

## **International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests of UN/ECE (ICP Forests) in cooperation with the EU**

### **Minutes of the 9<sup>th</sup> ICP Forests Expert Panel on Foliar Analysis (EP on Foliage)**

18 participants from 12 countries attended the meeting (Annex 1).

1. The 9<sup>th</sup> EP on Foliage meeting took place from 20<sup>th</sup> to 21<sup>st</sup> June 2005 in Duplin/Ireland.
2. The Chairman (Mr. Pasi Rautio) opened the meeting
3. Mr. Martin Lowery (Coillte, Chief Executive) gave an introduction to Coillte, The Irish Forestry Board
4. Mr. Diarmuid McAree (Forest service, Chief Inspector) gave a talk about the Sustainable Forest Management policy in Ireland as well as the many roles that forests have in Ireland and the Forest Service in managing all that.
5. The meeting adopted the attached agenda (Annex 2).

6. Mr. Georg Becher (ICP Forests Program Coordinating Centre) introduced the latest news from the ICP Forests:

Mr. Haussmann retired from his position as the Chairman of ICP Forests. His successor is Mr Köhl, Head of the Institute for World Forestry at the Federal Research Centre for Forestry and Forest Products in Hamburg (Germany). The new chairman, of ICP Forests together with PCC, will in the short-term continue with the previous strategy of ICP Forest. Mr. Becher was appointed as the ICP contact person for the Foliar Expert Panel. The forthcoming task of ICP Forests and PCC will be to develop a new strategy, the final proposal of which will be discussed at the meeting of the Programme Coordinating Group (PCG) in December 2005 in Hamburg and submitted to the 2006 Task Force Meeting ( to be held in Estonia) for adoption. The main points of the new strategy will be:

- Cooperation of ICP Forests with UN/ECE,
- Updated evaluation system for the next Forest Condition Report,
- Data management including responsibilities in plausibility checks,
- Accessibility and data publishing,
- Target groups of ICP Forests' activities and reports.

In regard to data management and databases, PCC manages, in close cooperation with FFCC and FSCC, all Level I data. Furthermore, it has the temporary task to administer old Level II data received from FIMCI together with Level II data collected in 2002 and 2003. A common Level I and Level II database is being developed by IMAGE, a Belgian company contracted by Joint Research Centre (JRC).

The duration of the Forest Focus Regulation ends by December of 2006 imposing a challenging time and enforced changes on ICP Forests. The new Regulation known as Life + will come into force in January 2007. Life + Regulation will be discussed in Standing Forest Committee in conjunction with future cooperation between the EU and ICP Forests as well the establishment of the European Forests Monitoring Centre (EFMC).

9. Ms Annemarie Bastrup-Birk (the Joint Research Centre, the European Commission) introduced the latest news from the Commission

- DG ENV
- The BioSoil project: demonstration project under the national programmes 2005/2006
  - o The aim: Use of the Level I network for new issues in a joint & harmonised way?
    - Soils
    - Forest biodiversity
  - o Execution 27 months (2005-2008)
- What is the Joint Research Centre (JRC)
  - o It is DG (like DG Env..) situated in Ispra, Italy
  - o Tasks: (among other things) building the Forest Focus database, data analysis and reporting of forest condition in the EU, operation and further development of EFFIS (European forest fire information system)
- Integration of Forest Focus and Life+ ?
  - o Policy objectives
    - Strengthening the forest sector in cross-sectoral policy issues
    - Speaking with one voice : provide similar information
    - Reducing reporting burden
    - Improving communication policy (user-friendly info)
- What needs to be done?
  - o Implementation of MCPFE C & I
  - o MS coherent approach : FI, ICP, remote sensing
  - o EU coordination facility
    - improving reliability of data for EU/international purpose
    - data or new parameters
    - capacity building
    - ensuring sound science-policy interface
    - flexible up-to-date reporting
- Ms Bastrup-Birk also presented some option how to organise the coming program as well how to link the different programmes ongoing at the moment (Level I, Level II, NFIs)

Ms Bastrup-Birk pointed out that in future (after the end of Forest Focus), there will be no more money spent on monitoring programs only.

10. Mr. Fürst (the Head of ICP Forests Forest Foliar Coordinating Centre): An overview about the timetable of the next interlaboratory tests. The 8<sup>th</sup> test is running now – the registration is ending at 8<sup>th</sup> of July. This test is demanded by ICP Forests for all labs, which are analysing Level II samples 2005/06. Deadline for data submission is end of 2005 according to the ICP Forests manual. 51 labs have registered todate. Mr. Fürst asked for comments of the panel members to improve the ringtest implementation.

For the next ringtest (2006) one or two foliar samples are needed.

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11. Mr. Fürst: The presentation of the results of 6<sup>th</sup> and 7<sup>th</sup> Interlaboratory comparison test. Mr. Fürst pointed out that it is necessary for participating laboratories to complete the questionnaire to get basic information what is going on in QC/QA in the laboratory. Only appr. 75% of the labs have done this. More than 50% of the labs were or planned to be accredited within two years – the use of control charts is common (>90%). The results of the 7<sup>th</sup> ringtest are slightly better than 6<sup>th</sup> test – most of the labs send correct results. For the elements P, K and C there is a clear improvement in data quality in the 7<sup>th</sup> test compared to the 6<sup>th</sup> ring test. The calibration problems with element analysers seemed to be fixed.

On the other hand the results of Ca, Mg and Pb are worse than in the 6<sup>th</sup> test. This could be connected with some interferences or too low element concentrations. Interferences and problems with the method are described in the manual. In case of very low lead concentrations, this influenced the ringtest evaluation as well – it was better to use the median than the mean value and calculate the tolerable limit from the median value.

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12. Mr. Fürst (Head of ICP Forests Forest Foliar Coordinating Centre): The next presentation was about problems of Needle/Leaf Interlaboratory Comparison Tests. The wishes from ICP-Forest/EC were to have good analytical quality to find also small differences between the results and to detect small trends. One good quality indicator was the results of the ringtest. Mr. Fürst pointed out that only participating in the ringtests was not enough for the laboratory, it was also necessary to use validated methods and QC-charts (for long time stability). Laboratories must react fast on wrong results and search scientifically for the reasons. They must fix the problem, recheck the method and avoid the mistake in future. Most of the labs are working well. FFCC tries to give further support to the labs, for example by arranging annual ringtests. In addition FFCC tries to establish the possibility for developing a communication platform for the exchange of technical expertise.

Both the expert exchange and Training-Course were supported as a means to improve lab quality in labs that have problems with quality. Mr. Matteucci (Italy) suggested a international 2-3 days workshop that deals problems in lab work and solutions for these. Also lab to lab cooperation was suggested by Mr. Bochereau (UK) and supported by Mr. O’Dea (Ireland). O’Dea pointed out that NFCs should be aware of the development in quality. Mr. Dietrich (Germany) pointed out that the coordination of this kind of activity (lab to lab cooperation, Training courses) should happen through FFCC. When the economic situation does not allow funding to support travels for national laboratories representative from FFCC or some other selected expert should visit labs if there is need for educate or training of the laboratory staff. FFCC will contact the labs and ask if there is a need for assistance.

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13. Mr. Fürst (Head of ICP Forests Forest Foliar Coordinating Centre): QC/QA work must be done in the laboratory – nobody else can do this work. Mr. Fürst gave an overview how to develop a new method and how this method must validated. A simple example for a control chart was given. An additional reporting (about changes) in the laboratory must be done to find the reasons for the ‘out of control situations’ on the laboratory’s control chart. And if there is an ‘out of control’ situation, it is necessary to correct the mistake and adjust the method to avoid the same mistake in the future. Interlaboratory tests are only the last thing in this long chain of QC/QA procedures. If the lab has good equipment, educated staff and QC/QA charts and procedures, then good analytical are routine.

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14. There is no direct link between the Level II data and the quality information of the ringtests. The NFC sends the Level II data to PCC Hamburg, while the laboratory sends their ringtest data to FFCC. FFCC is sending an overview of the annual ringtest results to PCC Hamburg. But in the database it is not possible to connect the results to the laboratory – especially when more than one laboratory was analysing samples in one country, if laboratories were changing or if the data quality was changing. All information available and must put in the submitted forms. Mr. Rautio presented the forms included this QC/QA information (labcode number and ringtest number) in the observation field. The new form could be downloaded from FFCC ([www.ffcc.at](http://www.ffcc.at)) and from PCC. Mr. Rautio noted also the changes in the form \*.foo after the Prague meeting (replace Na and Al with C and Cd). Also a change in the old DARQ from PCC must be done (put in the actual annual ringtest instead of the old one of 1995). Mr. Rautio informed that the latest ICP-Forests Task (in Rome, Italy) gave a mandate to for EP foliage to approve the changes in the data forms. There is also an update of the DARQ sending from PCC necessary – this will be done from PCC.

The change in the forms was discussed and panel accepted these amendments in the forms. PCC and FFCC will inform the panel members and NFCs about these changes.

Mr. O’Dea cautioned that there was a possibility that PCC will receive requests on the reliability of the stored data based on the ring test results and that a protocol to handle such information requests must be developed in co-operation with the other ICP/Forest Focus Expert Panels.

Also the format of the forms was discussed. PCC take both Excel and ASCII but it is recommended that only ASCII format is used.

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#### 15. Other issues

The French want to collect young foliage growth after storm damage to either a Level I or II plot(s) some years ago. The manual does not say that this is prohibited. The panel discussed options in this kind of case: move the plot (and change the plot number and coordinates) or continue on the same plot and collect the young growth.

16. Invited speaker. Mr. Mika Sulkava (Helsinki University of Technology) gave a presentation how laboratory quality affects the ability to detect trends in environment. He showed that not fulfilling the ICP Forests quality demands has a drastic effect on the ability to detect trends in the foliar concentrations. He pointed out that investment on the quality saves both time and money in the future.

#### Abstract:

Analysing chemical characteristics in samples collected from different components of ecosystems are key methods in environmental monitoring. Chemical analyses are, however, prone to many errors which has brought up concern about the reliability of the analyses. Quality of measurements is an important factor affecting the reliability of analyses in environmental sciences. The aim of this presentation is to show how large of an impact laboratory quality has on detecting changes in environment. We have combined conifer foliar measurement data from Finnish ICP Forests Level I plots and results of national calibration tests and international interlaboratory measurement quality tests in order to study the effect of measurement quality

on the reliability of foliar nutrient analysis. In particular, we study the use of weighted linear regression models in detecting trends in foliar time series data. Using both theoretical computations and real-world data we show that changes in measurement quality have a clear effect on the significance of results.

It was noted from Mr. Sulkava's presentation that it takes many years to detect a small trend in nature. Based on these results, the panel pointed out that this justified the necessity for continuing monitoring activities in the future. Points were raised about the improvement of lab quality and that it is crucial to control also field quality because the errors made there are most likely larger than in lab. Hence following the manual carefully and e.g. doing the sample collection always the same way (same time etc.) is extremely important.

Discussion about how to control quality in field was also raised. It was pointed out the sampling is well documented in the manual but there is a need for a better documentation of field work and collection procedures. Panel stressed the need to translate the sampling protocols in the ICP Forests manual for the national technical staff and to develop field forms where required. Panel also discussed about possible QC/QA parameters for the fieldwork and advised, where possible, repetitive sampling (and analysis) of foliar samples from the same plot by different people as a possible parameter that could be examined in a pilot study.

Expert Panel wants to warmly thank the organisers of the meeting, Coillte (Mr. Martin Lowery (Chief Executive), Messers Pat Neville and Philip O'Dea) and Forest Service (Mr. Diarmuid McAree, Chief Forest Inspector)!

Annex 1 (List of participants)

Annex 2 (Agenda of the meeting)