RiskForBeech

Beech decline risk following the 2018 extreme drought event

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Summary —

Context —
The recurrence of extreme climatic events threats the survival of forests worldwide, including in France, where numerous dieback events occurred following the extreme droughts experienced between 2018 and 2020. Since 2018, an unprecedented dieback of beech occurred in the North-East of France, in the heart of the distribution range, which offers a unique opportunity to understand the processes involved in dieback and the resilience of beech.

Objectives —
The project will investigate the physiological and edaphic thresholds beyond which beech trees switch between resilience and mortality trajectories.

Approaches —
This project is based on a network of 30 semi-permanent plots set up in Grand-Est and Bourgogne Franche-Comté since 2019 by the Department of Forest Health (DSF). The health and survival of 15 trees per plot are monitored since 2019. The trees in the network will be cored to retrospectively analyse annual tree growth. A sub-sample of trees will be selected to perform anatomical analyses on tree rings from the last 7 years (before, during and after stress). These anatomical properties, which partly control the circulation of sap in the trees, will be compared with carbon reserve monitoring data acquired in parallel on the same trees and will be linked to stand water balance data calculated using the Biljou© model.

Expected results and impacts —
The project will help to better identify the multiple risks to the health of beech forests in the face of extreme events. The project will also help to identify the vulnerability and resilience factors of beech forests, which will help to better guide silvicultural management strategies in favour of the resilience of these forests.