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Fungi in the forest

*This time of year is particularly good to get a glimpse of the fungi that live in our forests. These attractive bracket fungi here are called *Coriolus versicolor* and colonise old tree stumps. They are very common and easy to recognise by their concentric bands of alternating colours.*



Welcome to the November issue of Ecotype, the Biodiversity and Conservation Newsletter for the Ecology Division of Forest Research.

As usual, the main part of Ecotype introduces you to an interesting selection of research projects currently undertaken within our Division.

Roger Trout describes the role of edible dormice in our woodlands and discusses the possible threat this invasive species might present in the future.

In a similar context **Mark Ferryman** reports his experience with our promising new mobile digital video recorders for monitoring wildlife using closed circuit television, CCTV.

A joint project by Forest Research and Scottish Natural Heritage investigating the possible causes of juniper die-back in south-east Scotland is presented by **Alice Broome** who works on the priority species of the UK Biodiversity Action Plan.

Remembering the Great Storm of 1987, **Chris Quine** throws some light on the developing regeneration in windblown gaps caused by such disturbance events that occur much more frequently in the North and West of Britain.

And as **Duncan Ray** explains, the Irish Republic is going to get a decision support tool for the adaptation of silviculture to climate change, CLIMADAPT, which is currently being developed by Forest Research in a similar way to the Ecological Site Classification tool for Britain.

Finally, **Jason Hubert** emphasises the importance of genetic variation in the conservation of biodiversity as he describes Forest Research's involvement in the pan-European co-operation to develop a European Information System on Forest Genetic Resources, EUFGIS.

These examples of the varied range of our work are extended by a good many short news items and details on a forthcoming series of seminars.

I hope this will make some interesting and enjoyable reading.

Andrea Kiewitt
Editor

Something grumbling beyond the Chiltern woods?

Roger Trout



The edible dormouse (*Glis glis*) is a woodland dwelling, nocturnally active, colonially hibernating rodent that is not native to Britain but originates from deciduous woodland of southern and eastern Europe. Glis looks superficially like a young grey squirrel (another non-native and hugely successful invader) but has more rounded ears, bigger eyes, very long whiskers and the underside of the tail is almost hairless and 'flat'. Mind you, the teeth and vocal chords work equally well when provoked!

Glis was introduced to Britain in 1902 into a park at Tring, Hertfordshire, and escaped from there into the Chiltern woods. As a non-native species, Glis falls within the new Defra Non-native Species Control Policy. Confusingly, it is both protected under European legislation but also heavily culled in several countries - and often used for food. In the UK, Glis can be shot or captured under licence where it is doing damage but cannot legally be released.

Why are Forest Research interested?

Mainly because we are realigning part of our forest ecology programme to focus on alien and invasive vertebrates with a potential damage implication. Widescale efforts are made on the continent to control Glis since it causes considerable damage to forest and orchard trees by removing bark from just above side branches. In Britain, the small area in the Chilterns currently occupied by Glis has very evident snap damage to the stems of trees, especially to larch. Glis also frequently enters buildings and attacks electrical wiring, insulation and stored food.

Also, climate change may enable this animal to spread far wider and faster [c 350m/yr] across the UK than during the previous century. Anecdotal news and rumours exist of illegal releases as far away as the New Forest and Kent but we have currently no information or risk predictions of more widespread damage in the future.

Further discussions are to be held with Forestry Commission colleagues to consider whether Glis should be chosen as a focus of future research and management advice as one of several invasive species that are actually or potentially troublemakers for forestry. In the meantime, we would be interested to hear of reports of damage or expanding range.

Finally, and maybe intended as a more sustainable option, recent publicity in the press has included a recipe for macaroni with edible dormouse and song-thrush sauce... - but only recommended if you want to endure a spell behind bars!

For further information or to pass on damage reports and sightings contact:

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Digital video technology for monitoring wildlife

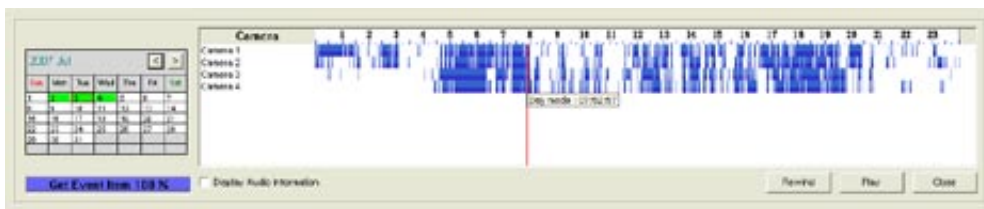
Mark Ferryman

[Brenda Mayle](#) and [Mark Ferryman](#) recently updated Ecology Division's wildlife closed circuit television (CCTV) capability with two mobile digital video recorders (DVR's). These stand-alone units are essentially robust, compact mobile computers running Windows with GeoVision software. Each have multiple camera inputs and operate from batteries in addition to mains voltage, so are ideal for field applications.

Other than cameras, a keyboard/touch pad and small LCD monitor are all that is required to set up the system. Recorded video is then copied to a mobile hard drive.

The main benefits of this system for monitoring wildlife are:

- ▶ Each video recorder can record full-size images from 1–8 cameras simultaneously to the onboard hard drive with the video from all cameras being identically time-stamped (16-camera versions are also available).
- ▶ Software video control allows a wide range of general and camera settings to be used. Various recording modes are available.



Grey squirrel feeding activity shown by four cameras during one day. Note the increased activity during early morning and late afternoon.

- ▶ The digital video recorder digitises camera images and compresses them into a PC-friendly format that can later be viewed on any up-to-date PC. Video clips and stills can be exported to view in other media.
- ▶ The video player software is used to view video and has various options for searching, editing and copying. Events can be found within seconds. When recordings are made using motion detection, one particular feature of this software is its ability to show activity between cameras over a time period. This is useful for identifying suitable periods of activity for analysis (see the image of activity from four cameras), which are then assessed to record activity.
- ▶ Digital video can be stored and backed up electronically, saving much space compared to conventional video tapes. The assessment of long periods of video for an experiment can be carried out from data on a single drive.

The equipment has been in use since June of this year and [Gemma Brandt](#) will be joining Ecology Division from November until March to process the video files.

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Juniper die-back in Tayside

Alice Broome



Juniper (*Juniperus communis* subsp. *communis*) is a priority species within the UK Biodiversity Action Plan (UKBAP) and also listed in Tayside's Biodiversity Action Plan as a local priority for conservation. Juniper woodland has a restricted distribution in Britain and the stands of juniper in Tayside are both of regional and national importance, being the most extensive areas of juniper woodland in south East Scotland.

One of the largest juniper populations in the Tayside area is Glenartney juniper wood, covering almost 100 ha and designated as a Special Area of Conservation. Recently, it has shown dramatic dieback of mature juniper bushes. Damage was noticed from the late 1990's onwards. Symptoms are characterised by browning and death of entire trees, or entire tree sections which originate from a single bush. Affected trees are scattered across the site with no apparent relation to any variation in site characteristics (e.g. wet as opposed to freely draining areas), and individual bushes and large clumps are equally affected.



Cross-sections of died-back juniper stems

In order to maintain the nature conservation value of the site, it will be necessary to identify the cause of the problem and implement restorative management actions. To forward this action, investigations into possible causes of die-back have been brought together under a joint project by Forest Research and Scottish Natural Heritage.

Glenartney juniper wood in Tayside with dead juniper bushes scattered throughout the site



Mature juniper bush with brown needles, entirely died back



Dieback of whole tree section

This project will follow a number of lines of enquiry and include:

- ▶ Identifying juniper life-span limitations
- ▶ Investigating potential root damage through mammal presence, pathogens and root growth patterns
- ▶ Assessing the nutritional status of both the site and the juniper bushes
- ▶ Researching and evaluating past management and also climatic factors

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Disturbing events – Wind and partial waves in the forest

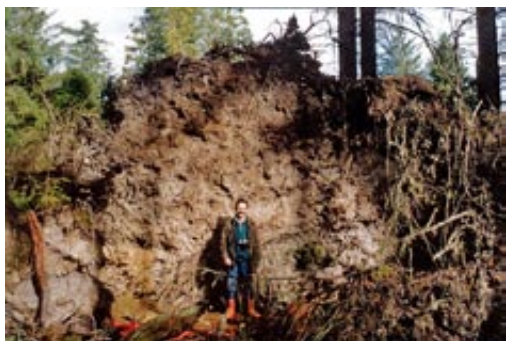
Chris Quine



Much has been made in the press in the past month of the 20th Anniversary of the 1987 storm in south-east England. Not only were the winds very strong, but the event itself was also very rare in that region – literally greater than living memory. Such ‘disturbance events’ are of great ecological interest, with vegetation exploiting windthrown gaps and new opportunities for tree regeneration. These dynamics are comparatively well understood in countries with substantial natural forest cover.

Britain’s wind climate varies with location and elevation, in general the windiest sites are in the north and west. In some locations, wind speeds able to cause trees to overturn or snap are much more frequent than in SE England.

One such location is Birkley Wood in Kielder forest which was planted in 1923 as a stand of Sitka spruce in mixture with Scots



The author next to one of the largest root plates in Birkley Wood!

pine. I monitored windthrow there, in the period between 1987 and 2000 and found that gaps developed on at least 38 separate occasions, leading to expansion of a proportion of the gaps downwind. Regeneration of spruce has occurred in the largest gaps and it is possible to see a partial wave or ramp structure in the regeneration

forming with the tallest trees close to the upwind margin and the smallest at the downwind margin - the height of the new trees being governed by the age of the gap at that point.

Speculatively, perhaps unmanaged forests in upland Britain might develop as a wind-driven mosaic – with the coarse pattern determined by particular exceptional events (at an intensity as in 1987), and the fine scale mosaic determined by the frequent disturbance and subsequent regeneration brought about by more frequent winter storms.



Regeneration establishing in windthrow gap in Birkley Wood

Further reading

Quine, C. P., and D. C. Malcolm. 2007. Wind-driven gap development in Birkley Wood, a long-term retention of planted spruce in upland Britain. *Canadian Journal of Forest Research* **37**, 1787-1796.

Quine, C. P., and B. A. Gardiner. 2006. Understanding how the interaction of wind and trees results in windthrow, stem breakage and gap formation. pp. 103-155. In: E. A. Johnson and K. Miyanishi (eds.), *Plant disturbance ecology: the process and the response*. Academic Press (Elsevier), New York.

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ESC going to Ireland (via Kyoto and Marrakesh)

Duncan Ray



Ecology Division has started developing an Ecological Site Classification (ESC) for the Irish Republic. The two year project called CLIMADAPT is part of the programme for Climate Change Mitigation and Adaptation in Irish Forests (CLI-MIT) funded by COFORD, the National Council for Forest Research and Development of the Irish Republic. This recent round of funding covers the development of a carbon accounting and reporting system for Ireland to meet both Kyoto Protocol and Marrakesh Accord commitments.

The parties to the Kyoto Protocol in 1997 consented to reduce carbon and other greenhouse gas emissions to 5% below the levels of 1990 during the first commitment period (2008-2012). At Marrakesh, in 2001, the parties acknowledged the role that sustainably managed forests provide, i.e. removing CO₂ from the atmosphere and offering a renewable alternative to fossil fuels. Greenhouse gas emissions in Ireland are currently 23% above the level of 1990, and Irish forests may offset 16% of these emissions during the first commitment period.

As a signatory to Kyoto and Marrakesh, Ireland must calculate the carbon sequestered by forests to provide evidence of their role in reducing greenhouse gas emissions. Ireland's forests have been recently assessed as part of a National Forest Inventory. But the inventory cannot account for land-use, land-use change, or the changes in forest carbon stocks. Instead a set of models collectively making up the CLI-MIT programme will be used to predict fluxes to and from forest carbon pools.

The CLIMADAPT project - like ESC in Britain - will provide strategic and operational guidance for the adaptation of species and silviculture to climate change in Ireland. This decision support tool will use new web-based technology, including Google maps and AJAX (Asynchronous Javascript And Xml), to deliver spatial strategic analyses, as well as a site-based assessments for operational use. The whole programme was reviewed by an international scientific committee to confirm that project plans met the good practice guidance on reporting from the Intergovernmental Panel on Climate Change (IPCC).

The review coincided with an international conference "Forestry, Carbon and Climate Change - local and international perspectives", and included contributions from both the review group and the project team.



Amongst the presenters at the conference were - left to right - Peter Stephens (New Zealand), Ricardo Valentini (Italy), Duncan Ray (Forest Research, Ecology Division - UK), Kevin Black (CLI-MIT programme manager - Ireland), Ken Byrne (Ireland).

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Establishment of a European Information System on Forest Genetic Resources

Jason Hubert



Genetic diversity is often a neglected area of biodiversity conservation, especially for species that are widespread. However, there is an increasing awareness of the importance of genetic variation given the potential consequences of climate change. Dynamic gene conservation emphasises the maintenance of evolutionary processes within tree populations to safeguard their potential for continuous adaptation. Many of our native tree species have very wide European distributions - see distribution maps of ash and wild cherry - , so that any attempts to conserve genetic variation at the species level require co-operation at a pan-European level. At this level, due to a lack of common minimum requirements and information standards, a wide range of protected forests are presently declared as gene conservation areas in addition to more specific gene reserve forests. However, most protected areas are established solely for species or habitat conservation and their suitability for long-term gene conservation has rarely been assessed prior to their establishment.

The EU funded project, EUFGIS (European Information System on Forest Genetic Resources), started in April 2007 to tackle this problem. EUFGIS aims to establish a Web-based information system to serve as a documentation platform for national forest genetic resources inventories and to support practical implementation of gene conservation and sustainable forest management in Europe. Before the information system can be developed, a major effort is required to harmonise minimum requirements for dynamic gene conservation units of forest trees and to develop common information standards for these units at pan-European level.



Distribution of ash (Fraxinus excelsior, left) and wild cherry (Prunus avium, right) in blue showing gene conservation units as red dots

The project is co-ordinated by Bioversity International and has six other international participating partners, including Forest Research. The project will run until September 2010. The opening meeting was recently held in Denmark. It reviewed the current level of forest conservation and drew together delegates from 30 countries plus others from international organisations such as the Food and Agriculture Organization of the United Nations (FAO).

More information about the project can be found on the EUFORGEN (European Forest Genetic Resources Programme) website <http://www.biodiversityinternational.org/networks/euforgen/> or from [Jason Hubert](#), the project partner at Forest Research.

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Genotyping Woodcrickets from the Isle of Wight

DNA extracted from wood crickets collected from a range of woodlands across the Isle of Wight are currently being genotyped by our geneticists using ten molecular markers. These genotypes will be used to examine the genetic differentiation in the crickets from those woodlands. The genetic information will be combined with landscape ecological data to determine the impact of forest fragmentation on a woodland dwelling species.



Wood crickets on the Isle of Wight

Habitat networks for red squirrels

[Alice Broome](#) and [Darren Moseley](#) are collaborating with Claire Stevenson and Andrew Ramsey from the University of Cumbria to examine habitat networks for red squirrels in the fragmented woodlands of the Solway Plains, in the north of Cumbria. The study is making use of data collected from woodland surveys, which detail: where suitable habitat areas exist (large seeded trees), woodland structure (larger trees with connecting canopy that allow the squirrels to move above the ground) and hedgrows, which provide important connectivity within a fragmented landscape. These data are then combined with red squirrel hair samples, collected on a sticky surface as the squirrel moves through the area, to determine actual and potential habitat networks for the red squirrel.

Forest Enterprise conservation meeting at Nethercroy

The FE conservation meeting was held at Nethercroy a recently acquired lowland site bought through the derelict land fund for carbon sequestration. This brought together FE staff concerned with conservation to discuss upcoming and relevant issues. The site has several priority BAP habitats that would not be suitable for tree planting and require grazing to maintain their favourable condition posing challenges for their management. A potential solution could be the development grazing animal project to enable site managers to get the right grazing animals in the right place at the right time.

Clonality, genetics and paternity in a semi-natural cherry wood

Ecology Division and Biometrics Division have been working with HRI (Horticultural Research International) to analyse microsatellite data from adult trees and seeds from a semi-natural cherry wood in Kent. We have already characterised the level of clonality in the wood and also the genetic structure of the adult trees. Both clonality and genetic structure were found to be high in relation to other tree species. We are now in the process of examining paternity of seedlings and are finding a high rate of pollen immigration from outside the wood. We are now attempting to correlate genetic and ecological variables to try to explain the different patterns of paternity in the ten mother trees that were sampled.

LiDAR for digital terrain models

The Ecology and Environmental and Human Sciences (EHS) Divisions working in collaboration have developed techniques for remotely exploring features hidden by woodland cover. Airborne LiDAR, flown specifically for the purpose, was used to create digital terrain models of the study area. These raw images were further processed using standard GIS techniques of Hill shading and Principle Components Analysis. The result is a single map product which can be used by practitioners in the field to find previously undetected archaeological features beneath the forest canopy.

A quick clearfell and a gentle thin – woodland restoration meeting in the High Weald

This field meeting organised by Mike Chapman, the High Weald Project Officer for Plantations on Ancient Woodland Sites (PAWS) visited a private woodland near Tunbridge Wells in East Sussex to look at woodland restoration. The diverse audience of woodland owners, managers, contractors and representatives of the Forestry Commission and Natural England had the opportunity to discuss operational, ecological and economic issues, grant schemes and archaeological matters related to the restoration. Two contrasting restoration approaches were demonstrated during the visit – half the site had been clearfelled, the other selectively thinned. [Andrea Kiewitt](#) of Forest Research's Ecology Division went along to compare the restoration progress on this operational scale as encountered there with that of ongoing scientific experiments on PAWS restoration of a similar nature undertaken by Forest Research.

Bog restoration – will it help to reduce greenhouse warming?

The main purpose of restoring bogs altered by afforestation is to re-create former habitats to help conserve specialist animal and plant species. There may also be benefits in terms of re-instating the carbon sink function of the bogs and this is the subject of a new study being set up at West Flanders Moss Forest, near Aberfoyle. [Russell Anderson](#) is working with [Sirwan Yamulki](#) (FR Environment and Human Sciences Division), who will investigate how bog restoration by tree removal and drain blocking affects emissions of the key greenhouse gases, carbon dioxide, methane and nitrous oxide.

Inducing aspen to flower

Demand for propagated aspen in Scotland is increasing, but widespread flowering is a rare event occurring only after exceptionally dry, hot summers (e.g. 1995). One approach is to raise plants from root cuttings, but this process is time consuming and labour intensive. In an attempt to induce flowering in the greenhouse environment we are planning to test water stress, a growth inhibitor and root pruning on aspen grafts from mature trees. If successful, this has the potential to provide large quantities of outbred seed quickly and cheaply.



Inducing aspen to flower in the greenhouse

Amended Habitats Regulations

The Regulations for [European Protected Species](#) which are rare or declining across the EU have recently been amended and incorporated into UK law. The Forestry Commission England is currently developing a 'Good Practice' guide in collaboration with Natural England to ensure that forest operations are carried out in accordance with the regulations. Important species on that list to consider in woodland habitats are bats, dormice, great crested newts, otters, sand lizards and smooth snakes. There have recently been seminars to inform operational and planning staff from the districts and a similar series of [regional seminars](#) is currently organised by the Forestry Commission for private woodland owners, managers and contractors. For dates and venues and how to book please see <http://www.forestry.gov.uk/forestry/inf-d-78klr7>.

Advice on protected species management can also be obtained from [FC regional offices](#)

or e-mail : england-protectedspecies@forestry.gsi.gov.uk.

New Farm Woodlands

The location of new farm woodlands has been the subject of a recent study by FR Ecology Division and the University of Bangor. 'Dendrovita' was a collaborative project involving farmers of the Pontbren Group. They found out that their recent planting schemes had considerably improved connectivity as measured by the habitat networks method, applied as a grant incentive to reduce fragmentation with new woodlands. [Amy Eycott](#), the FR researcher, learnt much about the limits of the modelling technique and the enthusiasm of farmers for biodiversity conservation in the face of considerable economic pressure.

New Biodiversity Manager in Tay Forest District

[Rob Coope](#) of Ecology Division has recently taken up a new role as Biodiversity Manager in Tay Forest District. In his new post he will see to it that proper consideration of biodiversity is engrained in all plans, operations, events and activities in the district, and that all action is within the wildlife and conservation legislation. His job also involves preparing and disseminating the district information on Priority Species and Habitats, adapting national guidelines and legislation and giving local guidance, particularly to operational staff. Rob will still carry on providing specialist ecological support with Forest Research.

Conversion of forests

In a European context the restoration work of PAWS (Plantations on Ancient Woodland Sites) within Ecology Division can be classified as conversion, when plantations of conifers are turned into stands with a more natural structure and mixture of species. [Ralph Harmer](#) of Ecology Division has just become a member of [CONFOREST](#), the association of European researchers interested in understanding the processes of conversion and developing methods by which it may be carried-out.

Conferences

Amendments to the Habitats Regulations: regional seminars

The Forestry Commission is currently holding a series of [regional seminars](#) for private woodland owners, managers and contractors. The seminars will advise on the legislative changes to the Habitats Regulations and how to ensure that forestry management and operations are compliant with the Regulations where protected species are present.

Each full day seminar will include the following:

- ▶ an introduction to the Habitats Regulations;
- ▶ information on good practice;
- ▶ when and how to submit licence applications;
- ▶ case studies;
- ▶ questions and discussion.

For dates and venues and how to book please see <http://www.forestry.gov.uk/forestry/infd-78klr7>.

Please see also the [corresponding news item](#) in this issue of Ecotype.

Advice on protected species management can also be obtained from [FC regional offices](#)

or e-mail : england-protectedspecies@forestry.gsi.gov.uk.

About Ecotype

Who reads 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 Ecology Division 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.

Contact details

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

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Visit the web pages of Ecology Division at:

www.forestresearch.gov.uk/ecology

For more general information about the work of Forest Research, please visit our website at:

www.forestresearch.gov.uk

For information on seminars, conferences and training days in which Forest Research are involved see the events webpage at:

www.forestresearch.gov.uk/events