Effects of deficit irrigation on two cherry tomato cultivars in hilly areas

*Pulvento C., Riccardi M., De luca S. d’Andria R., Lavini A.,
CNR-Institute for Agricultural and Forest Mediterranean Systems (ISAFoM)

*E-mail: c.pulvento@isafom.cnr.it

Abstract

In the last years the cultivation of cherry tomato significantly increased in the hilly area of Campania region since the favourable climatic conditions provide to obtain a high-quality yield. Generally in the Campania hilly area the specie is cultivated under rainfed conditions to improve the sugar and soluble solids content and other quality parameters. The cultivation without irrigation is feasible thanks to the resistance to abiotic stress (high temperatures and water deficit) of the specie and because climatic conditions of hilly area are characterized by erratic rainfall during the summer. This practice is very risky for farmer’s income because is subjected to useful rains events during the most important phenological stages of the crop (fruit set and fruit growth). Climate global change models, in addition, forecast a decrease of summer precipitation of about 10 to 15% that makes crucial to study sustainable irrigation scheduling in the area of the experiment.

The aim of the present work was to evaluate the response to deficit irrigation scheduling based on critical plant growth stages to ensure good productivity. The trial was carried out in 2005 and 2006 at the experimental station of the CNR-ISA FoM, in Piano Cappelle (BN).

Two cultivars of cherry tomato (Altavilla cv. standard and Mignon hybrid) were subjected to four irrigation regimes: T0 (rainfed), T1 (one irrigation at beginning of flowering), T2 (one irrigation at beginning of flowering and another at 50% of fruit set) and T3 (at beginning of flowering, at 50% of fruit setting and, after, every 15 days). During the crop cycle the soil water content for each treatment was monitored to estimate water consumption. Irrigation was delivered weekly and watering volume was estimated as to replenish the soil profile to 50% of field capacity for a soil layer of 0-0.6 m. At harvest the quantitative and qualitative characteristics of yield were determined.

Results showed that, in the area of the experiment, a limited water supply is useful to increase yield depending on the climate of the year. In fact in the driest year (2005) yields obtained by T0 and T1 treatments were significantly lower than the two more irrigated treatments in both cultivars. Moreover T3, that received an irrigation volume of 155 mm during the crop cicle, performed significant higher yield than T2 for both cvs. Between cvs, treatment T3 of Mignon yielded a higher commercial production than the same treatment of Altavilla.

In the wet year (2006) differences between irrigation treatments were less evident. In both cvs commercial yield values showed a significant yield increase of T3 as respect T1, while T2 and T3 were not different. Moreover, in this year cvs responded similarly to irrigation levels.

The quality parameters indicated that in the experimental area it is possible to obtain high quality cherry tomatoes yield also with a limited irrigation water supply.

In conclusion, in the year, characterized by little or no rainfall during the growing cycle, was necessary two (T2) or four (T3) waterings to ensure good yield and quality, depending of water cost, while in the years with useful precipitations during critical phenological stages one watering at the beginning of flowering may be sufficient to achieve good yield for Mignon the less sensitive to drought. The tolerance to water stress of cvs must be considered.