

Ohio Vegetable & Small Fruit Research & Development Program

Final Report

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Project Title: Identifying tomato rootstocks resistant to key soilborne diseases in Ohio high tunnels

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Why was this project funded? Previous tomato grafting studies in Ohio have focused on grafting's impacts on yield and vigor, while impacts on soilborne diseases were not examined. Soilborne disease complexes in Ohio high tunnels consist of Verticillium wilt (*Verticillium dahliae*), Fusarium wilt (*Fusarium oxysporum* f.sp. *lycopersici*), corky root rot (*Pyrenochaeta lycopersici*), black dot root rot (*Colletotrichum coccodes*), and root knot nematodes (*Meloidogyne* sp.). The objective of the proposed research was to identify tomato rootstocks that are resistant or tolerant to key soilborne diseases in Ohio high tunnels.

Project outline. We are screening eight commercial rootstocks and 18 rootstocks from the breeding program of Dr. David Francis against two Ohio strains of each of the following fungal pathogens: *Pyrenochaeta lycopersici* Type 1 (strains HT62 and HT68) and Type 2 (strains HT43 and HT46), causal agents of corky root rot of tomato, and *Colletotrichum coccodes* (strains HT8 and HT60), causal agent of black dot root rot. Fungi were grown in small Petri plates containing ½ or ¼ strength acidified potato dextrose agar with five plates of each medium used for each culture. *Pyrenochaeta* cultures were grown for four weeks, while *Colletotrichum* cultures were grown for two weeks. For inoculation, all 20 plates of the two strains of each fungus were placed in a blender and homogenized in 300 mL of sterile distilled water and of the homogenate was brought to 1 liter with sterile distilled water. The homogenized fungal slurry was added to 1.5 kg of dry, coarse vermiculite and 4 liters of distilled water was added to the vermiculite and mixed by hand. The infested vermiculite was placed in 72-cell plug trays and then planted with the various rootstocks and tomato 'Moneymaker' as a susceptible control. Six cells were planted for each rootstock and pathogen combination and non-infested vermiculite was used for a negative control. Seedlings were grown in the

greenhouse for eight weeks; however disease severity was not sufficiently high in susceptible controls and additional weeks have been added to the assay. At assessment, roots will be washed in tap water and examined for disease. Roots will be rated using a 1-5 taproot rating scale: 1: taproot healthy, 2: one to two small lesions or slight discoloration on taproot, 3: multiple lesions covering less than 50% of the taproot, 4: multiple lesions covering more than 50% of the taproot, 5: taproot completely rotted or missing.

Rootstocks: Maxifort, Estamino, Beaufort, Trooper, Stallone, Yedi, Colosus, Arnold, FG08-103, SG08-329, SGH06-220, FGH-324, SGH06-211, WG12-125, FGH06-306, FGH06-313, SGH06-216, FG11-321, FG13-801, FG11-304, FG12-180, FG11-330, WG12-131, FGH06-301, SGH06-217 and SGH06-212.

What was discovered? These experiments are still in progress, and a supplemental report will be submitted upon completion of the screening in 2-4 weeks.

Take-home messages.

- Trial results will provide an indication of relative susceptibility of rootstocks to corky root rot and black dot root rot. This information will be useful for growers in choosing rootstocks for high tunnel tomato production.
- Breeding lines showing high degrees of disease resistance will be selected as potential new rootstocks.