

Controlling nematode infection in fruit groves

Abstract

Parasitic nematodes are one of the most biotic threats that cause economic loss for fruit producers worldwide. Nematode infection causes weak vegetative growth and reduces tree productivity, which leads to the deterioration of the whole tree, such as in banana, peach, and citrus cultivations. Therefore, integrated control strategies are required to control nematode infection, reduce the economic loss for fruit growers worldwide, protect human health, and sustain the environment from nematicides hazards.

Keywords: banana, citrus, fruit groves, integrated control strategies, parasitic nematodes, peach trees

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Introduction

Plant-parasitic nematodes (PPNs) are tiny roundworms that reside in the soil and destroy the root systems of numerous plants. PPNS are considered a major threat to the agricultural production of different crops worldwide and cause more burdens on crop production. Yellowing, stunting, and wilting are common nematode signs, and they are all associated with tree decline and decreasing yield.¹ Fruit growers worldwide suffer from significant losses due to nematode infection, such as Banana, citrus, and peach growers.² Previously, different techniques, particularly nematicides, were used to fight nematodes.

Currently, it is more interesting to use integrated strategies for the control of nematodes in fruit orchards. Integrated management for controlling nematodes aims to minimize the use of nematicides to reduce hazards to human health and protect the environment, it includes agriculture practice management like fallow, cover crops, crop rotation, and mulching in addition to biological control.³

Controlling nematode

Various agricultural practices have been tried in fruit orchards to get rid of the nematodes from the soil.

Among these practices are:

- I. Constant flooding of the soil before planting.
- II. bare soil for sufficient time before planting.
- III. Planting non-hosting plants for nematodes like pangolin and Sudan grass.
- IV. Crop rotation before establishment of fruit orchards.
- V. Mulching.
- VI. Cover crops.

Alternate nematode control techniques are becoming more popular because of the hazards of chemical nematicides. Identification and implementation of host resistance for nematode species are considered useful techniques in controlling nematode infection.⁴

Due to the adverse effects of nematicides on human health and their damaging effects on the environment.

Integrated control strategies that include agricultural management practices with resistant rootstocks, Biological control agents, and proper nematicides for controlling nematode infection are required to reduce the economic loss for fruit producers.

Using Biological control agents that include fungi and bacteria is considered an efficient technique to control, reduce, or regulate the nematode population by using living organisms.⁵

Biological fungal agents

There are various fungi, such as *Trichoderma* spp., *Purpureocillium lilacinum*, *Pochonia chlamydosporia* mycorrhizae (*Glomus* spp.). Furthermore, there are numerous species used as a biocontrol agent for their activity against nematodes, such as bacterial species that includes *Bacillus* spp., *Serratia* spp., *Streptomyces* spp., *Pseudomonas* spp., *Agrobacterium* spp., *Arthrobacter* sp., *Corynebacterium* spp., *Azotobacter* spp., *Desulfovibrio* spp., *Clostridium* spp., *Burkholderia* spp., *Azospirillum* spp., and *Chromobacterium* spp.⁶

Conclusion

Fighting nematodes in fruit groves is a very important practice to improve tree growth, increase productivity, and enhance the profitability of fruit growers. While nematicides are harmful to both human health and the environment. Integrated management that uses various agricultural practices and biological agents with minimal use of nematicides is considered an efficient strategy to control nematodes, increase farmers' income, produce safe fruits for humans, and protect the environment.

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Conflict of interest

Authors declare that there is no conflict of interest.

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