



## Second BASIS meeting (April 3 and April 4, 2008)

Aanmelding wetenschappelijke bijdrage / Submission of scientific contribution

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**Deadline: February 15, 2008**

Titel / Title: Foliar uptake of N-15 by four deciduous tree species

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Te presenteren als / Poster  
to be presented as:

Oral presentation

Poster

Samenvatting / Abstract:

Semi-natural ecosystems such as forests are exposed to enhanced atmospheric deposition of nitrogen (N) compounds originating from anthropogenic emissions. To relate these inputs to changes in biodiversity or nutrient cycling and to determine exceedances of critical and target loads, an accurate quantification of total N deposition is required. One widely used approach is the throughfall method, but then the aboveground uptake of N needs to be measured too. Furthermore, canopy uptake of N is an important ecological process because it enables plants to absorb a relevant fraction of incoming N without soil microbial competition. Even though the ability of plants to take up mineral elements directly by leaf tissues is well known, this uptake is hard to quantify. The most convincing and sensitive way to determine foliar uptake of N is to apply N-15 labelled sources. We applied this method in situ to young trees of four deciduous species, i.e. European beech (*Fagus sylvatica* L.), common ash (*Fraxinus excelsior* L.), red oak (*Quercus rubra* L.), and sycamore maple (*Acer pseudoplatanus* L.). Dissolved N-15 was applied by spraying rain water with added  $^{15}\text{N-NH}_4^+$  or  $^{15}\text{N-NO}_3^-$  onto living leafed twigs in September 2007. The experiment was repeated in October 2007 to assess the effect of leaf phenology on foliar N uptake. Furthermore, living twigs in plastic bags were exposed to  $^{15}\text{N-NH}_3$  and  $^{13}\text{C-CO}_2$  for examining gaseous N uptake, corrected for varying light conditions. The foliar N uptake of dissolved and gaseous N compounds was meaningfully affected by the tree species, with European beech having the highest  $\delta^{15}\text{N}$  values and red oak the highest relative N retention. For all tree species, the foliar uptake of dissolved  $\text{NH}_4^+$  was higher than of  $\text{NO}_3^-$ .