

## **A water balance model on an oak mixed forest in the Italian Alps: effects of the unprecedented drought of summer 2003**

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A water balance has been set up in a thermophilous oak forest grove in the Italian Alps, to investigate relationships between water stress and plant damages. In the experimental site a meteorological station is operated since 1993, which provided data series for modelling. The calculation approach has been adapted from a protocol developed for an European pilot study a Penman – Monteith's "one step" method has been used for calculation of evapotranspiration; resistance coefficients have been evaluated according to maximum values found in literature and adapted to a daily step for the water balance model. Ad hoc equipment installed in the site and measures performed - under-canopy precipitation, soil moisture, LAI - allowed an experimental verification of the results of single parameterisations. Water balance model, and particularly relative transpiration, allowed a good description of last years' dry periods, and particularly for 2003, whose summer turned out to have a major impact on the phytosanitary state of plants. Water stress data of the previous decade were analysed and correlated with data of defoliation and discoloration of permanent monitored tree species growing in the area. Links between stress indexes and health tree status of the studied species have been investigated and discussed.