g. The number of marketable and non-marketable fruit were totaled for each plot on 20 September and 3 October.
- h. The weight of marketable and non-marketable fruit were totaled for each plot on 20 September and 3 October.

Table 3. Populations of plant-parasitic nematodes at planting of squash, as affected by fumigants, Fall 2005 Tifton, GA.

Treatment ^a	Application ^b Rate/A	Plant Parasitic Nematodes / 150 cc soil ^c		
		Root-knot	Stubby	Sting
1 TAPS	25gal/A PPI	110.0a	10.0a	0.0b
2 TAPS	50 gal/A PPI	12.5b	5.0a	0.0b
3 TAPS	25 gal/A Drip	27.5ab	5.0a	0.0b
4 TAPS	50 gal/A Drip	82.5ab	5.0a	0.0b
5 Vydate	3qt/A Drip	25.0ab	0.0a	10.0a
6 Untreated		30.0ab	0.0a	0.0b

- a. Data are means of six replications. Means in the same column followed by the same letter are not different ($P = 0.05$) according to LSD. No letters indicate a non-significant difference.
- b. TAPS was applied as a pre-plant incorporated, PPI, using a boom sprayer and a rototiller. Drip application was made through drip tape for two hours at thirty psi.
- c. The at plant soil sample was taken on 18 August. Root-knot nematode (*Meloidogyne* spp.); Sting Nematode (*Belonolaimus longicaudatus*); Stubby root nematode (*Paratrichodorus* spp.).

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

Treatment ^a	Application ^b Rate/A	Plant Parasitic Nematodes / 150 cc soil ^c		
		Root-knot	Stubby	Sting
1 TAPS	25gal/A PPI	392.5b	17.5ab	42.5a
2 TAPS	50 gal/A PPI	590.0b	2.5b	50.0a
3 TAPS	25 gal/A Drip	1665.0a	2.5b	25.0a
4 TAPS	50 gal/A Drip	615.0b	12.5ab	47.5a
5 Vydate	3qt/A Drip	487.5b	32.5a	35.0a
6 Untreated		365.0b	2.5b	42.5a

- a. Data are means of six replications. Means in the same column followed by the same letter are not different ($P = 0.05$) according to LSD. No letters indicate a non-significant difference.
- b. TAPS was applied as a pre-plant incorporated, PPI, using a boom sprayer and a rototiller. Drip application was made through drip tape for two hours at thirty psi.
- c. The at harvest soil sample was taken on 7 October. Root-knot nematode (*Meloidogyne* spp.); Sting Nematode (*Belonolaimus longicaudatus*); Stubby root nematode (*Paratrichodorus* spp.).