

USE OF OPTICAL SENSORS TO ESTIMATE CHLOROPHYLL AND FLAVONOID CONTENT IN AMBIENT AND ELEVATED CO₂: A COMPARISON OF BARLEY GENOTYPES WITH DIFFERENT ORIGIN AND GENETIC BACKGROUND

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A large set of barley genotypes were analysed using a non-destructive optical instrument (Dualex, Force A) to estimate the chlorophyll and flavonoid content and the Nitrogen Balance Index (NBI), which is the ratio chlorophyll/ flavonoid. Measurements were carried out in two different field experiments during the growth season in order to: a) identify genetic diversity in cultivars of different origin, growth habit, row-type as well as in advanced breeding lines; b) evaluate the effect of elevated CO₂ under ambient (400 ppm) and FACE (Free Air Carbon Dioxide Enrichment, 560 ppm) conditions in 4 modern cultivars released by the CRA-GPG of Fiorenzuola d'Arda (PC) and 2 morphological mutants. A high level of genetic diversity was found and some constitutive differences were identified. The relevance of environmental factors and their interactions with genotype are discussed for data interpretation. A high potential of the employed method for use in phenotyping of large plant populations has been evidenced in a perspective of application to plant biology, functional genomics and crop breeding.

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