

Last decade has been confirmed as the warmest decade since the global temperature was recorded regularly. Changes in mean annual temperature along with the redistribution of precipitation have a profound impact on plant species phenology, species distribution and growth. In Europe, mixed forests composed of European beech and silver fir are viewed as beneficial in mitigating the negative effect of weather anomalies, and thus lower the risk in forest management. The previous studies showed that benefits of tree species mixture on diameter growth increase with tree size. However, little is known if the similar positive effect of beech and fir mixture can be observed for other growth parameters (a stem elongation, a lateral branch elongation etc.) or in younger life stages of these two species. Our project can fill this gap in our knowledge.

We are planning to choose several locations in Poland and Balkans to measure a radial, height and lateral growth of young beeches and firs. All locations are situated in divergent regions of natural distributions of these two species. We want to assess the moment of time during the growing period when young trees exhibit the most vigorous growth in height, diameter and lateral branch elongation. Moreover, by daily monitoring weather and soil conditions, we will get information about the distribution of these variables between months and years. Additionally, we will assess in a regular interval the changes in such parameters, as leaf area index (LAI), photosynthetically active radiation (PAR), direct and diffuse radiation levels during the growing season. We would like to test which environmental and climatic variables (or their interactions) are crucial in shaping growth of young trees and how large interspecific differences we can see between European beech and silver fir by employing a set of regression models. We will put a special attention toward any observed weather anomalies (their duration, intensity and timing) to determine if specific weather conditions may disadvantage a certain species in a long-term, thus, threatening its presence in a forest community.