51° ANNUAL CONGRESS

Italian Society of Agriculture Genetics

SCIENTIFIC PROGRAMME
POSTER LIST

September 23-26, 2007
Palazzo dei Congressi - Riva del Garda (TN)

Proceedings of the 51st Italian Society of Agricultural Genetics Annual Congress
Riva del Garda, Italy – 23/26 September, 2007
ISBN **978-88-900622-7-8**

Poster Abstract – D.11

DIFFERENT *FAGUS SYLVATICA* GENOTYPES UNDER HIGH LEVEL OF CO_2: GENE EXPRESSION AND ECOPHYSIOLOGY ANALYSES

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Beech, CO_2 response, ecophysiology, microarray

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 enhanced CO_2 production, as well as for air temperature increases. This scenario could determine global changes affecting precipitation patterns, nitrogen concentration in the atmosphere, UV radiation increase, and temperature range. 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 CO_2 from two different *F. sylvatica* genotypes by gene expression and ecophysiology analyses.

Scions of *Fagus sylvatica* (Montieri (GR), Italy) and *F. sylvatica* "purpurea tree" (Grosshansdorf, Germany) were grafted on *F. sylvatica* rootstocks. Plants were grown under controlled conditions in climate chambers. Air temperature was 25°C during light period and 20°C at night, and humidity 60%. Fluorescent lamps (18 36W) provided a photosynthetic active photon flux density (PPFD) of 250 µmol m^{-2} s^{-1} at plant top level. CO_2 concentrations were about 450 ppm (ambient) and 1000 ppm (high) for control and high CO_2 chamber, respectively. 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. Light response curves were recorded up to a light intensity of 420 µmol m^{-2} s^{-1}. At each step the leaf was illumined for 3 minutes.

Under ambient CO_2 concentrations, electron transport rate (ETR) was higher in the Italian compared to the German genotype. After 4 days at high CO_2 level, the ETR increased compared to plants growing in the control chamber. Photosynthesis of Italian genotype adapted to 1000 ppm of CO_2 decreased immediately after been exposed for 2 hours to 450 ppm CO_2. No down-regulation of photosynthesis could be observed in leaves at 1000 ppm CO_2 level.

Microarray analyses are in course and preliminary results will be discussed.