

IS UNDERSTOREY VEGETATION DIVERSITY ASSOCIATED WITH TREE SPECIES DIVERSITY IN EUROPEAN FORESTS? THE FUNDIV EUROPE PROJECT PROTOCOL AND ITS APPLICATION IN THE ITALIAN SAMPLING SITES

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FunDiv Europe is a new FP7 broad-scale research project involving 24 scientific partners that will collaborate to quantify the effects of forest biodiversity on ecosystem functions and services in major European forest types (<http://www.fundiveurope.eu>). It focuses on how tree species diversity can be used to foster the provision of forest ecosystem services such as timber production, carbon sequestration and freshwater provisioning. Although the relevance of these issues is today widely acknowledged, such questions are still waiting to be answered through an integrated scientific approach focusing on temperate forests (Scherer-Lorenzen *et al.*, 2005).

The Exploratory platform of this project consists of a network of approx. 300 plots in natural mature forests in six different focal regions in Europe. Italy is one of these regions and should be representative of the category “thermophilous deciduous forests”.

The basic methodological philosophy of the project is the “all measurements on all plots”, and one of the tasks focuses on the diversity of the understorey vegetation. Despite its relatively low biomass compared to the forest overstorey, the diversity and functional importance of the shrub and herb layer is high. For instance, it is a potential nectar source for pollinators, provides habitat for small mammals, affects tree regeneration, invasion resistance and influences decomposition and nutrient cycling. Hypotheses to be tested in this task are: 1) diversity of the understorey vegetation increases with increasing overstorey diversity in the canopy; 2) overstorey diversity effects on herb layer diversity and abundance are caused by a direct effect of canopy complexity and an indirect effect of the overstorey diversity on the humus layer dynamics; 3) in turn, a more diverse and abundant understorey has a positive feedback on litter decomposition and nutrient cycling.

The Italian sites are located in central-southern Tuscany, where extensive submediterranean woodlands dominated by broad-leaf and evergreen trees occur in various combinations. In order to meet the requirements of the the project, the fourty selected plots are representative of four diversity levels based on different admixtures of five focal species, e.g. *Quercus cerris*, *Q. petraea*, *Q. ilex*, *Castanea sativa* and *Ostrya carpinifolia*. The basic data concerning geographic location, ecological characters, forest structure and floristic composition at these sites are presented here. Diversity of the understorey vegetation will be assessed through repeated sampling in spring and summer 2012, through a standard protocol that involves the establishment of four 5 x 5 m subplots in each plot, plus an additional one for a separate but coordinated “tree regeneration” analysis. After scoring all vascular plant species for ground cover in each subplot, a small frame of 0.5 x 0.5 m will be placed randomly within the subplots and all above ground parts of the vegetation passing through this frame will be clipped. Oven-dried biomass samples will also be analysed for content in C, P and N.

Scherer-Lorenzen M., Körner Ch., Schulze E.-D. (Eds.), 2005. Forest Diversity and Function. Ecological Studies 176. Springer.

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