The Effect of Nematode Isolate and Soil Environment on the Tobacco Cyst Nematode (*Globodera tabacum solanacearum*), a Pathogen of Flue-Cured Tobacco and Other Solanaceous Crops

by

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(ABSTRACT)

Tobacco cyst nematodes (TCN), *Globodera tabacum solanacearum*, are one of the most serious pests for Virginia flue-cured tobacco (*Nicotiana tabacum* L.) farmers. These nematodes continue to spread to new farms every year and are now reported in 11 Virginia counties, seven North Carolina counties, and one farm in Maryland. The objectives of this study were to determine the ability of different populations of TCN to reproduce upon both a susceptible (K326) and resistant (NC567) cultivar, to compare TCN reproduction in non-infested soils with currently TCN-infested soils, and to examine reproduction and pathogenicity of TCN on other solanaceous crops.

Tobacco cyst nematode reproduction on the TCN-resistant cultivar NC567 was significantly reduced when compared to the TCN-susceptible cultivar K326. Although significant differences among the populations were detected on both cultivars, the differences were not consistent across experiments. Results indicate similar pathogenicity among TCN populations on resistant and susceptible flue-cured tobacco cultivars. Plant breeders may use one population of the tobacco cyst nematode to screen tobacco germplasms for TCN resistance.

Significant differences were noted in TCN reproduction among the various soils used in this study. However, the differences were inconsistent, making correlations between TCN reproduction and soil edaphic characteristics unreliable. Sterilizing the soils did not increase TCN reproduction. Reproduction in non-infested soils indicates that TCN will continue to spread throughout tobacco producing regions.

Although traditionally an exclusive pest of tobacco, TCN's spread may threaten production of other solanaceous crops. Eggplant (*Solanum melongena* L.), pepper (*Capsicum* spp. L.), and tomato (*Lycopersicon* spp. L.) were confirmed to be hosts of TCN under field conditions. Eggplant was highly susceptible to TCN reproduction and yield suppression, exhibiting a 64% yield reduction in plots not treated with a nematicide compared to fumigated plots. Tomato allowed high rates of TCN reproduction but did not suffer yield loss. Tobacco cyst nematode reproduction was suppressed on pepper compared to the other two crops. No crop loss was noted in nontreated pepper plots compared to plots treated with a nematicide. Results would indicate that tobacco rotations including tomato or eggplant would be unacceptable due to high TCN reproduction rates. The tobacco cyst nematode does not seem to jeopardize the production of tomato and pepper in the southeastern United States, but does threaten profitability of eggplant production in this area.

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