pots filled with Metro-mix 360 commercial substrates. During the one-month experimental period (12 Aug. to 12 Sept. 2013), seedlings were treated with nutrient solution (control) at electrical conductivity (EC) of 1.1 $dS \cdot m^{-1}$ or saline solution at EC of 5.0 $dS \cdot m^{-1}$ (salt treatment) for a total of seven times. All chili pepper plants did not experience any visible foliar salt damage (leaf edge burn, necrosis, or discoloration). However, salt treatment significantly decreased plant growth with large variations among cultivars. Plant height, leaf area, and shoot dry weight of 18 chili pepper cultivars reduced by 7% to 34%, 17% to 47%, and 13% to 39%, respectively. Hierarchical cluster analysis was conducted based on multivariate parameters including relative plant height, leaf area, and shoot dry weight. All chili pepper cultivars were clustered into three groups. *Capsicum annuum* 'Keystone Resistant Giant' and 'New Mexico 6-4' were the most tolerant cultivars to salinity. *Capsicum annuum* 'Charleston Hot', 'Golden Bell', 'Hungarian Yellow Wax', 'Mesilla Cayenne', 'Mirasol', 'NuMex Centennial', 'NuMex Española Improved', and *Capsicum frutescens* 'Malagueta' had intermediate salt tolerance, whereas *Capsicum annuum* 'Barker's Hot', 'California Wonder', 'Cayenne', 'Pimiento', 'Rio Grande', 'Sandia', 'Sonora', and *Capsicum frutescens* 'Tabasco' were the most sensitive cultivars to salinity.

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(359) Yield and Fruit Quality of Field-grown Grafted Tomato with Different Plant Spacings

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Plant spacing is a major production factor affecting tomato growth and yield as well as economic returns. As growth promotion and yield improvement are increasingly recognized as benefits of grafting it is important to determine the performance of grafted tomato plants in response to different planting densities. In this field experiment conducted at the University of Florida, Plant Science Research and Education Unit, Citra, FL, in Fall 2015, determinate tomato 'Tribute' was grafted onto three hybrid tomato rootstocks, including 'Estamino', 'Multifort', and 'RST-04-106-T', while non-grafted 'Tribute' was used as a control. Plants were grown in a fumigated field with five different in-row spacings (i.e., 0.46, 0.61, 0.76, 0.91, and 1.07 m). The experiment was arranged in a split plot design with four replications with spacing as the whole plot factor and grafting the subplot factor. Results showed that although the average fruit weight was not significantly affected by either grafting or spacing, marketable fruit number and weight per hectare were markedly impacted. Grafting with 'RST-04-106-T' and 'Multifort' resulted in significantly higher total marketable fruit weight as opposed to non-grafted plants, while plants grafted with 'RST-04-106-T' also had higher total marketable fruit number than all other treatments including the non-grafted control. Marketable fruit weight and number were significantly higher in plants grown at 0.46 and 0.61 m than that at 0.91 and 1.07 m. The regression analysis suggested that grafted plants especially those with 'Multifort' and 'RST-04-106-T' could be grown at wider spacing while maintaining/improving marketable yield in contrast to non-grafted plants. Neither grafting nor spacing showed any significant influence on tomato fruit soluble solids content, titratable acidity, and pH. Interestingly, 'Tribute' grafted onto 'Estamino' and 'RST-04-106-T' exhibited higher ascorbic acid concentrations as the in-row spacing increased, whereas the opposite trend was observed in tomatoes from the non-grafted plants and plants grafted with 'Multifort'. Grafting with 'RST-04-106-T' significantly increased fruit dry matter content as compared with non-grafted and other grafted plants. With respect to lycopene content, grafting resulted in significantly higher levels despite the rootstock cultivar used. Lycopene content at 0.46 m spacing was significantly lower than other spacing treatments. Grafting did not affect tomato total phenolic content but the 0.61 m spacing led to a significant increase in total phenolics of tomato fruit than the 0.46 and 1.07 m spacing treatments.

(360) Yield and Fruit Quality of Grafted Tomato Plants in Organically Managed High Tunnels Containing Zones with Different Compost Application Histories

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Documenting the performance of grafted plants under a wide range of conditions will allow many to benefit more reliably from grafting as an emerging technology in the United States. The goal of this research was to document grafted and ungrafted plant performance in organically-managed high tunnels containing zones with different compost application histories, using fruit yield and quality as primary indicators. Studies were conducted in 2012, 2013, and 2015 using a split-plot design with compost application history as the main plot and grafting combination as the subplot. Two compost treatments were included, one with annual compost application since 2003 and the other with no soil amendment since 2002. Two commercial rootstocks ('Maxifort' and 'Emperador') and one experimental line ('338') grafted to the same scion ('Moskvich') and ungrafted 'Moskvich' controls were employed in 2012 and 2013; two commercial rootstocks ('Maxifort' and 'Estamino') grafted to ('BHN589') and un-

grafted 'BHN589' controls were used in 2015. Ripe fruits were harvested weekly 8–9 times to measure weight and number of total fruit, marketable fruit, and fruit showing blotchy ripening, and a subset of fruits was analyzed for °Brix, pH, and titratable acidity (TA). Consistent yield trends were observed across the three years. Yield was greater in plots with a history of compost application and in plots containing grafted plants. Average marketable fruit weight was not different among grafting and compost treatments in 2012 and 2013, but it was larger for grafted versus ungrafted plants in 2015. Likewise, percent marketable yield was higher in compost-amended versus non-amended and grafted vs. ungrafted plots in 2013 and 2015, perhaps because compost application and grafting were associated with declines in the percent of fruit showing blotchy ripening in both years. However, Brix tended to be lower in fruit from grafted versus ungrafted plants across all years, while pH was higher in fruit from grafted vs. ungrafted plants in 2012 and 2015. TA was not affected by grafting, but it was higher with compost application in 2012. The compost-grafting interaction was not significant for most variables. We conclude that compost application and grafting can increase fruit marketable yield and alter some fruit traits, including °Brix and blotchy ripening. Grafted plants have a higher yield potential than ungrafted ones regardless of whether compost was applied to soils previously or not.

(361) Grafting English Cucumber Onto a Gourd Rootstock Improves Pot Cucumber Yield and Disease Resistance in Greenhouse

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Greenhouse production of high value vegetables from late fall to early spring provide farmers opportunity to target peak market prices and capitalize on the rising demand for locally grown produce. Low yield and disease problems are the main limiting factors for production during this period. This study focuses on evaluating grafted cucumber (grown in pots) as a potential high value crop, thus improving greenhouse output. We tested the grafting of cucumber scions onto a selected gourd (*Lagenaria siceraria*) rootstock for yield improvement and disease resistance. The results showed that grafted plants produce more fruits than the non-grafted control. Grafted Camilla plants yielded more fruits per plant (4.6 lb) than non-grafted plants; additionally grafted plants showed improved disease resistance. Grafted fruit taste is comparable to the non-grafted control. This research helps to prove that specific gourds can be a good rootstock candidate for off-season cucumber production in greenhouses by improving output per square feet.

(362) Effect of Fertilizer Source and Grafting on Quality of High Tunnel-grown Tomato

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Tomato is a major vegetable crop worldwide, and is grown in high tunnels in most regions. This study compared two fertilizer sources and the use of grafted plants on the quality of tomato fruit grown in high tunnels in northwest Washington in 2015. The two fertilizer sources were commercial conventional fertilizer [monoammonium phosphate (11–52–0), potassium sulfate (0–0–50), and urea (46–0–0)] applied at 112 N, 168 P_2O_5, and 56 K_2O kg·ha^{-1}, and an integrated fertility treatment [poultry manure (2242 kg·ha^{-1}) plus 90 kg·ha^{-1} urea (46–0–0)] where poultry manure application was limited by P content. The experimental design was a split plot where the main plot treatment was fertilizer and the subplot treatment was grafting: 'Panzer' grafted on 'Estamino', Maxifort', 'DRO138TX', and non-grafted 'Panzer' (control). Fruit were harvested once a week, when fruit reached the 75% red stage, and the quality of marketable fruit were evaluated for juice content, fruit firmness, soluble solid content (SSC), pH and titratable acidity. There were no significant differences due to fertilizer source on any of fruit quality parameters measured in this study. Overall mean juice content was 93.4% for both the commercial fertilizer and the integrated fertility treatments. Overall mean firmness of tomato fruit was 2.5 N for commercial fertilizer and 2.4 N for the integrated fertility treatment. Overall mean SSC (°Brix) of tomato fruit was 5.1, and overall mean pH was 4.3 for both fertilizer treatments, while overall mean titratable acidity (% CA eq.) was 0.36 and 0.33 for the commercial and integrated fertilizer treatments, respectively. On the other hand, fruit from grafted plants had higher juice content than non-grafted plants on 10 and 17 Aug. (93.6% and 93.2% overall average, respectively). Additionally, fruit from plants grafted with 'Estamino' rootstock had a higher pH on 10 Aug. than other grafting treatments (4.4 and 4.3, respectively). There were no differences in fruit firmness, SSC, or titratable acidity due to grafting.

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(363) Increasing Survival of Grafted Watermelon Transplants

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Although grafting holds promise as a soilborne disease management strategy for watermelon production in Washington, it currently has significant limitations. Increased production costs related to grafting include the skilled labor needed for grafting, the special facilities that are required for the proper healing of the grafted plants, and unpredictable survival rate of grafted watermelon transplants. Studies with grafted tomato showed 98% survival by using a low cost healing chamber but watermelon