

Abstract

Mountain Spruce forests in Central Europe with predominant Norway Spruce (*Picea abies*) are repeatedly facing various disturbances such as windstorms followed by Bark Beetle (*Ips typographicus*) gradations. These disturbances significantly affect the structure of forest ecosystems. This thesis studies the development of *Picea abies* seed bank in the understory vegetation of a fully established Mountain Spruce forest and its importance in the process of disturbed forest vegetations regeneration. The research was conducted in three localities in the Šumava National Park during the period of 2016–2021. The aim was to analyze the contribution of seed years, localities, and a substrate type to natality and mortality of spruce seedlings. The results show a considerable effect of seed years on natality of seedlings of *Picea abies*. This is shown specifically by the results of the year 2019 in which the natality reached its peak over the course of the whole studied period (320 individuals/m²). The type of substrate also played an important role as a factor influencing both the seedlings' natality and mortality. Mossy substrates offered optimal conditions for the establishment of seedlings thanks to their ability to hold enough moisture. Conversely, establishment on plant litter substrates was dependent on their thickness and water availability. The mortality of the seedlings was the highest during their first year and it was heavily influenced by the substrate type and microclimate conditions. The results suggest that the population dynamics of *Picea abies* is significantly affected by the interplay of seeding years, properties of the substrate, and climate change. Furthermore, it was found out that the seedling establishment rate and seed bank size can be supported by canopy disturbances caused by windthrows and Bark Beetle outbreaks. These findings are critical for the restoration of Mountain Spruce forests.

Key words: *Picea abies*, Šumava Mts., regeneration, age, size and spatial structure, mast years