Project Database of ICP Forests
PROJECT DESCRIPTION

PROJECT INFORMATION

Project title: PhD thesis: "Discriminant taxonomic descriptors of leaves and spring phenology analysis in oak (*Quercus robur* L.) and grayish oak (*Q. pedunculiflora* K.Koch)"

Project ID: 53

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Background

Changes in the seasonality, or phenology, of biological processes is one of the most sensitive and prominent responses to global climate change; particularly in Europe wide-spread changes in plant and animal phenology have been documented in the last two decades. In forests, phenological processes such as leaf budburst, full leaf unfolding, and leaf senescence and abscission, are in varying degrees controlled by weather patterns, and together regulate the cycling of carbon and water between soils, vegetation, and the atmosphere. The onset of spring, evidenced by the unfolding of leaves in deciduous tree species, marks the ramping up of photosynthetic activity and, thus, of carbon uptake. Along with it, water uptake from soils through roots increases, as does the release of water to the atmosphere through evapotranspiration from the forest canopy. In autumn, leaf senescence marks the slowing down of carbon uptake in forests. Over time, the carbon in abscised leaves eventually gets respired back to the atmosphere by microorganisms, or incorporated into the soil for long term storage. Changes in tree phenology thus have repercussions for the biogeochemical cycling of greenhouse gasses and for biomass or soil carbon gains in forests. In the longer term, the ability of tree populations to maintain sustainable phenological cycles as climate changes, exerts a strong control on their geographical range. In sum, a mechanistic understanding the phenology of trees is critical to forecast their carbon and water cycling under current and future climates, as well as their fate under climate change. With this in mind, compiling, summarizing, and analyzing available tree phenology data for Europe will improve our ability to forecast the future of Europe's forests resources.