Replant Treatments for Coffee in Root-knot Nematode Infested Fields

Session 2
Myers

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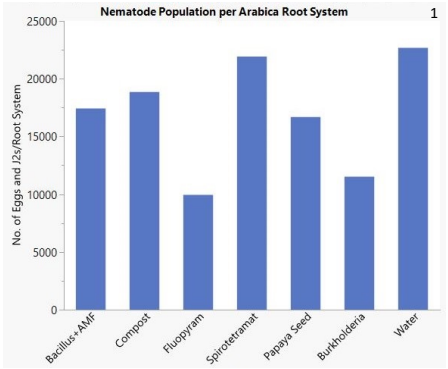
Introduction

In Hawaii coffee plantations, *Meloidogyne konaensis*, Kona coffee root-knot nematode, is highly pathogenic *on Coffea arabica* cv. Typica. The nematodes feed on the tap root causing galling, cracking, and loss of feeder roots. The destruction of the root system leads to defoliation, toppling, yield reductions, and eventually mortality of susceptible trees. In this study, chemical and biological nematicides were evaluated for their efficacy at reducing *M. konaensis* populations when replanting in infested fields.

Materials/Methods

Fluopyram, spirotetramat, *Burkholderia* spp. Strain A396, *Bacillus subtilus* + arbuscular mycorrhizal fungi (AMF), 1% papaya seed, and compost were compared to an untreated control in a greenhouse bioassay. *Coffea arabica* cv. Typica and *C. liberica* cv. Arnoldiana were planted in pots inoculated with 2500 *M. konaensis* and treated quarterly. Nematode reproduction, plant growth, root weight, and root health were evaluated after 1 year.



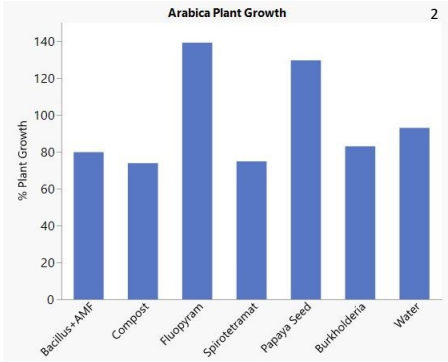


Figure 1: Reproduction of *Meloidogyne konaensis* on inoculated Arabica roots after one year with quarterly treatments of chemical and biological nematicides.

Figure 2: Percentage of growth in inoculated Arabica plants over one year with quarterly treatments of chemical and biological nematicides.

Figure 3: Inoculated Arabica roots with no treatment (A), spirotetramat (B), fluopyram (C), and inoculated Liberica roots with no treatment (D).

The lowest nematode populations in Arabica roots were observed in fluopyram and Burkholderia treatments, whereas in Liberica roots, Bacillus+AMF and compost treatments had the lowest nematode numbers. Root weights were highest in Liberica treated with fluopyram or compost. Plant growth was higher in Arabica seedlings treated with fluopyram or papaya seed compared to untreated Arabica. Liberica treated with fluopyram had the highest plant growth. Untreated inoculated Liberica plants demonstrated greater plant growth than all treated Arabica.

Conclusion/Perspectives

Fluopyram reduced nematode populations in susceptible Arabica roots while also improving shoot growth.Overall tolerant Liberica plants were healthier and more vigorous than Arabica in nematode-infested soil, confirmation that nematode tolerant rootstocks should be utilized when replanting in nematode-infested fields.