

Exceedance of critical limits and their impact on tree nutrition

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For N limited stands, enhanced N supply may stimulate the production of above-ground biomass. However, in excess, N loads may lead to nutrient imbalances and sensitivity to frost, insects, and fungi may increase (N saturation hypothesis, postulated by Aber et al., 1989).

This study aims on investigating the following relations based on the level II network - Relations between exceedances of critical loads and indicators for actual N saturation and soil acidification status Relations between exceedance of critical limits for soil solution and tree responses For these purpose the measurement of throughfall deposition, soil solution, foliar analyses, damage cause assessment, crown condition and soil classification on the ICP-Forests level II plots between 2006 and 2010 as well as critical loads calculated with SMB method have been used.

For plots with higher N throughfall ($>20 \text{ kg N ha}^{-1} \text{ a}^{-1}$), nitrate concentrations lowest lysimeters more often exceed critical limits for N saturation. About half of the level II plots with critical loads exceeded already show indication of N saturation while the other half may still be in the phase of accumulation. Similarly, proportion of plots with BC/Al criterion exceeded ($\text{BC/Al} < 0.8$ in more than 80% of the samples) seems to be higher among the plot with exceedance of critical loads of acidity.

At plots with exceedance of critical limits in soil solution the N in foliage is more often in than below optimum for Spruce, Pines and or above then in optimum for Oak. For Mg it is vice-versa for Spruce, Pines, and Beech. For the tree species groups of Spruce and Pines the percentage of plots with foliar N concentrations below optimum is significantly lower for plots with critical limits exceeded. In the presentation the tendency to more frequent appearance of light green to yellow discolouration as well as possible reasons will be discussed.