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Cause-Effect Relations with Regard to Functional and Morphological Humus Characteristics in Mixed Forest Stands

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A major argument brought forward when giving reasons for the admixture of deciduous tree species into coniferous forest stands is the amelioration and stabilization of biogeochemical cycles. An ecologically oriented silviculture relies on detailed knowledge about the ecosystem effects of practical measures. Thus, it focuses on the 'amelioration potential' of a specific tree species with respect to changes of topsoil characteristics in typical monocultural situations. Up-to-now, few data is available concerning the percentages of deciduous species (degree of admixture) or type of admixture (single-tree, small or large groups) required to achieve desired effects, e.g. faster decomposition and incorporation of organic matter in the mineral soil. Thus, the objective of this study is (1) to analyze the impact of admixtures on topsoil properties and processes, and (2) to establish spatial models of such effects. The experiments are conducted in even-aged Norway spruce (Picea abies [L.] KARST.) stands with a variable admixture of Silver birch (Betula pendula Roth) in the Ore Mountains (Saxony, SE Germany). The approach starts with explanation of single-tree-effects and approves in a next step the enlargement to forest stand ("from-point-to-area-approach"). This attempt is expected to provide models with few parameters which can be used to modify the common exclusive growth models.