containers owing to the poor retention capacity of the substrates used in ornamental nursery production. This can result in wastage of fresh water and contamination of ground or surface water by nutrients leached from nurseries. The objective of the study is to asses the effect of amending a standard nursery substrate (8 parts pine bark + 1 part sand, PBS) with either calcined clay (PBSC) or diatomaceous earth (PBSD) at 10% v/v to improve water and nutrient retention. Measurements included soil moisture retention (SMR) curves for each substrate, and electrical conductivity (EC) and nitrate concentration of each substrate after sequential irrigations. The SMR curves indicated that container capacity of PBS substrate was lower than that of the PBSC substrate but not different to the PBSD substrate. This indicates that water retention capacity of PBS substrate can be improved by amending with calcined clay. Approximately 10%, 28%, and 38% of water drained as the water potential dropped from container capacity to –1.0 MPa (close to wilting point) in PBS, PBSD and PBSC substrates respectively. This indicates that more water can be available to plants when PBS substrate is amended with either diatomaceous earth or calcined clay. Moreover, amending PBS substrate with diatomaceous earth or calcined clay could decrease the risk of rapid exposure of plants to drought stress that may happen in PBS substrate. Although EC and nitrate concentration of all three substrates decreased during sequential irrigations, both measures remained higher for PBSC and PBSD than PBS substrate after any irrigation. This indicates that nutrient retention in general, and nitrate retention, in particular was improved by amending PBS with either diatomaceous earth or calcined clay. In general, PBSC appears to retain more water and nutrients than PBSD substrate.

Oral Session—Vegetable Crops Management 2

Moderator: David Suchoff
North Carolina State University, Raleigh, NC

8:00–8:15 AM

Grafting and Rootstock Effects on Pepper (*Capsicum annuum* L.) Fruit Morphological and Chemical Characteristics Grown Under Plastic House Conditions

Mahmoud Mohammad Ahmed Soltan*
The Ohio State University-OARDC, Wooster, OH

Farouk Abd El-Salam El-Aidy
Kafr El-Sheikh University-Faculty of Agriculture, Kafr El-Sheikh, Egypt

Mohamed Bassiouny El-Sawy
Kafr El-Sheikh University-Faculty of Agriculture, Kafr El-Sheikh, Egypt

Sami Abd El-Gwaad Gaafar
Agriculture Reasearch Center-Horticulture Research Institute, Giza, Egypt

Matthew Kleinhenz
The Ohio State University-OARDC, Wooster, OH

The use of grafted plants to limit biotic and abiotic stress, extend production-market windows, and increase productivity is becoming more common worldwide. Still, it is important to verify that grafting does not result in deleterious changes in fruit quality through, for example, unwanted shifts in shoot physiology or the translocation of unwanted substances from root to shoot. Given the origin, makeup, and history of some rootstocks, careful rootstock-scion evaluation and selection and grafted plant management may be needed. The objective of this study was to document the effects of grafting and rootstock-scion combination on major fruit physical and chemical characteristics. Four pepper scions: a) two blocky varieties ('Toronto'—yellow and 'Zedinca'—red) and b) two elongated varieties ('Kurtovszka Kàpia' and 'Eigman') were splice-grafted onto five rootstocks ('TAN TAN (NO: 12G076)', '52-03 RZ', 'Budai csipős', 'NOURDINE', and 'CCA-4758') varying in fruit shape, size, and other traits. Additionally, the four scion varieties were self-grafted and non-grafted as controls. Plants representing all rootstock-scion combinations and controls were arranged in a randomized complete block design with three replicates, pruned according to local practice, and grown in a passively-controlled, plastic-covered greenhouse in Kafr El-Sheikh, Egypt. All fruits were harvested when fully mature and three to five fruits per plant were randomly selected for further measurement (length, diameter, shape index, flesh thickness, soluble solids content, ascorbic acid content, and total titratable acidity). The experiment was repeated in June 2013–May 2014 and June 2014–May 2015. Fruit yield, size, and thickness were larger and values of fruit chemical attributes tended to be greater in grafted than in ungrafted plants. Grafting onto rootstocks also tended to produce larger and thicker fruit with higher chemical attribute values (except titratable acidity) relative to fruit from self- and ungrafted control plants. For example, self-grafted 'Toronto' produced fruit with flesh thickness 5.6% higher and soluble solids content 16.6% higher compared to non-grafted plants. Overall, fruit thickness of all rootstock-scion combinations ranged from 0% to 22.4% higher in grafted than non-grafted plants whereas soluble solids content ranged from 22.9% to 35.1% higher in grafted than non-grafted plants.

8:15–8:30 AM

Comparative Analysis of Tomato Rootstock Root System Morphology

David Suchoff*
North Carolina State University, Raleigh, NC

Christopher Gunter
North Carolina State University, Raleigh, NC

At its most basic, grafting is the replacement of one root system with another containing more desirable traits. Grafting of tomato (*Solanum lycopersicum*) onto disease-resistant rootstocks is an increasingly popular alternative to managing economically damaging soil-borne diseases. Certain rootstocks have been