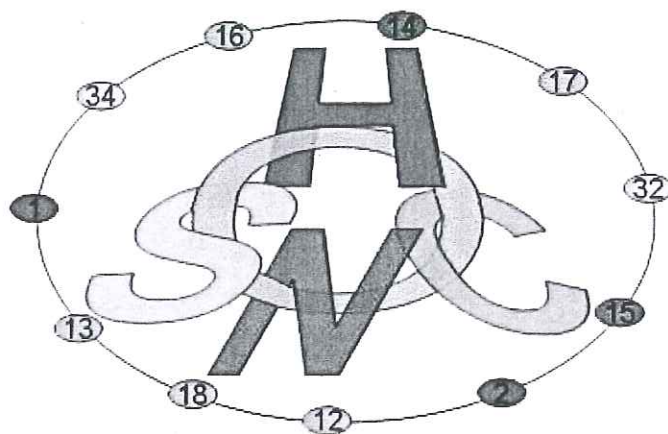


The 1st Isotope Ratio MS DAY



May 9-11, 2016

Fondazione Edmund Mach

S. Michele all'Adige (Trento, Italy)

BOOK OF ABSTRACTS

**PROCEEDINGS OF THE
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OR11 - A multiparametric approach to study the forest ecosystem responses to environment

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Forest ecosystems are subjected to numerous environmental constraints, both abiotic (edaphic and climatic limitations) and biotic (competition and facilitation processes between tree species, pest and pathogen attacks). To understand the mechanisms of plant's response to environmental factors, a multiparametric approach has been developed in order to improve the informative potential of methods commonly applied in ecological researches and, at the same time, to design an effective cost-benefit surveys. In this presentation we report an experience concerning the application of foliar $\delta^{13}\text{C}$ as part of the 'leaf traits analysis' in forest tree species. This approach was adopted to study the responses of forest trees in mixed forests and in relation to environmental factors, within the 7FP project FunDiveEUROPE. Foliar $\delta^{13}\text{C}$ is a key parameter for exploring carbon sequestration and strategies for an efficient water use of plants under water stress conditions. Its combination with other plant functional traits, that are indicators of climatic stress, drought, air and soil pollution, light use, competition, plant nutritional status, health plant condition (i.e. specific leaf area, leaf C and N content, chlorophyll *a* fluorescence parameters) is a powerful tool to analyse on the whole and in-depth the physiological processes involved in the plant responses to environment. This presentation provides examples about the informative potential of foliar $\delta^{13}\text{C}$, in combination with other plant traits, in the assessment of the cause and consequences of crown defoliation on tree health in a mixed forests in Tuscany. Moreover are provided examples about the application of foliar $\delta^{13}\text{C}$ as supporting parameter in a study on the taxonomic and ecological meaning of the chlorophyll *a* fluorescence signature of tree species. These examples point out the effectiveness and powerful of the combined analysis of functional plant traits, included foliar $\delta^{13}\text{C}$, in the ecological research, improving significantly the informative potential of the (field) surveys.