



# Evaluating efficacy of a novel nematicide for management of Northern Root Knot nematode in greenhouse strawberry production



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## Introduction

- The Northern root knot nematode, *Meloidogyne hapla* is a major pest of horticultural and field crops (Subbotin & Burbridge, 2021).
- In Canada, reducing total yield and quality of fruits and vegetables due to this nematode is an increasing concern (Bélair, 1998).
- The management of *M. hapla* is challenging (Desaeger, 2022) and limitations on available nematicides in market further reduces farmers options.
- Alternatively, new nematicide with favorable toxicological and environmental effects that will allow Canadian farmers to use under the minor use pesticide program is urgently needed.
- The discovery of studied nematicide which has minimal effect on free-living nematodes and environment has already proven to exert adverse effects on *M. hapla* in several greenhouse vegetables production (Akanwari & Sultana, 2021).
- However, our knowledge of the effect of this nematicide (Y) on *M. hapla* associated with greenhouse strawberries in Canada is unknown.

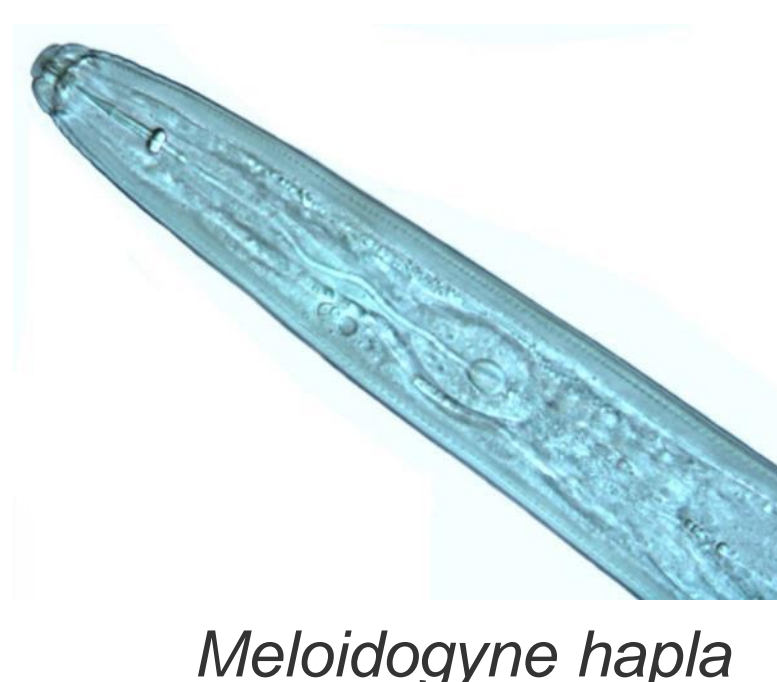
## Objectives

- Determine the effect of different rates of applied nematicide on *M. hapla* reproduction in greenhouse strawberries production.
- Examine whether the use of this new nematicide on greenhouse strawberries have an influence on yield (total, marketable, unmarketable) when applied in the presence of *M. hapla*.
- Estimate the residue level of applied nematicide in the soil overtime.

## Materials and Methods

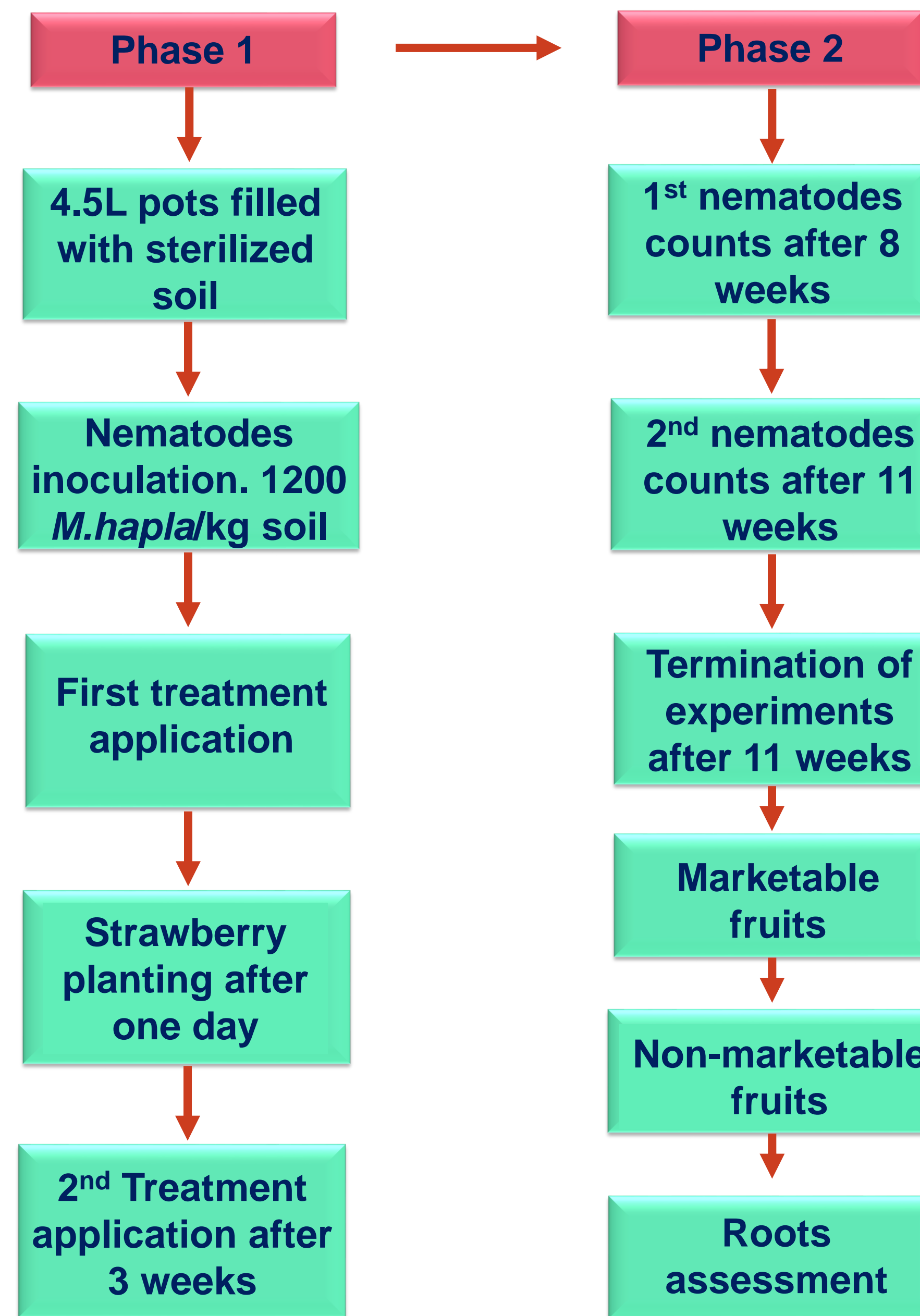
Treatments	First application	Second application
Y1	560 g ai/ha	
Y2	1120 g ai/ha	
Y3	1680 g ai/ha	
Y4	2240 g ai/ha	
Y5	1120 g ai/ha	560 g ai/ha
Volume Prime	250 g ai/ha	
Untreated	Water	

## Greenhouse setup



*Meloidogyne hapla*

## Flow chart



## Results and Discussion

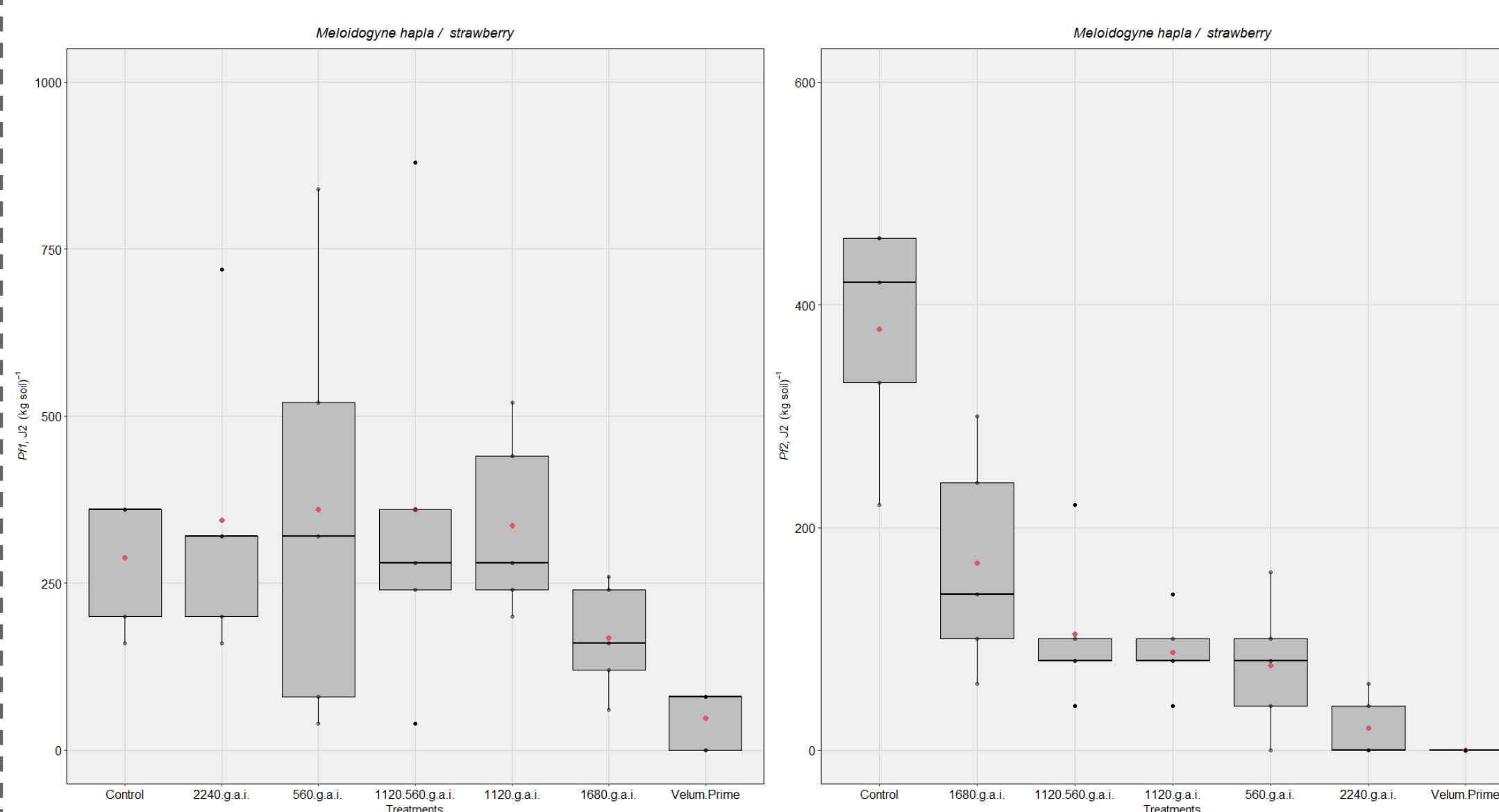
### Damage of *M. hapla* on strawberries



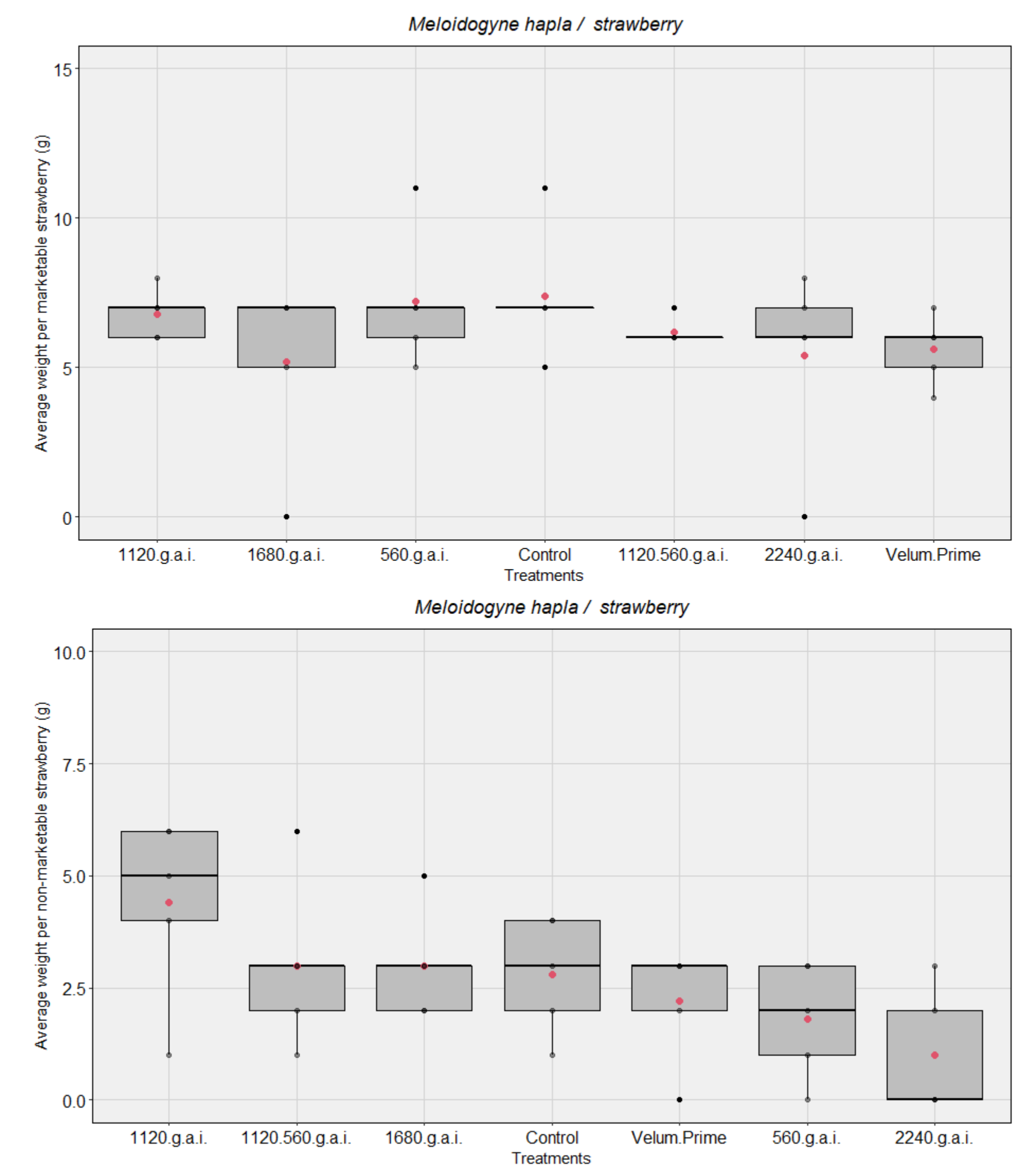
**Fig 1:** Strawberry roots infected with *M. hapla* under different application rate of nematicide Y. A = control, B = 560 g ai/ha, C = 1120 g ai/ha, D = 2240 g ai/ha



**Fig 2:** Root galls on strawberries caused by *Meloidogyne hapla*.  
**Fig 2.1:** Comparison between marketable and non marketable fruits.



**Fig 3:** *M. hapla* reproduction after 8 and 11 weeks. No significant difference was observed after 8 weeks. Except at 1680 g ai/ha, all treatments had significantly lower nematodes reproduction after 11 weeks. 2240 g ai/ha had the lowest nematodes reproduction among the treatments.



**Fig 4.** Average marketable and non marketable fruits. No significant difference was observed between treatments and the control, and this result is consistent with literature. However, 2240 g ai/ha had the lowest average weight of non marketable fruits when compared to our reference nematicide Velum prime

## Conclusion

- All treatments of Y are effective reducing the reproduction of *M. hapla* in strawberry production.
- Y at 2240 g ai/ha rate was very effective in managing *M. hapla* as well as reducing non marketable fruits in strawberry production.
- The root volume in strawberry plants treated with Y was higher than in the control.
- The phytotoxicity data taken at regular intervals showed no residues of Product Y in the soil (data not shown).

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## Acknowledgement

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## References

- Akanwari, J. and Sultana T. (2021): Understanding the efficacy of a novel nematicide for the management of Northern Root Knot nematode. Ontario Pest Management Conference, Virtual, Ontario, Canada. 2 November.
- Bélair, G. (1998). Seasonal and vertical distribution of *Meloidogyne hapla* in organic soil. *Phytoprotection*, 79(1), 1–8.
- Desaeger, J. (2022). *Meloidogyne hapla*, the Northern Root-Knot Nematode, in Florida Strawberries and Associated Double-Cropped Vegetables. UF/IFAS Extension. ENY-070.
- Subbotin, S.A. and Burbridge, J. (2021). Sensitive, Accurate and Rapid Detection of the Northern Root-Knot Nematode, *Meloidogyne hapla*, Using Recombinase Polymerase Amplification Assays. *Plants* 10, 336.