

Effect of post-plant application of Vydate on carrot infected with southern root-knot nematode

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Introduction

Root-knot nematodes (*Meloidogyne* spp.) are the most damaging plant-parasitic nematodes to many vegetable crops. The main species affecting carrots in Georgia are southern root-knot (*M. incognita*) and peanut root-knot (*M. arenaria*).

The problem

A vegetable grower in Screven County, GA was challenged with carrots not growing properly. This field had decreased growth, leaf chlorosis and significant galling from root knot nematode (Fig. 1). Telone II (12.5 gal/acre) was applied preplant though field conditions showed lack of efficacy for unknown reasons. The carrots were seeded from September 25 to October 1 of 2019.



Project Objectives

- 1) Evaluate initial impact of nematodes on carrots by taking nematode samples and completing root gall ratings.
- 2) Design a trial to apply multiple applications of Vydate L during the growing season with side by side comparisons of treated and non-treated plots.
- 3) Evaluate benefit of applying Vydate L through analyzing the yield and rating gall damage on carrots at the end of the growing season.



Fig. 1. Initial symptoms of root knot nematode from the infected field include stunting, chlorosis, and gall formation on the roots.

Research plots and treatments:

Research plots were designed to have treated (with nematicide) plots directly adjacent to an untreated plot (Fig. 2). Plots were forty feet long and four beds wide with a minimum of 2 beds for a buffer on each side. Plots were forty-foot-long and four beds wide. Vydate L was applied broadcast by a tractor sprayer covering 9 beds per pass. Two applications of Vydate L were made during the growing season.

Upon project completion, 1 foot of the twin rows from each bed was dug, carrots were washed and sorted by size and weighed. Data on gall severity and nematode numbers in the soil were collected and analyzed.

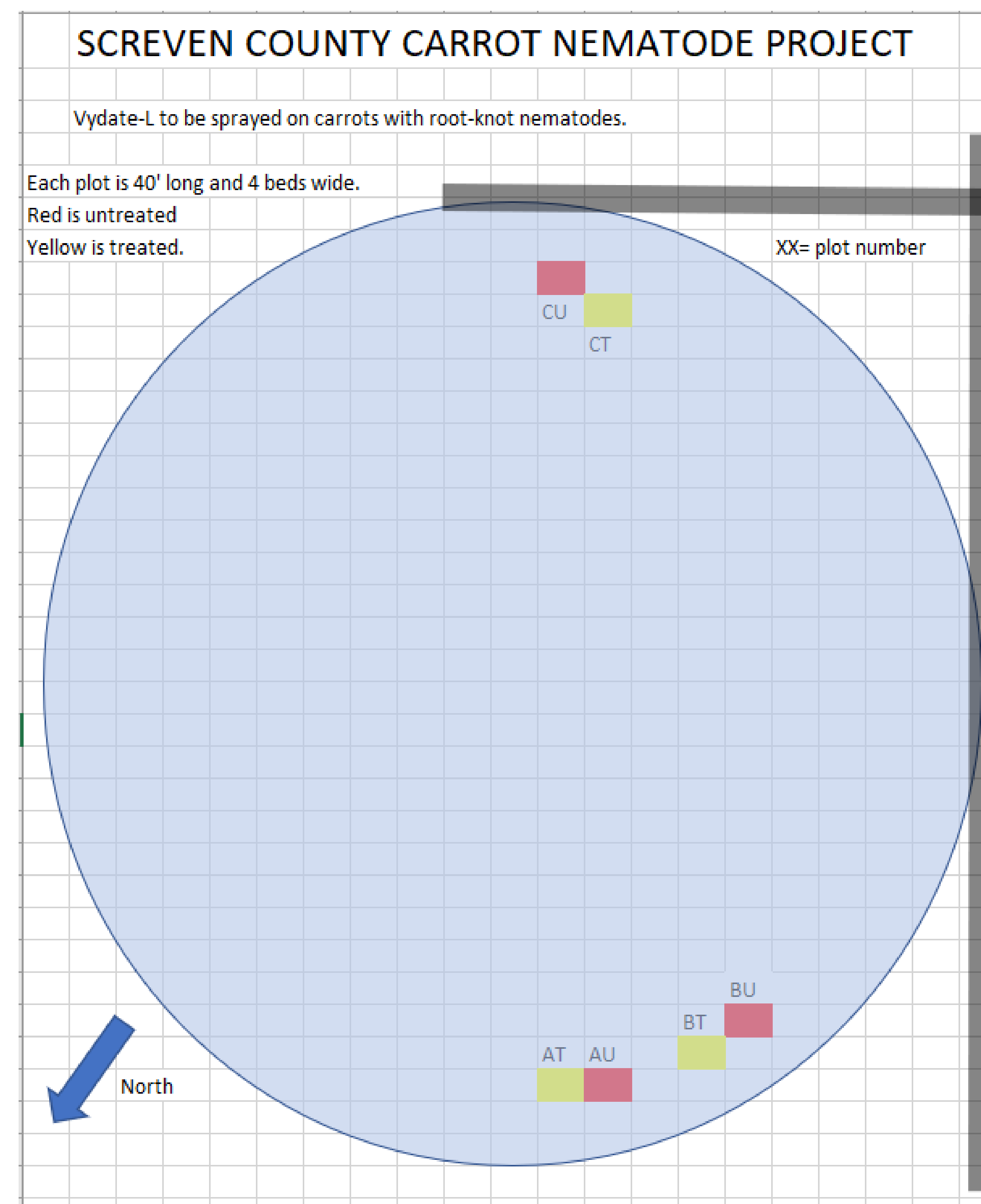


Fig. 2. The experiment site showing the research plots.

Results

- Plants affected by nematodes generally produce smaller fruit. Particularly in carrots, nematodes can cause stunted growth, forked growth and galling (Table 1).
- No significant difference was found in carrot yield between treated and untreated plots.
- The population density of root-knot and stubby-root nematodes in nematicide treated plots were numerically lower but not significantly different than the nematode count in untreated plots (Table 1).
- Numerical reductions were found at harvest in the population densities of both root-knot and stubby-root nematodes as well as reduced gall ratings (Fig. 3 and 4) in treated plots compared to the control.

Table 1. Data on root-knot nematode and carrot yield in plots treated with nematicide Vydate.

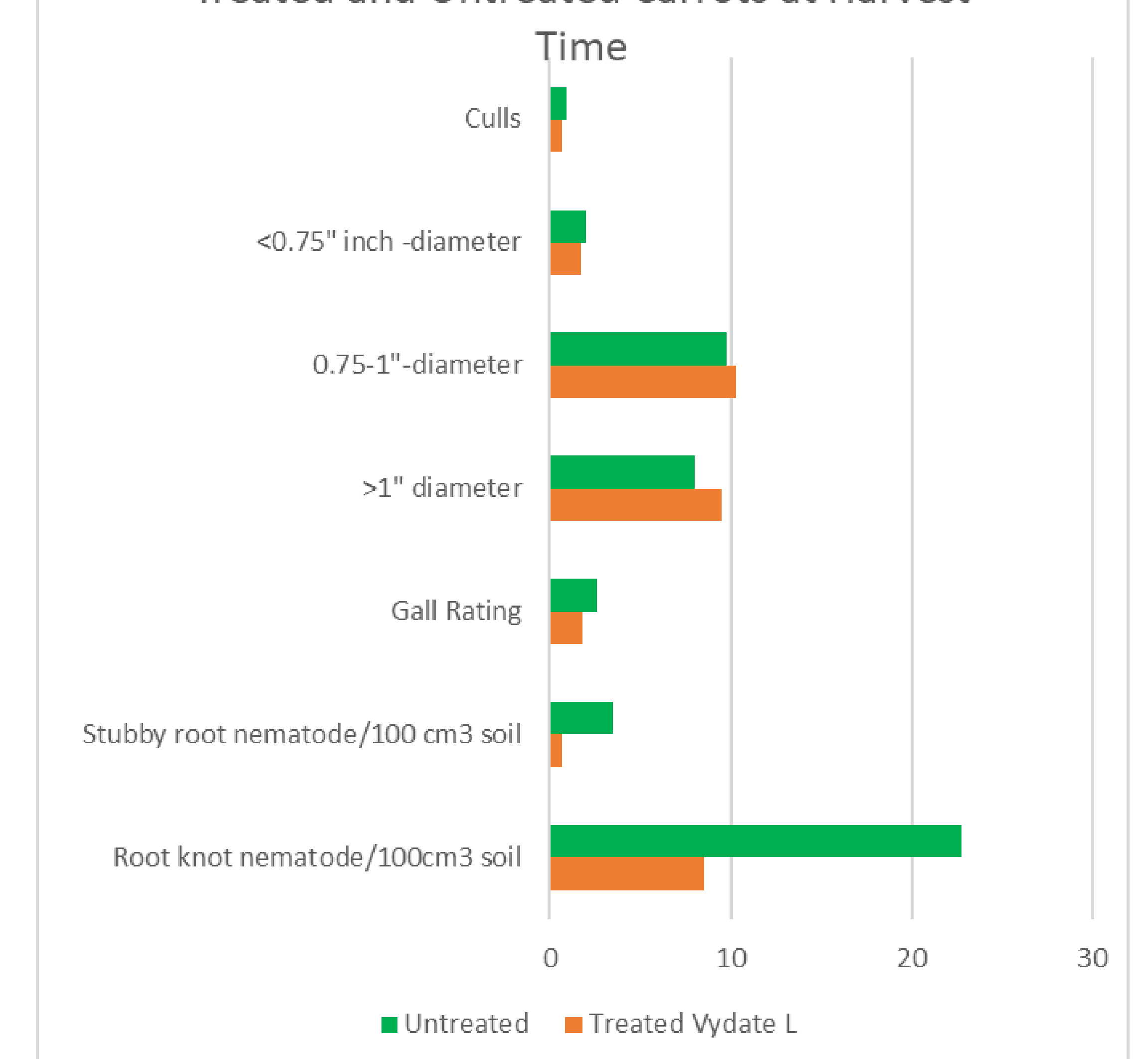
Treatment and rate of product/A	Root knot nematode/100 cm ³ soil	Stubby root nematode/100 cm ³ soil	Gall rating*	Yield (oz/1 ft)			
				>1.0 inch-diam.	0.75-1 inch-diam.	<0.75 inch-diam.	Cull
Vydate L - 64 fl oz	8.5 a	0.7 a	1.8 a	9.5 a	10.3 a	1.7 a	0.7 a
Untreated control	22.8 a	3.5 a	2.6 a	8 a	9.8 a	2.0 a	0.9 a

* Gall ratings assessed on a scale of 0-5 where: 0 = roots with no gall, 1 = 1-5, 2 = 6-10, 3 = 11-20, 4 = 21-30, and 5 = > 30 galls. Each value represents the mean of each treatment. Within a column, values followed by same letter are not significantly different (P=0.05) based on Tukey's test.



Fig. 3. Carrots treated or untreated with Vydate were sorted by size and quality.

Fig. 4. Average of 1 foot of Row Comparison of Treated and Untreated Carrots at Harvest



Conclusion

Overall, the systemic activity of Vydate suppressed root-knot nematode growth in infected roots resulting in relatively better nematode control and lower yield loss.

Acknowledgment

We thank the grower for providing us the opportunity to conduct this research on his farm.



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