

Ecotype

Spring 2011

Ecotype is the biodiversity and conservation newsletter produced by Forest Research's Centre for Human and Ecological Sciences.

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Bluebells will soon be letting us know Spring is here

A word from Chris Quine, the Head of Centre for Human and Ecological Sciences:

Welcome to a New Year of *Ecotype* – and to our new editor, Claire Sabin. Claire takes over from Andrea Kiewitt who has been a very effective editor over the past years and transformed the production of the newsletter into its present form. It would have been good to begin the year with an indication of the forthcoming research programmes that will subsequently feed into *Ecotype*, but at the time of writing, there remains considerable uncertainty over the scope and extent of future research within the Centre for Human and Ecological Sciences (CHES), so more details will follow in due course.

Editorial

Welcome to the Spring 2011 issue of *Ecotype*, the biodiversity and conservation newsletter produced by Forest Research's Centre for Human and Ecological Sciences (CHES).

I'd like to thank Andrea for the fantastic job she did as Editor of *Ecotype* for the past four years. There will be very little change to the successful format Andrea established. The main emphasis will still be on giving an update of our recent and current projects, along with some short news items and conference details. Each issue will also include an article from one of the PhD students working with CHES.

Chris Quine kicks the year off with an insight into 'interdisciplinarity', showing us how the combined insights of scientists from different disciplines have been influencing and enhancing recent projects.

Georgianna Watson and **Alice Broome** introduce the exciting development of the first web-based tool to inform habitat management for species specifically in woodlands.

Colin Edwards presents his work on Oak deadwood using dendrochronology, giving us a glimpse of the wealth of information trees store in their rings.

Helen Armstrong provides an update on the recently upgraded Woodland Grazing Toolbox, a useful source of information and guidance.

Back from his travels, **Mike Smith** introduces us to a new collaborative project involving Forest Research and Forest Research India.

Nadia Barsoum and student **Filipa Cox** take us into the world of mycorrhizal communities. Filipa has recently finished her PhD entitled 'The mycorrhizas of Europe's pine forests in the context of nitrogen pollution'.

And finally, our **news and conferences** page contains a short announcement of the retirement of a valued member of our team, a note about the UK National Ecosystem Assessment, and information on forthcoming conferences: the IALE Conference on landscape ecology and ecosystem services, and the Association of Applied Biologists' Vegetation Management Conference.

All together these articles highlight a selection of the current projects we are working on at Forest Research. I hope you find this Spring 2011 issue of *Ecotype* informative and enjoyable to read.

Claire Sabin
Editor

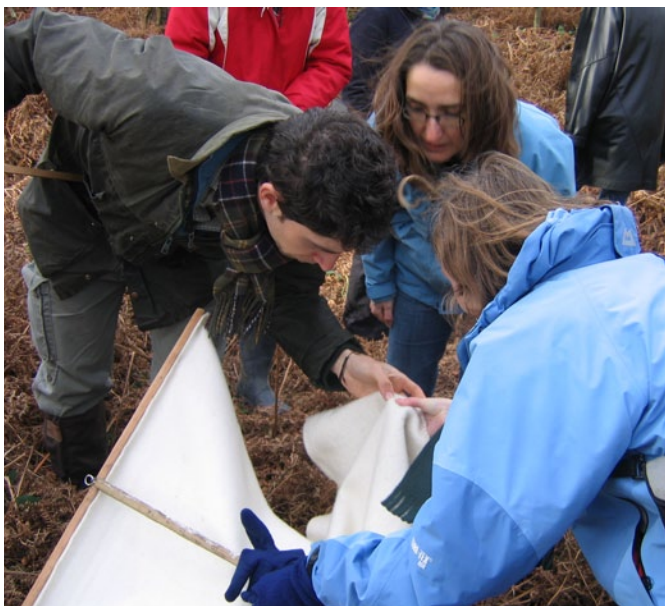
What's all the fuss about Interdisciplinarity?

Chris Quine

'Interdisciplinarity' is a word that is becoming more common in conversations around research methods and in specifications for research projects. Sounds impressive, and keeps the facial muscles working, but what is it all about?

Interdisciplinarity reflects an ambition to integrate the contributions of different disciplines (e.g. ecologists, physicists, economists,

social scientists) to provide more comprehensive outcomes than would be possible by scientists working alone on a problem or with colleagues of the same discipline. Some argue that it is particularly appropriate for research that is problem-focused and addresses issues of technical or policy relevance. Interdisciplinarity isn't the same as multi-disciplinary research where scientists work in parallel; instead it expects greater interaction between those involved, such that methods and perspectives change and knowledge is integrated. Key advantages include gaining a broad characterisation of a problem, providing a greater challenge to orthodox thinking, and achieving new types of output.



Social scientists get to grips with the intricacies of tick sampling.

The RELU (Rural Economy and Land Use) programme has been a major supporter of interdisciplinary research in recent years (www.relu.ac.uk/research/Interdisciplinarity/Interdisciplinarity.html), involving a number of Forest Research and CHES researchers (see *Ecotype* 47 for details of a collaboration around deer management). Recently, a number of us have worked on a project 'Assessing and communicating animal disease risks to countryside users'. Integrative outputs from this work include two frameworks: one that helps organisations consider the possible responses to disease incidence, and a second that identifies how preventative behaviour can be encouraged through risk communication. It has certainly been stimulating to work on the project and bring together the diverse perspectives of parasitologists, ecologists, psychologists, social scientists and stakeholders from a wide range of land-based organisations. RELU will soon publish a Policy and Practice Note (see www.relu.ac.uk/news/policyandpracticenotes.htm) and other outputs from the work can be accessed at the project website (www.forestry.gov.uk/fr/animaldiseaserisks). Have a look and see for yourself that interdisciplinarity works!

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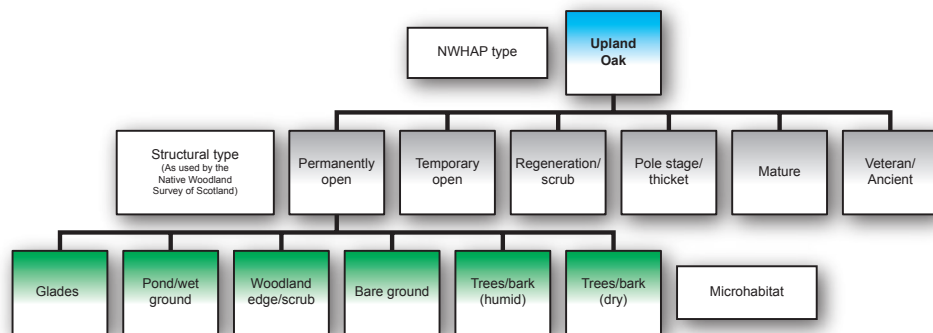
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Development of a web-based tool to inform woodland management for species

Georgianna Watson and Alice Broome

The 1994 UK Biodiversity Action Plan (UKBAP) outlined the UK's plan to halt biodiversity loss and targeted 391 species and 45 habitats. Following re-evaluation, revised lists were published in 2007 identifying 1,150 species and 65 habitats of priority. Conservation effort has refocused on habitat management, benefiting multiple species, ensuring the increased number of species are adequately protected.



Hierarchical representation of species habitat preferences.

Web-based tools to inform habitat management for species (TIHMS) are being produced by Scottish Natural Heritage (SNH). Forest Research is developing the first system; woodlands. This will provide information on:

- potential species occupying particular priority native woodland types (NWHAPs) e.g. Upland oakwood,
- recognition of critical habitat features,
- methods to beneficially manage woodlands for all the protected species.

Species from the Scottish woodland priority list were:

- allocated into a NWHAP type,
- classified by their woodland structural type plus microhabitat; termed "niche".



Hedgehog in typical habitat.



This resulted in a number of woodland 'niches' being identified which would provide for the requirements of species. The structures and microhabitats were described so that the 'niches' could be recognised and this identified the appropriate woodland management advice to deliver these 'niches'.

◀ Common juniper (*Juniperus communis*) in a permanently open area.

Management advice considers both maintenance and creation of particular structural stages within woodland and further management of each microhabitat is provided.

TIHMS will be published by SNH on their website after April 2011 and it is hoped will be a beneficial tool, reducing the economic costs of conserving priority species through targeting actions for multiple species.

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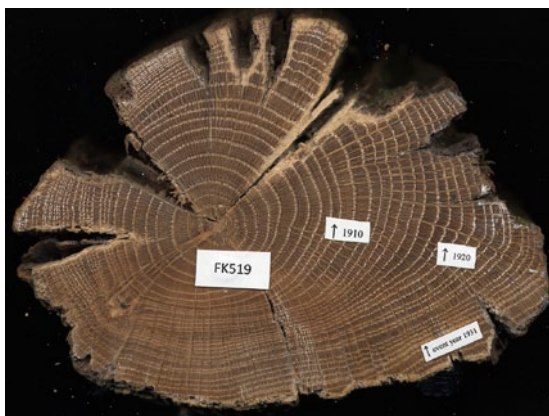
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Reading between the lines

Colin Edwards

Dendrochronology is the science of dating tree rings to the exact year of formation, and studying their structure to interpret information about environmental and historical events that have influenced tree growth. Forest Research's Colin Edwards is currently using dendrochronology to date naturally occurring oak deadwood, to calculate how long it has been in the deadwood 'pool' and to determine its rate of decay or loss.

So far, samples from live and dead trees have been collected from three sites in Scotland, one of which, Dalkeith Old wood SSSI, is an ancient royal forest and pasture woodland. Additional sites are to be sampled to cover a range of geographic locations, stand types and climatic variables.



A dead coppice stem originating in 1900: the signature year 1931 is clearly visible as a narrow ring. Only heartwood is present as all the sapwood has rotted.

"...one of the most important environmental recording techniques for a variety of natural environmental processes..." Speer (2010)

Once collected, the samples are slowly dried before being sanded to allow the detailed ring structure to be viewed and measured. Live material is dated from the last formed ring beneath the bark, while deadwood sections are dated by counting from the known date of their last coppicing, or from recognisable patterns of

common narrow and wide rings called 'signature years'. All dates are checked by statistical analysis of measurements against a mean pattern for the site or region. The project is in its early stages and analysis of the samples is ongoing. However, initial findings from one site (Fairy Knowe in Central Scotland) indicate that it was once managed coppice with standards and was last coppiced in 1899. One stem (left) originated on a coppiced stump in 1900; it was approximately 57 years old when it died and was still standing when sampled in 2010. An adjacent stem, established before 1864, shows evidence of a previous coppicing event in the early 1880s.



A maiden stem from 1864 showing period of reduced growth in 1880s probably a result of competition from newly coppiced stems.

This information will add to our understanding of stand dynamics, when the deadwood component was created, and how long it has been in the deadwood pool.

Further reading:

J. H. Speer. (2010). Fundamentals of tree-ring research. The University of Arizona Press, Tucson.

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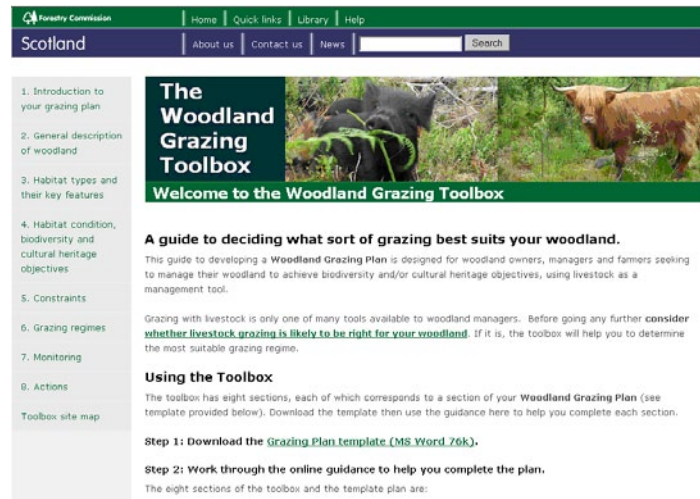
The Woodland Grazing Toolbox

Helen Armstrong

The Woodland Grazing Toolbox is a new collection of web pages and documents that take users through the process of writing a woodland grazing management plan for the achievement of biodiversity or human heritage objectives.

Production of the Toolbox was funded by Scottish Natural Heritage and Forestry Commission Scotland with the aim of providing easily accessible advice to land managers wanting to apply for funding under the woodland grazing element of the Scottish Rural Development Programme.

The Toolbox contains a template woodland grazing management plan as well as a worked example. The sections of the Toolbox correspond to the sections of this plan. Under the 'Condition Assessment and Objectives' and 'Monitoring' sections of the Toolbox, detailed guidance is provided on how to assess both the initial condition of the woodland with respect to objectives and how to monitor its condition over time. The method provided, which will be used by Forestry Commission Scotland staff to check on compliance, is a subjective method based on recording observations at ten stops within



each woodland type. At each stop, woodland structure is first categorized as one of eight types. The level of current herbivore impact on each of seven indicators is then also recorded as being from 'very high' to 'absent'. Guidance is provided on how to define the woodland condition that is most likely to achieve the desired outcome. Each time the woodland is monitored, the manager compares the outcome against the desired condition and, if necessary and practicable, adjusts the stock grazing regime accordingly. It is recommended that monitoring is carried out at least twice a year at the same time each year.



Highland cow and birch.

Photo courtesy of Richard Thompson

The Toolbox first went online in April 2010 and a major upgrade is scheduled for the end of March 2011. For more information, or to use the Toolbox, please use the link www.forestry.gov.uk/woodlandgrazingtoolbox

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UK India collaboration project

Mike Smith

Forest Research is undertaking a collaborative project with our counterparts in India, Forest Research India. The aim is to develop a better understanding of the broad ranging contribution that forest restoration can make to



Examining the success of forest restoration after rock phosphate mining near Dehradun.

ecosystem services, climate change mitigation and adaptation, biodiversity, and to people and the economy. This is to be achieved by carrying out an overview of forest landscape restoration (FLR) activities in India and the UK.

This will include a description of the scope and scale of FLR, clarifying its objectives, and assessing its success in terms of delivery and lessons learned.

The project is being carried out through the Global Partnership on Forest Landscape Restoration which is a proactive network that unites Governments, organisations, communities and individuals with a common goal to restore degraded landscapes. The partnership was initiated with the purpose of catalyzing and reinforcing a network of diverse examples of restoration of forests and degraded lands that deliver benefits to local communities and to nature, and fulfil international commitments on forests.

The first phase is the production of a general overview of the current FLR in India and specific initiatives in the States of Madhya Pradesh, Orissa and Uttarakhand. In the UK the same overview is being undertaken for FLR activities in Scotland. This review will provide material for the development of the second phase, focusing on the implementation of the FLR approach in the whole country. A study tour to India, focussing on the technical and practical aspects of FLR will be undertaken by UK based practitioners, policy makers and researcher who are currently involved in the subject.

For further information on the UK India collaboration project contact:

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Trees, fungi and nitrogen pollution

Filipa Cox and Nadia Barsoum

Human driven global environmental change has potentially serious implications for biodiversity in temperate and boreal forests. Trees in these forests are dependent on mycorrhizal fungi, a group of symbiotic organisms which provide a source of nutrients to their host tree in exchange for a supply of carbon. Changes to mycorrhizal communities are expected to affect forest ecosystem functioning, but the factors that control mycorrhizal distributions, diversity and community structure are little understood. Consequently, the role that global environmental change may play in altering mycorrhizal communities is not known.

By focusing on broad-scale environmental gradients, studies led by Filipa Cox (Forest Research/Imperial College London), and collaborators from one of the world's largest biomonitoring networks (ICP Forests), are aiming to unveil the dominant processes that structure mycorrhizal fungal communities within Europe. Supported by the Natural Environment Research Council and Kew Gardens, this work has so far found evidence that increasing nitrogen availability is associated with a reduction in mycorrhizal fungal richness and changes in community composition. This is a worrying trend in the face of predicted future increases and a globalisation of nitrogen deposition driven by anthropogenic activities. In addition to the potential role of nitrogen; soil pH, stand age, mean annual temperature and altitude have also been identified as variables associated with changes in mycorrhizal communities across broad spatial scales.

Future work hopes to expand the scale of mycorrhizal sampling further, so that insights into the patterns and processes driving mycorrhizal communities at continental scales can be ascertained.



Ectomycorrhizal fungi, such as this *Boletus*, provide trees with nutrients and help protect them against drought and pathogens.

Further reading:

Cox F., Barsoum N., Lilleskov E.A., Bidartondo M.I. (2010) Nitrogen availability is a primary determinant of conifer mycorrhizas across complex environmental gradients. *Ecology Letters*, 13, 1103-1113.

For further information on the Pine forest mycorrhizas project contact:

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News and conferences

Retirement of Dr Roger Trout

Our colleague, and *Ecotype* contributor, Dr Roger Trout is retiring from Forest Research in early March 2011. During his time at FR, his enthusiasm and expertise in mammal population ecology and management has been widely valued - including predator control to conserve capercaillie populations, technical improvements in forest fencing (culminating in the FC Forest Fencing Technical Guide 2), countering the threat of alien and invasive species, and in hazel dormouse conservation. We wish him well in his retirement.

IALE Conference

The International Association for Landscape Ecology have announced their 18th annual UK meeting, which will explore landscape ecology and ecosystem services. Presenters from FR in previous years have included Peter Freer-Smith, the Forestry Commission's Chief Scientist.

The meeting will be held at Wolverhampton University's Telford campus, 6-8th September 2011.

CHES's Amy Eycott is part of the organising committee and recommends that you see www.iale.org.uk for more information on the conference.

Vegetation Management Conference

The Association of Applied Biologists will be holding their fifth conference on Vegetation Management. CHES's Alice Broome will be presenting 'A comparison of two management methods for encouraging the natural regeneration of juniper in the British Uplands'.

The conference will be held at Sheffield Hallam University, Sheffield, on 27-28th April 2011.

More information can be found at the AAB website www.aab.org.uk

UK National Ecosystem Assessment

The UK National Ecosystem Assessment (NEA) will be published shortly. CHES's Chris Quine has co-ordinated the writing of the woodlands broad habitat chapter and was a member of the expert panel overseeing the synthesis of the NEA findings. Gregory Valatin contributed to the NEA valuation of ecosystem services, and to the woodlands chapter.

More information is available at <http://uknea.unep-wcmc.org/>

About Ecotype

Ecotype addresses forestry practitioners and conservation professionals, in both the public and private sectors. Amongst our readership are people from:

- County and District Councils
- Natural England
- DEFRA
- Wildlife Trusts
- National Trust
- British Trust for Ornithology
- RSPB
- Woodland Trust
- Forestry Commission, Forest Enterprise
- Centre for Ecology & Hydrology
- Natural Environment Research Council
- Universities, Museums
- Private consultants
- Interested individuals

Who contributes

Most of the articles are written by people within the Centre for Human and Ecological Sciences and sometimes other parts of Forest Research about work related to biodiversity and conservation management of forests and woodlands. Contributions may also be invited from other parts of the Forestry Commission, and others working within forest biodiversity and conservation, subject to relevance to the main themes of Ecotype.

Note that the editor reserves the right to edit, delay or reject articles depending on the space available and relevance of the subject.

Contacts

To comment, provide material for future issues, or if you wish to receive Ecotype by e-mail, please contact the editor:

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Web links

www.forestry.gov.uk/fr/ecology

www.forestry.gov.uk/forestresearch

www.forestresearch.gov.uk/fr/growingplaces