

Litter decomposition and soil carbon storage in Norway spruce, Douglas fir, and European larch stands

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An increase in droughts and subsequent insect infestations threatens Norway spruce (*Picea abies*) stands across European forests. With a higher drought tolerance, Douglas fir (*Pseudotsuga menziesii*) and European larch (*Larix decidua*) became a suitable non-native and a native silvicultural alternative to Norway spruce. How tree species selection affects fate and rates of litter decomposition and forest soil carbon (C) storage is, however, still not fully understood. Therefore, this study aims i) to answer if Norway spruce, Douglas fir and European larch differ with regard to litter mass loss partitioning into CO_2 and leaching of dissolved organic C during decomposition, ii) to relate mass loss partitioning to biochemical properties of litter and iii) to link mass loss partitioning to soil C stocks. It is hypothesized that tree species with a higher partitioning into leaching of dissolved organic C have higher soil C stocks.

The study took place in the Vienna Woods, Austria and measurements were conducted from April to December 2018. Litter CO_2 efflux and leaching of dissolved organic C was measured in situ by means of respiration chambers and zero-tension lysimeters. Litter bags were used to study mass loss and biochemical litter processes/properties (e.g. microbial activity, lignin content). The results of this study will improve our understanding of tree species effects on the forest soil C cycle and help to lower the uncertainties of soil C storage estimates for the forestry sector. Furthermore, new insights into the complex process of litter break down will be provided. Preliminary results will be presented at the conference.