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Abstract

Trees as a Legacy of Forest Fires in Scots-Pine-Dominated Stands: Case Study in Latvia †

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Abstract: A large proportion of the forest stands in the hemiboreal zone of Europe are managed for timber production using clear-cutting systems. Stands usually are even-aged, monodominant, or two-layered stands with Norway spruce in undergrowth. There is limited information on the mortality pattern/survival of trees after wildfire in these novel ecosystems. A vast majority of forest fires (e.g., 1000 wildfires per year in Latvia on average) are human-induced. Fires are usually not stand-replacing fires, but there is scarce information about the growth of surviving trees after fires. Therefore, the aim of our study was to assess the factors affecting the probability of survival and increment of fire-damaged trees. We established sample plots in the 27 stands as soon as possible after wildfires which occurred during 2004, 2006, and 2008, and measured the diameters and heights of the trees as well as the damage level (scorching of the stem, damage to the foliage, and burning of major roots). For survival analysis, the trees were assessed twice a year for upto 4 years. Additional diameter increments of 607 surviving pines were assessed 5 years after the fire using trees in the stands of similar age and forest type as a control. The results revealed that the probability of survival was positively correlated with tree diameter and negatively correlated with stem-scorching height and the proportion of uncovered root systems. In cases of low fire severity, trees can even increase their diameter increment; however, with increasing fire severity, increment becomes negative, i.e., undisturbed trees generate more stem volume than trees affected by fire.

Keywords: tree survival; additional increment; fire severity

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