CFS Management Visits Aspen FACE
Mr. Bruce Pendrel (far left), Science Director, Forest Health and Biodiversity at the Natural Resources Canada, Canadian Forest Service's Atlantic Forestry Centre (CFS-AFC) in Fredericton, New Brunswick and Dr. Kevin Percy (center), CFS-AFC Senior Scientist and member of the Aspen FACE Steering Committee, visited the Aspen FACE project on October 4 and 5, 2004. Representing the US Forest Service at the meeting were Dr. Rob Doudrick (far right), Assistant Director of the North Central Research Station, and USFS NC Project Leader Dr. Neil Nelson (second from right). After a brief presentation on Aspen FACE by Project Director Dave Karnosky (Michigan Tech), ongoing and potential collaborative efforts were discussed at the site and later at the USFS Forestry Sciences Laboratory.

Wisconsin Public Radio Visits Aspen FACE
Mike Simonson, Wisconsin Public Radio, recently visited the Aspen FACE site. In the photo on the left, Mike interviews Aspen FACE scientist Dr. Mark Kubiske (USFS). Mike's wife, Jennifer, taped several common sounds of the Aspen FACE site, including the sound of the CO2 truck disengaging from our CO2 tanks (right). The story aired on Wisconsin Public Radio, October 1, 2004 and can be listened to on line at [http://www.wpr.org/news/newsstories.cfm](http://www.wpr.org/news/newsstories.cfm). The story was also aired worldwide on Voice of America radio on October 16 and 17, and may be translated into as many as 44 languages. The story also aired November 1 on the Great Lakes Radio Consortium [http://www.glrc.org/story.php3?story_id=2447](http://www.glrc.org/story.php3?story_id=2447) which has 150 stations in the United States and Canada.
Jim Trochta, WDNR, Continues Ozone Calibration
Jim Trochta, an Air Management Environmental Specialist with the Air Quality Division of the Wisconsin Department of Natural Resources, recently completed another season of calibration and monitoring of ozone at the Harshaw Farm site. Jim makes monthly visits to the Aspen FACE site each summer to calibrate the O$_3$ monitor in our control shed. Each spring and autumn, we also calibrate our own site’s 10 monitors against Jim’s EPA-equivalency primary O$_3$ standard photometer. Jim was instrumental in operating our fence line O$_3$ monitors during our full first year of operation and has maintained the control shed monitoring program for the past 11 years, first with Dave Karnosky (MTU) and Ed Jepsen (WDNR)’s bioindicator project at the Harshaw Farm and then with the Aspen FACE project since 1997. Thanks much, Jim!

Anu Sober Completes Another Summer at Aspen FACE
Dr. Anu Sober (left), Ecophysiologist with Tartu University in Tartu, Estonia, is shown in the photo to the left. Anu recently completed her 7th summer at the Aspen FACE site. Working with Drs. Dave Karnosky (Michigan Tech), Mark Kubiske (USFS), and Neil Nelson (USFS), Anu coordinated the summer’s diurnal photosynthesis campaign. Assisting Anu were graduate students Katre Kets (Tartu University) and Joseph Darbah (Michigan Tech), shown in the photo on the right. Anu’s husband Jaak Sober is the head operator of the Aspen FACE project. Anu first came to the U.S. in the summer of 1993 when she collaborated with Dave Karnosky’s open-top chamber project at the Ford Forestry Center in Alberta, Michigan. Anu’s gas exchange data has been featured in the Noormets et al. (2001) Trees and Plant Cell Environment papers, in the Sharma et al. (2003) Ekologia paper, and in a Sober et al. paper in revision for Trees.

Stora Enso Visit
USFS Project Leader Neil Nelson (far left) and USFS scientists Mark Kubiske (back row-far right) and Vanessa Quinn (next to Neil) recently gave a tour of the Aspen FACE site to 10 local and international representatives of Stora Enso Company’s corporate forestry environmental management group. Stora Enso participants were from all the company operations including North America, Europe and Brazil. Headquartered in Finland, Stora Enso is one of the world’s largest forest products companies.

Other Aspen FACE tours this summer and fall included the Rhinelander Charter School Science class and Nicolet College Weather and Climate and Ecology classes.

Free-lance Photographer Photographs Aspen FACE
David Hay Jones (left), a free-lance photographer who provides photos of global change experiments to textbook printers in the United Kingdom, visited Aspen FACE on October 4, 2004 to photograph our site. David also visited several other USFS and DOE facilities this summer. According to David, “This is a fantastic place for photographs, much more photogenic than the typical indoor labs I visit.”
**Mondor and Lindroth’s Research Receives Great Press**

Ed Mondor and Rick Lindroth (both from the University of Wisconsin-Madison) have had some excellent press on their pioneering aphid research at Aspen FACE. Their recent Global Change Biology paper on phenotypic plasticity of goldenrod aphids being mediated by global atmospheric change was featured in the Editor’s Choice “Highlights of the Recent Literature” section of Science (Science 306:199). Then shortly thereafter their recent Ecology Letters paper on aspen aphids was featured in the “Dispatches” section of the Ecological Society of America’s Frontiers in Ecology. Their work was also written up in the University of Wisconsin CALS News and can be viewed at [http://news.cals.wisc.edu/newsDisplay.asp?id=1116](http://news.cals.wisc.edu/newsDisplay.asp?id=1116). Congratulations to Ed, Rick and their UW colleagues for work exceptionally well done!

**Argonne Crew Samples Mycorrhizal Fungi**

Vicki Allison (right), postdoctoral fellow with Dr. Mike Miller (Argonne National Lab), prepared to label an Aspen FACE location where she collected 50 um diameter mesh hyphal in-growth bags filled with clean sand that were buried the previous fall beneath a tree’s fine roots for quantifying the amount of mycorrhizal fungus that grows into the soil (as compared to the amount of fungus associated with roots). Vicki was joined by technicians Zhanna Yermakov and David Loehlin.

**John Hom Heads Stem Respiration Campaign**

John Hom (below), Assistant Director of the USFS Northern Station’s Global Change Program, led an extended campaign to measure stem respiration at Aspen FACE this past summer. The small trailer housed John’s monitoring equipment which read continuous respiration values for diurnal curves. The respiration chambers and associated tubing are shown below. John was joined in this effort with Vanessa Quinn (USFS postdoctoral fellow in Neil Nelson’s project at Rhinelander), Steve Roberts (San Diego State University), Joanne Lund (USFS), and Matt Patterson (USFS).

**New Study of Understory Nutritive Value**

Dr. Art Chappelka (right), Auburn University, and his technician Efrem Roberts visited Aspen FACE on August 9-10, 2004 to collect understory vegetation to examine the effects of elevated CO$_2$ and O$_3$ on nutritive quality. Art is cooperating on the project with Dr. Russ Muntifering, also at Auburn University. According to Art, “We have previously seen substantial changes in forage quality of grasses exposed to O$_3$. Because of the well-known effects of elevated CO$_2$ on nitrogen dynamics of plants, we are anxious to see how forage quality of various plants is affected by elevated CO$_2$ and by the interaction of elevated CO$_2$ and O$_3$. This study also will be a good comparison for our previous O$_3$ work which was done in open-top chambers.”

**Washington Post Features Aspen FACE Story**

Duluth News Tribune Does Followup on Aspen FACE

Aspen FACE was featured in an August 22, 2004 Duluth News Tribune story entitled "Scientist study trees to get to root of pollution debate", as a followup to a story run shortly after we began operating. John Myers (shown in the photo interviewing Aspen FACE and Canadian Forest Service Senior Scientist Dr. Kevin Percy) interviewed Kevin, Dr. David Karnosky (Aspen FACE Project Director, Michigan Tech), Dr. Neil Nelson (USFS Project Leader), Dr. Mark Kubiske (USFS), and Dr. Vanessa Quinn (right) on July 14-15, 2004. Myers was accompanied by a photographer who took many photos of the site, including several from our aerial lift vehicle operated by Jaak Sober (right). The story can be viewed at http://www.duluthsuperior.com/mld/duluthsuperior/9463233.htm?temp.

Aspen FACE Featured on Local Television

Rhinelander’s Channel 12 television ran a news story in early September, 2004 on Aspen FACE. A Channel 12 reporter (photo on left) interviewed USFS Project Leader Dr. Neil Nelson and USFS Scientist Dr. Mark Kubiske (right), and Dr. David Karnosky, Project Director, and took a number of video clips of the various treatments rings.

New CFS Study of Canopy Architecture

Dr. Joanne MacDonald, Canadian Forest Service’s Atlantic Forestry Centre (CFS-AFC) in Fredericton, New Brunswick, and technician Gary Henderson (CFS-AFC) visited the Aspen FACE project on November 2-4, 2004 to organize a new study in which they are examining the effects of greenhouse gases on crown architecture (photo on right). The study, in collaboration with Aspen FACE Director Dr. David Karnosky and Dr. Kevin Percy (CFS-AFC and FACE Steering Committee member), builds on previous research in open-top chambers suggesting that crown architecture may be subtly altered by elevated CO2 and O3 (Dickson et al. 2001. Environ. Pollut. 115:319-334).

Aspen FACE Featured at McIntire-Stennis Biennial Meeting

Dr. David Karnosky (MTU), Director of Aspen FACE, presented an invited talk at the Second Biennial McIntire-Stennis Biennial Meeting at the CSREES building in Washington, D.C on October 27, 2004. Speaking on behalf of Michigan Technological University, Dave discussed how McIntire-Stennis research support is being used for research at Aspen FACE. Dave’s McIntire-Stennis support is being used for modeling research at Aspen FACE. Don Zak (University of Michigan) also has McIntire-Stennis support supplementing his DOE-sponsored studies of belowground community dynamics.

New Gates Being Installed for Use with Rabbit Fences

New gates (left) are being installed along the rabbit fences this autumn on the west side of each ring. The gates are meant to accommodate access to the rings without stepping over (or on) the rabbit fence. Rabbit damage continues to be a problem, especially on maple as shown on the right from Ring 1.2 in April, 2004. We ask all Aspen FACE users to use these gates for accessing the rings once the fences are up. Thanks to Wendy Jones (MTU), Aspen FACE site operator, and Tribin Holbrook (MTU) for organizing this effort.
Local Papers Feature Aspen FACE Stories
Aspen FACE was featured in two local papers this autumn. Sarah John wrote an article entitled “Local scientists lead the way in air pollution study” that appeared in the August 29, 2004, North Star Journal. Sarah interviewed Aspen FACE scientists Dr. David Karnosky (MTU) and Drs. Neil Nelson and Mark Kubiske (USFS). Then, Sandy Lotto wrote an article entitled “Getting the facts on FACE and other aspen research” in the fall issue of the Trees for Tomorrow newsletter, Northbound, Vol. 24, Number 3, page 5. Sandy interviewed Dr. Vanessa Quinn (USFS).

POPGENICS Update
POPGENICS is a DOE-sponsored consortium of scientists examining ways to increase carbon sequestration potential of trees and is focusing on trees growing at Aspen FACE and POPFACE (in Italy). Foliar samples were taken at three time points during the 2004 growing season for both aspen and birch for study of gene expression. Dr. Ramesh Thakur (right) and Aspen FACE Project Director Dr. David Karnosky collected 5-10 leaves per each of three genotypes of each species; the leaves were wrapped in aluminum foil and then placed in liquid N. Aspen samples will be run on microarrays by Dr. Gopi Podila (University of Alabama-Huntsville) and the birch samples will be examined by Dr. Elina Vapaavuori (METLA-Finland).

POPGENICS Scientists Drs. Gail Taylor, Gopi Podila, David Karnosky, Ramesh Thakur, Chung-Jui Tsai and Francis Martin attended the recent “Functional Genomics of Environmental Adaptation in Populus” Symposium on October 10-13, 2004 in Gatlinburg, Tennessee. Drs. Taylor and Martin made oral presentations, while Dr. Podila chaired a discussion session. Four posters including POPGENICS research were presented by Drs. Podila, Taylor (2) and Karnosky.

Aspen FACE New Publications

Journal Articles


Other Publications


People at the Aspen FACE Project

Joanne Lund, Technician-USFS

Editors: How did you get started at Aspen FACE?

Joanne: My brother lived in Harshaw (still does) and thus I was familiar with the area and its overwhelming natural beauty. I had completed a master's degree in the spring of 1998 in insect ecology and applied for a forestry position at the Forestry Sciences Laboratory in Rhinelander, for which I was not selected. However, Jud Isebrands called me in response to my application and explained that there would be opportunities in the near future for someone with a background in plant-insect interactions. He asked if I would be interested in working as an operator at the FACE Site beginning immediately, and I agreed. I initially was unaware of the wonderful complexity and uniqueness of the project.

Editors: How long have you been involved in the Aspen FACE project?

Joanne: I began as a FACE Site operator in August of 1998 during the first treatment season. In
December 1998 I began working for the Forest Service as a Biological Science Technician for Jud Isebrands and Bill Mattson.

*Editors:* What are your current activities at the FACE Site?
*Joanne:* These are various and many. Every spring I work with a team assessing insect damage on stems and branches from the previous season. I have been monitoring insect populations using passive sticky traps for the past 3 years, and assist visiting scientists in installing and maintaining specialized equipment such as the sap flow meters and the multi-cuvette respirometry system. I conduct tours of the FACE Site by groups of scientists and students. I participate in the processing of trees during the destructive harvests, and in measuring tree heights and diameters each year at season's end. In the laboratory I analyze FACE samples for total carbon and nitrogen and for energy density. I am always on the lookout for newly-arriving insect species that colonize the treated trees, so that we can prepare to monitor these populations the following spring and/or develop manipulative studies.

*Editors:* You have no doubt seen a lot of changes at the Aspen FACE Site over the years. What is your impression of the project now and as compared to when it started?
*Joanne:* The most striking difference on the surface is that the trees in each ring have grown from skinny saplings to become a forest! This has in turn led to all kinds of logistical problems. But looking deeper, we are getting to a point where cumulative and longer term effects are manifest, and this is very exciting.

*Editors:* Have there been any surprises in your research project at Aspen FACE or have things gone pretty much as expected?
*Joanne:* I must say that the differences in tree growth and physiology between the carbon dioxide and ozone treatments are striking and more dramatic than I had expected. I had no real preconception of the effects of treatments on the trees, phytophagous insects, and their parasitoids because I had only studied such interactions under ambient conditions. One unforgettable surprise was the Forest Tent Caterpillar outbreak, which peaked in 2001. I had not previously witnessed an outbreak of such magnitude, but it lead to some interesting studies on egg mass distribution, hatch rate, and patterns and levels of parasitism.

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*Ed Mondor, Postdoctoral Fellow, University of Wisconsin*

*Editors:* Ed, what was your background before coming to Aspen FACE?
*Ed:* It really has been a long and winding road. I have a B.Sc. degree in psychology from Brandon University and a M.Sc. in zoology from the University of Alberta. I then completed a Ph.D. at Simon Fraser University in Burnaby, BC. For my thesis research, I studied the ecology and evolution of aphid alarm pheromone production and emission. Specifically, I wanted to find out why aphids evolved unique anatomical structures, cornicles, for alarm signaling.

*Editors:* How did you get started with aphids?
*Ed:* Aphids have always seemed like interesting little creatures. Most of the year they reproduce asexually forming clones, yet when environmental conditions change these same individuals produce sexual morphs. Aphids are also great for fitness studies as they are easy to rear, have short generation times, lots of offspring, and high levels of phenotypic variation.

*Editors:* We have seen you out here at Aspen FACE very often the last two summers. How do you like working at Aspen FACE?
*Ed:* Aspen FACE is an incredible place. Compared to greenhouse studies, open top chambers, etc., Aspen FACE offers a unique and realistic environment in which to study changes in the genotypic and phenotypic structure of insect populations under future atmospheric conditions. It’s truly a “world class” place to work!
Editors: Ed, what are your future goals?
Ed: I’d love to get a faculty position where I could combine both teaching and research. I’d like to continue my research to better understand how global atmospheric change will alter the abundance and diversity of insect populations, and trophic functioning.

Editors: Ed, your presentation this past spring at the Air Pollution Workshop was truly outstanding. It seems now you are starting to get quite a lot of recognition for this pioneering research.
Ed: Yes, we’ve been fortunate with the two FACE papers we’ve recently published. Our Ecology Letters paper, on how greenhouse gases alter aphid transgenerational phenotypic responses, was featured in the Editor’s Choice section of Science earlier this month. Then, our Global Change Biology paper, on atmospheric effects altering aphid alarm pheromone responses, will be covered next month in the Dispatches section of Frontiers in Ecology and the Environment.