



Utilizing forest tree genetic diversity for an adaptation of forest to climate change

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Since climate conditions are considered to be major determinants of tree species' distribution ranges and drivers of local adaptation, anthropogenic climate change (CC) is expected to modify the distribution of tree species, tree species diversity and the forest ecosystems connected to these species. The expected speed of environmental change is significantly larger than the natural migration and adaptation capacity of trees and makes spontaneous adjustment of forest ecosystems improbable. Planting alternative tree species and utilizing the tree species' intrinsic adaptive capacity are considered to be the most promising adaptation strategy. Each year about 900 million seedlings of the major tree species are being planted in Central Europe. At present, the utilization of forest reproductive material is mainly restricted to nationally defined ecoregions (seed/provenance zones), but when seedlings planted today become adult, they might be maladapted, as the climate conditions within ecoregions changed significantly. In the cooperation project SUSTREE, we develop transnational delineation models for forest seed transfer and genetic conservation based on species distribution models and available intra-specific climate–response function. These models are being connected to national registers of forest reproductive material in order support nursery and forest managers by selecting the appropriate seedling material for future plantations. In the long-term, European and national policies as well as regional recommendations for provenances use need to adapted to consider the challenges of climate change.