

Abstract

The Effect of Water Stress Combined with a Heatwave on Reproduction and Yield of Roma-VF Tomatoes [†]

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Abstract: Tomato (*Solanum lycopersicum*) is one of the most consumed fruits, supplying humanity with both economic and nutritional benefits. However, its production is affected significantly by climatic conditions especially extreme weather events, such as heat waves, flooding and drought. The objective of this study was to evaluate the additively combined effects of heat and water stresses on the reproductive traits and yield of Roma-VF tomato variety. Pollen morphology, number of developed flowers, fruits and aerial biomass were monitored. At five weeks after sowing, the tomato plants were subjected to day/night temperatures of 28/20 °C as a control treatment and 35/23 °C as the heat stress treatment. The water stress was imposed by reducing the water received by plants in each 10-L plastic pot to 70% soil field capacity (moderate stress) and 40% (severe stress). The stress lasted for eight weeks, which was followed by five weeks of recovery period. Our results showed that plants under additively combined heat stress with either moderate or severe water stress produced flowers with no single pollens during the treatment period. We also found that Roma-VF tomato has a high plasticity in response to this particular heat stress for vegetative growth when well irrigated, but when heat and water stresses were additively combined the plants became highly susceptible. This is also the first report of yield response of Roma-VF tomatoes to the additively combined effect of heat and water stressors.

Keywords: climate change; simulation; plant growth; pollen; flowers; fruits

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