BOOK OF
ABSTRACTS

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Assisted migration of European beech populations - options and limitations

S3.1 Assisted migration for adapting forests to climate change

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Abstract: European beech (*Fagus sylvatica* L.), the major native decidous tree species in Central Europe is known to be drought sensitive. In particular, the reoccurrence of two extreme drought events in 2003 and 2018–2020 in Central Europe, in a time span shorter than 20 years, caused severe deterioration and decline of tree crowns as well as growth reductions. This loss of vigor might persist as legacy effects, including lagged post-drought responses. These may hamper tree recovery, due to carbon depletion through reduced photosynthesis as well as hydraulic dysfunction, which, if persistent over time, can lead to mortality. In particular, on sites with low soil water storage capacity (SWC) beech trees run into the risk of lethal hydraulic failure if climate change aggravates drought and heat extremes; in Germany, the centre of beech native range, one third of today's beech forest area grow on drought-exposed sites with less than 90 mm soil water storage capacity within 1 meter soil depth. Assisted Migration (AM) may provide a solution towards more adaptive forests with beech, moving seed sources or populations of European beech to a location not accessible by natural dispersal. This is aimed at introducing better drought-adapted or adaptive beech genotypes and thus improving the resilience of forests. The high variation of beech populations within its recent native range in sensitivty to drought and cavitation enables adaptation options using AM, in particular using marginal population from the drought-induced range edges. However, phenotypic and epigenetic plasticity of beech and in-situ adaptation processes may also provide successful adaptation options. Based on own and compiled study results we discuss the options and limitations of AM versus in-situ adaptation of European beech in Central Europe and further needed steps to manage future forests with dominant or admixed European beech.