

Title Ozone Sensitivity Differences in Five Tomato Cultivars: Visible Injury and Effects on Biomass and Fruits

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Abstract

Five tomato cultivars (Nikita, Ailsa Craig, Moneymaker, UC 82 L and Piedmont) were exposed in open-top chambers to three ozone treatments: charcoal-filtered air (F); non-filtered air (NF); and non-filtered air plus 70 ppb ozone (NF+, 8 h, 133 days). Ozone-specific visible symptoms were recorded for all cultivars in the NF and NF+ treatments. All cultivars showed a reduction of root biomass in the NF+ treatment, root-biomass reductions were also observed in the NF treatment in Nikita (29%) and UC 82 L (33%). Four cultivars from the NF+ treatment showed reductions in aboveground dry biomass (25–50%). The sensitive cultivar Nikita also decreased its aboveground dry biomass (28%) at the end of crop cultivation in the NF treatment. Crop production showed generalized reductions in the total number of ripe and unripe fruits in the NF+ treatment (53–73%), with Nikita presenting a 24% decrease in the total number of ripe fruits in the NF treatment as well. A decreased ripeness rate was detected in all cultivars in NF+ and in three cultivars in the NF treatment (Nikita, Moneymaker and Piedmont). The effect of ozone on total crop production (kg m^{-2}) was more important in the early harvest (50–63%) than in the late harvest. The ozone doses in the NF+ treatment affected fruit quality in all cultivars with the exception of Piedmont. Nikita and Ailsa Craig also showed fruit quality changes in the NF treatment. Nikita seems to be an ozone-sensitive cultivar, UC 82 L and Piedmont are more ozone-tolerant and the other two cultivars are in an intermediate position.