

FR News

News from Forest Research, December 2008

FR News is a free quarterly newsletter that is distributed to a wide range of organisations and individuals who have interests in trees, woods and forests.



Welcome to the first edition of the 'new look' *FR News*. Following consultation with readers, we have made some refinements and tweaks to our newsletter to make it more to your liking. Now a quarterly newsletter, it still highlights a selection of current work at Forest Research and gives details of how you can find out more information. From now on, links to websites and contact details will always be highlighted in a green box to help you find them more easily. Anything written in green, such as the contents list below or website addresses, is a live link – so click on **green** if you want to explore...

If you have any queries or comments about anything in *FR News*, please **contact us**.

Message from the Chief Executive

These are challenging and exciting times for Forest Research (FR). Issues such as climate change, carbon, pests and diseases, renewable energy and increasing the use and usability of natural resources are high-profile, here to stay and all part of the work that FR is involved in. The requirement to deliver research in an increasingly complex and uncertain environment is paramount. For example, FR is developing a robust evidence-based case to underpin forestry's role in addressing the threats and opportunities posed by climate change. This work will range from developing carbon accounting tools, to improving our understanding of species selection and site, soil and water management. Global trade and climate change are changing the nature of the disease threats facing trees and woodlands, so it is likely that FR will be doing a lot more research into biosecurity in the future.

This issue of *FR News* highlights some of the excellent work being carried out at FR. Future editions will bring further details of how the organisation is responding to current research needs and, by April 2009, will have evolved into three new linked centres: the Centre for Forestry and Climate Change, the Centre for Forest Resource Management and the Centre for Ecology and Human Sciences. For now, read more about current projects in this issue of *FR News*.

Lastly, very best wishes for the festive season from all at Forest Research.

James Pendlebury

Quick links: [New toolkit measures the health benefits of urban trees](#); [Landscape-scale conservation](#); [Calling all private woodland owners](#); [Assessing the fate of direct-sown seed](#); [RRSP workshop series](#); [Stem bleeding on oaks](#); [TSU - listening to customers](#); [Greening at Alice Holt](#); [New publications](#); [Staff news](#); [What's new on the website](#)

New toolkit measures the health benefits of urban trees

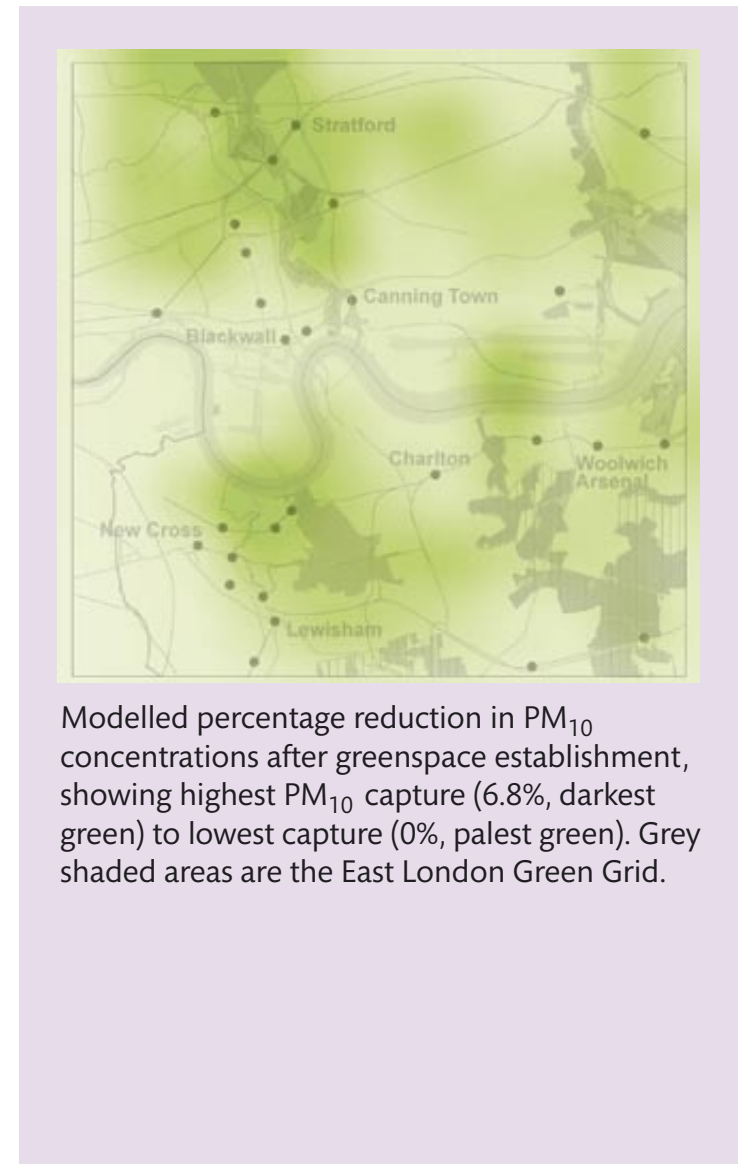
Poor air quality in urban environments poses a serious risk to human health. Particulate matter (PM₁₀) is known to cause respiratory illnesses and cardiovascular disorders. Trees have long been recognised for their ability to capture these particles and remove them from the air we breathe, but now an integrated tool has been developed to model the impact of tree planting and its effect on human health.

Developed by Forest Research, along with the University of Manchester and London School of Hygiene and Tropical Medicine, the tool uses air dispersion and particulate interception models (ADMS-Urban and UFORE) to predict the PM₁₀ concentrations both before and after greenspace establishment. This has been demonstrated using a 10 x 10 km area of the proposed East London Green Grid. The health benefits for this area, in terms of premature mortality and hospital admissions for respiratory disease, were also modelled as a result of the local population's reduced exposure. PM₁₀ capture from a scenario comprising 75% grassland, 20% sycamore and 5% Douglas fir was estimated to be 90.41 tonnes per year, equating to 0.009 tonnes per hectare per year over the whole study area. The human health modelling estimated that two deaths and two hospital admissions would be averted each year in this area.

This model will enable those involved in greenspace establishment to select species for maximum PM₁₀ removal, target tree establishment to those areas posing the greatest risk to the population and monitor the success of such schemes.

Danni Sinnett

For further information please contact Danni at: danielle.sinnett@forestry.gsi.gov.uk



Landscape-scale conservation

Two collaborative projects have recently been successfully completed by Forest Research on the theme of landscape connectivity, funded by a consortium of eight organisations led by Defra. The first was a full systematic literature review aiming to address the question 'Which landscape features affect species movement and dispersal?', carried out in conjunction with the Centre for Evidence-Based Conservation at Bangor University. Although the literature examined did not cover all species groups or landscape types, there was evidence that corridors facilitate movement between habitat patches and that matrix types similar to a species' 'home' or breeding habitat patch are more permeable to their movement than other matrices.

The second project investigated and tested a range of methods for assessing connectivity in the UK, with the aim of selecting the best method to use as an indicator for European biodiversity reporting in 2010. Around 30 methods were tested, ranging from a simple 'nearest neighbour' method to complex incidence function models (IFMs). The project, carried out in collaboration with the Centre for Ecology and Hydrology, recommended an indicator that accounts for functional connectivity, i.e. the impact of land uses between patches. This was supported by the findings of the evidence review and is likely to be adopted by the UK for 2010.

Landscape ecology research at FR presently focuses on validating the principles underlying current policies on improving landscape connectivity.

Chris Quine



Both of these contract reports are available for download from the Defra website:

- Evidence review
- Connectivity indicator report

For more details of FR's landscape ecology research, contact **Kevin Watts** or visit www.forestresearch.gov.uk/landscapeecology

Calling all private woodland owners

Since the formation of the Forestry Commission, Forest Research (and its forebears) has created and maintained a network of permanent sample plots. The data from these plots are invaluable and form the basis of essential publications like the *Forest Mensuration Handbook*, *Roundwood and Sawlog Volume Tables* and *Timber Measurement*, which are used extensively throughout the forestry sector.

The data are also used to develop national yield models that help to estimate the effects of different silvicultural treatments on production forecasts for Great Britain. For this reason it is important to represent the variation found within the whole forest estate, in terms of location, species and management. Currently, most plots are on FC-owned land, but historically there have always been plots on private estates. FR is very grateful for the valuable co-operation it receives from private woodland owners and is seeking to increase this type of collaboration.

FR is keen to establish new plots in stands of a number of different species and mixtures of species. If you own a woodland and would be happy to have a research plot on it, then FR would like to hear from you. Individual plots are normally established at the time of first thinning and occupy about 0.25 hectares. They are usually re-measured on a five-year cycle, although this can be adjusted to coincide with local forest management plans. All research work is undertaken with the permission of the woodland owner.

Ian Craig

If you would like to help or have any comments or questions, please contact either of the following for more details.

- Ian Craig: 01420 526286 or email ian.craig@forestry.gsi.gov.uk
- Miriam White: 01420 526283 or email miriam.white@forestry.gsi.gov.uk



Assessing the fate of direct-sown seed

Last winter, as part of a wider investigation into the potential for direct seeding in the uplands, Forest Research began to investigate the fate of direct-sown seeds of birch, rowan, Scots pine and Sitka spruce on an upland clearfell site at Clocaenog, North Wales. The aim was to identify the key factors limiting seedling establishment in order to help judge the viability of direct seeding for woodland regeneration, and to devise practical ways to improve the success rate.

Seeds were placed in the same environment as direct-sown seeds, with each one tagged to mark its location; they were then recovered some months later to determine what proportions had germinated, died or been removed. The biggest challenge was the small size of the seeds, which made tagging them difficult, but a technique used for larger, broadleaved seeds was adapted, which involves gluing a fine fishing line to each seed and tethering the other end to a stake.

It was expected that the test site would not sustain many seed-eating small mammals in winter, so environmental conditions would be the main factors affecting seedling establishment. Nevertheless, some rodent-proof exclosures were included to determine the extent of loss to predators. It soon became clear that for most species this was a key issue because nearly all tagged seeds placed outside the exclosures were rapidly removed. Inside the exclosures, however, over 90% of seeds were recovered, demonstrating the resilience of our tagging technique. Losses of birch seeds were high in all treatments, due to premature seed detachment; the technique has now been refined for birch and better results are expected this winter.

Richard Jinks and Matt Parratt

Newly emerged Scots
pine seedlings with
threads still attached
to the seed coats



Rural Research and Strategy Partnership launches Research Workshop Series

The Rural Research and Strategy Partnership (RRSP), led by Forest Research, launched its series of research workshops this November.

The series was successfully kicked-off with a 'Rural Scenario Development' workshop at Sussex University. Dr Sigrid Stagl and Prof Gordon Mackerron, of the University's Science and Technology Policy Research Unit (SPRU), led workshop participants through the process of scenario development and jointly explored the key underlying themes and factors that could influence future rural developments in South East England. Amongst the delegates were Malcolm Rowe, Head of Rural Business and Communities at the South East England Development Agency (SEEDA), and Chris Quine of Forest Research.

During the upcoming months, the RRSP will run further workshops, each led by key researchers from one of its partner institutions. Forthcoming workshop events will include:

- 27 January 2009** – Forest Research: Opportunities and barriers to woodfuel system approaches
- February 2009** – University for the Creative Arts: Zero carbon buildings – opportunities for rural living? (date to be confirmed)
- March 2009** – University of Surrey: Ageing in rural environments (date to be confirmed)
- 25 March 2009** – University of Reading: Energy and waste – anaerobic digestion systems

Anja Ueberjahn-Tritta

If you are interested in attending any of these events or would like further details of past and future workshops, contact Anja at: anja.ueberjahn-tritta@forestry.gsi.gov.uk – information is also available from www.forestresearch.gov.uk/rrsp



Investigating the cause of extensive stem bleeding on oaks



In 2005 Charnwood Borough Council requested help from the Forest Research Disease Diagnostic Advisory Service (DDAS) after becoming concerned about extensive stem bleeding on oaks which they thought might be infected with *Phytophthora ramorum* (Pr), the Sudden Oak Death pathogen. FR specialists were able to rule this out as the cause, but with the continued increase in the number of symptomatic trees and tree deaths, they described the condition as 'acute oak decline'. A key symptom is extensive stem bleeding, which is visible on affected trees. The same disorder was also reported from Hoddesdon Park in Hertfordshire, sites in Suffolk, Surrey and the Forest of Dean. Trees progress from apparently healthy to dying or dead in just 3–5 years.

In 2008 a small study was initiated to determine possible causal agents. Branch, twig, root and soil samples were taken from the affected sites for analysis. None of the roots showed symptoms of bleeding, but bacteria were consistently obtained from bleeding stems, suggesting that they play a key role in this condition.

Similar bleeding stem symptoms on Mediterranean oak have recently been reported in Spain and bacteria are also thought to be the cause of these occurrences. Questions remain about how widespread the problem is in Britain.

Sandra Denman

Assessing an oak with stem bleeding in the Forest of Dean

Technical Services Unit – listening to customers

The Technical Service Unit (TSU) within Forest Research provides experimental and survey fieldwork, nursery and engineering workshop services to FR scientists and Forestry Commission managers. Contract work for other research organisations and land managers is also welcome.

TSU undertakes a wide variety of fieldwork and is always interested in developing new services. For example, at Flanders Moss in Scotland, TSU staff are working on an experiment established to look at bog restoration after removal of tree cover. For over 10 years, they have been providing ground vegetation and water level assessments for the site. Recently, the work expanded to include a study of greenhouse gas emissions using on-site semi-permanent chambers. These are covered and gas samples taken for analysis by research colleagues in FR.

TSU is keen to deliver high-quality services tailored to customers' requirements. Dr Janet Dutch, Head of Technical Services Unit comments:

“For the past two years we have carried out a customer survey, scoring our performance against a number of criteria. The primary objective is to identify where and how we need to improve services to customers. Results from 2007–08 show a significant improvement in performance ratings, particularly in areas highlighted last year as requiring attention. This not only reflects well on TSU staff, but also on our customers, whose constructive responses to the survey enable us to better understand their needs.”



Sampling of greenhouse gases using a closed flux chamber at the Flanders Moss peatbog site in Sterling

For more details on working with TSU, contact Janet Dutch: 0131 445 2176 or janet.dutch@forestry.gsi.gov.uk

Greening Alice Holt

The UK Government has shown its commitment to addressing the effects of climate change with the introduction of the Climate Change Act. This Act has legally binding targets, including reducing greenhouse gas emissions in the UK by 80% by 2050 and a reduction in carbon dioxide emissions of at least 26% by 2020. In addition, the Scottish Government published its Climate Change Bill on 5 December, which includes an 80% reduction target for greenhouse gases by 2050, an interim 50% reduction by 2030 and annual targets in the intervening years.

The Forestry Commission launched its Greenerways Project in response to the requirement that all government departments meet the carbon reduction targets for energy, travel and waste. The Greenerways team works with staff across the Commission to raise awareness of climate change and encourage staff to adopt sustainable practices.

In November, delegates at the FC's first national meeting of Greenerways local 'champions' heard from Vicki Lawrence (Forest Research) about initiatives at the Alice Holt site in Hampshire. Vicki commented:

"Recycling is one area where staff at Alice Holt have made real progress. We've significantly increased the levels of paper recycling and widened the range of materials we recycle."

FR is also making progress at its Northern Research Station (near Edinburgh) and fieldstations based at Talybont (Brecon), Ae (near Dumfries) and Newton (near Elgin). Increased rail travel and video conferencing have helped reduce the carbon footprint generated by staff travel.

Vicki added:

"We recognise we can't change everything overnight. Meeting energy targets is a particular challenge when you work in old buildings, but we're determined to make a difference!"

FR's award-winning display



FR won two gold medals for its design and construction of a display on behalf of FC Wales at the Royal Welsh Show this summer. The awards were for Best Forestry Trade Stand and Trade Stand – Educational Value. The display included two 'mad professors' and their carbon-eating machine (above), which turned out to be no match for Mother Nature's own carbon-eating invention – the tree.

New Publications

Research Notes

Benefits of improved Sitka spruce: volume and quality of timber

by Shaun Mochan, Steve Lee and Barry Gardiner (FCRN003)

The increase in timber volume gained from planting improved Sitka spruce stock has been estimated to be between 21% and 29% at the end of a rotation. This Research Note presents the results of new research designed to investigate the impact of improved Sitka spruce stock on quality characteristics which determine the quantity of green sawlogs in the forest and construction-grade timber in the sawmill. The study was carried out using trees close to rotation age from a trial of improved Sitka spruce at Kershope Forest in Cumbria. A number of characteristics relating to growth rate and timber quality were assessed on the standing trees in the forest and the sawn timber obtained from the trees after felling. The results at both the individual tree and per hectare level showed increased sawn timber volumes from improved planting stock without deterioration in construction grade strength requirements. In the best progeny, increases of up to 130% in both green sawlog volume and sawn timber volumes per hectare were predicted with equivalent mechanical properties to the Queen Charlotte Island stock.

The economic and social contribution of forestry for people in Scotland

by David Edwards, Jake Morris, Liz O'Brien, Vadims Sarajevs and Gregory Valatin (FCRN102)

This Research Note summarises the results of a two-year valuation of the current social and economic contribution of forestry, forests and woodlands to the people of Scotland. The research was structured around 30 quantitative indicators distributed across seven themes: employment and volunteering; contribution to the economy; recreation and accessibility; learning and education; health and well-being; cultural landscape; and community capacity. Key findings are presented for each theme. Additional insights from qualitative research undertaken in two case study regions highlight how people value forestry in multiple and often intangible ways that cut across the seven themes to support both individual and community development. The research will provide a valuable resource for policymakers and researchers over the next few years, and a model upon which similar valuations in other countries might be based.



Continued ►

New Publications (continued)

Impacts of climate change on Wales

by Duncan Ray (FCRN301; a Welsh language version is also available, FCRN301(W))

Climate change is now one of the greatest global challenges and research is under way to establish the likely impacts on many aspects of the environment. This Research Note provides an initial synopsis of the likely impacts, with preliminary recommendations to support the revision of the Wales Woodland Strategy. Climate change will create challenges and opportunities for the Welsh forest industry. Productivity will increase in some areas and a wider selection of species will become suitable, but effects will vary spatially and by species. New approaches to woodland management will be required to address potential threats of drought, increased pest and disease damage, and wind damage. An aspiration of the current Wales Woodland Strategy is to increase the proportion of woodlands managed using low impact silvicultural systems. This conforms with the need to adapt management through species choice, promote management that has a lower environmental impact on forest sites, and improve the overall resilience of woodland ecosystems to climate change.



Forest Research Annual Report and Accounts 2007-2008

July 2008, 112 pages (£18.55)

This report describes the work of Forest Research during the period April 2007 to March 2008 and presents the audited accounts for the financial year. It gives a useful overview of the variety of research carried out by Forest Research and outlines a number of recent projects as examples.

Copies can be downloaded from www.forestresearch.gov.uk/annualreports or hard copies may be ordered from **The Stationery Office**.

Pathology Advisory Note 7: Problems on plane trees

A publication that will be particularly important to arborists and managers of urban woodlands. This Note describes the pathogens that could potentially be very damaging to plane trees (*Platanus* spp.) in the UK; visit www.forestresearch.gov.uk/fr/infd-5zabpx

Staff news

Dr Bianca Ambrose-Oji joined Forest Research in October 2008, working in the Social and Economic Research Group (SERG). She has 18 years' experience in social forestry and forest governance. She completed a degree in Rural Environmental Science at Wye College (Kent), before beginning a forestry career with research and consultancy work in Europe, advising on Environmental Impact Assessments, and in Asia, where she investigated local knowledge and livelihoods related to forests and agroforestry systems. Bianca gained an MSc in forestry from Oxford University and then spent five years in Cameroon working to conserve tropical forest biodiversity by working with local communities.

For the past eight years, Bianca has been working at CAZS-Natural Resources (CAZS-NR) at Bangor University. Her work has included consultancy, advising on participatory forest research and management processes with different forestry services and institutions in Asia and Africa, the provision of professional training for forestry personnel, and a variety of governance and livelihood-focused collaborative research projects with European and international partners. Her research collaborations included work with the School of Environment and Natural Resources at Bangor University, for whom she also played a significant lecturing role and managed an MSc programme.

Dr Steven Hendry, formerly of Tree Health Division at our Northern Research Station (NRS), has transferred to the post of upland native woodlands ecologist. Steve has a range of skills and breadth of knowledge that will be extremely valuable in developing a new phase of work within this area. His experience includes a first degree in Botany, a PhD on the pathology of environmentally stressed beech trees, time working in ecological surveys and consultancy, and his recent work leading the forest condition monitoring work across Great Britain.

Steve will be spending the next few months reviewing progress within the upland native woods element of the Priority Woodlands Programme, understanding policy and practice developments, scoping future directions and talking to our contacts and stakeholders.

Dr Hugh Evans, Head of Tree Health Division, is to lead the development of Forest Research's profile and business opportunities in Wales. His appointment is part of developments by Forest Research and Forestry Commission Wales to establish a research base in Aberystwyth, where the Commission has its National Office for Wales.

A native of Bangor in North Wales, Dr Evans is currently based at Alice Holt Research Station near Farnham in Surrey, and will transfer to Aberystwyth on 5 January 2009. He will continue to carry out research, especially on aspects of biosecurity, and will maintain his support for the Forestry Commission's Plant Health Service, which is responsible for protecting Britain's forests and woods from pests and diseases.

Dr Nadeem Shah was appointed as a hydrogeochemist at NRS in October 2008. He will be working on a number of studies investigating the effects of forestry on water quantity and quality. Current projects include the hydrological impacts of short-rotation energy crops, and the role of woodlands in sustainable flood management and pollution control.

Nadeem graduated with a BSc (Hons) in environmental chemistry from the University of Glasgow, where he subsequently worked as a researcher on agricultural herbicide usage. He completed an MSc (Research) in environmental engineering science and a PhD on natural attenuation of contaminants in groundwater, both with the Groundwater Protection and Restoration Group at the University of Sheffield. He has held a number of research posts at the University of Sheffield, most recently four years investigating the remediation potential of an underground fuel spill in the UK Chalk aquifer, which included collaborative research on isotope biogeochemistry at the UFZ Centre for Environmental Research in Leipzig.

What's new on our website

Adapting forests and woodlands in Wales to a future climate

How will climate change affect forests and woodlands in Wales?

www.forestresearch.gov.uk/fr/INFD-7fxbyq

Tree seed storage and pretreatment

Storage properties, dormancy characteristics and pretreatment durations for over 120 woody species commonly grown in Britain.

www.forestresearch.gov.uk/fr/INFD-7F8AJ4

Environmental volunteering

Understanding what motivates people to become involved in practical environmental volunteering work, what benefits they gain from their involvement and whether there are any potential barriers to getting or staying involved.

www.forestresearch.gov.uk/fr/INFD-7gdhd3

Management and restoration of priority open habitats

Research to support the management of existing open habitats and restoration of former priority habitats altered by afforestation.

www.forestresearch.gov.uk/fr/INFD-7j5cly

Climate change projects

Our programme of climate change-related research, conferences, seminars and other events, covering impact assessment and monitoring, adaptation and mitigation.

www.forestresearch.gov.uk/fr/INFD-7K9DFZ

Continuous cover forestry: social dimensions

Studying how social science can contribute to the development of forest management through understanding communication pathways and supporting the links between science and practice.

www.forestresearch.gov.uk/fr/INFD-7kedye

Awards



Professor Clive Brasier

has been honoured by the British Society of Plant Pathology and invested with lifetime Honorary Membership.

This is in recognition of his lifetime achievements in forest pathology research and more recently his focus on the global plant biosecurity threat posed by invasive pathogens such as *Phytophthora* spp., both directly and through their evolutionary potential. These add to the honours already conferred on Clive as a Fellow of the British Mycological Society and a Fellow of the American Phytopathological Society. Congratulations to Clive on his considerable and prestigious achievements.