

PROJECT INFORMATION

Project title: **Linking forest diversity and tree health in Europe**

Project ID: 127

Contact person: Filippo Bussotti (filippo.bussotti@unifi.it)

PROJECT DESCRIPTION

The state-of-the-art

Recent studies attribute importance to the role of structure and composition of forest stands, especially to tree diversity, as determinant factor for the responses of individual trees to environmental constraints and biotic factors. Experimental and observational pieces of evidence show that tree diversity has a positive effect on productivity (Liang et al. 2016) and plays a stabilising role on annual growth rates of trees (Jucker et al. 2014). Confirmations for this beneficial effect came from the analysis of national forest inventories data (Ruiz-Benito et al. 2014). Interestingly, Ratcliffe et al. (2015) proved that tree diversity plays a more relevant role in enhancing tree vitality and growth in Mediterranean regions (water limited) than in continental forests. Moreover, It is generally accepted that tree diversity reduces the intensity of insect herbivore attacks and modifies the virulence and diffusion of pathogen fungi.

The effects of tree diversity on many ecological and physiological processes, including tree health, have been examined in experimental conditions (Verheyen et al. 2016) and in forest stand selected ad hoc (Baten et al. 2013).

Aim of the study

This project is aimed at exploring, by using the Level I network at European level, the role of the specific composition of the forest stands (tree diversity) in the vitality of trees and in the severity of parasitic attacks. The data will be treated globally, per functional group, singular species and climatic region. Specific aims are:

- To individuate the most suitable metrics to express the impacts on different tree species (for ex., defoliation threshold at 25 and/or 60%; mortality; damage symptoms), also elaborating composite synthetic indices combining defoliation and damage.
- To explore the responses of trees in “key” years, i.e. when extreme weather conditions (for ex. heat waves and drought) occur. Special attention will be devoted to extreme crown reduction and possible subsequent recover (resilience) or mortality.
- To assess the role of functional traits of trees, and functional diversity, in relation to the prevailing ecological conditions of the sites.

References

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