FIELD EVALUATION OF NONCHEMICAL ALTERNATIVES FOR CONTROL OF RING NEMATODE ON PEACH

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The ring nematode, *Mesocriconema xenoplax*, causes peach trees to be more susceptible to peach tree short life disease (PTSL) and is widespread throughout the major peach producing areas of Georgia and South Carolina. Tree losses due to this nematode-associated disease has generated a growing awareness that suitable alternatives to presently registered nematicides have not been developed for peach and need to be explored. Rootstock resistance and crop rotation are just two key research areas that are being investigated at our location and have been reported on at past MBAO conferences. The objective of this study was to evaluate selected crop rotations in conjunction with Guardian rootstock for suppression of ring nematode and incidence of PTSL

Materials and Methods

The experiment was initiated in 1996 at the ARS laboratory in Byron, GA. For this study, 5 different preplant rotations in conjunction with an improved rootstock are being compared for their effectiveness in suppressing the ring nematode and incidence of PTSL tree death. Wheat and sorghum rotation crops chosen for this study were known to suppress ring nematode (Nyczepir and Bertrand**,** 1990; Nyczepir, et al., 1996). Canola was also chosen because greenhouse evaluations indicated that it was a nonhost to *M. xenoplax*.

Rotation establishment - In the initial phase of the study, 5 different preplant crop rotations and continuous peach plots [i) 1-yr wheat/sorghum; ii) 3-continuous yrs wheat/sorghum; iii) 3-continuous yrs fallow/sorghum; iv) 1-yr canola/sorghum; v) 3-continuous yrs canola/sorghum and vi) 3-continuous yrs peach] were established. Crop rotation sequences were tested against continuous peach (ring nematode susceptible Nemaguard rootstock) to determine if nematode populations were suppressed during this period of time.

Rotation evaluation - After crop rotation sequence establishment in 1999, all trees were removed from the continuous peach plots and 2 the number of these plots were then preplant fumigated with methyl bromide, resulting in 7 main plot treatments. In 2000, all plots were split and planted to either Redhaven peach on Nemaguard or Guardian (i.e., ring nematode tolerant) rootstock. Nematode populations (Mar. & Dec.) and percentage of PTSL tree survival were recorded.

Results and Discussion

Rotation establishment – In June 1999, all wheat-sorghum, canola-sorghum, and fallow-sorghum rotations suppressed ($P \leq 0.05$) nematode populations compared with the 3-yr continuous peach treatment. Suppression of ring nematode appeared to be the result of Stacy wheat being a poor host and NK2660 sorghum & canola being nonhosts to *M. xenoplax.*

Rotation evaluation – Ring nematode populations were greater ($P \leq 0.05$) on Nemaguard than for Guardian rootstock on all sampling dates (2000-2003), indicating that Nemaguard was a better host for the nematode.

The effect of rotation in suppressing the ring nematode population was evident 10 and 15 months after replanting the site back to peach in Feb. 2000. Ring nematode populations were higher ($P \leq 0.05$) in the 1-yr wheat/sorghum, 1-yr canola/sorghum and unfumigated plots than in the 3-continuous yrs wheat/sorghum, fallow/sorghum, and canola/sorghum and fumigated plots. No differences in nematode numbers were detected among the latter 4 treatments at that time. Twenty-four months after methyl bromide application, the nematode population in the fumigated plots did not differ from those in the untreated plots; similar results were observed for subsequent sampling dates.

Peach trees developed typical PTSL symptoms and died during the experiment. In June 2001 (16 months after replanting site back to peach), more ($P \leq 0.05$) trees developed PTSL and died in the 1-yr wheat/sorghum (25%), 1-yr canola/sorghum (19%) and unfumigated (24%) plots than in the 3-continuous yrs wheat/sorghum (2%), fallow/sorghum (6%), canola/sorghum (1%), and methyl bromide fumigated (2%) plots. Twenty-six months (April 2002) after replanting peach, only the 3-continuous yrs wheat/sorghum (16%), fallow/sorghum (18%) and canola/sorghum (4%) plots had fewer ($P \leq 0.05$) dead trees than the unfumigated (34%). Differences in PTSL tree death among rotation and fumigation treatments were not detected in 2003. However, more ($P \leq 0.05$) trees on Nemaguard rootstock (65%) developed PTSL symptoms and died than on Guardian rootstock (2%).

Results from this study indicate that integration of certain rotation practices in conjunction with the improved Guardian rootstock will provide the basis for developing a nonchemical pre- and postplant recommendation for managing the ring nematode in establishing peach orchards on PTSL sites.

References

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