

## **Drought and forest biodiversity**

Volkmar Wolters, Frédéric Archaux

Strong alterations in forest biodiversity have been an immediate effect of the 2003 drought event. Current state of knowledge suggests that a decrease in ecosystem productivity and an increase of mortality are the most general consequences of drought. Some ecosystems seem to be particularly sensitive, with disturbed ecosystems often being less stable than undisturbed systems. Concerning differences between taxonomic groups, competitive species, species adapted to cold and wet conditions as well as species with low reproduction rate and/or mobility are particularly sensitive. Mechanisms such as avoidance (e.g. via moving to more protected areas) and resistance (e.g. via modifying transpiration rate) further modulate the species-specific response to drought. Long-term consequences of drought are difficult to predict. There is evidence, however, that recurrent periods of drought may even increase biodiversity by reducing competitive interactions. Moreover, the fact that responsive species seem to recover more rapidly than drought-resistant species may induce considerable shifts in community composition. Consequences of drought on ecosystem functioning and its relationship to biodiversity are poorly understood. They are probably closely related to the many indirect effects of drought, including increased fire frequency or a higher level of pathogenic infection. Such effects must be evaluated in the context of other drivers of global change. Considering the high probability of drought frequency and intensity to increase in the near future, interdisciplinary research initiatives on this issue are urgently needed. These should apply a variety of approaches (experimental, observational and modelling) for both better understanding the complex environmental effects of drought and devising management options.