



PostDroughtNUT

Effect of repeated early drought events on nutrient uptake of beech trees during the post drought period

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Context —

Drought events stress trees in a multiple way through shortage of water and nutrient availability, heat, insects and other pathogens. Effects of drought on tree physiology, nutrient uptake and functional biodiversity has been rather intensively studied (e.g. DFG Beech research group). But, less attention has been given to the post drought period, which could attenuate the drought induced consequences on tree physiology, tree nutrition and soil – plant interactions.

Objectives —

The objective is to study the nutrient uptake of trees during the post drought period and more in detail, soil N fluxes and the temporal dynamic of root uptake of plant available N.

Approaches —

We will evaluate the physiological impact of drought on the capacity of fine roots (ectomycorrhizal fine roots) to take up nitrate during late summer and autumn in drought stressed and control plots. During the post drought period the uptake of soil applied ^{15}N labelled nitrate by the mycorrhizal fine roots is measured regularly until leaf senescence. Fine root density, root length, mycorrhizal diversity and partitioning of residual ^{15}N among the different soil N pools are recorded.

Expected results and impacts —

The post drought period modulates the impact of the preceding drought(s) on the capacity of the trees to take up water and nutrients. Here, we evaluate and compare the root uptake of ^{15}N labelled N of drought stressed and control trees during late summer. Root morphology, fine root density, mycorrhizal diversity, partitioning of the ^{15}N label among different soil N pools are additional indicators of the response of trees. As drought events are thought to be more frequent in the near future, it is urgent to evaluate if the post drought period attenuates drought stress induced nutrient deficiency.