



PLANFORBIO NEWS

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WELCOME

The FORESTBIO research project, which is gathering information on the biodiversity of native woodlands, mixed species and second rotation plantations, is nearing the end of its fieldwork and data collection phase. The team are now working on transforming this fieldwork data into definitive findings to inform policy and practise. This research will ultimately be disseminated in the form of conference presentations, research publications and several theses. It specifically addresses the aim to obtain information on the biodiversity that plantation forests and native woodlands support as identified in Ireland's National Biodiversity Plan.

The RHODO project is progressing well, with bio-control and re-invasion experiments advancing to the data collection phase. The HEN HARRIER project is heading into its third breeding season with five fieldworkers now collecting data on breeding success in some of the species strongholds in Ireland. Scientists on this project are now ready to begin deployment of GPS tags on adult Hen Harriers for the first time in Ireland. Filming with Duncan Stewart for his EcoEye programme was done during the month of June when Hen Harriers are actively foraging at breeding sites. On a bright sunny June day they filmed adult birds from remote vantage points and also filmed interviews with Mark Wilson, Barry O'Mahony and John O'Halloran. Further filming will take place before the show is aired in early 2010.



John O'Halloran with Duncan Stewart filming a section on Hen Harriers for Ecoeye

PLANT IDENTIFICATION - Linda Coote & Karen Moore

After two wet summers of plant surveys, the focus of the TCD ground flora team since the summer of 2008 has been on the identification of those plants returned from the field. When carrying out the plant surveys, many of the plants could be recognised on sight but, when there was any doubt, the first port of call was the identification keys and picture books that we brought into the field with us. However, with the conditions often a bit wet for books, this was not always possible and so the plants were instead labelled and placed in plastic bags or envelopes. That night in our B&B (much to the amusement of many landladies) we made one last try at identifying the fresh plants before pressing them. For the bryophytes and lichens a microscope was needed so these were saved for the lab. Unlike vascular plants, bryophytes and lichens don't need to be pressed and will keep for years once dried.

When back in the more comfortable and well equipped surroundings of the lab we made a final attempt at identification. Bryophyte identification is particularly fiddly work and involves removing the tiny leaves and looking at them under a microscope. If still unsure, we then called on the help of our colleagues in the Botany Department. We were also lucky to have the TCD Herbarium on our doorstep, containing pressed specimens of Irish plants and dried bryophytes for comparison. Our final port of call was to send specimens off to the recognised expert on that particular group of plants. We were delighted to recently have a moss species new to Co. Offaly, *Sphagnum girgensohnii*, confirmed by Dr Mark Hill. This moss was found in Sheskin, a 15 year old second rotation Sitka spruce plantation on relatively poorly drained peat (see photo). Of the hundreds of plants collected over the two years just a few remain unidentified and, once these are

identified, we can turn our attention to data analysis and start to see the fruits of all our hard work.



Orla Daly and Karen Moore keying out a sedge species in Woodburn Forest, Co. Antrim.



Sitka spruce plantation at Sheskin where the moss *Sphagnum girgensohnii* was found during biodiversity surveys.

GRANT AWARDED TO ANNE OXBROUGH

Dr. Anne Oxbrough, a post-doctoral researcher at UCC, has been awarded an INSPIRE International Mobility Fellowship grant by IRCSET to continue her forest invertebrate biodiversity research.

This grant will see Anne travelling to the University of Alberta for two years during 2010 and 2011 to work with Prof. John Spence where collaborative research will further our understanding of invertebrate biodiversity in mixed forest plantations. Anne will then return to UCC for the final year of this grant where she will continue her research on the PLANFORBIO programme.



Mammal Workshop

In the November 2009 a workshop will be held to determine the current state of knowledge on forest-occurring mammals in Ireland, with specialists invited from the research community as well as forestry practitioners, wildlife rangers, NGOs and other stakeholders. This will be held as part of the 2st All-Ireland Mammal Symposium (AIMS 2009) which will take place between 6-8 November at Waterford Institute of Technology (www.allirelandmammalsymposium.org).

Topics will include the following:

- Forest as a habitat for mammals;
- Mammals as a determinant of forest biodiversity (browsing/grazing);
- Mammals in the food chain a e.g. as prey and as predators;
- How current research seeks to address forest diversity and management.

The call for abstract for oral/poster presentations and registration is now open.

RHODODENDRON BIO - HERBICICE DEVELOPMENT AT WIT

- Eddie Daly



Eddie Daly with his poster at the COST action final workshop in Denmark, May 2009

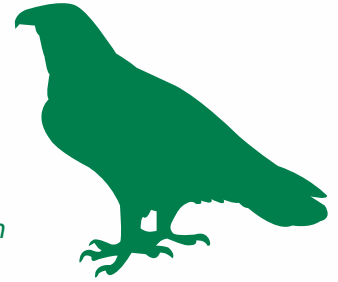
During the month of February we were joined by a plant pathologist from CABI UK (Centre for Agricultural Bioscience International). Dr Marion K. Seier provided training on methodologies to isolate and create a culture from a sample of a fungal fruiting body collected in the field. We attempted to locate *Chondrostereum*

purpureum (the fungus we will to use a bio-herbicide) in and around the forests of Waterford. Try as we might the wood rotting fungus proved quite elusive, apparently it prefers the autumn. Instead we used a more common fungus as an understudy so our guest could demonstrate the do's and don'ts of creating fungal cultures. We are now geared up and ready for the mushroom when will appear en mass in the autumn.

At the final COST action E47 (European Network for Forest Vegetation Management – Towards Environmental Sustainability (2005-2009) in Denmark, I presented a poster outlining the current project on rhodo control. The COST action conference provided a very interesting forum where foresters from across Europe (and beyond) discussed vegetation management. It was eye opening to learn how similar problems require almost completely different solutions depending on where one is located on the continent. I also got quite a shock when I learned that in its natural habitat *Rhododendron* is a protected species! Also present at the conference was a research group from the Finnish Forest Research Institute. They were almost finished a study into the bio-control of Birch using *Chondrostereum purpureum*. Results look promising – only 12.5 % of treated stumps were re-sprouting after two years. I hope to join the team in Finland in the autumn to see their work first hand.

FALCONRY PRACTICE

- Mark Wilson



In January 2009 Mark Wilson and Barry O'Mahony met with Jeremy Nicholson, a professional falconer. Jeremy keeps over two dozen falcons and other birds of prey at his home in Cappoquin, Co. Waterford, which he uses as part of his job, managing and advising on control of bird activity in and around airfields, dumps, sports grounds and other places where bird populations can cause problems. Jeremy had generously agreed to the use of his birds for trialling the harnesses that we hope to use for deploying GPS tags on wild Irish Hen Harriers in 2009. We will use these tags on adult male harriers to gather information about their foraging while providing for the young chicks and it is very important to find out as much as we can about our equipment and methods before using them in earnest, in order to minimise any negative effects they might have on this rare species. The bird we used for harness trials was a Harris Hawk, a species whose popularity with falconers has spread far beyond its native America, due to its intelligence and cooperative nature. We tested two types of harness on the day. The first was the breast-strap harness, which we had seen used on Harriers in Spain during a study visit their in 2007.



Jeremy Nicholson with a Harris Hawk trialling the GPS tag attachment for the Hen Harrier project

This type of harness secures the GPS unit to the back of the bird with a loop under each wing going from the front to the back of the unit, the two loops being joined by a strap across the breast. The second harness was a leg-loop harness described in a paper published in the early '90s. This holds the GPS unit in place with two loops, one around the inside of each thigh. The three aspects of harness function we wanted to test were their effectiveness in holding the GPS unit on the back of the bird, the ability of the bird to move around and fly with the harness,

and the ease with which the harness released from the bird when broken at a predetermined position. Both types performed satisfactorily with regard to the first two functions, holding the tag securely in place while still allowing Harry the Harris Hawk to fly.

However, when it came to releasing from the bird after breaking, the breast-strap harness typically became stuck around the pectoral muscle or the tops of the bird's thighs. The performance of the leg-loop harness was far superior, harness and unit sliding cleanly off the bird's legs. When we deploy GPS units on adult males this summer, we will therefore use leg-loop harnesses – and we owe a debt of thanks to Jeremy for enabling our decision to be so well-informed.

FOREST INVERTEBRATE SAMPLING AND IDENTIFICATION

- Anne Oxbrough & Rebecca Martin

As part of the FORESTBIO project the diversity of a wide range of invertebrate taxa are being investigated, from ground-dwelling spiders to moths associated with native woodlands and aphids from the forest canopy. Invertebrates are a vital part of all terrestrial ecosystems: they fulfil important functional roles such as nutrient cycling and pollination, and act as a food source for other groups of organisms such as birds and mammals. In addition, predatory species are useful as 'biocontrol agents', regulating pest populations in agro-forest ecosystems. Invertebrates are usually sampled over the summer months when their diversity is at its highest, and a range of methods are employed: for moths identification is carried out in the field, when the researcher returns early in the morning to a light trap that has been left out over night. For other groups of invertebrates such as spiders and beetles samples are collected in the field using pitfall traps or canopy fogging techniques and identification is carried out later in the laboratory.

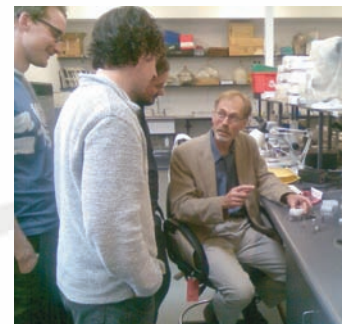
The FORESTBIO project currently employs a team of six entomologists. Anne Oxbrough, a postdoctoral researcher, and Tad Kirakowski, a research assistant, are currently sorting pitfall trap samples to remove spiders and Carabid beetles which will be identified to species level. Erkki Palmu is identifying Carabid beetles from a range of unplanted habitats and five year old Sitka spruce plantations to assess the influence of the initial stages of afforestation on these invertebrates. Patrick Smiddy has just completed spring sampling of moths. Rebecca Martin, a postgraduate researcher, and Eoin O'Callaghan, a research assistant, are sorting invertebrates from canopy fogging samples such as spiders, beetles, harvestmen, mites and aphids. Many of these will be identified to species level. The FORESTBIO project is also involved in working with undergraduate students, who will complete various tasks during six week bursary projects and honours research projects over the summer. Such tasks

include measuring size classes of aphids sampled from the forest canopy. This will give valuable information on invertebrate biomass in the canopy, which is particularly important as a food source for birds.

Specialist taxonomic training is required to identify many invertebrate groups to species level and such skills are essential to the successful completion of the FORESTBIO project. In February Rebecca Martin travelled to the British Entomological and Natural History Society (BENHS) in Berkshire, UK to take part in an identification workshop on a family of beetles known as Staphylinidae (Rove beetles). The workshop was lead by Dr. Roger Booth, Chief Entomologist for the Natural History Museum, London. This diverse family of beetles are both active predators and detritivores (feed on dead/decaying matter), and exploit a variety of forest habitats, including ground litter, deadwood and the tree canopies. Staphylinids are identified under the microscope using a range of morphological features such as shape and sculpture of the abdomen and thorax, among others. Typically, identification keys are used, however, this can be difficult for some of the rarer genera, because of their small size, the majority of which are less than 5mm in length.



FORESTBIO project entomologist Tad Kirakowski sorting spiders and beetles from pitfall traps samples in the lab.



Visiting academic Pete Smithers of Plymouth University, UK, showing Forestbio project entomologists Eoin O'Callaghan, Tad Kirakowski and Erkki Palmu beetle pinning techniques.

USE OF LASER SCANNING IN BIODIVERSITY ASSESSMENT

- Steven Keady

As described in our previous newsletter, the FORESTBIO project secured EPA funding for research concerned with the application of terrestrial laser scanning as a tool for the assessment of forest biodiversity. In a general sense, this research will apply the science of ecology to a real world question in the interest of sustainable forest management. In January 2009 the PLANFORBIO team welcomed Steven Keady BSc., MSc., to work on this research project. Steven's background is in computer science.

The environmental technology being investigated is the laser scanner, a piece of equipment that (in sequence) emits laser light (intense, of one colour and directional) in nearly all directions and reads the resulting reflection of that light. Laser light has been used for years for purposes such as dance floor illumination, movie production, video disc access and is widely used architectural, engineering and industrial measurement. Remote sensing is method of acquiring information about vegetation using a device that is not in physical contact with the subject. It has previously been applied in forestry in the form of airborne LIDAR (Light Detection and Ranging) to study leaf area, canopy heights and take biomass measurements. Terrestrial laser scanning is currently employed by an Irish software company (TreeMetrics Ltd.) who developed it for use in the accurate measurement of tree volume prior to harvest.

A laser scanner captures detailed, three-dimensional information about its immediate environment/scene and the objects within it. In the context of this research, the scene is an area of a forest and typical objects are trees, plants and terrain. The resulting data is a collection of geometrical points describing the surfaces of the scene, which can be used to extrapolate the shape of the objects in the scene or to measure quantity and structure. To understand and interpret the data, it can be visualized and manipulated using computer graphics.

Our research will determine whether terrestrial laser scanning can be used to efficiently analyse biodiversity indicators in forest structure. Conclusions from Steven's research could advise policy on the targeting of laser scanning as an additional tool to develop for use in the efficient assessment of biodiversity. Efficient biological diversity assessment informs management decisions and policy that affect preservation of species diversity and best practices for sustainable management. Thus, it directly and indirectly impacts the achievement of various ecological, social and economic goals. Planning and carrying out fieldwork took centre stage for Steven in spring 2009. The goal was to capture information about native woodlands in leaf free condition. These sites will be re-surveyed during the summer of 2009 when the trees are in leaf, together with a number of Sitka spruce plantations.

BIRDS OF SECOND ROTATION PLANTATIONS

One of the main aims of the ornithology surveys of reforestation sites conducted by Oisín Sweeney on the FORESTBIO programme during the summer of 2007 was to assess the bird communities of second rotation Sitka spruce plantations in Ireland, and compare them with those of first rotation plantations surveyed during the earlier BIOFOREST project. This work was conducted at 20 plantations throughout Ireland and Oisín has recently completed the analysis of this data, which revealed little difference between the bird communities of first and second rotation plantations. No difference in species richness was detected at any of the four growth stages under investigation (pre-thicket, thicket, mid-rotation and mature). Both overall bird density and migrant bird density were higher in the second rotation in the pre-thicket stage (5 years), but similar during all later growth stages. A small

number of common species, some migrants and species of conservation concern, were present at higher densities early in the second rotation than in first rotation forests and these higher densities were related to different vegetation conditions. This suggests that the future increase of second rotation plantations will benefit bird communities up to the point of canopy closure. While the number of bird species recorded was comparable both between age classes and rotations the majority were present at low density. This pattern was particularly pronounced in the later stages of the forest cycle. Management targeted at this stage of the forest cycle and aiming to increase habitat heterogeneity, in particular shrub cover, may help to decrease the dominance of a small number of species and enable plantations to benefit a wider range of species.

BIRD FIELDWORK ENDS IN WINTER SUNSHINE

- Oisín Sweeney

The Irish weather proved its unpredictable nature by delivering a winter 2008/09 vastly more sunny than the summer of 2008! Welly-warmers, hat, gloves and five layers were essential garb though, as January produced some bitterly cold mornings. Still, it was a pleasant change to get a consistent spell of good weather that allowed a run of bird surveys!

The 2009 winter fieldwork for the FORESTBIO bird project involved repeat surveys of 18 of the 30 forests that were surveyed in the breeding season. Three mixed plantations of Scots pine and Norway spruce and Oak and Norway spruce, six stands of pure Norway spruce and three Oak and Ash native forests were surveyed twice, using the same points as during the breeding season.

Winter is the most difficult time of the year for birds, when cold snaps and food shortages can kill many individuals – particularly vulnerable are the young from the previous breeding season. This is why, despite the difficulties in conducting surveys, it is extremely important to attempt to evaluate the importance of different habitats for birds in winter. It will be very interesting to see whether species richness and bird density differ between the plantations and native forests in winter, and whether the winter bird communities contained in the different forests mirror those of the breeding season or whether communities change between seasons.

However, winter bird surveys pose other challenges beyond simply keeping warm! Many bird species do not sing or display in winter (with the notable exception of the Robin who happily sings right through the year) which makes detecting them difficult. This is particularly pronounced in evergreen forests as the dense needles can conceal birds well. Birds also tend to join flocks to increase their foraging efficiency, and this makes them more patchily distributed than when they are holding territories in the breeding season. These factors explain why the volume of literature addressing winter bird populations is tiny compared to the number of studies carried out in the breeding season. Our knowledge of winter bird communities therefore needs to be improved, and studies such as this will help in this regard.



Uragh Co. Kerry Native Oak Woodland Co. Kerry



DmoreNative Ash Woodland Dromore Co. Clare

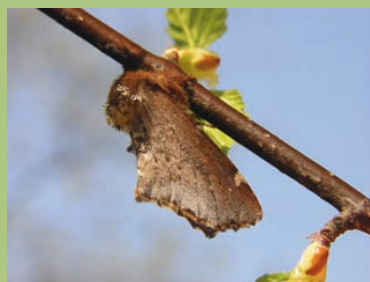
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Trinity College Dublin
PI: Dr. Daniel Kelly

Waterford Institute of Technology
PI: Dr. Nick McCarthy

Coillte
PI: Mr. Mick Keane



Scarce Prominent *Odontotia Carmelita* (Photo courtesy of Biopix.dk JC Schou)

NEW FACES

We are delighted to welcome a number of new people to the PLANFORBIO team this summer. Paul Troake and Barry Ryan have both joined the HEN HARRIER project for the summer to assist with fieldwork. They will be looking for Hen Harrier nests through the early part of the breeding season, and then gathering data on breeding success at these nests in the later stages. They will also be involved in data collection using GPS tagging, nest cameras and wing tagging of young chicks later in the season.

Steven Keady joined the FORESTBIO team at UCC in January to work on the EPA funded Masters project on terrestrial laser scanning at a number of FORESTBIO sites. Steven is a graduate of University College Cork with a BSc in Computer Science and an MSc in Multimedia Technology. Erkki Palmu also joined the team at UCC on an Erasmus placement from Lund University in Sweden. Erkki will be working with the FORESTBIO team at UCC examining ground beetles collected during BIOFOREST with a view to preparing a report on the effects of afforestation on Carabid beetles in peatlands and grasslands in Ireland for his Masters.

A number of temporary staff also joined the FORESTBIO team during the current reporting period. Following the resignation of Veronica French who worked exclusively on the lepidoptera section of the project, the lepidoptera fieldwork was completed by Mr. Pat Smiddy during March and April 2009. Tadeusz Kirakowski and Eoin O'Callaghan both joined the team at UCC to assist with lab work on invertebrates collected using both pitfall traps and canopy fogging. The newest member of this team in the lab is Rob Deady who will undertake a summer bursary during June and July. Rob is a recent graduate of UCC with a keen interest in terrestrial invertebrate ecology. This represents significant capacity building for taxonomic work which is one of the 91 actions of Ireland's National Biodiversity Plan.

MOTH DIVERSITY SURVEYS

- Pat Smiddy

In summer and autumn of 2008 Veronica French conducted a moth-trapping survey of woodland sites across Ireland, north and south, as part of the PLANFORBIO research programme. The intention was to continue the survey in spring 2009 in order to obtain a profile of the species present in these woods at that early season. However, Veronica decided to migrate to a sunnier climate 'down-under', and I was asked to fill the gap in the spring surveying.

Beginning in late March and finishing at the end of April, I spent of 18 days in the field surveying in 11 counties, including three in Northern Ireland. I logged a total of 36 trap nights during the survey. The weather could have been kinder, but I managed to avoid the worst of the frequent rain and the lowest of the temperatures. Since all of the trapping was done in relatively sheltered woodland, weather conditions were somewhat better at the trapping sites than in the open country. I clocked up visits to all but three of the 32 counties of Ireland (Galway, Mayo and Donegal were the odd ones out) during surveying or while travelling to survey sites.

A total of 389 moths (plus 12 micros) of 32 species were trapped during the

survey. Only at one trap was nothing caught, and the catch at the other 35 traps ranged from just one moth to 71 individuals. Tomnafinnoge Wood (Wicklow) was the most interesting and most productive site where two traps produced 113 moths of 22 species.

For me the most interesting species were Scarce Prominent (11), Brindled Beauty (6) and Lesser Swallow Prominent, Red Sword-grass, Pine Beauty and Nut-tree Tussock (one each). In fact the Scarce Prominent was the most significant catch as I believe it is genuinely a scarce species in Ireland, but one that may be increasing. All the other species captured and identified were ones that would be expected to be flying during March and April. Only one of the moths captured was killed, and this happened by accident. A single Common Quaker was found squashed under the lip of the cover of one of the traps. Otherwise, all moths were released into vegetation or were placed on tree trunks at the site of capture.

Overall, it was an enjoyable experience, and I thank Ken Bond for allowing me to 'pick his brains', and Sandra Irwin, Anne Oxbrough, Veronica French and John O'Halloran for their support during the project.

FOR FURTHER INFORMATION

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