

European beech provenances (*Fagus sylvatica* L) under climate change: Response of transpiration, chlorophyll fluorescence and tree ring growth

M. Veste, u. Schmitt, W.-U. Kriebitzsch & W. Beck

The ongoing climate change will increase temperature by 1.5-2.5 K. As a consequence, precipitation will decrease and the increased frequency and severity of drought will affecting the growth of plants by water depletion in northern and eastern Germany. Already in the recent years drought periods affected the ecosystems in Western Europe. Furthermore, increasing temperature causes a shift of the zones of natural forest vegetation types as well as of the range of the beech (*Fagus sylvatica*) towards higher altitudes and to the north and – perhaps - northeast. Various ecotypes have developed in Europe under different local climate and soil conditions based on genetically differences. A provenance trial was established in Schädtdbeck (Schleswig-Holstein) to compare the adaptability of beech provenances to climate changes. For the investigations 6 provenances from Austria, Czech Republic, Germany (Brandenburg, Harz), Romania and, Spain were selected representing a with range of climatic conditions from 575 mm to 1400 mm annual rainfall. Transpiration, leaf conductance and electron transport rates were determined during the summer in July 2006. Samples for tree ring growth were sampled covering the growth period between 1996 – 2006. Fig. 1 shows the variation of leaf conductance between the population. Mean annual transpiration rate was lowest in the population from Czech Republic ($3.5 \text{ mmol m}^{-2} \text{ s}^{-1}$) and Romania ($4.1 \text{ mmol m}^{-2} \text{ s}^{-1}$) and highest in population from the Harz ($5.3 \text{ mmol m}^{-2} \text{ s}^{-1}$) and Spain ($5.9 \text{ mmol m}^{-2} \text{ s}^{-1}$). The summer drought in 2003 had drastic effects on the tree growth in all provenances, while the recovery depends from the provenances.

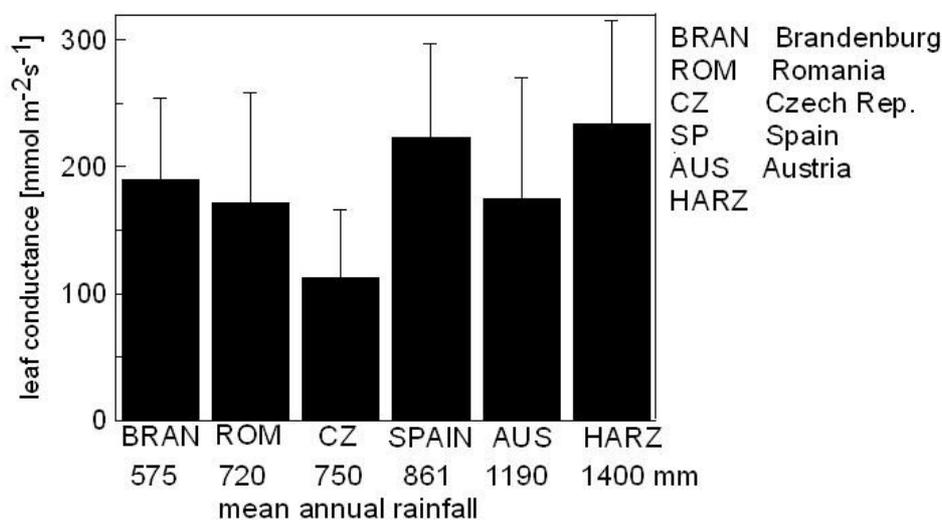


Fig. 1: Mean leaf conductance of 6 European beech provenances in Schädtdbeck (Schleswig-Holstein) in July 2006.