INSTITUTE FOR LOWLAND FORESTRY AND ENVIRONMENT

Variation in xylem vulnerability to embolism in European beech from geographically marginal populations. Tree Physiology 38(2), 173-185, 2018.

Scientific paper

Stojnić, S., Suchocka, M., Benito-Garzón, M., Torres-Ruiz, J.M., Cochard, H., Bolte, A., Cocozza, C., Cvjetković, B., de Luis, M., Martinez-Vilalta, J., Ræbild, A., Tognetti, R., Delzon, S.

The main objective of this study was to evaluate the in situ phenotypic variability of embolism resistance across 15 beech populations from different marginal sites of the species distribution in Europe, and to evaluate the relationship between embolism resistance and climate in these populations. The significant correlations between embolism resistance and both latitude and AI indicate that beech populations located in southern Europe, which experience higher water deficits, are more resistant to embolism than those located in northern Europe, where drought is less frequent and milder. Modeling also showed that populations with lower habitat suitability values were more resistant to embolism than those with higher habitat suitability values. Together, these results suggest that southern marginal populations have developed ways of protecting the xylem, through evolution and/or plasticity, in response to water scarcity.

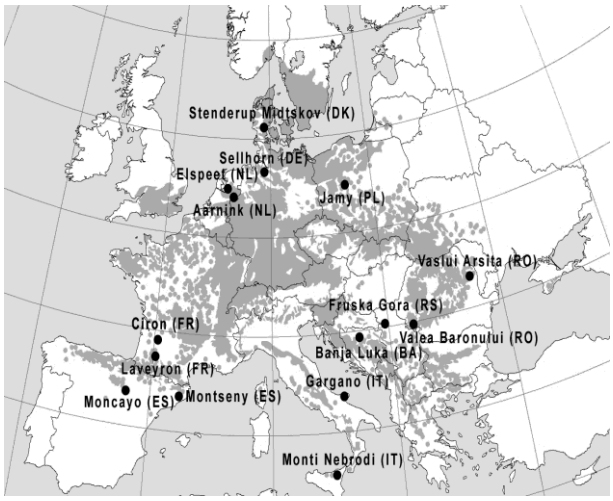

Figure 1. Map of Europe showing the distribution range of Fagus sylvatica L. and the 15 marginal populations studied here.

The in situ phenotypic differentiation of embolism resistance described here is relatively large and probably results from phenotypic plasticity, even if we cannot exclude the role of genetic variation for embolism resistance in marginal beech populations.

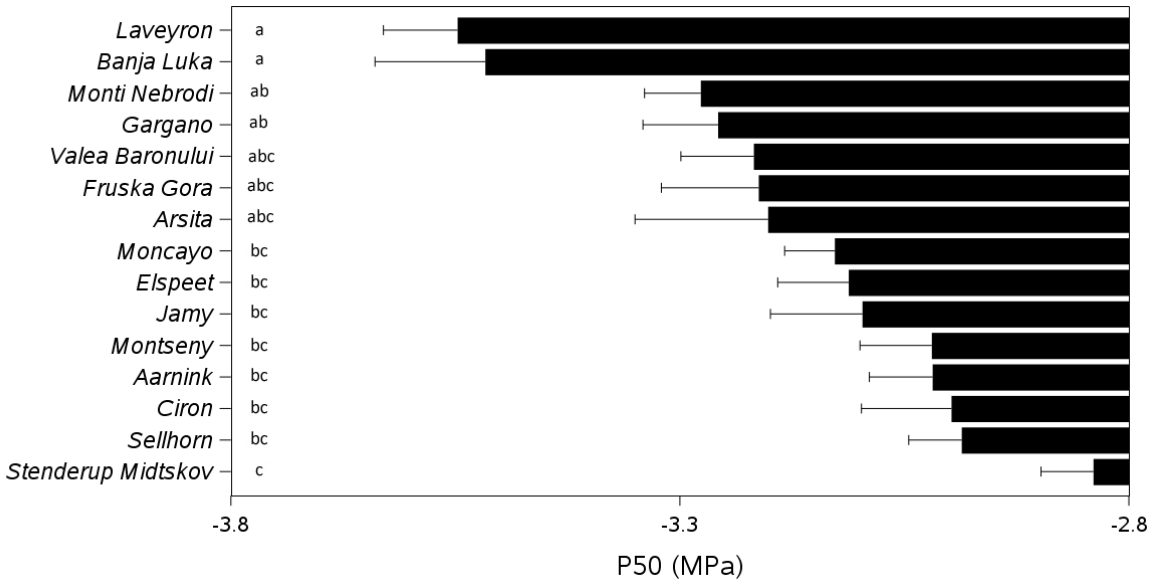

Figure 2. Variation of P50 between the European beech populations studied. The error bars represent the standard deviation. Different letters indicate significant differences between populations at α=0.05.