Crop and soil-water stress coefficients of tomato in the glass-greenhouse conditions

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Abstract

In order to determine the actual evapotranspiration of tomato in the greenhouse, crop and soil-water stress coefficients were surveyed. To compare the actual evapotranspiration at different irrigation intervals (1, 2, 4, 6 and 8-day), a completely randomized blocks design with four replications was performed. The present study was carried out in a greenhouse covered by 4 mm thick glass. Maximum and minimum temperatures and solar radiation were measured inside the greenhouse once in 24 h. Relative humidity was measured in the greenhouse once in 2 h. Microclimate data were measured in a metrological station, 100 m from the greenhouse, simultaneously, at outside the greenhouse. Reference crop evapotranspiration was calculated by FAO Penman-Monteith method for inside and outside of the greenhouse. Results indicated that the reference evapotranspiration in the inside of the greenhouse was 73% of outside the greenhouse. The actual evapotranspiration of tomato for inside of the greenhouse was determined by using the water balance method. By using the pergeometer and albidometer data, the crop coefficient for inside the greenhouse at three different stages (development, mid, and end) of growth was determined as 0.85, 1.0 and 0.77, respectively. Soil-water stress coefficient, with readily available coefficient of 0.7, was determined to be in the range of 0.53 to 0.98 for all the treatments. This coefficient was 0.88 for water-stressed 4-day treatment, and reduced to 0.72 for 8-day treatment.

Keywords: Tomato, Evapotranspiration, FAO Penman- Monteith, Greenhouse.

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