International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests of UN/ECE (ICP Forests)

Minutes of the 16th ICP Forests Expert Panel on Foliage and Litterfall

23 participants from 13 countries attended the meeting (Annex 1).

The 16th ICP Forests Expert Panel on Foliage & Litterfall meeting took place on 27th March 2019 in Brussels, Belgium.

1. The chair Pasi Rautio and the co-chair Liisa Ukonmaanaho opened the meeting

2. The meeting adopted the attached agenda (Annex 2).

3. Expert panel members gave presentations about the ongoing European foliar and litterfall data assessments (the presentations can be found in FFCC homepage: www.ffcc.at):

i. Hans-Peter Dietrich gave an overview of 'Forest Environmental Monitoring in Germany Today'

- Forest Environmental Monitoring in Germany is based on a binding obligation since Dec 2013 (Forest Environmental Monitoring Directive, ForUmV)
- Level II activities are carried out with a national scope on 68 plots. There are also additional intensive monitoring plots of Bundesländer and the monitoring data will be reported to ICP Forests.
- On national level additional measures are agreed upon, still following the ICP Forests Manual: e.g. annual foliar monitoring is mandatory at Level II core plots in Germany. Litterfall is collected in each plot, the way of fractionizing of litter is more unified. Level II monitoring results will be used in NEC directive reporting.

ii. Anita Nussbaumer presented a study 'Impact of mast events on carbon and nutrient allocation in common beech and oak species'. Results of this study show that:

- A clear decreasing trend in stem growth of beech during mast years whereas a non-significant increase in oak was detected
- A clear increasing trend in leaf production during mast years in oak but not in beech.

iii. Hans-Peter Dietrich presented a study 'Effects of "*once in a hundred year summer-events*" to nutrition and leaf biomass production of beech tree stands'.

- During extreme summer-drought early litterfall in beech occurred. This suggests that early litterfall could be used as an indicator for drought events
- Although effects in crown condition are observed in subsequent year of summer-drought, analysis of tolerance of extreme events during 2003 and 2015 suggests, that beech was fairly robust in terms of leaf litter biomass production and nutrient supply at the observed plots.

iv. Anita Nussbaumer gave an outlook on ongoing study: 'Summer drought 2018 - Impact on fruit development in Swiss beech stands'

- Motivation for the study rose from observed early senescence in parts of the Swiss plateau, the Jura Mountains and the Pre-Alps due to very hot and dry summer 2018 in Switzerland.

- Further motivation was that even though beech flowers and pollen were present in spring, next autumn fruit biomass in littertraps was mediocre or absent. Also foresters reported i) sporadic occurrence of empty beech cupules, ii) fruit production only on some trees, not in whole stands and iii) stands often assessed as 'Halbmast' (half masting)

4. Co-chair Liisa Ukonmaanaho gave an update on the state of the European litterfall data in the ICP Forests database

- 24 countries have delivered data to the database (1-18 years of data)
- minimum requirement is to deliver dry weight of litterfall fractions but Liisa Ukonmaanaho presented a table showing that quite much element data (including heavy metals) have also been delivered to the litterfall database
- Liisa Ukonmaanaho reported also ongoing studies that are using litterfall data
- Expert panel also discussed the ongoing foliar Hg-study that Lena Wohlgemuth is carrying out at the University of Basel. There might be the possibility in future to do Hg analyses also for litterfall samples. This however needs to be discussed with Lena Wohlgemuth once the study using foliar samples is finalised.

5. Inken Krüger presented the structure and content of the draft of the coming ICP Forests brief on nutrient imbalances

- EP members discussed about the content of the draft and gave comments on it. It was agreed that EP members can send further comments by email within two weeks

6. The chairman presented issues to be taken into account in the coming foliar and litterfall manual update (to be presented in 2020 TF)

- New optional parameters (decided in the EP meeting in Zagreb in 2017) need to be listed both in foliar and litterfall manuals. Even though the results from studies by Alfred Fürst in Austria and Lena Wohlgemuth in Switzerland suggest that drying temperature does not affect Hg concentrations in foliar samples, unlike previously thought, high drying temperature might affect As concentrations. Hence a mention to avoid high drying temperatures when analysing As in foliar or litterfall samples will be added to coming manuals. Further studies are needed to examine the effect of drying temperature on As concentrations in foliar and litterfall samples.
- Chairman raised the issue of Level II plots that have already passed the normal phase of maturation of managed forests and thus need to be thinned or cut. Many plots have also been facing insect outbreaks or storms and in some cases all the mature trees in a stand have fallen down. This issue was discussed already in the previous EP meeting and also in the last ICP Forests PCG meeting. Manuel Nicolas (France) gave a presentation on the situation in France where 10 Level II plots have been destroyed (no or only few mature trees left) and both options to either (1) move the monitoring activities to a stand in nearby forest or (2) continue the monitoring activities in the same place have been considered. The EP discussed the pros and cons of both options. The EP came to a conclusion that no definitive instructions to select between the two options - i.e. (1) to move to a similar stand nearby or (2) to stay on the same place - can be given at the moment, as the situations and the monitoring interest varies between countries. Hence more experiences of both above options are needed in different forest types for the basis of further discussions before any European-wide strategy and recommendations can be made. The EP made clear, however, that the coming manuals need to give guidelines for both options 1 and 2 above so that common guidelines are followed whichever option countries select if they are facing this situation. It was decided that in the coming manuals both of these options are

described. To make sure that the given instructions are relevant for each participating country, the drafts need to be circulated for comments. As an example, Manuel Nicolas presented how the manual was adapted to sample foliage in juvenile (and more or less homogeneous) stands in French Level II network. Also the changes in the foliar sampling needs to be harmonised with the crown condition monitoring so that the foliar sampling is not affecting the trees used for the crown condition assessment.
- Co-chair Liisa Ukonmaanaho raised small issues related only to litterfall manual:
    - Weight of litterfall should be reported at 105° C
    - Code list to the species which cause most damage should be updated (www – address, Nenad Potocic will provide the correct address). Code is needed to add if organism is identified from the litterfall biomass (e.g. bark beetle)
    - Plausible range of elements for other litterfall fractions such as bark etc. should be added to Table 3. (Plausible range of element…). Also plausible values of new optional parameters (As, Cr, Co, Hg, Ni) should be added to the table.

9. Chairman closed the meeting

Expert Panel wants to warmly thank the organisers of the meeting, Ms. Natalie Cools, Mr. Bruno De Vos, Mr. Arne Verstraeten and their Belgian colleagues from Research Institute for Nature and Forests (INBO) for their efforts when making all the arrangements to make this meeting possible.

Annex 1 (List of participants)
Annex 2 (Agenda of the meeting)

Presentations given in the meeting are available (as pdf-format) for registered users in the FFCC-homepage (www.ffcc.at). To get access to FFCC-homepage contact A. Fürst (Alfred.Fuerst@bfw.gv.at).