

IUFRO Research Group 7.01.
“Impacts of Air Pollution and Climate Change on Forest Ecosystems”
Riverside Convention Center, Victoria Room, Riverside, California
September 12 & 13, 2006

Program

Tuesday, September 12, 2006

Organizational Remarks – Andrzej Bytnerowicz, USDA Forest Service, Pacific Southwest Research Station, Riverside, CA, USA (8:00-8:05)

Welcome address – Elena Paoletti, Coordinator of IUFRO Research Group 7.01, CNR, Florence, Italy (8:05 – 8:10)

Welcome address – Hao Tran, Assistant Director, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, USA (8:10-8:20)

Welcome address – Ron Loveridge, Mayor, City of Riverside, CA, USA (8:20-8:35)

Welcome address – John Toliver, Director, Forest Management Science, USDA Forest Service, Washington Office, Washington, D.C., USA (8:35-8:50)

Session I, Invited Talks (Elena Paoletti, Chair) - I (8:50-10:15)

John Innes (IUFRO Vice President for Policy, University of British Columbia, Vancouver, Canada) - *IUFRO activities - vision for the future*

Neil Cape (Centre for Ecology and Hydrology, Bush Estate, UK) – *Air pollutants of significant importance for forest health*

Borys Tkacz (USDA Forest Service, Washington Office, Washington, D.C., USA) – *Forest health status in North America*

Martin Lorenz, Volker Mues, and Michael Köhl (International Cooperative Program [ICP] Forests, Hamburg, Germany) – *Forest health status in Europe*

David F. Karnosky¹, Kevin E. Percy² and Ben Felzer³ (¹Michigan Technological University, Houghton, MI, USA, ²Natural Resources Canada, Fredericton, New Brunswick, Canada, ³The Ecosystems Center, Marine Biological Lab, Woods Hole, MA, USA) – *Climate change, air pollution and carbon sequestration*

Break (10:15-10:30)

Session II, Invited Talks (John Innes, Chair) - (10:30-12:00)

Ronald P. Neilson¹, James M. Lenihan¹, Dominique Bachelet², Raymond J. Drapek¹, and John Wells² (¹USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR, USA, ²Oregon State University, Corvallis, OR, USA) - *Forecasts of continental and global vegetation distribution changes related to climate change*

Deborah Chavez (USDA Forest Service, Pacific Southwest Research Station, Riverside, CA, USA) – *Social issues & research needs in the urban-wildland interface*

Michael Arbaugh, Andrzej Bytnerowicz, Mark Fenn, Nancy Grulke and Pamela Padgett (USDA Forest Service, Pacific Southwest Research Station, Riverside, CA, USA) – *Forty years of research on air pollution and its effects in southern California forests*

(Tuesday cont.)

Edith B. Allen¹, Patrick J. Temple², Abby Sirulnik¹, Leela Rao¹, Andrzej Bytnerowicz², and Michael F. Allen¹ (¹University of California, Riverside, USA, ²USDA Forest Service, Pacific Southwest Research Station, Riverside, CA, USA) – *Patterns of understory biodiversity in mixed coniferous forests of southern California impacted by air pollution, fire and drought*

Robert Heath (University of California, Riverside, USA) – *Alterations of the biochemical pathways of plants by the air pollutant, ozone: which are the true gauges of injury?*

Lunch (12:00-13:00)

Session III, Interaction between Air Pollution, Climate and Forest Pests (Rainer Matyssek, Chair) - (13:00-14:30)

Matthias Dobbertin, Beat Wermelinger, Beat Forster, Urs Gimmi, Christof Bigler, and Andreas Rigling (Switzerland) - *Linking increasing drought stress to Scots pine mortality and bark beetle infestations*

Frank Fleischmann, Rudi Schäufele, Hans Schnyder, and Wolfgang Oßwald (Germany) - *Changes in susceptibility of European beech towards Phytophthora citricola under the influence of elevated CO₂ and nitrogen fertilization*

Thorsten E. E. Grams (Germany) - *Acclimation to O₃ affects host/pathogen interaction and competitiveness for nitrogen*

Elena Paoletti, Naldo Anselmi, and Antonio Franceschini (Italy) - *Pre-inoculation ozone exposure predisposes oak leaves to attacks by Diplodia corticola and Biscogniauxia mediterranea*

Review of Posters (Nancy Grulke and Elena Paoletti, Presenters) - (14:30 – 15:15)

Break (15:15 – 15:30)

Session IV, State-of-Science on Concepts of Critical Loads for N, S, and Acidity and Critical Levels for Ambient Ozone (Steve McNulty and Robert Musselman, Chairs) - (15:30 – 17:00)

Robert C. Musselman (USA) - *The use of critical levels for determining plant response to ozone in Europe and in North America*

Marco Ferretti and Lisa Emberson (Italy and UK) - *Critical levels for air pollutants to protect forest vegetation in Europe – are they still useful?*

Rainer Matyssek, Gerhard Wieser, Heinrich Sandermann, and Robert C. Musselman (Germany, Austria and USA) - *The challenge of making ozone critical levels more mechanistic*

Sabine Braun, Sebastian Leuzinger, and Christian Schindler (Switzerland) - *Use of sapflow measurements to validate stomatal functions for mature beech (Fagus sylvatica) in view of ozone flux calculations*

Steven G. McNulty (USA) - *Redefining critical load limits in United States ecosystems to include multiple environmental stresses: implications and solutions*

Allen R. Riebau, Gregory A. Reams, and W. Brad Smith (USA) - *The USDA Forest Inventory and Analysis Program and the concept of critical loads and levels: opportunities and challenges*

Dinner at the Mission Inn, Galleria Room (19:00 – 22:00)

Wednesday, September 13, 2006

Organizational Remarks – Andrzej Bytnerowicz, USDA Forest Service, Pacific Southwest Research Station, Riverside, CA, USA (8:00 – 8:05)

Kevin Percy (IUFRO Division 7 Deputy Coordinator, Natural Resources Canada, Fredericton, New Brunswick, Canada) - *Overview of research activities of IUFRO Division 7 “Forest Health”* – (8:05-8:20)

Session V, Diagnosis, Monitoring and Evaluation (Marco Ferretti and Algirdas Augustaitis, Chairs) – (8:20 – 10:00)

Algirdas Augustaitis et al. (Lithuania) - *Trend in ambient ozone and an attempt to detect its effect on biota in forest ecosystem (overview of three poster presentations)*

Stanislaw Cieslik, Giacomo Gerosa, Antonio Ballarin-Denti, A. Finco, F. Manes and M. Vitale (Italy) - *Ozone deposition on forests in southern Europe: risk assessment revisited*

Marco Ferretti, Filippo Bussotti, Gianfranco Fabbio, Marco Calderisi, Giada Bertini and Giacomo Gerosa (Italy) - *Ozone exposure, growth and condition of selected forests in Italy*

Winfried Schröder, Roland Pesch, and Gunther Schmidt (Germany) - *Biomonitoring the exposition of forests to climate change and nitrogen deposition by plant phenology and mosses*

Vidas Stakėnas and Brigita Serafinavičiūtė (Lithuania) - *The morphological sensitivity of Norway spruce and Scots pine saplings to different ozone concentrations*

E. L. Zvereva, E. Toivonen, and M. V. Kozlov (Finland) - *Meta-analysis of the responses of plant communities to the disturbance caused by point polluters*

Break (10:00-10:20)

Session VI, Mechanisms of Action and Indicator Development (Madeleine Günthardt-Goerg, Christian Andersen and Jesada Luangjame, Chairs) - (10:20 – 12:15)

Asta Judzentiene, Aida Stikliene, and Eugenija Kupcinskiene (Lithuania) - *Changes in essential oil composition in the needles of Scots pine (Pinus sylvestris L.) growing in the areas affected by industrial pollution*

Rocío Alonso, Susana Elvira, M^a José Sanz, and Benjamín S. Gimeno (Spain) - *Parameterisation of the stomatal component of the DO₃SE model for Mediterranean forest trees*

Nancy E. Grulke and Elena Paoletti (USA and Italy) - *Quantifying short term O₃ exposure effects on the level of nighttime transpiration*

Elena Paoletti, Niela Contran, William J. Manning, Francesco Tagliaferro, Annamaria Ranieri, and Antonella Castagna (Italy and USA) - *Gravitational infusion of ethylenediurea (EDU) into trunks protected adult ash trees from foliar ozone injury and highlighted the mechanisms of protection*

Roger Cox, and John M. Malcolm (Canada) - *The effects of tandem summer ozone and winter thaw treatments on biomass and carbohydrate partitioning xylem cavitation and dieback in yellow birch saplings*

Pierre Vollenweider, Gustav Schneiter, Beat Rihm, Terry Menard, Marcus Schaub, and Madeleine S. Günthardt-Goerg (Switzerland) - *Ozone or drought symptoms? Diagnosis of stress factors in field samples of beech collected during the dry and hot 2003 summer*

Karl-Heinz Häberle, Marcus, Löw, N. Koch, Angela, J. Nunn, M. Kitao, H. Werner, H., and Rainer Matyssek (Germany) - *Response to ozone uptake in forest trees: scaling from cell to stand level at Kranzberg Forest*

Lunch (12:15 – 13:15)

(Wednesday cont.)

Session VII, Atmospheric Deposition, Soils and Nutrient Cycles (Dale Johnson, Chair) - (13:15 – 15:00)

Mary Beth Adams (USA) - *The Fernow Watershed Acidification Study: results from the first 15 years*

Kirsti Derome, John Derome, and Antti-Jussi Lindroos (Finland) - *Nitrogen status of forest soils in Finland: does nitrogen deposition pose a threat to forest ecosystems?*

Friedl Herman, Klaus Butterbach-Bahl, Michael Englisch, Ernst Gebetsroither, Erik Hobbie, Robert Jandl, Klaus Katzensteiner, Manfred Lexer, Stefan Smidt, Friederike Strebl, and Sophie Zechmeister-Boltenstern (Austria) - *Modeling of nitrogen dynamics in an Alpine forest ecosystem on calcareous soils: A scenario-based risk assessment under changing environmental conditions*

Carolyn Hunsaker, Andrzej Bytnerowicz, Jessica Auman, and Ricardo Cisneros (USA) - *Air pollution and watershed research in the central Sierra Nevada of California: nitrogen and ozone*

O. J. Kjønaas, A. O. Stuanes, and P. Nilsen (Norway) - *Effects of experimentally elevated N input on foliage element concentrations, tree increment and vitality in a Norway spruce stand, Gårdsjön, Sweden over an eleven-year period*

Diane M. Styers and Arthur H. Chappelka (USA) - *Urbanization and atmospheric deposition: Use of bioindicators in determining patterns of land use change*

B. Wolff, N. Wellbrock, and W. Riek (Germany) - *Atmospheric deposition and N status of German beech (*Fagus sylvatica*) forest*

Break – 15:00 – 15:15

Session VIII, Influence of Air Pollution and Climate Change on Genetics, Adaptation and Succession (David Karnosky, Chair) - (15:15 – 17:00)

Carlo Calfapietra, A. Wiberley, A. Linskey, T. Falbel, F. Loreto, D. F. Karnosky, G. Scarascia-Mugnozza, and T.D. Sharkey (Italy and USA) - *Isoprene synthase and isoprene emission in aspen are inhibited more by elevated O₃ than elevated CO₂ in FACE conditions*

Joseph N.T. Darbah, Mark E. Kubiske, Neil Nelson, Elina Oksanen, Elina Vaapavuori, and David F. Karnosky (USA and Finland) - *Impacts of elevated atmospheric CO₂ and O₃ on paper birch (*Betula papyrifera*) reproductive fitness*

Elina Häikiö, Egbert Beuker, Vera Freiwald, Toini Holopainen, Riitta Julkunen-Tiitto, and Elina Oksanen (Finland) - *Impacts of elevated ozone and increased nitrogen on Finnish aspen and hybrid aspen clones*

Mikhail V. Kozlov and Elena L. Zvereva (Finland) - *Industrial barrens: extreme habitats created by non-ferrous metallurgy*

Elina Oksanen, Maarit Falck, Elina Häikiö, Sari Kontunen-Soppela, Svetlana Ossipova, Vladimir Ossipov, Vivek Pandey, Tarja Pasanen, and Matti Rousi (Finland) - *Northern deciduous trees are prone to ozone stress*

Tarja Pasanen, Toini Holopainen, Heikki Roininen, Matti Rousi, and Elina Oksanen (Finland) - *Interactive effects of elevated ozone and springtime frost on growth and physiology of birch (*Betula pendula*) in the field conditions*

Rüdiger Baumann, Carl Gunnar Fossdal, Øystein Johnsen, Cristina Vâlcu, and Gerhard Müller-Starck (Germany & Norway) - *Effects of temperature regimes on gene regulation in Norway spruce as indicated by DNA methylation*

Closing Remarks - Elena Paoletti, Coordinator of IUFRO Research Group 7.01, CNR, Florence, Italy (17:00-17:20)

Poster Session (17:20 – 19:00) (refreshments served)

Poster Presentations

1. Andersen, Chris P., Donald L. Phillips, Paul Rygiewicz, and Marjorie J. Storm (USA) - **Root growth and turnover in different aged ponderosa pine stands in Oregon, USA**
2. Augustaitis, Algirdas, Ingrida Augustaitiene, Gintautas Mozgeris, Rasele Girgzdiene, Kestutis Arbaciauskas, Irena Eitminaviciute, Reda Mazeikyte (Lithuania) - **Trend in ambient ozone and an attempt to detect its effect on biota in forest ecosystem. Step I of Lithuanian studies**
3. Augustaitis, Algirdas Ingrida Augustaitiene, Almantas Kliucius, Rasele Girgzdiene, and Dalia Sopauskiene (Lithuania) - **Trends in main transboundary pollutants, meteorological conditions and Scots pine defoliation: long term study of key factors of changes in defoliation. Step II of Lithuanian studies**
4. Augustaitis, Algirdas, Edmundas Bartkevicius, Almantas Kliucius, Gintautas Cinga Romualdas Juknys, and Adomas Vitas (Lithuania) - **Does the surface ozone affect the radial increment of Scots pine (*Pinus sylvestris* L.) on territories under regional pollution load? Step III of Lithuanian studies**
5. Beedlow, Peter A., David T. Tingey, Donald L. Phillips, William E. Hogsett, and David M. Olszyk (USA) - **Rising atmospheric CO₂ and carbon sequestration in forests**
6. Bernasconi, Petra, Pierre Vollenweider, Elena Paoletti, Madeleine S. Günthardt-Goerg (Switzerland and Italy) - **Differences in the structural reactions of leaves exposed to elevated levels of controlled versus ambient ozone in *Fraxinus ornus***
7. Blumenröther, M. C., M. Löw, R. Matyssek, W. Obwald (Germany) - **Investigations on the response of sucrose and starch concentrations in leaves of adult *Fagus sylvatica* (L.) to a chronic free-air O₃ exposure**
8. Breiner, Joan M., and Mark E. Fenn (USA) - **Is the Simple Mass Balance Model a realistic estimate of nutrient N critical load for the San Bernardino Mountains in Southern California?**
9. Breitenbach, Margarethe, Robert Hacker, Michael Englisch, Stefan Smidt, and Michael Tausz (Austria and Australia) - **A multiple-year time-series of defence compound patterns in spruce needles and their potential relationship to meteorological conditions, site factors, and ozone exposure**
10. Bussotti, Filippo, Rosanna Desotgiu, Dario Cantu, Giovanni Agati, Riccardo Marzuoli, Giacomo Gerosa, and Corrado Tani (Italy) - **Ozone-induced oxidative burst in *Populus nigra* and *Fagus sylvatica* leaves. Ultrastructural and physiological aspects.**
11. Caboun, Vladimír, and Tibor Priwitzer (Slovakia) – **Ecological stability classification system usable for evaluation of impact of anthropogenic effects on forest ecosystems**
12. Chien, Chao-Jung, Gail Tonnesen, Zion Wang, Mohammed Omary, and Andrzej Bytnerowicz (USA) - **Atmospheric modeling of nitrogen species in San Bernardino mountain, CA areas**
13. Contran, Niela, and Elena Paoletti (Italy) - **Visible foliar injury and physiological responses to ozone in northern and central Italian provenances of *Fraxinus excelsior* and *F. ornus***
14. Ferretti, M., D. Rocchini, F. Bussotti, A. De Marco, G. Gerosa, and B. Petriccione (Italy) - **Scaling-up ozone exposure from ‘found’ data to the systematic network of forest condition assessment in Italy**
15. Gerosa, Giacomo, A., Angelo Finco, Stefano Grazioli, Riccardo Marzuoli, Filippo Bussotti, and Antonio Ballarin-Denti (Italy) - **Ozone flux measurements at a coastal Holm oak forests in non-ideal terrain conditions.**
16. Gerosa, Giacomo A., Angelo Finco, Riccardo Marzuoli, Marcello Vitale, Stanislaw Cieslik, Fausto Manes, and Antonio Ballarin-Denti (Italy) - **Seasonal variations of ozone exposure and fluxes in a Mediterranean Holm oak forest during two seasonal field campaigns**
17. Günthardt-Goerg, M.S., P. Vollenweider, C.J. McQuattie, M. Schaub and R. Matyssek (Switzerland, USA and Germany) - **Visible and microscopical symptoms of ozone stress in leaves of European beech**

18. Hermle, Sandra, Madeleine S. Günthardt-Goerg, Rainer Matyssek, and Rainer Schulin (Switzerland and Germany) - **Foliar gas exchange, biomass production and heavy-metal uptake of young deciduous and coniferous trees grown on contaminated soils**
19. Hovmand, M.F., Ib Johnsen and Kaare Kemp (Denmark) - **Heavy metal accumulation in background forest soils due to long range transported atmospheric deposition**
20. Inclán, Rosa, Daniel De la Torre, Marta Benito, and Agustín Rubio (Spain) - **Soil CO₂ efflux in a mixed pine-oak forest in Valsaín (Central, Spain)**
21. Kohno, Yoshihisa, Hideyuki Matsumura and Takashi Ishii (Japan) - **Risk assessment of ozone effect on *Pinus densiflora* and *Fagus crenata* in Japan**
22. Löw, Markus, Karl-Heinz Häberle, and Rainer Matyssek (Germany) - **Dose-response relationships of photosynthesis in adult *Fagus sylvatica* under experimentally enhanced free-air O₃ exposure**
23. Małek, Stanisław and Aleksander Astel (Poland) – **Chemometric study of bulk precipitation and throughfall in different age of spruce stands on Potok Dupnianski catchment within 1999-2003 (Silesian Beskid – southern Poland)**
24. Maňková, B., Oszlanyi, J., Percy K., and Karnosky D.F. (Slovakia, Canada and USA) – **Impact of greenhouse gases on epicuticular waxes of *Populus tremuloides*, *Accer saccharum*, *Betula papyrifera*: results from an open-air exposure and a natural O₃ gradient**
25. Minaya, M., Sánchez G., Grau, J.M., López, M., Cruz, A.; Gonzalez, I.; Serrano, M., and Sánchez, G. (Spain) - **Level II plots in Spain : atmospheric deposition years 1998-2003**
26. Mikkelsen, Teis N., and Mads F. Hovmand (Denmark) - **Ozone deposition to forest is dynamic and correlates positive with temperature**
27. Neufeld, Howard S., Alan W. Davison, Arthur H. Chappelka, Kent O. Burkey, Werner Heller and Heinrich Sandermann (USA, UK and Germany) - **Foliar injury caused by exposure to ozone reduces the absorbance of light in leaves of cutleaf coneflower (*Rudbeckia laciniata* var. *digitata*)**
28. Novak, Kristopher, Marcus Schaub, Jürg Fuhrer, John M. Skelly, Beat Frey, and Norbert Kräuchi - **Ozone sensitivity of *Fagus sylvatica* and *Viburnum lantana* seedlings grown in monoculture or in mixture**
29. Pollastrini, Martina, Filippo Bussotti, Paolo Cherubini, Rosanna Desotgiu, Giacomo Gerosa, Riccardo Marzuoli (Italy and Switzerland) - **Biomass and tree-ring analysis in young trees from an open-top chamber study of the effects of tropospheric ozone**
30. Potočić, Nenad, Tomislav Ćosić, Davorin Kajba, Marija Pecina, Boris Vrbeč, Ivan Seletković (Croatia) - **Differential response of ten poplar clones to fertilization and climate effects at low groundwater table**
31. Priwitzer, Tibor, Vladimír Čaboun, and Pavel Pavlenda (Slovakia) – **The effects of alkaline air pollutants on selected tree species**
32. Raftoyannis, Yannis, Andreas Papadopoulos, Anastasia Pantera, Gerasimos Goudelis (Greece) - **Decline of Greek fir (*Abies cephalonica* Loudon)**
33. Sanz, M.J., Sanz, F., and Sanchez-Peña, G. (Spain) - **Ozone in the National Parks and protected forest of Spain**
34. Suto, Hitoshi, Yasuo Hattori, Nobukazu Tanaka and Yoshihisa Kohno (Japan) - **Effects of strong wind and ozone on tree decline in mountains**
35. Wood, Yvonne, Mark Fenn, Thomas Meixner, Peter Shouse, Joan Breiner, Edith Allen, and Laosheng Wu (USA) - **Air pollution, Mediterranean climate, and the San Andreas fault -- rapid forest soil acidification across an ancient landsurface, San Bernardino Mountains, southern California**