Role of diversity on stability of forest ecosystems in context of global change.

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Abstract

Global change impacts ecosystem functioning in several ways. These impacts can be direct, through changes in climate, and also indirect because of modification in ecosystems' composition and richness. In fact, the relationships between diversity and ecosystem functioning, have been widely explored in the last two decades. For instance, a general consensus has emerged stating that productivity generally increases with diversity. However, most of the studies have focused on the mean level of a given ecosystem process, and much fewer works have explored the effect of diversity on the temporal stability of these processes. Yet, the insurance hypothesis states that diversity should stabilize ecosystem functioning. Here, we propose to study timber production's stability in forest ecosystems. The main questions deal with the influence of tree diversity (i) on the temporal variability of tree growth, and (ii) on the resistance and the resilience of productivity after a climatic stress at both ecosystem and individual levels. Then we propose to explore (iii) how climate may influence these patterns. To do so, we rely on both field data analyses and results of simulation from a forest gap model. Dendrochronology data have been collected along a latitudinal gradient in the extern Alps, in six different sites. In each site are located several triplets replica, constituted by a mixed-forest plot dominated by two tree species, and a plot of each corresponding monospecific forest. Furthermore we will use a dynamic forest model to explore the same question but on an expanded domain of sites and species.

Keywords: productivity, biodiversity, forest, global change

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