Fresh market tomatoes have been increasingly grown in high tunnels because of the extended production season, higher yield and better fruit quality. Unfortunately, high tunnel production of tomatoes is often limited by the foliar disease leaf mold (*Passalora fulva*), which may cause defoliation of tomato plants. While some tomato varieties have resistance to leaf mold, growers often chose varieties based on consumers' preference rather than the disease resistance. Grafting is becoming increasingly accepted among fresh market tomato growers because this technology is known to increase yields and offer resistance to soil borne diseases. Yet, it is unknown how grafting affects susceptibility to leaf mold. In this study, the leaf mold susceptible variety 'Mountain Spring' was grafted with tomato rootstock 'Maxifort'. Non-grafted plants were used as controls. Six fungicide treatments, i.e. Dithane® (mancozeb), Badge X2® (copper), InspireSuper® (difenoconazole + cyprodinil), Serenade® (*Bacillus subtilis*), Milstop® (potassium bicarbonate) and an untreated control were applied weekly beginning 3 June when the leaf mold symptoms were first observed. The experimental design was split-plot design with fungicide as the whole-plot treatment and grafting as the sub-plot treatment. Leaf mold symptoms were evaluated using a Horsfall-Barratt scale; Area Under the Disease Progress Curve (AUDPC) were calculated. In addition, we recorded the number of leaf lesions on individual leaves. Tomato harvest started on 15 Jun. and ended on 7 Sept. The values of AUDPC were significantly lower for plants treated with Dithane® and InspireSuper® than other fungicide treatments and the untreated control. However, no significant differences in tomato yields were observed among the fungicide treatments. Grafted and non-grafted plants had similar AUDPC values. But more leaf mold lesions were observed on individual leaves of grafted plants. Grafting slightly delayed the early harvest of tomatoes in June, but it significantly increased tomato yield by 19% compared with non-grafted controls during the production season. Total soluble solids (TSS), pH, and titratable acidity of tomato fruit were evaluated on 5 July and 15 Aug. No significant differences in the quality attributes were observed in the first evaluation. But tomatoes harvested from plants treated with Dithane® had significantly higher TSS compared with non-treated control, as well as plants treated with Serenade®, Copper® and Milstop®. This study indicated that leaf mold can reduce fruit quality. Grafted tomatoes had increased yields, but were associated with increased lesion numbers on leaves.

3:15 PM – 3:30 PM

## Grafting and Microbial Crop Biostimulant Effects on Early Growth of Greenhouse Tomato

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We set out to determine the separate and combined effects of a microbial crop biostimulant (MCBS) and grafting on early growth of greenhouse tomato. The experiment was repeated three times (June-July 2015 and 2016, and November 2016-January 2017) at the OARDC in Wooster, Ohio. Each run lasted five weeks from transplanting to completion of data collection and employed a split plot design with four replications. A commercial MCBS ('Environoc 401') containing multiple species of nitrogen-fixing and phosphorous-solubilizing bacteria was applied to tomato seedlings grafted onto three different rootstocks ('SuperNatural', 'Maxifort', and 'Estamino') and the ungrafted scion 'BHN 589'. Non-inoculated plants were used as a second control. Grafted plants were purchased from Plug Connection (Vista, California) in Runs 1 and 2 and prepared at OARDC in Run 3. Grafted and ungrafted plants (6–8 weeks old with four true leaves) were transplanted to 15-cm diameter plastic pots filled with Promix (Premier Horticulture, Québec, Canada) medium. Half of all plants were drenched with 50 ml of microbial solution around the stem and beneath the canopy at 3, 5, and 7 days after transplanting. Non-inoculated plants received only the same amount of water. Each drench contained 3.3 x 106 colony forming units (CFUs), giving a total of 107 CFUs per plant. Plant height, stem diameter at 5 cm above the soil, total branch length, and total number of opened flowers and fruit were measured weekly in all runs, while percent leaf coverage and root fresh and dry biomass were only measured in Runs 1 and 3, respectively. Generally, inoculated plants were statistically or numerically taller, and had greater total branch length and more opened flowers and fruit than non-inoculated plants at each weekly measurement in all runs. Stem diameter was greater in inoculated plants only in Run 2. Regarding grafting effects, 'BHN 589'–'SuperNatural' and 'BHN 589'–'Maxifort' plants were taller and had larger total branch length than ungrafted plants in the first two runs. 'BHN 589'–'Estamino' plants were similar in all vegetative variables to ungrafted plants but had the largest number of opened flowers and fruit in all runs. Most additive effects (grafting and inoculation effects used in combination > arithmetic sum of grafting and inoculation effects) were observed starting at two weeks after transplanting. The data indicate that grafting and microbial crop biostimulants can be used alone or in combination to enhance early growth in greenhouse-grown tomato.

3:30 PM – 3:45 PM

## Grafting Melons Increases Yield, Harvest Period, and Resistance to Sudden Wilt

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Melons (*Cucumis melo* L.) are potentially a high value crop for New England, but production is limited by cool soil temperatures in spring and sudden wilt. Sudden wilt, characterized by rapid wilting of vines as fruit near maturity, reduces fruit quality and yield. Use of early varieties, raised beds, black plastic mulch and rowcovers have increased early melon yields, but has not reduced the incidence of sudden wilt. One promising solution