

DESCRIPTION FOR THE GENERAL PUBLIC

The aim of this project is multidimensional analysis of spruce regeneration development processes before, during and right after the period of intense dieback of this species in the Central Europe resulting from bark beetle occurrence. This subject is essential for forest management, because in recent years, a huge losses were noticed in managed spruce forest stands, in which bark beetle outbreaks occurred. High spruce mortality is also a problem for nature protection. As a matter of fact natural old-growth forests proved more resistant than managed ones, but they were also significantly affected by tree mortality of various intensity and spatial scale unprecedented in last centuries. During these types of disturbances, a new generation of young trees is emerging to replace the old trees in the future. This process is long-lasting and has various intensities. The amount, age and height of young spruces is highly diversified. Future stands originating from these young trees should have diverse structure, similar to the old-growth spruce forest observed today. Thus, bark beetle outbreaks, despite killing individual trees or groups of them, should not harm future forest stands in a serious way. For researchers, these events are a good occasion to analyze complicated and long-lasting processes of forest regeneration after large-scale disturbances. The results of such studies could show us the influence of rarely occurring environmental processes upon spruce forest resilience. They can also help to improve a forest management techniques employed in continuous cover forestry by increasing the resilience of forest stands. Until now, the studies concentrating upon these subjects were conducted in managed or at best semi-natural forests. and did not reflected the mechanisms functioning in old-growth forest, where some trees are nearly 400 years old. Implementation of some of these mechanisms in forestry could improve forest management in conifer forests. Hence the need of developing a reliable model of natural spruce forests regeneration seems to be crucial. We plan to develop such a statistical model on the basis of measurements of young generation of trees, conducted in more than 120 permanent circular plots (over 6 ha altogether) in Tatra and Babia Góra National Parks. The model will also contain data acquired in our previous projects on the mortality among trees during the bark beetle outbreak, as well as from aerial photographs analyses. It is very important to start the project as soon as possible because as the time passes some key factors affecting spruce regeneration may become impossible to trace and analyze.