PLANFORBIO NEWS

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WELCOME

This is the fourth newsletter of the PLANFORBIO research programme, published twice each year and provides an update on current activities of the project to team members, stakeholders, policy makers and members of the public. PLANFORBIO is a six year research programme, funded by COFORD, aimed at providing the forest industry with information to maximise forest return while enhancing biodiversity and promoting sustainable forest development. It encompasses four individual resarch projects on plant and animal biodiversity in Irish forests (FORESTBIO), conservation of the Hen Harrier (HENHARRIER) and control of Rhododendron (RHODO).

The summer of 2008 has seen the second very succesfull field seasons on the FORESTBIO and HENHARRIER projects and the initiation of the RHODO project, based at Waterford Institute of Technology. Many researchers on the FORESTBIO project completed their biodiversity surveys of Irish forests during 2008, while those on the HENHARRIER project made the first attempts at using new technologies such as nest cameras and GPS tags to answer their reserach questions. The FORESTBIO project too is exploiting new environmental technologies having recetnly secured funding for the inclusion of a terrestrial laser scanning component in their research.

2008 FORESTBIO FIELD WORK ROUND UP

The FORESTBIO team have completed another successful summer of field sampling at sites throughout Ireland and although detailed data analysis will be conducted during the coming years some interesting findings are apparent. For example, it seems that ash woods have a higher vegetation diversity than oak dominated woods especially Greenaun, Carrickbreeny and Gole woods which, interestingly, are all in the North West. Poorer oak sites appear to have a ground flora dominated by wood rush. The findings of Orla Daly's Masters at TCD suggest that oak plated with Norway spruce may have a greater influence on ground flora diversity than Scots pine planted with Norway spruce.

The moth and butterfly survey found that species diversity was highest at the native woods with many species identified as specialist feeders, particularly in oak. Autumn sampling revealed that there are different species active than during the summer months. An interesting find was the Clouded Magpie in Rostrevor, Co. Down, an oak wood. This species feeds on elm trees and has been rare in Ireland since the occurrence of Dutch elm disease. Canopy fogging was very productive this year and 18 sites in total were surveyed. A new species of spider to Ireland was discovered during canopy fogging and lab work on the samples collected using the fogging technique is now underway and hopefully there will be several more exciting finds.

Ground-dwelling spiders and beetles were trapped this summer using pitfalls with no significant trap losses. Several sites from the 2007 reforestation surveys were also re-sampled this summer as they had suffered extensive trap loss to animal disturbance. Two different techniques were employed to prevent animal disturbance at these sites: traps were protected from deer disturbance using wire mesh square boxes placed over the top of each trap and held in place by plastic tent pegs. The boxes were approximately 15x15cm in size and had a mesh size of 3cm to allow ground dwelling invertebrates to enter the box and traps were protected from badger disturbance using wire mesh square 'roofs' of 30x30cm in size which were placed above each pitfall trap. They were suspended 5cm above the ground by plastic tent pegs attached to each corner of the roof. The six wire mesh roofs within each plot were connected to one battery unit using electric fence cord to deter the badgers. In each case these measures were successful at deterring mammal disturbance at these sites. Further information kamoor@tcd.ie

INVASIVE WEEDS AND BIO-CONTROL

The RHODO project got underway in September of this year with the recruitment of Eddie Daly as PhD student on that project. Eddie's PhD will investigate the control of Rhododendron in Ireland. Rhododendron is an invasive species that out-competes many of our native plants and currently there is no reliable control method. In stable ecosystems harmony exists in the use of resources by co-existing flora and fauna. However, a small percentage of introduced species find a gap in their new habitat which they exploit to become established.

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CANOPY FOGGING UNCOVERS NEW SPECIES OF MONEY SPIDER

A new species of spider to Ireland was found this summer during a canopy fogging survey at a native woodland. One male and one female of Entelecara acuminata (Wider, 1834) were captured at Brownstown Wood in Co. Kilkenny. This native Oak woodland is located on brown, gley soils with medium to good drainage and has a canopy dominated by Oak with a Holly and Hazel understorey and a Bilberry/Wood Rush field layer. E. acuminata is a small brown spider from the Linyphiidae family, commonly known as money spiders, usually found on bushes and low trees. It is locally common but patchily distributed in southern England, rarer in northern England and has occasionally been recorded in Scotland, but never before in Ireland. However, it may have previously been unrecognised or under-sampled in Ireland due to its arboreal lifestyle and small size (1.8-2.4mm). The use of the new canopy fogging method for invertebrate surveys on this project may have been directly responsible for its discovery now. Although a labour intensive and often difficult method for surveying invertebrates in forest canopies, thermal fogging does offer a unique tool for the assessment of life in our forest canopies.
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<continued from pg. 1>Rhododendron is a native to Iberia that found a gap in Ireland and has successfully exploited it. Introduced here in the late 18th century, rhododendron has become one of Ireland's most insidious invasive plants. Cherished by many gardeners for its colourful flowers, rhododendron, once established at a site, kills the ground layer and smothers the regeneration of trees and other plants that were present before. Rhododendron invades several Annex 1 habitats in Ireland listed under the EU Habitats Directive and successful control of the invasive rhododendron is required to maintain these habitats in 'favourable conservation status' particularly where these are contained within the NATURA 2000 Special Area of Conservation. Traditional methods of vegetation clearance (manual clearance, herbicide application) are currently used to combat rhododendron. However these methods are generally economically prohibitive and rhododendron is only removed from intensively managed sites. Where rhododendron establishes itself on marginal, unproductive land it is left to its own devices, exacerbating the re-invasion problem. Couple that with the various governmental and industry issued codes of best practice's on reducing the use of herbicides, the future for the management of rhododendron looks difficult. A potential solution is to incorporate biological control into the management of rhododendron. This approach makes use of the invasive plant's naturally occurring enemies to help reduce the invasive plant's impact. During 2009 the RHODO project team at WIT with the assistance of the Centre for Agricultural Bioscience International in the UK (CABI) will begin isolating the fungus Chondrostereum purpureum for possible use as a mycoherbicide to combat rhododendron. Such biological control is a long-term solution which is most effective as part of an integrated weed management approach and not as a replacement for banned herbicides. Coupled with the investigation of the bioherbicide, the RHODO team will be assessing the eco-physiology of the species with the view to providing a holistic management tool incorporating both bio-control and re-invasion prevention.

INTERNATIONAL FOREST BIODIVERSITY CONFERENCE

In August Anne Oxbrough travelled to British Columbia to deliver a presentation at a conference organised by the International Union of Forest Research Organisations (IUFRO) on 'Biodiversity in forest ecosystems and landscapes'. The conference was held at Thompson Rivers University in Kamloops approximately 200 miles west of the Rockies in a mountainous region of British Columbia which is host to a diverse range of forest types. The conference was attended by over 120 participants from 21 countries and a diverse array of topics were covered including issues related to managed and native forests in both temperate to tropical biomes, and taxonomic groups including mycorrizhae, invertebrates, birds, and mammals. The conference included 3 days of talks and a poster session. Anne's talk was entitled: 'Biodiversity indicators of ground-dwelling spiders in Irish plantation forests and native woodlands' and described some preliminary FORESTBIO findings making some initial comparisons with data from the BIOFOREST project.

Close up of the galleries made by the Mountain pine beetle (width of branch = 5cm).

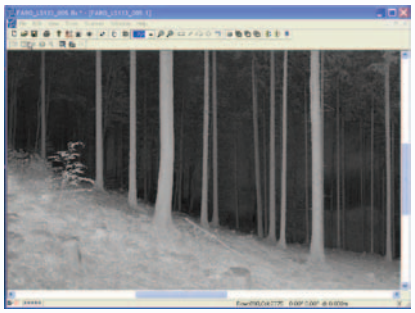
Delegates were also treated to two field trips which explored the local forest types and gave time for informal discussions on local issues surrounding forest biodiversity. The first began with a visit to a Ponderosa pine dominated area in the Tranquille Ecological Reserve of Dewdrop Valley which has extensively damaged pine trees at all altitudes in the area (Figure 1). This was followed by a short trip to the Lac du Bois dry grassland above the Thompson rivers valley where we saw the famous black bear! We then travelled to a Lodgepole pine area which has been severely affected by the Mountain pine beetle. In some areas of British Columbia around 95% of the trees have been lost and in 2007 alone over 10 million hectares were affected. Dead trees remain viable for harvest up to two years post-mortem, and there is much debate on how best to deal with these dead trees. Public opinion and that of many timber companies is that the discoloured trees look unsightly and should be harvested. On the other hand, ecologists and conservationists are concerned at the influence such a large scale forest clearance will have on the trees' ability to regenerate, and also on forest associated flora and fauna.

Ponderosa pine stands: Dr Andre Arsenault (BC Ministry of Forests and Range) describing the prescribed burning regime of Ponderosa pine stands in the semi arid habitat. Discoloured trees killed by the Mountain pine beetle attack are visible in the background.

The second field trip took us to the higher altitude Sicamous Creek Sivicultural Systems Project area approximately 150m miles west of Kamloops where the forests are typically under snow for five months of each year. The dominant tree species are Englemann spruce and Sub alpine fir. The Sicamous Creek project is a long term experiment set up in 1992 and forecast to run for an entire forest rotation (~ 100 years) which examines the influence of various harvest regimes on forest flora and fauna. The experiments treatments test the effect harvest type (no harvest, single-tree selection, or clear cut) on various patch sizes and configuration (0.1ha, 1 ha and 10 ha). Approximately every five years plants, invertebrates, mammals and birds are surveyed. In addition to this soil biota and chemistry were examined. Further information: a.oxbrough@ucc.ie

TERRESTRIAL LASER SCANNING

The FORESTBIO project has secured funding for a research Masters to work on terrestrial laser scanning under the EPA STRIVE Programme 2007-2013. This research is concerned with the application of terrestrial laser scanning as a tool in the assessment of forests for biodiversity. Terrestrial Laser Scanning has been developed to capture detailed, three-dimensional information about an object's dimensions, spatial positioning, texture and colour and is widely used in architectural, engineering and industrial measurement. In recent years it has been adapted for use in the forest industry where it is used for taking measurements from standing timber to inform optimal harvest and reduce waste. These measurements would previously have been obtained through manual field surveys but can be gathered much more efficiently and at much higher levels of accuracy using laser scanning. An Irish company, TreeMetrics Ltd., who are a project partner, have developed a fully automated laser scanning system for pre-harvest timber measurement.



Three dimensional image produced using terrestrial laser scanning

The data collected using laser scanning has a wide range of potential applications in forests outside those concerned with timber production including monitoring of carbon sequestration, and the measurement of structural characteristics of forest stands related to biodiversity. At present the data yield is limited only by the availability of algorithms for filtering the enormous quantity of data produced. These are being further developed on an ongoing basis by TreeMetrics Ltd., and this project will advance this field in the direction of data collection for biodiversity assessment applications.

TRAINING IN STATISTICAL ANALYSIS

Eight members of the PLANFORBIO team gathered at UCC for a week in mid September to attend a course on "Mixed Modelling, Generalized Linear Mixed Models (GLMM) and Generalized Additive Mixed Models (GAMM)". They were joined by other PhD and Masters students and departmental staff from UCC, as well as a representatives from BirdWatch Ireland. The course was taught by Alain Zuur and Elena Ieno of Highland Statistics (www.highstat.com) and built on what was learned at the course they previously taught to PLANFORBIO researchers on "The use of Generalized Linear Models (GLM) and General Additive Models (GAM) in Ecology" attended by a number of members in Cork in September 2007 and by others in Portugal in March of this year. This follow up course was essential for the PLANFORBIO team members, as most real life data sets require the use of mixed effects models.

PLANFORBIO researchers enjoy a weeks intense statisitcal training at UCC

While the analyses on the first course were done using the point and click software package, Brodgar, developed by the company and named after a stone circle in Orkney, analyses on the second course used R. R is a programming language and software environment for statistical computing and graphics which is free for download (http://www.r-project.org/). The majority of people on the course were new to R so using it was daunting at first, but everyone soon got used to it and got better at spotting the mistakes in the programming language that inevitably resulted in error messages. The pace of this course was slower than the previous one, much to everyone's relief. The course material was based around the book in press, on which Alain and Elena are co-authors, "Mixed effects models in ecology with R", which follows on from their previous publication "Analysing Ecological Data". All of the theory that was taught was backed up by real life ecological examples. The participants came away feeling better prepared to deal with their particular datasets. Now to put the theory into practice! Further information lcoote@tcd.ie

ORNITHOLOGICAL RESEARCH CONFERENCE

The fifth all-Ireland ornithological research conference was held at UCC on November 15th-16th hosted by the Department of Zoology, Ecology and Plant Science (ZEPS). Demand to speak on Saturday was unprecedented, with over 150 abstracts received for just 22 slots! A fascinating keynote address was given by John Quinn concerning the importance of predation not only to birds, but as an important consideration in species and habitat conservation, before delegates from all corners of Ireland delivered presentations on all things ornithological, from waders to wildfowl, passerines to predators. The PLANFORBIO programme was particularly well represented at this meeting, with both Mark Wilson and Barry O'Donoghue giving impressive presentations on the HENHARRIER project and Oisín Sweeney delivering the results of his first PhD chapter to rapturous applause. Particularly encouraging was the news that the Red Grouse population in Ireland may be larger than previously estimated, and the incredible re-colonisation of much of the country by Buzzards after recent near extinction.

That the delegates comprised not only scientists of world renown and conservation organisations such as BirdWatch Ireland and the RSPB, but also students and interested members of the public, bodes extremely well for the future of ornithological research in Ireland. And although not all of the news was positive, with particular concern surrounding the plight of waders in the Shannon callows and the Twite, the body of expertise present at the conference gives hope that measures can be taken to halt and reverse the declines of those species before they become rare or worse, extinct. Further information o.sweeney@ucc.ie

John O'Halloran and Tom Kelly (UCC) making a presentation to John Wilson (NPWS) on the occasion of his retirement.

NEST CAM NEWS

For the first time this year, cameras were installed at Hen Harrier nests, gather information on parental behaviour at the nest, which can be difficult to observe directly. Our aim is to investigate how brooding, incubation and provisioning behaviour of breeding Hen Harriers affect nestling development and fledging success, and to investigate the influence of weather and habitat on these aspects of parental care. However, cameras have also revealed more unusual behaviours that have not previously been recorded in this species, but which nevertheless improve our understanding of Hen Harrier ecology.

Pictures from one nest clearly show an adult male plucking a dead chick at least three days after the chicks at the nest had died. Instances of nestlings eating their dead siblings have previously been recorded in this species, but we are not aware of any reported instances of dead harrier nestlings being eaten by one of their parents. In many species of raptors, it is the exception rather than the rule for all the chicks in a nest to fledge successfully. In fact, in many of the larger raptor species, siblicide of the youngest chick by the eldest is a near-obligate behaviour known as 'cainism'. In Hen Harriers, reduction in brood size between hatching and fledging is a commonly-observed phenomenon, but previous studies have not found that aggression between nestlings is common, or that death of nestlings is caused by siblicide rather than alternative factors such as starvation or predation. At one of the nests where a camera was installed this year, a series of pictures shows a brood of 3 fortnight-old chicks responding to the arrival of their mother with food. One chick, apparently accidentally, steps on the head of its sibling which does not move again subsequently. As far as we know, this is the first direct evidence of siblicide in Hen Harriers. Finally, one camera yielded useful information about a predation event. At one of the nests that failed this year, pictures taken by the camera clearly reveal the predator to be a fox. Several (though not all) studies have found a link between visits to bird nests and nest predation, suggesting that some predators may follow tracks or scent trails left by fieldworkers. However, at this nest the fox is shown to have gained access to the nest via a different route from that taken by fieldworkers when the camera was installed. Further information mark.wilson@ucc.ie

Evidence of predation by a fox at a Hen Harrier nest.

PROJECT PARTNERS

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Coillte
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SOJOURN IN THE ALPS

During September Rebecca Martin and Veronica French attended a two week summer school on 'Modern Taxonomy and Fieldwork' in the glorious setting of the French/Italian Alpine nature reserves of Mercantour and Alpi Marittime. This was hosted by EDIT (European Distributed Institute of Taxonomy) to train students in "Best Practice" of field sampling and various aspects of taxonomic research relevant to biodiversity and conservation biology research, and both were successful in securing a full grant for their trip. Their time was divided between the two nature reserves, with the first week spent in Alpi Marittime in Italy and the second in Mercantour, France. The course included lectures on taxonomy, tracing its origins from first appearances in both the Western and Eastern world through to modern taxonomy which started when the famous Swedish botanist Carl Linnaeus devised the binomial system for naming flora and fauna in the 18th century. The current state of taxonomy was discussed and in particular the challenge of the 'taxonomic impediment' which encompasses the extent of both undiscovered and undescribed species, added to the challenge of biodiversity loss. Information was also provided on the recently established 'All Taxa Biodiversity Inventory and Monitoring' project that is taking place in the Mercantour and Alpi Marittime nature reserves which aims to record, identify, and document the entire biodiversity of particular areas within the nature reserves and one of the intended outcomes is that the information will be used to form the basis for monitoring biodiversity changes over time. Time was also available for cultural experiences and sightseeing of the area. One of their days off was spent going for a long hike in the Alps and taking part in a guided tour around a museum in the town of Tende that gave an account of the cultural history of Mercantour, including the Vallee de Merveilles (Valley of Wonders), a sacred site containing many engravings dating from the Bronze Age, which is currently under consideration for designation as a World Heritage Site by UNESCO. In Italy the local town was holding its 'Miss Potato 2008' competition but unfortunately neither of the girls qualified. Further information v.french@ucc.ie

Rebecca Martin carrying out bioacoustic sampling

Veronica French pinning bees at the EDIT Summer School.

ENVIRON 2009 FIRST ANNOUNCEMENT

The 19th Irish Environmental Researchers' Colloquium will take place at Waterford Institute of Technology from Wed 18th to Fri 20th of February 2009. Environ 09 will be jointly hosted by Waterford Institute of Technology and Teagasc, Johnstown Castle. Registration and abstract submission opens online on December 1st at www.esaiweb.org. Abstracts are invited from all areas of Environmental Sciences and the deadline for abstract submission 15th January 2009. Further information: Laura.Kirwan@teagasc.ie

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