CITRUS NEMATODE *TYLENCHULUS SEMIPENETRANS* AND ITS PATHOGENIC RELATION TO CITRUS TREES

A THESIS

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Summary

The present research work aimed to study the occurrence, distribution of plant parasitic nematodes in three governorates (Alexandria, El-Behera and Kafr El-Siekh), pathogencity and control of the citrus nematode *Tylenchuulus semipenetrans* study aimed to identificate plant-parasitic nematodes associated with citrus trees orchards, particularly specially and to eliminate the damages induced by this complex through applications of some bioagents, fungicides and nematicides. Summary of the present work showed the followings:

1. A survey study was conducted to determine the plant-parasitic nematodes associated with citrus trees in Alexandria, EL-Behera and Kafer-Elshiekh governorates. The results indicated that 9 nematode genera were present in the surveyed citrus trees orchards i.e., *Tylenchuulus, Trichodorus, Rotylenchus, Helicotylenchus, Aphelenchoides, Tylenchus, Pratylenchus, Tylenchorhynchus* and *Meloidogyne*.

   In soil samples of the surveyed governorates, *Tylenchuulus semipenetrans* was the most common with 100% FO, and the highest population density (1105 – 7121 J_2s /250g soil). The other nematode genera and their respective percentage of occurrence were; Trichodorus (16.4%), *Pratylenchus* (14.6%), *Helicotylenchus* (13.3%), *Aphelenchoides* (10.9%), *Tylenchorhynchus* (8.4%), *Meloidogyne* (3.6%), *Rotylenchus* (2%) and *Tylenchus* (0.23%).

2. The reaction of the citrus species sour orange rootstock (*C. aurantium*), mandarine *(Citrus deliciosa*) and lime (*Citrus aurantifolia*) to *T. semipenetrans* indicated that all the tested citrus species were susceptible to *T. semipenetrans*. Seedlings of the tested citrus species showed symptoms of slow decline disease such as smaller leaves, stunt growth and di-eback branchs.

3. The reaction of the grapevine cultivars Crimson and Thompson to the citrus nematode, *T. semipenetrans* indicated that the tested cultivars were susceptible to *T. semipenetrans*. Infection with *T. semipenetrans* reduced the shoot and root dry weights of the tested grape cvs Crimson and Thompson seedless.

4. The reaction of the olive cultivars Spanish, Ogeizei and Pikwal to the citrus nematode, *T. semipenetrans* indicated that all the tested olive cultivars were susceptible to *T. semipenetrans*. Infection with *T. semipenetrans* reduced the shoot and root dry weights of the tested olive cultivars.

5. The reaction of the loquat seedlings to citrus nematode, *T. semipenetrans* indicated that all the tested seedlings were susceptible to *T. semipenetrans*. Infection with *T. semipenetrans* reduced the shoot and root dry weights of loquat seedless.

6. The reaction of the Kaki seedlings *T. semipenetrans* indicated that the tested Kaki seedlings were susceptible to *T. semipenetrans*. Infection with *T. semipenetrans* reduced the shoot and root dry weights of Kaki seedlings.

7. The effect of *Bacillus subtilis* and *Bacillus* sp. against 2nd stage juveniles of *T. semipenetrans* was studied *in vitro*. The results showed that *B. subtilis* and *Bacillus* sp. had a high mortality effect (58-100%) on *T. semipenetrans* 2nd stage juveniles.

8. The effect of the plants extractsi.e., moringa (*Moringa oleifera*), dodonia (*Dodonnea angustfolia)* and basil (*Ocimumb asilicum*) on the mortality of *T. semipenetrans* 2nd stage juveniles was studied, *in vitro.* The results showed that the highest mortality effects (85-100%) were induced with moringa and basil treatments, whereas dodonia treatment gave a lesser mortality percentage of nematode juveniles.

9. The effects of the biocontrol agents i.e., (*Bacillus subtilis* and *Bacillus* sp., moringa (*Moringa oleifera*) and abamectin) and nematicides i.e., Nemacur®10G and Fibermax® 10% GR on the infections of *T. semipenetrans* on citrus seedlings indicated that the highest reductions of citrus nematode (99-100%) were recorded with treatments of moringa and abamectin. *Bacillus subtilis* &Nemacur®10G gave 78.4-89.6% reductions of *T. semipenetrans* and enhanced growth of shoot and roots system of seedlings.

10. The effects of soil treatments with the biocontrol agents abamectin and six nematicides, i.e.,Nemacur®L, Rugby® L, Fluopyram®, Krop card®, Dinto® and Fibermax® on the

infection citrus trees cv navel orange (*citrus sinensis L.*) grafted on sour orange rootstock with *T. semipenetrans* indicated that the highest reductions (99- 97 -92%) of *T. semipenetrans* 2nd stage juveniles *T. semipenetrans* were obtained with Rugby®, abamectin and Nemacur® respectively®, followed by Fluopyram® treatment whish showed (76%) reductions in *T. semipenetrans* J_2s. Fibermax® and Krop card® showed (50- 52%) reductions, but the lowest reductions was obtained with Dinto® (0%). All treatments enhanced growth of shoots, branched and roots of the treated trees, compared to untreated trees.