parameters and were not statistically different. Our results indicate that leaf removal of the scion can increase high quality plants for growers because of the lower adventitious rooting and does not reduce the early season growth of the transplant.

Specified Source(s) of Funding: North Central Region SARE, Ceres Trust Organic Initiative

10:30–10:45 AM

Light Intensity and Relative Humidity Effects on the Regrowth of Newly Grafted Tomato Plants

Bizhen Hu*
Ohio State University, Wooster, OH; hu.327@osu.edu

Peter Ling
Ohio State University, Wooster; ling.23@osu.edu

Matthew Kleinhenz
Ohio State University–OARDC, Wooster; kleinhenz.1@osu.edu

Grafting successfully and efficiently requires levels of light, temperature, and humidity that promote vascular reconnection and plant growth. Tomato plants are routinely grafted successfully in practice; however, it may be possible to further optimize the process with a heightened understanding of the separate and interactive effects of key environmental variables on plant growth during the healing phase. Therefore, we completed two studies involving a total of eight combinations of light intensity and relative humidity at standard healing temperatures. The use of light-emitting diodes (LEDs) and climate-controlled chambers was central to this purpose. Because they light with less heat than conventional sources, LEDs may be more significant in commercial grafting operations in the future. LEDs are also useful experimentally because they emit customized spectra at highly-controlled intensities. In both studies, four week-old 'Cherokee Purple' and 'Maxifort' tomato seedlings were splice-grafted and placed under LEDs emitting a 20% red, 20% white and 60% blue mixed spectrum for 12 hours each day. Study 1 light levels were 2–5, 45–65, 140–160, or 290–310 μmol·m^{-2}·s^{-1}, all– at 25±4 °C and 79±8% relative humidity (RH). Study 2 conditions were the four combinations of 45–65 or 240–260 μmol·m^{-2}·s^{-1} light with 65% or 90% RH, all at 26/20 °C. We hypothesized that these conditions would affect at least one of the nine components of plant growth we tracked after grafting, beginning with plant survival and concluding with stem and leaf traits at 7–10 days after grafting. In both studies, above ground dry weight and compactness (above-ground dwt/plant height) increased with light intensity. No across-study trends were evident in the other seven measured variables. In Study 2, the light x RH interaction influenced leaf fresh weight, leaf area relative growth, and specific leaf area. Relative humidity affected these variables only at 45–65 but not at 240–260 μmol·m^{-2}·s^{-1}, with the combination of 45–65 μmol·m^{-2}·s^{-1} at 90% RH always having the largest value. These results suggest that the common practice of placing newly grafted plants in low light conditions should be reexamined, especially if alternative light sources are available.

10:45–11:00 AM

Grafting Watermelon to Manage Verticillium Wilt in Washington State

Jesse A. Wimer
Washington State University, Mount Vernon; jesse.wimer@wsu.edu

Carol Miles*
Washington State University, Mount Vernon; milesc@wsu.edu

Debra A. Inglis
Washington State University, Mount Vernon; dainglis@wsu.edu

Grafting watermelon (*Citrullus lanatus*) for soilborne disease control is common in many areas of the world but has not yet been widely adopted in the United States. This 2014 study investigated the use of grafting to manage Verticillium wilt (caused by *V. dahliae*) at three diverse field locations: Othello and Eltopia in the Columbia Basin of eastern Washington, and Mount Vernon in northwestern Washington. The *V. dahliae* population density was estimated to be < 1.0, 5.7, and 18.0 colony forming units per gram (cfu·g^{-1}) of soil at Othello, Eltopia, and Mount Vernon, respectively. At each site, the experiment was arranged as a randomized complete block with three replications, and the treatments consisted of Verticillium wilt-susceptible 'Sugar Baby' non-grafted and grafted onto commercial rootstocks 'Marvel', 'Rampart', 'Tetsukabuto', and 'Titan'. Plots were rated visually for Verticillium wilt 4–5 times beginning at symptom onset, and fruit yield and quality were assessed. Area under disease progress curve (AUDPC) values differed significantly among treatments at Eltopia and Mount Vernon, with non-grafted 'Sugar Baby' having the highest AUDPC value (most severe disease) and 'Sugar Baby' grafted onto 'Tetsukabuto' having the lowest. At Othello, where disease pressure was lowest, AUDPC values did not differ significantly among treatments. Non-grafted 'Sugar Baby' had significantly lower marketable fruit weight per plant than all other treatments at Eltopia, while at Othello marketable fruit weight per plant did not differ significantly among treatments. Total soluble solids (TSS) differed significantly among treatments at Eltopia and Othello, although none were significantly different than non-grafted 'Sugar Baby'. Grafting 'Sugar Baby' onto 'Titan' and 'Marvel' significantly increased flesh firmness at Eltopia, but there was no difference at Othello. Lycopene content did not differ significantly among treatments at Eltopia or Othello. At Mount Vernon, fruit did not reach maturity and only total fruit weight was measured; 'Sugar Baby' grafted onto 'Tetsukabuto' had significantly greater total fruit weight per plant than all other treatments. All treatments at Eltopia and Mount Vernon were assayed for *Verticillium* spp. (at Othello, plants were removed by the grower prior to assay), and microsclerotia characteristic of *V. dahlia* were observed in all treatment samples. Results indicate that watermelon grafting can be used effectively to manage Verticillium wilt of watermelon in areas of Washington where the *V. dahliae* soil density exceeds 5.0 cfu·g^{-1}. Furthermore, grafting does not lead to reduced fruit quality and certain rootstock-scion combinations can actually improve flesh firmness.

Specified Source(s) of Funding: Emerging Research Issues grant from Washington State; Washington State Commission

An asterisk (*) following a name indicates the presenting author.