

## Effects of regulated deficit irrigation (RDI) on grape development and fruit composition in Piedmont (Italy)

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Vineyard irrigation is not a traditional practice in Piedmont, but in recent years high summer temperatures and persistent drought have spurred interest and application toward this practice also in this region. We tested drip irrigation on two major red wine cultivars of this area, Dolcetto and Barbera, the latter in two different locations. Irrigation was applied from beginning of July to veraison following a regulated deficit calculation model. Three water levels were applied at weekly intervals, calculated as 10% (T10), 20% (T20), and 40% (T40) of the weekly amount of grape evapotranspiration calculated through the Blaney-Criddle formula. In the year of the experiment (2005), total water applied ranged between 15 and 60 mm during the irrigation period (five weeks), according to the three deficit levels. According to a soil water balance, in absence of irrigation soil water content was lower than 50 % of the easily usable water content from beginning of July till end November. Irrigation shortened this critical period, which lasted from half July to end October for T10 treatment; from beginning of August to half September for T20; and from half August till end August for T40. Soil moisture and leaf water potential were positively affected by irrigation while total leaf area and leaf shading were not affected in Barbera and increased in the irrigated treatments in Dolcetto. Irrigation induced an increase in cluster weight and yield per vine. In Barbera, irrigation induced an increase in sugar concentration and it lowered acidity in both experimental fields. In Dolcetto, irrigation induced a slight decrease in sugar content and an increase in titratable acidity. The content of total anthocyanins increased in irrigated plants in Barbera and was little affected in Dolcetto. The concentration of total polyphenols was not affected by the irrigation treatment. These results show that regulated deficit irrigation in Piedmont has the potential to affect quality of grapes. These effects are dependent on the grape genotype and the vineyard localization.