

Growth and vitality of fine roots of Norway spruce as influenced by experimental and natural drought

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The presented project deals with drought effects on the dynamics of fine roots of Norway spruce. A study on pure spruce stands along a precipitation gradient is carried out in order to investigate the adaptations of adult trees to natural differences in soil drought conditions. The research plots represent a transect in central Germany from the Solling Mountains in the state of Lower-Saxony along the southern border of the Harz Mountains (state of Thuringia) to Halle in the state of Saxony-Anhalt. The annual rainfall on these sites decreases from West to East from 1000 mm to about 500 mm of precipitation per year. By determining the fine root bio- and necromass using an inventory depth profiles of fine root distribution are created and the effect of drought on live:dead ratio of fine roots can be evaluated. Furthermore fine root morphology is analysed and used to calculate root area indices on stand level. An application of the minirhizotron method as well as the ingrowth core method will allow for monitoring fine root growth and turnover.

Additionally, above ground biomass and productivity are analysed measuring aboveground stand structure, stem increment and leaf litter production.

Our presentation will give an overview on the planned experiments as well as an account of some preliminary results.

Keywords: fine roots, Norway spruce, drought, minirhizotron, ingrowth cores