INSTITUTE OF BOTANY ASCR

PRESS RELEASE

21. 02. 2012

Nitrogen time bomb threatens biodiversity of European forests

In recent decades, European forests have been exposed to the impact of atmospheric nitrogen deposition. The mechanisms of the impact of increased nitrogen on European forest vegetation have been little studied so far. Czech scientists from the Institute of Botany of the Academy of Sciences, together with 20 colleagues under the leadership of Prof Verheyen from Ghent University studied the impact of air-borne nitrogen on the vegetation of broadleaved temperate European forests. Nitrogen deposition and consequent eutrophication might be the main causes of species composition and diversity changes in forest understories.

The study published in March 2012 in the Journal of Ecology is based on the repeating of 20–70-year-old species records from 1205 forest plots across Europe. Species composition, the relative importance of nitrogen deposition and other selected drivers such as game stock and forest management were analysed. It was found that current conditions promoted shade-tolerant and nutrient-demanding plant species. By contrast, in the past nitrogen was the main limiting nutrient.

The changes observed could be interpreted as a consequence of nitrogen content increase in the environment. Surprisingly, further research established that forest management was probably more important than nitrogen deposition. In particular, the intensity of management decreased, tree crowns merged and changes in tree species occurred. Under dark canopies, the proportion of trees with easily decomposing litter increased.

This study shows that one should be cautious when drawing conclusions about the impact of atmospheric nitrogen depositions. However, the accumulated nitrogen might still have a significant impact if forest canopies open up again. In such a case, the nitrogen time bomb may in fact explode.

Děvín (Pálava), one of our study sites with 50 resurveyed plots used in the paper published in the March 2012 issue of the Journal of Ecology.

Milíčovský forest in Prague, where black elder, hornbeam and ash expanded due to nutrient enrichment. Massive invasion bv *Impatiens parviflora* occurred only in the last 30 years.

Contact:

Radim Hédl, Institute of Botany, Academy of Sciences of the Czech Republic, Department of Vegetation Ecology, Lidická 25/27, 60200 Brno, Czech Republic
e-mail: radim.hedl@ibot.cas.cz
telephone +420 541126219

Petr Petřík, Institute of Botany, Academy of Sciences of the Czech Republic, Department of Geobotany, Zámek 1, 25243 Průhonice, Czech Republic
e-mail: petr.petrik@ibot.cas.cz
telephone +420 271015246.

Verheyen K., Baeten L., De Frenne P., Bernhardt-Römermann M., Brunet J., Cornelis J., Decocq G., Dierschke H., Eriksson O., Hédl R., Heinken T., Hermy M., Hommel P., Kirby K., Naaf T., Peterken G., Petřík P., Pfadenhauer J., Van Calster H., Walther G.-R., Wulf M., Verstraeten G. (2012) **Driving factors behind the eutrophication signal in understorey plant communities of deciduous temperate forests.** Journal of Ecology 100: 352–365.