

# **How to cope with environmental changes? Adaptation and resilience on the ecophysiological scale**

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The expected climate change will increase temperature by 1.5-2.5 K in the next decades. For Central Europe climate scenarios indicate a decrease of mean precipitation and an increased frequency and severity of drought events. So, in 2003, spring and summer were characterized by extremely low precipitation accompanied by high temperature. Furthermore, lower winter temperature will shifting the distribution range of various species, including evergreen broad-leaved species towards the north (1,2).

European beech (*Fagus sylvatica* L.) is one of the most important broad-leaved trees in Europe. A provenances trial was established in Schädtbeck near Kiel (3). There are significant differences between the six provenances with regard to photosynthesis performance, transpiration and the increment development (4,5). At least in the year 2006 after a drought period of several weeks, the three provenances originating from sites with low precipitation are characterised by especially low leaf conductance and photosynthesis (Fig 1.). Leaf conductance as expression of stomata opening obviously influences the increment development. For all provenances, extreme dry periods like in summer 2003 caused in the following year a small stomata opening and therefore low biomass increment. Therefore, the sensitivity of some provenances against all kinds of stress appears higher in the following years after dryness than those of other provenances. Hence, in future an increased frequency and severity of drought events may contribute to a destabilization of forests build up by more sensitive provenances.

For a better understanding of the responses of plant species to environmental and climate changes the ecophysiological adaptedness and adaptability have to investigate and to be linked to genetic differences between populations. In this context further research is needed to understand the adaptation processes to climate change(s) on larger scales.

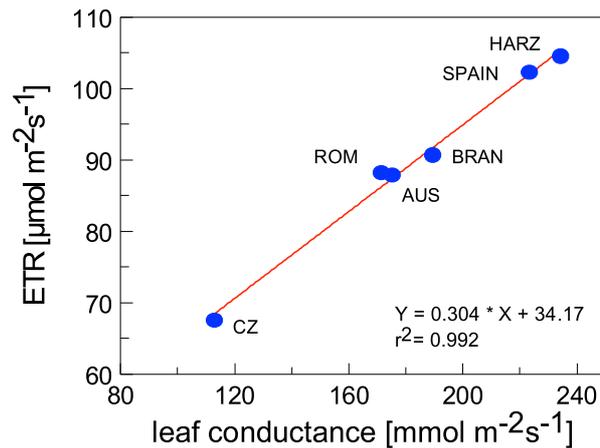


Fig. 1: Relations between leaf conductance and electron transport rate of six European beech provenances after drought period in 2006 [4]

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## References

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