

EVALUATION OF GENE EXPRESSION AND PHOTOSYNTHESIS ACTIVITY IN DIFFERENT *FAGUS SYLVATICA* GENOTYPES UNDER HIGH CO₂ LEVEL

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The problems related to global changes, mainly caused by human activities, are the origin of much concern for the health of the environment. Oil and carbon combustion, the use of chlorofluorocarbons, and deforestation are some of the principal factors responsible for CO₂ production and for air temperature increase. The scenario is factors leading to global changes affecting precipitation patterns, nitrogen concentration in the atmosphere, UV-B radiation increase and temperature increase. Forest trees constitute a relevant economic and ecological resource that is under severe treat by environmental changes.

The principal aim is to investigate the response to CO₂ from three different genotypes of *Fagus sylvatica* by gene expression and ecophysiological analyses. Shoots of *F. sylvatica* (Montieri (GR), Italy) and *F. sylvatica* “purpurea tree” were grafted on *F. sylvatica* rootstocks. Plants were grown under controlled conditions in a climate chamber using the same temperature and light parameters, while CO₂ concentrations were approx. 380-400 ppm (ambient) in the control room and 1000 ppm (high) in the experimental room.

A PAM fluorescence system (PAM-2000, Heinz Walz GmbH, Effeltrich, Germany) with a 6 mm diameter standard fibre optic was used for the measurements of the *in vivo* photosynthesis. Under ambient conditions photosynthesis (expressed as electron transport rate) was higher in the Italian compared to the German genotype. After 4 d under high CO₂ treatment, electron transport rate showed increased values compared to the plants growing under ambient CO₂. Photosynthesis of plants (Italy) adapted to high CO₂ decreased immediately after been exposed for 2 h to ambient CO₂. No down-regulation of photosynthesis could be observed in leaves at high CO₂ level. Microarrays analyses have already been done and preliminary results will be discussed.