



Water use efficiency in orange orchard under deficit irrigation

Lais Karina Silveira (1), Glaucia Cristina Pavão (2), and Regina Célia de Matos Pires (3)

(1) MSc student. Post-Graduation Program in Tropical and Subtropical Agriculture of the Agronomic Institute (IAC), Campinas, SP, Brazil. Email: lais.k.silveira@gmail.com, (2) PhD student. Post-Graduation Program in Tropical and Subtropical Agriculture of the Agronomic Institute (IAC), Campinas, SP, Brazil, (3) Scientific Researcher. Ecophysiology and Biophysics Center. Agronomic Institute (IAC), Campinas, SP, Brazil Brazil.

Brazil has an important participation in global citrus market, being one of the largest producers and exporters of orange juice. São Paulo state stands out in this sector for its larger production and cultivated area. The orange orchards in São Paulo have showing gains in productivity specially the last decade due to the adoption of technologies amongst them irrigation and fertigation. In this context it is important to adopt and improve water and nutrient use. This study aimed to evaluate the effect of deficit irrigation and fertigation on water use efficiency (WUE) and fruit yield (Y) of Pera sweet orange. The experiment was carried out in a commercial orange orchard in Iaras (São Paulo State, Brazil) in a randomized block design, with six replications and five treatments applied by drip irrigation: 100% of crop evapotranspiration (T1), ET_c; 75% ET_c (T2); 50% ET_c (T3); 25% ET_c (T4) and rainfed (T5). WUE was obtained by the ratio of fruit yield by irrigation depth plus rainfall. The irrigation depth and rainfall were summed considering the period between two harvests. Water use efficiency (kg mm⁻¹ ha⁻¹) and fruit yield (ton ha⁻¹) were evaluated in 2014/2015 (A) and 2015/2016 (B) seasons. Season A had an extensive soil water deficit while season B showed a large surplus period. Analysis of variance and Scott-Knott's test were applied at 5% probability. In season A, treatments T2, T3 and T4 presented higher WUE and averaged 39 kg mm⁻¹ ha⁻¹, while in season B all irrigated treatments showed lower WUE (27.7 kg mm⁻¹ ha⁻¹) and they were different from rainfed (34.2 kg mm⁻¹ ha⁻¹). Irrigation proved to be important during dry seasons. In season A, T1, T2, T3 and T4 showed higher Y values with no difference among them (64.1 ton ha⁻¹) but significantly different from rainfed (41.4 ton ha⁻¹). However, there was not significant difference among treatments in season B.