

Research Unit Forest Dynamics - colloquium

Date: 04.10.2022

Time: 13:00

Room: Englersaal

Duration: 25 minutes

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Title: **What makes a Scots pine tree sensitive to climate and how does it die during or after a drought?**

Abstract:

Scots pine (*Pinus sylvestris* L.) is one of the most widely distributed tree species in the world covering a range of 10, 000 km longitudinally and 3, 700 km latitudinally. In recent decades, large number of studies reported drought induced crown dieback and mortality of Scots pine across several countries in Europe. In this review, we aim to study Scots pine which can be considered as a model tree species for deepening our knowledge on drought-induced tree mortality since the species is fast growing and at the same time holds a strong stomatal control during droughts. Hydraulic failure and carbon starvation have been identified as key mechanisms driving drought induced tree mortality. However, contrasting results have been reported with respect to how these mechanisms can be generalized across species and sites. They appear to depend on regional climate, soil fertility, functional diversity of the tree species involved, developmental stage of the forest and the site and region-specific occurrence of biotic stressors such as pests, diseases and parasites and the interrelations between all these factors. The purpose of this review is to summarize current knowledge and to suggest a conceptual framework to explain the various processes leading to tree mortality. We are synthesizing existing literature to understand how local drivers and site-specific conditions modify the impact of overall changing environmental boundary conditions. We also aim to synthesize the climate-growth sensitivity of Scots pine and how it varies over time and space to assess its linkages to and its suitability for predicting drought-induced tree mortality of Scots pine.