The effect of late season irrigation on chestnut physiology and yield

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Italy is one of the most important world chestnut producers. The majority of traditional sweet chestnut orchards are still non-irrigated since typically located in mountain-hill areas (not limiting climate conditions for vegetative and reproductive growth). Nowadays, the increase of summer temperatures and the decrease of rainfall are affecting negatively chestnut physiological performances and productivity. The adoption of scheduled irrigation practices, in light also of the limited water availability/possibility of storage (e.g., artificial lakes, reservoirs) of these areas, should become part of chestnut orchard management. The aim of the present study was to evaluate the effect of irrigation on sweet chestnut physiology, yield, and nut size. The study was carried out in 2020 in a traditional chestnut orchard of the "Marron Buono di Marradi" ecotype, located in the Tosco- Romagnolo Apennines (Marradi, Italy). Two treatments: non-irrigated and irrigated were carried out between August and September. Leaf gas exchanges and plant water status were monitored. At harvest, tree yield and nut size were assessed. Preliminary results showed that irrigated trees exhibited, in middle September, higher photosynthesis, transpiration and stomatal conductance compared to the non-irrigated ones. Leaf and stem water potentials were not affected by the irrigation treatment. Chestnut yield, although not statistically significative, was improved in the irrigated treatment compared to the non-irrigated one. Nut size was statistically smaller in non-irrigated trees than in irrigated ones. Despite the favourable weather condition occurred in 2020 (a mild and rainy season), the application of irrigation in late summer was beneficial for enhance sweet chestnut physiological performances and for improving nut quality.

Keywords: *Castanea sativa* Mill., chestnut physiology, leaf gas exchanges, tree water potential, irrigation.