EFFECTS OF BIOFUMIGATION OF SPIDER PLANT (Cleome gynandra L.) AGAINST ROOT-KNOT NEMATODES (Meloidogyne spp.) ON QUALITY OF TUBEROSE (Polianthes tuberosa L.)

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Introduction

- Tuberose (*Polianthes tuberosa* L.) - a fragrant ornamental flower in the family Asparagaceae and genus Polianthes, native to Mexico.
- It accounts for 0.09% of summer flowers which comprise 2.9 % of the total cut-flowers produced in Kenya and is mainly grown by smallholders (HCD, 2017).
- Production constrained by RKN.

Tuberose (*Polianthes tuberosa* L.)

Introduction cont'

- The incorporation of macerated plant materials into the soil to liberate toxic compounds for management of RKN.

- Common with brassicaceae plants that release volatile toxic compounds upon hydrolysis of glucosinates to suppress pests including nematodes (Matthiessen & Kirkegaard, 2006).

- Spider plant (*Cleome gynandra*) emits significant quantities of bioactive compounds including methyl isothiocyanate and their levels of vary among the accessions (Nyalala et al., 2013).

Problem Statement

- Tuberose production is currently threatened by pests especially root knot nematodes which cause extensive yield losses.
- Nematodes like *Meloidogyne incognito* and *Meloidogyne javanica* may completely wipe out tuberose flower industry.
- Nematicides are too expensive for smallholders to afford and belong to toxicity class 1 or 2 which are prohibited or restricted for use.
- Repeated use of synthetic pesticides results in increased pest resistance, environmental pollution elimination of beneficial organisms.

Justification

- Efforts to control root knot nematode have so far proved to be difficult and complex as most of the chemicals are expensive and not environmentally friendly.

- The demand for "healthy products" by consumers coupled with the high cost of pesticide, calls for an integrated approach that focuses on prevention and reliance on cultural and biological control methods that would offer amicable solution to this eminent problem.

- *C. gynandra* is locally available and adaptable to wide range of ecological condition.

Objectives

The **general objective** is to contribute to improved tuberose yield and quality by evaluating the biofumigation efficacy of *C. gynandra* accessions against RKN and their effects on growth, yield and quality of the crop.

Specific objective was to determine the effect of biofumigation with different *C. gynandra* accessions on quality of Tuberose.

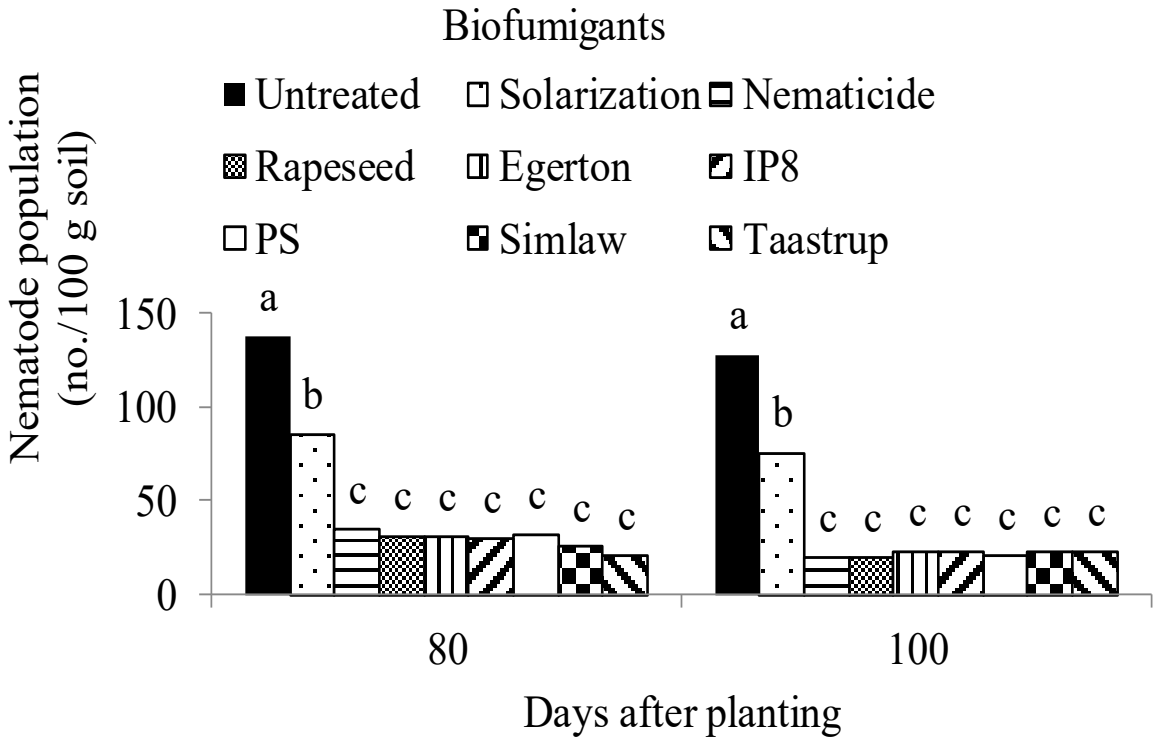
Methodology

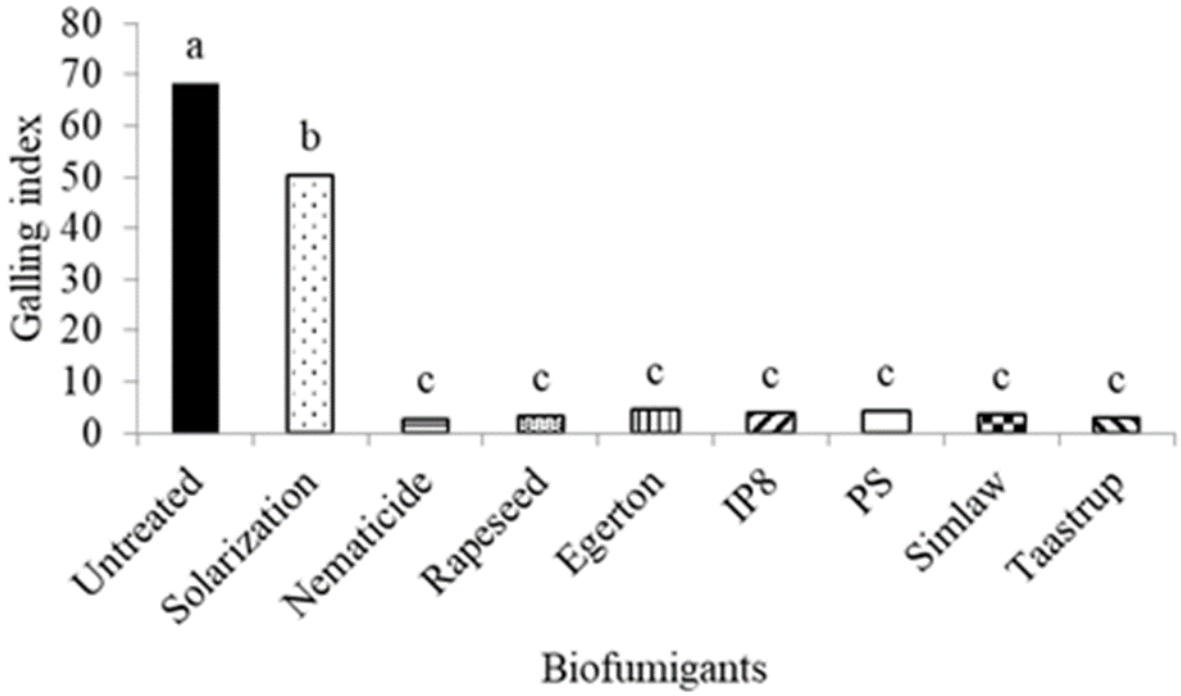
- The study was conducted at the Horticulture Research and Teaching Field, Egerton University, Njoro.
- Nematodes were extracted from infested tomatoes plants and augmented in two weeks old tomato seedling established outdoor, according to Siddiqui & Akhtar (2007).
- The experimental was laid in a randomized complete block design with four replications.
- There were nine treatments consisting of chopped C. gynandra accessions: 'Simlaw- SM', 'Egerton- EG', 'Taastrup- TA', 'PS- PS' and 'IP8- IP'; Brassica napus- BN; fumigant- FU, solarization- SO and; untreated control- UC.

Methodology cont'

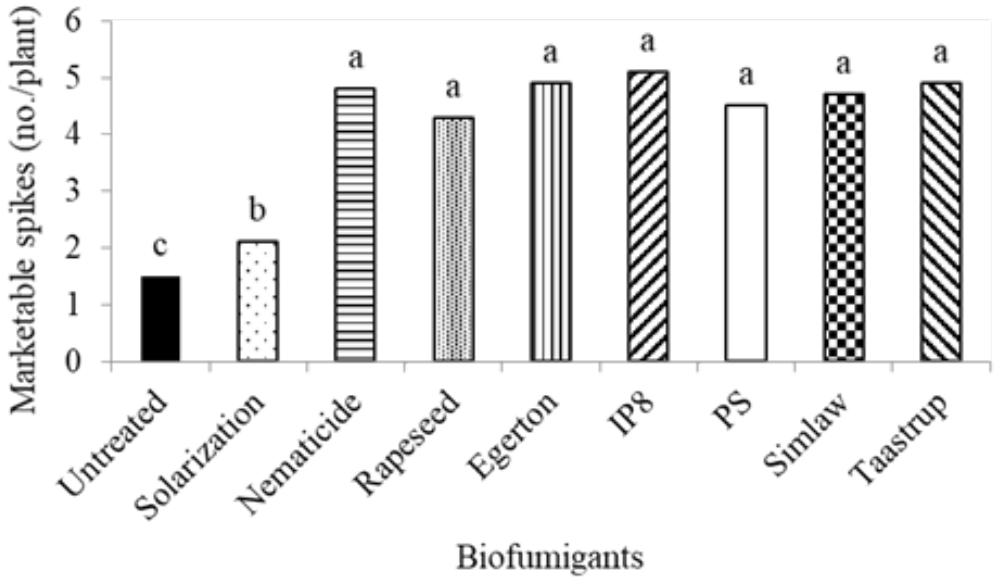
- Data were collected on nematode population, gall numbers, galling index and tuberose quality attributes.
- *Data was analyzed using SAS statistical package (version 9.1; SAS). Institute, Cary, NC) (2005).*
- All numerical data was subjected to analysis of variance (ANOVA) at $p<0.05$ and means for significant treatments was separated using Tukey's honestly significant difference test (HSD) at $p=0.05$.

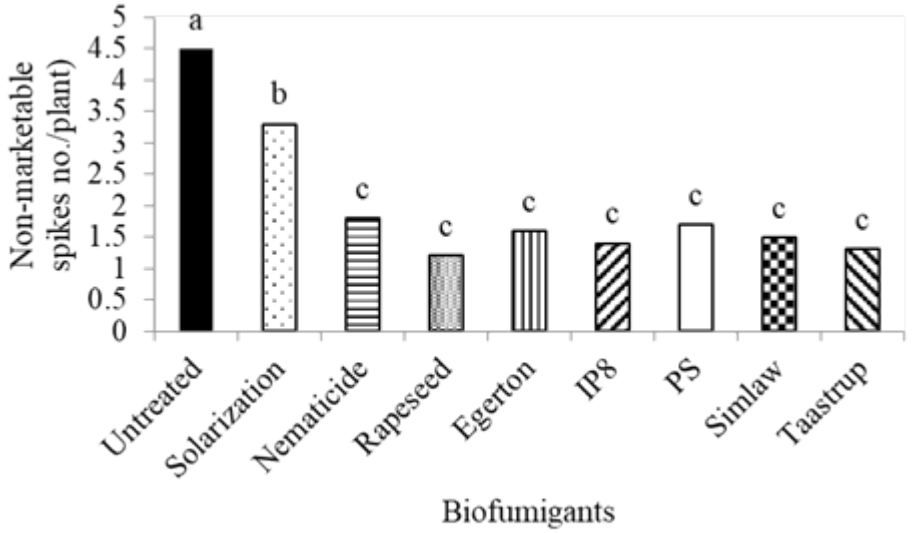
Results- Nematode population and Galling index



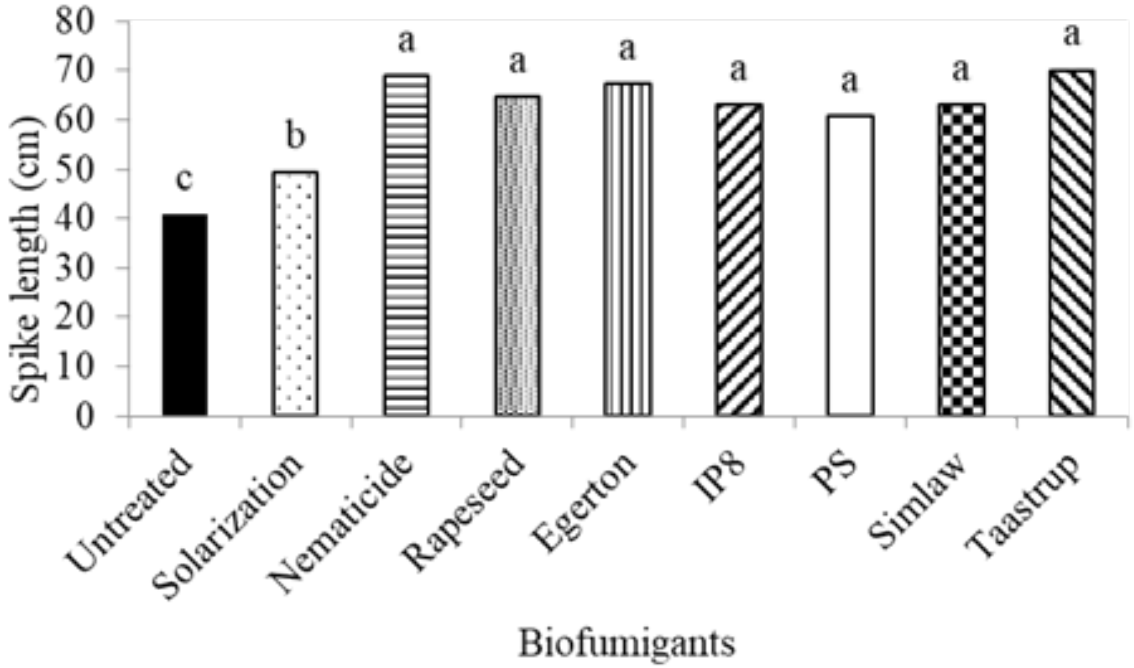


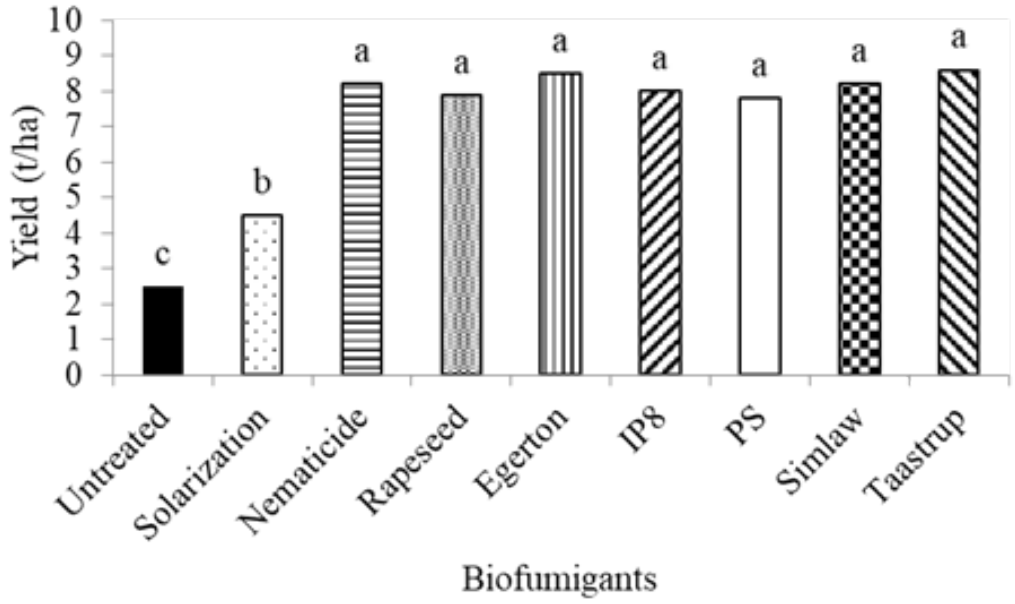
Results cont'-
Marketable and Non-marketable Spikes





Results cont'- Spike Length and Fresh weight





Conclusion

1. *C. gynandra* accessions is as effective as the nematicide (97% dazomet) and rape seed against root-knot nematodes with the different accessions similarly reducing the nematode population in tuberose by 34%, gall numbers by 83% and galling index by be 96%.

2. C. gynandra accessions similarly enhanced quality of tubersose spike length by 32%, marketable spikes by 80%, and reduced nonmarketable spikes by 95% and flower yield by 90% .

Recommendations

1. Biofumigant with any studied *Cleome gynandra* accession can be used to manage root-knot nematodes in tuberose.

2. Biofumiogation with *Cleome gynandra* accessions used in this study can be used to enhance quality of tuberose cut flower.

Acknowledgements

Theme: *"Enhancing Phytosanitary Systems for Healthy Plants, Safe & Sustainable Trade"*
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