

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

5th Meeting of the Forest Foliar Expert Panel (Vienna, Oct 5-6 1998)

MINUTES

The Meeting was attended by experts from Austria, Belgium-Wallonia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Lithuania, Norway, Poland, Slovak Republic, Spain and the United Kingdom. In addition to these 15 European countries, the European Commission (EC) and the Forest Intensive Monitoring Co-ordinating Centre (FIMCI) were represented (see *List of Participants*, Annex I).

Item 1: Opening and welcome; Adoption of the agenda

The Meeting was opened by the Chairman of the Forest Foliar Expert Panel, Mr. K. Stefan (Austria), who welcomed the participants on behalf of the Director of the Vienna Federal Forest Research Centre and on behalf of the host country, Austria.

The proposed agenda (Annex II) was adopted. Mr. Haußmann (Germany) was elected Co-chairman of the Meeting.

Item 2: Further implementation of the EU / ICP Forest programme

Mr. Haußmann in his presentation focused on the ICP Forests strategy paper which had been approved at the 14th Task Force Meeting in Segovia, Spain, in May 1998, and which contains the activities scheduled until 2001. For the time being, no repetition of the Level I Foliar Survey is planned for that period. A good time for another Level I survey might be the year 2005, because the Level I soil inventory might be repeated then, too. Moreover, an investigation on the Level II plots is scheduled for 2005, which would definitely make it easier to compare the results.

In the meantime the Expert Panel and the ICP-Forests should concentrate on an integrated evaluation of the available results. At present, two groups are working at European level to

integrate the Level I data of the individual surveys (DLO and FSCC Gent in cooperation with PCC Hamburg).

Mr. Haußmann also referred to the agreement of the 8th Soil Expert Panel Meeting, as the latter treats the question of a possible repetition of the surveys on Level I plots. A practicable and realistic time frame would be the period from 2004 to 2006. The Soil Expert Panel proposed to the Foliar and Crown Expert Panel to integrate in this approach both foliar and crown surveys, during the same time period and on the same plots.

Mr. Herkendell (EC) pointed out that the EC was definitely not in a position to sponsor the project with higher amounts of money in future years. It will be necessary to set priorities and, if there are no other possibilities, to make budget cuts in some areas of activity of the EU programme.

It is planned to discuss future points of main effort as well as the cooperation with other expert groups in the individual Expert Panels and to lay down the priorities for the time after the year 2001 in a new regulation for EU and a new programme scheme for ICP-Forests.

Framework conditions and the framework programme for the time after 2001 are to be elaborated in a workshop organized by the EC and ICP-Forests. The preparatory works for this workshop are under way.

Item 3: Information regarding the results of the 3rd Combined Meeting of SAG and NFCs in Heerenveen, Netherlands

Mr. Deelstra (FIMCI) informed on the discussion of the data evaluation, which had taken place in FIMCI. In 1998, investigations have focused primarily on meteorological parameters, soil solution, and deposition.

Mr. Deelstra also indicated that there were some discrepancies between the methods recommended in the Manual and those described in the Data Accompanying Questionnaire Report (DAQR) with respect to sampling and sample investigation. With a view to data quality assessment, the Expert Panel asked FIMCI to define questionnaires, documenting the measures of quality control in the individual laboratories to be sent with the annual DAR.

In the course of the discussion, an integration of the different survey parameters of the Programme was stressed.

Item 4: Activities of the FFCC since the 4th Meeting of the Forest Foliar Expert Panel

Mr. Fürst (Austria) pointed out new aspects of the FFCC activities undertaken since the 4th Meeting of the Forest Foliar Expert Panel:

- Report „Forest Foliar Condition in Europe“
- Keeping track of the Forest Foliar Database
- Compilation of a "data dictionary"
- Submission of the foliar data to the PCC
- Implementation and evaluation of the 3rd interlaboratory test
- Provision of an Internet web page
- Preparatory works for the 5th Meeting of the Forest Foliar Expert Panel

In the ensuing discussion, Mr. Fürst was asked if additional data had been received after the completion of the report. Mr. Fürst informed the participants that this was the case only for Finland, Austria, Italy, and the Slovak Republic, and that it was planned to evaluate the new data only after receipt of additional information from other countries and/or other years.

Item 5: Discussion of the results of the 3rd interlaboratory test; Evaluation of the applied chemical methods; Updating of the methods recommended in the Manual while keeping in mind the results of the interlaboratory tests; Comparison of the results of the 2nd and 3rd interlaboratory tests from the different countries

Mr. Bartels (Germany) recalled the results of the 3rd interlaboratory test, recently sent to all participants. He pointed out the following main points of effort:

After the results of the 3rd, and all preceding, interlaboratory tests, dry digestion is not to be used any more because the loss of elements and contaminations might give a distorted picture. The combination of pressure digestion (no. 4.1) with ICP-AES (no. 31), which, except for nitrogen, can be used for all mandatory and optional elements, contains the minimum risk of receiving false results.

When comparing the 3rd and the 2nd interlaboratory test, it is important to consider changes and developments in equipment. By now, many laboratories use fully automatic analyzers and multi-element processes. Modern tools frequently use elementary analyzers (for C, N, S) and acid pulping (pressure, micro-wave, or open) with ICP-AES measurement. For this reason, Mr. Bartels proposed a revision of the Manual (Chapter 4). The revised edition is to be compiled in cooperation with Mr. Fürst and should be completed before the Task Force Meeting 2000. It is to be taken into account which methods were used by „good laboratories“ (see Annex III).

Regarding the determination of the sulphur, sodium, copper, lead, boron, and cadmium content, quality was improved.

Although better equipment was available, the analytical findings for phosphorus, calcium, magnesium, potassium, and manganese were worse than those of the 2nd interlaboratory test. Mr. Bartels therefore proposed to carry out interlaboratory tests in regular two-year intervals (in parallel to the Level II survey). This proposal received with general approval.

The 4th interlaboratory test will be carried out in autumn next year, if possible with certified samples and „black samples“. In order to allow a complete evaluation before the Task Force Meeting in May 2000, the data have to be transmitted to Dr. Bartels until **15 February 2000**, at the latest. The analyses are to be carried out together with the Level II samples. Sample material from the Slovak Republic, Norway and Austria will be provided for the 4th interlaboratory test.

It is necessary to regularly validate the analytical methods (with certified reference material - CRM, national reference material - RM), also at the national level so as to assure continuous quality control (quality assurance system).

It was unanimously agreed that the laboratory codes of the countries participating in the interlaboratory test could be passed on to the FIMCI so as to make it possible for the latter to assess the quality of the transmitted data. This information may be used for the assessment of the foliar data only (e.g. include with a warning hint, or exclude from evaluation). The Expert Panel however opposed any release of codes beyond that.

For the evaluation of the interlaboratory test samples, the nitrogen limiting value was reduced from 15 to 10 %.

The results of the interlaboratory test should be published in a technical journal.

Item 6: Critical review of the data assessment procedure in the international monitoring programme. Discussion of the value of mandatory and optional parameters of needle and leaf samples. Can the number of investigated elements be reduced or should some optional parameters become mandatory (keeping in mind the investigations of other expert panels). 4th edition of the Manual.

The evaluation of the DAQR returned to the FIMCI showed various deviations from the rules in the manual. The general opinion was that contacts should be established between those countries not following the rules of the Manual and the FIMCI in order to clear up possible misunderstandings.

It was discussed in the Expert Panel whether Zn, Fe, Mn, and Cu, micronutrients which in most laboratories are determined by multi-element processes (ICP-AES), should be included into the list of mandatory parameters. Because of the present financial situation, described by Mr. Herkendell, it was however decided not to make any changes regarding the division into mandatory and optional parameters, although the micronutrient results are of high technical relevance. Countries where the micronutrients are determined should provide these results together with the mandatory parameters.

As has been indicated in Item 5, the analytical methods of the Manual are to be revised.

Item 7: Follow-up of the discussion on micronutrient classification values for the main tree species

Mr. Fürst put up for discussion the classification values elaborated at the 4th Meeting of the Forest Foliar Expert Panel. The only modification regarded the iron classification value for oak, where the upper limit for Class 2 was raised from 200 to 300 ppm (upon proposal of Mr. Gonzales Cascon, Spain). The following table shows the micronutrient classification values of the four main tree species, approved by the Expert Panel.

5th Meeting of the Forest Foliar Expert Panel - Classification Values for Micronutrients

Tree species	Class	Zn	Mn	Fe	Cu
Spruce	1	≤20	≤20	≤20	≤2
	2	-60	-2000	-200	-7
	3	>60	>2000	>200	>7
Pine	1	≤20	≤20	≤20	≤2
	2	-70	-800	-200	-10
	3	>70	>800	>200	>10
Beech	1	≤20	≤60	≤60	≤5
	2	-50	-2500	-200	-10
	3	>50	>2500	>200	>10
Oak	1	≤15	≤60	≤60	≤5
	2	-50	-2500	-300	-10
	3	>50	>2500	>300	>10

Item 8: Discussion on a potential linkage of Level I and Level II data resp. evaluation of foliar data in relation to other results of the Programme. Discussion when and whether it will be possible with a larger number of participating countries to repeat the needle/leaf analyses on Level I plots in coordination with the investigations on Level II plots and soil analyses.

Mr. Haußmann pointed out that the integration of Level I and Level II data was not of equal significance to all countries. According to the information provided by the national representatives participating in the Expert Panel, Level I and Level II foliar data have, but for few exceptions (Austria, Finland, Germany) not yet been integrated. Mr. Stefan used the results of the Austrian surveys to show that in a topographically and geologically structured country it was not possible to investigate the spatial distribution by means of Level II data. The annual variations are similar in units of different sizes, however at different levels. Greece and Hungary are not interested in another investigation on Level I. Poland is willing to carry out an additional Level I survey, however with a somewhat smaller Level I network.. The Slovak Republic is interested, but has financial problems. All other countries represented at the Expert Panel expressed their interest in a repetition of the Level I investigations. Continuous investigations of the Level I plots are undertaken in Finland, Spain and Austria.

It is planned that the Level 1 survey scheduled for 2005 will focus on the main tree species of spruce, pine, beech, and oak.

To elaborate a feasible proposal on future Level I surveys, a working group with Mr. Bille-Hansen (Denmark), Mr. Haußmann (Germany), and Mr. Solberg (Norway) was established. This working group should also get in contact and cooperate with the Expert Panels responsible for crown assessment and soil investigation.

Item 9: Miscellaneous

It was proposed that the next Expert Panel Meeting be held at the end of March / beginning of April 2000, maybe together with „Soil“. Preliminary items on the agenda include

- the 4th interlaboratory test
- the revision of the Manual by Mr. Bartels / Mr. Fürst (recommended methods)
- integrated studies (soil, crown, foliar).