Progress report 2012

Selected topics

- Air pollution impact on species diversity of epiphytic lichens (EB.AIR/WG.1/2012/5)
- Tree response to critical limit exceedances (EB.AIR/WG.1/2012/5)
- Participation of EECCA countries
- Ongoing study on large-scale critical loads exceedances (interim results)
Species diversity of epiphytic lichens

Lichens
- most sensitive to several air pollutants
- used for revising critical levels for ammonia

Study of relationships
- epiphytic lichen diversity
- nitrogen deposition

On 70 ICP Forests Level II plots
- 1155 trees
- 292 epiphytic lichen species

Oligotrophic lichens (144 species)
- used as indicators
- adapted to nutrient-poor conditions
- expected to react first to nitrogen deposition
Species diversity of epiphytic lichens

Share of oligotrophic lichens

- highest in Finland and parts of Italy and Spain
- lowest in central Europe (high N deposition)

Calculation of correlation

- share of oligotrophic lichens (per plot)
- Nitrogen throughfall (mean of 1996-2007 per plot)
Species diversity of epiphytic lichens

Share of oligotrophic lichens decreases
- with increasing N throughfall
- below 40% if N troughfall exceeds 3.8 kg ha\(^{-1}\) yr\(^{-1}\)

Decrease below 40 %
- indicator for N deposition impact
- on 80% of the plots

Effect of nitrogen deposition on diversity of lichen species in forests

Similar correlations for
- \(\text{NH}_4^+\)
- \(\text{NO}_3^-\)
ICP Forests

Tree response to critical limit exceedances

Assessments of
- Bulk and throughfall of N
  - on 251 plot
  - in 25 countries
- Annual mean concentrations of N in soil solution
- Ratio of samples exceeding critical limits
  (for nutrient imbalances)
- Proportions of trees
  - light-green discolouration
  - yellow discolouration
Tree response to critical limit exceedances

With increasing N-throughfall

- percentage of plots without exceedance of critical limits (green) decreases
- percentage of plots with exceedances of critical limits (orange/red) increases

Related to discolouration
Tree response to critical limit exceedances

Percentage of trees with discolouration
- Smallest if critical limits not exceeded
- Increased if critical limits exceeded by 0-50% (Beech and silver fir)
- Highest if critical limits exceeded by >50% (Pine and spruce)
Tree response to critical limit exceedances

In summing up

- Relation between
  - N deposition
  - high nitrate concentrations in soil solution indicating plots being in the phase of N saturation
- Exceedances of critical limits for nitrate in soil solution are related to
  - higher discolouration
  - less favourable foliar nutrition
Participation of EECCA countries

EECCA countries
- participating in ICP Forests
  - Belarus
  - Moldova
  - Russian Federation
  - Ukraine
- Attending Task Force Meetings as observer
  - Georgia

Participating EECCA countries
- conduct monitoring
- submit data
- are partly included in data analyses
Participation of EECCA countries

Russian Federation
- Basic plot information (Levels I and II)
- Crown condition survey (Level I)
- Surveys (Level II)
  - Deposition
  - Soil and soil solution
  - Needle-/leaf chemistry
  - Crown condition
  - Ground vegetation

Belarus, Moldova, Ukraine
- Basic plot information (Level I)
- Crown condition data
Cooperations

Cooperation with ICP M&M

- Critical load exceedance at Level I
- Interim results
- Not ready for publication
Critical Load Exceedances

Database
- Soil data of ICP Forests from 4600 Level-I plots
- Deposition data from EMEP (EMEP 1980)
- National Projections (NAT 2000) by CCE
- Scenarios by CCE
  - Cost Optimised Baseline (COB 2020) scenario
  - Maximum Feasible Reduction (MFR 2020) scenario

Calculation of critical load exceedances
- Mapping- Manual of ICP M&M
- Application of VSD/VSD+
  - by German NFC of ICP M&M (ÖKO-DATA)
  - for the years
    - 1980
    - 2000
    - 2020
Critical Load Exceedance (4600 Level I plots)

Deposition of Acidity in 1980 (EMEP 1980)

- Exceedances on 37.3 % of the plots (● ● ● ●)
- No exceedance on 62.7 % of the plots (●)
ICP Forests

Critical Load Exceedance (4600 Level I plots)

Deposition of **Acidity** in 2020 (COB 2020)
- Exceedances on 0.1 % of the plots (● ● ● ●)
- No exceedances on 99.9 % of the Plots (●)
Critical Load Exceedance (4600 Level I plots)

Deposition of Nitrogen in 1980 (EMEP 1980)
- Exceedances on 46.4% of the plots (● ● ● ●)
- No exceedances on 53.6% of the plots (●)
Critical Load Exceedance (4600 Level-I-Plots)

Deposition of **Nitrogen** in **2020** (COB 2020)

- Exceedances on 19.0 % of the plots (●●●)
- No exceedances on 81.0 % of plots (●)
Further steps

Reasons for presentation as „interim result“

- Criticism by Task Forces of
  - ICP Forests
  - ICP M&M

- Suggestion
  - National peculiarities (e. g. site conditions) to be taken into account
  - Prevent confusion between maps
    - confined to forests
    - including more susceptible ecosystems
      (with higher exceedances)
Further steps

Consultation with ICP M&M

- Distribution to NFCs
  - Results (maps and numerical figures)
  - Description of the approach

- Question to NFCs
  - Agreement?
  - Recalculation by NFC? (raw data to be provided)
  - Rejection?

- Revision of maps
- Presentation at 32nd session of WEG